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A STUDY OF THE INFORMATION SEARCH PROCESS
USED BY VETERINARIANS IN CLINICAL PRACTICE
IN NEW ZEALAND

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ABSTRACT

Veterinarians face problems in deciding whether or not to adopt new technical innovations which become available to them for use in veterinary practice and in solving problems they have not previously faced. In these "new situations" which they face frequently, they must draw on various sources of information to make an informed evaluation.

This thesis examines the process by which practising veterinarians search for this information, the sources they use, and the problems they face. By the nature of the information being sought, it was necessary to gather the data after the search for information on a particular topic had been completed. To minimise the biases inherent in reconstruction of past events, three different research approaches were used to provide complementary insights into the information search procedure.

Information concerning the nature of the employment and work of veterinarians is presented, with particular emphasis on the 70% of the profession who are employed in practice.

The value and limitations of various information sources were investigated, and views sought on needs not currently met. The most important feature of the information sources from the viewpoint of respondents was that they be in a form that is easily stored, retrieved and used, so that information was at hand when it was needed. Information supplied at a time remote from the need was not valued highly, compared with (possibly lower quality) information available easily when it was needed. Requests for additional information services concentrated heavily on those which would improve the management of information within the work environment.

Veterinarians see themselves as active users of information, but working under severe time constraints which limit their options. There were no marked differences among various categories of veterinarians in their search approaches.

Since requests to them were infrequent, the managers of information sources saw veterinarians as passive in their search behaviour. In fact, this was because time pressures forced veterinarians to use locally available information for most searches, resorting to recognized information suppliers only when local sources failed them.

There was clearly a mismatching between these two viewpoints, and in the light of the study a map of

information source usage has been drawn up, showing the intensity of use of various sources. There is an "inner circle" of information sources that are used for most problems. Preferred sources are those with which the veterinarians can interact easily, especially those with which they are familiar. They prefer those which reduce the time required to complete the search process.

The patterns of information use identified in the study are likely to be applicable to other professional groups which have frequent need for new information. Educators will also find this study of information search useful for their professional training curriculum development.

ACKNOWLEDGEMENTS

The study could not have been completed without the generous cooperation of veterinary practitioners, the decision makers in those organizations that supply veterinary information, and the final year veterinary students. The nature of the topic meant that the questionnaire was long and demanding for practitioners. Despite the fact that practitioners are working under considerable time pressure, all respondents were helpful and patient.

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INTRODUCTION

With the dynamic expansion of knowledge which has occurred over recent decades the term "information management" has become commonplace. However, it is commonly used in the very narrow sense of computerized management systems used to store and retrieve information. The subject is in reality much broader than this, and involves many issues related to the way people comprehend and use information they receive, not merely the way computers process information. To study the way in which people deal with information it is necessary to go beyond the mechanics of information management and consider the more subjective elements of the process of information gathering and evaluation. There are many subjective factors associated with the management of information that have received inadequate attention.

Research in such diverse disciplines as psychology, clinical medicine, education, and library science have shown that these subjective aspects have a strong influence on people's behaviour. This is especially true when people are dealing with situations that they have not previously experienced.

Having to deal with "new situations" is a common event in the life of a veterinarian. It is important that a practitioner is able to find the critical information needed to make an informed decision when dealing with a problem not previously encountered. Innovations in all aspects of veterinary medicine are occurring at an ever increasing rate. Practitioners are being faced with the constant challenge to stay abreast of these innovations.

This is not an easy task. The pressures of a full practice schedule, professional and geographical isolation, client and professional expectations, and the sheer magnitude of the changes have led to frequent expressions of concern by veterinarians about the problem of keeping up to date.

There are many factors influencing the veterinarian's success in finding the information needed. This study was designed to investigate the information search process used by veterinarians in clinical practice in New Zealand. The prime objective of the study was to examine the process of information search used by veterinarians when they need to find out about and

evaluate changes in veterinary knowledge and technology.

It looked at the role which information plays in everyday veterinary practice. Issues that were investigated included:

pressures that stimulate a search for information,
sources of information,
types of information,
perceived usefulness of sources and types of information,
attributes of "good" information,
barriers to obtaining needed information.

The subject of information use in problem-solving/information search situations has been examined from a number of different perspectives and in a number of different disciplines. This study will try to combine these parallel but distinct approaches into one concept that seems appropriate to the process used by veterinarians.

Profile of the Veterinary Profession 1985

A demographic profile of the veterinary profession was prepared as a distinct component of this study. However, a brief sketch of the profession is included here as an introduction to the occupational group.

In 1985 there were 1308 registered veterinarians working in New Zealand and an additional 304 overseas. The profession is growing. The number of veterinarians has increased by 73% over the last decade. The mean age in 1985 was 38 years with the men being on average 10 years older than the women. Eighteen percent of the veterinarians were women. Clinical practice provided employment for 70% of veterinarians: of these 59% worked principally with farm animals and 41% with non-farm animals. The remaining veterinarians were employed by government (22%), University (5%), and Industry (3%).

The postal survey used in phase 2 of this study showed a similar demographic structure as that shown in the 1985 statistics. The questions in the survey were more closely focused. As a result, employment and workload statistics were more enlightening. However, it must be

noted that the survey was sent to clinical practitioners only¹.

Thirty-eight percent were in large animal practice (less than 20% of work devoted to companion animals) and 31% were in small animal practice (more than 80% of work with companion animals). The remaining 31% were in mixed practice, with a workload intermediate between the other two groups. Cats and dogs took up the largest number of veterinary hours per person (1092 hours per year). Dairy cattle were second (438 hours), and horses third (302 hours). Deer and goats together used more veterinary hours per person than sheep and beef cattle. Other species comprised very minor parts of the overall workload.

Veterinarians must have a minimum of 5 years of University training and be registered with the Veterinary Surgeons Board in order to practice. While there are a few veterinarians (approximately 30 per year) from overseas who enter the workforce, the single most important source of veterinarians is the Faculty of Veterinary Science at Massey University.

Innovations in veterinary medicine and technology are commonplace, and information management is a major concern of the profession as a whole. This concern prompted the following study.

¹ The results of the survey are not directly comparable because the veterinarians that are not in clinical practice deal predominantly with production animals. If they were included in the survey statistics then there would not have been such a high proportion of veterinarians working predominantly with non-farm animals.

CHAPTER 1

THE PROCESS OF INFORMATION SEARCH IN "NEW SITUATIONS"

With the present rate of increase in available information and in the amount of new technology, "new situations" are a common occurrence. For the purpose of this thesis, a "new situation" faced by a veterinarian is one in which he/she does not have adequate knowledge and/or sufficient depth of experience to make an informed decision on the appropriate action to take. The process of information search begins with the realization by the veterinarian that what is known about the situation is insufficient to make a decision as to the most appropriate course of action.

While veterinary practitioners were the focus of the present work, previous studies have shown that the process is similar for everyone. Researchers in psychology, sociology, political science, medicine and education have looked at information management from their perspectives and described the phenomenon using terms that were most appropriate for colleagues within their particular discipline. This has resulted in a multiplicity of descriptions for the same process.

To alleviate the language and conceptual problems which those various terminologies could create in this study, it was necessary to build a theoretical framework from previous studies and to clarify the specific area of inquiry. A number of terms, concepts, and paradigms such as problem solving, "information", "information management", and "personal constructs" are needed to understand the theoretical framework of this study. These components fit together like a puzzle in which each piece contributes to the whole picture. The difficulty arises in deciding where to start. Each concept will be discussed in this chapter so that by its conclusion the rationale supporting the focus and methodological tools used in this study will be apparent.

INFORMATION SEARCH BEHAVIOUR

Recent studies into information management have concentrated on the technology of storage, transfer, retrieval, and manipulation of data. In contrast, this study is concerned with the human factors in the process. To build a picture of the information search

process it was necessary to begin with a very basic behavioural model (Skinner, 1978)¹ as shown in figure 1.

This early behavioural model emphasized the basic tenet that the unit being investigated was like a "black box" that could not be examined directly. Stimuli and behaviour could be observed and measured but the motivational factors were too complicated to be studied scientifically. Responses, however, could be counted and, in fact, the best predictor of future behaviour was found to be past behaviour.

This tenet had its advantages if the factors that influence behaviour were constant. However, it could not shed any light on why certain factors produced a behavioural change. It could not explain why a rat chose to take a longer, scenic route to food when there was a much more direct route available. With an increased number of factors affecting human behaviour the model became quite limiting. To understand these factors it was necessary to expand the "black box" theory and find ways to examine subjective variables.

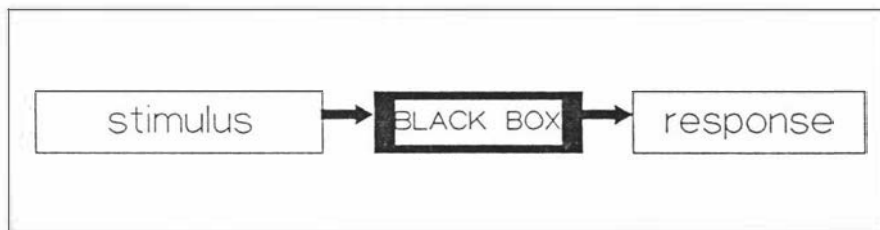
The first step is to determine what variables to focus on. The basic behaviour model has to be expanded to give a more comprehensive view of the problem-solving/information search phenomenon. At this point it is useful to consider Roger and Shoemaker's (1971) model of the adoption of innovations, as shown in figure 2.

This divides the adoption process into four basic components: knowledge, persuasion, decision, and confirmation. This has expanded Skinner's behaviour model by segmenting the stimuli into the observable data and pressures that act upon the "black box". It hints at the extended definition of information that is described later in this thesis (chapter²). It also shows that a response to a stimulus is not a single event but has a feedback component which influences subsequent behaviour.

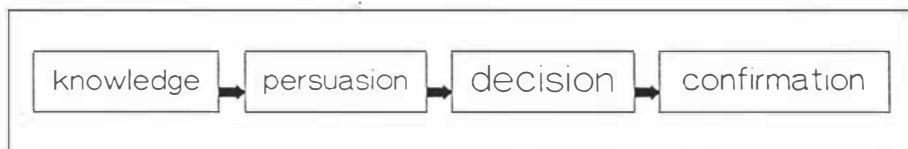
¹ The term "black box" is not attributed to Skinner specifically. However, it is an appropriate phrase to describe Skinner's basic tenet that behaviour is a system in which changes in response to variations in inputs can be studied, even though the internal process of changing cannot be examined. (Laser, 1962).

². It is unfortunate but necessary that the definitions of information and information management have to be discussed at a later stage in the development of this issue in order to maintain the sense of the present argument.

Figure 1: Basic behaviour model in which only the stimulus and response can be measured



**Figure 2: Basic adoption of innovation model
(Rogers and Shoemaker)**



When the ramifications of the adoption model are considered, it is possible to see the cyclic nature of the problem solving/information search process. A new event must be seen in light of information assimilated from previous events. This will be discussed in more detail later, as it is at the heart of the research paradigm used in this study.

The model can be expanded even further by combining it with the consumer behaviour model of Engel, Kollat, and Blackwell (1973). This combination is shown in figure 3.

The working model now recognizes the distinction between those components of the process³ that are internalized as opposed to those that are visible outside the "black box". It emphasises the work done by cognitive psychologists to map the process of problem solving.

To explain the detail in the composite model it is necessary to look at the process from the perspective of the person trying to deal with a "new situation" rather than the full continuum of the adoption process. It is also necessary to introduce the concept of "problem solving".

The general definition of problem solving is the process by which a new situation is evaluated and information is used to determine or choose the most appropriate answer.

Within the definition of problem solving there are a number of issues that need to be discussed. Are there subjective as well as objective components of a problem? Is there more than one definition of a problem? What are the components of problem solving? What is meant by information? What factors influence the appropriateness of an answer? To deal with these questions in a productive manner, the inter-related concepts of problem solving and information management have to be put into perspective.

PROBLEM SOLVING

A "problem situation" can be defined as an event (in the broadest sense of the word) in which a barrier stands in the way of a move (Dervin, 1976) (Berner,

³ At this point the "process" refers to the set of observable and hidden events that lead to some observable behaviour. The behaviour would indicate that a person has made sufficient sense of a "new situation" to act.

Figure 3: Combined adoption and behaviour model

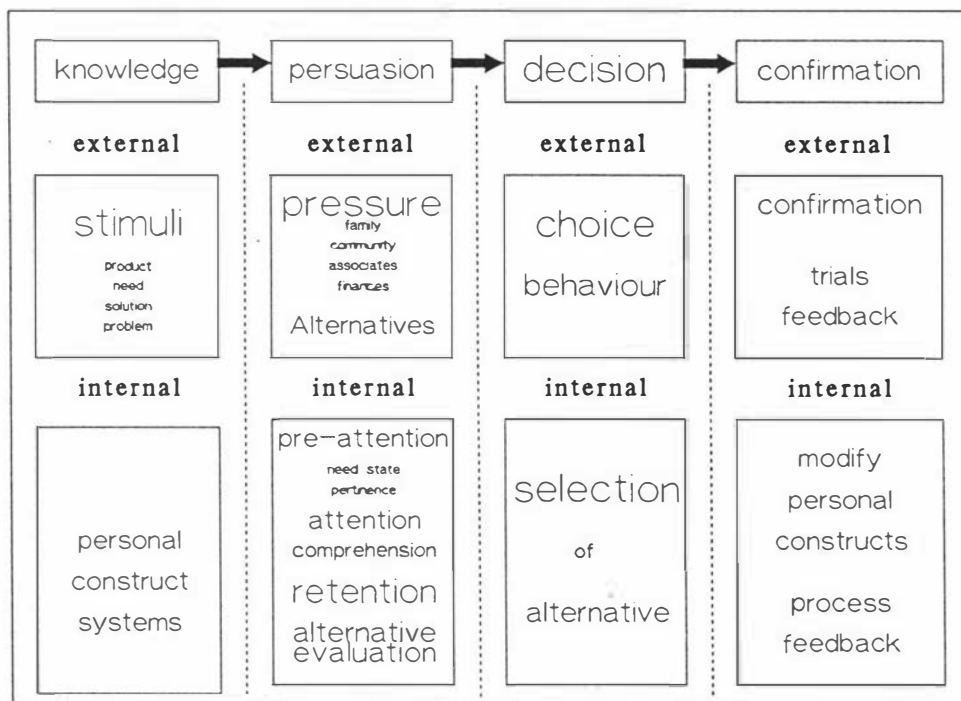
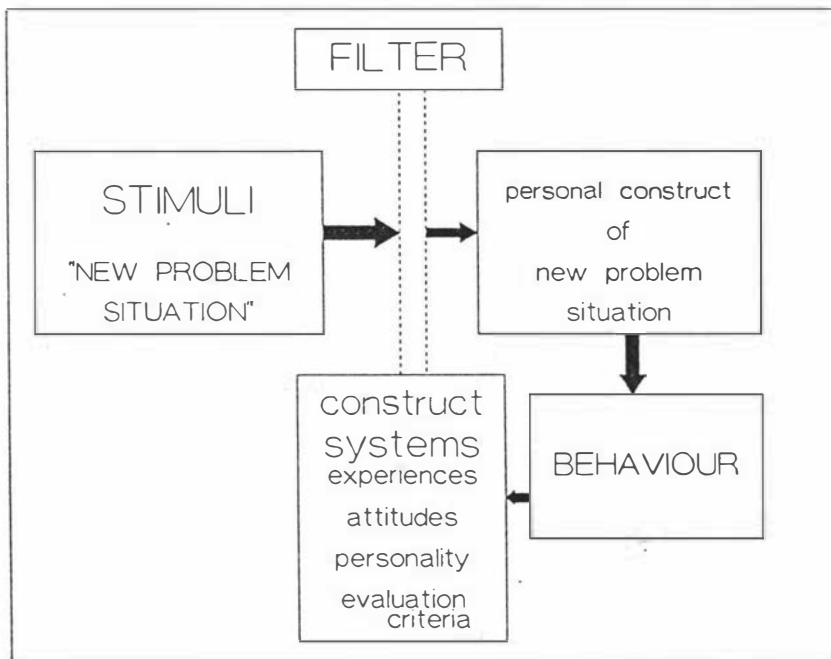


Figure 4: Information filter and personal construct model



1984). It may or may not have an element of distress in which the participant perceives a lack of predictability or control over the outcome. The participant may have the confidence that the barrier can be removed and, as a result, is not particularly concerned. However, the barrier must be dealt with before any further action can be taken. Aspects of a problem situation are:

- 1) objective reality of the problem,
- 2) context of the problem,
- 3) attention to the problem.

The first aspect to be considered is the objective reality ("knowledge" in Rogers and Shoemaker's model) of a problem. It is data that can be identified and measured, consistently. It is independent of the participant. This component of the problem will be discussed in relation to the definition of information.

The context of the problem is the time and setting of the event, the characteristics of the participants, and the personal definition of the significance of the relationship of these components. It is the environmental influence ("persuasion" in the model) on the perception of the problem.

However, attention to the "problem situation" is the critical factor in problem solving. There is much more happening around us than we could possibly deal with at any one time. Our senses are being assailed all the time, and if we did not have some defense mechanism we would all be suffering from permanent information overload.

We all have a finite capacity to process information. Figure 4 represents a different perspective of the same process shown in figure 3. It looks at the issue from the actor's point of view. It introduces a number of additional terms and concepts like personal constructs and systems, evaluation criteria, and information filter which are needed to describe the variability of the phenomenon that is being studied.

The information filter is a mechanism that blocks out whatever seems irrelevant to our current needs. When this "filter" is in use extraneous stimulation is either temporarily or permanently filtered out. The filter as it applies to the process of attending to sensory input was investigated by Broadbent (1958). He postulated that information can be received by only one channel at a time. Other researchers investigated the filter and found that it was used selectively to control what information was attended to (reached a conscious level). For example, unattended messages

were not lost immediately but were attenuated. We have all experienced this phenomenon when we remember later that something happened in the background while we were engrossed in an activity and hence did not notice at the time. However, as Treisman (1960) described, at any time a peripheral message may override the message that we are concentrating on if it is more important according to our perception (evaluation criterion) of the importance of the message; for example, when we hear a fire alarm.

With a limitation on the volume of sensory input that can be processed at any one time, it becomes imperative that information is processed as quickly as possible. Each individual develops "meanings" or schemata to deal with events. These schemata become the criteria for evaluating events. A schema is "an abstract and generalized rule or heuristic regarding the regularities in the relationships of events" (Stotland and Canon, 1972, p. 67). These schemata determine whether a situation is attended to and even the subsequent behaviour that is appropriate.

Once an event has been attended to, it is necessary for a person to define the problem. This is not as objective and logical a process as many people believe. In many cases it is not a matter of distilling it down to the bare facts and choosing the "correct" answer because "correctness" may be irrelevant and inappropriate as the criterion for selection of an answer. There are so many subjective variables involved in the selection of an appropriate response that rules of logic are inadequate.

A statement like "choose the most correct answer" presupposes a common definition of the question/problem⁴. It seldom elicits a common response.

⁴ For problems that have only one answer it is possible to consider the selection of the "correct" answer. In fact, when investigating the process of problem solving, cognitive psychologists eliminate the multi-dimensional nature of all problems to reduce the effect of additional variables. This simplifies their trials. However, when the researchers eliminated variables they "decomposed" the decision task (Slovic, Lichtenstein 1971; Slovic, Fischhoff, Lichtenstein 1977). As a result they were left with a false impression of the process used to solve the problem because many of those excluded variables were quite relevant to the process. In fact, according to Ebbesen and Konecni (1980) the decision rules and processes were created to fit the specifics of the task. Therefore, eliminating variables changed the task and the researcher investigated something that did not exist except in the experiment. It would seem that it

This is because an event, like a "problem situation", is a blend of the innate structure or pattern of reality, the definition of reality formulated by the participants in the event, and the procedures (schemata) that the participants use to make sense of and react to the event (Dervin, 1976). Only a fraction of this blend is made up of objective data. The "problem situation" context and the previous experiences of the participants alter the perception of the problem. This altered perception, in turn, influences the way in which the problem is solved. It is at this point that the models in figure 3 and 4 begin to make sense in relation to each other.

In most situations there are as many alternative solutions as there are people defining the problem. As Cohen and Christensen (1970) said,

"... we shall need to inquire into the basis of our conduct when the information at our disposal is felt to be incomplete. We shall have to understand actions under varying degrees of subjective uncertainty, which may range from paralysing doubt to whole hearted conviction."

Therefore, it seems appropriate to consider the main tenets of George Kelley's personal construct theory (Bannister and Fransella, 1981) as shown in figure 4. Kelley believed that the basic unit of measurement is the person and that you cannot dissect the person into components like cognition, attitudes and social interaction to investigate each one in isolation without drastically altering the processes that the person uses. This is necessary because each person develops a "personal construct" of the situation based on experiences, attitudes, personality, and "evaluation criteria". The "person" in Kelley's theory corresponds to the "central control unit" in Engel, Kollat and Blackwell's (1973) consumer behaviour model⁵ and the "black box" in the simple behaviour model (figure 1).

is imperative that any investigation of problem solving should try to maintain the complexity of the task even though this is likely to produce a number of alternative appropriate solutions, and, as a result, complicates the investigation.

⁵ The 1973 edition of Engle at al is used in this case instead of the 1978 edition because the newer version deemphasizes the central control unit. The composite model in figure 4 does not show the "central control unit" but implies someone is adopting something.

Considering the many variables that influence the way a veterinarian deals with "new problem situations" it would seem appropriate to use a combination of the adoption of innovation model, the consumer behaviour model and Kelley's personal construct theory as a foundation for a substantive model of the veterinary problem solving process.

Kelley's basic principle is that a person behaves in a manner which is consistent with the anticipated development of the event based upon his/her construct systems. For example, when some people go to the dentist they expect it to be a painful experience. Previous experiences of similar situations are used by a person to predict the way the event will develop and what the outcome will be. This means that he/she chooses to act in a way that is consistent with the way he/she has understood (internally constructed) the situation.

Everyone has sets of experiences that are used to give "meaning" to an event. The "meanings" as expressed by Herbert Blumer (1969) in his concept of symbolic interaction would be very close to Kelley's internal constructs. Blumer's theory is based on 3 premises:

- 1) People act toward things on the basis of the "meanings" that the things have for them.
- 2) The "meanings" are derived from social interaction.
- 3) These "meanings" are handled, modified, and interpreted by people in dealing with the thing encountered.

In this context even the most technical and scientifically based situation will have a personal element in its definition. As a result, no two people will see and interpret an event in exactly the same way.

Problem solving per se has not been investigated in the veterinary profession but it has received considerable attention in the field of human medicine. There are many similarities between physicians and veterinarians. Professional training, problem situations, client and professional expectations that affect performance are remarkably similar. Therefore, one could postulate that the problem-solving research done by Elstein, Schulman, and Sprafka(1978) and others (as reviewed by Berner,1984) could be used to describe veterinary problem-solving with very little modification.

Elstein et al found that within the medical profession:

- 1) Problem-solving was highly problem-specific and context dependent.
- 2) Hypotheses were used to organize data in short term memory.
- 3) These hypotheses were generated very early in the initial examination of the patient.
- 4) No matter how complicated the problem was, only a small number of hypotheses were generated for a problem.

These findings were all consistent with general research on cognitive theory and the role of short and long term memory (Simon 1969, Newell and Simon 1972, with an overview in Mayer 1983 and Wallsten 1980). Elstein's research also noted that diagnostic competence was problem-dependent rather than consistent across physicians. In addition, the physician's anticipation of the outcome of the case directed the problem solving behaviour. This is consistent with Kelley's personal construct theory. The problem space (the total relevant information area - Newell and Simon 1972) in diagnostic situations is much too large to be managed without creating some initial hypotheses (schemata) to reduce the area to be investigated and to direct the search for information. However, early hypothesis generation leads to a much narrower perspective within which the problem is subsequently investigated.

McGuire(1985) in her critique of the medical problem-solving literature has put forward a critical interpretation of the research. She comments that:

" Studies to date strongly suggest that the best predictor of outcome accuracy (diagnosis) is the inclusion of the correct hypothesis in the initial ones considered."

She goes on to say that

"At least, implicitly or intuitively, (decisions) are based on crude assessments of probability... and these perceived probabilities are often considerably less than accurate and plagued with overconfidence".

She makes the comment that it may not be hypotheses at all that physicians form but merely a recognition of a pattern or template of the problem that is used to match to templates already stored in long term memory - purely a matter of associative retrieval rather than

strategy-guided search. This may be overstating the case, but patterns repeated frequently enough would greatly influence behaviour through a strongly held schema.

This all implies a patterned, reactive behaviour process of problem-solving which is highly personal and which greatly depends on the way in which the diagnostician has internally constructed his\her view of the context of the situation. It is clear that, for physicians, factors other than the technical principles of their profession modify their personal constructs and, as a result, their problem-solving behaviour.

It is not intended to confirm the similarities between veterinarians and their medical colleagues in this project. The comparison is made solely to take advantage of the research into clinical problem-solving by the medical profession. The parallels will have to remain unverified for the present. Suffice it to say that the basic similarities between veterinarians and physicians are obvious and the behaviour is consistent with general principles of cognitive and personal construct theories. Problem-solving by physicians (and, by implication, veterinarians) is not predominantly a matter of inductive reasoning with "reserved judgment" as extolled by their formal training but rather a process of deduction based on hypotheses generated very early in an investigation. The hypotheses focus the deductive reasoning and, therefore, both direct the search for information and influence the subsequent diagnosis.

This behaviour is the basis of the substantive theory of information search process that directed this research. Attention to the problem, definition of the problem, selection of strategies to solve the problem, and expectations concerning the appropriate nature of solutions are all influenced by the personal construct of the participants in the event. This personal construct is a blend of the innate problem structure, the imputed "meaning", and the information acquisition procedures. Therefore, any examination of information search must consider the personal, subjective aspects of the process.

However, it is intended to put diagnostic problem-solving aside and concentrate on the specific component of the problem-solving process referred to as information search. What motivates a search for information? What factors influence the strategies used and the depth of the search?

Clinical problem solving is only one type of innovation that medical professionals have to deal with. Considering Bannister and Franzella's argument, it is

probably safe to assume that the development of a personal construct of any innovation, whether it is a new clinical condition or a new drug, will direct the search for information.

It is believed that factors other than technical considerations influence the strategies used to gather information and the selection of information sources that are considered appropriate and useful. At this point it is important to clearly define what is meant by information management.

INFORMATION MANAGEMENT

Information: The definition of information is as broad as could be imagined. It is not necessarily a fact per se but is anything external or internal that is used to make sense of what is happening or will happen. Information has been divided into 3 main components by Dervin (1976) as follows:

- 1) the innate structure or pattern of reality,
- 2) the structures imputed onto reality by people,
- 3) the procedures by which people acquire what they didn't know previously, by which people are informed or instructed.

This is similar, in principle, to the intent behind Cohen's classification of information into two major categories- selective and semantic. Selective information (point 1 above) is quantitative and refers to what could have been conveyed, not what was actually conveyed. Semantic information (results from points 2&3 above) is qualitative and refers to what was actually conveyed. There is no guarantee that in any particular information transfer situation the selective information is the same as the semantic information.

It is easy to see that selective information (confirmable fact- sensory stimuli) is altered by the receiver to produce the semantic information that is used to solve problems. In other words identical "knowledge" (in the objective sense) of a problem can have different behavioral effects depending upon the beliefs of individuals about the significance of that knowledge. This also highlights the limitations associated with describing information management in relation to objective data only, and the delay in the definition of information until the theory of personal constructs could be explained.

Information management: Much of the research into the cognitive process (thinking) has been done in response

to the growing interest in the development of artificial intelligence in computers (Simon 1969, Nilsson 1971). Researchers found that they could not program a computer to do something that was not thoroughly understood. Computer concepts like naming files, searching, retrieving, storing, entering, reading, etc., are descriptive terms of the process of information management, and are very appropriate to describe the human thought processes.

Therefore the definition of "information management" is the process of finding, storing, and using any relevant data (facts, attitudes, impressions, or rules). Of this encompassing term the decision to look for additional information was the point of focus for this study.

It is obvious why the "black box" theory was so comforting. The complexity and variability of the issue presented methodological difficulties in designing a research project that would achieve its objectives. The literature describing information research was examined to see what solutions had been found in previous studies.

RESEARCH STUDIES ON INFORMATION SEARCH BEHAVIOUR

Information specialists have been working in a number of disciplines to try to find an appropriate research tool to measure the problem solving/information search process. Even so, as Stone (1982) said, present literature gives little guidance as to how to meet the information needs of people. The implications of the research that has been done is unclear (Wilson, 1984). The discussion of the methodological problems associated with the investigation of the problem solving/information search process revolved around two specific issues. One was the debate as to the appropriate place for quantitative and qualitative research. The other issue was which of the basic information research paradigms could be used.

Qualitative versus Quantitative Research

It is clear that the subjective nature of the inquiry and the lack of baseline information about what veterinarians do when faced with a new situation required an in-depth examination of the phenomenon first. There has been specific encouragement (Duffy, 1985) for an initial concentration on qualitative data in medical research as well as in any research concerning human behaviour (Taylor, 1972; Bogdan and Taylor, 1982; Denzin, 1978).

The initial fascination of social science researchers with quantitative methods to the exclusion of the more subjective data of in-depth interviews has given way to a much more balanced perception of the value of this type of information.

Specific tools have been developed to maximise the useful information gained through qualitative research (Pelto and Pelto, 1978; Becker and Greer, 1957; Lofland, 1974; Glaser, 1965; Glaser and Strauss, 1967).

This does not deny the value of quantitative methods but indicates that they are inappropriate in the initial exploratory stage of an investigation in which the objective is to develop a theory of what is happening. These methods are much more valuable when confirming the significance of hypotheses generated from qualitative studies. In the present study qualitative methods were used first, followed by a quantitative survey as recommended in the research methods literature.

Research Paradigms

Previous research into problem solving and information management were germane to the present study (Taylor, 1962; MacMillan and Taylor, 1984; Friedlander, 1973; Hanson, 1971). The area of inquiry contained the process of making sense of an innovation within the broader topic of information management. The literature indicates that this type of study could be approached from a number of different perspectives based on what was being investigated and how it was to be investigated.

Studies in the late 60's and early 70's concentrated the inquiry into what the respondents felt about existing information services. The channels of information were the focus instead of the content. By the mid 70's the increased access to electronic data processing and computers inspired further studies into attitudes toward systems. While these studies produced useful information they did not examine the process of information search used by the respondents.

At the same time there were studies concerning information use which concentrated on the fact that respondents all belonged to the same interest group. These studies were based on the hypothesis that common interest will be expressed as common need for information. They looked for common factors that were related to being part of a group, as indicators of information search behaviour.

These early studies did contribute to the base knowledge of information researchers, but they used the "black box" theory as an axiom. Later studies were characterized by a paradigm shift that tried to capture the individuality of the information search process. They looked at search strategies, expectations, information needs, and barriers that prevented successful information search.

The studies could be divided into 3 distinct information research paradigms as described by Dervin (1984). These included:

- 1) attitudes toward existing services,
- 2) common characteristics associated with group membership,
- 3) the process of information search (motivation and behaviour).

Each of these paradigms had their limitations but the principal difficulty was associated with the arbitrary separations of attitudes, characteristics and behaviour. This is contrary to the "personal construct" paradigm (Bannister and Fransella, 1980) in which researchers should examine the person, event, and environment as a whole.

There were important factors highlighted in the review of information search research (Dervin, 1984). It was clear that the particular paradigm used to design a study determined which factors were emphasised. Therefore, to avoid over-emphasis of any particular aspect of the search process, it was decided that each of the 3 paradigms had its merits and should be incorporated into the design of the study.

The preceding discussion leaves us with a general theory governing the process of problem solving/information search which is characterized by an individual's personal construct of the new situation. The following study applied this generalized theory to the specifics of veterinary information search in such a manner as to maintain as many dimensions of the process as possible. Data on common characteristics of veterinary practitioners, attitudes towards existing information services, and the specific search behaviour were collected to translate the general theory into a substantive description of veterinary search behaviour.

CHAPTER 2

VETERINARY INFORMATION SEARCH PROJECT

PROJECT STRATEGY

There were two basic approaches to the gathering of the relevant data. The initial exploration of the search behaviour used qualitative techniques to gather in as much pertinent information as possible. This information was developed into a substantive theory of the search process and then tested using a quantitative survey of practitioners.

With the objective and the theoretical perspective of the project set, the study was divided into 3 phases. The first phase was an exploratory, qualitative investigation of the search process. In-depth interviews with practitioners, historical documents related to information needs, group discussions with veterinary students and literature review were all used to examine the search process. The in-depth interview and discussion group transcripts as well as a limited selection of historical documents relating to the information needs of practitioners were examined using content analysis and comparison of data. This process is described in chapter 3.

Phase 1 was purely qualitative and descriptive. The objective was to describe, in depth, the phenomenon of information search used by a segment of the veterinary population, the concepts they used to describe the phenomenon, the limitations and barriers to effective information search that they experienced, and their perceptions of the sources of veterinary information. This information was used to develop a theory of information search that would explain, substantively, the search behaviour used by veterinarians.

In the second phase of the study the substantive theory developed in phase 1 was tested by means of a quantitative survey to confirm the representative nature of the theory. The survey took the form of a postal questionnaire in which the choice of questions, the wording of the questions and the lists of responses were grounded in the data gathered in phase 1.

The questionnaire was sent to all veterinary practitioners and analysed to confirm or refute the theory of veterinary information search developed as representative of clinical practitioners in general as

well as being substantively appropriate for the interviewed sample.

The third phase involved in-depth interviews with decision makers in some of the most commonly used veterinary information sources. This phase was designed to identify any discrepancy between information search behaviour as described by veterinarians themselves and the perception of the process as seen by the suppliers of the information. However, the subsequent hypotheses developed during this phase were not tested using a comprehensive survey as in the case of the practitioner data.

The three research paradigms (attitudes toward existing services, common characteristics of group members, and examination of the search process itself) described in chapter 1 were used in each contact with veterinarians and information sources. As a result, each interview or questionnaire had demographic information, motivational and behavioural details, and attitudes towards existing services. The mix of research paradigms, data sources, and collection techniques produced a highly complex matrix. For convenience and clarity the results were separated into data relevant to each research paradigm for initial analysis/discussion and then re-examined across paradigms.

The process of separating the results into components based on research paradigms made it easier to compare the conclusions drawn with those of others studying information search. It also meant that the components focused on the line of inquiry rather than on the data collection technique. For example, attitudes towards existing services as indicated in the postal questionnaire were expanded upon using the more illustrative data from the in-depth interviews. This, in combination with the demographic profile of the profession and previous general information research gave a clearer impression of attitudes toward the services. This is an example of triangulation of data as described by Robinson (1951)¹.

