RESEARCHREPORT

ANIMAL WELFARE

Title: Perceptions among college students about food safety and animal care and ethics in food animal production. Implications for veterinary medicine and the swine industry. – **NPB# 99-137**

Investigator: Lennart Backstrom, DVM PhD

Institution: University of Wisconsin

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I. ABSTRACT:

This project presents the results of a college student survey regarding opinions about utilization of animals in medical research, food and byproducts, farm-thru-slaughter food safety issues, food animal production methods and routine surgical procedures, as well as animal wellbeing and ethics in animal agriculture.

The survey was conducted from October 1999 to March 2000. It totaled 2377 college students distributed on 1373 veterinary students at 6 US universities and student chapter members of the AASP (Amer. Assn. of Swine Practitioners), plus one veterinary school in each of Canada, Mexico, UK, Belgium, Germany, Denmark, Sweden, Taiwan, Thailand, two schools in Australia, and 3 schools in Japan. At the 6 US universities, 489 animal science and 515 non-ag students (sociology course) were also surveyed similarly.

Results varied greatly between the US veterinary schools and between college majors at the same universities. Among US veterinary students, species interest (companion animals vs food animals) was strongly correlated to student opinions , with companion animal oriented students being much more critical about animal agriculture systems and practices. Overall, “companion animal students” were similarly or even more critical than non-ag college students, while “food animal students”, in particular “AASP” students, were similarly or even more positive about animal agriculture than students majoring in animal sciences. The impact of species interest on student opinions was much less pronounced among veterinary students in the other countries.

Overall, veterinary students in the EU schools were more critical about food animal production systems and practices than veterinary students surveyed in Canada, Australia and Japan, and those students were more critical than the US students. The veterinary students in Thailand, Taiwan and Mexico were the most supportive of animal agriculture systems and practices.

Faculty resources and programs on specific swine topics varied greatly between veterinary schools in the USA. Seven of 27 schools funded swine programs with more than one full-time (FTE) faculty, five with one FTE, and 17 with less than one FTE or no swine faculty at all. Similarly, core and elective courses varied greatly. Overall, swine

programs were funded by more faculty and teaching resources in the international schools.

II. INTRODUCTION:

Food animal production, not least the swine industry, has come under increasingly negative public critique for *de facto* or perceived deficiencies regarding production ethics, animal care, and pre-harvest food safety. The use of animals in medical research is another critical issue. Recent pilot surveys of veterinary students at the University of Wisconsin indicated similar critique, in particular among companion animal oriented students, who now represent the vast majority of students in American schools. .This may cause some alarm in animal agriculture since these students as veterinarians will work much more closely with the general public and concerned animal owners than food animal veterinarians, and they may have a greater impact on public opinions on the above issues.

The findings raised several questions: Did the critique represent a local aberration, or did it reflect a national trend? How did the critique compare with students in other college majors and with veterinary students in other countries? Why was the critique stronger among "companion animal students" than "food animal students"? Do veterinary schools provide enough of faculty and teaching resources for students to understand why and how animal agriculture is evolving, and are student opinions utilized as a source of critical information to animal agriculture?

The following study aimed at bringing more extensive and in-depth information about the above questions, not only in veterinary schools in the USA but also in European and other international schools. For comparison, students in animal sciences and non-ag majors (introductory course in sociology were also surveyed at the same US universities as the veterinary students.

III. OBJECTIVES:

To determine the role on student opinions of

A. College major
B. Animal species interest;
C. Curricular tracking;
D. Importance of swine production in the area on
   a) human utilization of animals (medical research, food, byproducts);
   b) production systems and procedures in animal agriculture;
   c) farm-thru-slaughter food safety, and growth promoting feed additives;
   d) animal welfare and cross-species DVM curriculum.

IV. PROCEDURES:

College majors, Universities, Countries: All 3rd year students at the veterinary colleges of Washington State (WA), Iowa State (IA), Wisconsin (WI), New York Cornell (NY), Massachusetts Tufts (MA), and North Carolina State (NC) Universities were selected for the survey. In addition, all members of the student chapter of the AASP (Amer. Assn. of Swine practitioners) were surveyed. One class of junior or senior animal science students and one class of non-ag students (introduction to sociology) were also surveyed at the above six US universities. In addition, one comparable class of veterinary students was surveyed at each of the universities of Guelph (CAN), Nuevo Leon (MEXico), Bristol (UK), Ghent (BEL), erlin (GER), Copenhagen (DEN), Uppsala (SWE), Tottori, Gifo and Sapporo (JAPan), Sydney and Melbourne (AUS), Neipung (TAIWwan), and Bangkok (THAiland).

