

# Information technology 13865

Technology



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Information technology is a rapidly growing part of today's society. It affects everyone's life in many aspects. Every human endeavor is influenced by information technology and the increasing rate at which what it can perform includes. One area of human endeavor that information technology has greatly influenced is the practice of medicine, specifically veterinary medicine. Not only has veterinary medicine been influenced by information technology, it has also been enhanced by it. The degree to which the practice of veterinary medicine includes information technology is observable at the Animal Emergency Clinic of Central New York on Erie Blvd. in Syracuse, New York.

#### Section I: veterinary medicine.

Doctors of veterinary medicine are the people who engage in the human endeavor of practicing veterinary medicine. The activities that are included in this endeavor are the prevention, diagnosis and treatment of animal diseases. The best way to handle a disease is to prevent acquiring it altogether. To accomplish this animals are given the available vaccinations for the most likely diseases they would get according to what type of animal they are and where they live. Unfortunately not every disease has a vaccination and not every animal has the opportunity to receive the available vaccinations. When an animal gets sick it is the duty of the veterinarian to determine the cause of the sickness and the best possible course of treatment for it. Veterinarians have many other responsibilities as well. These range from, but are not limited to, treating wounded animals and spaying or neutering them to preventing the spread of diseases from animals to humans through agriculture.

The first school of veterinary medicine was in France. It opened in 1761. Veterinary medicine schools started to open in the United States of America during the civil war. (www. encyclopedia. com)

To become a doctor of veterinary medicine, DVM, one must complete veterinary school. To get accepted into a school of veterinary medicine, a student has to meet the requirements of that particular vet school. Most of the requirements can be satisfied through undergraduate course work. The hard part is to have done a better job at meeting these requirements than the competition has.

As an undergraduate, the student must demonstrate not only academic excellence and dedication to service and helping others, but also a vast repertoire of experience in the field. To prove that he/she is truly dedicated to the service of others, community service must be done and documented. Working, volunteering and interning are all acceptable ways to gain experience in the field of veterinary medicine. The reason behind schools requiring experience is to ensure that the student knows what they are getting into before they spend thousands of dollars (approx. \$20, 000/yr.) and at least four years of their life in an extremely intensive academic environment. Many people have an altered idea of what being a vet is about. A lot of physical and emotion endurance is necessary to be a successful veterinarian. Many people are unaware of that.

The specific undergraduate course requirements to get into a school of veterinary medicine vary between the schools. All of them are science intensive. Most require a well-rounded education. The University of California

at Davis school of veterinary medicine requires one year of general biology, one year of general chemistry, one year of organic chemistry, and one year of physics as far as lower division requirements. Upper division requirements include a semester of biochemistry, a semester of systemic physiology, a semester of vertebrate embryology, and a semester of genetics. On top of that they want their applicants to have taken courses in English composition, humanities, social sciences as well as statistics. Simply taking these courses is not enough, they need to be completed with a GPA above a 2.5. However, the competition has an average GPA of 3.45. The GRE must also be taken and a competitive score must be achieved for consideration. Tuskegee University requires two semesters of English, two of math, two of chemistry (Enough to include organic. Which really means four), two of physics, three of biology, two of animal science, one of animal nutrition, and then courses in humanities, social sciences and electives. They add that grades less than a C are not acceptable.

Once a student has met all of the undergraduate requirements and has been accepted into a school of veterinary medicine he/she still has the hard part to look forward to. It has been said many times that vet. school is harder than med. school. The course work is extremely intensive and demanding. Not everybody makes it through. Nobody becomes a vet. for the money because what one must go through to become and be a vet. is not worth it. That is why veterinarians are so dedicated to what they do.

In order to keep up with new findings veterinarians must continue to take courses so they can learn new findings that have occurred since they were in vet. school. To keep up with the competition veterinarians must stay current

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when it comes to technology. This also allows them to be aware of the most efficient and effective ways available to treat their patients. Short courses are offered to veterinarians on such changes. Since medical discoveries have been and still are constantly being made, and technology is always advancing, veterinarians have always had to continue their learning of information. The only difference over time is the actual material that they are learning.

## Section II: Information uses and needs in the practice of veterinary medicine.

There is a lot of information that doctors of veterinary medicine need and use in the process of preventing, diagnosing and treating animals. The courses they are required to take account for a lot of the information they know and bring to work with them every day. They have to know the anatomy of the normal canine locomotor system and a normal canine head. The structure and function of the cardiorespiratory system as well as the urinary system is imperative information. So are parasitology, epidemiology, virology, bacteriology, and mycology. Principles of nutrition and behavior come in very handy when trying to determine the cause of distress in an animal. Immunology is necessary when it comes to routine vaccinations, auto immune reactions and pathogenic responses. Even veterinarians who do not perform surgery must retain information on anesthesiology since it is sometimes necessary for other procedures. In order to correctly prescribe medicines they must have information on pharmacology and toxicology. Physiological chemistry and correct pH balance of body fluids is another must. So are many other areas that cannot be seen by the naked eye like cell and tissue structure and function, endocrinology, metabolism. Then

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there are other specific areas that all veterinarians must know information about such as oncology and neurology. Much of this information is gained through traditional textbooks and lectures. A great deal of it, however, is made tangible through advances in technology. Cornell's school of veterinary medicine has modular research centers, MRC, which greatly enhance what a vet. Student reads in a book. Cornell also has computer labs that simulate a variety of systems and processes that go along with what a student hears in class or reads in a text.

