BREED-SPECIFIC
Preventive Care and Illness-Monitoring Programs

Published by the American Animal Hospital Association with a generous educational grant from Abaxis.
Contents

The Power of Preventive Care............................................ 2
Customizing Preventive Care Programs by Breeds........... 3
Customizing Your Hospital Research............................. 4
Customizing Core Tests and Protocols.......................... 6
Customizing Your Equipment, Staffing, and Training Needs............................................................ 6
Customizing Financial Models and Packages............... 8
Customizing Your Preventive Care Protocol................... 9
Customizing Client Education Materials.......................12
As outlined in the previous booklet, *Implementing State-of-the-Art Preventive Care: A Primer*, building a preventive health care program takes time and commitment from all members of the veterinary hospital staff. Both the development and the implementation of a preventive care program require several steps of communication, training, education, and monitoring. Working through the process will serve as a team-building exercise, and the resulting program should reflect what your team would recommend for their pets.

In fact, a preventive care program mandates a consistent, focused effort from the hospital leadership to do the following:

- **Develop** a specific program for the practice based on the hospital team's needs, the demographic, and the hospital's culture.
- **Train** the hospital team to understand the need for preventive, presurgical, and illness-monitoring diagnostics; understand that asymptomatic patients could still have serious underlying diseases; and discuss the importance of diagnostic testing with owners.
- **Practice** by performing diagnostic tests on the hospital team's own pets to understand the importance of diagnostic testing in identifying subclinical disease.
- **Implement** a definitive program that makes specific recommendations to increase the quality and length of a patient's life, defines the importance of the health care recommendations, protects the liability of the practice, and develops a plan to make incremental practice changes that will produce a positive impact.
- **Track** the hospital's progress throughout the program and develop a rewards system for successes.

This booklet builds on the first booklet. It shows you how to further differentiate your practice by developing a breed-specific preventive care program.

Andrew J. Rosenfeld, DVM, DABVP
Medical Director, Abaxis Global Diagnostics
The Power of Preventive Care

Preventive care has the capacity to change lives, not only for patients but also for pet owners and hospitals. By detecting disease early, costs of future treatments can potentially be reduced. Simultaneously, the success rate of any treatment rises, and may result in an increase in the length and quality of the pet’s life.

For the hospital, preventive care programs do more than enable veterinarians to affect and communicate the “whole story” of a patient’s health. Medication compliance can also rise with state-of-the-art point-of-care testing (POCT) or patient-side diagnostic testing.

Such outcomes are not solely the result of diagnostic evaluations. Indeed, a preventive care program is a larger system and philosophy that includes client education, client and veterinary monitoring, and carefully selected diagnostic testing, customized for every patient.

Just as each patient is different, so too is each practice and its preventive care program offerings. Designed by the hospital team, a preventive care program carries the unique brand of that hospital and its team. It will vary based on hospital philosophy, geographic region, and demographic and animal populations.

A preventive care program should not be complicated, but it should be specific and differentiate your team from other hospitals. It should also demonstrate your hospital’s quality and commitment to preventive care.

Finally, a preventive care program should be a comprehensive program that recommends diagnostic testing that each member of your team would want to have performed on his or her own pet.

When strategically designed and implemented, a preventive care program can benefit all whom it touches—the practice, the client, and, most certainly, the patient.

Find *Implementing State-of-the-Art Preventive Care: A Primer* at [https://www.aaha.org/professional/resources/abaxis.aspx](https://www.aaha.org/professional/resources/abaxis.aspx)
Customizing Preventive Care Programs by Breeds

In the first client care booklet, *Implementing State-of-the-Art Preventive Care: A Primer* (available online at aaha.org/professional/resources/abaxis.aspx), the process for setting up and implementing a preventive care program was introduced.

This 12-step process for setting up a preventive care program takes a practice from initial conversations about preventive care to designing a program unique to the hospital.

The first booklet outlined the steps for setting up a general preventive care program. Steps 1 and 2 outlined how to introduce the concept and define a mission and goals. Steps 3 through 8 showed you how to conduct research, and identify and develop protocols, as well as practice and client materials and support. Steps 9 through 12 walked you through how to launch a program.

