

UNIVERSITY OF WAIKATO ANIMAL ETHICS COMMITTEE



Protocol Number: **388**

APPLICATION COVER SHEET

Project Details	
Full Protocol Title: Looking for a magnitude effect in hens.	
Name of Primary Applicant: Grace Budenberg	
Faculty/School/Department: School of Psychology	
Expected start date: 26/04/2013	Expected completion date: 15/04/2014
Animals species: Domestic Hen. (common name)	Number to be used: 8
Impact Level: Grade B (See Q 6 Animal Use Statistics Form – Appendix 1):	

Type of Application (Can tick more than one box):	<input type="checkbox"/> Research <input type="checkbox"/> Teaching <input type="checkbox"/> Other (Specify) <input checked="" type="checkbox"/> Part of research thesis
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Standard Operating Procedures:	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes: SOP Number/ Title:
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Other AEC approval:	Has this application been submitted any other AEC for approval <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Specify Committee) Details:
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Funding support:	Is this research part of a funding grant either received or pending <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Specify funding source) Details:
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OFFICE USE ONLY		Protocol Number:
This proposal is approved for the period:		
From: 26/04/2013	To: 26/04/2014	
Signature AEC Chair: [Signature]	Date: 26/4/13	

All research involving the use of animals must comply with the *Animal Welfare Act (1999)* and the University of Waikato Code of Ethical Conduct for the Use of Animals in Teaching and Research.

Please submit this form to the Animal Ethics Committee, Research Office, B Block, University of Waikato or email animal.ethics@waikato.ac.nz

APPLICATION

Section1: Personnel Information

1.1 PRIMARY APPLICANT (Researcher or student undertaking thesis)	
Title, first name, last name: Miss Grace Budenberg	
Qualifications: Bachelor of Social Science (Psychology & Human Development).	
Mailing address: 41 Te Anau Place, Glenview, Hamilton, 3206	
Email: gjb18@students.waikato.ac.nz	Phone: 021 347 223
Please detail the relevant experience you have (including the number of years) in the procedures/techniques to be used in this project.	
<p>I completed PSYC314 as part of my undergraduate degree. This required about 10 hours' work at the animal laboratory in which I had to become familiar with the laboratory environment, experimental processes and how to properly handle and care for hens that were being used in experiments.</p> <p>I will also be undergoing more training with PhD and Masters students to ensure that I understand the laboratory procedures required of me so that I am prepared to undertake my own experiment.</p>	

1.2 CHIEF SUPERVISOR (WHEN APPLICABLE) TO BE COMPLETED BY THE STUDENT'S SUPERVISOR (IT IS EXPECTED THAT THE SUPERVISOR WILL ASSIST THE STUDENT WITH THE DEVELOPMENT OF THIS APPLICATION)	
Title, first name, last name: Dr James McEwan	
Qualifications: BSocSc(Psych), MSocSci(Psych), DPhil(Psych).	
Mailing address: School Psychology FASS	
Email: jmcewan@waikato.ac.nz	Phone: 021 463512
What is your Role in this project?	
I am responsible for the scientific merit, ethical conduct and practical implementation of the research	
Please detail the relevant experience you have (including the number of years) in the procedures/techniques to be used in this project.	
I have supervised 8 – 10 thesis research projects per year on animal behaviour at NO3 Dairy over the last 8 years.	

1.3 OTHER PERSONNEL MUST INCLUDE DETAILS OF VETERINARIAN TO THE PROJECT			
Title, First Name, Last Name	Qualification	Contact details	Role In Project
Ali Cullum	Vet BSc(Hons), BVM&S, MACVSc (Avian Health)	0272883068	Veterinarian to the Project.
Dr James McEwan	BSocSc(Psych), MSocSci(Psych), DPhil(Psych)	jamesactus@gmail.com	Supervisor
Dr Lewis Bizo	BSc, PGDipSci, PhD	lbizo@waikato.ac.nz	Supervisor
Jennifer Chandler	BSc Waikato MASCTA	chandler@waikato.ac.nz	Lab Technician

Section 2: Project Description

2.1 LAY SUMMARY OF OVERALL PROJECT (one paragraph)

(To be written in terms that people with a non-scientific background will understand)

This research project is going to examine an aspect of behaviour found in the study of intertemporal choice called the magnitude effect. The magnitude effect is commonly found in humans who tend to wait longer for a large reward than they would for a smaller reward. People discount larger rewards at a lower rate than smaller rewards over time. Grace (2012) was able to find evidence for a magnitude effect in pigeons, a finding that had not previously been reliably observed in animals.

