

CURRENT CHEMOTHERAPEUTIC MANAGEMENT OF
SMALL ANIMAL NEOPLASIA

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For thousands of years--from the earliest Egyptian physicians, through Hippocrates, and finally culminating in Halsted and the radical mastectomy--surgery was considered to be the definitive treatment for cancer. Most patients whose tumors were surgically removed ultimately died, however, either from local recurrence or regional and distant metastasis. Over the years, surgical treatments became progressively more radical in an attempt to cure. When the radical mastectomy did not cure breast cancer, Halsted advocated forequarter amputation, since he felt that tumor cells advanced progressively and could be arrested in their spread if only enough tissue could be removed. In most cases, results of these extremely radical surgeries were no better than those obtained with "lumpectomies." In recent years, the surgical cure of cancer has been generally shown to be a rarity. Cancer cells which have spread beyond the primary site are now considered to be a manifestation that distant metastasis has occurred rather than a precursor of metastasis. While this basic premise about the spread of cancer was becoming obvious to oncologists, many chemotherapeutic agents were being discovered which had cytotoxic activity against tumor cells. The chemotherapeutic treatment of cancer in man has progressed rapidly since the 1950's when an objective response to drug treatment was first demonstrated in human malignancies such as choriocarcinoma and leukemias.

There are two major objectives of the chemotherapeutic treatment of cancer: palliation and cure. In some human malignancies, a cure is now possible solely with the use of chemotherapy; these tumors include seminoma, choriocarcinoma, Wilm's tumor and acute lymphocytic leukemia of childhood. In other tumors, cure can be achieved with the use of chemotherapy as an adjuvant measure to surgery, radiation or hormonal treatment. Tumors in this category include osteosarcoma and mammary adenocarcinoma. Many tumors are less sensitive to the effects of currently available drugs; palliation of disease is achieved for a variable period of time, with cure being rare. Examples of tumors in this category would be the gastrointestinal malignancies and most adult-onset lymphoid and hematologic tumors. In some forms of cancer, no cure or prolongation of life has yet been achieved with chemotherapy. Drug therapy is of little value, for example, in the treatment of bronchogenic carcinoma and pancreatic adenocarcinoma; both tumors progress relentlessly despite aggressively applied drug regimens. It is apparent that, in working to achieve a chemotherapeutic cure for cancer, one must first learn to palliate before one can learn to cure. Drugs must be discovered which are effective against a particular tumor cell type.

In the testing of new chemotherapeutic agents for toxicity, the dog has played an important role as an animal model. Unfortunately, however, little systematic testing of drugs against particular tumor cell types has been performed in the dog or cat. In general, veterinary oncologists have used the human as an animal model for the therapeutic application of cancer treatment to small animals; what works in man for a particular tumor has been directly applied to the dog or cat. At this time, the only canine tumor which can be

cured by chemotherapy as a single modality is the transmissible venereal tumor. Palliation may be achieved in several different types of cancer, including hemangiosarcoma, thyroid carcinoma, lymphosarcoma, multiple myeloma, seminoma and various hematologic malignancies. It is possible that cures may be achieved in some of these chemotherapy-responsive cancers if drugs are applied as adjuvant agents when the tumor cell burden is low or after it has been reduced greatly by surgery or radiation therapy. In many tumors of the dog and cat, however, chemotherapeutic treatment is at best equivocal and at worst useless. This category includes some common tumors of the dog, such as malignant melanoma, nasal carcinoma and osteosarcoma. Such a lack of response in treatment of the canine or feline patient is particularly frustrating when good responses--even cures--can be achieved in the same tumor in man. A tumor of this type is the osteosarcoma; in humans, a high cure rate is achieved with high-dose methotrexate and doxorubicin, but no such response can be demonstrated in the dog. Yet osteosarcoma in man and dog is histopathologically and behaviorally the same, with both tumors demonstrating early metastasis to the lungs. Why is the canine osteosarcoma seemingly so resistant to drug treatment?