THESIS DOCUMENTATION

The documentation of the study is separated into the same components. Chapter 1 discussed the theoretical perspective in regards to problem solving, information search behaviour, information management, and

¹ Robinson explains how different data sets, different observers, and different theories combine to give a supportable composite view of a phenomenon.

information research, which was used to determine the appropriate strategy for the project as described in this chapter.

This is followed in chapter 3 by a detailed description of the process of content analysis and constant comparison as described by Glaser and Strauss (1967), which has been used in the present study.

Chapter 4 describes the findings from the postal questionnaire.

Chapters 5,6, and 7 deal with the results of both the interview phase of the study and the postal questionnaire. Each chapter is based on one of the 3 research paradigms. Chapter 5 gives the results of the demographic section of the postal questionnaire. This has been supported by a separate study of the 1985 registration data collected by the Veterinary Surgeons Board.

Chapter 6 concerns the process of information search. It includes:

the reasons veterinarians gave for initiating an information search,
what they felt their clients expected of them,
what search strategies they employed,
what attributes of information and sources they considered important,
what determined the reliability of information,
and other factors influencing search behaviour.

Chapter 7 describes the result of the inquiry into veterinarians' attitudes towards existing information sources and formal information formats.

Chapter 8 considers the implications of the results of the previous 3 chapters in relation to each other and in relation to meeting the information needs of practitioners.

Chapter 9 discusses the methodological tools that were used in this study. It restates how these tools were appropriate to describe the subjective nature of information search. The chapter also includes some concluding remarks on the results and significance of the study.

The appendices include a copy of the Questionnaire, the covering letter, the follow-up letter plus a report of the 1985 Veterinary Surgeons Board Statistics.

CHAPTER 3

GROUNDED THEORY - COLLECTION AND ANALYSIS OF
QUALITATIVE DATA IN THE PRELIMINARY
RESEARCH INVESTIGATION

For very practical reasons it is important to confirm that research hypotheses can be applied to the whole population with an acceptable degree of confidence. Careful research design and application of statistical tools will assure the reliability of the data collected. However, if the initial hypotheses are based on inappropriate assumptions held by the researcher, the results could be highly significant from a statistical point of view and, at the same time, totally irrelevant. This is especially possible when what is being investigated is dependent upon human behaviour. Assumptions as to why people behave as they do will always have a profound influence on a researcher's line of inquiry and the conclusions that are drawn.

Researchers in the physical and biological sciences are much more comfortable with quantitative research methods such as surveys and trials. However, as was clearly discussed by Duffy(1985) in her plea for more phenomenological research in the field of medical care, the use of quantitative investigation methods are important to confirm hypotheses, but they are not appropriate for the generation of the hypotheses in the first place. The restrictions on a quantitative study necessary to insure the reliability of the data distort the phenomenon to such an extent that the validity of the research is questionable. Her sentiments are a reflection of BG Glaser's comment:

...while the verification of theory aims at establishing a relatively few uniformities and variations on the same conceptual level, the generation of theory should aim at achieving as much diversity in emergent categories, synthesized at as many levels of conceptual and hypothetical generalization as possible.¹

Since, in a preliminary investigation, the primary objective is to develop a theory about what is happening in the situation, a qualitative assessment of

¹. Glaser BG, Strauss A. The Discovery of Grounded Theory; Strategies for Qualitative Research. Aldine, 1967 pg 37

the phenomenon is more appropriate. Therefore, phase 1 concentrated on gathering as many perceptions of the search process as possible.

To eliminate any preconceived ideas concerning the process it was important to concentrate on the validity² of the data collected rather than its statistical significance. The information that was gathered in this phase of the study was not quantifiable in a head counting sense. It included quite subjective perceptions. As a result, it was always possible to make invalid assumptions from subjective statements. However, this danger was minimized by applying the technique of triangulation (Robinson, 1951). The term is much more common in the field of land survey but the objective is the same. A surveyor pinpoints the exact location of an object by taking a compass bearing from 3 different locations. In a similar manner a subjective event can be looked at from a number of different viewpoints. Each viewpoint is subjective in itself but when combined they give a more reliable picture of the event. It is possible to triangulate relevant information from pre-existing theory, alternative sources of data (ie interviews from different groups, historical documents, examination of services, etc.), and observations of other researchers (Miller and Evko 1985).

There is not complete agreement as to how to gather and analyse such data. However, social scientists have developed research techniques to reduce the uncertainty and subjectivity of data associated with behavioural research. These qualitative techniques played an important role in the initial investigation of the search process used by veterinary practitioners.

Two such tools, described by Glaser and Strauss (1976) in their investigation of hospital care for patients and nurses' attitudes towards patients, were used in this study. A combination of content analysis of interview transcripts and documents and constant comparison (Glaser, 1965) were used to identify and justify plausible patterns of behaviour and to suggest, where appropriate, theoretical frameworks of interpretation. The tools were used to create a substantive theory grounded in fieldwork data by defining the line of inquiry "... from the actor's own frame of reference" (Bogdan and Taylor 1975).

². For a discussion of the difference between validity and reliability see Lehmann 1979 pg 94.

METHODOLOGY

SAMPLE SELECTION AND INTERVIEW TECHNIQUE

As Glaser and Strauss suggested, the selection of interviewees was based on a desire to include as many divergent subgroups of the population as possible. Practically speaking, this meant that individuals who were likely to challenge the developing behavioural patterns because of unusual post graduate training, geographical isolation, age, sex, affiliation to professional groups, etc. were included in the sample.

There was no specific sample size or composition set at the beginning of the investigation and the starting point was arbitrary. University veterinarians were the first group to be interviewed. The group included 2 veterinarians engaged in post-graduate study and a full-time member of the academic staff. This group was the most convenient while the interviewing technique (the questioning, taping, and transcribing) was being refined.

These first interviews were followed by a group discussion with 5 final year veterinary students. The group discussion technique was not used with any other contacts. It was felt that the technique was appropriate in this case because of the students' limited amount of veterinary practice experience.

At this stage practitioners were selected to represent as broad a cross section of the profession as possible. Of the 12 veterinarians interviewed, there were 2 recently retired and 2 recently qualified individuals. The range of years of veterinary experience was 1-25. There were 9 men and 3 women, 10 full-time and 2 part-time employees. As the part-time employees were both women, the part-time perspective was one-sided. (Subsequent demographic data indicated that there were very few men in part-time employment in the profession.)

The majority of veterinarians were located in the Palmerston North/Taranaki area, but a few were spread throughout the country from as far away as Whangarei and Alexandra. Most of the interviews were conducted in clinics but 2 were conducted in the interviewee's home. Twenty veterinarians were interviewed in all, and a further 7 interviews were conducted in phase 3 of the study using the same content analysis and constant comparison procedure.

The objective was to understand the phenomenon clearly. Therefore, as many potentially productive avenues of inquiry as possible were investigated. The net was

cast wide to capture significant variations in search behaviour. Not having a specific sample number or composition made it difficult to predict where the endpoint of the investigation was. This was a two-edged sword. Initially, it made the researcher apprehensive that the investigation would go on indefinitely. However, it also prevented any premature inflexibility in the inquiry.

CONTENT ANALYSIS

The interviews, which were relatively unstructured, were taped³ and transcribed later the same day. The audio-tapes were transcribed in such a way as to leave a wide margin on the left hand side of the page for analysis next to the relevant script (see figure 5). Transcriptions and analysis were completed as soon as possible after the interview took place. This was essential to preserve the non-verbal data (reactions, body language, impressions, etc.).

The transcripts were examined to identify categories (e.g. attributes of information) that related to the phenomenon being investigated. The technique emphasizes similarities in responses without requiring an exact match in terminology as in a key word count. The categories were expanded by identifying their properties (e.g. familiarity, on hand, current). A full inventory of the categories and properties are given in appendix A. In addition to categories and properties, the researcher's impressions of the subjects behaviour and the significance of comments were noted. The final notes are given in appendix E. Categories, properties, and researcher's notes were recorded in the space provided to the left of the transcript.

When the initial examination of the transcript was completed, each category was transferred to its own index card with its properties listed below (see Figure 6). The researcher's notes were transferred to a separate record sheet (Figure 7). At this point the resulting transcript, category cards, and researcher's notes were used as the basis of comparison between separate interviews.

³. From practical experience the audio-taping of interviews was essential to preserve the exact detail of responses.

Figure 5 : Sample transcript and initial analysis

Self-expectation Image of an expert	<p>I REALIZED THAT MY CLIENTS UNDERSTOOD THAT I COULDN'T KNOW EVERYTHING. BUT THEY EXPECTED ME TO FIND OUT AND GET BACK TO THEM WITH AN ANSWER OR SOME ADVICE. SOMETIMES I THINK THE OWNERS ENJOY BEING INVOLVED IN SOMETHING NEW OR UNUSUAL. WHEN I DON'T KNOW THE ANSWER, THE FIRST THING I DO IS DISCUSS IT WITH THE OTHER VETS IN THE PRACTICE. IF WE CAN'T COME UP WITH AN ANSWER OR IF SOMEONE REMEMBERS READING SOMETHING I CHECK THE TEXT BOOKS AND PROCEEDINGS THAT WE HAVE. JOURNALS ARE HARD TO FIND ANYTHING IN. I AM USED TO USING THE BOOKS AND PROCEEDINGS AND WE HAVE THEM RIGHT HERE.</p>
Client expectation Not to know everything To find out	
note: Veterinarians prefer to interact with the information source.	
Search strategies Discuss with colleagues Check personal library	
note: Veterinarians prefer using familiar sources.	
Attributes of information Retrievable Familiar On hand	

Figure 6: Sample category card with properties

Attributes of information
<p data-bbox="379 849 852 1455">practical specific instructions not too complicated accessible easily extracted information readily applied quickly obtainable must attract attention brief/to the point accurate readable contain references/contacts interesting</p>

Figure 7: Researcher's notes; Hypotheses

Client needs and satisfaction are the prime motivation for the search for information.

Current information is not as important as familiar and readily accessible information.

Veterinarians prefer their own libraries.

Information sources that are hard to use, time consuming, or unfamiliar are not used.

Time is the most important limiting factor influencing information search.

CONSTANT COMPARATIVE METHOD

The method is divided into 4 stages:

- 1) continually comparing incidents
- 2) integrating categories and properties
- 3) delimiting theory
- 4) writing theory

Comparing incidents

As each event was documented the researcher referred back to previous events to see if categories and properties were being repeated or new ones generated. The category cards were expanded with each additional event. Patterns of responses emerged quickly. For example, veterinarians repeatedly commented that time was such a critical factor that most information searches were related to current problems rather than in anticipation of need.

In the early stages it was very important to compare each event. However, as additional events were processed the point of comparison shifted from an individual event to a generalized event generated by the comparison process.

Integrating categories and properties

Repeated responses suggested a behavioural pattern. Not only did categories become obvious but the interrelation of categories began to emerge. These interrelations were also recorded as researcher's notes which, subsequently, became hypotheses (eg veterinarians prefer information that is immediately at hand).

When the investigation began, the researcher had to make some assumptions in order to direct the first interviews. However, with the constant comparison method, these assumptions were replaced quickly by the new grounded hypotheses. The researcher's biases were eliminated as soon as possible.

This also allowed a finer focus on the area of inquiry by constantly reassessing the investigation. For example, it was clear that there were a number of career choices (part time employment, senior managerial position, etc.) made by veterinarians which influenced their search behaviour. However, to investigate the implications of these decisions was not within the scope of the study. Therefore, the line of inquiry was directed away from this particular aspect.

The collection of interview events was terminated when no new categories or properties were found. Not all the hypotheses were robust enough to withstand repeated challenges. Those that were not repeated in subsequent interviews were eliminated. For example, final year students were concerned about admitting to their clients that they did not know the answer. This was the only group in the sample that shared this concern. The original hypothesis, "veterinarians need to be seen to know everything" was replaced with "as veterinarians gain personal confidence they are more comfortable with saying - 'I don't know'". Hypotheses were reworked to be as specific and inclusive as possible.

Delimiting theory

The decision as to the extent of the investigation was not as arbitrary as it seemed at first. Just as Glaser predicted, the data itself generates the cut off point. The collection of events was terminated when no new categories were found and the existing categories became saturated with properties (no new properties volunteered by respondents). Exceptional circumstances had been actively sought to test the durability of assumptions, and the accumulated information was subjected to a process of distillation. This refined information was used to formulate a substantive theory that described the phenomenon of information gathering and use by veterinarians.

Writing theory

At the completion of the investigation the researcher was left with:

- 1) a set of categories and their properties,
- 2) a set of hypotheses that integrated the categories,
- 3) the concepts, language and terminology used by interviewees,
- 4) the focus of the line of inquiry,
- 5) examples veterinarians used to describe search behaviour.

Developing the theory governing the search process was reduced to a matter of putting all the pieces of the puzzle together. It must be remembered that the objective was to create a theory, not to test pre-existent hypotheses. The theory was then used to design the quantitative research necessary to test the hypotheses that were still in question. It was possible to make a judgement as to which hypotheses needed quantitative confirmation and which seemed sufficiently robust to be accepted without further

confirmation. This allowed a much finer focus in the next phase of the study as described in chapter 4.

SUMMARIES OF THE CONTENT ANALYSIS AND COMPARISON OF IN-DEPTH INTERVIEWS

The following summaries of the interviews describe the way veterinarians perceive the search process and the factors influencing their behaviour.

PRACTISING VETERINARIANS

All respondents commented on the sheer magnitude of the task involved in being a general practitioner. The areas of knowledge required were extensive and change was occurring at an ever increasing rate. The perceived difficulty of the task had not changed the respondents' commitment and desire to stay up-to-date in their profession; there was a unanimous intent to search for the needed information to deal with innovations.

However, this intent was coupled with a pervasive belief that there was insufficient time to achieve that goal. The combination of a very large task, the perceived lack of time, and the urgency (real or imaginary) of the demands on time produced an environment that moulded veterinarian's behaviour patterns. The resulting information search was dominated by concerns for speed and efficiency at the expense of currency, comprehensiveness, and depth of understanding. Respondents were not in a position to search until they had a comprehensive answer. The process was much more pragmatic than that. As one veterinarian said, "I search until I'm confident I can act".

Time was valuable. The urgency of the problem structure and context or the urgency of other problems waiting to be attended to created a cut-off mechanism in the information search process.

Veterinarians use feedback from their clients as a major indicator of success and a determinant for further investigation. This is quite reasonable but at the same time the veterinarians recognized that they had to expend considerable energy and time prompting their clients for feedback.

Client satisfaction was such a strong influence on practitioner behaviour that, often, the search for

information⁴ was stopped when the client was happy with the results. Perceived client satisfaction with the veterinarian's treatment of the problem was sufficient to change the priority of the situation to such an extent that further investigation of the problem was out of the question, even though the veterinarian was not entirely satisfied with the conclusion. "When the client is happy, the veterinarian is happy". This was repeated by most of the respondents.

Veterinarians gave the impression that most innovative events are construed in the light of relevancy at the time. "I remember information when it relates to some problem I'm dealing with at the time". This was a common statement from the respondents and quite predictable in light of the research into cognitive and personal construct theory. The inverse was also expressed. Respondents said that information that was irrelevant at the time of introduction was very difficult to retain and recall. The implication is that the context of a problem has a major effect on subsequent information search behaviour.

With these introductory comments in mind, the other findings of the practitioner interviews delineate a clear pattern of behaviour in regards to the information search component of the adoption of innovations.

Speed and efficiency were paramount. As with the development of any skill, practice makes perfect and practice makes perfect-faster. Strategies used to make sense of an innovation appeared to be highly individual decisions. The multitude of information sources and the kinds of information made the search area look like an "information jungle" as one respondent described it. Each veterinarian had familiar paths through the jungle and the selection of strategies to use maximized the amount of time the veterinarian could stay on familiar ground.

Different strategies were used for different problems. In fact, the context of the problem determined the strategies used and the information gathered. It also determined the depth of the investigation.

The primary rule used to guide a search was: use the most familiar source first. The source the veterinarian used most often to solve a particular kind of problem was the one which required the least expenditure of energy. This need for a close association with the source and the information was

⁴ In fact, many times, the recognition of an innovation in the first place was related to a client inquiry.

emphasized by the consistent preference for familiar publications (usually text books) that contained a comprehensive index and were present in the veterinarian's own library. It also explained why the discussions with colleagues in the same practice were so valuable to all the respondents. Specialists and consultants were most valuable when they were known personally.

When searching for information, the veterinarian often did not know what was needed. Information sources were regularly used to clarify a problem as well as to supply a specific piece of information. To meet this need, personal interactive contact with familiar helpful sources was a preferred strategy. The reasons given were the speed of the answer and the opportunity to interact for clarification of the problem and the answer. As one veterinarian said, "I prefer to direct questions to people I know. It's faster and more effective, and I respect their opinion".

Veterinarians had their preferences for information sources. Different sources were preferred in different search situations. Sources which encouraged contact and interaction were rated higher than those with perceived greater expertise and currency.

For example, commercial travellers were considered an important source of information. However, they were considered more valuable to single person practices and to practice managers. The rapport between the veterinarian and the commercial representative affected the attitude of the veterinarian towards the company itself.

Veterinarians also preferred specialists who were easy to work with over those who had more expertise but were difficult to work with for one reason or another. This assumed that there was sufficient confidence in the specialist and his\her information.

There was a rationalization of the veterinarian's level of expectation (Lindblom,1977) in a new situation. Since decisions must be made with imperfect information, the veterinarian had to make a decision as to the degree of imperfection that was tolerable.

When it came to confirming the value of the information received, the principles of speed and efficiency became critical factors once again.

As one respondent said "it is a pain to have to confirm information". The need to verify information was kept to a minimum by:

- 1) Discriminating as to the reliability of a source. Characteristics identified were:

previous experience of reliability
 professional reputation of the source
 obvious back-up resources of the source
 length of time the source has been established
 frequency of contact with the source

- 2) Testing the information against the veterinarian's construct systems. This is consistent with the principle of incrementalism which states that people are most comfortable with new ideas that are only slightly divergent from existing experience.

These two heuristics (rules of thumb) were used by all the veterinarians interviewed. They were influenced by the time consuming nature of confirming information. As one respondent said, "If the information felt right and it came from a source that I trusted, then I could use it with confidence".

FINAL YEAR VETERINARY STUDENTS

The final year students were interviewed in a group situation to take advantage of the interaction of participants, since they had very little practice experience.

Their perception of the future was limited because it was developed entirely through their work/study experience with veterinarians and farmers. They felt that the formal training over the last five years at university was not designed to prepare them for the practicalities of the real world.

They perceived everything as a new problem situation and were very concerned about the development of their professional image. They could see that there would be many occasions when they would need more information. They hoped that their need to search for information would not be too obvious and that it would not affect their client's perception of their abilities in a negative manner. They felt that their clients would be expecting them to have all the answers. This appears to be the voice of inexperience. When practitioners were asked how they felt about a situation where they had to tell their client that they did not know the answer, the veterinarians had a clearer conception of what their clients expected of them. One said, "I realized that my clients did not expect me to know

everything". Experience made veterinarians more confident in their role as the health advisor. As a result, they were much more comfortable in the situation.

The students were depending on the help and loyalty of the more experienced veterinarians. They felt that their primary search strategies would be consultation with colleagues and checking in their personal library.⁵

They also saw information sources as institutionalized. There were potential categories that they thought were available. This was distinctly different (but understandably so) from the practitioner's concept of a source. It appears that after graduation source organizations are rapidly replaced by individuals within organizations -- to such an extent that the organizations were only mentioned after considerable prompting by the researcher, even though the respondents volunteered individuals within those organizations as very important information sources.

Time was still considered as the most important limitation on information search. Familiarity and accessibility were the attributes that were most highly prized in both the information source and the information itself.

An unusual aspect of the discussion with the final year students was the pervasive theme of distrust. They were depending on the support of their colleagues, but they were prepared for lies and half-truths from other groups which they knew they would have to depend on for information. The discussion group agreed that they should, "Always suspect a drug-salesman". It was not possible to determine what the source of this attitude was but it was clear that it was not held by practitioners to anywhere near the same extent.

Students were concerned about understanding the problem sufficiently to explain it to their client. They were also concerned about how they were going to fit into the greater community as a "medical professional". All of these pressures and conceptions colored their technical considerations and responses. In contrast, even the most recently qualified veterinarian interviewed did not volunteer any of these concerns. While the practitioners spoke of maintaining their reputation it was from a position of confidence and understanding of the explicit and implicit

⁵. students identified their university notes as an important information source. This source was also volunteered by practitioners even though the notes were hand-written and quite old.

reciprocities of the veterinarian/community interaction.

The sources of information that the students identified were the same as those identified by practitioners. However, they were theoretical and impersonal. The students identified a few extra sources like meat works and the Meat Division of MAF. They prefaced these possibilities with the comment that they thought they would have information. Most of the practitioners did not include non-veterinary professionals in their list of sources.

UNIVERSITY VETERINARIANS

This group consisted of veterinarians who were associated with the Faculty of Veterinary Science at Massey University. Most of the respondents had gained experience in practice before joining the faculty.

The experiences of this group closely paralleled those of the practitioners, with a few interesting exceptions. The university veterinarians had more opportunity to narrow their field of expertise. They could specialize more and concentrate their information search because of this specialization.

They preferred personal interaction with an information source just as did the practitioners, but they had better access. They cultivated a "network of human resources" to speed up their information gathering and to cover a subject sufficiently.

Familiarity, accessibility, retrievability, and speed were all important attributes of a source and its information, but the motivation for search was modified by their work environment and others' expectations. They took the role of specialist/expert more frequently and, as a result, they felt a more pressing need to be "up-to-date".

The depth of information search increased. Self-satisfaction and interest were more prominent in initiating and maintaining a search. Client satisfaction did not have the pervasive influence on behaviour as it did with practitioners.

Time was still the limiting factor but it took on a different aspect. There was less uncontrollable and unpredictable consumption of time than that experienced by practitioners. However, university veterinarians expressed a greater concern for the necessity to spend time on routine information searches. They perceived that some aspects of the search could be delegated to assistants and post-graduate students while their time

could be spent in consultation and clinical evaluations.

Members of this group had the closest association with the information sources mentioned by the other groups, especially the scientific literature. However, they experienced the same frustrations of inaccessibility and irretrievability. Personal libraries and consultation with specialists still ranked high on the preference list as sources of information, even though the best collection of veterinary literature was only a few buildings away. Some respondents said that even that short distance was sufficient to limit their use of the facilities. This is corroborated by the persistent conflict at the university over where the veterinary collection should be housed.

It was clear that information processing time was more of a barrier to information search than accessibility. One might suspect that the practitioners' concern over accessibility would change to the real limitation of time if they had better access.

For the university veterinarians the information sources were the same as for the students, with a few exceptions. The sources had become more personal and less institutionalized. Meat works or Meat Division of MAF were not mentioned by the university veterinarians interviewed.

The attributes of an information source changed in priority to put ease of use and familiarity above current and comprehensive, but it was not as distinct a shift as in the practitioner group. The university veterinarians seemed to have many of the perceptions of practitioners, but their near proximity to information sources modified their search motivations and strategies.

The kinds of information used were more personal than used by students. Their use of the scientific literature was much more sophisticated than that of the students or practitioners. Their use of support literature, popular press, and commercial information was less than in the practitioner group.

The attributes of good information were the same as the students and the practitioners but, like practitioners, emphasized the more personal and helpful attributes.

The barrier to search was TIME.

CONTENT ANALYSIS AND COMPARISON OF
HISTORICAL DOCUMENTS CONCERNING INFORMATION SEARCH

The only documents that were found to be directly relevant to this study were the evaluation forms from the 1986 course evaluations of the Centre for Continuing Veterinary Education. Because continuing education is one of the information search strategies used by veterinarians, it was felt that their comments about courses were germane to the present study. The comments made by participants were re-analysed using the content analysis technique described in this chapter. The following categories and properties are a composite extracted from the evaluation forms:

Attributes of the course:

- length of course
- venue
- cost
- presentation
- pre-course advertising
- contributors
- support material
- course structure
- course content

Motivation to attend:

- understanding
- improve skills
- discuss cases/subjects
- add to knowledge

Limitations on usefulness of course:

- relevancy
- level of technical presentation
- practicality of information
- pre-course information
- course support material
- previous training
- competition between veterinarians
- time

When these categories and properties were compared across evaluation forms and courses there were some clear attitudes toward courses which were consistent with those expressed in the in-depth interviews with regard to the search process as a whole.

Finding time to attend courses was a major concern to participants. Efficiency in the use of time during the course was important. The veterinarians did not want to "waste time".

As far as the venue was concerned it had to be convenient and well suited for the course. The major objections were due to:

1. factors that limited the transfer of information (poor lighting, too much noise, etc.),
2. events that broke the flow of information (having to break up and move for meals and teas).

The preference was for facilities that "enhanced presentation and encouraged interaction and discussion."

Cost was related to returns. If the course supplied practical information that would improve skills, efficiency, and commercial potential, then cost was not a limiting factor.

The content of the course had to be relevant and practical. Superfluous technical detail had to be kept to a minimum. Practical cases, hands-on experience, and ample discussion were valued components of courses.

The amount of material had to be limited to what could be absorbed in the given time. Conflicting information needed to be resolved or put into perspective by the end of the session.

Presentations had to facilitate the assimilation of information. Poor acetates, overly technical presentations, having to take notes, all detracted from the usefulness of sessions. Contributors had significant influence on the participants' perception of the value of sessions. Personal image and presentation style were important factors.

Interaction between participants was considered very important. The size of the course and the course structure both seemed to affect interaction.

The lack of pre-course material (course outline, participant list, contributor profiles, proceedings, etc.) limited the effectiveness of courses, especially in the case of proceedings. Participants wanted to interact during the course, not take notes. The proceedings were the main tool to retrieve the information at a future date.

SUMMARY

To develop a substantive theory of the process used by veterinarians to search for information it was necessary to form a framework that was consistent with present knowledge of cognition and the adoption of innovations. In chapter 1 the consumer behaviors model of Engel, Kollat, and Blackwell(1973) was combined with the adoption of innovation model of Rogers and Shoemaker(1971) and the principles of personal construct theory (Bannister and Fransella 1980) to demonstrate the use of information in the adoption process. These concepts are expanded in light of the interview data. The modifications in the model make it more specific to the information search process used by veterinarians. The model is shown in figure 8. The filter described by Broadbent is affected by the problem structure, the problem context, and the personal need state of the veterinarian, as well as his or her construct systems.

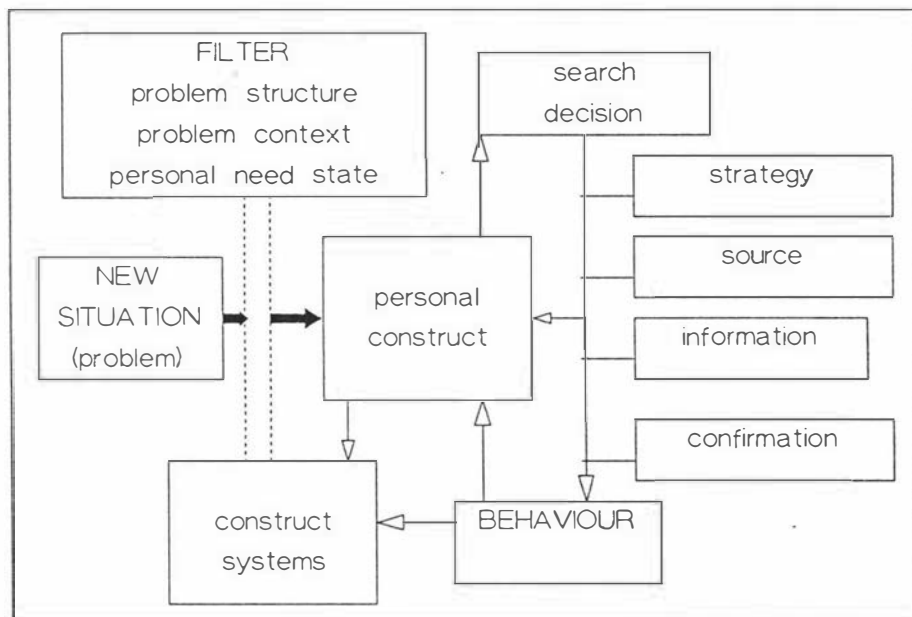
Each step in the search chain influences the subsequent steps by modifying search behaviour. Each and every search event has a long term effect in that the construct systems are modified. This influences the way subsequent "new situations" are perceived.

In this model, the veterinarian must attend to or ignore the innovation situation. According to respondents only those events that were perceived as important were attended to. This depended on the way the veterinarian construed the situation. The veterinarian did not act as a result of the situation itself but as a result of a translation (internally construed simulation) of the event. This is a personal process and highlights the futility of the expression "all things being equal". It is impossible for all things to be equal.

The translation of the "new situation" was influenced by:

- 1) the problem structure (this is innate in the problem itself and is described by Cohen (1964) as the selective information)
- 2) context of the problem (the environment in which the problem is presented)
- 3) the need state of the veterinarian (only problems relevant to needs are attended to)
- 4) construct systems (this is the amalgam of previous experience and the rules governing their interrelation- it includes experiences, attitudes, beliefs, and the rules that determine behaviour).

**Figure 8: Information filter and personal construct model
specific for the information search process**



The translation of the situation directed the search process. The veterinarian decided to search for information and then chose an appropriate strategy. Information was gathered and an evaluation made of the process. The veterinarian took some sort of action in relation to the innovation situation, and modified his/her construct systems to influence future translations of situations.

No two people will form the same personal construct of an event. However, in the case of veterinarians making sense of innovations, previous training, similarities of problem structure and context, and the finite number of alternative actions that could be taken produced some generalities in behaviour. The one-to-one interviews have highlighted similarities common to most respondents.

It would appear that veterinarians are predictable in their information search. When faced with an innovation situation, they look at their watches and say,

" No Time To Waste! The client needs help, the patient needs action, I have a responsibility to solve this problem, and there are other pressing problems waiting to be attended to.

I think I understand the problem. Now, how can I find out what I need to know in the quickest, most efficient manner? I will discuss it with my colleagues, and check in my personal library.

If the answer is not there and the problem is still urgent, then I will contact the nearest, familiar, helpful specialist. I will clarify the problem with the specialist and get the information in the most accessible, practical, retrievable form. If the information feels right and it has come from a source that I trust, I will act on it.

If the client is satisfied, there are no urgent nagging doubts, and the subject is not a burning passion of mine, then I will go on to the next urgent problem".

There were differences between the groups of veterinarians interviewed. However, these differences were consistent with the substantive theory developed from the data. Age, experience and relative ease of access to information sources can explain the variation.

At this point, the substantive impression was tested in a quantitative manner through the use of the questionnaire to all clinical practitioners. This is described in the following chapter.

CHAPTER 4

QUANTITATIVE POSTAL SURVEY OF VETERINARY PRACTITIONERS

The data collected in phase 1 of the information search study as described in chapter 3 was used to design a postal survey that would confirm the hypotheses that were generated. Although the questions were generated from the in-depth interviews, care was taken to avoid the usual pitfalls encountered in questionnaire design (Schuman and Presser, 1981; Payne, 1980). The number of interviews conducted in phase 1 was limited because the behaviour pattern was evident quite early in the series of interviews. This occurred even though exceptional examples were actively sought.

This chapter gives the basic data collected as a result of the postal survey and highlights the differences between the veterinarian sub-groups. Subsequent chapters will extract the data in units related to the research paradigms described in chapter 1. For convenience and continuity, each section of this chapter has been cross-referenced to the relevant question/s in the questionnaire.

POSTAL SURVEY METHODOLOGY

Questionnaire distribution

Each veterinary practitioner received a questionnaire, introductory letter on official Massey University stationery and signed by the researcher and the sponsors, and a stamped return-addressed envelope.

The questionnaires were individually numbered and related to a particular veterinarian on the address list. There was no other identification on the questionnaire. The numbering system was used specifically for sending out reminder letters. This was done independent of the recording of responses so that each questionnaire was anonymous. If a reminder letter was sent it also included another copy of the questionnaire and return envelope.

Questionnaire analysis

All of the responses were coded and transferred to a database using PANACEA (a general purpose database

system from PAN Livestock Services Ltd., 2 Heath Road, Reading, England). A small number of open ended questions had to be analysed by hand using the content analysis procedure described in chapter 3. Most of the structured questions included an "other" choice category and these were tabulated by hand where appropriate. Frequency, ranking, range, and distribution of frequencies or rankings of responses were considered in the structured questions when selecting the most preferred responses. For example, if 90% of the respondents chose an answer and they all ranked it as important, then it was considered a preferred choice. If only a few respondents chose an answer but ranked it as very important it was not considered a preferential choice for the population. In the unusual cases in which a few respondents felt that a choice was very important but the majority of the sample didn't, the characteristics of those few veterinarians were examined to see if there was an explanation for the difference.

All answers depended on recall of events in the past. The respondents' answers were only broad estimates. Therefore, choices that were similar in frequency and ranking were considered to be approximately the same as a preferred choice. This procedure could have misrepresented some of the choices. However, the responses were so consistent that it was very easy to distinguish the preferred choices.

The coding of responses was such that only whole number answers were acceptable. All answers were rounded off to the nearest whole number. This is only relevant to those questions in which respondents were asked to estimate an amount or frequency. It is important to remember that the questions asked for estimates and depended on recall in the first place. As a result, any specific figures are a rough guess only. The objective was to obtain an idea of the magnitude of the response rather than an exact figure.

The statistics generated from data derived from the structured questions are given in appendix D. To interpret these statistics they should be examined in conjunction with the questionnaire in appendix B. Only the statistics which represent the whole sample have been included. The same procedure was used to extract the statistics for the sub-groups. Variations in responses have been highlighted in the text. However, in most cases, the difference between sub-groups was only minor so the raw data has not been included.

The division of the sample into relevant sub-groups was based on the first 12 questions in the survey. Men and women were obvious sub-groups. However, to highlight other differences that might clarify some of the

critical factors influencing information management, the sample was divided into additional sub-groups based on years of experience, position in the practice, caseload characteristics, and number of veterinarians in the practice.

Years of experience were divided into four categories:

- 1) less than 2 years experience
- 2) 2 to 4 years experience
- 3) 5 to 9 years experience
- 4) 10 or more years experience.

The categories for practice position were divided into:

- 1) senior or administrative positions including owner of the practice, partner, or senior veterinarian,
- 2) full time employee
- 3) part time employee
- 4) locum.
- 5) There were only 5 veterinarians who designated an "other" position. These were mainly consultancy roles.

