

Listing of Inherited Disorders in Animals (LIDA) for cats: an on-line relational database, using non-technical descriptions written by veterinary students

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***Abstract:** The Listing of Inherited Disorders in Animals (LIDA) for cats has implemented research-led approaches to learning and teaching and used these to showcase student output of high quality. The Listing of Inherited Disorders in Animals (LIDA) is a leading example of how learning outcomes can be aligned with assessment and the students' deliverables then developed into a learning resource. Exemplifying the high standard of work students can produce when thoughtfully guided and advised, LIDA began as a library-based activity offered to Veterinary Science undergraduate students. The exercise was designed for students to develop an appreciation of the variety of congenital and inherited disorders in cats, and to reflect on the impact of these on cat welfare, describing their effects in clear, plain English. Much of the written work submitted by students for this assignment was incorporated, with their permission and acknowledgment, into the LIDA database. It now constitutes an online relational database, using non-technical descriptions, almost all credited to individual students.*

Background

Inherited disorders are a significant cause of welfare issues in domestic companion animals (McGreevy and Nicholas 1999). Existing inherited disorder databases devoted to dogs are appropriate for the needs of specialists in veterinary genetics and clinical practice but have the potential to make content inaccessible to a wider audience, including undergraduate veterinary students and most stakeholders outside the profession (including breeders and owners). Similar sites exist for cats, but these focus on the needs of breeders. These include the Online Mendelian Inheritance in Animals Database (OMIA 2008) in Australia and in the UK the Genetic and Hereditary Conditions of Pedigree (purebred) and Domestic Cats Database (catvirus.com 2008) and the Inherited Disorders in Cats – Confirmed and Suspected Database (Feline Advisory Bureau 2008). The current application describes a project that builds on an initiative that began in 2004 (McGreevy, Costa, Della Torre, Thomson and Nicholas 2005). It details an innovative development that formed part of a student assessment activity in 2007 and 2008.

The chief aim of the project was to produce an on-line relational database to describe the inherited disorders that are reported in common breeds of pedigree cat. A secondary aim was to provide a valuable learning experience for the students involved in providing non-technical descriptions of the disorders. The static nature of the disorder description obviated the need to generate the database afresh each year. So, only one whole cohort of students gained this benefit; subsequent *ad hoc* additions to the database being foreseen with casual, voluntary student involvement. Although unique, this project provides a model of how high quality work by students can be inspired by a perceived need, crafted by clear goals and delivered with appropriate permission to a wide audience.

Rationale

Veterinary students in the so-called clinical years are ideally placed to provide non-technical descriptions of inherited disorders – they have the motivation and enthusiasm to synthesise available knowledge but are only newly acquainted with technical terms. As veterinarians, they will be required to translate complex technical descriptions of diseases and treatments to their clients – the lay, pet-owning public (Collins 1997). The ability to pitch language appropriately for a given audience does not always occur naturally; some students are able to anticipate the level that is required, while others need guidance to avoid either overusing their newly acquired jargon or 'talking down' to their audience. Accordingly, we set an exercise for final-year veterinary interns to describe



inherited disorders in non-technical terms and to classify each disorder according to organ system. Such a student-focussed, active approach enhances students' abilities to transfer concepts to new problems (Bauer and Ogilvie 1996; Herron, Wolf and DiBrito 1990). Furthermore, it can develop the skills students require to find information on their own while refining interpersonal, communication and teamwork skills (Schon 1983).

Description

The student activity of describing disorders in lay-terms and mapping them to affected breeds and organ systems evolved into an online database using a search facility that allows users to select from the 53 recognised cat breeds in Australia and find out which ones are prone to the more than 279 inherited conditions on record. It acknowledges the changing nature of knowledge (Johnston 1998) and the continual need to update one's understanding of which breeds present which disorders (McGreevy et al. 2005). It was developed in consultation with a number of supporting organisations including the local breeders' governing body and animal welfare groups, as well as owners. Although primarily for veterinary education, the website will increase awareness amongst breeders and may encourage them to adopt breeding programs that will decrease the occurrence of the most prevalent disorders. This outreach activity and its uptake validate the quality and confirm the relevance of the students' work, and provide a model for the higher education sector to transfer knowledge to non-tertiary stakeholders.

Aims and outcomes

These descriptions and classifications have been incorporated into an on-line relational database called the Listing of Inherited Disorders in Animals (LIDA 2008) which also includes a hierarchical classification by breed group and breed within group. LIDA is linked to Online Mendelian Inheritance in Animals (OMIA 2008) and PubMed, which provide up-to-date lists of references for each disorder, together with direct access to genetic and comparative information for each disorder.

This application reports the creation and initial student utilisation of LIDA and the ongoing population of the database with feline content. In creating LIDA, we had three principal aims, to:

1. involve final-year veterinary students in the creation of jargon-free descriptions of inherited disorders, and in allocating each disorder to an organ system;
2. combine these descriptions with classifications of disorders by breed and organ system in a relational database; and
3. present this information on line in a format convenient for breeders and owners, to provide a foundation for future web-based on-line reporting of the incidence of inherited disorders.

In 2007, a library-based activity was offered to 120 final-year Bachelor of Veterinary Science (BVSc) interns at The University of Sydney. The aim of the exercise was for students to:

1. consolidate their knowledge of the variety of congenital and inherited disorders in domestic cats
2. further develop written communication skills with clients, specifically to appreciate the virtues of writing in clear, plain English.
3. develop autonomous lifelong learning skills in research and enquiry.