My project will attempt to recreate Grace's 2012 procedure using hens, to see if the same results can be reproduced.

2.2 AIM OF THE PROJECT

(Brief and written in terms that people with a non-scientific background will understand)

The aim of the project is to ascertain whether Grace's 2012 study can be replicated. This could help validate previous results and possibly assist in generalising findings across different species.

2.3. BACKGROUND

(Include a short review of previous relevant studies in this area and references where appropriate)

The main study that this project is based on was conducted by Grace, Sargisson and White (2012). As discussed above, their experiment found evidence for a magnitude effect in pigeons under the contextual choice model, using concurrent schedules of reinforcement.

Grace's 2012 study lead on from previous research which looked at how amount of reward affected self-control outcomes in pigeons under the matching law (Grace, 1999). The results of this study found no magnitude effect.

Other relevant studies in this area have attempted to measure indifference points in non-human animals. A study by Green, Myerson, Holt, Slevin and Estle (2004), looked to whether adjusting combinations of delay and amount of reward would affect the rate of discounting in rats and pigeons. The results of their study found that rate of discounting was not affected by reward amount, there was no magnitude effect. Similar results have been observed by Freeman, Green, Myerson and Woolverton (2009), who did not find an effect of reward amount on temporal discounting in rhesus monkeys. These findings are in contrast with human studies that have consistently found a significant magnitude effect for rewards that differ in quality and amount (Estle, Green, Myerson & Holt, 2007).

References

Estle, S. J. Green, L. Myerson, J. Holt, D. D. (2007). Discounting of monetary and directly consumable rewards. *Psychological Science*, 18, 58-63. doi: [10.1111/j.1467-9280.2007.01849.x](https://doi.org/10.1111/j.1467-9280.2007.01849.x)

Freeman, K. Green, L. Myerson, J. Woolverton, W. (2009). Delay discounting of saccharin in rhesus monkeys. *Behavioural Processes*, 82, 214-218. doi: [10.1016/j.beproc.2009.06.002](https://doi.org/10.1016/j.beproc.2009.06.002)

Grace, R. C. (1999). The matching law and amount-dependent exponential discounting as accounts of self-control choice. *Journal of the Experimental Analysis of Behavior*, 71, 27-44. doi: [10.1901/jeab.1999.71-27](https://doi.org/10.1901/jeab.1999.71-27)

Grace, R. C., Sargisson, R. J., White, K., G. (2012). Evidence for a magnitude effect in temporal discounting with pigeons. *Journal of Experimental Psychology*, 38, 102-108. doi: [10.1037/a0026345](https://doi.org/10.1037/a0026345)

Green, L. Myerson, L. Holt, D. D. Slevin, J. R. Estle, S. J. (2004). Discounting of delayed food rewards in pigeons and rats: Is there a magnitude effect? *Journal of the Experimental Analysis of Behavior*, 81, 39-50. doi: [10.1901/jeab.2004.81-39](https://doi.org/10.1901/jeab.2004.81-39)

2.4 JUSTIFICATION FOR THE PROJECT

- a. What are the potential benefits of the research – to humans, animals, or the environment?

The potential benefits of the project would be that it contributes to the wider field of knowledge in behavioural psychology. The findings may help build on previous findings in the study of choice and animal behaviour.

- b. How will the results of this work be disseminated?

The results of this experiment will be used as part of a Masters Thesis. The results may be published in journal articles or presented at conferences.

2.5 DESCRIPTION OF PROCEDURES

(Detailed description of all procedures)

What will happen to the live animals? Give a step-by-step description of all procedures to be carried out on each group of animals. The use of your own flowchart, table or "research design" figure is recommended for complex experiments.

The hens will be housed individually in cages and fed commercial pellets daily to be maintained at 80% of their free feeding body weight. Each hen will be weighed before every experimental session.