To give an indication of the effect of caseload on information search behaviour, the sample was divided into small animal, large animal, mixed, dairy, and horse practice. The definitions of small, large, and mixed were based on the proportion of the annual caseload devoted to cats and dogs:

- 1) if more than 80% of the caseload was devoted to cats and dogs then the veterinarian was classified as a small animal practitioner,
- 2) if cats and dogs accounted for less than 20% of the caseload then the respondent was classified as a large animal practitioner,
- 3) if cats and dogs made up between 20 and 80% of the caseload then the respondent was classified as a mixed practitioner.

Two other sub-groups based on caseload were included in the analysis. Respondents were considered to be either specialist dairy cattle or equine practitioners if that animal type made up more than 80% of the caseload. These were treated as sub-groups within the large animal practice category.

The critical factor in relation to the number of veterinarians in a practice is the amount of interaction that was possible. Therefore, an obvious sub-group was people who were in single veterinarian practices. The other categories used in reference to number of veterinarians in the practice were: 2, 3-5,

6-10, and more than 10 veterinarians in the respondent's practice.

In addition to these sub-groups, some questions were analyzed in relation to the following sub-groups:

- 1) those respondents who had additional tertiary degrees,
- 2) respondents who did not belong to any professional society or association,
- 3) respondents who felt, in general, they were not successful in their search for information,
- 4) veterinarians who felt that it was relatively easier for them to find information than for other veterinarians,
- 5) veterinarians who felt that it was relatively more difficult for them to find information than for other veterinarians.

Sample and return statistics

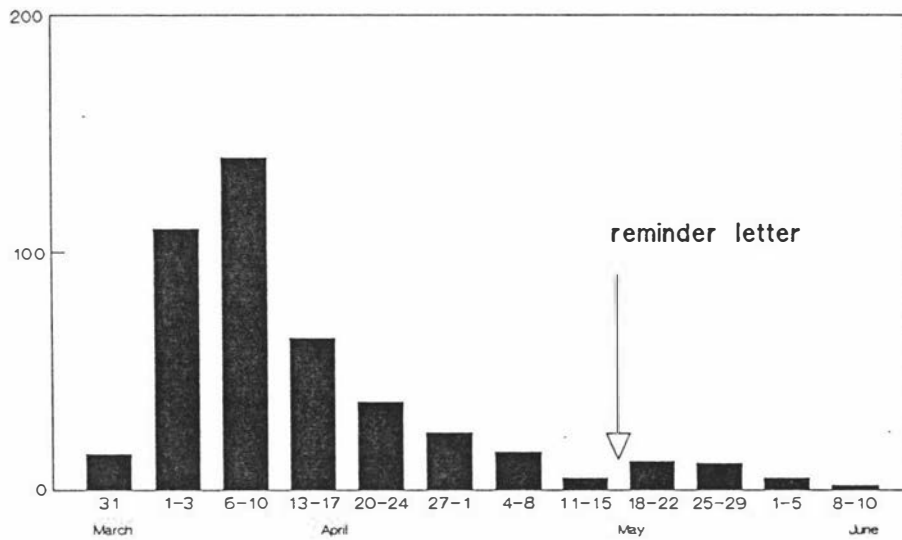
To confirm that the substantive theory was sufficiently reliable the questionnaire was sent to all veterinary practitioners. Eight hundred and fifty-five questionnaires were sent during the last week in March, 1987. There was an immediate response and returns peaked on April 6 with 69 returns (the distribution of returns over time is shown in figure 9). The original address list was thought to be correct since it was the emergency response procedures record of the location of veterinarians held by the Ministry of Agriculture and Fisheries. However, at this point, the initial addresses were checked. Of the 855 questionnaires that were sent only 670 could have reached the respondent. The main reason for this was due to the number of veterinarians who were overseas during the survey. This was determined by comparing the address list from the Ministry of Agriculture and Fisheries with the current address list of the Veterinary Surgeons Board.

By May 6 there were 338 returns. Three hundred and thirty-two veterinarians had not returned their questionnaire. The 1986 veterinary surgeons register was used to analyze the characteristics of the 332 non-respondents. Approximately, 82% were men, and 18% were women. The median graduation date was 1976 (10 years experience). The approximate mean age was 35, and the ratio of farm animal veterinarians to non-farm animal vet was 1.4 to 1.

These statistics were similar to those for respondents and to data for the whole population from the Veterinary Surgeons Board statistics. Therefore, it was felt that there were no significant biases represented in the non-respondent population. However,

Figure 9: Distribution of returns -
30 March - 10 June

■ Returns



it was felt that a higher return was desirable to ensure that the assumptions drawn from the results would be fully representative of the population. Three hundred reminder letters and questionnaires were sent out on May 15.

A total of 440 questionnaires were received by June 10. Of these, 399 (60%) were usable responses. [Note: As stated in Appendix D, 401 positions were entered into the database; however, two of these remained blank.] A 60% return rate gave the researchers confidence that if there were differences between the population sub-groups, then these differences would be apparent.

PRESENTATION OF FINDINGS

In the material which follows, major findings of the study are reported and notable findings are emphasised.

Appendix D contains means, standard deviations and ranges for each variable. In general, statistical analyses have not been reported because the aim was to present findings for the characteristics of the entire population rather than to emphasise statistically significant differences between sub-groups.

PROFILE OF RESPONDENTS (Questions 1 through 12)

The first 12 questions asked for demographic information from veterinarians. The questions concentrated on additional information than that which was available through the Veterinary Surgeons Board (VSB) statistics. However, this information was compared with the VSB data in chapter 5.

The profile of the sample is very similar to the profile of the profession as described in chapter 5 and appendix G. The mean age for the whole sample was 36. There was a difference of 7 years between the mean age of male respondents (37) and female respondents (30). There were 327 (82%) men and 72 (18%) women represented in the sample. The responses for question 7 (years of practice) were added to those of question 8 (years in veterinary fields other than practice) to give the total years of veterinary experience. The range of years of experience in a veterinary related field was 1-50 years and the mean for years of experience was 12. The mean for years of experience was different for men (13) and women (6). Given the mean age of respondents, this would be expected since most people enter the profession at approximately the same age. As a result, age and years of experience have a high positive correlation. In the analysis, years of veterinary

experience was more relevant to information search than age, so it was used as the criterion for allocation to appropriate sub-groups.

Source of basic veterinary degree was consistent with the profile in Appenix G. Massey University graduates make up the bulk of the sample. Great Britain and Australia supplied the remainder except for a few from North America and Continental Europe. Seventy four (18%) of the respondents had additional tertiary degrees besides their basic veterinary degree. These included a small number of veterinarians with Bachelor, Master, and PhD degrees in other fields such as agriculture and engineering, as well as advanced degrees in veterinary fields.

Ninety-one percent of the sample veterinarians belonged to a professional veterinary society or association. The respondents were not asked to state the names of the societies and associations that they belong to so there is no information as to the number of associations.

The distribution across types of practice management is shown in table 1. The distribution of men in relation to practice management was virtually the same as these figures. However, there were proportionally fewer women in contract practices and more in club practices. There was approximately the same proportion of men and women in private practice.

In relation to position in a practice, the distribution of respondents across the positions is shown in table 2. Three percent of the respondents chose "other" as the practice position. When this distinction was examined for men and women separately it was found that it included 3% of the men in the sample and 5% of the women. Most of the men chose the category to highlight their positions as consultants, while most of the women used it to highlight their temporarily un-employed status.

The distribution of the number of veterinarians in a practice is shown in table 3. The mean number of veterinarians was 4, with a range of 1-13. In proportion to the total number of men and women in the practitioner population there were:

- 1) a higher proportion of men than women who said they worked alone;
- 2) the same proportion of men and women indicated that they worked with one other veterinarian;
- 3) a higher proportion of women than men who stated that they worked with two to four other veterinarians;

Table 1: Distribution of veterinarians across practice management categories

Practice management	Men (%)	Women (%)	Total (%)
Private	198 (61)	43 (61)	241 (61)
Contract	42 (13)	4 (6)	46 (13)
Club	84 (26)	19 (27)	103 (26)
Other	3 (1)	4 (6)	7 (1)

Table 2: Number and percent of respondents in each practice

Practice position	men (%)	women (%)	total (%)
Seniour vet	33 (11)	2 (3)	35 (9)
Partner	95 (30)	11 (16)	106 (27)
Full time emp	111 (34)	34 (49)	145 (37)
Part time emp	5 (2)	10 (14)	15 (3)
Owner	74 (23)	4 (6)	78 (20)
Locum	1 (0.3)	6 (8)	7 (2)
Other	8 (3)	3 (4)	11 (3)

4) approximately the same proportion of men and women said they worked with more than five other veterinarians.

It should be noted that this information is based on the number of questionnaire respondents who stated that they were in particular sizes of practice. Since each 4 person practice could contribute between 1 and 4 questionnaires to the complete data set, whereas a 1 person practice could only contribute 1, the statistics will bear little relation to the number of practices in a size category.

Respondents were asked to estimate how much of their case load was made up of particular species. This was much more detailed information than was available through the annual licencing application information in which there was a distinction between farm and non-farm animals only. The distribution of caseload as to type of animal seen varies greatly according to the emphasis of the practice. A description of the caseload is summarized in tables 4,5 and 6.

The responses for each type of animal were recorded separately. If there was no response for a particular type of animal, the response was not counted in the tally. This accounts for the difference in the total for each type. For example, 172 (43%) respondents said that beef cattle made up less than 10% of their total workload. Nineteen veterinarians (5%) said that beef cattle accounted for between 10% and 20% of the total. The remaining 15 respondents that worked with beef cattle gave percentages of between 20 and 45%.

Cats and dogs together accounted for the most veterinary-hours in the annual caseload. There were, proportionally, more women than men working primarily with small animals. In fact, 44% of the women were classified as small animal practitioners (more than 80% of the caseload). This compares with 24% of the men. In the whole sample 28% were classified as small animal veterinarians. There were more women (14%) than men (9%) that gave "other" species as an answer. This is consistent with the higher percentage of women in small animal practice since the most common alternative species were turtles, birds, rodents, and rabbits.

As far as specialization was concerned there were more women (53%) than men (34%) who indicated that a species made up more than 80% of their total caseload. The species that they specialized in were different as well. Men specialized in cats/dogs or horses and women specialized in cats/dogs or dairy cattle.

There were responses in all the percentage ranges for cats and dogs. This was true for both men and women.

Table 3: Distribution of respondents as to number of veterinarians they stated worked in their practice.

No. of veterinarians	Men (%)	Women (%)	Total (%)
1	47 (14)	6 (9)	53 (13)
2	60 (18)	12 (18)	72 (18)
3-5	150 (46)	34 (51)	184 (47)
6-10	54 (17)	12 (18)	66 (17)
>10	16 (5)	3 (5)	19 (5)

Table 4: Number of veterinarians in each Percentage category of caseload

(Total 399)

Species	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Beef	172	19	11	3	1					
Cat/dogs	69	49	33	29	35	8	11	17	21	92
Dairy	88	27	23	16	17	18	20	16	8	3
Deer	183	35	9	4	3	1	1			
Goats	221	26	9	4			1	1	1	
Horses	202	23	11	12	7	4	3	3	2	20
Pigs	118									
Poultry	30									
Sheep	152	38	8	4						
Other	37	1		1	2					

**Table 5: Number of men in each Percentage category of caseload
(Total 327)**

Species	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Beef	145	19	11	2						
Cat/dogs	60	44	28	24	32	6	9	12	14	67
Dairy	75	24	21	14	15	14	18	14	6	1
Deer	161	19	9	3	3	1	1			
Goats	187	26	5	4			1	1		
Horses	171	19	9	12	7	4	3	3	2	20
Pigs	99									
Poultry	28									
Sheep	132	33	7	3						
Other	28			1	2					

The distribution showed two peaks (one in the lower percentage range and the other one around 90%) separated by a trough at approximately 50%.

This pattern was seen only in relation to cats and dogs. The distributions relating to the other animal types except horses showed a peak at the low ranges and then a decline as percentage of caseload increased. In the case of horses there were 22 veterinarians who were classified as equine practitioners. There were no women in this classification.

After cats and dogs, the next most frequent animal type seen was dairy cattle. While the distribution of responses decreased as percentage of caseload increased, there were responses in all the ranges. There were, proportionally, more women than men working with dairy cattle in the higher percentage ranges, but, proportionally, more men than women that worked with dairy cattle at all.

The next most frequent species was horses. There were more veterinarians who worked with horses than dairy cattle. However, when the number of responses were multiplied by the percentage of caseload, dairy cattle became the second most important species. Two hundred and two veterinarians said that horses made up less than 10% of their total caseload. This compares with only 88 veterinarians who said that dairy cattle made up less than 10% of the total.

It is interesting that the next 2 most frequent species were deer and goats. One might have expected sheep and beef cattle to occupy this position, but they were definitely 6th and 7th in the order of percentage of caseload. There were no veterinarians who could be classified as predominantly beef cattle or sheep practitioners. In fact, the maximum percentage of case load for beef or sheep was less than 45%. However, there were 2 veterinarians who said deer made up more than half of their caseload and 3 veterinarians who said goats made up more than half of their caseload.

Pigs and then poultry were the types of animal least frequently seen. Three hundred and eighty-nine veterinarians worked with pigs but 271 said that they accounted for less than 1% of their total caseload. One veterinarian said that pigs made up 9% of the total, but 93% of the respondents said that pigs made up less than 3% of the total caseload. Many veterinarians combined pigs, poultry and sheep together and said that all these types of animals made up less than 5% of the total. For convenience this total was divided equally among them.

Three hundred and ninety veterinarians worked with poultry but 360 said that poultry accounts for less than 1% of the total. The maximum percentage given was 3% by 4 veterinarians.

An interesting point was that, apart from cats/dogs and dairy cattle, there were relatively fewer women in the intermediate percentage ranges. They indicated that the other animal types usually made up less than 10-30% (depending on the type of animal) of their total caseload. On the other hand there were relatively more men who said the other types of animals made up portions of the caseload between 30% and 80%.

INFORMATION SEARCH BEHAVIOUR

Questions 13 through 32 were concerned with the process of information search used by veterinary practitioners. The majority of the questions were structured with a list of possible responses which were derived from the in-depth interviews. However, there were a few open ended questions which gave the respondent an opportunity to personalize his/her answers. The statistics for the structured questions are in appendix D.

Commonly encountered situations (Question 13)

What do veterinarians remember about the kinds of new situations they face and how often do such situations occur? Respondents were given a choice of new situations and asked to estimate how often in a year they would have to deal with each type.

The most common types of new situations (in order of frequency) for the whole sample were:

- 1) a treatment that didn't work,
- 2) recognizing a clinical condition that you have not seen before,
- Equal 3) adopting a new product/service for routine veterinary use,
- Equal 3) wanting to know more about the financial management of your practice,
- 5) being introduced to a new type of veterinary activity.

Veterinarians with less than 2 years of experience gave 2 and 4 of the above choices as most frequent, with adopting a new product/service next. Other differences were:

- 1) Small animal veterinarians felt that situations in which a treatment didn't work happened more often

than their large animal or mixed practice counterpart did.

- 2) Overall, dairy and equine practitioners thought that new situations occurred at a lower frequency than small or mixed animal practitioners.
- 3) Small animal veterinarians were faced with new products/services more often than their counterparts in other practice types; mixed practitioners were next.
- 4) Situations involving the financial management of the practice ranked at similar levels in all practice categories.
- 5) Veterinarians with additional tertiary degrees gave higher frequencies for the occurrence of new situations than people without extra degrees.
- 6) Veterinarians who were not members of any professional group gave lower frequencies for the occurrence of new situations than those who belonged to at least one professional organization.

Sources of new situations (Question 14)

When the respondents were asked to consider the sources of new situations and estimate the number of times in a year that each would present them with a new situation, the most common responses were:

- 1) the technical literature,
- 2) discussions with other veterinarians,
- 3) client need/request.

These were close to the top of the list in all the sub-groups as well. However, as veterinarians gained more years of experience, took on senior positions, or were in single-charge practices, the commercial firm representative became more prominent as a source of new situations.

In many cases the more experienced veterinarians were the same as those in senior positions with managerial responsibility. Veterinarians working in isolation also have managerial responsibilities and, as a result, come in contact with commercial firm representatives more frequently. Thus it is not possible to clearly distinguish among these influences.

Common motives for information search (Question 15)

In this question respondents were asked to rank their choices from a list of important considerations when deciding to search for information. The most common responses were:

- 1) the urgency of the situation,
- 2) the client's expectations,
- 3) the veterinarian's responsibility in the situation,
- 4) the risk associated with not having the information.

These ranked choices were consistent across all sub-groups with only very minor variations in order.

Other choices, in descending order of importance were: "How much will it cost to search for information", "Will the search affect my income" and "Would it be better for my reputation to give an immediate answer". Twenty veterinarians suggested alternatives to those offered. The most common were:

- 1) time,
- 2) personal interest in the situation,
- 3) being able to exert more influence on the outcome of the situation through having more information.

Common information search strategies (Question 16)

Question 16 referred to the possible strategies used by veterinarians to find the information that they wanted. The question was designed to see what preferences veterinarians would show, in a general situation, on the assumption that the strategies which were most familiar and most frequently used would be given a higher ranking. Respondents commented that the strategies used were situation-dependent. This was an understandable limitation of the question. The most common strategies used, in order of preference were:

- 1) discussion with co-workers
- 2) search through your personal/practice library
- 3) use your own thinking/experience

- 4) contact the MAF diagnostic laboratory, or a specialist in practice
- 5) contact the Massey Veterinary school.

These responses were relatively consistent across all the sub-groups with virtually no variation except that the choice of discussion with co-workers was not available to those veterinarians working in isolation.

Attributes of an information source (Question 17)

When asked about important attributes of an information source, the most common responses, in order of preference were:

- 1) easy to contact
- 2) perceived to have the latest information
- 3) is a recognized expert
- 4) is familiar
- 5) follows up your inquiry

Once again, the responses were consistent across all sub-groups. The most interesting variation was for veterinarians with less than 2 years of experience who indicated a preference for a source who was interested in their inquiry. A few other variations of interest were:

- 1) Horse veterinarians considered the most important attribute was that the source was considered to be an expert,
- 2) Dairy practitioners did not consider that the source was recognized as an expert as particularly important,
- 3) The small group of veterinarians who felt that, in general, they were not successful in their search for information considered familiarity of the information source more important than did the other sub-groups.

Impressions of the ease of search (Question 18)

How easy do veterinarians find the process of information search? Twenty-one (6%) found it very easy to search for information, while 220 (58%) found it somewhat easy. This accounts for the majority of the sample. One hundred and thirty-nine respondents

found it somewhat difficult. Only 4 veterinarians found it very difficult.

Veterinarians who had to work in isolation found it more difficult to find information as a general rule. Most sub-groups felt that it was relatively easy to find information. Responses to this question were examined for those who felt that, in general, they were not successful in finding the information that they wanted. This group felt that the process was somewhat to very difficult.

Relative ease compared to other veterinarians
(Question 19)

Respondents were asked how they felt about the ease of search for them in relation to their colleagues. This prompted a number of comments to the effect that they had no idea how difficult or easy their colleagues found the process. This was expected when the question was written. However, it was asked to give some impression of the information search environment in general. It was an indirect method of testing the respondents' relative confidence in their ability.

While a small number of veterinarians doubted their ability to assess their strategies in relation to their colleagues, the majority were able to answer the question. Twenty (6%) thought that it was much easier for them. Eighty (22%) thought it was slightly easier. 212 (56%) thought it was about the same. And 55 (15%) thought it slightly more difficult. Nine veterinarians thought it was much more difficult.

Reasons for differences in ease of search (Question 20)

This was an open ended question designed to elicit specific responses that were most relevant to veterinarians. One hundred and fifty-four veterinarians answered this question. The most common answer (40) volunteered for the reason why someone felt that the information search was easier was that they had a comprehensive and well indexed personal or practice library. Other common responses were:

- large multi-vet practice (23)
- the number of personal contacts (19)
- close to, and good relations with:
 - laboratories (13)
 - Massey University (9)
 - Ministry of Agriculture and Fisheries (5)
 - other veterinary practices (3)
 - many years of experience (5)
 - familiarity with what is available (4)
 - attitude of the practice (4)

having helpful working colleagues (3)
having specialist knowledge (2)

The most common reason for the search being relatively more difficult was the veterinarian's feeling of isolation (56). Other common responses were:

having a limited personal or practice library (10)
not enough time (8)
being a foreigner (2)

There were other responses but they were mentioned by only 1 veterinarian each and have not been included in this analysis.

Impressions of search success (Question 21)

Most respondents (93%) thought that under most circumstances they were successful in finding the information that they wanted.

Common reasons for unsuccessful search (Question 22)

Only 20 veterinarians in the sample felt that, in general, they were unsuccessful in their search for information. Fifteen men (5%) and 5 women (7%) were included in this group. They tended to be older than the mean of the sample and working in isolation with significant time limitations.

The most common reason for their dissatisfaction was that they felt they did not have enough time to search for information. This was followed by the feeling that they knew where the information was but didn't know how to get it. Not knowing exactly what information they wanted and an uncooperative information source were the next most common choices.

Common reasons for stopping the search (Question 23)

As was stated, most veterinarians in the sample felt that they were successful in their search for information. When asked what were the most important reasons for deciding to stop looking for more information, the reasons, in order of preference were:

- 1) the situation was resolved to their satisfaction
- 2) the client was happy with the results
- 3) they ran out of time or they could not find the information that they wanted.

This was true for both men and women veterinarians. In fact, the responses were consistent across all the sub-groups with no significant variations.

Criterion to determine reliability of information
(Question 24)

As far as the reliability of information was concerned, the most important factor was that the information source was perceived as reliable. The next most common response was that "the information was complete", followed by the choice "the information feels right from experience".

This was true for all the sub-groups except for those veterinarians who felt that, in general they were not successful in their information search. They felt that "the information should feel right" was slightly more important than that "the information is complete".

The wording of the choice "the information should feel right from your own experience" may have caused a certain amount of misunderstanding. In the "other choice" category there were examples that showed that some veterinarians were uncomfortable with the expression "feeling right". They may have decided choice number 2 was too intuitive for their liking. They changed the expression to "the information was consistent/made sense in relation to previous knowledge/experience". However, there were so few respondents who made this qualification that the order of preference would not have been changed.

Particular new situation (Question 25)

In most cases respondents were able to recall a specific new situation that occurred in the last year. Sixteen veterinarians did not answer this question. Forty respondents said they could not remember a specific new situation and 345 could.

Specific situations (Question 26)

Respondents were asked to describe the new situation. The answers were coded into generic categories and tabulated to give a frequency for each category. The 12 categories used to code responses were:

- A) new veterinary technique
- B) unknown clinical condition
- C) new treatment/information about a condition previously experienced

- D) first learned about a condition other practitioners were seeing
- E) new type of livestock management
- F) new information related to livestock health and production
- G) herd health problems
- H) new diagnostic test
- I) herd health programmes
- J) government/MAF issue
- K) unresponsive clinical condition (treatment that didn't work)
- L) other

Unfortunately, it was difficult to place the responses into mutually exclusive categories. Therefore, the frequencies are relatively crude and only comparisons that indicate large difference in the frequencies have been singled out. The distribution of specific "new situations" for the sample is shown in table 7.

The most common response for men, mixed practice, large animal, and equine veterinarians was being introduced to a new veterinary technique. The first choice for women, small animal, and dairy practitioners was "having to deal with an unknown clinical condition".

Sub-group differences (in order of highest frequency first) were as follows:

- 1) Men selected a "new technique", dealing with an "unknown clinical condition", a "new treatment", and a "herd health problem".
- 2) Women did not include a "new technique" in their first choices.
- 3) Small animal practitioners said dealing with an "unknown clinical condition", a "new treatment", a "new technique", "first learning of a condition other practitioners were seeing".
- 4) Mixed practitioners included "herd health programmes" as an addition to the first few choices.
- 5) Large animal practitioners included "herd health problems" closer to their first choice.
- 6) Dairy practitioners included "a treatment that didn't work" in their first three situations.
- 7) Equine practitioners included first learning of a "condition other practitioners were seeing" as their fourth most frequent situation.

Table 7: Specific new situations volunteered by respondents

specific new situation *	men	women	total
A	84	4	88
B	42	17	59
C	45	9	54
D	18	4	22
E	2	3	2
F	3		3
G	35	5	40
H	6	2	8
I	16	5	21
J	5		6
K	14	3	17
L	13	5	18

* see text for explanation of letter codes used to categorise new situations.

Common motives for search (Question 27)

In relation to the new situation mentioned in question 26, 51% of the respondents said the situation interested them personally. Fifty-two percent said their clients needed the information. The next most common response was that they wanted to reduce the risk of making a mistake. Forty-four percent of respondents said that it was a potential growth area for their practice, and 7% said that they were chosen to investigate it for the practice. The order of responses were approximately the same for men and women except that more women, veterinarians with additional tertiary degrees, and those not associated with any professional body wanted to reduce the risk of a mistake, and proportionately more men thought the new situation investigated offered a potential practice growth area. Seven percent (mostly men) gave alternative motives that prompted their information search. These related to a feeling that something had to be done and their information/experience was not sufficient to decide on a plan of action. The other common reason given was that the action that they took was not successful or the patient had not responded.

Common strategies (Question 28)

The most common responses to the question concerning the strategies used to find information needed to deal with the volunteered new situation were the same as those in question 16.

For all the sub-groups the preferred strategy was searching their personal/practice library. This was followed closely by using their own thinking/experience and discussing with their co-workers. The exceptions to this pattern were the veterinarians working in isolation (who had to depend on their own library and experience), and the veterinarians with less than 2 years of experience (who discussed the situation with their co-workers first).

If more information was needed, the choices of additional information sources were the Ministry of Agriculture and Fisheries diagnostic laboratory, a specialist in practice, or other veterinarians in general. Massey University Veterinary School was included in this set of sources but it was mentioned less frequently. Respondents then reassessed the situation and repeated the cycle by returning to their original sources and discussing the situation and the new information with their co-workers or reexamining the references in their library.

If more information was needed, they would go back to familiar sources. Other sources of information that were mentioned were:

- Industry veterinarians/representatives
- MAF field officers
- University library
- National library service
- Educational courses

Still looking for information (Question 29)

The respondents were asked if they were still looking for information about the new situation that they described. The majority (60%) said that they were not looking any longer. Twenty-six percent said they were and 15% did not answer the question.

Common reasons for stopping the search (Question 30)

The most common reason why respondents stopped looking for more information was because they had found sufficient information. The next most common reason was because they were unable to find the information that they wanted, followed by "the situation was no longer important".

Different strategies from above (Question 31)

Most veterinarians (60%) said they used the search strategies in this particular new situation that they normally used. However, 22% said the strategies differed. Eighteen percent did not answer the question.

Specific strategies (Question 32)

The most common response to this question was that normal strategies were unsuccessful or not tried because of the exceptional circumstances of the situation (50 respondents).

Other common responses were:

- an unusual information source available (10)
- went straight to the expert (9)
- needed first-hand/hands-on experience (3)
- had more time (3)
- different systems in NZ (2)
- case was more urgent than normally (2)

PREFERENCES FOR SPECIFIC INFORMATION FORMATS

The next section of the questionnaire (questions 33 through 56) was concerned with the format of veterinary information that is already available. The section was prefaced with three definitions:

Journal: a publication that is divided into issues at relatively regular intervals throughout the year and covers professional or technical subjects of relevance to your practice

Text book: a single publication or set of volumes that deals with a particular subject

Proceedings: a published collection of papers that were presented in association with a specific conference or lecture series

In addition to the questions related to the three types of written material mentioned above, the respondent was asked what his/her attitudes were to continuing education events and video material.

Receive journals (Question 33)

Virtually all the veterinarians (97%) in the sample receive at least one journal.

Number of journal titles (Question 34)

For those respondents who said they received journals, the range for the number of separate journal titles received was 1-20. The mean number of titles was 3. There was a difference in the range between men and women with the maximum for women in the sample being 6. However, the mean was approximately the same for both groups.

Usefulness of journals (Question 35)

When asked about their general feeling toward the usefulness of journals, 19% found them very useful, 52% found them useful, and 29% felt they were not very useful.

Common attitudes toward journals (Question 36)

Considering journals in general the statements that best described veterinarians' attitudes toward journals varied. The most influential statement in the offered list was "I use them as needed to keep up with technical changes". This was followed closely by the

statement, "they are too research oriented". When asked about having time to read them the population was evenly divided between "I regularly find time to read them" and "I seldom find time to read them". These two statements shared the same approximate level of influence with "I just use them for the professional news".

Seventeen veterinarians gave an alternative statement as their most influential statement. The most common of these were: "they should be practice oriented" and "I skim them for interesting articles". Comments directly related to the New Zealand Veterinary Journal were: "I read it for the professional news" and "it is the worst of the lot for relevant clinical information".

Desirable attributes of journals (Question 50)

The most important attributes of a journal from the point of view of the respondents was that "it has the latest information". The next two most important attributes were that "it gives examples of actual cases" and "it has professional news". "It is practical", "it has article summaries", "it has all the technical details", and "having it on hand when you want it" were about the same in importance. "Oriented towards New Zealand" and "indexed" were next in importance. "Having advertisements" and "a section to test the veterinarian's skills" were of only minor importance.

Text book use and frequency of text book use (Questions 37 and 38)

Ninety-nine percent of respondents have text books. Three hundred and six veterinarians (77%) said they used text books at least once a week. 71 (18%) said once a month, 17 (5%) said 2 or 3 times a year, and only one veterinarian said once a year.

Number of personal\practice texts and number of working texts (Questions 39 and 40)

The mean number of text books that veterinarians had was 26 with a range of 1 to 50. Respondents said that they used only a portion (a mean of 7) of these on a regular basis.

New text book purchases in an average year and number per year (Questions 41 and 42)

Seventy-five percent of the sample would buy additional texts in an average year with a mean of 2 books per year.

Desirable attributes of text books (Question 50)

The most important attributes (in order of preference) of a useful text book were:

having it on hand when you want it
 it has all the technical detail/it is indexed
 the information is practical/it has the latest information
 it has examples of actual cases

Use of proceedings and impression of usefulness of proceedings (Question 43 and 44)

Ninety six percent of the sample use proceedings. When asked what their impressions were of the usefulness of proceedings, 69% said they were very useful, 31% said they were useful.

Frequency of use of proceedings (Question 45)

How frequently did the members of the sample refer to their proceedings? Responses ranged from more often than once a week to once a year. Two hundred and ten (55%) said at least once a week. 137 (36%) said once a month and 36 (9%) said 2 or 3 times a year. Only 6 said that they referred to their proceedings once a year. The median response was between once a week and once a month.

Number of proceedings on hand; number of proceedings used regularly (Questions 46 and 47)

There was a range of 1-50 proceedings in private/practice libraries. The mean number was 19. However, the range of proceedings that were regularly used was 1-50 with a mean of 7.

Proceedings purchase policy yearly purchase (Question 48 and 49)

Ninety-four percent of the sample said that they would purchase additional proceedings in an average year with a mean of 3-4 each year.

Desirable attributes of proceedings (Question 50)

The most important attributes (in order of preference) of proceedings were:

has the latest information
having it on hand when you want it
the information is practical
it has all the technical detail/it is indexed
it has examples of actual cases

Short course/conference attendance
(Questions 51 and 52)

Respondents were asked if they had attended any courses during 1986. The answer was usually affirmative with 361 veterinarians answering yes. Only 78 responded with no. However, a particularly interesting point to note was the difference in attendance between men and women. Eighteen percent of the men said that they had not attended any courses during 1986, but 26% of the women responded negatively. This should be examined more closely, especially in light of the increasing ratio of women to men.

When asked how many days of courses they attended during the year, the range of responses was 1-50 days with a mean of 4.5 days and a standard deviation of 4 days. There was almost a full day difference between the mean days for men (4.9) and for women (4.1).

Particularly favorite course (Question 54)

Two-hundred and ninety three veterinarians answered the question concerning the course that they felt was the most beneficial. Seventy said no and 223 said yes there was one particular course. A long list of course titles was volunteered, but there were a few that were repeatedly highlighted. The most popular course was the deer conference (34), followed by the Sheep and Beef Society seminar (20) and the nutrition and goat production (17), feline medicine (19), goat reproduction (13), neurology (12) and clinical pathology courses (21). Other courses varied from equine surgery to practice management and acupuncture. There was a minor difficulty with the tabulation of the responses to this question because veterinarians did not give the exact course name. Responses were tabulated together if the course name given approximated a previously mentioned course.

Attributes of a course (Question 55)

When asked what the most important attributes of a course were, the two most common responses were that the "speakers were recognized experts" and the "course had proceedings". The next most important attribute was that "there was time for discussion". "The whole event is not too long" and "it is close to home" were next most important, with "presents all the technical detail of the relevant research" next. "Having pre-course information" was the least important of the offered attributes. Forty veterinarians offered additional attributes as their first choice and these respondents expressed some significant concerns. The course had to be practical and relevant to practice, with new information.

Use of video tapes (Question 56)

It was clear from the responses that video taped material is not a common source of information. The 2 sources of video material that veterinary practitioners would know about were named in the questionnaire, and respondents were asked if they have either bought or hired videos from them. Out of the 389 veterinarians who answered the question, 13 answered yes in relation to the Postgraduate Committee in Veterinary Science (University of Sydney), 5 said yes to the Unit for Continuing Education (University of London). Forty-six veterinarians said they had bought or hired videos from other sources but they were not asked to give the name of the source so that information is not available.

Any other information service (Question 57)

The final question gave respondents the opportunity to suggest any additional information service which would be of use in meeting their information needs. The most common (48) response to this question was a comprehensive local audio/video library that was easy to use at a reasonable cost. However, it is very possible that there was a position effect on this question. It occurred immediately after the series of question concerning the use of video libraries. As an example, one respondent stated, "I hadn't thought of videos, but that is an obvious, potentially very useful source of information". Another respondent put videos into perspective when he said he would like to use videos if he had the time and the money.

Other common responses (improving the availability of information within the work environment) were:

- Computer linked information search (28)
- A central register/information centre (20)
- Better access to libraries (15)
- Posting of indices and abstracts/reprints (20)
- Practical journal/information (13)
- A teletex-type service (12)
- A list of specialists (11)
- Better access to specialists (7)
- A list of publications, new drugs/techniques, research and
- Contacts (16)
- Research/MAF updates (4)
- Better texts/proceedings (7)
- Veterinary TV programme (2)

Few responses related to improving the flow of information outside the immediate work environment, but those offered more than once were:

- More continuing education courses (3)
- Roadshows/seminars (3)

Note:

The interpretation and discussion of this data is presented in subsequent chapters. Not all the normal value statistics have been included in appendix D. Although the distinctions between sub-groups were examined in the same manner as the whole sample, the variations were not sufficient to warrant their inclusion in the appendix.