With such different responses to chemotherapy of the same tumor in the dog and man, it becomes apparent that man is not always a good model for the treatment of cancer in other species. To discover a drug protocol effective against such tumors as canine osteosarcoma, it appears that veterinary oncologists will have to go through the same expensive, time-consuming and often frustrating systematic search which has been applied in man. Fortunately, for most currently available drugs the Phase I trials in the canine are complete. Toxicities and safe dosage schedules have usually been determined in the dog before the drugs are applied in the human. If animal rights legislation produces the decline which is predicted in the use of the dog as a research model, however, newly-discovered drugs will have to go through Phase I trials in the dog and cat to determine pharmacokinetics, toxicity, mode of administration and dosage schedules before they can be used in animals kept as pets.

Veterinary oncologists have been most deficient in the application of Phase II and III trials in animals, probably because it is difficult to obtain funding to perform these studies. Phase II and III trials test chemotherapeutic agents against spontaneous neoplasms in the clinical animal. Phase II trials act as a "screen" for any demonstrable efficacy of the drug against a variety of tumors. Once several drugs have been discovered which produce a response in a particular tumor, Phase III trials may be conducted to test combinations of these drugs. Drugs are selected to be part of a combination treatment based on (1) demonstrated cytotoxic tumor response when the drug is used as a sole agent against the particular tumor in question, (2) a different toxicity from other drugs in the combination, and (3) a mode of cytotoxicity or stage of the tumor cell cycle affected which is different from other drugs in the combination. If a drug combination can be shown to produce a response in treatment of a tumor, the new protocol is then tested in controlled trials against the existing "best" treatment. In evaluating effectiveness of drugs in Phase II and III trials, the animals studied must be measurable--preferably in three dimensions--in order to allow the evaluation of a response to drug treatment. It is for this reason that animals with pulmonary metastasis or spread to the skin or subcutaneous tissue are most useful; their tumors may be measured reproducibly, either directly or on a

radiograph. It must be emphasized that even a complete response--disappearance of all measurable disease--does not mean a cure has been produced. Any tumor nodule smaller than 10^9 cells is essentially invisible; an animal may be riddled with metastatic tumor nodules, all visible only if histopathologic sections are taken of various organs. Once a drug protocol has been discovered which produces either a complete or partial response in an animal with measurable disease, it may be applied to the animal with assumed micrometastatic disease, whose primary tumor has been either surgically removed, irradiated or treated with a combination of the two modalities. Since this animal does not have measurable disease, response to adjuvant chemotherapy must be evaluated by disease-free survival time (abbreviated as NED time, for No Evidence of Disease). By following this research scheme, an effective and safe protocol can eventually be achieved which has a reasonably high chance of producing a cure.

It should be obvious from the preceding discussion that the task of producing a chemotherapeutic cure for even one "chemotherapy-resistant" canine tumor will be arduous, involving great expense, the donation by owners of large numbers of pet animals with metastatic disease for experimental treatment, several years of study, meticulous recording-keeping and many follow-up examinations of treated animals. Unless more funding becomes available from agencies like the National Cancer Institute or the American Cancer Society for study of cancer in spontaneous canine and feline neoplasia, it appears that veterinary oncologist will continue to be limited to a "hit or miss" approach to the chemotherapeutic treatment of cancer in small animals.

