

A COMPUTERISED SMALL ANIMAL PRACTICE
HEALTH MANAGEMENT SYSTEM WITH A CENTRALISED
DATA ANALYSIS FACILITY
THRUSFIELD, M.V.

INTRODUCTION

Data for small animal epidemiological studies frequently have been acquired either *ad hoc* (e.g., by postal questionnaires) or from established databases, the latter of which usually are attached to veterinary schools. Small animal epidemiological research therefore has been hampered by a lack of unbiased, primary-care data which can be obtained relatively simply. A computerised health management system, *HEDVET* (Hill's/Edinburgh University Small Animal VETerinary Record Management System), has been developed to overcome this problem. It comprises two components: 1.) a local clinical record management system for small animal practitioners; and 2.) a central database. Relevant components of the locally recorded data are transferred to the central database where they are available for epidemiological studies.

LOCAL CLINICAL RECORD MANAGEMENT SYSTEM

System configuration

The local system is designed primarily as a tool for clinical record management, while providing basic administrative and accounting facilities that were identified during discussions with participating practitioners during the system's initial development. It uses the *PARADOX* relational database management system (RDBMS) (Borland International, 1800 Green Hills Road, Scotts Valley, CA 95067-0001), mounted on an *Epson PC AX3s* microcomputer with a 100MB hard disk. An *Epson LQ400* 24-pin dot-matrix printer, with cut-sheet feeder, produces consultation proformas and case record sheets, and provides letter-quality 'hard copy' on practice stationery for elective-procedure reminders and practice circulars. The system is located in the reception area, and 'dialogues' with the microcomputer are usually conducted by the receptionist via menu-driven screens. Therefore, during normal surgery hours, the package is run by secretarial or nursing staff, with little change to the veterinarian's normal consulting practice.

Basic system structure

Stored data: The following information is stored:

1. animal's name (and, optionally, national identification number), breed (or species), sex and date of birth;
2. owner's name, address and telephone number(s);
3. history;
4. clinical signs;
5. management (including diet);

6. diagnoses;
7. treatment;
8. fees.

Additionally, animal's temperament and owner's payment status are cryptically 'flagged'. The veterinarian can also add his own special flags.

Protocol for recording cases: When a client registers with the receptionist, the system produces a proforma for the client's animal(s). This is headed with descriptive details of the client and animal (name, address, breed, sex, etc.). The remainder of the proforma is divided into boxes for history, management, clinical signs, diagnoses, treatments (explicitly related to preceding diagnoses), and general comments. The veterinarian completes the proforma, and returns it to the receptionist who then keys in the information. Breed, sex, management, diagnoses and treatments are stored as either alpha- or alphanumeric codes to maintain uniformity in the central database, but these are hidden from the user: data entry is by variations of the textual equivalents, to ensure a user-friendly environment.

Storage of case records: When the proforma's information is entered into the computer, the system produces a printed version which can be stored in the usual manner. Its trimmed format is 8" x 5", to fit standard filing cabinets. The proforma may then be destroyed. The system also continually compresses previous records into a compact form to reduce the space required to store case records. A 'hard copy' version is considered prudent: it acts as security against possible hardware/software problems and electrical power cuts, and provides immediate access to those unfamiliar with the package (e.g., *locum tenentes*). Additionally, an integral *Tecmar Minivault 120i* tape streamer is used to back up the local database. The entire hard disk is backed up weekly, and changed files are incrementally backed up daily until the next weekly backup.

Features of the local system

Automated scheduling of elective procedures: Elective procedures (E.P.s) can be scheduled for specific species and individual animals. Reminders, customised to individual animals and owners, are then issued automatically at the appropriate time. Elective-procedure scheduling is performed automatically for 'mandatory' vaccination regimens (e.g., distemper virus vaccination). An optional E.P. also can be applied to a specific animal. This E.P. may have a fixed periodicity (e.g., vaccination against *Bordetella bronchiseptica*) which is programmed into the software, or a variable periodicity which the veterinarian can define (e.g., a routine ocular examination). The system will again issue reminders, suitably customised, at the appropriate time.

Post-operative care reports: The system also automatically prints documents describing animal aftercare. These, too, are customised, and have two forms relating to major and minor veterinary procedures.

CENTRAL DATABASE

'Core' data from the patients' local records, comprising practice and animal identifiers, breed, sex, date of birth, date of consultation, clinical signs, diagnoses and related treatments, are periodically automatically extracted from records in the local practice database, and transferred to floppy disk, but all confidential information (e.g., clients' names and addresses and account status) are excluded. The disks are sent to the University of Edinburgh, and the data are 'dumped' centrally to the *ORACLE* RDBMS (Oracle Corporation, 20 Davis Drive, Belmont, CA 94002), mounted on a *DEC VAX 8530* mainframe computer, running the *VMS* operating system (Digital Equipment Corporation, 110 Spit Brook Road, Nashua, NH 03062-2698).. This RDBMS has a powerful query language, *SQL*Plus*, and has been used successfully for several years for storing small animal record summaries at the University of Edinburgh, and for subsequent epidemiological studies (Stone and Thrusfield, 1989).

FUTURE DEVELOPMENTS

The system currently is running as a two-year pilot project in practices in the Edinburgh area, ending in 1992. During the pilot period, feedback from participating practitioners is being used to modify subsequent releases of the software which incorporate new requirements when the latter are identified. It is intended that the system will become more widely available, and therefore will provide various small animal practitioners with a practice management package, while supplying primary-care data which will be used for epidemiological studies. These data will be relatively unbiased and, because of the anticipated volume, should facilitate the study of rare diseases, and increase the precision of risk estimates. The single-user configuration can be replaced by a multi-user one, if this requirement is subsequently identified. Movement of records to the central database by floppy disk is also likely to be replaced by electronic transfer via modems. This will also enable electronic bulletin boards to be created, thus giving participating practices immediate access to topical clinical and commercial information.

REFERENCES

- Stone, D.J.W. and Thrusfield, M.V. 1989. A small animal clinical and epidemiological relational database. *Preventive Veterinary Medicine*, 7:289-302.