Fortunately for the clients veterinarians are required to study ethics and issues in veterinary medicine. Veterinarians must also know how to properly handle animals in order to prevent injury to them and the animal. The rest of the information that veterinarians need in preparing to practice comes from in-clinic experience. This is a required part of vet school. These experiences may be gained in small animal practices, on farm, in an equine practice facility, a zoo, or even in a wildlife rehabilitation center. Many veterinarians learn information on food animal practice to prevent disease spread to humans. The information a veterinarian gains cannot be summed up in any paper. All of the knowledge they have prepares them to practice veterinary medicine. As they continue in the field they must continue to update their knowledge with new findings as well as procedures that change as a result of the change in technology.

When it comes to performing a diagnosis and treatment of disease in an animal, a vet. needs to have all of the above information understood, but he/she also needs information on the patient. A lot of this information is gained from simply asking the caretaker of the animal questions regarding

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the behavior and diet of the animal. The majority of it comes from the vet's own investigating. This usually includes looking at the animal's medical past, weighing the animal and when necessary performing the tests relative to the symptoms of the animal. These tests may include, but are certainly not limited to blood tests, urine tests and even radiology. The use of an idexx machine helps a great deal with blood testing. An IV pump machine does a lot of the work when it comes to monitoring and maintaining an animal.

The office at which all of this takes place must be set up in a very specific manner in order to accommodate all of the needs of practicing veterinary medicine. It must be equipped with the necessary testing equipment as well as the obvious, phone fax, voice mail. And, of course, a way to keep track of the patients and clients information, such as, names addresses, medical past and services rendered to ensure proper charging.

Section III: Modern information technology and the use of information.

Walking into one of the MRC's is similar to walking into a zoo in the sense that such a wide variety of animals in different states can be found there. None still alive, but most preserved in such a way that they can be touch and handled for examination and comparison without deteriorating. One specimen, for example, is a dog's head sliced vertically from the ear to the neck. This allows students to see and feel what it is like inside of a dog's head and what a normal brain appears like. The next specimen looked similar except for minor differences in the brain. A student who studies this now knows, thanks to technology, what to expect if a dog comes into their clinic with the same condition. This MRC also contained healthy, injured,

diseased and deformed skeletons of many species. Before these labs came about vet. students really were unable to gain such experience before they began their practice.

Another lab, which contains computers, has a station for different aspects of studies ranging from metabolism to oncology to cell physiology. On each computer was a simulation relative to the area of study it specialized in. These computers are a great resource for trying to understand systems and processes that cannot otherwise be seen such as a cancerous tumor dividing or the immune system at work. They can show, in detail, what is actually happening. During the simulation the student can stop and rewind at anytime to get another look. He/she can also point and click on anything pictured on the screen to get a definition or explanation of what is going on. There is always the option of seeking out a professor or textbook if anything remains unclear. When these computer programs were unavailable, there was really no way for vet students or even vets to observe these micro systems.

This idexx machine tests the levels of twenty one substances in the blood such as glucose, potassium, calcium, and other elements. It also checks the number of platelets, white blood cells and red blood cells to give the doctor a better idea of what is going on inside the patient. All the doctor has to do is put a drop of blood into the Idexx and it does the rest. It even prints out a receipt looking report that contains not only the animals blood levels, but includes a column of what a normal reading is for each part that is off. This report is species-specific. If it is normal it simply reads normal next to that element. Traditionally the doctor would have to put the blood under a



microscope to determine the cell count. Finding the level of a certain element would require a lot more blood and materials resembling a chemistry kit. Not to mention a lot more time.

The IV pump machine regulates the flow of the intravenous fluids into the bloodstream of the animal. Some of them come equipped with ways to monitor the animal's heart rate. It also alerts the vet. with a beep or ring when something is not right with the animal. This could be the animal's heart rate or it could signify that the fluid is not getting into the animal correctly.