A number of chemotherapeutic agents have been determined to be effective in the dog against various types of tumors; commonly used drugs include cyclophosphamide, chlorambucil, phenylalanine mustard, vincristine, methotrexate, 5-fluorouracil, cytosine arabinoside, doxorubicin, bleomycin, prednisone and L-asparaginase. All these agents, although toxic, have side effects which are tolerable. The cat apparently has less tolerance for chemotherapy than does the dog. Although most side effects of chemotherapy are similar in the dog and cat, a profound anorexia--usually unaccompanied by vomiting or obvious nausea--may be produced in the treated cat. In some instances, drug dosages must be greatly decreased to allow continuation of the chemotherapy; occasionally, treatment must be stopped completely. The reason for this drug-induced anorexia in the cat is not proven, but it is likely to be due to chemoreceptor trigger zone (CTZ)-induced nausea. If so, it may be possible to prevent anorexia by pre-treatment of the animal with CTZ blocking agents, such as the promazine antiemetics. Simultaneous administration of these compounds has done a great deal to decrease the gastrointestinal side effects produced by chemotherapy in man. Since the cat's appetite is so heavily influenced by olfaction, it is also possible that chemotherapy alters the cat's sense of smell, thereby decreasing its appetite. Such a side effect of chemotherapy is not uncommonly reported in man.

Several new agents are being tested in the dog to determine whether their toxicity and efficacy make them useful clinically; examples of these are cis-platinum, a drug which is extremely effective in man for many tumors but has severe renal toxicity, and mitoxantrone, an anthracenedione dye which has been demonstrated in man to be equally as effective as doxorubicin against a variety

of tumors but with greatly reduced toxicity. A plethora of other questions remain unanswered concerning the chemotherapeutic treatment of cancer in the dog and cat. A few of them are listed here:

- 1) Is it possible to cure canine lymphosarcoma by employing a "consolidation" protocol after initial induction, with later periods of "intensification" chemotherapy using different drugs? In man, these measures have greatly increased the cure rate of the solid lymphoid malignancies.
- 2) What is the role of hormonal intervention--including the estrogen receptor-blocking agents like tamoxifen--in the treatment of canine mammary adenocarcinoma? It appears probable, as in man, that these agents will be useful principally in the estrogen receptor-positive tumors, but this remains to be proven.
- 3) Can intrathecal administration of chemotherapy allow the cure of lymphocytic leukemia in the dog? The CNS is a proven "sanctuary site" of tumor in children with acute lymphocytic leukemia; if it is not treated either by intrathecal chemotherapy or with prophylactic irradiation of the brain and spinal cord, remissions are short and cure is not possible. Might the same situation hold true in the dog?
- 4) What therapeutic benefit might be obtained by adjuvant treatment of canine prostatic adenocarcinoma and perianal adenocarcinoma with testosterone receptor-blocking agents such as cyproterone acetate or flutamide? These agents are currently not commercially available in the United States, since they have not obtained FDA clearance.
- 5) Could dosages of myelosuppressive agents like cyclophosphamide be increased--with a resultant increased tumor cell kill--if the animal were pre-treated with lithium? Lithium carbonate is a readily available, inexpensive drug which has been shown in the dog to increase colony-forming units of the granulocytic series in the bone marrow. The neutrophil nadir obtained when myelosuppressive agents are given is not as low when lithium is given simultaneously.
- 6) What benefit could be obtained from the low-dose administration of cell "differentiating" agents like cytosine arabinoside or cytarabine in the pre-leukemic syndrome associated with the feline leukemia virus? Impressive results have been obtained in man with these agents, with pre-leukemic marrows returning to near normal for long periods of time.

One of the most important problems in the treatment of cancer in man and animals involves acquired resistance of tumor cells to chemotherapeutic agents. Often, even though an initial, partial or complete response is obtained with treatment, remission is short. The tumor which grows in the face of continued drug treatment is "new," in that it is different enzymatically or metabolically from the original tumor. It has become resistant to the drugs used against it. The work of researchers like Isaiah Fidler and Garth Nicolson has proven that tumor cells in metastatic lesions are less genetically stable than those in the primary tumor; they may duplicate DNA with increased frequency of error or be less efficient in repairing errors when they occur. It is also possible that

metastatic cells may produce a mutagenic factor leading to replication errors in neighboring cells. Whatever the cause, the genetic instability of tumor cells in a metastatic lesion makes an effective chemotherapeutic treatment more difficult. By the time metastasis is detected, the tumor has often generated so many cell variants that it is impossible to treat with one protocol and effect a cure. Thus, an oncologist should treat "expectantly," when tumor cells are present in invisible numbers. As many effective agents as possible should be used together in the highest possible dosages to obtain complete destruction of micrometastases before a number of genetic variants can be produced. Although there are exceptions--notably, the transmissible venereal tumor, which appears to maintain its exquisite sensitivity to chemotherapy throughout its growth--we may expect that much of the future progress which will be made in cancer chemotherapy in the dog and cat will be attributable to early, intensive, multiagent treatment.