CHAPTER 5

VETERINARY GROUP CHARACTERISTICS:
PROFILE OF THE VETERINARY PROFESSION

One of the three basic information research paradigms used in this study concentrates on group characteristics. The basic tenet of this paradigm is that shared educational and occupational experiences produce similar attitudes and behaviour patterns. The relative importance of this paradigm lies in the fact that it produces information that can be used to predict behaviour. It uses the simple behaviour model (figure 1, chapter 1) in which the response (behaviour) can be measured in a number of individuals with shared characteristics. This can then be used to predict the behaviour of individuals who have the shared characteristics.

It is relatively simple to catalogue an individual's characteristics as to education level, schools attended, specific details of occupation, affiliation with professional and social groups, level of income, etc. If an individual shares a number of the common characteristics with the group whose information search behaviour has been elucidated then it would be reasonable to expect that the individual would show similar information search behaviour. While this paradigm has predictive value it does very little to highlight the factors that can be changed to modify the search behaviour. This argument was expressed in chapter 1. It was decided that, since each of the research paradigms had advantages, all three would be used in this study.

In this chapter the demographic data gathered from the first 12 questions in the postal survey have been analysed and compared with a separate survey of the veterinary profession in New Zealand (Boland and Morris, 1988) which was carried out using the 1985 statistics on veterinary employment collected by the Veterinary Surgeons Board (VSB). The earlier survey included in this thesis (appendix G.) was conducted prior to the postal survey to provide an initial appraisal of employment within the profession since published data on this subject is sparse.

The 1985 demographic profile described the characteristics of veterinary practitioners (who comprise 70% of the profession), and also the 30% of the profession who are in non-practice forms of employment. However, because the source of the data

was the annual application for a practising certificate, which asks for minimal data on employment, this source could provide at best a very broad summary of the profession.

The 12 questions in the present postal survey were included to fill out the detail for the 70% of the profession working in clinical practice. These were analysed to clarify the original profile as well as to supply a basis on which sub-groups could be defined for the later study of information needs. The information which follows is drawn from the 399 responses to the postal questionnaire, but where appropriate, the findings are compared with those reported for 1985 by Boland and Morris (1988).

DEMOGRAPHY, EDUCATION, AND EMPLOYMENT

The mean age for the whole sample was 36. There was a difference of 7 years between the mean age of male respondents (37) and female respondents (30). There were 327 (82%) men and 72 (18%) women represented in the sample.

Eighteen percent of the sample had further tertiary degrees in addition to their veterinary qualification. Ninety-one percent belonged to at least one professional organization. Massey University Veterinary School was the main source of respondents (303) with Australia (50) next, followed by Great Britain (33). There were 6 and 7 respectively from North America and Europe.

Years in veterinary practice were combined with years working in other forms of veterinary employment to give the total years of veterinary experience. The range of years of experience in a veterinary related field was 1-50 years and the mean was 12. The mean was different for men (13 years) and women (6 years).

The distribution across types of practice management showed 61% of the veterinarians were in private practice, 14% in contract practices, and 26% in club practices. The comparison of distributions between men and women is shown in figure 10.

There was approximately the same proportion of men and women in private practice, but there were proportionally fewer women in contract practices and more in club practices.

The distribution of veterinarians in a respondent's practice is shown in figure 11. The mean number of veterinarians was 4, with a range of 1-13. These statistics are in relation to the environment in which individuals practice. It is a measure of

Figure 10: Distribution of veterinarians across practice management categories

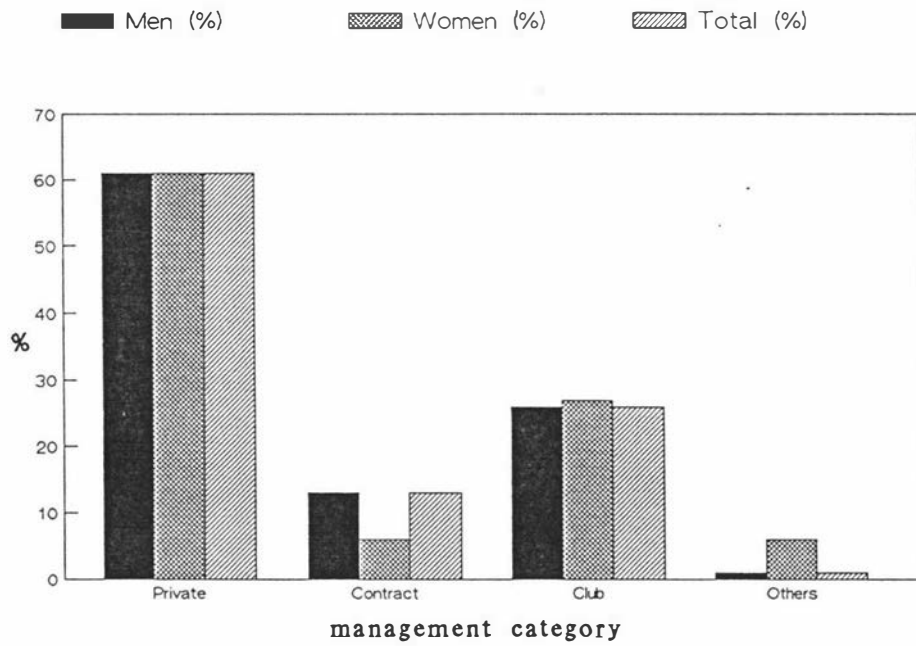
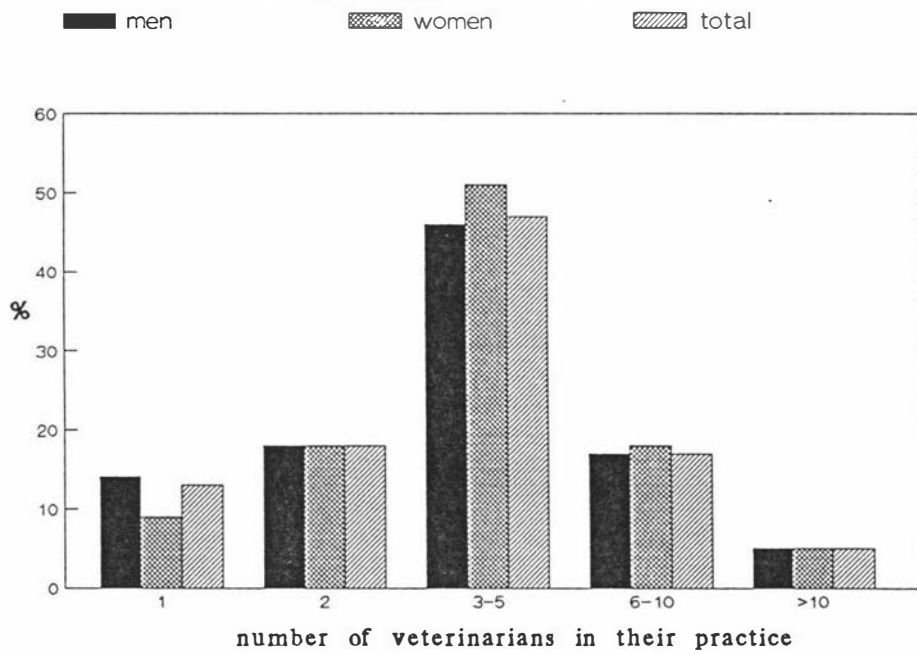


Figure 11: Distribution of respondents
(veterinarians in their practice)



veterinarians, not practices. For example, if all 4 practitioners in a 4 veterinarian practice returned the questionnaire, each veterinarian's response was counted. This is an important distinction because the study was examining individual behaviour. It means, however, that the figures are not a reliable guide to the distribution of practice size, but rather to the numbers of veterinarians who work in practices of that size.

Proportionally, practice composition showed more men than women in single-veterinarian practices and in practices with more than 3 veterinarians. The proportion was reversed in 2-3 vet practices.

In relation to position in a practice, the distribution of respondents across the positions is shown in figure 12. The largest category was "Full time employee" followed by "Partner", "Owner", and "Senior vet". There was a marked difference in responses from men and women with proportionally more men than women who were senior veterinarians, partners, and owners of practices. The ratio was reversed in the categories of "Full time employee", "Part time employee", "Locum", and "Other".

This was the case for the whole sample. Because the women were considerably younger than the men, the data was re-examined specifically for those respondents with less than 10 years of experience. The results are shown in figure 13.

When only respondents with 10 years of experience or less were considered, the proportion of full-time employees was approximately the same for men and women. Five percent of the men and 3% of the women were senior veterinarians. The most marked differences between men and women in this younger segment of the sample were in the positions of partner and owner. Twenty seven percent of the men were partners and 11% owned their own practice. Only 10% of the women were partners and 3% owned their own practice. Less than 1% of the men were employed in the part-time, locum, and "other" positions combined, while 15% of the women were part-time, 10% were in locum positions, and 5% were in the "other" category.

In addition to men and women the statistics from the sub-groups described in chapter 4 were examined separately to tease out some of the differences.

A very important sub-group was those veterinarians who work by themselves in single-veterinarian practices. The in-depth interviews highlighted geographical and occupational isolation as serious barriers to information search. Therefore it was important to look

Figure 12: Distribution across positions in practice for the whole sample

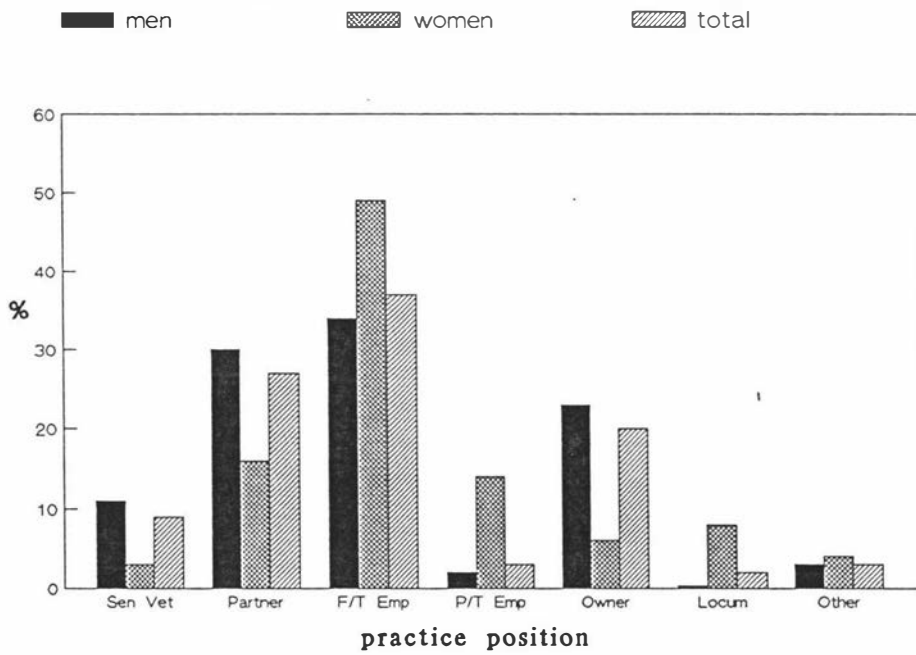
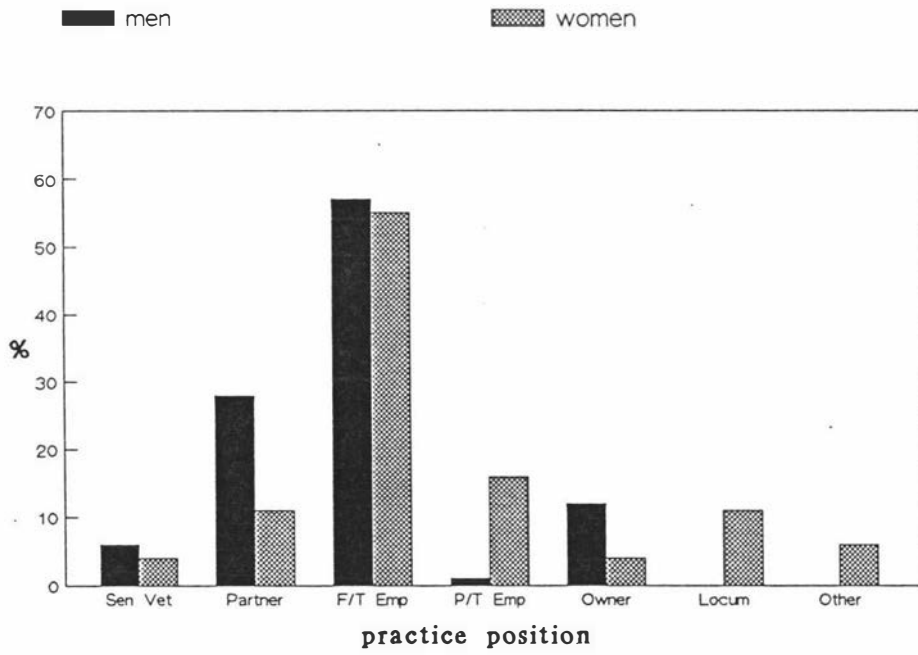


Figure 13: Distribution across positions for men and women < 10 years experience



at the different characteristics of this sub-group. The mean years of experience (17) of single-veterinarian practitioners was five years higher than for the total sample. Twenty-five percent (compared with 18%) had further tertiary degrees, and 87% (compared with 91%) belonged to at least one professional organization.

Another distinct sub-group was those veterinarians who worked predominantly with one type of animal. The equine practitioners were all men; they had on average 3 more years of experience than the mean of the sample; 27% of them had further tertiary degrees; and only 81% of them belonged to at least one professional organization. Of the 22 equine practitioners 6 (27%) worked in single-veterinarian practices.

The dairy practitioners were 3 years younger than the sample mean; none of them had additional tertiary degrees; and 81% belonged to at least one professional organization. One out of 11 (9%) practitioners worked in single-veterinarian practices.

In the case of small animal practitioners, they had the same number of years experience (12) as the sample mean; 20% had further tertiary degrees; and 89% belonged to at least one professional organization. Twenty-two out of 113 (19%) worked in single-veterinarian practices.

WORKLOAD DISTRIBUTION BY TYPE OF ANIMAL

In regard to annual caseload and the influence of certain animal types, the list of alternatives allowed a much closer focus on the average work patterns of practitioners than was possible using the VSB statistics. Using the segmentation definitions given in chapter 4, there were 153 (38%) large animal (production animals and horses) veterinarians, 133 (33%) mixed practice veterinarians, and 113 (28%) small animal veterinarians. However, using 20% and 80% as benchmarks in the definitions was an arbitrary decision. This comment is most germane in the case of mixed practice veterinarians. In this group respondents were spread across the percentage scale, especially in relation to cat and dogs (table 4, chapter 4). Since it was not possible to be so specific in the examination of the VSB statistics, there is a noticeable difference from the distribution quoted in appendix G.

Eleven (3%) veterinarians were predominantly dairy practitioners, 22 (6%) were predominantly equine practitioners, and 2 (<1%) worked predominantly with goats. One hundred and thirteen veterinarians worked

predominantly with cats and dogs. There were no veterinarians in the sample who worked predominantly with any of the other types of animal. Thirty-eight (10%) respondents worked exclusively with small animals, 12 (3%) exclusively with horses, and 3 (<1%) with dairy cattle.

The initial data referred to percent of workload. To change the perspective slightly, these figures were converted into veterinary-hours per year. It was assumed that there were 2300 working hours in an average year for a practitioner. This was calculated using 8 hours per day, 6 days per week, with 4 weeks annual leave. This is only illustrative because it is obvious that not every veterinary working hour is devoted to animal cases. However, it was felt that converting the data to veterinary hours per year would make the data easier to conceptualise. More importantly, it allowed overall workloads to be estimated for the profession, since calculations based on percentage data creates analytical problems which may produce biased conclusions.

The composite means of the sample for veterinarian-hours across all the animal types categories is shown in Table 8. This is graphically presented in figure 14.

Although this profile is of a hypothetical individual, it shows the relative significance of the different species to the annual caseload of an "average" veterinary practitioner in New Zealand. Mean values for men and women are shown separately in figure 15.

DISCUSSION

It must be remembered that the sample represented 60% of the calculated "potential" practitioner population. However, this was a satisfactory response rate for a survey of this type¹ and is high enough to assume that the ratio of small to mixed to large animal practitioners in the sample is approximately the same as for the population.

The general profile of the profession derived from the survey sample was very similar to that of the profession as described in the original demographic analysis (appendix G). The mean age (36) and the ratio of men (82%) to women (18%) were virtually the same as in the first study. However, the age range was

¹ A survey in the State of Indiana (USA) investigating the same subject achieved a 38% return (Drake, 1978).

Table 8: Veterinary-hours per animal type

Animal type	hours		
	men	women	total
Beef	101	62	94
Cats/dogs	992	1384	1062
Dairy	448	397	438
Deer	136	72	124
Goats	122	144	126
Horses	350	82	302
Pigs	17	11	16
Poultry	2	1	2
Sheep	102	66	95
Other	16	16	16

Figure 14: Veterinary-hours per year
as to type of animal

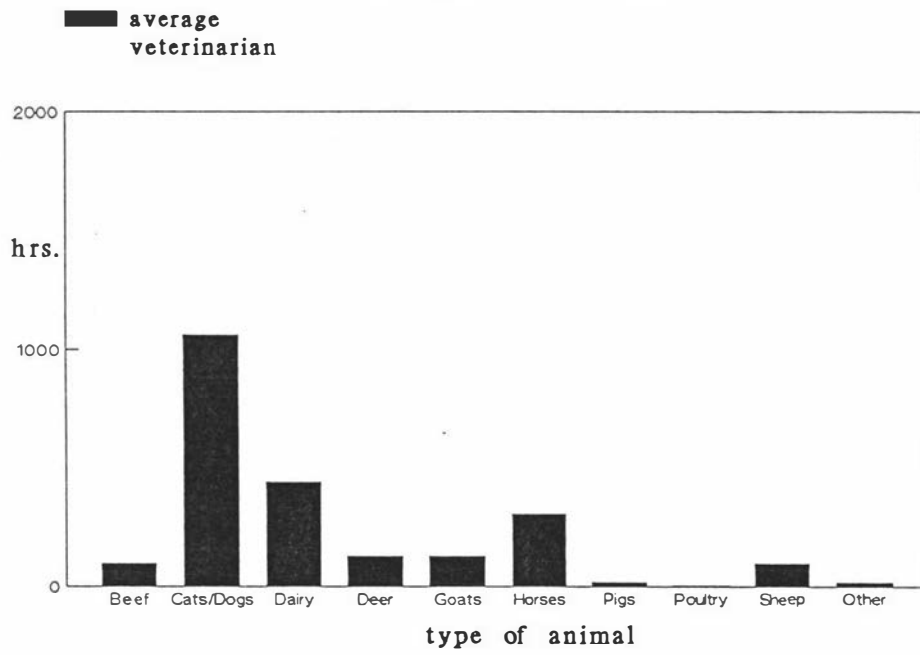
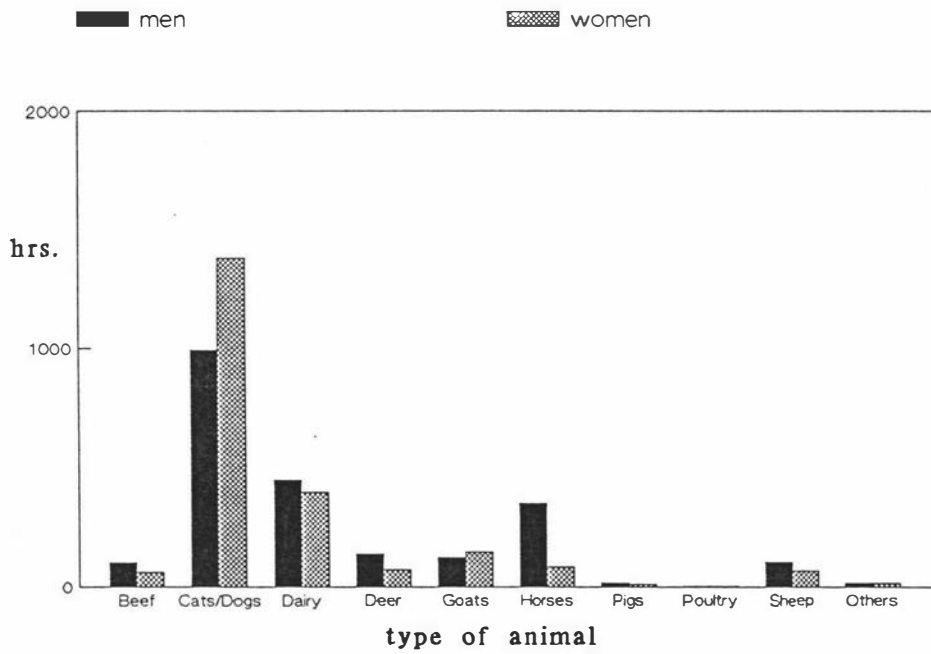


Figure 15: Veterinary-hours per year for men and women veterinarians



narrower in this survey. This was expected because the survey included only practitioners while the veterinary employment categories not included contain a higher proportion of older veterinarians.

Age and years of experience showed a high positive correlation. This is to be expected since most people enter the profession at approximately the same age. The difference in years of experience between men and women is explained by the relatively recent increase in the number of women entering the profession. In relation to practice management, the results are consistent with those from the VSB statistics.

The significance of the difference between the proportion of men and women in contract practices is not clear, but it might be significant if there are some basic work patterns or terms of employment that make this type of practice management more attractive to men.

The marked difference between men and women in the "other" category is due to the fact that a number of women felt the category was appropriate to highlight their part time/locum status. One of the four women had a production-related business, while the 3 men who chose the "other" category were in a production/consultancy business.

It is clear from the survey that veterinarians who work in a single-veterinarian practice make up only a small percentage of the population. About half of the respondents were in practices with more than 3 colleagues. The mean number of veterinarians which respondents said worked in the practice was 4, although, as discussed earlier, this overestimates the number of larger practices because all responses from the large practices would be counted.

The explanation as to why there are proportionally more men than women who said they worked alone and more women than men who worked with two to four other veterinarians cannot be extracted from this data. Women may be choosing to work in medium-sized practices or it may be purely coincidental. It may also reflect practice sizes in the specific categories where they mainly worked (for example, small animal practices may more commonly have 3-5 veterinarians compared with larger rural practices). However, with the changing ratio of women to men in the profession, any genuine difference between the sexes on this point may influence employment patterns in the future.

The same is true of the differences in practice positions held by men and women. The lower proportion of women in managerial or ownership positions may have

a number of explanations. This was not simply an age factor; when the data was re-examined for veterinarians with less than 10 years of experience the differences were even greater. Therefore the explanation that women are younger and have not yet reached those senior positions does not fit the data. The higher proportion of women in locum or part time positions suggest a career choice in favour of less than full-time paid employment.

It is impossible to tell from this data if women have chosen not to take senior positions or whether other factors have, at least so far, kept their numbers small in the management roles. As pointed out in the earlier study (appendix G), the career pathways followed by women will become very influential for veterinary activity as a whole, because they comprise a rapidly growing portion of the total profession and within twenty years may comprise a majority. These issues cannot be examined fully by this survey, which obtained data at a single point in time. Therefore, a companion study is currently being undertaken to compare the career pathways of men and women since graduation in order to determine what differences there have been in career choices over time. Even this study will be limited. It will show changes over time but it will not shed any light on the motivations influencing career changes. In-depth interviews would be needed to explain any differences that are highlighted by the statistics.

Some of the qualitative factors have been described in the formative research done by Jones (1985) concerning work patterns of women veterinarians and Harris (1980) with regard to final year veterinary students' perceptions of employment potential. However, to understand the current career choices of veterinarians it would be necessary to examine present-day attitudes and aspirations toward veterinary employment.

Examination of the results of the caseload question highlight a number of interesting points. The first and most obvious is the major influence of companion animals on the work patterns of veterinary practitioners. In a country which is dependent on its primary animal produce, pets represent the single largest component of the workload of the "typical" veterinary practitioner, occupying 47% of the hours devoted to cases. Production animals comprise 40% of the workload and horses the remaining 13%. While only 31% of the respondents were classified as predominantly small animal practitioners, a further 31% were mixed practitioners with a significant small animal component to their caseload.

Specialist large animal practitioners were, however, the largest single group, comprising 38% of the sample. It should, of course, be borne in mind that the 30% of the profession in non-practice employment work predominantly with production animals and their products. As a result an analysis of the profession as a whole would show a much more even distribution in relation to species/veterinary hours. For example, on the reasonable assumption that these veterinarians spend 90% of their time on production animals, 5% on companion animals, and 5% on horses, the distribution for the whole profession would be 55% on production animals, 34% on companion animals and 11% on horses.

There has been a change in the traditional large animal species that make up the bulk of the farm animal workload. At the time of the study, deer and goats took up more veterinarian hours than beef cattle and sheep. There have been special factors operating over the last 2 to 3 years to produce this situation, but if it is a long term trend then it may be necessary to re-assess the emphasis placed on each species in veterinary training.

Veterinarians still have very limited involvement with pigs and poultry. It is not possible to determine if this is by choice or whether the profession has failed to achieve or maintain a role in this area of animal production. The number of veterinarian hours is very low, and is an overestimate because responses were rounded off to the nearest whole percent. This rounding off error is quite significant in this case as the maximum time spent on these species was less than 200 hours.

For the purpose of analysis it has been assumed that all working hours were allocated to a type of animal. This is obviously an oversimplification. When responses were separated into those from men and from women, there were some marked differences. The most obvious was the greater amount of time women devoted to small animals (including cats, dogs, and all other species kept as pets).

Men spent proportionally more time with all the other species except goats. This was especially marked in the case of horses to which men devoted approximately 3 times more veterinarian hours than women.

CONCLUSION

The survey has added considerable detail to the general profile that was developed from the Veterinary Surgeons Board data. The distinction of 59% working with farm animal and 41% with non-farm animals has been examined much more closely. This has highlighted the need to change some traditional assumptions on the work patterns of practitioners. The veterinary profession is changing quite substantially both in demographic structure and in forms of veterinary work carried out. These changes will need to be taken into account by educators and professional societies as they work to ensure that they meet the current needs of the profession.

The differences in the work and career patterns between men and women need a more intensive investigation to determine the underlying factors that would explain the apparent divergence in career paths. Understanding the motivating factors for each group would improve the accuracy of veterinary manpower requirement predictions.

In relation to information search and management the demographic detail in the survey has highlighted differences between sub-groups. On the basis that group characteristics do influence attitudes and behaviours these differences could be used to segment the veterinary practitioner population to facilitate more in-depth research into the motivating factors driving the information search behaviour of the sub-groups.

CHAPTER 6

THE INFORMATION SEARCH PROCESS USED BY
VETERINARY PRACTITIONERS
WHEN DEALING WITH NEW SITUATIONS

The previous chapter and appendix G have jointly defined the group and its common characteristics. The characteristics are easily determined and, as a result, it is easy to describe a veterinarian in these terms. Using the group membership research paradigm the information search behaviour would be relatively predictable if the search behaviour pattern of the group were known.

In this chapter the data gathered in the interviews and postal survey were examined to determine the information search behaviour of veterinary practitioners. This was developed into a behavioural model that could be used to predict with a degree of certainty how an individual would act when searching for information about a "new situation".

DEFINITION OF "NEW SITUATIONS"

The term "new situation" refers to any event that has not been experienced before and requires a participant to search for additional information. The examples of "new situations" used in the postal questionnaire (question 13, appendix B) were generated from the in-depth interviews. The results of the whole sample are given in appendix D.

The new situations that were chosen by respondents were related to particular clinical problems - a treatment that didn't work, recognizing a new clinical condition, adopting a new procedure, etc. Practitioners were asked if they could recall a specific "new situation" in the last 12 months. The responses of the whole sample are given in table 7, chapter 4. Situations related to clinical problems seemed to be the ones that were most vivid in respondents' memories. The use of new veterinary techniques (eg embryo transplants), unknown clinical conditions, new treatments, and herd health problems were the most common responses. The specific "new situations" were consistent with the interview data, the responses to the structured question 13, as well as with cognitive theory in general. They were also consistent across all sub-groups and indicated that the environment in which veterinarians practiced dictated the type of situations

that must be handled. It does not give any indication of the actual exposure to the different types of situations but only an estimate of the frequency of events the veterinarian noticed and remembered (Broadbent, 1958). There is no way to relate this recall to actual exposure.

Small animal veterinarians had an overall higher frequency of new situations as compared with large animal practitioners. The interview data suggests that they were more closely associated with their clinics and, as a result, came into contact with information sources more frequently.

Large animal practitioners felt they were more geographically isolated and spent considerable amounts of time out in the field. This group expressed a lower frequency of "new situations" than the small animal practitioners.

Recent graduates had a higher frequency of "new situations". The final year students said, "everything was going to be new". Predictably, this response changed as practitioners gained in years of experience.

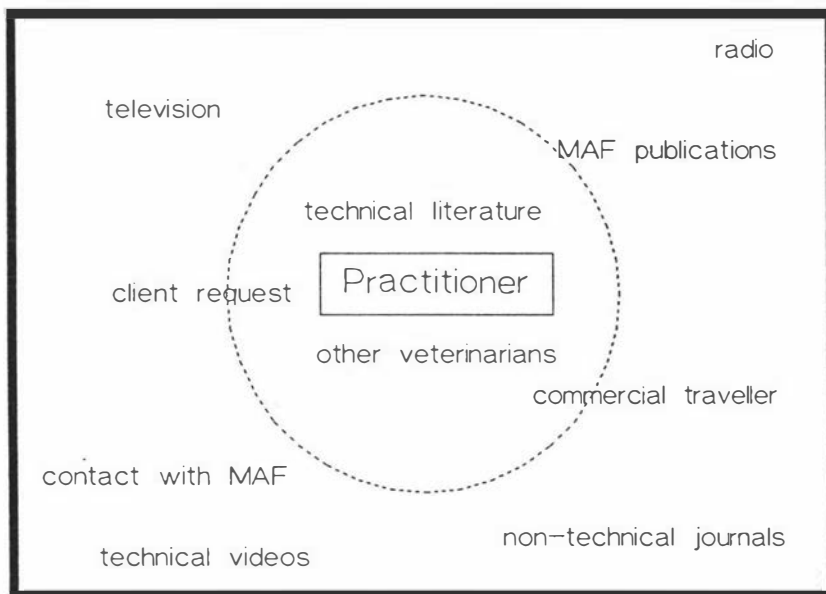
The actual events that were chosen or recalled were not very different between sub-groups. The most important fact was that remembered situations were those that were relevant to real, current problems. This was true whether the veterinarians were remembering the actual situations or the information which they gathered in relation to the situation; the critical fact was having a good reason to remember the event.

Veterinarians who felt that it was relatively easier for them to find information reported overall a higher frequency of new situations. They seemed to be more comfortable with innovations and information sources. Veterinarians with additional tertiary degrees had the greatest range of frequencies of occurrence of new situations. Interestingly, veterinarians who were not members of any professional group had the lowest frequencies overall and the shortest range of frequencies. The trend was for veterinarians with more contact to be more familiar with innovations and information sources.

SOURCES OF "NEW SITUATIONS"

The network of sources of "new situations" is shown in figure 16 with the veterinarian at the centre of the network. The distance between the sources of "new situations" and the veterinarian indicates the relative importance of that source. This was estimated as a combination of the number of veterinarians choosing the

Figure 16: Network of sources of "new situations".



source and the mean value of the frequencies of occurrence. The dotted circle represents the boundary of the "inner circle". Inside this circle are the most important sources to the regular information search process. The most common source of "new situations" was the technical literature, followed very closely by discussion with other veterinarians. This is not entirely consistent with the responses of the interviewees. They reversed the order of importance and said the technical literature was important but the direct interaction with colleagues was more effective and rewarding.

The discrepancy was most likely related to the kind of situation that the respondent had in mind when he or she answered the question. Situations in which a veterinarian was interacting with the source of the "new situation" (eg. a client request) required an action and a specific information search. In such cases the technical literature would be valuable, but it would probably be used in the second stage of investigation, after consultation with colleagues. In other cases, where a new situation arose in the course of personal development efforts (eg. skimming journals for interesting articles), the technical literature would be the primary source from which new information was gained. It was only during interviews that it was possible to be sure which type of situation the practitioner was referring to.

In the survey, the margin of differentiation in frequencies between "the technical literature" and "discussion with colleagues" was not great. As a result, when the population was divided into sub-groups the two alternatives varied between first and second choice. Veterinarians with only a few years of experience tended to use the technical literature in preference to discussions with other veterinarians, while older veterinarians preferred to discuss things with their colleagues. When the population was divided in relation to species of animal predominantly seen, the equine practitioner preferred the technical literature while the others tended to prefer discussion with colleagues. Veterinarians with additional tertiary degrees and those who felt that they were, in general, unsuccessful in their search for information, and veterinarians who found it relatively easier to find information all preferred to discuss things with their colleagues. There was not enough difference between sub-groups to draw any definitive conclusions from variations in the order of choices. In fact it may be that the distinctions between sub-groups is irrelevant to the issue. This is supported by the impression that the context of the situation is more influential than the characteristics of the practitioner. Further investigation would be necessary to see how significant the differences are.

All the sub-groups included clients as a common source of new situations, except those veterinarians who had additional tertiary degrees. This sub-group can be regarded as sharing features with the university veterinarians who participated in the in-depth interviews. Veterinarians with additional degrees seem to be more familiar with other sources of information and used them regularly. It could be assumed that the client-university veterinarian relationship was different than the relationship between client and practice veterinarian. The university veterinarians mentioned clients, but because of their familiarity with other sources, their clients were less likely to be the source of a new situation. However, the university veterinarians were not represented in the postal survey so it is not clear why clients were not the first choice of veterinarians with further tertiary degrees. This sub-group also placed contact with the Ministry of Agriculture and Fisheries higher on their list than other groups.

Veterinarians in management positions felt that commercial representatives were a more common source of new situations. This would have included veterinarians who worked on their own. This same pattern was common in the interviews where the comment was usually prefaced with a statement like "you wouldn't believe it but..." It seemed that interviewees were slightly embarrassed to admit that they valued the non-veterinary information from the commercial representatives. Veterinarians who were not in management positions did not see the commercial representative as so useful. In most cases these practitioners had considerably less contact with the non-veterinary representatives.

MOTIVATIONS/CONSIDERATIONS INFLUENCING THE SEARCH PROCESS

Urgency was the primary consideration. This was true for all the sub-groups and for all the interviewees. Time was a critical factor. It was such a common response that it would be safe to hypothesize that the single most critical factor involved in the search process is whether or not there is sufficient time to find additional information.