The **Questionnaire** included 7 parts with a total of 18 questions and 70 sub-questions:**1. Pre-college experience of farm work and pet ownership; 2: Species and career interest; 3. Utilization of animals in medical research, food, and byproducts; 4. Food animal housing systems (confinement vs. pen/pasture) and swine industry trends; 5. Routine surgical procedures of both food and companion animals; 6. On-farm-thru- slaughter food safety, the use of growth promoting antibiotics, hormone implants and genetic engineering, and trustworthiness of information sources; and 7. Animal welfare and cross-species issues in the DVM curriculum.** The questionnaires for students in animal sciences and non-ag majors (introduction course to sociology) had the similar design, but omitting the questions about career and species interests.

Responses to the questions ranged from 1-5 with 1 = strong interest/support/very adequate; 2 = some interest/support; 3 = little interest/support/somewhat negative; 4 = no interest/support at all; 5 = no opinion/don't know. Questions about own consumption of food animal products were answered yes or no, and reasons for no were identified as ethics, religion, health, cost, or taste .

For **comparisons between college majors**, all pre-veterinary students were omitted from the animal science majors in order to establish a biased "true" animal science group. Similarly, all agriculture majors were omitted from the sociology students to create a biased group of "true" non-ag students.

For **comparisons of species interests between veterinary students**, students with strong interest (response 1) in dogs and/or cats and/or exotics were grouped as companion animal (CA) students, strong interest in horses as HO students, strong interest in dairy, beef, small ruminants, swine and /or poultry as food animal (FA) students, and students with strong cross-species interest in more than one of these blocks of species as MIX students (combinations of CA+HO; CA+FA; or HO+FA).

Schools and countries were then grouped in 4 blocks to provide sufficient numbers for statistical purposes and comparisons: One block for the US schools, one for the EU schools, one for Canada, Australia and Japan (CAJ), and one for Thailand, Taiwan and Mexico (TTM).

The **Design of student questionnaires, and methods and analysis of the survey** were based on several pilot studies at the University of Wisconsin School of Veterinary Medicine, which were carried out throughout the 1990s. The **UW Survey Research Laboratory** helped to finalize the design and print the questionnaires The Laboratory also performed the data entries and summarized the results with code-books of frequencies and chi-square cross-tabulations between college majors and species preferences, using the SPSS (Statistical Package of Social Sciences) system.

The **Student surveys were conducted from October of 1999 to March 2000**. To maximize response rates, questionnaires were mailed to collaborating faculty at each university, handed out and collected during a class session. All surveys were then mailed back to Madison for data entry and result analysis. Only one group of students, the "AASP" students, was surveyed by mail. The success of the survey would not have been achieved without the help by the 32 faculty who volunteered to carry out the survey in the USA and internationally. They are acknowledged in the attached IPVS abstract #I.

A **Faculty and teaching resources survey** of all participating veterinary schools plus all other veterinary schools in the USA was conducted in the summer of 2000. That questionnaire contained data about number of faculty/instructors and graduate students in the area of swine production and health, as well as the amount of specific swine topics in the core and elective DVM curriculum in the areas of husbandry, physical

examination, preventive and diagnostic medicine, theriogenology, internal medicine and surgery.

V. RESULTS:

Tabulated frequencies for each group of students, and summaries and cross-tabulations for impact of college major and species interest on opinions, were presented at the International Pig Veterinary Society Congress in Melbourne, Australia, 9/17-20, 2000. Those 8 abstracts have been updated and are attached to this report. In the following, some of these results are highlighted and expanded, in particular the impact of college major, species interest, individual schools and countries (see also Table 1). Survey results on faculty and teaching resources are also presented.