TABLE 1

PHASE I TRIAL
Initial pharmacologic evaluation
Establish the mode of administration
Establishment of tolerance of a schedule at increasing dosage

PHASE II TRIAL
"Screening" for efficacy of a drug against a variety of tumors

PHASE III TRIAL
Determination of effective drug combinations
Comparison of new protocol to existing "best" treatment

TABLE 2

DEFINITION OF RESPONSE IN MARKER LESION
AFTER TWO COURSES OF TREATMENT OR ONE MONTH

Complete response (CR)	-- No disease
Partial response (PR)	-- A decrease of > 50% in marker lesion
Minor response (MR)	-- A decrease of > 25% but < 50% in marker lesion
Stable disease (SD)	-- A decrease of < 25% or increase of < 25% in marker lesion

TABLE 3

CRITERIA FOR DECLARING A TREATMENT PROTOCOL
INEFFECTIVE AND/OR UNSAFE

Progressive growth (> 25%) in marker lesion
Appearance of new lesions
Severe toxicity with irreversible, cumulative, or unpredictable manifestations
Death from tumor, with or without demonstrable drug toxicity
Deterioration in symptoms, with either stable disease or partial response to drug treatment

COMPUTERIZED MANAGEMENT OF A VETERINARY PHARMACY
TELECOMMUNICATIONS

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Abstract

A veterinary computerized information system for obtaining product information, placing orders, communication and performing literature searches through the use of computer technology is described.

Computerized information retrieval must overcome the obstacles imposed by computer to computer hardware incompatibilities, language differences and space problems brought about by the stored information. Incompatibilities cited are avoided through the application of telecommunication techniques.

Designed for use by veterinary pharmacists and other professionals in the animal health field, the veterinary computerized information system offers the benefits of low cost, speed, ease and simplicity of search.

Background

At the last annual meeting of the Society of Veterinary Hospital Pharmacists, I was given the opportunity to demonstrate a new and exciting technique for the management of information in the veterinary pharmacy. During today's presentation, I hope to bring those of you who were not at that meeting the essence of what transpired. For all of you in attendance today, it is the goal of this presentation to give you some of my experiences over the past year, illustrate a few applications of this technology and relate the advances in telecommunications which have taken place. There is much to cover in a short period of time, so let me begin.

The Concept

Imagine for a moment that you are trying to find an item you might need in your pharmacy. Let's call this imaginary item a 3/8" "WIDGET." There are several ways to explore the availability of "widgets."

If you do not know the maker of "widgets," you might begin your search by calling your favorite supplier. Unfortunately, the supplier doesn't stock "widgets" of any size, and has no reference of such an item in their files. You may then consult a sales representative. If that does not turn up a "widget," the next logical step would be to turn to catalogs you've been saving in your office.

Have you ever tried to search through a catalog that doesn't contain a complete index of its contents? Have you ever tried to find an item in a catalog from an unfamiliar supplier? When faced with these problems, the only thing you can do is a page-by-page search through each of them. If that doesn't work, you might contact a colleague, or you might even attempt to retrofit another product.

This process can waste a lot of time. During my seven-year tenure as a pharmacist at the New York State College of Veterinary Medicine, I chased many such "widgets," and sometimes came up empty-handed. Pure frustration not only for me, but also to the person seeking the product! Wouldn't it be ideal if there were a comprehensive, cross-indexed listing of the items used in veterinary practice?