When required, the hen will be placed in an operant chamber measuring approximately 800mm wide, 500mm high and 500mm deep. On one side of the chamber there will be two response keys and a hole underneath to allow access for food via a raised magazine.

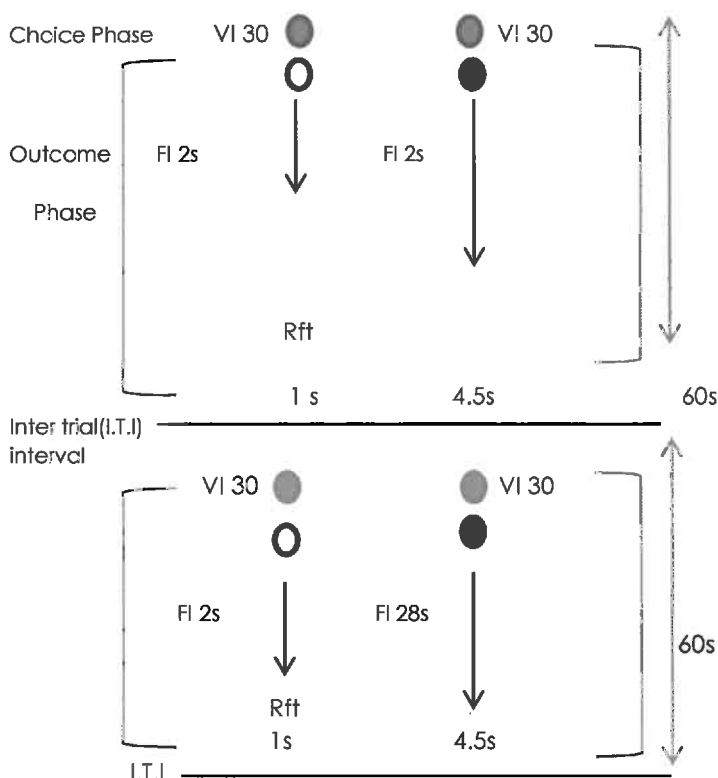
During the experimental procedures the hens will allocate responses between the two lit keys (red or green) which will operate under different fixed interval schedules and a concurrent variable- interval (VI30) schedule of reinforcement, in a concurrent chains procedure.

Depending on the hens responses, the food magazine will be raised to allow either 1s or 4.5s access to food after a variable delay. Each session will include 60 trials with a maximum time limit of 90 minutes per session.

The conditions, outcome phase schedules and reinforcer durations are outlined in the table below.

	RED		Green	
Condition	Left	Right	Left	Right
1	FI 2s	FI 2s	FI 2s	FI 28s
2	FI 2s	FI 6s	FI 6s	FI 28s
3	FI 2s	FI 15s	FI 15s	FI 28s
4	FI 2s	FI 24s	FI 24s	FI 28s
5	FI 2s	FI 28s	FI 28s	FI 28s
Reinforcer duration	1s	4.5s	1s	4.5s

The flow chart below is a summary of how the procedures will work with an example of a trial from condition 1.



Each trial begins with two keys both lit either red or green, indicating the start of the choice phase. Trials with red or green are directly alternated throughout the session. A single response on one of the keys allows access to an outcome phase which takes place for an average of 30s according to a VI schedule.

If the outcome phase is entered from the left key, the left key is lit white and the right key would go dark, and vice versa.

During the outcome stage, the first response after a fixed interval of time is passed (according to the FI schedule) would be followed by different duration of access to food delivery depending which key (left or right) the hen had responded on during the choice phase.

As seen in the flow chart, if the hen responds first on the left key, for both red and green trials she would then have 1-s access to the food magazine, after the FI schedule had elapsed. The same is true if the hen responds on the right key, she would have access to 4.5-s of food on both red and green trials after the different FI schedules had finished.

Are there any other procedures that do not involve live animals (e.g. tissue sample analysis etc)? Please provide details. N/A

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2.6 SCIENTIFIC DESIGN OF THE EXPERIMENT AND PROPOSED STATISTICAL ANALYSIS

(Give a clear description of the design of the experiment. Describe the statistical approach that will be used and evidence that the approach can yield answers to the proposed research question.)

The experiment is a group design from which data of individual hens will be averaged across the group to determine if the rate of temporal discounting was affected by the large and small reward outcomes.