Clients' expectations and the veterinarian's perception of his/her responsibility in the situation were the second and third choices. Interviewees added that their expectation as to the success of the search was also important. Risk reduction was the next most common choice. A few veterinarians said that personal interest was an important consideration.

There was very little variation between the sub-groups. All data indicated that external pressures common to veterinary practice were more influential in prompting the search process than sub-group differences. In addition, external obligations formed the boundaries for information search. Personal interest was secondary to pressing needs. Many interviewees emphasized this concern. The pressure of current problems limited their ability to achieve a comprehensive information search.

An interesting point in regard to search motivation was that, in the question referring to a specific new situation, more women (45%) wanted to reduce the risk of making a mistake than men (36%). These responses were not ranked but considered individually. Therefore, it was not a matter of preferring one answer over another. It appears to have been a specific difference in choice. The data was re-examined including only those veterinarians with less than 10 years experience to see if the difference was due to the fewer years of experience in the younger female sample. Most of the difference disappeared so it can be assumed that it was not a real sex difference.

INFORMATION SEARCH STRATEGIES

The selection of an appropriate information search strategy was dependent on the practitioner's perception of the possibilities. Interviewees were asked what were their information sources. These were used to make up the list of alternatives in question 14. The responses of the whole sample are given on page 4 of appendix D, but the relative importance of the sources of information are shown in figure 17. The "inner circle" in this case includes those information source that are used consistently as the first-line information resources. Respondents were most familiar with these sources and used them frequently.

The selection of information sources and the process of information gathering is shown in the form of a flow chart in figure 18. According to the interviewees and the order of responses in question 28, the process is cyclic beginning with those sources that could be used with the least time/energy expenditure. Discussion with co-workers and reference to their personal/practice library were, by far, the most common strategies. With this information and a liberal dash of their own common sense most problems could be solved. If the information gathered in this manner was insufficient the veterinarian consulted with sources that he/she was familiar with (eg. MAF laboratory, specialists) but were outside the immediate information sources.

Figure 17: Veterinary information network

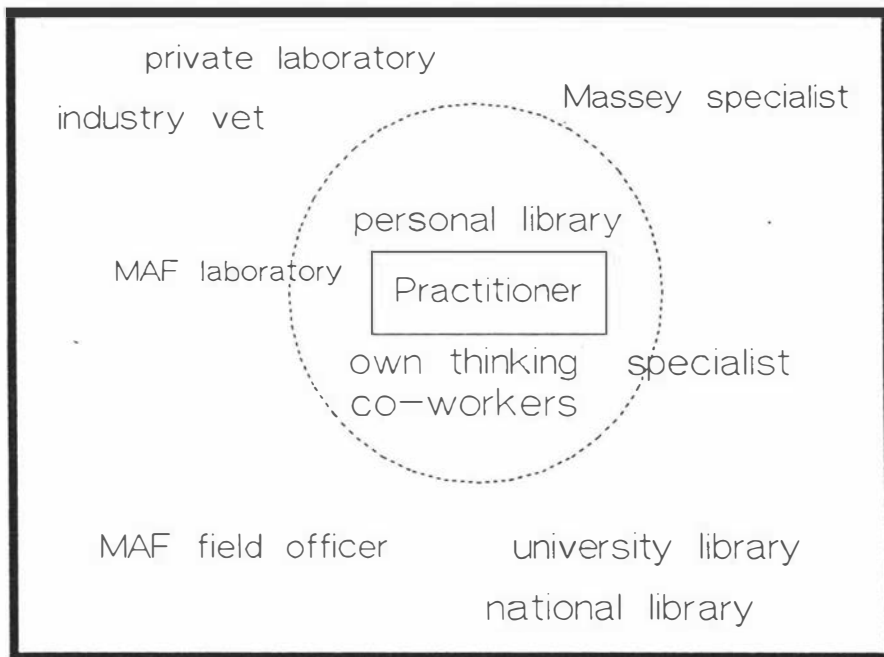
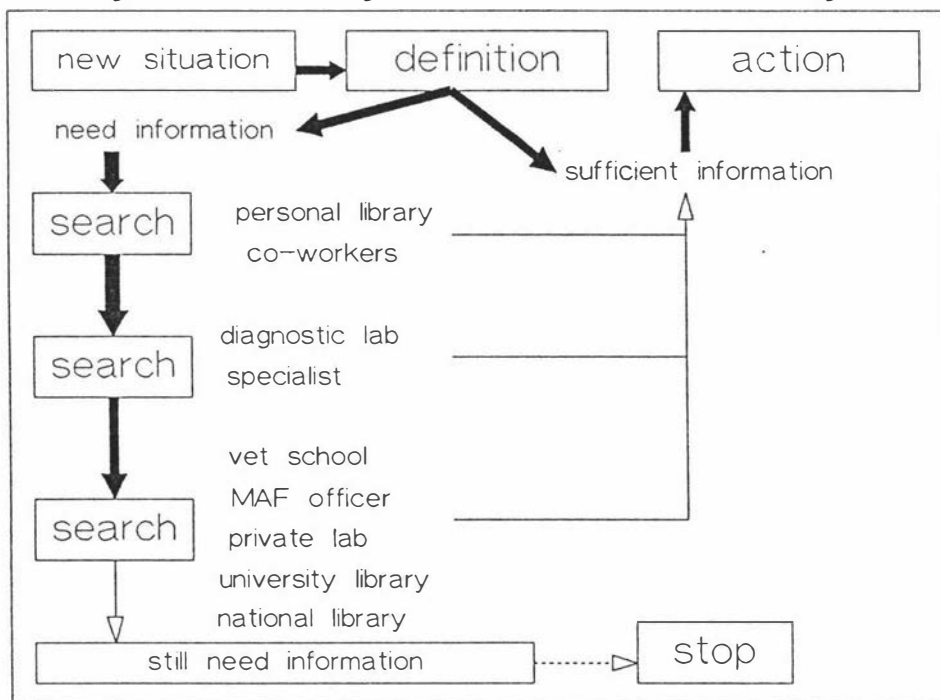


Figure 18: Flow diagram of information search strategies



The information gathered was brought back into the "inner circle" and processed by discussing it with co-workers or relating it to personal library resources. If the information was still not sufficient the veterinarian went further afield. This process continued until there was sufficient information to act or the veterinarian was forced to stop, usually by competing pressures on time.

The respondents were asked what strategies they used in the case of the specific new situation that they described in the questionnaire. The strategies were the same as in the general question. The frequencies were similar as well. In addition, it was noted that respondents used the immediate sources first then went to an outside source and returned to the immediate sources to put the new information into perspective before going to another outside source. This pattern was repeated until the search was terminated. Such an evaluation of new information and reassessment of the situation is consistent with both the information search model (figure 8, chapter 3) developed in this study and the behaviour model of Engel, Kollat and Blackwell (1973).

Veterinarians had specific information sources which they preferred for dealing with particular types of situations. Most of the preferences were related to obvious advantages of a particular source (eg. diagnostic laboratories for clinical samples), but other preferences were related to familiarity/ease of contact with the source.

Those respondents (78) who indicated that they had used strategies other than their usual one to find information about a specific "new situation" said, "they did not get a response from the normal sources" (22), "the specific new situation was an exceptional circumstance" (19), "there was an unusual source available" (11), or "there was no information available" (11). It is clear that veterinarians were flexible in their search strategies, taking advantage of an unusual resource if they could.

The actual frequency with which strategies were used indicates that veterinarians were not happy in their ignorance. In a later portion of the questionnaire, respondents were asked how frequently they referred to the most common types of written literature, especially textbooks and proceedings. By far, the most common response was "more than once a week". Obviously, veterinarians are actively searching for information, but time restrictions made it difficult to extend their search to outside information sources.

STALL AS A STRATEGY

A curious exception to the general preference for strategies was noted in the interviews with the final year students. They identified "stalling" as a means to cover their information search. They were much more concerned to avoid saying that they didn't know the answer than veterinarians with a few years of experience. Older veterinarians recalled a similar feeling when they first qualified. They thought their clients expected them to know everything. They said that they soon realized that this was not a client expectation at all. They all said it became easier to say "I don't know" as the years went by.

ATTRIBUTES OF AN INFORMATION SOURCE

Some of the attributes of an information source have been mentioned already. Once again, there was a subtle difference between the data from the interviews and those from the survey. In both cases the most important attribute was that the source was easy to contact. This is quite consistent with the time limitation. The need to consult with a source not included in the "inner circle" added considerably to the expenditure of time and energy.

The difference between the in-depth interviews and the survey appeared in the second choice of attributes. In the survey the selections "has the latest information" (380, with a mean of 2.7) and "is a recognized expert" (344, with a mean of 3.1) were considered more important than "follows up your inquiry" (347, with a mean of 3.9) and "is familiar to you" (321, 4.1). When veterinarians were able to talk through choices, they preferred the attributes that facilitated the process. Being familiar with the source and getting a response quickly were more important than the currency of the information or the overall reputation of the source.

Having made this observation, it is important to qualify it with the fact that in a later question and in the interviews, the most important consideration in deciding whether information was reliable was whether the respondent thought the source was reliable. This reliability had to be expressed on a personal level. Whatever the public reputation of the source was, the respondent had to have personal confidence in the source. This appeared to be an earned respect in most cases. The respondents had to trust the source's information based upon previous interactions or referral by a trusted colleague.

The emphasis in the interviews seems consistent with the behaviour model. Expediency is paramount, and any

attribute that facilitated the process would be preferred. The discrepancy may reflect the sincere desire to gather the very best information. This desire is tempered by the limitations inherent in the interaction with the information source. For example, as one interviewee described, she wanted a chart of the normal values for vital signs in ferrets. Information on ferrets was very difficult to find. Most sources had very few references and none had a chart of normal values. The information was not stored in that form. The veterinarian finally gathered the information (with a great expenditure of energy) after repeated dialogues with individuals who had fragments of the data. This is a good example of Taylor's (1972) fourth level of information need, "what you really want is seldom what you get"¹

Most of the responses were the same for all sub-groups with a few minor exceptions. Veterinarians in management positions, those in mixed or large animal practices, and those with additional tertiary degrees placed "has the latest information" at the top of the list over "easy to contact", although the differences were not great. The significance of this difference cannot be determined from the answers to the questionnaire.

The one difference that was marked was that newly qualified veterinarians wanted the information source to be interested in their inquiry. This is probably a reflection of the lower level of self-confidence in this group. There may be more at stake for a young veterinarian who did not want to publicise his or her ignorance by contacting an outside source, so they appreciate the source's interest more than experienced veterinarians do.

PERCEPTION OF SEARCH SUCCESS

Veterinarians seem to be relatively confident of their success in finding the information that they want. There were only 23 respondents who said they were unsuccessful in their search for information. The

¹ Taylor described 4 levels of information need which differed in the refinement of the focus. The 4 levels were:

- 1) a vague feeling of something missing,
- 2) an internal perception that information is needed,
- 3) a clarification of what information is needed,
- 4) a request for information "compromised" by the limitation inherent in the information source as to what information can be supplied.

feeling of success seemed to be related to the level of expectation. Interviewees commented on the fact that they searched for information in order to take some action. In most cases, the veterinarians felt that they found sufficient information to act but wished they could have found more. Respondents said that they knew that the information they had gathered was incomplete. They felt that they had gathered sufficient to act but they monitored the results of their action to see if they had made the right decision. The veterinarians' expectation of the value of the information was confirmed by the satisfactory conclusion of the event that initiated the search.

This was expressed by most of the veterinarians interviewed. It was shown in the survey as well. When asked what were the most important considerations when deciding to stop looking for more information, most respondents said that either "the situation was resolved and the client was happy" or they "could not find the information and time ran out". The respondents who felt they were unsuccessful in their search for information said they "didn't have enough time".

This time factor becomes very important when the search schemata are generated or modified. The selection of strategies, the degree of confidence in the information source, the level of expectation related to information management, and other related attitudes and behaviour are formed in an environment governed by a stop watch. It is clear why the strategies that facilitate rapid search are preferred.

The majority of respondents felt that, in comparison with other veterinarians, they had about the same amount of difficulty finding information. Eighty respondents said that it was easier for them to find information. The most common reasons why they felt it was easier were because they "had a well organized personal library", "there were other veterinarians in the practice to discuss things with", and they had a good network of "personal contacts".

The opposite was true for the 55 respondents who said it was more difficult. They were predominantly veterinarians working in isolation in single veterinarian practices with very little time and limited libraries. Interviewees felt that the interaction with colleagues was very important, especially those who had little opportunity to take advantage of it.

The next most common reason for unsuccessful information search was that respondents "knew where the information was, but they did not know how to get it".

Understanding how to use an information source quickly and effectively was a concern expressed in the interviews and the historical documents as well. Familiar information sources were used more often because the veterinarians knew how to use them. They felt that with only a limited amount of time, they could not spend it trying to work an unfamiliar system.

The above responses were in relation to "new situations" in general. Respondents were to consider a specific "new situation" that they could remember in regards to the search process that they used.

In most cases respondents were able to recall a specific new situation that had occurred in the last year. Sixteen veterinarians did not answer this question. Forty respondents said they could not remember a specific new situation and 345 could.

The respondents were asked to describe the new situation. The answers were coded into generic categories and tabulated to give a frequency for each category. There were 12 categories based on the choices given in question 13 (different kinds of situations). Unfortunately, it was difficult to place the responses into mutually exclusive categories. Therefore, the frequencies are relatively crude and only comparisons that indicate large difference in the frequencies have been singled out.

The most common response for men, mixed practice, large animal, and equine veterinarians was being introduced to a new veterinary technique. The first choice for women, small animal, and dairy practitioners was "having to deal with an unknown clinical condition".

Sub-group differences (in order of highest frequency first) were as follows:

- 1) Men selected a new technique, dealing with an unknown condition, a new treatment, and a herd health problem.
- 2) Women did not include a new technique in their first choices.
- 3) Small animal practitioners said dealing with an unknown condition, a new treatment, a new technique, first learning of an old condition.
- 4) Mixed practitioners gave the same choices as the men but included herd health

problems and programmes as additional first few choices.

- 5) Large animal practitioners included herd health problems closer to their first choice.
- 6) Dairy practitioners included an unresponsive treatment in their first three situations.
- 7) Equine practitioners included first learning of an old condition as their fourth most frequent situation.

In relation to the new situation mentioned in question 26, 51% of the respondents said the situation interested them personally. Fifty-two percent said their clients needed the information. The next most common response was that they wanted to reduce the risk of making a mistake. Forty-four percent of respondents said that it was a potential growth area for their practice, and 7% said that they were chosen to investigate it for the practice. The order of responses were approximately the same for men and women except that more women, veterinarians with additional tertiary degrees, and those not associated with any professional body wanted to reduce the risk of a mistake, and more men thought it was a potential growth area. Seven percent (mostly men) gave alternative motives that prompted their information search. These related to a feeling that something had to be done and their information/experience was not sufficient to decide on a plan of action. The other common reason given was that the action that they took was not successful or the patient had not responded.

The most common responses to the question concerning the strategies used to find information needed to deal with the volunteered new situation were the same as those in question 16.

For all the sub-groups the preferred strategy was searching their personal/practice library. This was followed closely by using their own thinking/experience and discussing with their co-workers. The exceptions to this pattern were the veterinarians working in isolation who had to depend on their own library and experience, and the veterinarians with less than 2 years of experience who discussed the situation with their co-workers first.

If more information was needed, the choices of additional information sources were the MAF diagnostic laboratory, a specialist in practice, or other veterinarians in general. Massey Vet School was

included in this set of sources but it was mentioned less frequently. At this point most respondents reassessed the situation and repeated the cycle by discussing the situation and the new information with their co-workers or returning to their library.

If more information was needed, they would go back to familiar sources. Other sources of information that were mentioned were:

- Industry veterinarians/representatives
- MAF field officers
- University library
- National library service
- Educational courses

SUMMARY

It would appear that veterinarians are predictable in their information search. When faced with an innovation situation, they look at their watches and say,

" No Time To Waste! The client needs help, the patient needs action, I have a responsibility to solve this problem, and there are other pressing problems waiting to be attended to.

I think I understand the problem. Now, how can I find out what I need to know in the quickest, most efficient manner? I will discuss it with my colleagues, and check in my personal library.

If the answer is not there and the problem is still urgent, then I will contact the nearest, familiar, helpful specialist. I will clarify the problem with the specialist and get the information in the most accessible, practical, retrievable form. I will check with my colleagues again. If necessary I will go to another external information and repeat the process until the information feels right and it has come from a source that I trust. Then I will act on it.

If the client is satisfied, there are no urgent nagging doubts, and the subject is not a burning passion of mine, then I will go on to the next urgent problem".

There were differences between the groups of veterinarians interviewed. However, these differences were consistent with the substantive theory developed from the data. Age, experience and relative ease of access to information sources can explain the variation.

Nevertheless, the actions of practitioners were quite consistent with present cognitive theory. Their behaviour even across sub-groups indicated that the external environment of veterinary practice in general is a much more pervasive influence on behaviour than personal difference between practitioners.

This behaviour pattern can be used in a predictive manner by applying it to individuals who share the characteristics described in chapter 5. It is possible that the pattern has more universal application as well since many of the characteristics common to veterinarians are common to members of the human medical professions and even non-medical professions.

CHAPTER 7

SOURCES OF TECHNICAL INFORMATION
USED BY NEW ZEALAND VETERINARY PRACTITIONERS

Asking questions about attitudes toward information sources encourages the respondent to consider the attributes of the source rather than his/her information needs. This line of inquiry has been followed by many researchers (Dervin, 1986). The results give an insight into the acceptability and patterns of use of the sources. However, such a study does not necessarily show the value of the sources in relation to specific information needs.

Dervin (1976) and Taylor (1972) would hold the opinion that an investigation of the process of information search as examined in chapter 6 is more rewarding. They believe that patterns of behaviour and motivation driving the search process give a more comprehensive understanding of the event. However, other researchers believe that the motivation behind behaviour cannot be specified. As a result, this "black box" concept of behaviour directs the line of inquiry toward observable behaviour and avoids making any speculation about the specific causes of that behaviour.

The assessment of information sources (and information itself) has received considerable attention in the last 10 years. The survey of libraries in veterinary practices in Great Britain (Raw, 1987) and the work done by Drake (1978) in the establishment of the veterinary information centre at Purdue University are specific veterinary examples that supplement the general studies described in Dervin's (1986) review.

Other organizations have gathered informal feedback concerning veterinary attitudes towards information and its sources; for example, the Post Graduate Foundation for Continuing Education at the University of Sydney (personal correspondence to the author), the continuing education study in Canterbury, New Zealand (Gumbrell, 1984), and the market research survey sponsored by the Animal Health laboratory at Palmerston North, New Zealand (Hobson, 1984). Unfortunately, few of these studies have found their way into the scientific literature.

In chapter 6 the attributes of information sources were considered in relation to search strategies used by veterinary practitioners. The preferred attributes were those which facilitated the search process and

reduced the search time to a minimum. It could be assumed that the preferred attributes of information itself would parallel those of the sources in that any attribute which facilitated the search process, minimized the expenditure of energy and shortened the time necessary to assimilate information would be attractive to veterinarians.

This chapter examines the data related to the major forms of information: scientific literature in the form of journals, text books, and proceedings; courses, workshops, and conferences; and video support material. The survey data is extracted from questions 33 to 57. This was supported by the in-depth interviews.

SCIENTIFIC LITERATURE

Journals

Virtually all the veterinarians (97%) in the sample receive at least one journal. The range for the number of separate journal titles received was 1-20. The mean number of titles was 3.

When asked about their general feeling about the usefulness of journals, 19% found them very useful, 52% found them useful, and 29% felt they were not very useful. This was compared with the interview responses to give a finer focus on what is meant by useful. In most cases, usefulness referred to helping them become aware of changes in the profession. In the eyes of the practitioners interviewed in detail, they were of limited use in solving current problems.

Considering journals in general¹, no single statement best summarized veterinarians' attitudes toward journals. The most common statement chosen from the offered list was "I use them as needed to keep up with technical changes". This statement was expanded upon by interviewees. They said that they used journals for awareness and personal development rather than as references. All but one veterinarian said that it was difficult to find information which they had seen in a journal. Their use of journals was immediate.

The next most common response was, "they (journals) are too research oriented". When asked about having time to read them the respondents were evenly divided between "I regularly find time to read them" and "I

¹ The data for the whole sample in regards to the structured questions which asked for the relative importance of responses are given in appendix D. The tables must be examined in conjunction with the questions in appendix B.

seldom find time to read them". These two statements shared the same approximate level of influence with "I just use them for the professional news".

Respondents said the 3 most important attributes of a journal were (in order of preference):

- 1) It has the latest information.
- 2) It gives examples of actual cases.
- 3) It has professional news.

"It is practical", "it has article summaries", "it has all the technical details", and "having it on hand when you want it" were about the same in importance, and lower than the three items above.

Text books

Ninety-nine percent of respondents had text books. Three hundred and six veterinarians (77%) said they used text books at least once a week. Seventy-one (18%) said once a month, 17 (5%) said 2 or 3 times a year, and only one veterinarian said once a year. Interviewees said that text books were very useful for solving problems at hand. The texts were used to "get their thoughts in order", and they were referred to frequently.

The mean number of text books that veterinarians had was 26 with a range of 1 to over 50. Respondents said that they used only a portion (a mean of 7) of these on a regular basis. Seventy-five percent of the sample would buy additional texts in an average year with a mean of 2 books per year.

The 3 most important attributes (in order of preference) of a useful text book were:

- 1) Having it on hand when you want it.
- 2) It has all the technical detail / it is indexed.
- 3) The information is practical.

Proceedings of conferences and continuing education courses

Ninety six percent of the sample use proceedings. When asked what their impressions were of the usefulness of proceedings, 69% said they were very useful, 31% said they were useful. Once again this was supported by the interview data. Proceedings had more practical information for solving current problems. In addition, it was felt that the proceedings were more likely to have recent advancements in the field.

Two hundred and ten (55%) said they referred to proceedings at least once a week. 137 (36%) said once a month and 36 (9%) said 2 or 3 times a year. Only 6 said that they referred to their proceedings once a year.

There was a range of 1 to over 50 proceedings in practice libraries. The mean number was 19. The mean number of proceedings that were referred to regularly was 7. Ninety-four percent of the sample said that they would purchase additional proceedings in an average year with a mean of 3-4 each year.

The 3 most important attributes (in order of preference) of proceedings were:

- 1) It has the latest information.
- 2) Have it on hand when you want it.
- 3) The information is practical.

CONFERENCES AND COURSES

Respondents were asked if they had attended any courses during 1986. The answer was affirmative for 316 veterinarians. Only 78 responded with no. However, a particularly interesting point to note was the difference in attendance between men and women. Eighteen percent of the men said that they had not attended any courses during 1986, but 26% of the women responded negatively.

When asked how many days they attended courses during the year, the range of responses was 1 to over 50 days with a mean of 4.5 days. There was a full day difference between the mean days for men (5) and for women (4) as well as the fewer courses attended by women. However, when the data was examined to eliminate a possible age factor, the difference in the length of time spent at courses between men and women was more complicated. For those respondents with less than 10 years of experience the mean number of days was 4.0 for men and 4.3 for women. For those respondents with more than 10 years experience the mean number of days at courses was 5.3 for men and 3.9 for women.

When asked what the most important attributes of a course were, the 3 most common responses were:

- 1) Speakers were recognized experts.
- 2) Course had proceedings.
- 3) There was time for discussion.

Forty veterinarians offered additional attributes as their first choice and these expressed some significant concerns. The course had to be practical, relevant to

practice, and include new information. Interviewees said that proceedings were essential for the long term value of any course. They preferred to listen to a recognized expert in the subject so that they could use the information with confidence. They also emphasized the value of interacting with the expert and their colleagues.

OTHER SUPPORT MATERIAL

Interviewees mentioned that they could remember a number of initiatives to supply other kinds of information in the form of study sets, audio-tapes, slide sets, and videos. Apart from the video tapes specific questions on these types of information material were not included in the survey so the interview responses cannot be backed up by any numerical data. However, the responses were so consistent with other aspects of the survey that it would be safe to predict how practitioners would have responded to such questions.

Interviewees said the study sets were used when they were first prepared. The respondents had no idea when or why they were no longer available. They did remember that some were very time consuming to go through and others were of irrelevant subjects or too research oriented. The audio-tapes of conferences were "particularly boring" and poorly regarded. Some practitioners said that they wished they could get good audio tapes that they could listen to in their car while they are travelling from one case to another but the tapes had to be "interesting and well done, not just taped lectures".

The video material had "interesting parts" but the tapes were an hour long and needed a video recorder and television. These limitations meant that the videos had to be watched during the veterinarian's "free time" once again.

It was clear from the responses in the postal survey that video taped material is not a common source of information. The 2 commonly known sources of video material for veterinary practitioners were named in the questionnaire, and respondents were asked if they have either bought or hired videos from them. Out of the 389 veterinarians who answered the question, 13 answered yes in relation to the Postgraduate Committee in Veterinary Science (University of Sydney), 5 said yes to the Unit for Continuing Education (University of London). Forty-six veterinarians said they had bought or hired videos from other sources. As they were not asked to give the name of the source, that information is not available. Most interviewees felt that videos

were not very practical because they did not have enough time to sit down and watch them. The video equipment was also a limiting factor.

ANY OTHER INFORMATION SERVICE

The most common (48) response to this question was a comprehensive local audio/video library that was easy to use at a reasonable cost. Other common responses (improving the availability of information within the work environment) were:

- A computer linked information search system (28)
- A central register/information centre (20)
- A posting service for indices and abstracts / reprints (20)
- Lists of information (e.g. publications, new drugs, techniques, research projects and expert contacts) (16)
- Better access to libraries (15)
- Practical information in journals (13)
- Videotext type veterinary information service (12)
- List of specialists (11)
- Better access to specialists (7)
- Better texts/proceedings (7)
- Research/MAF updates (4)
- Veterinary TV programme (2)

What respondents meant by better access to libraries or specialists and better texts/proceedings cannot be clarified further using the present data as the question did not ask for a full explanation. However, in the interviews some aspects were mentioned. Veterinarians were not sure who were the specialists in a particular field. They were also unfamiliar with the procedures to follow to use libraries and other information sources. At the time of the study respondents were uncomfortable with the technology associated with electronic information management systems. These were probably some of the problems that respondents had in mind when they were suggesting additional information services.

The common responses related to improving the flow of information (outside the immediate work environment) were:

- More continuing education courses (3)
- Roadshows/seminars (3)

DISCUSSION

In general, text books and proceedings are much more useful to veterinarians as problem-solving references than journals. When veterinarians said that one of the most common search strategies was to use their own libraries, this did not normally include scientific journals. Respondents said that journals were most useful as a means of awareness of changes in the profession. The journals were used to keep abreast of innovation in the profession, not to refer to for information about a specific problem even when veterinarians could remember that they had read something that was relevant. Since practitioners said that most information searches were associated with specific current problems journals played only a very minor role in the search process.

It could be argued, as well, that journals would play a small role in the assimilation of veterinary information. The absorption of information must be very limited. General cognitive theory (Mayer, 1983) would indicate that it is unlikely a person will attend to and retain information that is not relevant at the time. Respondents indicated this fact themselves.

Therefore, articles that are not tied to current concerns are overlooked by the majority of readers. This was reinforced from a different perspective when respondents commented that, in most cases, journals are too research oriented and not very practical. Although all respondents receive at least one journal, half of them had difficulty finding time to read them. Since they seldom used them as a reference to solve current problems, having them on hand when you want them was much less important for journals than for texts and proceedings.

Books seemed to be referred to most frequently and by a high percentage of veterinarians. Interviewees said this was the case because they used a text to organize their thoughts when initially defining a problem. In many cases this was sufficient to allow them to decide on a course of action. Even if it was not sufficient it usually clarified the problem to a point where further information search was more productive.

While personal libraries were usually large with ranges of 1-20 journals, 1-50 texts, and 1-50 proceedings, only a relatively small portion of their libraries was used on a regular basis. Journals were "skimmed" for interesting articles when they first arrived and then set in a pile for further reading when the veterinarian had some free time. As has been shown in chapter 4 and 6 this is a very optimistic attitude since virtually

all respondents indicated that "free time" is a very rare commodity.

Only 25-33% of the texts and proceedings were used on a regular basis. The emphasis on the practicality and retrievability of information in specific books and proceedings were important attributes that made them more valuable to practitioners. Some respondents said, "some of my books fall open to the pages I want because I've used them so often". In the interviews respondents said that they knew recent advancements would not be in an old text but the convenience of a familiar book outweighed this limitation.

Apart from any deficiencies that the technical literature had, it was still recognized as the most important source of information. Personal or practice libraries were referred to regularly, and there was a commitment to keeping them stocked with new material. Respondents said that they would refer to texts and proceedings frequently (the most common frequency was "at least once a week").

There is some indication that even though the scientific literature was the most important source of veterinary information this was wishful thinking on the part of respondents. During the interviews it was clear that the literature was not as useful as practitioners wanted it to be. They also had very limited knowledge of how to use any literature source other than their own libraries. When it came to solving specific problems practitioners used information sources that they could interact with rather than the scientific literature. This was partially due to limited amount of time available for the information search and partially to the uncertainty as to what information is needed.

Interviewees indicated that they had never been trained to use the available information sources and that, in practice, this uncertainty as to how to use a source was sufficient to prevent them from trying.

The frequent request for a comprehensive video/tape library service would indicate that there would be considerable support for the development of such a resource. However, this high request rate must be qualified. There seems to have been a position effect on responses to this question. It occurred immediately after the series of questions concerning the use of video libraries. As an example, one respondent stated, "I hadn't thought of videos, but that is an obvious, potentially very useful source of information". Another respondent put videos into perspective when he said he would like to use videos if he had the time and the money.

The initiatives to supply alternative types of information which have been tried in New Zealand have been unable to maintain active support from veterinarians. There seems to be interest in the veterinary profession for these alternatives. However, it is clear that competent marketing would have to be an essential component of any initiative to meet this interest.

Conferences and continuing education courses were recognized as sources of information but the time away from practice was a luxury that few veterinarians could afford on the scale they would prefer. Confidence in the contributors and printed proceedings were essential ingredients of good courses. In addition, the opportunity to interact with colleagues and contributors greatly increased the value of courses.

The difference in course attendance between men and women suggests that, at the time of this study, this form of information transfer is less appropriate for women veterinarians. This should be examined more closely especially in light of the increasing ratio of women to men in the veterinary profession in New Zealand.

However, even considering the value of interaction, the most telling aspect of the survey was the predominance of requests for information services that improve the management of information within the work environment rather than more formal course work.

This seems obvious and yet evaluation of trial systems designed to give veterinarians more access to technical information have all shown that they do not take advantage of these services, such as: Study sets from the Ministry of Agriculture and Fisheries; Audio tapes from the Centre for Veterinary Continuing Education; A reprint service through the Centre for Veterinary Continuing Education, Argus, and Massey University Library, when they are offered. The immediate response to this would be to suggest that veterinarians do not know what they want. The trials appear to be failures because of disinterest on the part of practitioners. Unfortunately, there are no documented investigations into the causes of the discrepancy between the expressed desire for information and the lack of supporting behaviour. This should be investigated before potential systems are discarded.

The evidence from this study would suggest that ease and speed of use, comprehensive coverage of relevant fields, and the ability to target the search precisely are key ingredients of a successful information service. Unless the service is above a threshold level on all of these attributes, it is likely to fail.

CONCLUSION

Asking respondents their opinions about sources does prompt answers that are more related to the sources than to the needs of the respondent. Nevertheless, this survey has indicated that veterinarians are eager to have information if it can be obtained easily and within the work environment. While this may be a difficult challenge to those who supply information, it is clear that it will be easier to change the way information is presented than it will be to change veterinarians or the forces that shape clinical practice.

Veterinarians will continue to look to the technical literature for new information. This will be by default rather than choice unless the formal information sources have the benefit of more detailed research into the process of information search and management to restructure their product to meet the needs of practitioners.

CHAPTER 8

MEETING THE INFORMATION NEEDS
OF VETERINARY PRACTITIONERS IN NEW ZEALAND

In recent years information management has taken on an identity of its own. This is certainly the case in the field of veterinary science. Access to and the skills to use information have become critical factors influencing the success of a veterinary practice.

Considering the importance of information management, is it achievable in the present environment? This is not a simple question because of the many variables associated with the process of information search and use. Unfortunately, if the scientific literature is an accurate measure of the direction that information research is going, there is an inordinate concentration on electronic data processing as it relates to information management. This in itself is not dangerous but it does put the cart before the horse.

No matter what tools are used to achieve information management the basic considerations of what the information is to be used for and what are the needs of the user should be paramount in the development of information services.

This principle prompted this veterinary information search study in the first place. The objective of the study was to obtain a clearer understanding of the information needs of practitioners through examining the search process that they employed.

From the practitioner's perspective information search is a regular part of the practice routine, but do the information sources see the veterinary information search process in the same light? This question could not be answered using the data that had been gathered from the in-depth interviews or the postal survey. However, the perception of the information sources was important to understand present information services because the investment that the source puts into the development of a particular information service was influenced by the anticipated use of that service. Therefore, the source's perception of the search process had a direct impact on the features of the service.

To remedy this deficiency in the data the third phase of the study was designed to collect the perceptions of the decision-makers within some of the major information sources. These included: the Ministry of

Agriculture and Fisheries, field service, laboratory service, and information service; a commercial pharmaceutical company; the Massey University Veterinary School; the Massey University Library; the Centre for Veterinary Continuing Education; and a private veterinary information service.

There were 9 in-depth interviews conducted with either the chief executive or the individual directly responsible for the distribution of information or processing requests for information.

The interviews were conducted and analyzed in the same manner as those described in chapter 3. However, the line of inquiry was related to how the information source perceived the information search process used by practitioners. Respondents had to describe what they thought was happening since they were only on the receiving-end of the behaviour.

When the data from practitioners was compared with the interviews with information sources decision-makers there was a subtle difference in the perception of the process between the users and the suppliers of veterinary information. This seems to have resulted in a mismatching of services to needs.

The situation can be examined in relation to 3 basic questions:

What is the perception of veterinary practitioners in regards to information search?

What is the perception of the information sources in regards to the way practitioners use their services?