Enter Computerized Telecommunications, The Problem-Solver

Computerized telecommunications is defined as, "the transference of messages at a distance through the use of computers." One computer "talking" with another, no matter what the distance, no matter whether the brands are different or whether the operating systems they employ are compatible.

When people refer to computers, terminology often becomes vague. Therefore, when mention is made of "terminals," we will mean either desktop, "dumb," "smart," personal, portable, micro- or mini-computers. When we talk about "mainframe," we will be referring to a very large computer remotely placed which has the ability to be accessed by any terminal, no matter what its size, language or operating characteristics.

Telecommunications allows us to create a system which looks, to the user, to be simple. Even though very complex tasks are being performed, the user sees only the end result, a very fast response to simple commands. In fact, it is as easy as dialing your telephone and typing on a typewriter.

It will be assumed in our discussion that you have a terminal, software, a telephone coupling device (or a data terminal that has these features built in), and of course that the subscription fee has been paid. A printer is an optional but recommended piece of equipment.

The system, which will be described is called the Veterinary Stock*Finder (tm).

The Veterinary Stock*Finder (tm)

The Veterinary Stock*Finder (tm) is a collection of over 10,000 pharmaceuticals, biologicals and veterinary supplies listed by generic name, trade name, form, strength, packaging, price and vendor. There is a separate listing of over 850 suppliers of these goods. This list contains the names, addresses and phone numbers for each of the main offices, as well as the branch warehouses and distribution center. Many of these listings contain several toll-free (800) numbers.

Development of the Veterinary Stock*Finder (tm) took 2 and 1/2 full-time employee equivalents almost two years to configure and input. The database is updated constantly for any change noted by the producers, such as price, name, address or telephone numbers. The pharmaceuticals, biologicals and veterinary supplies list is growing at the annual rate of about 3,000 new items per year.

Accession to the Veterinary Stock*Finder (tm) is made through a local terminal. In most cases connection is made by dialing a local telephone number.

Once the telephone connection has been established through your terminal, a prompting message from the mainframe, followed by a local response giving proper identification will immediately bring up the Main Menu.

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* * * * *
* W E L C O M E T O T H E *
*       V E T E R I N A R Y       *
*       S T O C K * F I N D E R       *
*               ( t m )               *
* * * * *
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- * 1 GENERIC DRUGS & FAMILIAR NAMES
- * 2 VENDORS AND/OR PRODUCERS
- * 3 FOOD AND DRUG ADMINISTRATION
- * 4 U.S. DEPT. OF AGRICULTURE
- * 5 ELECTRONIC MAIL
- * 6 BULLETIN BOARD
- * 7 OFFICIAL AIRLINE GUIDE
- * 8 GAME MENU
- * 9 MULTIPLE ON-LINE USERS "CHATTING"
- * 10 DIALOG INFORMATION RETRIEVAL
- * 11 STATISTICAL PROGRAMS
- * 12 EXIT THE VETERINARIAN DATABASE

Type "INFO MORE" for more instructions

Enter a Service Code

In order to demonstrate the ease with which items on the database might be found, a search will be performed to find a 3/8" "WIDGET." At the prompt, enter the number "1" to begin our search of "WIDGET" within the database, GENERIC DRUGS & FAMILIAR NAMES.

Enter service code
--1

The computer responds:

Enter Keyword
--

We now type in the name to be searched:

Enter Keyword
--WIDGET

The mainframe responds:

Searching - Please wait ...
2 Occurrences...

Enter keywords or Read or Scan or Mail

Within seconds the computer tells us that the search has uncovered two pointers to the word, "WIDGET," and that gives us an opportunity to keep searching another keyword, or expand our knowledge of the word it has found.

The prompt, "Read," will allow us to see all the information listed in the two occurrences of the keyword. The "Scan" prompt allows us to see generic title information, thereby eliminating the necessity to read long lists of unwanted material.