Preference for the sooner smaller outcomes (1-s access) will be compared to the delayed outcome (4.5-s access) by measuring the ratio of responses to the left and right keys separately for red and green trials. Responses will be plotted as a function of the logarithm of the FI schedule value associated with either the 1s or 4.5s rewards.

An ANOVA will also be carried out to determine if the variables of amount and delay interacted significantly during the experiment. A Post Hoc test will be conducted to see if the relative value of the large reward was significantly greater than the small reward over the different delays.

Averaged response ratios will also be compared to the predictions held under the generalised matching law and the contextual choice model.

2.7 ADDRESSING THE THREE RS

Replacement, Reduction and Refinement (or the "Three Rs") are the cornerstone for ethical use of animals in research, testing and teaching.

(Please complete all three sections – one to two sentences per section)

2.7.1 Replacement (what alternatives to animal use have you considered e.g. computer modelling)

The nature of this project requires hens or other animal species to be used. There are no possible alternatives for this particular project.

2.7.2 Reduction (what ways do you propose to minimise the use of animals while still keeping the results meaningful)

A minimal number of hens are going to be used in the experiment and the hens will only be working in the operant chamber when necessary, for short periods of time each day, while the experiment is running.

2.7.3 Refinement (how have the procedures been refined to decrease the negative impacts these procedures have on animals e.g. analgesic use, appropriate housing, the skill of those involved in the use and care of the animals).

The condition and general health of the hens is monitored closely on a daily basis. The hens are housed individually with adequate space. There is very limited negative impact from the procedure relating to the project. The students handling the hens are instructed on how to properly care for and handle the hens so that their welfare needs are met.

2.8 ANIMALS TO BE USED IN TEACHING (I.E. UNDERGRADUATE LABS)

If no, proceed section 3

2.8.1	Detail preparation of students for animal use	N/A
2.8.2	Detail supervision of students	N/A
2.8.3	Detail overall relevant experience of students	N/A
2.8.4	Copy of laboratory handout is attached	N/A

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Section 3: Animals Used and Welfare

3.1 ANIMAL SUMMARY (Please also complete Appendix 1) Species scientific & Common name ONE SPECIES PER LINE		Strain	Species Code (see Q1 of Animal Use Statistics Form Appendix 1)	Total number required (over the life of the project)	Grading of manipulation (see Q6 of Animal Use Statistics Form Appendix 1)
1.	Gallus gallus domesticus/Brown shaver hen	Mixed	1P	8	Little impact (Grade B)
2.					
3.					

3.2 WILL ANIMALS BE HOUSED OR HELD (SHORT-TERM OR LONG-TERM)?		
If no, proceed to 3.3		
3.2.1	Where will the animals be housed?	During the project the hens will be housed individually in cages at The Learning Behaviour Welfare Unit (No. 3 Dairy, Ruakura Rd).
3.2.2	Describe container (dimensions of cages / pens)	The cages are industry standard size and made of durable, strong wire. Each cage allows the hen free access to water via a water tube that runs along the top of the cage.
3.2.3	How many animals per container / enclosure?	One hen per cage, six cages per room.
3.2.4	What will be the duration of housing?	The hens will be housed for the duration of the project, approximately 52 weeks.
3.2.5	Who will be responsible for the care of the animals?	Masters and Doctoral students are responsible for attending to the immediate needs of the animals. This includes daily feeding and monitoring. Jenny Chandler, as the animal technician, has overall responsibility for the welfare of the animals housed at Dairy No. 3 and is kept informed about concerns that may arise regarding animal care.

3.3 PRIOR HISTORY OF THE ANIMALS

(If animals are to be used from another project a summary of the type of project, its protocol number, and other information such as the amount of time between projects etc. is to be stated)

The hens being used in this procedure have previously been used in 2011 for undergraduate research in PSYC314, protocol 832. They were housed in cages for 2 months and underwent experimental procedures in which they worked for two types of wheat to assess preferences. The hens were then used as part of the "happy hen" experiment for 18 months, protocol 842. During this time the hens were kept in cages with a period of a few weeks in an enclosure.