Response rates were high, 80-100%, for all groups of students except for one class in Australia and the mail surveyed AASP students where response rates were 50%. The **total number of completed surveys** by **veterinary students** was 1373, with 547 in the USA (WA 55, IA 91, WI 83, NY 71, MA 71, NC 59, AASP 59), and 476 in the EU countries (UK 52, BE 136, GE 156, DE 65, SW 58). For the other countries, surveys were completed as follows: CAN 60, MEX 60, JAP 90, TAIW 50, THA 85, and AUS 73 students.

The total number of 492 questionnaires completed by **animal science students (AS)** was equally distributed between the six US universities. That number was reduced 57% to 211, when all pre-veterinary students were omitted to create the block of "true" animal science students. Similarly, the total of 516 surveys, completed among **students in sociology courses (SS)** at the WA, IA, WI, MA, and NC universities, was reduced to 447 when ag major students were omitted to create the block of "true" **non-ag college students.**

Previous farm work experience was reported for a mean of 41% of the US vet students, 43% EU, 61% CAN, 20% AUS and JAP, 15% TTM and 75% for AASP students. Among the animal science students, 51% had work experience, and 9% among the non-ag students;

Pre-college **Ownership of pets** was common among most groups of students: dogs 75-95%, cats 40-85%, horses 20-57%, and other pets 50-80%. Horse ownership was rare among non-ag students and JAP, TAIW, and THA vet students.

Species interests (a great deal of interest, and some interest = questionnaire responses 1+2) among all veterinary student groups were dominated by companion animals, but various combinations of multiple species interests were also common. In the US schools, 94% reported strong or moderate interest in dogs, 85% cats, 61% horses, 60% wildlife, 57% exotic animals, 55% dairy/beef, 48% sheep/goat, 24% swine, 20% lab animals, and 15% in poultry. The interest in swine was similarly low in the CAJ schools but stronger (53-64%) in the EU and TTM schools. As expected, the percentage of positive responses (1+2) among AASP students was high for food animals; 92% for both bovine and swine. But similarly to other students, AASP students also reported interest in dogs (75%), cats (53%), horse (59%), and sheep/goat (71%). CA students indicated much less interest in swine.

When grouped by strong interest only (response 1), a dominance of companion animal interest was evident among the veterinary students in the USA and CAJ schools, while mixed species interests dominated in the EU and TTM schools.:

Species preference	CA	HO	FA	MIX (CA+HO)+(CA+FA)+(HO+FA)
USA	50%	2%	9%	38% of all students
CAJ	45	5	4	46 "
EU	22	8	6	64 "
TTM	26	1	9	64 "

CA students at the US schools were generally more critical about the issues identified in the survey than FA students and AASP students. Such differences were much less obvious in the other blocks of schools (see below "Impact of species interest…").

Career interests were strongly dominated by veterinary practice in all countries (85-95%). In addition, Academia/research was favored by 42-52% of the students, Diagnostic medicine (33-52%), Public health/epidemiology (22-39%), and pharmaceutical industry (18-54%).

Utilization of animals in medical research, food, and byproducts:

The support for utilization of animals varied markedly between schools, college majors, and species preference. The support (responses 1+2) for use of animals in medical research varied from 61% in Berlin Germany to 100% in NC, USA. Only 1-3% of all students were totally opposed to the use of animals in research, but a fairly large segment of students in several schools, in particular CA students and non-ag sociology (SS) students, were somewhat critical (response 3) (Table 1). Similar results were found for the use of animals for food and byproducts.

Overall, meats of veal and sheep were less consumed than pork, beef, poultry, and fish. About 10% of veterinary students in the USA, EU, and Australia, and 5% of the Canadian students were lacto-vegetarians. In contrast, almost all TTM students were meat eaters. Again, strong differences were found between CA and FA veterinary students and between AS and SS students in the USA (Table 1).

Production methods, conditions, and surgical procedures for food animals:

This section included three questions. The first asked **"How adequate do you think the current husbandry and housing conditions in your country are for 1. Dairy cows; a) stanchion barns; b) loose housing; 2. Beef; a) feedlot; b) free range; 3. Veal; 4. Swine; a) stall/crate confinement; b) loose in pens/ pasture; 5. Lay hens; cages; b) free range; and 6. Broilers?"** Each option of housing method was to be answered separately of each other. For instance, the same student could be supportive of both dairy stanchions and loose housing, or both sow stalls and pasture.