Enter keywords or Read or Scan or Mail
--SCAN

The computer responds:

1 APR 2, 1984
WIDGET COLLAR

2 APR 2, 1984
WIDGET

Enter keywords, or Read or Scan, or Mail
--

A "Scan" of the 2 Occurrences allows us to eliminate unwanted parts of the database, thus saving time. Since we have no interest in "WIDGET COLLARS," we will expand the search even further by now reading the entire listing under "WIDGET" (item number 2).

Enter keywords, or Read, or Scan, or Mail
-- READ 2

WIDGET

WIDGET, LATEX 1/4" OTC
(M) ABC CO. 40 EA/PKG 1 4.00 (D)
10 EA 3.40 (D)
(S) XYZ CO. 40 EA/PKG 1 5.40 (N)
10 EA 4.50 (N)

WIDGET, NYLON 3/8" OTC
(M) ABC CO. 20 EA/PKG 1 4.50 (A)
10 EA 4.00 (A)
(S) XYZ CO. 20 EA/PKG 1 5.25 (A)
10 EA 4.75 (A)

Enter Keywords or Read or Scan or Mail
--

Now the correct "WIDGET" has been found, let us find the listing for one of the vendors, the "XYZ CO." At the prompt, a simple command, QUIT, returns us to the Main Menu.

--2 Vendors and/or Producers

Once back to the Main Menu, selection of Option number "2" will activate the Vendor list. When prompted for a Keyword, simply type in "XYZ," one of the vendor names.

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Enter keywords or Read or Scan or Mail
--XYZ
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Searching - Please wait...
1 Occurrences...
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Enter keywords or Read or Scan or Mail
--
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In this example, there is only one occurrence of XYZ, so at the prompt: Enter keywords or Read or Scan or Mail, we would type the word: "READ"

