Veterinary Economics

What veterinarians can and should know about the price elasticity of demand

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On a plane from Denver to Des Moines, we met a successful entrepreneur who had established a well-known chain of convenience stores that seemed to be in every town across the Midwest. "Economics?!" he responded when we told him what we did for a living. "What a terrible waste of time. I had to take two semesters of it. Too much useless jargon. I slept through it all."

He continued, "There are just two things a businessperson needs to know. First, there are some things, if you raise their price, people will still buy pretty much the same amount, so you will make more money. Second, there are other things, if you lower their price, people will buy so much more of them that you will make more money. I went bankrupt 5 times before I figured those 2 things out."

Surprisingly, despite our traveling companion's avowed aversion to economics, he had finally discovered one of its most basic concepts: the price elasticity of demand. Knowing the price elasticity of demand for the things they sell benefits all businesspeople, including veterinarians.

Although many factors drive demand, price is an obvious one. People generally buy more of something when its price is lower or when it is on sale and generally buy less of that thing when its price is higher. The question is how much more or how much less. The percentage change in the quantity purchased due to a percentage change in the price is known as the price elasticity of demand.

Veterinarians who own their own practice need to know how to raise revenue to cover rising costs but should realize that it may be a mistake to simply raise all prices. In particular, owners of practices should know which of the services they provide are ones that, in the words of the convenience store chain founder, "if you raise their price, people will still buy pretty much the same amount, so you will make more money" and which are ones that "if you lower their price, people will buy so much more that you will make more money."

The first type is a service for which demand is *inelastic*. Demand is inelastic when the percentage change in the quantity purchased is lower (in absolute value) than the percentage change in price. For example, if a veterinary practice raised its fee for an elective service or product by 10%, and the number sold fell by just

2%, the price elasticity of demand for that service or product is 2% divided by 10%, or 0.2. Inelastic demand has a price elasticity that is < 1. When demand for a particular product or service is inelastic, a practice can raise the price, sell almost the same amount, and make more money.

The second type is a service for which demand is *elastic*. Demand is elastic when the percentage change in the quantity purchased is larger (in absolute value) than the percentage change in price. For example, if a veterinary practice lowers its fee for an elective service or product by 10% and then sells 15% more (assuming no changes in the other factors that affect demand), the price elasticity of demand for that service or product is 15% divided by 10%, or 1.5. Elastic demand has a price elasticity > 1. When demand is elastic, by lowering price, a practice can sell so much more that it can make more money.

In the first example, the practice makes money by raising its price. In the second example, the veterinary practice makes money by lowering its price. To make more money, those running a practice need to know the price elasticity of demand of each product or service before deciding how to change prices.

For a variety of reasons, the price elasticities of demand for the services that veterinarians provide are unknown. For one, most veterinarians cannot afford to experiment with different pricing schemes (and would irritate their clients if they did). Also, to isolate the effects of price changes, all of the other factors that could affect demand—such as changes in pet owners' employment status and income, changes in the numbers of pets clients own, and changes in clients' residential circumstances—must be documented and included in the statistical analysis of the quantities of veterinary services purchases at the fees charged. Furthermore, there may be potential clients who would purchase veterinary services if the services were available at prices they could afford. Of course, potential clients who have never purchased any veterinary services would be unknown. It would be prohibitively difficult for any one veterinarian to maintain data about all of these factors and all of the potential as well as actual clients.

Factors other than price that can affect the quantity of veterinary goods and services purchased include the quality, convenience, and friendliness of the veterinary practice. These are all characteristics of the services provided. Other important factors are characteristics of the purchasers, such as income, attitude toward pets (eg, whether pets are viewed as members of the family), or the length of time pet owners have had a relationship

with a practice. Veterinary practices located in high-income neighborhoods typically sell more services. The availability and price of alternative services, such as the opportunity to board a pet at a low-cost kennel rather than at a veterinary practice, are also important determinants of demand and the price elasticity of demand.