For several of the student groups, in particular SS and CA students, the number of "don't know" responses was high (50-70%). However, among almost all students with an opinion, the support for less confined housing systems was greater than for stanchions, stalls, crates, and cages. This was particularly true for the EU and Australian students, as well as CA and SS students in the USA. Even AS, FA and AASP students were generally more supportive of loose/free range/pasture housings than strict confinement (Table 1). The only exceptions from that rule were found among veterinary students in the TTM block of schools.

The second question in this segment asked **"In general, do you support or oppose the present changes of the swine industry to fewer but much larger herds and intensive production systems?"** Similarly, as for the questions about confined systems, TTM veterinary students were more supportive than all other groups, while the support was very low in the EU schools, Japanese, and Australian schools (IPVS

abstract #IV). Overall, the support was also low in the US veterinary schools, including the ISU, Ames IA (only 12% responses 1+2). Only 38% of the FA students. 58% of the AASP students, and 47% of the AS students held similarly positive opinions (Table 1).

The third question asked **"How much do you support or oppose the following common surgical procedures performed on animals in many countries: Castration of pigs, lambs and calves; Tail docking of pigs, lambs, dairy cows, and dogs; De-horning of cows; Ear-cropping of dogs; and De-clawing of cats".** For most of these questions there were great differences between groups of students with most of the support (responses 1+2) coming from the TTM veterinary students and the FA, AASP, and AS students in the USA. For pig castrations the mean support frequencies were 72% among veterinary students in the USA, 54% EU, 50% Canada, and 48% in Australia. The support frequencies for tail docking of pigs in the same groups of students were, respectively, 65%, 27%, 74%, and 54%. The support for tail-docking of lambs was high among veterinary students in the USA and Australia, but low for tail-docking of dairy cows in Australia. The support for ear cropping and tail-docking of dogs was generally low among CA and SS students compared to AS, FA and AASP students (Table 1). One exception was the 56% support for de-clawing of cats among the SS students. Overall, EU, Japanese and Australian veterinary students were quite strongly opposed to most of these practices (IPVS abstract #V).

Food safety and public health issues:

In this section four different issues were covered: A. **"How important are food safety issues to you?** B. **"In general, how would you rate the overall quality of pre-harvest food safety conditions and controls from the farm through the slaughter plant in your country?** C. **"How much do you support or oppose the use of a) low dose feed antibiotics; b) hormone implants; and c) genetic engineering for increased growth of food animals?"** D. **"How much confidence do you have in each of the following information sources on pre-harvest (from farm thru slaughter) food safety; a) farmers, b) livestock organizations; c) food animal veterinarians; d) companion animal veterinarians; e) university scientist; f) government; g) media; h) animal rights organizations?"**

A. Almost all students in all groups and countries felt that food safety issues were very important to them.

B. There were great differences of opinions between different groups of students (IPVS abstracts #VI and VII, and Table 1). Typically, **AS, FA and AASP students were more confident (86-94%) of pre-harvest food safety in the USA than CA and SS students (59-71%).** Confidence was low among the veterinary students at Cornell and Tufts (27%) schools as well as Berlin and Ghent (29%) in Europe, and the Mexican (29%), Japanese (30%), Taiwanese (28%), and Thai (3%!) schools. The percentages of students with no opinions/no knowledge for these questions were quite high among some of the students, in particular FA and SS students.

C. Again, there were great differences between student groups. a) **In the USA only 17% of the CA students, and 25% of the SS students supported (response 1+2) the use of low dose feed antibiotics for growth promotion compared to, respectively, 62%, 74%, and 67% for FA, AASP, and AS students** (Table 1). Only 10%of the veterinary students at Cornell and 7% at Tufts University were supportive. The support was even lower in the EU schools (mean of 12%), 21% in Canada, 15% in Australia and 23% in Japan. b) The support for use of hormone implants were similarly low in the same groups of students (e.g. 5% in the EU schools, 18% at Tufts, 16% in Japan and Australia, 18% in Thailand, and in the USA 33% among CA students and 20% among SS students . c) Genetic engineering as a method of growth promotion was

strongly opposed in the EU schools (81%), Japan (71%), Australia (68%), and SS students in the USA (76%).There was less opposition in Canada (45%) and among AS (34%), FA (24%) and AASP (22%) students in the USA.