The computer will respond:

```
XYZ COMPANY

THE XYZ COMPANY
123 INDUSTRY HIGHWAY
ANYTOWN
YOUR STATE 43223-7501
212-450-1000
800-212-4500 (IN STATE)
800-213-4322 (OUTSIDE STATE)
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Enter Keywords or Read or Scan or Mail
--
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At this point, an order may be placed with the XYZ CO. for a package of "WIDGETS." Simply type "M" at the prompt.

At the To: prompt, we type "XYZ EX" and press the RETURN key to begin our order. Notice, we do not have to type in the address of the company, just XYZ and the letters, "EX," to send express or urgent mail, the order will get there immediately. You don't even have to state the name of the account sending the order. That's all done for you.

TO: XYZ EX

SUBJECT: RUSH ORDER

TEXT:

Please rush by Greyhound bus, today sure!
1 pkg. 3/8" WIDGETS, NYLON

.SEND

The computer will respond:

XYZ CO. -- Sent Express

This vendor had only one location, but if the company has branch offices, you would see all the branches listed, as well. Toll-free (800) numbers are displayed where known. There are over 1,000 toll-free numbers listed by the Veterinary Stock*Finder (tm).

How Rapid is this System? Is it Cost-Effective?

Searching and locating an item by keyword search usually takes less than 2 minutes. We have a few of the vendors online at this writing. Veterinarians will now be able to find items sold by these vendors on the database, see the vendor name, and rapidly place an order for goods through a process known as ELECTRONIC ORDERING. How long does this process take? Usually, less than 4 minutes.

At the rate of \$35 per hour, a typical keyword search would cost less than \$1.00. An order placed with a vendor would cost less than \$2.00. This is often less than current long-distance telephone rates.

Advantages to ELECTRONIC ORDERING:

1. Fewer errors; since printed copy is received by the vendor, there is less room for interpretative error by the order-taker.
2. Instantaneous placement of orders; faster than the mails.
3. Eliminates long-distance telephone charges for the veterinarian placing orders with vendors that do not have toll-free numbers
4. Place orders 24-hours a day
5. See the price you will pay at the time the order is placed.

Vendors are being added to the system as rapidly as possibly.

Other Features

Option 3. FOOD AND DRUG ADMINISTRATION

Selecting this option brings up a sub-menu which contains all the latest information relative to the latest food, drug and cosmetic information straight from Washington. The sub-menu lists:

- New releases
- Enforcement reports
- Device approval list
- Import detention list
- Drug approval list
- FDA Consumer Magazine Index
- FDA Federal Register summaries

You are also able to communicate directly with the FDA through the use of Electronic Mail within their system. This permits direct response to your inquiries. Though the FDA system is primarily set up for the human sector, animal drug topics are accessed from menu, through keyword searches or by electronic mail.

Option 4. U.S. DEPT. OF AGRICULTURE

The sub-menu found on this option allows you to explore any topic relating to agriculture. Updates to this database are performed daily, and include:

- USDA news releases
- Farm Paper Letter
- Foreign Agricultural Service reports
- Crop Reporting Board reports
- Outlook and situation summaries
- Regional news releases
- Morning news highlights
- Outlook reports
- Electronic Mail
- United Press International

Besides agricultural news, would you like to get the latest sports scores, weather, or national, regional or state happenings? It's all here on USDA.

Option 5. ELECTRONIC MAIL

This option allows subscribers to send and receive messages instantaneously.

No waiting for mail to be typed, addressed, placed in an envelope, stamped and delivered. The instant the message is sent to a subscriber's "mailbox," it is there. The message is held in a mailbox until read and disposed of by the user.

Option 6. BULLETIN BOARD

There are many bulletin boards set up across the country , but so far as I can determine, there are only two devoted to veterinary topics. There is a special interest group (SIG), called Veterinarian's Forum, located on CompuServe Information Service.² The other bulletin board service devoted to veterinarians is located on the Veterinary Stock*Finder (tm). The categories presently listed on the system are:

- Ag Business
- Am. Veterinary Computer Soc.
- Animal Health Forum
- Chat
- Computer-Hardware
- Computer-Software
- Computer in Vet. Med.
- Employment-Opportunities
- Hospital Formulary
- Merchandise
- Servicers
- Soc. Vet. Hosp. Pharmacists
- Travel
- Veterinary Medicine Forum

Our subscribers control the content of each of the messages on the Bulletin Board, and categories may be added or deleted as they determine.

Option 7. OFFICIAL AIRLINE GUIDE

The Official Airline Guide allows you to plan a trip by airline, anywhere in the world, and determine fares for that trip right from your office. We hope to have a service very soon that will allow you to place your reservation for planes, cars, hotels and restaurants, as well. The system for placing reservations, known as Travel-Scan, is being tested at the present time, and should be online by the time this presentation is printed.

Option 8. GAMES

Games have been included for two reasons; to let the new subscriber become accustomed to the system, and to help develop hand-eye coordination.

Option 9. MULTIPLE USERS ON-LINE "CHATting"

Teleconferencing is a feature with a lot of potential. Our system can support large numbers of users participating in a conference. Imagine attending a meeting such as this one, without leaving your office. Think of the savings in cost and time for such a meeting.