To measure the price elasticity of demand for a particular good or service, economists usually estimate what is known as a demand function. A demand function summarizes the whole set of quantity-price pairs that are (or could be) observed in a marketplace, controlling for all the other factors that affect demand. Knowledge of quantity alone or price alone is not sufficient to estimate a demand function or price elasticity. Furthermore, to avoid overestimating the importance of price alone, economists include data on the full spectrum of all other demand determinants when they statistically estimate how the quantity purchased varies with price.

The AVMA pet demographic survey, which is performed every 5 years, does a good job at gathering data about potential and actual pet owners (ie, potential and actual consumers of veterinary services). It collects information about pet owners' attitudes toward their pets and about their relationships with their veterinarian. It also records respondents' recollections of their expenditures on veterinary services. An expenditure is defined as the product of the price paid and the quantity purchased, so a reported annual expenditure in the Pet Demographic Survey could represent a high price paid for a single visit or low prices paid for multiple visits. Because the expenditure data do not distinguish prices paid from quantities purchased, the Pet Demographic Survey provides only part of the data; information about many other determinants of demand would be needed to estimate demand functions and thus the price elasticities of demand.

Similarly, results of the veterinary fee reference survey performed by the American Animal Hospital Association provide only part of the data needed to estimate demand functions and the price elasticity of demand. Although the veterinary fee reference survey provides data on prices charged for various veterinary goods and services, it does not include any information about the quantities purchased at those prices, nor does it include any of the information about other determinants of demand needed to isolate the effect of price on the quantity purchased.

By the same token, the only published report of a study[1] on the price elasticity of demand for veterinary services did not include the kind of information needed to properly estimate demand. Daneshvary and Schwer[1] used survey data from approximately 500 small animal veterinarians about the fees charged and the total number of cat or dog clients served per day. The price of a client visit was measured as the mean of all the fees charged by the responding practice for all the various services sold for cats or all the services sold for dogs. For example, the fee charged for a simple vaccination visit would be averaged with the fee charged for a complex surgery visit. Unfortunately, that approach combines services for which demand may be inelastic with those for which demand may be elastic. An incorrect approach to measuring price cannot be expected to yield correct estimates of elasticities.

Another drawback of that study[1] is how the quantities of services purchased were measured. The quantities purchased were measured as the number of cat or dog client visits per day. Unfortunately, those quantities are determined by the suppliers, not the customers (the supply side of the market instead of the demand side). The number of clients any practice can see during a day depends on the practice (eg, veterinarians and staff employed, hours the practice is open each day, and time spent on each visit). Consider a veterinary practice that focuses on complex services, such as surgeries, at relatively higher prices, where the mean length of a visit is 2 hours. That practice will serve fewer customers per day than one where the mean length of a visit is 15 minutes. Those 2 price-quantity pairs simply reflect the fact that services requiring more time cost more than services requiring less time. In the end, Daneshvary and Schwer[1] reported estimated price elasticities of demand that were very low, suggesting that the demand for veterinary services is inelastic. Although the demand for veterinary services may in fact be inelastic, the estimates obtained from such a flawed approach cannot be believed. Also, the nature of demand for companion pet health care may have changed since the time of that study[1] in 1993.

To provide veterinarians with better information about the price elasticities of demand for veterinary services, the AVMA has begun to cooperate with the American Animal Hospital Association to obtain the price, quantity, customer, and market information needed to estimate demand functions for veterinary services. In addition, the AVMA Veterinary Economics Division has engaged economists with expertise in the statistical estimation of demand elasticities to help with these efforts.[2] Estimating the price elasticities of demand for specific veterinary services may not be possible with the data at hand, will require substantial ingenuity and time, and may require a new survey. Meanwhile, the AVMA has already begun to work on a tool that will enable veterinarians to use these elasticities to guide them in determining optimal prices for various veterinary services on the basis of their specific practice types, costs, and locations.

References

1. Daneshvary N, Schwer RK. The nature of demand for companion pet health care. *J Appl Business Res* 1993;9(4):24–32.
2. Johnson SR, Hassan ZA, Green RD. *Demand systems estimation.* Ames, Iowa: Iowa State University Press, 1984.

Initial results of the AVMA's study of the price elasticities of demand for specific veterinary services will be presented during the Second Annual AVMA Economic Summit in Chicago, October 28, 2014.