D. Across all groups of US students, the confidence in trustworthiness was greatest for food animal veterinarians (IPVS abstract #VII). Second to that, university scientists and government were also rated positively. Farmers were also generally rated positively, with the exception of somewhat less trust among CA students. Livestock organizations and companion animal veterinarians were given mixed ratings, while **media and animal rights organizations were rated low except for SS students, who rated animal rights organizations quite high (53%). SS students also gave a much higher rating (86%) for trustworthiness of companion animal veterinarians than any other student group**. Veterinary students in the other countries differed in their opinions from the USA students in several categories. For instance, animal rights organizations were generally related more positively in the EU and most of the other countries than in the USA and Canada (IPVS abstract #VII).

Animal welfare and cross-species issues in the veterinary curriculum:

Overall, all student groups were strongly supportive of having both animal welfare courses, and more of cross-species courses in the core DVM curriculum. In the USA, there was a stronger support for these curricular issues among FA students compared to FA and AASP students (IPVS abstract #VII, and Table 1).

The impact of species interest among students in veterinary schools in the USA, EU, CAJ and TTM:

Cross-tabulations with chi-square analyses of opinions between students with different species interests showed significant ($p<.05$) differences between CA and FA students in the US schools for 39 of 57 questions analysed in the survey (Table 1). Such differences were much less common among CA and FA students in the block of EU schools (14 of 57 questions), CAJ schools (10 of 57 questions), and TTM schools (7 of 57 questions).

Faculty and teaching resources of swine topics in the DVM curriculum:

Faculty resources and programs on specific swine topics varied greatly between veterinary schools in the USA. Among 27 schools, seven funded the swine programs with more than one full-time faculty (Universities of Minnesota, North Carolina, Illinois, Purdue, Iowa, Missouri, Pennsylvania), five with one FTE (Michigan, Wisconsin, Ohio, Pennsylvania, Kansas, Georgia) and 15 with less than one or no FTE at all. Faculty resources for each school generally reflected the size of the swine industry in the state. In all international schools except for Australia and Japan, there was a minimum of 2 FTEs assigned to swine topics.

Sixteen of the US veterinary schools provided opportunities for elective swine courses or externships. The number of lectures/labs in the core DVM curriculum for specific swine topics (husbandry, physical examination, pathology/diagnostics, preventive medicine, theriogenology, and medicine) varied from 0 to 69 hours in the US Schools and from 25 to 124 hours in the international schools.

The number of core swine clinic days was 0 in all US schools except for Georgia (5), Illinois (3), and Missouri, Ohio, and Texas (0.5 -1 day). The core swine clinic days in the international schools ranged from 4 to 45.

VI. CONCLUSION AND FUTURE WORK

Further analysis of this survey is in progress. Logistic regression methods are being employed to identify prior experiences, species and career interests that predict support or opposition towards the issues identified in the survey. Initial analyses have been encouraging in that a subset of US vet student data yielded results that were internally consistent and quantitative. This method appears capable of allowing more in-depth comparisons of attitudes among regions and countries and by student discipline.

Such analysis will be important. The survey results indicate strong student critique of several areas of modern animal agriculture in the USA, in particular among non-ag (SS) students and CA veterinary students. Similar critique is also apparent in the EU and CAJ schools, but there is much less differences of opinion between CA and FA students in those schools, as well as in the TTM schools. This brings up questions about the amount of cross-species courses in the DVM curriculum in these schools.

The survey of faculty and teaching resources in swine topics indicates that veterinary curricula in the USA are much more elective than in all the other countries, meaning much less of core food animal topics for the vast majority of students who elect companion animal tracking. One implication of this may be that the dominant sector of American veterinary professionals is increasingly disenfranchised from knowledge and understanding of animal agriculture in general and swine in particular, which also is likely to have a negative impact on future veterinary involvement in pre-harvest food safety and public health.