A feature which will eventually enhance Teleconferencing is Videotex. Videotex is the coupling of television with computer-generated text. It is my understanding that this feature has already passed the first test in Miami and Philadelphia. We will have this feature as soon as it is available.

Option 10. DIALOG INFORMATION RETRIEVAL

Access to other services, such as the FDA, USDA, and DIALOG,³ is provided by a seemingly simple technique known as a gateway. In practice, a gateway is a very complex series of computer commands which are completely transparent to our subscribers. When option "10" is selected, all the subscriber has to do is give a password, and they will then be able to search any article from about 80,000,000 volumes.

Option 11. STATISTICAL PACKAGE

At the request of one of our subscribers, we recently added a group of statistical formulas. A subscriber can now enter data and perform the following:

1. Print summary data for the degree of fit for each of six functions.
2. Calculations on simple linear regression.
3. Report analysis on 7200 observations.
4. Simple linear regression on ungrouped data.
5. Analysis of variance for a Youden "square" design.

Option 99. EXIT THE VETERINARY DATABASE

This option quickly and easily signs off the system.

COSTS INVOLVED

To give you an idea of some of the costs involved in setting up a telecommunications system in your office or home, I would like to present three different installations:

(low cost)

TRS-80 Portable Data Terminal	
-or-	
PT-210 Data Printing Terminal	
-or-	
NEC PC-8201A Portable Computer	\$600*
One-time Subscription Fee	250
TOTAL	\$850

*No special software need be purchased for these terminals. All communications software is included with the units. A printer option for the NEC will cost less than \$400.

For less than \$1,000, you would be able to access the largest veterinary database in the world. This computer system will not be able to handle complex office tasks, but will do telecommunications very easily. This system is slower at performing routines, but may be hooked up to office computers through an optional attachment. The data terminal or portable computer is recommended if price and simplicity are absolute factors.

(medium cost)

Apple or IBM System	
Terminal	\$1495
Monitor	150
Modem	250
Software	150
Cables, phone cord	55
One-time Subscription Fee	250
TOTAL	<u>\$2350</u>
TOTAL (w/printer option)	\$2750

The medium-priced systems do quite well in handling telecommunications. Apple, IBM, Radio Shack, Franklin Ace, Commodore and Kaypro are a few of the many brands to choose from. They are faster than the lower priced terminals in performing tasks and will store a fair amount of information. Software titles include: Access, Visiterm, Micro-terminal, Micro-Link.

(moderate cost)

Fortune, Corvus, or Xerox Systems	
Terminal	\$5000
Monitor (included)	NC
Modem	500
Software	500
Cables, phone cord	100
One-time Subscription Fee	250
TOTAL	<u>\$6350</u>
TOTAL (w/printer option)	\$7450

The moderate cost systems offer features which fit nicely into the office setting: besides telecommunications features, they have the ability to store patient records, keep track of inventory and handle most of the accounting chores. Mass storage devices will increase the cost of the basic systems.

In addition to the hardware/software costs, a subscriber pays a one-time fee of \$250 and only \$35/hour for computer connect time. There is no monthly minimum fee, the user pays only for time while actually on the computer. The initial subscriber's fee covers the costs incurred in setting up a subscriber's "mailbox" on the main computer. The fee also covers the printing of a user's manual which is tailored to the subscriber's computer system as well as to the person's locale. A unique identification and password is issued to each subscriber. In most instances, access to the system is made through a local telephone call.

Discussion

Comprehensive information is now available to the veterinarian in minutes, instead of days or weeks. And the information is now available at low cost.

Pharmacists and veterinarians have the ability to rapidly access multiple catalog information, locate vendors, perform literature searches and communicate with one another and their colleges through the use of telecommunications.

Veterinary colleges have many areas which can effectively use the Veterinary Stock*Finder (tm). The pharmacy can use the system to build an inventory list, complete with prices. The purchasing department can use the system to rapidly place orders with vendors. The library can use the gateway feature of the system to search for more information for the professional staff in less time.

The diagnostic lab now has the ability to list prices for their tests and communicate results of those tests to the veterinarians in the field.

Vendors can employ this technology in many ways. Manufacturers can equip their representatives with portable computers to allow rapid transmission of orders or inquiries to the home or office by veterinarians. Using this technology, branch warehouses can re-stock shelves. Electronic ordering may also be used by distributors to place orders with manufacturers.

The technology exists. It functions well. The cost is low. It only needs to be utilized.

Additional Information

1. The Veterinary Information Co., Inc., P.O. Box 2509, East Hill Plaza, Ithaca, New York 14850-7509, (607)257-4303.
2. CompuServe Information Service, 5000 Arlington Centre Blvd. Columbus, Ohio 43220, (614) 457-8600.
3. The Dialog Information Services, Inc., 3460 Hillview Avenue, Palo Alto, California 94305, (800) 227-1927.