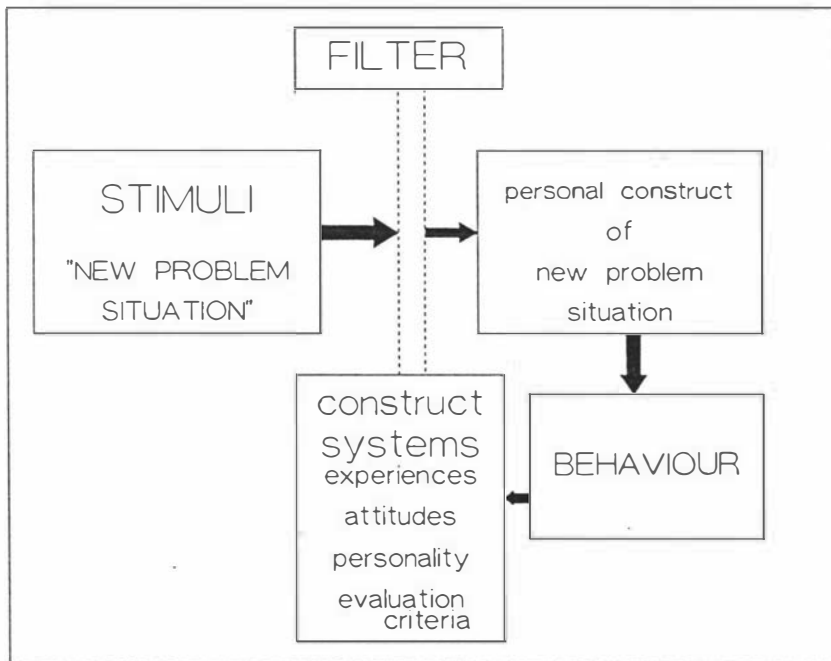
Is there a mismatch in these perceptions?

THE VETERINARY PRACTITIONER AND INFORMATION SEARCH

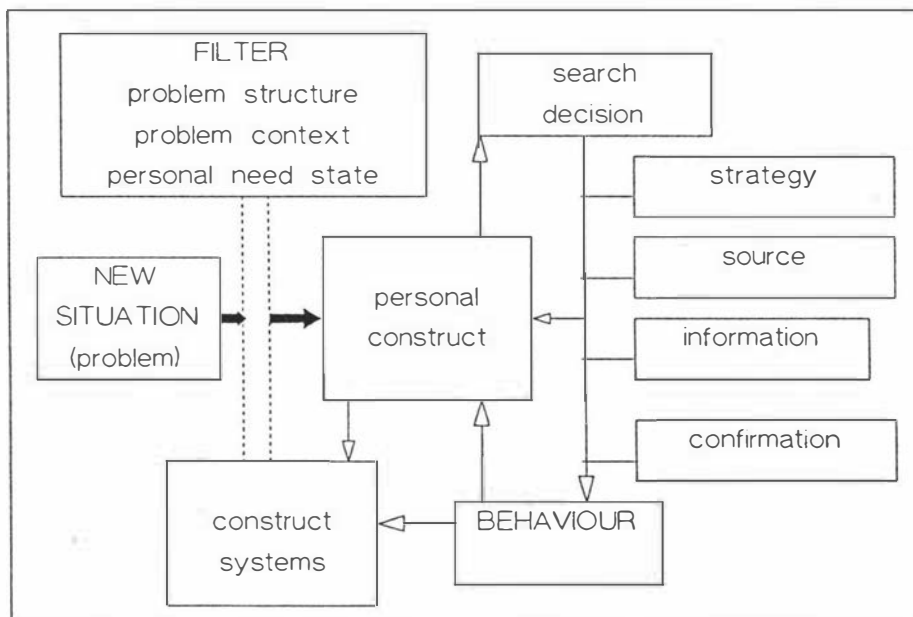
At this point it is necessary to draw together the critical components of the literature search and the results obtained using the 3 information research paradigms to describe the information search process from the practitioner's perspective.

The concept of "personal construct" (figure 4) in which any event is seen as an internally translated and created fabrication of the event based on previous experience set the stage for subsequent information search behaviour. The "construct systems" that a veterinarian has includes a set of rules (schemata) that direct his/her behaviour. This is represented more specifically in figure 8 in which the steps between a veterinarian forming a "personal construct"

Figure 4: Information filter and personal construct model



**Figure 8: Information filter and personal construct model
specific for the information search process**



of an event and the subsequent action taken in regards to that event has been expanded to highlight the steps in the information search process. Each step influences the following steps as well as influencing the "personal construct" itself.

This is a very dynamic process and cyclic in nature. Information search is a process of refinement. The veterinarian makes his/her way through the levels of information need described by Taylor (1958). As this process continues the "personal construct" changes and subsequent information inquiries change.

Underlying this process are the schemata governing the information search behaviour. Mechanically, these can be looked upon as resident behaviour programs. These help the veterinarian anticipate what the outcome of the event will be. They even help the veterinarian know who will be the most likely sources of events ("new situations" in the case of this study) in the first place. These sources and their relative importance are shown in figure 16.

"New situations" occur very frequently according to practitioners and they feel like they are constantly having to deal with something new. Information plays a critical role in dealing with "new situations". Within the schemata are also rules governing how, when and from whom to gather information.

The network of information sources is shown in figure 17. However, the application of specific information strategies can be seen more easily in the behaviour flow diagram (figure 18). This not only shows the search as a dynamic, cyclic process but also shows the preferred order in which the veterinarian uses the information sources.

At any point in the process the veterinarian may be forced to terminate further search and act upon available information. The order shows how practitioners use sources that are most familiar and easily contacted first. It is implied in the flow chart that as new information is gathered the veterinarian tests it by conferring with his/her initial information sources. For example information that is gathered from outside sources is discussed with co-workers to put it into perspective.

Another very important concept that is relevant to the veterinary information search process is that each veterinarian has a personal "level of expectation" (Lindblom, 1968) as to what can and will be achieved as a result of a search. Previous experience has modified his/her construct systems in such a way as to influence any judgment about the value of information or likelihood of success in finding the information required.

Figure 16: Network of sources of "new situations".

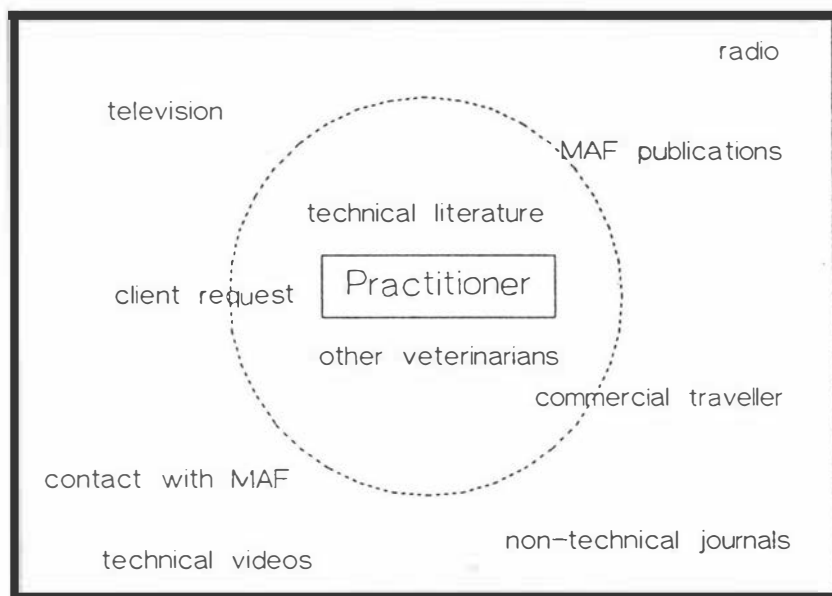
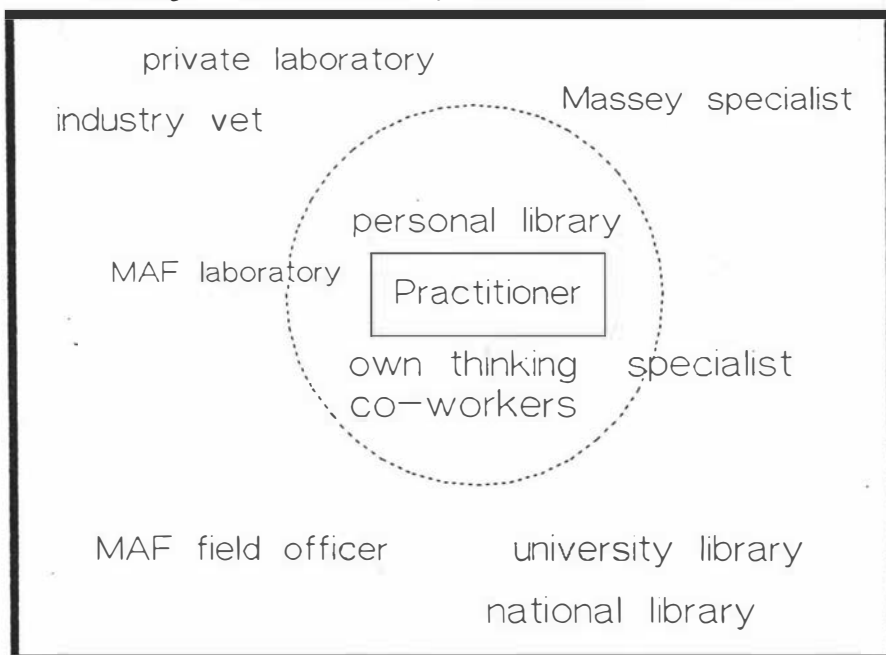


Figure 17: Veterinary information network



These rules are not unique to veterinarians. Every person who tries to make sense of an unfamiliar situation is subject to them. This illustrates why the definition of an event and the appropriate conclusions drawn are dependent on the situation and the participant.

Even though behaviour is personal to each veterinarian there are similarities because of the common experiences that make their search behaviour relatively predictable. All veterinarians are equipped with the same basic training. Their concepts of what information is and where it can be found are products of their common training and the practice environment. This is to be expected but an interesting point expressed by almost all interviewees was that their training did not prepare them for the "realities of practice", nor did it train them in how to use the more common information sources.

The single most important factor influencing the information search process was the feeling that there was not enough time. This lack of time modified all the other factors and the subsequent decisions.

The aspects of search behaviour that were common to practitioners were:

- 1) all respondents were actively searching for information on a very regular basis,
- 2) most searches were related to a problem at hand rather than for general interest,
- 3) in most cases when the client was satisfied with the conclusion the search stopped,
- 4) many respondents did not attempt to search for information because they were unfamiliar with the procedures involved,
- 5) respondents preferred to interact with the sources to clarify their request for information.

It was clear that the limitation of time and the need to interact with the source have had a strong influence on the information networks that practitioners develop to meet their information needs.

INFORMATION SOURCES' PERCEPTION

The attitudes expressed in the in-depth interviews were not confirmed by any quantitative survey of sources of veterinary information as was done for the veterinarianian data. However, the 9 interviewees were selected so that their views reflected the policy of the organization, and that most relevant organizations were represented.

A confounding variable in the analysis of this data was the time frame over which the interviews were conducted. There was a 9 month interval between the first and the last interview. During this time there had been a marked change in attitude on the part of some of the sources because of a change in emphasis toward more sensitivity to client's information needs. The earlier interviews were more consistently naive in regard to the perception of the search process while the latter ones did reflect a finer understanding of their client's working environment.

The description of the search process given by the representatives of the information sources had many similarities to that of the practitioners although there were subtle but significant differences.

Most sources felt that they were not in close enough contact with practitioners to be certain of the veterinarians' search behaviour, but they all had a "gut feeling" of what was happening. Consistent attitudes were:

- 1) the sources felt under-utilized and that veterinarians did not realize how much they had to offer,
- 2) they all felt that they had an important role to play in supplying information to veterinarians,
- 3) they all felt that they had important information that the veterinarians should need,
- 4) they did not understand why veterinarians did not use them more often,
- 5) they had the feeling that a large proportion of veterinarians did not actively search for information. One source suggested that over half of the veterinarians fall into this category. Another source said that they seem to be "happy in their ignorance",

- 6) they equated a good, progressive veterinarian or practice with one that regularly took advantage of their services,
- 7) their perception of veterinarians was based on the frequency of requests for information,
- 8) in their view, the frequency of inquiries for information was not comparable with the rate of change in information and the number of potentially unfamiliar situations which veterinarians should be meeting.

The sources identified a number of cases in which they went to a great deal of difficulty and expense to organize information outlets and services that supplied the kinds of information that veterinarians said they wanted. In each case the source was very disappointed with the lack of patronage. They said there were a "few good veterinarians" who could see the value of the services and took advantage of them, but they were the exception.

These impressions were corroborated and, in fact, based upon the frequency of use of the information services. Reprint services, information and study set services, audio/visual libraries, video-text services, journal subscriptions, etc. showed what appeared to be a lack of interest in new ideas and veterinary innovations¹.

Some sources had a feeling that the services that they offered may not be what the veterinarians wanted. This was expressed as a vague notion in the earlier interviews. In later interviews this had solidified into specific action on the part of the source to see if their services were appropriate.

MISMATCHED PERCEPTIONS

Veterinarians perceive themselves as active users of information but working under quite rigid time restriction. They found the greater part of the information that was available to them was not directly applicable to their problems. In order for the veterinarians to meet client's needs for information they preferred to interact with the most convenient

¹ Many of the above services have been discontinued through lack of support (some of the services were never even used)- for examples, the Argus videotext service and the reprint service through the university library.

source that could supply information that satisfactorily met their level of expectation. This level of expectation became very critical. The amount of detail, complexity, and sophistication that was used to make a decision was considerably less than was potentially possible. In most cases this level could be satisfied by using the more familiar sources.

On the other hand the source saw veterinarians as passive in their search behaviour since inquiries for information were infrequent. The inquiries themselves showed a lack of veterinary sophistication. Attempts to introduce other information services seemed to meet with little acceptance from an indifferent audience.

So which perception is more correct? The answer is simple. The two perceptions cannot be compared. The sources are measuring veterinarians' commitment to information management using criteria that deal with only the most difficult information searches carried out, and they miss a very high proportion of the information searches undertaken. In many cases the value of information in relation to the overall advancement of veterinary science is not the same as the value of information to solve a client's problem. The fact that many information services have been discontinued due to lack of interest is not surprising. In most cases they either supplied information that did not match the problem-solving approaches of veterinarians or they supplied information that veterinarians were already receiving through their more familiar information network.

These points are obvious but what is more subtle and yet more germane to information search behaviour is the mismatching of the level of expectation of what can and will be achieved as a result of a search. Practitioners evidently are satisfied with information that the sources would consider as quite inadequate. The veterinarian needs enough information to make a decision which he or she can have reasonable confidence will satisfy the client's need. Imperfect but prompt answers are much better than perfect answers obtained too late. Excess information may even hinder the decision making process.

IMPLICATIONS

The mismatching of perceptions becomes very important when information services are being designed. Many of the unsuccessful attempts to introduce information services have concentrated on modifying the way the sources can manage information whether it be through traditional systems or new technology (Stibic, 1981). It is obvious from the lack of success that this approach is inappropriate. It is more likely that improvements could be achieved by looking directly at the needs of the people involved, rather than making "reasonable assumptions".

If the process of information search were analyzed using the flow chart in figure 18, it is clear that there are critical control points that could be modified for the client's and veterinarian's benefit.

Points that could be modified to improve the search process include:

- the level of expectation of the client,
- the level of expectation of the practitioner,
- the interaction between veterinarian as a consultant and his/her client,
- the communication skills of the practitioner,
- skills in defining problems,
- information search and management skills,
- the translation of veterinary research into applicable information,
- getting more applicable knowledge into the inner circle of information sources.

All these concentrate on modifying the level of expectation concerning the information search process as well as the construct systems that influence the "personal constructs" of new situations. This in turn modifies the decision to search for information and the particular strategies used. The emphasis on modifying behaviour at the decision-making level rather than supplying more sophisticated information storage and retrieval tools would produce more durable change.

CHAPTER 9

DISCUSSION OF METHODOLOGY AND CONCLUSIONS

METHODOLOGY

All practising veterinarians in New Zealand had the opportunity to participate in the survey. Considering the difficulty of the subject, the 60% response rate was acceptable.

The historical view of the profession shown in appendix G was used as the base line to assess the representative nature of the sample that responded to the questionnaire. When the characteristics of the non-respondents were analyzed and found to be consistent with the profile of the profession, it was felt that there were no obvious biases inherent in the non-respondents.

Examination of the characteristics of the respondents indicated that the sub-groups were as well represented as could be expected considering the distribution of some of the sub-groups within the population. There was not an exact comparison between the profile and the survey because more information was requested in the latter to assess the relative importance of particular types of animals in relation to the information search process. This made it possible to analyze respondents in sub-groups related to the types of animals that made up their caseload. Dairy, equine, and small animal practitioners were analyzed separately. This was not possible using the data from the Veterinary Surgeons Board information.

CONTENT ANALYSIS AND CONSTANT COMPARISON

Because the search process was so personal and subjective it could not be examined in a purely quantitative manner. In fact, the process had to be looked at from a number of different view points. This required a triangulation (Glaser, 1965) of data, sources of data, pre-existing theories of the psychology of cognition (Dervin, 1976), (Cohen, 1964), the development of personal constructs (Bannister and Fransella, 1980), the development of schemata (Stotland and Canon, 1972) directing behaviour, and multiple methodological tools. However, the initial emphasis had to be on a qualitative examination of the search process.

The initial phase of the project was designed to delineate a substantive theory (Glaser and Strauss, 1967) of what the information search process was and how veterinarians described it. Each respondent would use his/her concepts and vocabulary to do this. Therefore, the methods used to gather this information had to maximise the analysis of variable, subjective data. It had to be able to find similarities and trends in the midst of a great deal of variation in ways of expressing the process.

To find these trends, content analysis of transcripts and constant comparison of cases, as described in chapter 3 provided the frame work for the analysis. These methodological tools proved to be eminently suitable for the task. Concepts and terminology used by veterinarians in the in-depth interviews could be extracted and compared with little difficulty or fear of overlooking critical nuances.

The initial line of inquiry was dependent on the researcher's definition of the process. However, the careful adherence to the procedures for content analysis and constant comparison prevented this initial bias from overpowering the development of the substantive theory. It also supplied the first hypotheses grounded in the responses of the veterinarians. These replaced the preconceived theories of the process and directed further inquiry.

Sample selection

According to Glaser and Strauss, the size and composition of the sample in a qualitative study is always variable and cannot be predetermined. The desire of the researcher to investigate any and all groups of the population that might add depth and variability to the subsequent theory had to be a prime motivation in the selection of interviewees.

Conscientious exploration of unique sub-groups of the population was the primary consideration during the first phase. However, the interviewing began as a matter of convenience. Veterinarians at Massey University were the first to be interviewed because they were readily available to the researcher. This also allowed the researcher to improve his interviewing technique and formulate a line of inquiry that was sufficiently specific to elicit the information that was required.

The selection of the sample of veterinarians was a progressive task. Final year veterinary students were the next group to be interviewed. Not surprisingly, they presented naive or inexperienced points of view

and showed they were as yet poorly prepared to deal with information search during their first few years in practice.

At this point clinical practitioners were interviewed. The sample included veterinarians who worked by themselves and those who worked in multi-vet practices. It included new graduates and a few veterinarians who had just retired. The age distribution was 21-69. It also included men and women. Private practices and clubs were represented. The interviews continued until there were no new categories or properties extracted from subsequent cases. This occurred within 15 interviews and was the first indication of the universal influence of external variables on the search process.

The net of inquiry was extended in the third phase to include decision makers within organizations which are among the most common sources of veterinary information. Their perception of the problem was dependent on the feedback that they received from veterinarians and the number and type of inquiries that they received. The same categories and properties were recognizable in these interviews but their perspective was markedly different. The methodological tools highlighted the difference clearly.

After investigating the obvious sub-groups in the veterinary population, it was clear that there was a stronger group pattern of behaviour than was first suspected. The saturation of categories and properties was achieved very quickly. This influenced the further development of the project because it was felt that responses were consistent enough to develop a postal questionnaire to confirm the substantive theory. Initially, it was felt that the search process was going to be too variable and personal to be examined in a quantitative manner. There was a potential danger in developing too narrow a theory from a small number of interviews. This would misdirect the line of inquiry in the quantitative survey. However, interviews were quite consistent and sub-groups were represented in the qualitative phase to give a broad enough perspective. The results of the questionnaire confirmed the consistency and appropriateness of the grounded theory.

Content analysis of historical documents

It was difficult to find any documents that directly related to veterinary information search. The only documents that were subjected to the rigors of content analysis and comparison were the 1986 continuing education evaluation forms.

There was other material that was examined to see if it was consistent with the data that had already been collected. These included: a paper on continuing education for Canterbury veterinarians (Gumbrell, 1984); a market research survey into disease information needs of the livestock industry for the Palmerston North Animal Health Laboratory, (Hobson, 1986).

The attitudes expressed in these documents were consistent in a general sense even though the specific categories and properties could not be extracted from the documents.

The course evaluations revealed the same concepts, categories and properties as the interview data. This data was compared with the data obtained from the interviews and the postal questionnaire to add more strength in generating the theory of search behaviour. The historical perspective added depth to the evaluation of the search process because the project data were collected within a very narrow time period while the course evaluations were written 18 months earlier.

QUANTITATIVE PHASE (POSTAL QUESTIONNAIRE)

The quantitative phase could not have been designed without the qualitative research that supplied raw material to formulate relevant questions and make lists of appropriate responses that could be quantified. Each question gave the respondent an opportunity to volunteer an answer that was not listed. However, the majority of respondents did not give responses that were not in the list already. Most respondents seemed to be satisfied with the choices given, with less than 8% of the sample volunteering alternatives to any of the questions. When the alternatives were examined, most of them were alternative ways of expressing one of the choices given rather than unique options. This was partially a reflection of the comprehensive nature of the lists which were grounded in the data gathered in the interviews and common to most respondents.

The primary limitations with the questionnaire were two-fold:

1) Information search in the abstract

The most important difficulty was that the respondents had strategies to deal with specific problems. Some respondents commented that the motivation for search and the particular strategies that they used were dependent on the situation. They found it difficult to look at the search process in the abstract. While a

number commented that this was a problem, only three said it could not be done.

2) Estimation of frequency and ranking

Respondents had difficulty recalling how many times something happened in an average year. However, this did not stop the veterinarians from making an estimate. Respondents were prompted to estimate frequencies in units of 5 or 10 percent. Most veterinarians did this and as a result the distribution was punctuated at these values.

This difficulty with estimating frequency was quite understandable and expected. As a result, the figures have been used in a way that recognizes the fact that they were only estimates. Questions regarding the magnitude of frequencies, based on respondents' recall, were trying to elicit general impressions only. This was successful but care had to be taken not to read into the results more accuracy than was inherent in the estimates made by respondents.

The questions that asked respondents to rank their choices relative to each other did not seem to cause any great difficulty. A number of respondents gave the same ranking to more than one answer. This was expected and the analysis took this into consideration.

The analysis of the survey did present one problem in that the selection of the most important responses had to be a product of a number of factors. It required a matrix composed of the frequency of a response, the ranking of that response relative to the other choices, and the frequency of that ranking. This gave a group preference for responses. Fortunately, this was not difficult because, in most cases, there were obvious preferences for some responses.

The "most important" responses were identified easily even though the position of a response within the matrix was not calculated using a specific mathematical formula. If there were any instances in which the differences were marginal then the choices were considered to be equal. It was felt that this was acceptable because all the answers were subjective and dependent upon what kind of situations the veterinarian was considering when he/she made the selection. Since the situations considered could not be controlled, it was inappropriate to highlight minor differences.

The researcher had hoped to achieve a response rate of 60%. The questionnaire was relatively long and required respondents to think about a process that they used automatically. Generally speaking, the data from the interviews showed that respondents were not

comfortable with feelings and impressions. They preferred to give a quantitative response. When they could not give a quantitative answer they doubted the usefulness of their contribution. It was explained to them that their impressions were valuable, but this did not always relieve the uncertainty. This was an interesting point because respondents obviously made decisions in the face of incomplete information. They trusted their own judgment even when the action had to be based on a gut feeling. However, when asked a question, the respondents preferred to answer in quantitative terms, and to dismiss "intuition" as second class information.

It was felt that in-depth interviews, secondary analysis of historical documents, comparison with established behavioural theory, and a quantitative survey of the population were all necessary to give a well-rounded picture of such a subjective, personal process as information search. Any one component of this methodology would not be sufficient to insure a robust theory of practice, but together they reinforce the general picture.

THE POSTAL QUESTIONNAIRE RESULTS

The first 12 questions in the survey gave the statistics of the respondents. The data showed that the distribution of respondents into sub-groups was consistent with the base profile (appendix G).

Question 12 was related to the percentage of the annual caseload each major species represented. It did not specifically state the units of measurement but assumed that the answers would be in terms of time. There is no way to be sure that all the questions were answered in this manner. This meant that to express the distributions in terms of veterinarian/hours might be quite misleading, although it was possible to produce a matrix of the number of veterinarians who indicated a percentage range for each species. It was also possible to show an average of the sum of percentage units based on the mean of each range times the number of veterinarians who designated that range. This showed the distribution of responses as well as the relative importance of each species in the "average" veterinary caseload.

There were aspects of the results that were surprising, eg. the relative importance of deer and goats over the more traditional species of beef cattle and sheep. This reflects the recent rise in interest in these species as well as the veterinarians' limited knowledge of them. They seem to be of considerably lower priority in the veterinary training if proportion of

curriculum time is an appropriate indicator of emphasis. This is corroborated in the responses to the question concerning new situations. Veterinarians perceived fewer new situations if the more traditional large animal species made up a larger proportion of their caseload. However, this situation could change very rapidly as the information requests from clients changes.

Another interesting aspect of the results of question 12 was the greater proportion of women in small animal practice. This was observed in the veterinary profile but the categories in the Veterinary Surgeons Board's handbook were too broad to draw any conclusion. The postal survey showed that women respondents were more concentrated in small animal practices than their male counterparts.

HISTORICAL DOCUMENTS

Aspects highlighted in the analysis of the historical documents have been integrated into the discussion of the results from the other data sets. However, the most significant concepts to be found in the historical data were that of an information centre and the permanent documentation of educational events.

Veterinarians wanted a way to process information at the workplace. They wanted an information centre that they could contact easily to get information, rather than take time out to go away to courses. These concepts were consistent with the emphasis on time limitations on information search. Respondents to the postal questionnaire concentrated their suggestions for additional information services on those that improved the flow of information within the work environment. Directories of specialist information, electronic data processing, newsletters, literature previews or reviews, all emphasised a closer interaction with information and its sources.

Maximising the utility of their personal libraries was of considerable importance to veterinarians in the sample. Course proceedings were of more long term value than the course itself.

The historical data, in-depth interviews, and the postal questionnaire pointed to the importance of the veterinarian's own information resources. This is consistent with cognition (Dervin, 1968), and schemata theories (Stotland and Canon, 1972).

CONCLUSIONS

The results of this investigation of the information search as it relates to practising veterinarians were consistent with the current theories of cognition and behaviour development. In a theoretical sense, it has not produced any surprisingly unique behavioural patterns, but it has changed the emphasis placed on certain aspects of the process.

The objective of the study was to describe the information search process used by practising veterinarians. The process was as individualistic as the literature suggested it would be, but the external pressures were similar for all respondents. As a result the search process was predictable in a general sense. Since respondents said that their approaches to search were context-dependent, there were similarities in motives prompting search and strategies used. The personal construct of a situation in which the veterinarian must look for more information defined the urgency and importance of the search process. The actual search tactics used by a veterinarian were combined into a strategy that was personally familiar and comfortable. This was based on schemata (Stotland and Canon, 1972) developed during previous attempts to find information.

The combination of qualitative and quantitative data has produced a sensitive picture of the nature of veterinary information search. By approaching the subject from a number of points of view it was possible to see why different groups concerned with veterinary information management are able to hold divergent perceptions of the same phenomenon. This in itself is consistent with Kelley's theory of personal construct. As the old adage goes, "you see what you want to see".

The perception of veterinary practitioners as a complacent group of technicians who are satisfied with the knowledge they received at university 10 or 20 years ago is grossly inappropriate. The survey has shown that veterinarians are actively and frequently searching for information.

Within the environment of veterinary practice there are inherent barriers preventing comprehensive information search behaviour. The most important barrier is time limitation. There are always pressing problems that demand attention. The time available to deal with any information search is inordinately short in relation to the significance of the problems themselves. In addition, the level of expectation of the practitioner's clients contrives to down-grade the return on the veterinarian's future investment in the search.

There are long term advantages to comprehensive information searches and the respondents in this survey are well aware of them. This only adds to their frustration. They can see the value of up-to-date information, but they don't have the personal resources to implement a proactive strategy to stay ahead of information changes.

In this environment the law of least effort prevails. This is not because the veterinarians are complacent. They are merely responding to what their limited resources will allow. As a result, the search process is driven by current problems. The same is true for the retention of information. The formal training in information management that they received did not prepare them for the present information explosion. Their education emphasized memory retention of information--an inappropriate mode in today's world.

Viewpoints

From the practitioner's point of view, any strategy that helps to deal with a new situation in the midst of a sea of information is valuable. They must make sense of a situation in a limited amount of time. Rapid collection and digestion of information is essential. It is no wonder that they use the closest, easiest, and most trusted information sources. It is also no wonder that they use more distant, less familiar information sources sparingly.

From the information source's point of view, veterinarians under-use and under-value their information. Sources are influenced by the number of requests for information, which seems quite small in comparison to the rate of change in information. At the same time they are at the leading edge of change. They see innovations in a completely different light than the practitioner. They have difficulty seeing how practitioners make do with outdated information. As a result they come to the conclusion that practitioners are satisfied with their level of knowledge and are not actively searching for more current ideas.

From the new graduate's point of view, the memorization of fact appears to be the solution to the complexity of problems that they will face when they become practitioners. This is coupled with a feeling that their clients are going to expect them to have all the answers in their head. While this has always been a fear of new graduates, it is being magnified by the rapid change in information.

Subgroup differences vs occupational pressures

This investigation looked at sub-groups within the veterinary profession. Variations in the process of information search related to sex, age, years of experience, number of veterinarians in the practice, position in the practice, kinds of animals seen, additional tertiary degree, and membership in professional associations were examined. The differences between sub-groups were minimal, and what differences there were could be explained by general behaviour theory.

Therefore, it seems that the innate structure of practice with its external pressures is most influential in directing the search behaviour. The pressures come with the occupation. These cannot be changed within the profession because they are imposed on practitioners by the expectations of clients and society.

Parallels in information management

This was a study of veterinary practitioners, but it is believed that the results would be paralleled in many professional occupational groups. The results of this study integrated so well with prevailing psychological and behavioural theory because it was a study of people dealing with the contemporary problem of information management. The law of least effort affects everyone's information search behaviour. Everyone has to make sense of new situations in the face of a staggering amount of information.

Sufficient time for a comprehensive information search is a luxury that very few people can afford. Information is needed at hand. Personally verifying information has become impractical so trusted expert advice and consultation is the only alternative. Being familiar with the trusted experts and understanding how to use their service is essential.

Information management skills

To deal with information management problems in the present state of rapid information change requires specialized skills. This need for specialized skills must, initially, be addressed within the education system. Students will have to be trained to manage information. This will require a change in emphasis within the schools. If veterinarians need information at the workplace they will have to learn to manage the information themselves. They will have to know what information sources are available and how to use them.

They will have to know how to extract relevant information from data bases, literature, personal contacts. They will have to know how to save, store, and retrieve information for future use. All of these skills were mentioned by respondents during the investigation as limitations that effect their efficiency right now.

Information sources

In light of this survey, information sources should develop information services that consider limitations facing practitioners. Sources should recognize the fact that practitioners are actively searching for information and try to solve the time barrier problem. They should also attempt to match innovations or new information with the level of expectation of veterinarians to increase adoption rate.

Continuing education of members of the profession should address the problem of getting usable information to the workplace. This is what respondents said would be of most use to them considering their limitations. A system that would monitor current veterinary problems would direct the selection of areas or subjects that should be developed. Educators of undergraduate veterinary students should look at the limitations on practitioners and help students develop the skills needed to streamline the information search process and the storage and retrieval of information. As the curriculum is already full, additional subjects would be difficult to introduce. However, information management should not be taught as a separate subject. It should be integrated into all the other subjects along with communication skills.

Long term needs

This survey was sponsored by the Ministry of Agriculture and Fisheries Diagnostic Laboratory Service and by the Foundation for Veterinary Continuing Education. Both of these organizations have a commitment to the veterinary profession's needs for information management. However, the veterinary profession as a whole should recognize the value of information management to its members. It should also see that it is beyond the capacity of individuals to achieve it on their own. Research and development is necessary to find the systems and support services that meet the needs expressed by veterinarians in this survey.

BIBLIOGRAPHY

- BANNISTER, D. and Fransella F.
Inquiring man : the psychology of personal constructs.
Middlesex : Penguin Books, 1980. 217 p.
- BECKER, H.S. and Geer B.
Participant observation and interviewing : a
comparison. Human organization 16 : 28-35, 1957.
- BERNER, E.S.
Paradigms and problem-solving : a literature review.
Journal of Medical Education 59 : 625-633, 1984.
- BLUMER, H.
Symbolic interactionism perspective and method.
Englewood Cliffs, N.J. : Prentice Hill, 1969. 203 p.
- BOGDAN, R.C. and Taylor A.
Introduction to qualitative research methods.
New York : John Wiley, 1975.
- BOLAND, C.J. and Morris R.S.
Demographic profile of the veterinary profession in New
Zealand. New Zealand Veterinary Journal 36 : 128-133,
1988.
- BROADBENT, D.E.
Perception and communication. London : Pergamon Press,
1958.
- COHEN, J. and Christensen I.
Information and choice. Edinburgh : Oliver-Boyd, 1970.
148 p.
- COHEN, J. (ed).
Readings in psychology; information theory.
London : Allen and Unwin, 1964. 414 p.
- DENZIN, N.K.
The research act; a theoretical introduction to
sociological methods. New York : McGraw-Hill,
1978. 368 p.
- DERVIN, B.
Strategies for dealing with human information needs :
information or communication.
Journal of Broadcasting 20,3 : 324-333, 1976.
- DERVIN, B.
Information needs and users. Annual Review of
Information and Technology 21 : 13-33, 1984.

DRAKE, M.A. and Woods L.A.

An information service for practicing veterinarians. Bulletin of the Medical Libraries Association, 66,4 : 437-440, 1978.

DUFFY, M.E.

Designing nursing research : the qualitative-quantitative debate. Journal of Advanced Nursing 10 : 225-232, 1985.

EBBESEN, E.B. and Konecni V.J.

On the external validity of decision-making research : what do we know about decisions in the real world? p 21-46. In Cognitive processes in choice and decision behaviour. Edited by Wallsten, T.S. Hillsdale, New Jersey : Lawrence Erlbaum, 1980.

ELSTEIN, A.S. et al.

Medical problem solving. Cambridge, Mass : Harvard University Press, 1978. 330 p.

ENGEL, J.F. et al.

Consumer Behavior. New York : Holt, Rhinehart, Winston Inc. 1973. 689 p.