Students were asked to submit a total of 250 words describing each of four disorders in lay terms, according to the following instructions:

1. select four feline inherited disorders from the Online Mendelian Inheritance in Animals (OMIA 2008) database;
2. browse the OMIA database for the chosen disorders, and, from a list of references for each disorder, choose key peer-reviewed journal articles;
3. obtain copies of these journal articles and, to place the detailed information in its proper context, consult relevant sections of standard veterinary medicine textbooks. Several textbooks on veterinary medicine were placed on Reserve at the library for this exercise;

4. using lay terms, write a description of the disorder; and
5. use all of the sub-headings for each disorder from the template provided (see Table 1).

Table 1. Fields used by students in writing descriptions of inherited disorders

Field	Additional information
DISORDER NAME	Issued to student at the start of the project
ALTERNATIVE NAMES	Any alternative names regularly used in the literature?
PRESENTING SIGNS	Up to 250 words describing, in lay terms, the ways the disorder affects cats
CATS AT RISK	Is the disorder found only in one sex? Is the disorder associated with particular feature within breeds, such as coat colour? Do not mention breeds here but instead explain whether any cats within a breed are at particular risk.
TREATMENT	Select from the following list: surgical, medical, surgical and medical, none
RELATED DISORDERS	Name other inherited disorders that commonly occur with the disorder - do not worry about these being obscure to your reader. There will be opportunities for web-site visitors to cross-refer to these disorders elsewhere in the web site. If no other inherited disorders commonly occur with the disorder, simply state 'None'
OMIA NUMBER	Refer to OMIA database
ORGAN SYSTEM	Select from the following list: cardiovascular, endocrine, alimentary, immune, integument, musculoskeletal, nervous/sensory, respiratory, urogenital

The disorder descriptions were assessed and then edited by a veterinary practitioner and professional scientific editor who moderated the terms and language used to ensure accessibility for the target audience, namely undergraduate veterinary students, breeders and owners. Written permission for inclusion in the database was obtained from all students contributing intellectual property to the database. Student authors are credited individually for each piece of work in the database.

The database's structure, and the indexing of organ systems, enables the following searches to be made:

- breed;
- disorder;
- breed;
- organ system and then disorder;
- free-text search within breed (e.g. searching for 'shorthair' will bring up all breeds whose names contain the word 'shorthair'); and
- free-text search within disorder (e.g. searching for 'dysplasia' will bring up all disorders containing the word 'dysplasia').

Evaluation

Two years after the first cohort of BVSc students had contributed their disorder descriptions, a new cohort of 120 Year 1 BVSc students was asked to complete an evaluation form that used a five-point scale to quantify the extent to which LIDA met six learning outcomes. The combined results appear as percentages in Table 2. The results clearly show that students gain great benefit from LIDA.

**Table 2.** Feedback on LIDA in relation to 6 learning outcomes, from Year 1 BVSc students (n=118)

LIDA helped me to	% of respondents				
	Strongly disagree	Disagree	Don't know	Agree	Strongly agree
understand the variety of inherited disorders that occur in pedigree animals	0	0	3	56	41
find information on the inherited disorders that may occur in animals of a certain breed	0	0	1	30	69
become familiar with the groups used to categorise pedigree animals	0	0	12	64	24
understand how inherited disorders can be categorised according to the organ systems they chiefly affect	0	0	11	48	41
become aware of alternative names for inherited disorders	0	1	27	49	23
find online reference material on inherited disorders	0	3	28	41	28

Application

Four units of study in the BVSc curriculum currently make direct use of LIDA:

- In Animal Husbandry, a first-year unit of study, students are asked to visit the site to familiarise themselves with disorders encountered in a breed owned by themselves or their family and a breed owned by one of their peers. The site also supports a two-hour lecture on the diversity of modern breeds and possible solutions to the common welfare problems associated with pure-bred breeding (McGreevy and Nicholas 1999).
- In Genetics and Biometry, a second-year unit of study, a tutorial is conducted on OMIA and LIDA, with a strong emphasis on the genetic basis of inherited disorders.
- In Veterinary Clinical Sciences, a Year 3 subject, and Veterinary Medicine and Clinical Pathology, a Year 4 subject, students are asked to visit the site as they learn about diseases by body system, to reinforce knowledge about breed predispositions for genetic conditions. Students in these years make the transition from acquiring knowledge of pre-clinical sciences to applying this knowledge as a clinician. They develop skills in clinical reasoning and pattern recognition. The age and breed of an animal are important triggers for students to consider possible disease associations.

LIDA has been widely praised by students, with comments such as:

- *Thanks so much for leading such a worthwhile and educational exercise.*
- *At last, a system for remembering which breeds get what.*
- *The practice I volunteer for were really impressed when I introduced them to LIDA.*
- *Our combined work helps to remind me why I want to become a vet.*

Conclusion

We consider that LIDA for cats fills the perceived need to provide a relational database that allows students to appreciate the variety of congenital and inherited disorders in cats, and to reflect on the impact of these on cat welfare. The emergence of problem-based learning in veterinary curricula has meant that frequently students are presented with a case's details that include the animal's breed. Thorough assessment of the case necessarily includes consideration of disorders to which certain breeds are particularly prone. Case studies built by Faculty colleagues provide links to LIDA to facilitate research of a breed's predisposition to disorders affecting particular organ systems. In assembling a differential diagnosis, once students have identified the organ system involved, they can

consult LIDA for a list of disorders within that organ system. More than 20,000 unique visitors use LIDA every month. Students are delighted to discover that their work is viewed by such a wide audience and feel that their contribution the knowledge base is significant.

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