3.4 MANAGEMENT OF ADVERSE EVENTS

(Describe any possible adverse events and how you might manage these. For example, proposed methods of prevention or control such as regular inspection, analgesic regimes and specified humane end points)

The main adverse event would be that one of the hens becomes sick or injured in some way. If this occurs, the vet would be consulted to ensure that the hen receives the appropriate treatment for its condition.

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3.5 FATE OF THE ANIMALS

(What will happen to the animals at the end of the experiment?)

After the experiment has concluded the hens will be housed in the aviary until they are required for further research.

Section 4: Specific Procedures

4.1 INSTITUTIONAL DRUG ADMINISTRATION ORDER

(See Appendix 2)

Is there an operational procedure required for the use of a product (drug /chemical) in the experiments?

If 'yes' this will require an Institutional Drug Administration Order. **No.**

Name of Product: N/A

4.2. USE OF ANAESTHETIC

If 'Yes' complete the table below

4.2.1	Name of anaesthetic	N/A
4.2.2	Local or general	N/A
4.2.3	Method of restraint	N/A
4.2.4	Will animals have to recover from anaesthetic? How long is the recovery period?	N/A
4.2.5	How will you deal with post-operative pain and/or discomfort?	N/A

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Section 5: Declaration

5.1 PERMITS AND APPROVALS		
5.1.1	Has an application been made to another Committee e.g. Ruakura?	No
5.1.2	Are any DOC permits required?	No
5.1.3	Are any Iwi approvals required?	No
5.1.4	Are any other approvals / permits required?	No

5.2 DECLARATION		CHECK
5.2.1	I have read and understand the conditions outlined in the Code of Ethical Conduct for the Use of Animals for Teaching and Research. http://www.waikato.ac.nz/research/unilink/ethics/animal_ethics.shtml	✓
5.2.2	I have read the Good Practice Guide for the Use of Animals in Research, Testing and Teaching http://www.biosecurity.govt.nz/files/regs/animal-welfare/pubs/naeac/guide-for-animals-use.pdf	✓
5.2.3	If this application is approved, I will inform the Committee of any changes in the project or unexpected outcomes affecting animal welfare, and any event (beyond any approved manipulation) impacting adversely on animal welfare.	✓
5.2.4	I will submit a complete Animal Use Statistics Form by the specified date.	✓
5.2.5	I will report as required to the Animal Ethics Committee.	✓

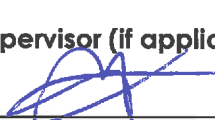
Signed by the applicant:



Date: 11/4/2013.

I accept responsibility for this project's compliance with the University's Code of Ethical Conduct for the Use of Animals for Teaching and Research.

Signed by the Chief Supervisor (if applicable):



Date: 11/4/2013

I accept responsibility for this project's compliance with the University's Code of Ethical Conduct for the Use of Animals for Teaching and Research.

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Appendix 1

Animal Use Statistics Form- one species per sheet

Note: Fill in the YELLOW areas now (this is part of the application form). The BLUE areas are to be filled in after the research has been completed, and a SIGNED hard copy of this form only is to be submitted to the AEC Coordinator by the completion date indicated on page 1 of this application form.

P = Planned to Use AU = Actually Used

1. Animal Type: Fowls, Chickens (1p) (see list on next page)
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2. Source of Animals:	P	AU
Breeding unit	8	
Commercial		
Farm		
Born during project		
Captured		
Imported into New Zealand		
Public sources		

3. Status of Animals:	P	AU
Normal/conventional	8	
SPF/germ free		
Diseased		
Transgenic/chimera		
Protected species		
Unborn/prehatched		
Other		

4. Purpose:	P	AU
Teaching		
Species conservation		
Environmental management		
Animal husbandry		
Basic biological research	8	
Medical research		
Veterinary research		
Production of biological agents		
Development of alternatives		
Other		


5. Re-use:	P	AU
No prior use		
Previously used	8	

6. Grading:		P	AU
No impact	A		
Little impact	B	8	
Moderate impact	C		
High impact	D		
Very high impact	E		

(see attached grading form)

7. Alive:	P	AU
	8	
Retained [by your institution]		
Returned [to owner]		
Released [to the wild]		
Disposed of [eg to works or rehomed]		
Total Alive		

8. Dead:	P	AU
Killed for dissection, sampling		
Died/destroyed in the course of manipulation/use		
Euthanased after manipulation or use		
Died/destroyed for reasons not associated with manipulation/use		

Completed by:	Grace Budenberg
Signature:	
Date:	08/04/2013
Protocol No.	