After school is completed and actual practice is taking place, the place in which the practice is occurring must meet the needs of veterinary medicine. Many of them have to do with information technology. Overlooking the obvious would be easy, mostly because these information technologies are highly taken for granted. A thermostat to keep a constant temperature throughout the facility is extremely important chilling or overheating a sick or wounded animal stresses it and can be devastating. Keeping the doctors and clients comfortable is important as well. A phone, preferably one with more than one line, is important for many reasons. One reason being for clients to call up, make appointments, discuss the situation of their animal and also for them to be able to check up on hospitalized animals. Another reason is for the doctors to be able to call out. They may need to call out to gain the permission of their clients on courses of treatments, to notify them of the condition of their animals and even to tell them that 'scruffy' is ready to go home. Doctors also need, occasionally, to confer with other doctors or pharmacists.

The fax machine is another bit of information technology that facilitates running a vet practice. In the case of the Animal Emergency Clinic of CNY, the fax machine is the primary source of contact with the share holding facilities when it comes to common patients. The medical charts of an animals are faxed to their regular veterinary facility to ensure proper follow-up care. It is also used to send out memos about available shifts and periods of no coverage. This keeps vets from referring their clients to the AEC of CNY when no doctor is on duty. The fax is also used to order supplies and medicines. Without a fax machine most of this information would have to be mailed, lengthening the time of notification in all of the above situations.

Keeping track of patients, clients and the services they received is a task that was once tedious, but now, thanks to technology, is easy, reliable and quick. In the case of the AEC of CNY, AVImark is the software employed that gets the job done. This software is a system of veterinary information management that is capable of handling a wide range of information both on the client and the patient. It makes appointments and follow-ups. It stores a file for each patient, which links it to its owner, the client. This file holds information such as the name, address, home and work phone number and even chart number of the client. For the patient it holds the same as well as, the species, breed, weight, color, regular vet, and even the date of the last entry as well as all services received during the current and past visits. AVImark has a catalog of all of the possible services a patient may receive along with the price of that service. These services are categorized for easy findings under maintenance, treatments, and applications. And then are further broken down into sub groups such as laboratory, radiology,

injections, pharmacy, etc. Another time saving feature AVImark has to offer is estimates. These estimates save time because they contain the routine treatments and medications for cases that are seen frequently such as hit by car, urinary track infection, the Parvo. virus, and many other common situations animals are in upon entering the AEC of CNY. When an estimate is clicked on the expected treatments are brought up along with the charges for each. The estimate also includes a variance column so the vet can customize the estimate for the severity of the patient's condition. An example of this is the standard hit by a car dog would need to be hospitalized over night receive a certain number of injections and IV bags. A dog may come in that was hit by a car, but is not in as bad shape as would be expected. The doctor would then reduce the number of injections, IV bags and hours of hospitalization predicted for the dog. The price on the estimate would change accordingly to give a more accurate expectation to the client. After the estimate is complete it is printed to and brought out the client for review. This saves the doctor time by eliminating having to write this all out and look up the prices. Before software like this was made available for use by veterinarians all of this had to be done by hand and recorded on paper. Storing the files of all of the patients who received care in a facility took up a lot of room and time to organize.

Technology has changed greatly what a vet has to do. The above information technologies play an important role in the practice of veterinary medicine. Over the years, however, technology has changed. What has been available to veterinarians has changed as a result. Thus technology has allowed veterinary facilities to accommodate more patients at once and accept more

animals as patients in their practice. This is because the time it takes to treat an animal is shortened thanks to technology.

#### Section IV:

It is hard to single out the most important aspects of the role of information technology in the practice of veterinary medicine. Primarily because know one knows where veterinary medicine would be to today if any or all of the technology that is a part of it had not been applied to this science. Any information technology that increases the chance of a veterinarian being able to save the life of an animal would be considered important in this field. The list of these would be never ending. The ones that facilitate vets. the most are the ones that increase the speed and accuracy of the vets. procedure. Examples of these information technologies are the idexx machine and the IV pump.

Technology of veterinary medicine has already had an influence on human medicine. An example of this are the use of vaccinations which are now used both on humans and animals. Vaccinations were originally developed for animals, but were found to be effective in humans. The use of live-virus vaccines has been used on humans since WWII. (www. encyclopedia. com) The use of certain information technologies in the field of human medicine are sure to have an influence in the practice of veterinary medicine. Antibiotics are another example of veterinary technology influencing human medicine. It is expected that advances in human medicine will affect veterinary medicine. The use of information technology to enable surgeons

to perform surgery off site is sure to carry over to veterinary medicine. This will have a great affect on the way doctors perform in this field.

To prepare oneself for success in veterinary medicine all of the required graduate and undergraduate courses must be completed. However, the best preparation for success is exposure to the field. In order to be completely ready for the practice of veterinary medicine knowing how to use the relevant information technologies is a necessity. The best way to accomplish this is through additional courses or observation. According to Tamela, a licensed veterinary technician who works at the AEC of CNY, watching another vet. at work, and seeing how he/she uses the technology to his/her advantage is an invaluable way to prepare for success in this field."