FRIEDLANDER, J.

Clinician search for information. Journal of the American Society of Information Science 24 : 65-69, 1973.

GLASER, B.G. and Strauss A.L.

The discovery of grounded theory : strategies for qualitative research. Chicago : Aldine, 1967. 271 p.

GLASER, B.G.

The constant comparative method of qualitative analysis. Social Problems 12 : 436-445, 1965.

GUMBRELL, R.C.

Continuing education for Canterbury veterinarians. Canterbury University. 1984. (unpublished)

HANSON, C.W.

Introduction to science information work. London : Aslib, 1971. 199 p.

HARRIS, R.E.

Opinions of Massey University veterinary students 2:potential employment. NZ Veterinary Journal 28 : 153-155, 1980.

HOBSON, H.J.

A market research survey into disease information needs of the livestock industry for the Palmerston North Animal Health Laboratory. 1986. Commercial report. (unpublished)

- JONES, J.M.
Survey of women veterinarians in New Zealand,
part 1 : patterns of work. NZ Veterinary Journal 33 :
121-126, 1985.
- LASER, W.
The role of modeling in marketing. Journal of Marketing
26 : 9-14, 1962.
- LINDBLOM, C.E.
Politics and markets : the world's political economic
systems. New York : Basic Books, 1977. 403 p.
- LINDBLOM, C.E.
The policy making process. Englewood Cliffs, N.J. :
Prentice-Hall, 1968. 122 p.
- LEHMANN, D.R.
Market research and analysis. Homewood Illinois : R. D.
Irwin Inc. 1979. 721 p.
- LOFLAND, J.
Styles of reporting qualitative field research. The
American Sociologist 9 : 101-111, 1974.
- MACMILLAN, S.E. and Taylor R.S.
Problem dimensions and information traits. The
Information Society 3, (1) : 9-11, 1984.
- MCGUIRE, C.H.
Medical problem-solving : a literature review. Journal
of Medical Education 60, (8) : 587-595, 1985.
- MAYER, R.E,
Thinking, problem solving, cognition. New York : W.H.
Freeman & Co, 1983. 214 p.
- MILLER, S.I. and Evko B.
An ethnographic study of the influence of a mobile home
community on suburban high school students. Human
Relations 38, (7) : 683-705, 1985.
- NEWELL, A. and Simon H.A.
Human problem solving. Englewood Cliffs, New Jersey :
Prentice-Hall, 1972. 920 p.
- NILSSON, N.J.
Problem-solving methods in artificial intelligence.
New York : McGraw-Hill, 1971. 255 p.
- PAYNE, S.L.
The art of asking questions. Princeton : Princeton
University Press, 1980. 249 p.

- PELTO, P.J. and Pelto G.H.
Anthropological research : the structure of inquiry.
New York : Cambridge University Press, 1978. 333 p.
- RAW, M.E.
Survey of libraries in veterinary practice. Veterinary Record 121 : 129-131, 1987.
- ROBINSON, W.S.
The logical structure of analytic induction. American Sociological Review 16 : 812-818, 1951.
- ROGERS, E.M. and Shoemaker F.F.
Communication of Innovation. New York : The Free Press (Macmillan Publishing), 1971. 476 p.
- SCHUMAN, H. and Presser J.
Questions and answers in attitude surveys : experiments on question form, wording and context. New York : Academic Press Inc, 1981.
- SIMON, H.A.
The science of the artificial. Cambridge, Mass : MIT Press, 1969. 118 p.
- SKINNER, B.F.
Reflections on behaviourism and society. Englewood Cliffs, New Jersey : Prentice-Hall, 1978. 290 p.
- SLOVIC, P. and Lichtenstein S.
Comparison of Bayesian and regression approaches to the study of information processing in judgement. Organizational Behavior and Human Performance 6 : 649-744, 1971.
- SLOVIC, P. et al.
Behavioral decision theory. Annual Review of Psychology 28 : 1-39, 1977.
- STIBIC, V.
Personal documentation for professionals : means and methods. ISBN : 0-444-85480-0. North-Holland, Amsterdam, 1981. 214 p.
- STONE, S.
Humanities scholars : Information Needs and Uses. Journal of Documentation 38, (4) : 292-313, 1982.
- STOTLAND, E. and Canon L.K.
Social psychology : a cognitive approach. Philadelphia, Penn. : W.B. Saunders, 1972. 592 p.

TAYLOR, R.S.

Question negotiation and information seeking in libraries. p. 36-55. In Key papers of information science. Edited by Elias, A.W. American Society of Information Science, 1972.

ISBN : 0-87715-101-6.

TAYLOR, R.S.

The process of asking questions. American Documentation 13 : 391-396, 1962.

TREISMAN, A.M.

Contextual cues in encoding listening. Quarterly Journal in Experimental Psychology 12 : 242-248, 1960.

WALLSTEN, T.S. (ed).

Cognitive processes in choice and decision behavior. Hillsdale, New Jersey : Lawrence Erlbaum, 1980. 285 p.

WILSON, T.D.

The cognitive approach to information seeking behaviour and information use. Annual Review of Information Science and Technology 4, 2/3 : 179-204, 1984.



11 March 1987

A SURVEY OF INFORMATION USE BY PRACTISING VETERINARIANS
IN NEW ZEALAND

Dear Veterinary Practitioner,

As a practitioner you will fully understand the problem of keeping up to date with new technical information, whether it be new livestock industries (goats, deer) or the development of new animal remedies and laboratory services. I would like to ask that you take about 25 minutes to complete the attached questionnaire, which is intended to identify ways of making information gathering easier and more effective for you. I am sure the return to you and the veterinary profession will make your effort well worthwhile.

The questionnaire is part of a research project that I am conducting with Professor Roger Morris in the Department of Veterinary Clinical Sciences at Massey University. The project is being sponsored by the laboratory service of the MAF Animal Health Division and the Foundation for Continuing Education of the NZVA. It is being conducted mainly by personal interviews, but I need to balance that approach with this questionnaire to the entire practising profession.


I hope to find out which information gathering strategies you prefer to use, so that organizations which serve your needs can target their services more effectively.


I need your help. I want to know what your preferences are. Your responses will be confidential. The number in the right hand corner of the questionnaire will be used to keep track of who has responded so that I can send reminders to those who might have forgotten to return their form. However, the number will be used solely for this purpose and will not be coded into the data file used for analysis.

A return addressed envelope has been included for your convenience. Please return your completed questionnaire to me by April 30. Thank you for your assistance.

Yours sincerely,

Sponsored by:


C. Boland
Department of Veterinary
Clinical Sciences,
Massey University,
Palmerston North


G. Petersen
Director
Centre for Veterinary
Continuing Education,
NZVA


J. Hellstrom
Acting Director
Animal Health Division
Ministry of Agriculture
and Fisheries

A SURVEY OF INFORMATION USE BY PRACTISING VETERINARIANS
IN NEW ZEALAND

PRACTITIONER STATISTICS

1. Year of birth _____
2. Sex _____
3. Year of graduation (basic veterinary degree) _____
4. Name of veterinary school attended _____
5. Do you have any tertiary degrees other than your basic veterinary degree?
Yes _____ No _____
6. Do you belong to any professional veterinary societies or associations?
Yes _____ No _____
7. How many years have you been in veterinary practice? _____
8. How many years have you worked in other forms of veterinary employment? _____

IN REFERENCE TO YOUR PRESENT EMPLOYMENT

9. What kind of practice management describes your practice?

Private	_____
Contract	_____
Club	_____
Other (specify) _____	_____
10. How many veterinarians, in total, are there in your practice? _____
11. What is your position in the practice?

Senior Veterinarian	_____
Partner	_____
Full time employee	_____
Part time employee	_____
Owner of the practice	_____
Locum	_____
Other (specify) _____	_____

12. How much of your yearly caseload is made up of the following kinds of animals?

Total caseload	<u>100%</u>
Beef cattle	_____
Cats and/or dogs	_____
Dairy cattle	_____
Deer	_____
Goats	_____
Horses	_____
Pigs	_____
Poultry	_____
Sheep	_____
Other (specify) _____	_____

GENERAL INFORMATION GATHERING

When people are put into a situation that is "new" to them they usually feel that they want more information before they decide what they can or should do. Every "new" situation is different and requires specific information which will dictate, to some extent, which information sources are appropriate.

13. Below is a list of different situations that are commonly encountered by veterinarians in practice. How many times in a typical year would you encounter each of the following situations?

(less than 1, 1, 5, 10, 20, etc., times per year)

- Being introduced to a new type of veterinary activity
- Investigating a herd/flock problem that you have not seen before
- Wanting to know more about financial management of your practice
- Having to deal with an issue in which government actions affect your practice
- Recognizing a clinical condition that you have not seen before
- Adopting a new product/service for routine veterinary use
- A treatment that didn't work
- Other (specify) _____

14. Read the following list and indicate how many times in a year each of the following would introduce you to a "new" situation (eg. a new product or service, a new technical discovery, etc).

(if any one of the choices is never a source of "new" situations please leave it blank)

- Discussion with commercial firm representative
 - Direct contact with MAF
 - Newspapers
 - Non-technical journals(NZ Farmer, etc,)
 - Radio
 - Client need/request
 - Television
- MAF publications(laboratory newsletters, Surveillance magazine, Aglinks, etc.)
- Discussion with other veterinarians
- Technical videos
- Technical literature(journals, proceedings, text books, etc.)
- Other (specify) _____

15. Please read through the following list of considerations and rank in order of importance (most important [1] second most important [2] etc.) when you are deciding whether to search for more information about a "new" situation. This will probably depend on the situation but try to answer in general.

(if a consideration is irrelevant please leave it blank)

- How much will it cost to search for information
- The urgency of the situation
- What are my client's expectations
- What would other vets in the same area do in this situation
- What is my responsibility in this situation
- Will the search affect my income
- What is the risk if I don't have all the information
- Would it be better for my reputation to give an immediate answer
- Other(specify) _____

16. Consider, in general, the way you would handle a "new" situation and how you would try to find out more about it. Please rank in order of your preference (i.e. the strategy you would use first [1], then second [2], etc.) the following list of possible strategies that could be used to gather more information. It is expected that your strategy will vary in different situations but try to show your typical approach.

(If you have not used one of these strategies please leave the space blank)

- Contact a private laboratory
- Contact a specialist in practice
- Contact an industry veterinarian
- Contact someone at Massey vet school
- Contact the MAF diagnostic laboratory
- Discuss it with your co-workers
- Discuss it with MAF field officers
- Search through your personal/practice library
- Use a university library service
- Use the national library service
- Use your own thinking/experience
- Other(specify) _____

17. Read the following list and rank in order of importance(most important [1], second most important [2], etc.) the attributes of an information source that makes it most useful to you.

(if any attribute is irrelevant please leave it blank)

- Easy to contact
- Follows up your inquiry
- Has the latest information
- Is a recognized expert
- Interested in your inquiry
- Is familiar to you
- Respects your client-vet relationship
- Other(specify) _____

18. In general, when you search for information, how easy is it to find what you want?

Very easy somewhat easy somewhat difficult Very difficult

19. Compared with other veterinarians outside your practice how much easier or more difficult would you say it is for you to find what you wanted?

- Much easier for you
- Slightly easier
- The same
- Slightly more difficult
- Much more difficult

20. If your answer to the last question was other than the same, can you explain why you felt that you were different? _____

21. Do you feel that, in most cases, you are able to find the information that you want?

Yes ___ No ___

If yes, go to question 23.

22. If no, read the following list and rank in order of frequency (most frequent[1], second most frequent [2], etc.) the possible reasons why you have been unable to find the information you want.

(if any of the reasons has not been a problem please leave it blank)

- You know where the information is but you don't know how to get it
- Competition between vets prevents you
- The information source doesn't understand what you want
- The information source is not cooperative
- You don't have enough time
- You don't know exactly what you want

Other(specify) _____

23. Read the following list and rank in order of importance (most important [1], second most important [2], etc.) the reasons why you decide to stop looking for more information.

(if any reason is irrelevant please leave it blank)

- The cost of getting more information is too great
- The situation is resolved to your satisfaction
- You can't find the information you want
- Your client is happy with the results
- You run out of time
- Other _____

24. Please rank in order of importance (most important [1], second most important [2], etc.) the following reasons why you would consider that a piece of information is reliable.

(if any reason is irrelevant please leave it blank)

- The completeness of the information
- The information "feels" right from your experience
- You consider the source to be reliable
- Other _____

A SPECIFIC "NEW" SITUATION

I would like you to consider a specific "new situation" that you can recall in which you had to search for additional information. The following questions are designed to find out what happened in that situation.

25. During 1986, was there at least one particular "new situation" that required you to search for more information?

Yes ___ No ___

If no, go straight to the section "Information Format" after question 32.

26. If yes, please describe the situation that stands out most clearly in your memory.

27. In reference to that "new situation" can you recall what prompted you to search for more information? (you may want to mark more than one answer)

Was it because:

- The situation interested you personally
- You wanted to reduce the risk of making a mistake
- You were chosen in your practice to research it
- You thought it was a potential growth area for your practice
- Your client needed the information
- Other _____

28. Could you describe, in chronological order, the steps you took to reach a conclusion about how you should deal with the "new situation" you described in question 26?

- First step _____
- Second step _____
- Third step _____
- Fourth step _____
- Fifth step _____

29. Are you still actively looking for information about the situation?

Yes ___ no ___

30. If no, read the following list and mark the reason(s) why you decided to stop searching for more information. If you had more than one reason please rank them in order of influence (most influential [1], second most influential [2], etc.)to your decision to stop searching.

Was it because:

- The situation was no longer important
- The search became too expensive
- The source that had the information was unwilling to give it to you
- You could not find the information you wanted
- You found enough information
- You ran out of time
- Other _____

31. In the above example did you use different strategies than you would have normally?

Yes ___ No ___

32. If yes, please explain how you feel they differed.

INFORMATION FORMAT

Now I would like to ask a few questions about the things that make information most useful to you. For the purposes of this survey we will define the following terms:

Journal: a publication that is divided into issues at relatively regular intervals throughout the year and covers professional or technical subjects of relevance to your practice

Text book: a single publication or set of volumes that deals with a particular subject

Proceedings: a published collection of papers that were presented in association with a specific conference or lecture series

JOURNALS

33. Do you or your practice receive any journals? Yes ___ no ___

34. If yes, how many distinct journal titles do you receive? _____

35. Do you find journals useful to you in practice?

Very useful ___ useful ___ not very useful ___ don't use them ___

36. Considering journals in general, which of the following statements best describes your attitude towards them? You may wish to mark more than one statement. If you do, please rank them in order of influence (most influential [1], etc.) on your attitude towards journals

- I have difficulty finding what I want in them
I just use them for the professional news
I regularly find time to read them
I seldom find time to read them
I use them as needed to keep up with technical changes
They are too research oriented
- Other _____

TEXT BOOKS

- 37. Do you use text books as sources of information? Yes ___ no ___
- 38. If yes, how many times, in a typical year, would you refer to them for information?
once a week ___ once a month ___ 2 or 3 times a year ___ once a year ___
- 39. How many text books do you have immediately available to you?
- 40. Of these how many would you use regularly as a reference?
- 41. Do you or your practice purchase additional text books in a typical year?
Yes ___ no ___
- 42. If yes, how many would you purchase in a typical year?

PROCEEDINGS

- 43. Do you use proceedings in your practice? Yes ___ no ___
- 44. If yes, in general, how useful are these proceedings to you in practice?
Very useful Useful not very useful
- 45. In general, how often would you refer to these proceedings?
once a week ___ once a month ___ 2 or 3 times a year ___ once a year ___

46. How many proceedings do you have immediately available to you?
47. Of these how many would you use regularly as a reference?
48. Do you or your practice purchase additional proceedings in a typical year?
Yes ___ no ___
49. If yes, how many would you purchase in a typical year?

ATTRIBUTES OF WRITTEN INFORMATION

50. Read the following list of attributes and rank in order of importance (most important [1], second most important [2], etc.) to you in reference to journals, proceedings, and text books.

(if an attribute is irrelevant please leave it blank)

	(Journals)	(Proceedings)	(Text Books)
Having it on hand when you want it
It has the latest information
It has all the technical details
It gives examples of actual cases
It has professional news
It has advertisements
It has article summaries
It is indexed
It is inexpensive
It is oriented toward NZ
The information is practical
It has a section that tests my knowledge
Other _____ (specify)

CONTINUING EDUCATION

51. Did you attend any short courses/seminars/conferences in 1986?
Yes ___ no ___

52. If yes, how many days, in total, did you attend courses/seminars/conferences during the year?
..... (days)

53. Was there any one course/seminar/conference that you were particularly glad that you attended?
Yes ___ no ___

54. If there was such a course, what was it? _____

55. Read the following list and rank in order of importance (most important [1], second most important [2], etc.) the attributes of a course/seminar/conference that would make it most useful to you?

(if any attribute is irrelevant to you please leave it blank)

- It is close to home
- You receive pre-course information
(participant list, pre-course reading, etc.)
- Presents all the technical detail of relevant research
- It has proceedings
- Speakers are recognized experts
- It has short sessions
- The whole event is not too long
- There is time for discussion and questions
- Other(specify) _____

56. Have you bought or hired video tapes from:

Postgraduate Committee in Veterinary Science
University of Sydney Yes ___ No ___

Unit for Continuing Education, Univ. of London Yes ___ No ___

Other veterinary video library Yes ___ No ___

57. If you could add one additional information service to those already available to you, what would it be?

Thank you for your assistance in this survey, I hope that the results of the survey will be very useful to you and the veterinary profession as a whole. A summary will be prepared for publication in the New Zealand Veterinary Journal.

This questionnaire should be returned in the enclosed envelope by April 30 to:

Dr. C. Boland,
Department of Veterinary Clinical Sciences,
Massey University,
PALMERSTON NORTH



PALMERSTON NORTH, NEW ZEALAND

TELEPHONES, 69-079, 69-089, 69-099.
DATEX: NZ 30974, Mas Uni
In reply please quote:

11 May 1987

A SURVEY OF INFORMATION USE BY VETERINARIANS
IN CLINICAL PRACTICE

Dear Veterinary Practitioner,

Early in April you should have received a questionnaire concerning your impressions of how, when, where, and why you search for information about innovations in the veterinary field. I have included a copy of the questionnaire in case you did not receive the first one.

I am trying to establish a general impression of how veterinarians approach their information search problems. I realize that you will not have quantitative answers for some of the questions. However, I am more interested in your perception of the situation rather than in any exact numbers. Your responses, when combined with those of your colleagues, will help service organizations to understand your information needs as a practitioner.

Your impressions are important. Please return the completed questionnaire to me as soon as possible. A return addressed envelope has been included for your convenience.

If you have returned the questionnaire already, please ignore this letter. Thank you for your assistance.

Yours sincerely ,

Chris Boland
Department of Veterinary
Clinical Sciences,
Massey University,
Palmerston North

Appendix D

The normal distribution statistics for those questions that offered a selection of responses and asked for the responses to be ranked have been included in this appendix to support the analysis in the text. The relative importance of responses was a product of the number of observations, range of responses, and the mean response. The number in the field definition refers to the particular question while the letter refers to the particular response (i.e. the first response in the list was designated 'A' and so on).

Produced on 10/07/88 at 12:27

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
13 BEEF	206	1 45	1624 (Excluding Zero)	7.8834951	62.9131896	7.9317835	.5526335
14 CATS AND DOGS	364	1 100	18430 (Excluding Zero)	50.6318681	1295.1313232	35.9879330	1.8862801
15 DAIRY	236	1 100	7605 (Excluding Zero)	32.2245762	808.8557338	28.4403891	1.8513116
16 DEER	236	1 70	2152 (Excluding Zero)	9.1186440	109.2369275	10.4516471	.6803442
17 GOATS	264	1 93	2186 (Excluding Zero)	8.2803030	135.0390021	11.6206283	.7152002
18 HORSE	287	1 100	5236 (Excluding Zero)	18.2439024	752.0172266	27.4229324	1.6187245
19 PIGS	122	1 10	277 (Excluding Zero)	2.2704918	4.2485435	2.0611995	.1866122
20 POULTRY	31	1 3	37 (Excluding Zero)	1.1935483	.2279569	.4774484	8.57522680-02
21 SHEEP	202	1 40	1651 (Excluding Zero)	8.1732673	65.5668439	8.0973356	.5697265
22 OTHER	41	1 50	273 (Excluding Zero)	6.6585365	134.3304878	11.5901030	1.8100699

Produced on 10/07/88 at 12:05

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
23 13A	381	1 100	2246 (Excluding Zero)	5.8950131	95.7521066	9.7853005	.5013161
24 13B	349	1 45	1328 (Excluding Zero)	3.8051575	19.4274445	4.4076574	.2359364
25 13C	347	1 100	2711 (Excluding Zero)	7.8126801	207.6786826	14.4110611	.7736263
26 13D	359	1 100	1549 (Excluding Zero)	4.3147632	55.2274630	7.4315182	.3922205
27 13E	388	1 100	4436 (Excluding Zero)	11.4329896	153.5174618	12.3902163	.6290179
28 13F	384	1 50	2896 (Excluding Zero)	7.5416666	48.2384682	6.9453918	.3544305
29 13G	374	1 100	6142 (Excluding Zero)	16.4224598	334.2607274	18.2827986	.9453810
30 13H	9	2 75	222 (Excluding Zero)	24.6666666	534.75	23.1246621	7.7082207

Produced on 10/07/88 at 12:07

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
31 14A	351	1 30	2564 (Excluding Zero)	7.3048433	44.4925193	6.6702713	.3560327
32 14B	284	1 30	1247 (Excluding Zero)	4.3908450	20.8961703	4.5712329	.2712527
33 14C	200	1 30	674 (Excluding Zero)	3.37	15.5307537	3.9409077	.2786642
34 14D	217	1 30	833 (Excluding Zero)	3.8387096	13.6451612	3.6939357	.2507606
35 14E	119	1 10	262 (Excluding Zero)	2.2016806	4.0098276	2.0024554	.1835647
36 14F	357	1 30	2382 (Excluding Zero)	6.6722689	37.8108299	6.1490511	.3254422
37 14G	102	1 30	263 (Excluding Zero)	2.5784313	13.2957678	3.6463362	.3610411
38 14H	323	1 30	2100 (Excluding Zero)	6.5015479	33.6358671	5.7996437	.3227008
39 14I	373	1 30	3175 (Excluding Zero)	8.5120643	41.7290207	6.4598003	.3344757
40 14J	87	1 20	231 (Excluding Zero)	2.6551724	9.4378508	3.0721085	.3293646
41 14K	362	1 30	4083 (Excluding Zero)	11.2790055	73.3762339	8.5659928	.4502185
42 14L	21	2 30	119 (Excluding Zero)	5.6666666	38.5333333	6.2075223	1.3545923

Produced on 10/07/88 at 12:09

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
43 15A	301	1 9	1626 (Excluding Zero)	5.4019933	2.4678626	1.5709432	.0905476
44 15B	384	1 7	719 (Excluding Zero)	1.8723958	1.5998626	1.2648567	6.45469490-02
45 15C	383	1 7	1036 (Excluding Zero)	2.7049608	1.6535617	1.2859089	6.57068780-02
46 15D	283	1 9	1525 (Excluding Zero)	5.3886925	2.9902262	1.7292270	.1027918
47 15E	381	1 7	962 (Excluding Zero)	2.5249343	1.5868766	1.2597129	6.45370510-02
48 15F	248	2 9	1568 (Excluding Zero)	6.3225806	2.0412694	1.4287300	9.07244480-02
49 15G	362	1 8	1368 (Excluding Zero)	3.7790055	2.3055967	1.5184191	7.98063360-02
50 15H	254	2 9	1654 (Excluding Zero)	6.5118110	1.9899785	1.4106659	8.85130590-02
51 15I	35	1 9	88 (Excluding Zero)	2.5142857	5.4924369	2.3435948	.3961398

Produced on 10/07/88 at 12:10

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
52 16A	162	1 11	1108 (Excluding Zero)	6.8395061	5.4896096	2.3429916	.1840828
53 16B	345	1 10	1448 (Excluding Zero)	4.1971014	2.5482473	1.5963230	.0859431
54 16C	191	1 11	1228 (Excluding Zero)	6.4293193	3.7726095	1.9423206	.1405413
55 16D	343	1 10	1649 (Excluding Zero)	4.8075801	2.4423985	1.5628174	.0843842
56 16E	370	1 9	1479 (Excluding Zero)	3.9972972	1.8726214	1.3684375	7.1141682D-02
57 16F	363	1 8	717 (Excluding Zero)	1.9752066	1.0905438	1.0442910	.0548110
58 16G	178	1 11	1157 (Excluding Zero)	6.5	3.7768361	1.9434083	.1456646
59 16H	378	1 8	939 (Excluding Zero)	2.4841269	1.6615510	1.2890116	6.6299605D-02
60 16I	143	1 10	1016 (Excluding Zero)	7.1048951	4.4466660	2.1087119	.1763393
61 16J	98	1 11	834 (Excluding Zero)	8.5102040	7.0153587	2.6486522	.2675542
62 16K	346	1 12	866 (Excluding Zero)	2.5028901	5.0970930	2.2576742	.1213733
63 16L	22	1 12	105 (Excluding Zero)	4.7727272	6.7554112	2.5991173	.5541336

Produced on 10/07/88 at 12:12

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
64 17A	381	1 8	942 (Excluding Zero)	2.4724409	2.8183174	1.6787845	8.6006740D-02
65 17B	347	1 7	1348 (Excluding Zero)	3.8847262	2.4837833	1.5760023	8.4604241D-02
66 17C	380	1 7	1031 (Excluding Zero)	2.7131578	2.5428343	1.5946267	8.1802621D-02
67 17D	344	1 8	1073 (Excluding Zero)	3.1191860	3.1548494	1.7761895	9.5765723D-02
69 17F	321	1 7	1333 (Excluding Zero)	4.1526479	3.8110007	1.9521784	.1089599
70 17G	263	1 8	1487 (Excluding Zero)	5.6539923	2.7004324	1.6432992	.1013301
71 17H	9	1 5	15 (Excluding Zero)	1.6666666	1.75	1.3228756	.4409585

Produced on 10/07/88 at 12:13

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
75 22A	15	1 4	32 (Excluding Zero)	2.1333333	1.2666666	1.1254628	.2905932
76 22B	2	3 5	8 (Excluding Zero)	4	2	1.4142135	1.0000000
77 22C	9	1 5	31 (Excluding Zero)	3.4444444	1.7777777	1.3333333	.4444444
78 22D	6	1 4	15 (Excluding Zero)	2.5	1.5	1.2247448	.4999999
79 22E	20	1 4	35 (Excluding Zero)	1.75	.8289473	.9104654	.2035862
80 22F	13	1 6	35 (Excluding Zero)	2.6923076	1.8974358	1.3774744	.3820426
81 22G	8	1 2	9 (Excluding Zero)	1.125	.125	.3535533	.1250000

Produced on 10/07/88 at 12:15

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
82 23A	269	1 6	1039 (Excluding Zero)	3.8624535	1.2235476	1.1061408	6.7442597D-02
83 23B	381	1 5	510 (Excluding Zero)	1.3385826	.6087443	.7802206	3.9971918D-02
84 23C	308	1 5	996 (Excluding Zero)	3.2337662	1.2676509	1.1259000	6.4154110D-02
85 23D	347	1 5	818 (Excluding Zero)	2.3573487	.7678865	.8762913	4.7041788D-02
86 23E	291	1 5	950 (Excluding Zero)	3.2646048	1.6021566	1.2657632	7.4200359D-02
87 23F	8	1 6	21 (Excluding Zero)	2.625	4.5535714	2.1339098	.7544510

Produced on 10/07/88 at 12:17

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
88 24A	345	1 3	733 (Excluding Zero)	2.1246376	.5280249	.7266532	3.91216970-02
89 24B	320	1 4	715 (Excluding Zero)	2.234375	.6815732	.8255745	4.61510180-02
90 24C	384	1 4	561 (Excluding Zero)	1.4609375	.4893317	.6995225	3.56973580-02
91 24D	15	1 4	27 (Excluding Zero)	1.8	.7428571	.8618916	.2225394

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
94 27A	205	0 (0.000%) NO	0 (0.000%) ?	205 (100.000%) YES			
95 27B	152	1 (0.658%) NO	0 (0.000%) ?	151 (99.342%) YES			
96 27C	28	0 (0.000%) NO	0 (0.000%) ?	28 (100.000%) YES			
97 27D	69	1 (1.449%) NO	0 (0.000%) ?	68 (98.551%) YES			
98 27E	211	1 (0.474%) NO	0 (0.000%) ?	210 (99.526%) YES			
99 27F	31	0 (0.000%) NO	0 (0.000%) ?	31 (100.000%) YES			

Produced on 10/07/88 at 12:20

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
106 30A	50	1 5	83 (Excluding Zero)	1.66	.6779591	.8233827	.1164439
107 30B	7	1 5	18 (Excluding Zero)	2.5714285	2.2857142	1.5118578	.5714285
108 30C	5	1 6	18 (Excluding Zero)	3.6	5.3	2.3021728	1.0295629
109 30D	22	1 4	34 (Excluding Zero)	1.5454545	1.0216450	1.0107645	.2154957
110 30E	198	1 3	207 (Excluding Zero)	1.0454545	5.37609600-02	.2318640	1.64778640-02
111 30F	26	1 4	51 (Excluding Zero)	1.9615384	.7584615	.8708969	.1707969
112 30G	31	1 3	46 (Excluding Zero)	1.4838709	.5247311	.7243833	.1301030

Produced on 10/07/88 at 12:21

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
137 J50A	250	1 12	883 (Excluding Zero)	3.532	7.3584096	2.7126388	.1715623
138 J50B	317	1 8	766 (Excluding Zero)	2.4164037	2.6994768	1.6430084	9.2280555D-02
139 J50C	248	1 12	1024 (Excluding Zero)	4.1290322	6.4367245	2.5370700	.1611041
140 J50D	260	1 11	985 (Excluding Zero)	3.7884615	5.4106771	2.3260862	.1442577
141 J50E	274	1 11	1148 (Excluding Zero)	4.1897810	9.7367450	3.1203757	.1885087
142 J50F	178	1 12	1111 (Excluding Zero)	6.2415730	15.0430076	3.8785316	.2907082
143 J50G	242	1 11	909 (Excluding Zero)	3.7561983	5.3469531	2.3123479	.1486433
144 J50H	202	1 11	957 (Excluding Zero)	4.7376237	6.4532042	2.5403157	.1787359
145 J50I	155	1 12	933 (Excluding Zero)	6.0193548	10.2658567	3.2040375	.2573544
146 J50J	227	1 12	979 (Excluding Zero)	4.3127753	7.2778449	2.6977481	.1790558
147 J50K	236	1 12	855 (Excluding Zero)	3.6228813	6.3890912	2.5276651	.1645369
148 J50L	101	1 13	786 (Excluding Zero)	7.7821782	15.0920792	3.8848525	.3865572
149 J50M	3	1 3	5 (Excluding Zero)	1.6666666	1.3333333	1.1547005	.6666666

Produced on 10/07/88 at 12:24

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
150 P50A	313	1 9	783 (Excluding Zero)	2.5015974	3.1866961	1.7851319	.1009016
151 P50B	334	1 8	705 (Excluding Zero)	2.1107784	1.9846882	1.4087896	7.70855390-02
152 P50C	244	1 10	883 (Excluding Zero)	3.6188524	3.3232645	1.8229823	.1167044
153 P50D	216	1 9	853 (Excluding Zero)	3.9490740	3.3508828	1.8305416	.1245525
154 P50E	53	1 12	373 (Excluding Zero)	7.0377358	14.4600870	3.8026421	.5223330
155 P50F	43	2 12	367 (Excluding Zero)	8.5348837	17.5404208	4.1881285	.6386836
156 P50G	107	1 11	543 (Excluding Zero)	5.0747663	7.6169987	2.7598910	.2668087
157 P50H	246	1 10	899 (Excluding Zero)	3.6544715	4.2515513	2.0619290	.1314637
158 P50I	194	1 11	919 (Excluding Zero)	4.7371134	6.7025532	2.5889289	.1858742
159 P50J	210	1 11	860 (Excluding Zero)	4.0952380	5.9239006	2.4339064	.1679555
160 P50K	314	1 12	950 (Excluding Zero)	3.0254777	3.7181986	1.9282631	.1088181
161 P50L	60	1 12	445 (Excluding Zero)	7.4166666	14.4844632	3.8058459	.4913325
162 P50M	4	1 5	8 (Excluding Zero)	2	4	2	1

Produced on 10/07/88 at 12:23

DATASET : INFORM

SEARCH COVERS CASES 1 TO 401

No conditions in effect.

FIELD	No. Obs.	RANGE From / To	Total	Mean	Variance	Std. Dev.	Std. Err.
163 T50A	329	1 9	588 (Excluding Zero)	1.7872340	1.7472755	1.3218455	7.2875702D-02
164 T50B	219	1 9	687 (Excluding Zero)	3.1369863	2.4031670	1.5502151	.1047538
165 T50C	304	1 9	793 (Excluding Zero)	2.6085526	2.1399926	1.4628713	8.3901423D-02
166 T50D	158	1 9	676 (Excluding Zero)	4.2784810	3.8709989	1.9674854	.1565247
167 T50E	42	2 12	312 (Excluding Zero)	7.4285714	11.6167247	3.4083316	.5259170
168 T50F	38	3 12	338 (Excluding Zero)	8.8947368	13.5021337	3.6745249	.5960866
169 T50G	80	1 11	414 (Excluding Zero)	5.175	6.45	2.5396850	.2839454
170 T50H	313	1 10	836 (Excluding Zero)	2.6709265	2.5804661	1.6063829	9.0798128D-02
171 T50I	109	1 12	601 (Excluding Zero)	5.5137614	7.7521236	2.7842635	.2666840
172 T50J	116	1 12	629 (Excluding Zero)	5.4224137	6.4374062	2.5372044	.2355735
173 T50K	243	1 9	773 (Excluding Zero)	3.1810699	2.7026153	1.6439633	.1054602
174 T50L	52	1 12	361 (Excluding Zero)	6.9423076	13.6240573	3.6910780	.5118604
175 T50M	2	1 6	7 (Excluding Zero)	3.5	12.5	3.5355339	2.5000000

Appendix E

CATEGORIES AND PROPERTIES FROM IN-DEPTH INTERVIEWS

The following are the categories and properties extracted from the in-depth interviews with final year veterinary students, university veterinarians, and clinical practitioners. there is no particular order to the presentation of the categories or the properties listed under a category. The relative importance of responses are given in chapter 3.