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Grade C – “Moderate impact”

Manipulations of minor impact and long duration or moderate impact and short duration

Examples:

Mental state: Recovery from major surgeries like thoracotomy, orthopaedic procedures, hysterectomy or gall bladder removal with effective use of analgesics; surgical procedures on conscious animals but with the use of local anaesthesia and systemic analgesic; movement of excitable free-range domesticated livestock to unfamiliar housing; short term capture, handling and restraint of wild or semi-domesticated animals that exhibit marked flight responses; moderate restrictions of water and/or feed intake beyond the normal period of satiation.

Food/water: Simulation of usual overall intake restrictions often experienced by pregnant/lactating ruminants during cold winters or drought; dietary induction of milk fever in cattle; induction of mild deficiency or toxicity signs by feeding diets containing inadequate or excessive amounts of essential nutrients.

Environmental challenge: Short-term exposure to severe extremes of cold or heat which would lead to collapse if prolonged.

Disease/injury/functional impairment: Studies of live vaccines; induction of clinical parasitism; induction of mild reversible infectious diarrhoea; moderate surgical and/or pharmacological modification to homeostatic capacity (for example, limited gut resection; endocrine gland removal with delayed or incomplete hormone replacement therapy); physical conditions that cause minor chronic lameness or other injuries; studies of the effects of infectious or toxic agents that cause rapid death without distress.

Behaviour: Medium-term restrictions of instinctive behaviour; medium-term holding of ruminants in a metabolism crate; long-term restraint leading to the development of reversible stereotypies; changing social group composition.

Grade D – “High impact”

Manipulations of moderate impact and long duration or high impact and short duration

Examples:

Mental state: Recovery from major surgery under anaesthesia without the use of postoperative analgesics; marked social or environmental deprivation; longer term capture, handling, restraint or housing, without the use of tranquilisers, of wild or semi-domesticated animals that exhibit marked flight responses.

Food/water: Dietary induction of advanced pregnancy toxemia in sheep or ketosis in dairy cattle; dietary induction of advanced signs of nutrient deficiency or excess; severe deleterious effects of dietary toxins; severe restrictions of water and/or feed intake beyond the normal period of satiation.

Environmental challenge: Prolonged exposure to severe cold or heat that would lead to failure of thermoregulation and collapse, but the exposure is terminated just before those outcomes.

Disease/injury/functional impairment: Studies of severe facial eczema; induction of severe diarrhoea or severe infectious pneumonia; protracted or irreversible pharmacological modification of homeostatic capacity (for example, chemical induction of diabetes mellitus without replacement therapy); marked surgical modification of homeostatic capacity (for example, extensive gut resection; cutting of sensory or motor nerves serving large areas of the body from which no self-mutilation injury results; precise lesioning of limited areas of the brain but with intervention before collapse); physical conditions that cause moderate chronic lameness or other injuries; studies of the effects of infectious and toxic agents that cause either a protracted death with minor distress or a rapid death with moderate distress.

Behaviour: Application of marked and repeated noxious stimuli from which escape is impossible; prolonged periods (several hours or more) of close physical restraint; marked alterations to the perceptual or motor functions of animals to test consequent behaviour.

Grade E – “Very high impact”

Manipulations of high impact and long duration

Examples:

Mental state: Conducting major surgeries without the use of anaesthesia on control animals in assessing efficacy of analgesics; testing the efficacy of analgesics in animals with severe induced pain.

Food/water: Experiments that cause animals to die from poisoning by toxins in the diet; protracted and severe restrictions on water and/or feed intake.