Excellent elective programs in swine veterinary medicine are offered at several US schools, but on a national level only a few students make that choice. At the same time the exposure of food animal topics is decreasing in the core DVM curriculum of all schools, and the end result may very well be a loss of most of the engagement of veterinary medicine in food animals. Typically, out of a total of about 8700 veterinary students in 1999 in the 27 schools in the USA, there were only a total of 120 (1.3%) student members in the junior chapter of the swine practitioners association (AASP), and 820 (9.4%) students in the bovine practitioners association (AABP). These figures are dwarfed by the large numbers of students in companion animal clubs and associations. For swine veterinary medicine this might be an inevitable event related to the development of the swine industry, and a parallel to the development of the poultry industry years ago. The consequences of such development would be far-reaching for both the veterinary profession and animal agriculture.

Table 1. Farm work experience and pet ownership, and support (responses 1+2) of utilization of animals, food animal production methods, food safety, and animal wellbeing, among students of different college majors x) and among CA and FA veterinary students at six US universities

x) AS = Animal science; SS = Sociology; VM = Vet. medicine: ASP = AASP junior chapter; FA = Strong food animal preference only; CA = Strong companion animal preference only (A total of 120 students reported strong interest in both food animals and other species. Overall, their scores of opinions averaged the means of FA+CA results).

Don't know/no opinion responses were omitted from the results. Also omitted were animal science students, who identified themselves as pre-veterinary students, as well as ag major students in the sociology course group.

Student Groups	**AS**	**VM-ASP**	**VM-FA**	**VM-CA**	**SS**
N	211	59	40	215	447
Farm work exp., yes	71%	75%	92%	17%	4%
Owned pets, dog	93	93	95	92	75
" cat	82	82	82	81	57
" horse	38	39	26	13	8
Opinions about use of animals in medical research, food, and byproducts (% supportive students):					
Medical research	84%	100%	95%	77%	70%
Food consumption	95	100	97	85	84
Byproducts (leather,etc)	81	86	95	76	44
Own consumption of animal products:					
Dairy `	99%	100%	100%	97%	99%
Beef	92	100	95	75	84
Veal	44	51	50	27	36
Lamb	55	71	79	41	42
Pork	87	100	92	69	73
Poultry	94	100	95	85	94
Egg	95	98	100	95	92
Fish	82	86	92	86	78
Support to food animal housing systems:					
Dairy, stanchions	80%	80%	84%	52%	56%
" loose housing	94	93	92	82	68
Beef, feedlot	79	86	74	39	43
" free range	97	97	97	91	74
Veal	45	44	45	15	29
Sow, stall/crate	58	83	68	30	24
" loose/pasture	85	93	94	76	73
Lay hen, cage	60	54	62	28	43
" free range	81	71	86	83	85
Broiler	74	61	57	40	48
Student Group	AS	VM-ASP	VM-FA	VM-CA	SS
Support to the present changes in the swine industry (fewer and much larger herds with intensive production systems):	47%	58%	38%	15%	23%
Student Groups	**AS**	**VM-ASP**	**VM-FA**	**VM-CA**	**SS**
Support to routine surgical procedures on food and companion animals (% supportive students):					
Castration, pig	92%	98%	95%	64%	27%
" calf/lamb	92	98	97	67	25
Tail dock, pig	88	100	98	62	22
" lamb	87	100	98	65	24
" dairy cow	59	70	62	33	24
" dog	43	40	42	18	18
Ear crop dog	38	26	30	6	17
Declaw cat	61	78	63	40	56
Importance of food safety to you:	96%	100%	100%	100%	95%
Confidence in pre-harvest food safety (farm-slaughter) conditions in the USA:	86%	93%	94%	71%	59%

Support to the use of feed additives for growth promotion of food animals:

Antibiotics	67%	62%	74%	17%	25%
Hormone implants	65	80	82	33	20
Genetic engineering	66	78	76	51	24

Trustworthiness of food safety information:

Farmer	82%	86%	89%	59%	77%
Livestock industry org.	68	80	79	35	47
Food animal vet	95	100	100	92	90
Comp. " "	77	32	35	49	86
University scientist	87	71	87	72	80
Government	76	83	74	71	66
Media	11	0	3	7	23
Animal rights org.	17	0	3	10	53

Support to animal welfare course in the DVM core curriculum:

	89%	78%	81%	88%	88%