The sources of information that practitioners identified were:

- commercial firms
- library services
- other veterinarians in the same practice
- veterinarians outside the practice
- Massey
- specialist veterinarians
- other professionals
- clients
- personal library
- MAF
- diagnostic laboratories
- popular press
- scientific literature
- support literature
- informal discussion with veterinarians
- discussion with commercial travelers
- referral/consultancy
- video material
- clinical investigation
- videotext material
- short courses/conferences/post graduate study
- personal experience/recall

The kinds of information that they used were:

- scientific literature
- informal discussion with veterinarians
- discussion with commercial travelers
- referral/consultancy
- clinical investigation
- conferences
- short courses
- personal experience/recall

Attributes of a "good" information source:

- familiarity
- accessability
- helpful manner
- interest in the problem
- follow-through with the enquiry
- supplies reliable information
- supplies information in a useful form
- comprehensive
- current
- available
- co-operative
- familiar
- willing to help
- understanding
- quick to response
- personable
- does not take the case away
- reputable
- able to advise on direction for further search

Attribute of "good" information;

- practical
- specific
- easy to apply to the problem at hand
- relate to a specific problem at hand
- readily accessible
- retrievable
- up-to-date
- understandable
- relevant
- reliable
- available
- easy to store
- familiar
- must attract attention
- brief and accurate
- interesting

The barriers to search were:

- time
- professional isolation
- geographic isolation
- retrievability of information
- reading is a low priority
- information is not in a usable form
- competition between veterinarians
- faulty internal communication in a practice
- unwillingness to share information
- perceived lack of benefit from search
- too much energy required
- other higher priority problems
- attitude of the information source
- not familiar with the system

Motivation for search:

- infuriating not to know
- personal drive/interest
- establish an information source
- responsibility as a source of health information
- client request/need
- relevant problem
- maintain image
- reduce risk of failure
- urgency of the problem
- peer pressure

Pressures on veterinary performance:

- client expectations/confidence
- personal standards
- colleague expectations
- reputation
- meeting personal goals
- life/well being of the patient
- livelihood
- time

Source of "new problem" situations:

- client enquiry
- clinical/field examination
- commercial firm
- other veterinarians
- popular press/television
- courses/conferences
- MAF
- technical literature

"New problem" situations:

- clinical conditions
- new technology
- new drugs
- new techniques
- new management
- new species
- new government policy
- unsuccessful therapy
- computers
- new field of practice
- Terramycin LA
- what to do about non-cycling cows
- intra-vaginal pessaries
- goat health and management
- embryo-transplants
- "stock still"
- feline disautonomia
- invomectins
- preventative health programmes
- advisory work

Attributes of new problem situations:

relevancy to the veterinarian at the time
proactive vs. reactive
client related vs. occupational development

Search strategies:

self-sufficiency
discuss with colleagues
refer to familiar literature
refer the situation
check with consultant/expert
develop an information source
use own experience
trial and error
clinical investigation
more extensive search of literature
use diagnostic laboratories
gather feedback
cross check information sources
talk to clients
stall for time
contact MAF

Confirmation of information:

perceived reliability of information
necessary investment into confirmation
test against previous experience
trial the information
peer evaluation
reputation of the source
client expectation
age of the information
endorsement by someone respected
the way the information is presented

Veterinary self-confidence:

length of experience
personal esteem
professional reputation
reputation with clients
able to say, "I don't know"

Veterinarian's attitude:

"you can't know everything"
have a responsibility to meet client's needs
veterinary and private time is in conflict
clients do understand limitations in knowledge

Veterinary image:

- competent
- reliable
- caring
- professional
- good communication
- knowledgeable
- helpful

Purpose for information search:

- practical application
- solve a problem
- save time
- clarify a problem
- stay informed/maintain standards
- improve practice
- second opinion

Consideration affecting search:

- cost/benefit
- will it improve present situation
- how risky is not knowing
- need to understand the innovation
- how effective/useful will the information be
- how easy will it be to find the information
- how urgent is the situation
- what does the client expect
- how much time is there

Client attitude:

- confidence in veterinarian
- prefers honesty
- veterinarian's role is to find out
- client likes to be involved in a mystery
- does not expect the veterinarian to know everything
- clients want to know as much as possible

Motives for further search:

- results/feedback
- personal interest
- client satisfaction
- time
- clarifying ambiguities (conflicting information)
- deciding appropriate action
- reduce risk
- cost/benefit

INFORMATION SEARCH HYPOTHESES

These hypotheses were derived from the researcher's notes on the in-depth interview transcriptions.

Veterinarians are active searchers for information.

Client needs and satisfaction are the prime motivations for search.

Professional reputation is important.

Current information is not as important as familiar and readily accessible information.

Veterinarians prefer their own libraries.

Veterinarians deal with problem at hand rather than anticipate problems.

Veterinarians remember relevant information.

The veterinarian that has direct contact with the commercial travelers sees them as most useful.

Veterinarians do not want the research rational and details beyond what is absolutely necessary.

Information sources that are hard to use, time consuming, or unfamiliar are not used.

Information that is hard to use or difficult to find is not used.

Time is the most important limiting factor influencing information search.

Veterinarians are active searchers for information.

Most information searches are completed without contacting outside information sources.

Veterinarians do not remember information that they receive if it is not relevant to a problem at hand.

The cost of information is a minor factor.

Veterinarians find individuals more useful than organizations.

Veterinarians trust published information.

Veterinarians must trust the information source in order to use the information.

The information must "feel" right to the veterinarian.

The information search process is personalized.

Retrieving information can be quite difficult.

Veterinarians have difficulty making general information fit the context of a particular problem.

Veterinarians have to put energy into getting feedback.

Veterinarians believe it is hard to be a general practitioner.

Veterinarians see information search as a jungle with unfamiliar paths.

Veterinarians find it harder to admit not knowing something when they first start practicing.

Demographic profile of the veterinary profession in New Zealand, 1985

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ABSTRACT

The demographic characteristics of the veterinary profession in New Zealand are examined using information supplied by registered veterinarians to the Veterinary Surgeons Board in their applications for annual practising certificates in 1985. Comparisons are made with the veterinary professions in other similar countries, and with the medical and paramedical professions in New Zealand. In 1985 1308 registered veterinarians were working in New Zealand and 304 were overseas, whereas in 1976 the equivalent figures were 748 and 182. This represents an increase of 73% in the number of registered veterinarians in the last 10 years. Eighteen percent of veterinarians were female. The mean age of veterinarians was 38 years, but females in the profession were on average much younger (32 years) than males (mean age 42 years). Clinical practice provides employment for 70% of veterinarians: of these 59% work principally with farm animals and 41% with non-farm animals. The remaining veterinarians are employed by Government (22%), University (5%) and industry (3%). The current demographic structure of the profession has been markedly influenced by the opening of New Zealand's only veterinary school at Massey University in 1963. Differences from other medical professional populations in New Zealand and overseas principally reflect the marked change in the number and sex ratio of graduates entering the veterinary profession since that time. It will take about another twenty years before the population reaches a stable age and sex structure, assuming that current graduation patterns persist throughout that period. Because the structure of the popula-

tion is changing, considerable caution is needed in predicting future employment trends from data for a single year.

INTRODUCTION

The maintenance of an approximate equilibrium between supply and demand for animal health services and veterinary manpower is of importance to the entire veterinary profession. If we are to forecast future needs for veterinarians in the various major forms of employment (industry, government, education, clinical practice), we must make periodic assessments of the expected future supply of manpower (determined largely by the current demographic structure of the profession) and factors affecting future demand. The latter include projected changes in the livestock industries, changing social expectations of the public concerning pet ownership and care, trends in family structure and disposable incomes, and the role played by the Government veterinary service.

Of the two sides of the equation, demographic structure is much easier to assess, although there have been surprisingly few published reports even on that issue. Projecting future demand is a far more difficult undertaking. Few attempts have been made, and even the most comprehensive ones (such as that carried out by Wise and Kushman(12), create controversy because the conclusions drawn depend so heavily on the assumptions made in the process of assessing demand.

Although the records of the Veterinary Surgeons Board provide at least a starting point for an analysis, there has never been any published demographic profile of the profession in New Zealand (2) - despite the value of such a summary for future planning. A few authors have referred to veterinary manpower needs in New Zealand (5) and the future demand on professional training at Massey University (3), but these papers give only a very limited description of the structure of the profession.

MATERIALS AND METHODS

The Veterinary Surgeons Act 1956 requires each registered veterinary surgeon to apply annually for a practising certificate. The application form includes a request for information on the present employment category of the applicant. Responses of registered veterinarians in 1985 were used, together with details recorded at the time of initial application for registration, to investigate the structure of the profession. It was assumed for the purpose of analysis that the data about each veterinarian held on the files of the Veterinary Surgeons Board was accurate and completely up to date, although this may not always have been strictly correct because some changes in employment may not have been notified. Where time trends were considered important, comparisons were made with the equivalent statistical data for 1976. Only those veterinarians who indicated that they were actively involved in the profession have been included in the analysis. Retired veterinarians and those who stated that their employment was not in the veterinary field have been excluded.

RESULTS

Age and Sex

The profession is young and predominantly male, with women representing only 17.6% of the total population. The mean age of registered veterinarians is 38. Two thirds of the members of the profession are between the ages of 27 and 49. Mean age differs markedly between men (42) and women (32) because of the very small number of women over 40 years of age. The age distribution of the veterinary population, subdivided into men and women, is shown in figure 1. The distribution of both sexes in the figure is skewed towards younger age groups, the shift being extreme for women. There are almost no women in the older age groups.

(Insert figure 1)

When the age categories are defined in the same manner as that used in the official government census (less than 25, 25-44, 45-59, 60 years or older) (8) a comparison can be made between the veterinary profession and the combined medical professions (medical, paramedical, and dental)¹ in New Zealand, as shown in figure 2. The veterinary profession has a higher proportion of both men and women in the 25-44 age range than the medical professions, a lower proportion of women older than 44, and a lower proportion of men less than 25 and greater than 59.

(Insert figure 2)

Years of Veterinary Experience Since Qualification

On average, in 1985 veterinarians had ten years of post-qualification veterinary experience. Two thirds of the total group had graduated between 1961 and 1981.

Source of Veterinary Qualification

The statistics concerning the institutions at which individuals obtained their registrable veterinary qualifications have been condensed into 6 general categories - New Zealand(NZ), Great Britain(GB), North America(NA), Continental Europe(Eu), South Africa(SA), and Australia(Au). Of the total group, 61% graduated from Massey University, 20% from Australian universities, 11% from universities in Great Britain, and the remaining 7% from Continental Europe, North America, and South Africa.

The information on source of veterinary qualification was cross-tabulated with age, as shown in Table 1.

(Insert Table 1 here)

¹ The population used for this comparison was made up of those professionals in the stated groups who had obtained tertiary qualifications. The definition of the groups and the statistics were taken from the New Zealand Census, 1981 (8).

Currently, Massey University is the major source of veterinarians. It is also the first substantial source of women in the profession in New Zealand. Massey University has maintained a policy of equal opportunity for men and women since it began to take in students in 1963. Recent veterinary classes at Massey University have shown a steadily increasing ratio of women to men. In those classes currently enrolled, the proportion of women has approached and even exceeded a ratio of 50/50 (women to men) in some cases.

Although Massey University is the major source of veterinarians, there has been a continuous influx from overseas. During the period between June 1980 and June 1986, there were 184 veterinarians with qualifications other than a BVSc degree from Massey University who obtained registered status. This was a mean influx of 26 veterinarians per year with a range of 10 to 57.

The statistics from the yearly application for a practising certificate were examined to assess the occupational trajectories of these veterinarians. The particular points of comparison were one year after initial registration and the statistics for 1986. The number of veterinarians from overseas has been increasing each year from 10 in 1980 to 57 in 1986. Approximately half of each year's intake is still employed in a veterinary occupation in New Zealand one year later. Up until 1984 the most important employer was the Meat Division of the Ministry of Agriculture and Fisheries. In 1984 and 1985, clinical practice played an increasing role in the absorption of the influx, while the Meat Division reduced its intake.

Employment

In 1976 there were 748 registered veterinarians working in New Zealand, and a further 182 overseas. By 1985 the total number had increased to 1308 working in New Zealand and 304 overseas. The distribution of veterinarians

across the classes of employment defined by the Veterinary Surgeons Board² is shown in Figure 3. It shows that there have been only minor changes in the distribution of veterinarians across the employment classes in the last 10 years.

(Insert Figure 3)

Clinical practice is the main employment category, occupying 70% of the population, a slight increase from 66% ten years earlier. Seventy nine percent of women veterinarians are in clinical practice, compared with 68% of men. The age distribution of both sexes is skewed to young ages - 65% of the men and 92% of the women in clinical practice are under 33 years of age.

(Insert Figures 4 and 5)

Of those in clinical practice, 59% work predominantly with farm animals and 41% with non-farm animals. Figures 4 and 5 show the division of women and men into farm/non-farm practice categories by age groups. Overall, 50% of women and 62% of men are in predominantly farm animal practice. The differences between men and women in the practice type they are pursuing are relatively small, the only notable point being the higher proportion of women between the ages of 28 and 37 who are in non-farm practice.

There are three major categories of clinical practice management in New Zealand, a rather more varied situation than in most countries. The types are club practice (a form of farmer co-operative veterinary service in which the veterinarians are employed by a farmer club), practices privately owned and

² The employment classes, as defined by the Veterinary Surgeons Board, are: clinical practice (CP), MAF Animal Health Division (AHD), MAF Meat Division (MD), MAF Research Division (RD), University (U), Industry (I).

operated by veterinarians, and contract practices (in which veterinarians enter a contractual arrangement with a group of farmers to provide their veterinary service, but the farmers do not directly employ the veterinarians). Veterinarians applying for their annual practising certificate are asked about the type of practice management under which they work. Private practice accounts for 60% of the respondents, with 28% and 12% of veterinarians employed in clubs and contract practices respectively. The percentage of men and women in the different types of practices is shown in figure 6. A higher proportion of women (43%) work in club and contract practices than men (33%), and hence less women (57%) work in private practice than men (61%). These percentages do not add up to 100% because some of the respondents did not designate the type of practice in which they were working. This was more often the case with responses from men (6%) than women (1%). The distribution of veterinarians across the practice types is shown in Table 2.

(Insert Table 2 here)

The New Zealand Government provides the second most important source of employment, almost entirely within its Ministry of Agriculture and Fisheries. The proportion of the profession employed by the Ministry has fallen slightly between 1976 and 1985, from 26.3% to 22.4%. Thirteen percent of women and 24% of men are employed by the Ministry. Of those employed by the Ministry, the Meat Division as constituted in 1985 employed 11.8%, the Animal Health Division employed 9.2%, and the Research Division employed 1.4%. This was a reversal of the ranking of the Meat and the Animal Health Divisions from 1976, when they had 10.6% and 13.2% respectively. Under the new structural arrangements within the Ministry, these findings would imply that about 21% of veterinarians would be located in MAFQual, and 1% in MAFTech.

The next largest segment of the profession is employed in the Univer-

sities, almost all at Massey University. The proportion of the profession employed there fell from 5.8% in 1976 to 4.6% in 1985. The Universities employed 6.7% of the female workforce and 4.2% of the male workforce in 1985.

The smallest employment group is veterinarians employed by commercial organizations of various types. In 1976, industry employed 2.3% of the veterinary workforce. By 1985 this had risen to 2.9%, representing 3.3% of the men and 1.0% of the women.

DISCUSSION

The veterinary profession in New Zealand is a relatively small close-knit one by world standards, and hence some of the features described in this paper will be well known to members of the profession. However even within the profession some characteristics of the population are not so obvious, such as the high proportion of women in farm animal practice, and the lower proportion of women than men in private practice. It is also notable that the distribution of veterinarians between employment categories has remained remarkably stable over the last ten years, when the total number of registered veterinarians has risen by 73%.

In terms of future implications of the current demographic structure of the profession, it is clear that the effect of the transition from a profession trained principally in Australia and the United Kingdom to one trained largely in New Zealand is still working its way slowly through the population. Whenever there is a marked increase in output of veterinary graduates, as occurred following the opening of the Veterinary School at Massey University, and again to a lesser extent when the size of the intake was increased by 8 students per class in 1971 and an additional 10 students per class in 1973, there is a sharp shift downward in the age distribution of the profession, which gradually readjusts to a stable age structure over the thirty to forty year working life of the first group to graduate after commencement or expansion of the training program. Thus the veterinary population of New Zealand can be expected to expand until between

the years 2000 and 2010, when approximate equilibrium will be reached between retirement of the early groups of Massey graduates and new entries to the profession. This inescapable long-term population growth which follows a change in output of graduates is frequently not adequately comprehended in discussions of future manpower issues.

The effects of the opening of Massey Veterinary School on female employment have been even more marked, since very few women graduates entered the profession in New Zealand while all training took place overseas. Conventional wisdom suggests that women follow somewhat different career paths from men, and if this is borne out by New Zealand experience then it will clearly have to be taken fully into account in all considerations of future manpower, since women comprise a rapidly rising proportion of the total profession. At this early stage, the data is too limited to allow any firm conclusions to be drawn. The most that can be said so far is that some of the data on employment of women described above does not fit neatly with conventional wisdom.

Veterinarians in New Zealand can be looked at in isolation, but there are international social trends that seem to be manifesting themselves in the character of the New Zealand veterinary profession just as much as they are in other similar countries. The United States, Canada, and the United Kingdom have each examined the subject of supply and demand for veterinarians and have highlighted some interesting developments, which can be compared with the situation in New Zealand.

The Third Report to the President and Congress on the Status of the Health Professions Personnel in the United States (9) showed that the veterinary profession was relatively young, with 3 out of 5 veterinarians under the age of 45. This is even more marked when the ages of men and women are examined separately. The median age for men was 40 years while for women it was 30 years.

The report states that a significant number of women in the profession

is a relatively new phenomenon. Approximately 50% of the women have qualified in the last 5 years. The report goes on to say that if women follow the same work patterns that they have shown in other medical professions, they will tend to leave the work force much earlier than their male counterparts. Whether this is a temporary or permanent exodus is uncertain because it is such a new phenomenon.

The distribution of women in relation to the type of practice or class of animal seen led the authors of the report to suggest that there is a trend for women to leave production animal practice very early in their careers. In 1980, women represented 10% of the total veterinary population in the U S. However, they made up only 5.7% of the large and mixed practice veterinarians (This does not include work exclusively on horses in which women make up 10% of the population). The trends in Canada (4) and the United Kingdom (7) parallel those in the United States.

It would seem that in New Zealand and these other three countries the development of the profession is following a common pattern. The profession is relatively young. Clinical practice is the major employment class. The ratio of women to men entering professional training is increasing (In the United States the ratio is approaching 50/50³). As a result, there is an increasing number of women entering the veterinary work force, so that the proportion of women in the profession will rise rapidly in all four countries over coming decades. In the case of New Zealand, for example, it will go from the 1985 figure of 18% to over 50% by about 2020.

As yet it is not possible to determine what career paths women will follow, and how different they will be from that of the men who have previously dominated the profession. Will they shift their work interest from farm animals

³ The trend toward an increasing ratio of women to men in the veterinary schools seems to have leveled off at 60 women to 40 men in the United Kingdom and Sweden (Stogdale 1985).

to non-farm animals within a few years after graduation, as is claimed to be the case in the United States? For what proportion of their potential working life will they be in veterinary employment? These issues will be of major importance in any accurate analysis of future veterinary manpower supply, yet there is almost no published information on which to make judgments.

Moreover, interpretation of trends in numbers and activities in the United States, Canada and New Zealand is complicated by the fact that the sharp increase in the number of women graduating from veterinary schools has coincided with major expansion of the total number of graduates due to opening of new schools, so the differential effects of a shift to a younger profession cannot easily be separated from the effects of a shift to a more even sex balance, at least with the very limited data obtainable from registration records. These demographic trends in manpower supply further interact with changes in demand for veterinarians in various areas of employment which are a continuing and accelerating feature of veterinary employment. Thus predictions of future trends in employment and in the balance between supply and demand are at best informed conjecture unless much more detailed information is collected on short term changes in employment, especially during the first fifteen to twenty years after graduation when mobility between activity types will generally be greatest. Studies such as those carried out on the work undertaken by recent graduates in the United Kingdom (1) can help answer these questions, and the U.K. may perhaps provide data which would help separate the various factors, since it has not had any major expansion of total graduate output in recent decades, and hence is closer to a stable situation than the other three countries considered.

It is difficult to draw any comparisons between the type of practice management in New Zealand and the other countries mentioned because of the unique development of the profession and the influence of the club system (2). However, the distribution of veterinarians across types of employment are very similar to those of the United Kingdom with 70% of all veterinarians employed in

clinical practice.

Although oversupply of veterinary graduates is not an issue of concern within the New Zealand profession, it is becoming a matter of considerable debate in other countries. It has been a prominent topic of discussion in Australia, the United Kingdom and the United States intermittently over the last decade or more. It is difficult to be totally objective on the issue, and in any case the evidence is sparse and open to various interpretations. Wise and Kushman (12) have provided the only study of the whole subject which comes close to completeness, and their report provides a model for other countries which find it necessary to look at the subject in detail. Their conclusion that there will be a substantial over-supply of veterinarians in the United States and a consequent fall in incomes has provoked extensive debate. It is clear that the possibility of a manpower surplus in the various professions will be a very controversial topic in most developed countries over the next twenty years as the various changes that have taken place in both supply and demand for professional services since the Second World War exert their full effect. If rational action is to be taken on adjustment of supply, data on the demographic structure of the professions in each country will be essential. With this in mind, it would be valuable to continue to monitor trends in the New Zealand veterinary profession in the future along the lines taken in this paper.

CONCLUSION

The increase in the number of women in the veterinary profession is a new phenomenon on the international scene as well as in New Zealand. Previous patterns of employment are being affected by the influx of women into the work force. Because of the additional factor of free movement of veterinarians between New Zealand and Australia, it may be more appropriate to consider the present situation in an Australasian context. Prediction of future behaviour during a period of international cultural change by extrapolating from previous behaviour is prone to very serious error. Fundamental cultural changes within the profession

and society as a whole make it complicated to predict the long term effect of the rising number of women veterinarians in the work force. However, some important trends are foreshadowed in this analysis, and these should be monitored in the future. Analysis of trends over time is essential for such monitoring, rather than the use of "census" data, which fails to represent the dynamics of change.

It must be stressed that the results presented provide only a assessment of present veterinary employment in New Zealand. Repeated analysis of the registration data in the future, preferably combined with longitudinal studies of the employment of recent graduates, will help to put this profile into better perspective.

REFERENCES

- (1) Anon (1987) Graduate Employment Survey. *Veterinary Record* 120: 153-159.
- (2) Burns E A M. (1979): Occupational Control in the Development of the Veterinary Profession. Massey University Thesis.
- (3) Garland BR (1983): Survey of Veterinarians in Industry, Club, and Private Practice. Report from the Market Research Centre prepared for the standing subcommittee on manpower of the New Zealand Veterinary Association.
- (4) Hlland TF (1983): More on Veterinary Manpower. *Canadian Veterinary Journal*, 24:xv.
- (5) Pryor WJ (1977): Veterinary Education, Present and Future Needs. *New Zealand Veterinary Journal*, 25:228-233.
- (6) Stogdale L. (1985): Feminization of the Veterinary Profession. *Journal of Veterinary Medical Education*, spring, 11(2):38-40.
- (7) Swann, M., Chairman (1975): Committee of Inquiry into the Veterinary Profession (U.K.). July, Cmnd 6143 ISBN 010 161430
- (8) The New Zealand Census of population and dwellings, 1981, Department of statistics. Education and Training, Vol.6.
- (9) The Third Report to the President and Congress on the Status of the Health Professions Personnel in the United States, 1982. U.S. Department of Health,

Education and Welfare.

(10) Veterinary Surgeons Board statistics 1986.

(11) Veterinary Surgeons Register 1976.

(12) Wise JK, Kushman JE. (1985). US Veterinary Medical Manpower Study: Demand and Supply from 1980 to 2000. Schaumburg, IL: American Veterinary Medical Association. Synopsis in Journal of the American Veterinary Medical Association, 187(4):358-61.

Table 1

Cross-tabulation of source of qualification (% of population) with age

Age Group	NZ	GB	NA	Eu	SA	Au [#]
<22	0.2	0.1				
23-27	13.6	0.5	0.2	0.2		0.4
28-32	18.6	1.5	0.4	0.5	0.3	0.3
33-37	16.3	1.0	0.2	0.1	0.1	1.1
38-42	10.2	1.1		0.2		2.1
43-47	2.1	1.5	0.3	0.3		5.3
48-52 *	0.4	1.5	0.3	0.6	0.2	4.0
53-57 *	0.2	1.8	0.1	0.6		2.0
58-62		1.5		1.2		2.9
>63 *	0.1	0.6		0.2		1.6

* New Zealand graduates in these age groups must have been either considerably older than the class average or else were overseas veterinarians repeating part of their training at Massey in order to obtain a registrable qualification.

Before the opening of Massey University Veterinary School, New Zealand veterinarians were trained principally at the two Australian veterinary schools which existed at the time, and it is therefore not surprising that Australian graduates predominate in the older age groups.

Table 2

The Distribution (% of population) of Veterinarians
across Types of Clinical Practice Management

	Club practice	Private practice	Contract practice	Not stated
Men	23.2	60.8	10.0	6.0
Women	31.3	56.7	11.2	0.8
Total	28.8	71.0	12.0	

fig 1 Age and sex distribution of veterinarians

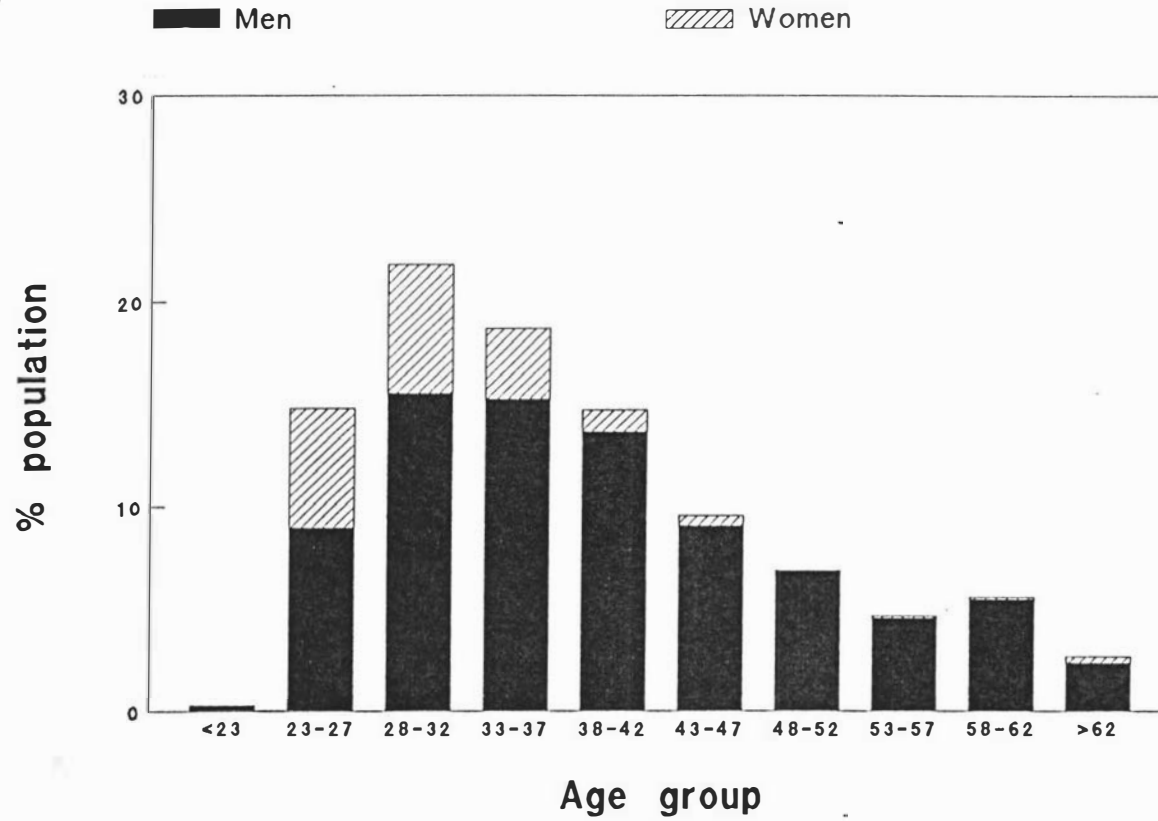
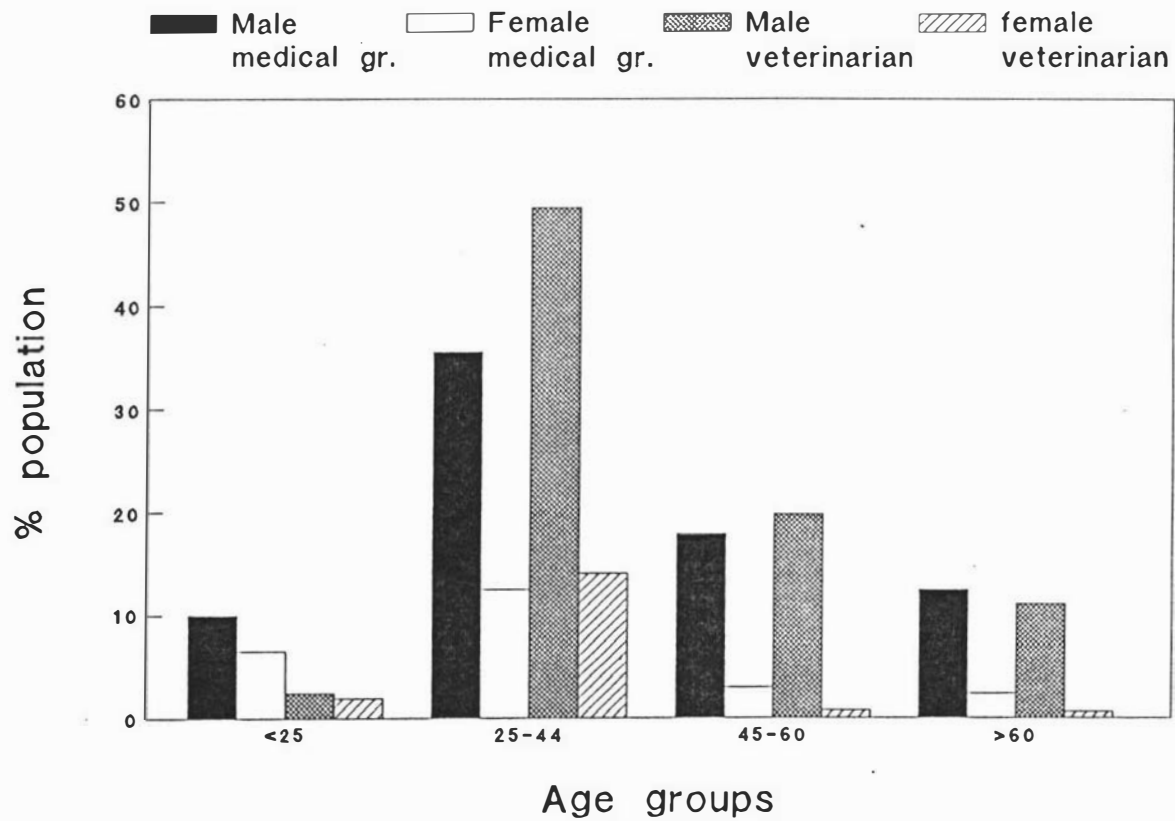


Fig 2 comparison of age-sex distribution between vets and other medical groups



**Fig 3 Distribution in employment classes
1976 and 1985**



fig 4 Age distribution of men in clinical practice categories

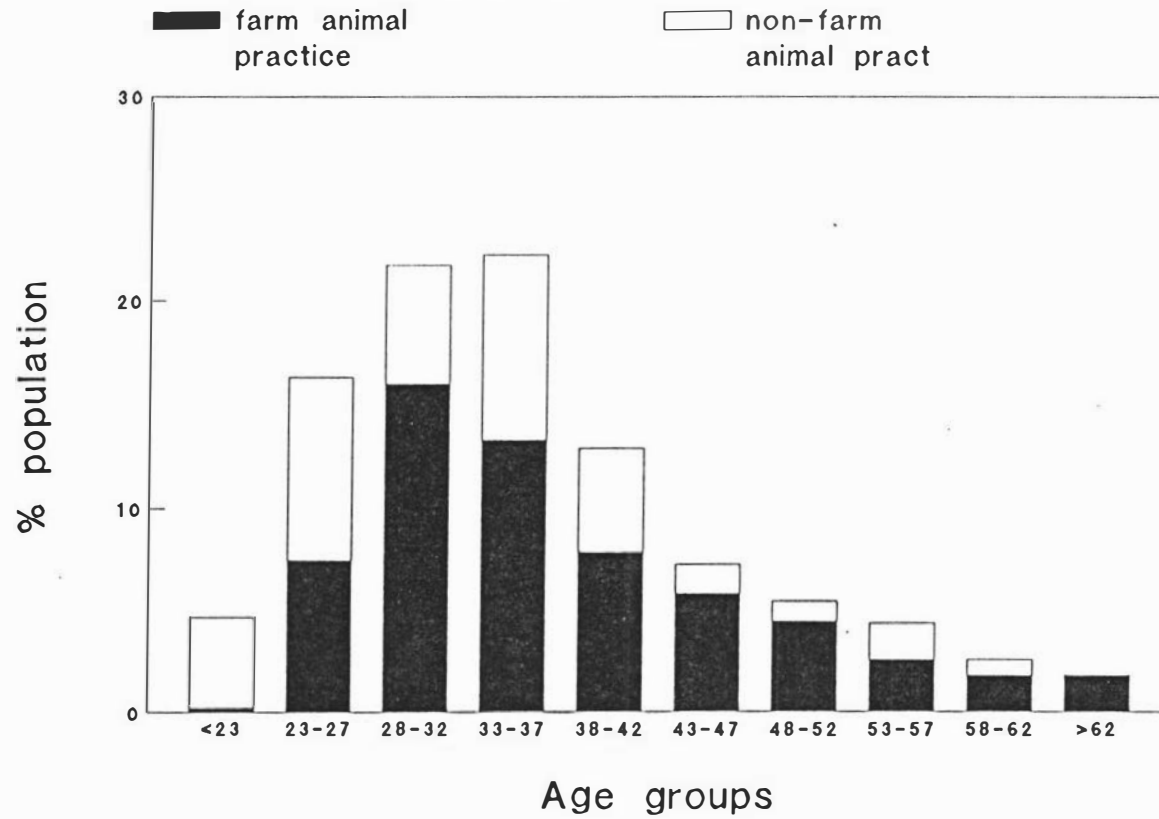


Fig 5 Age distribution of women in clinical practice categories