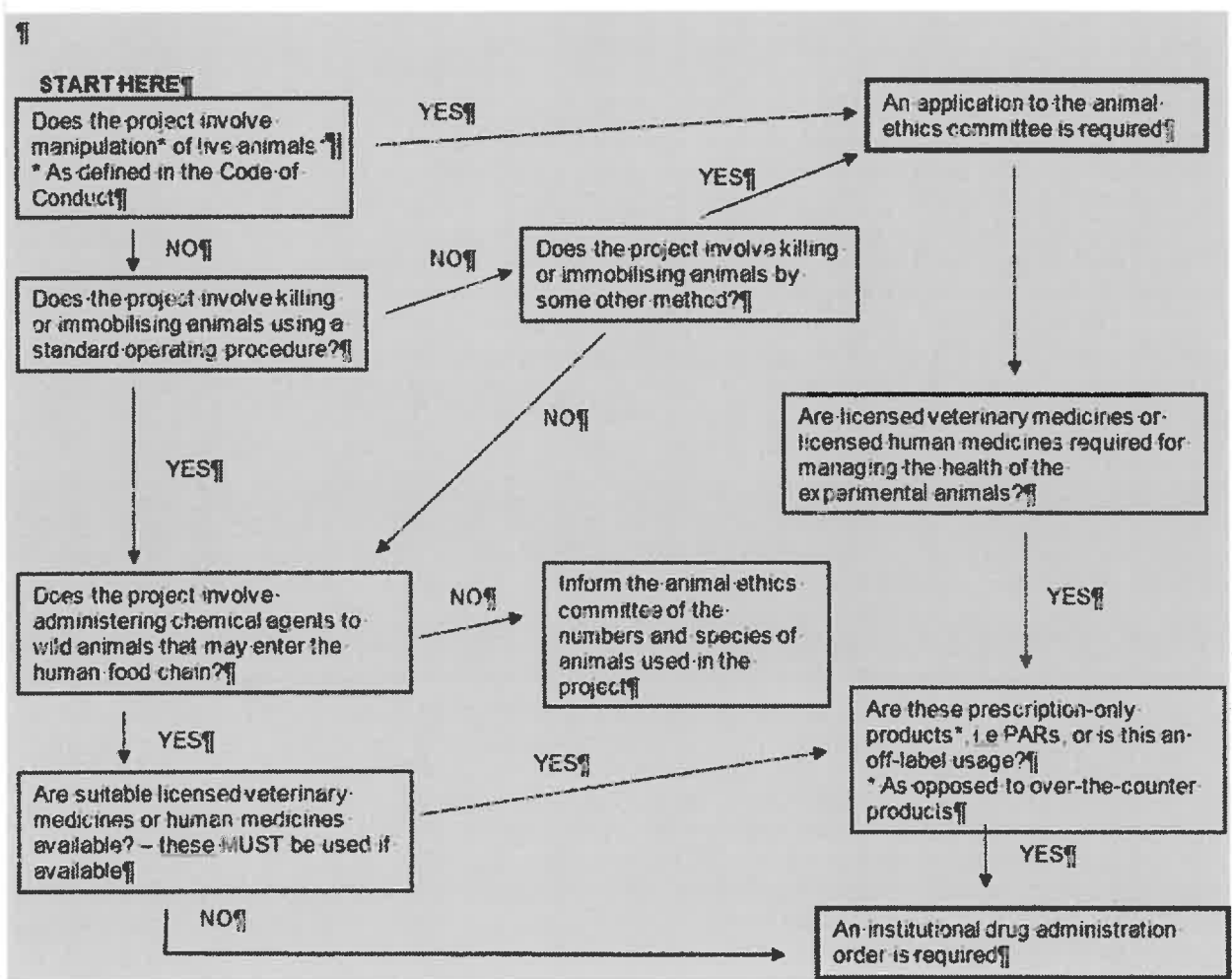
Environmental challenge: Purposeful exposure of conscious animals to lethal extremes of cold, heat or barometric pressure which duplicate naturally occurring conditions.

Disease/injury/functional impairment: Studies of methods for killing pest animals; cutting of sensory or motor nerves serving large areas of the body from which self-mutilation injury results; evaluation of vaccines where death is the measure of failure to protect; studies of the effects of infectious or toxic agents which cause either a protracted death with marked distress or a rapid death with severe distress.

Behaviour: Application of marked and repeated extremely noxious stimuli from which escape is impossible; prolonged periods (several hours or more) of close physical restraint.

Appendix 2

Is an Institutional Drug Administration Order (IDAO) Required?



If a decision remains unspecified then no further action is required.