This booklet will show you how to customize Steps 3 through 8 of this process so that you can develop a preventive care program for breed-specific and illness-monitoring programs.
Step 3 Customizing Your Hospital Research

The collection of internal hospital data is at the foundation of any preventive care program and is customized even more for breed-specific programs. And, just as a general preventive care program relies on four areas of market research, so too does a breed-specific preventive care program.

The four areas of market research are the following:
- Hospital pet population
- Regional diseases
- Area breeders/prevalent breeds and specialties
- Client populations

Hospital Pet Population
The first type of research involves your hospital pet population. Depending on your hospital’s geographic region and community, the pet population may vary significantly. For example, large metropolitan areas tend to have a greater number of small canine breeds and a higher population of felines. Additionally, most felines are inside-only pets and canines are limited to walking on a leash rather than running freely in a dog park or a large yard. In rural settings, canines tend to be larger breeds. Both felines and canines are outside more often. Each setting influences the types of disease and emergency concerns the veterinarian sees most frequently.

Regional Diseases
Breed-specific market research should also include identifying specific regional infectious diseases, toxins, and poisons. For example, routine screening for Lyme disease may be part of an annual preventive care visit for patients living in the Northeast United States, whereas intestinal parasites are more of a concern in the Southeast United States.

Also, your research should include an identification of specific fungal, protozoal, and bacterial diseases that occur in your region.

Finally, research should include any environmental toxins and diseases in your region. For example, in the Southwest United States, heat stroke, toad poisoning, and oleander toxicities are prevalent.

Area Breeders/Prevalent Breeds and Specialties
In addition to the above, you may also want to offer a practice niche that will enable you to distinguish yourself from the competition. For example, your practice can become known for serving a particular breed prominent in your area/practice, such as bulldogs.

Client Populations
Finally, market research must include an understanding of the regional client demographic. Knowledge about the general age, income level, and education level of your demographic will impact how you market, price, and position your preventive care program.

Clients spend money on what they value—that is, their psychographic makeup influences their purchasing decisions.

What Pet Population(s) Do You Serve?
- What is the prevalent species, canine or feline, seen by your hospital?
- What are the top five breeds your hospital sees?
- Is your pet population more working pet or house pet?
- Is your pet population mostly young, adult, or senior?

Resources:
For instance, a younger client population, used to having information available at their fingertips, may be more receptive to the immediate information a preventive care program can provide. An older, more traditional client population may require more education about the value of preventive care.

Regardless of your client populations' needs, leave the decision making to the client regarding what he or she can afford. Your role is to develop a preventive care plan that will suit a pet's needs and educate the client about the importance of it.

In doing that, you provide your clients with the information they need so that they—not you—can make an educated decision about enrolling in a preventive care program.

Once you’ve done your market research, the information uncovered will enable you to educate your hospital team about the regional and seasonal dangers. The information will also be used to create client materials, educate clients, and develop preventive care protocols.

### EXAMPLES OF BREEDS WITH POTENTIAL GENETIC DISEASES

<table>
<thead>
<tr>
<th>Breed</th>
<th>Common Diseases in Their Genetic Pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boxer</td>
<td>• Arrhythmogenic right ventricular cardiomyopathy (ARVC) (boxer cardiomyopathy)</td>
</tr>
<tr>
<td></td>
<td>• Dilated cardiomyopathy</td>
</tr>
<tr>
<td></td>
<td>• Hypothyroidism</td>
</tr>
<tr>
<td>Doberman pinscher</td>
<td>• Dilated cardiomyopathy</td>
</tr>
<tr>
<td></td>
<td>• Cervical vertebral instability (wobbler syndrome)</td>
</tr>
<tr>
<td></td>
<td>• Intervertebral disk disease</td>
</tr>
<tr>
<td></td>
<td>• Von Willebrand's disease</td>
</tr>
<tr>
<td></td>
<td>• Diabetes mellitus</td>
</tr>
<tr>
<td></td>
<td>• Hypothyroidism</td>
</tr>
</tbody>
</table>
Step 4  Customizing Core Tests and Protocols

For a breed-specific preventive care program, core tests and protocols should be customized based on the breeds you will serve, as determined or validated in your market research.

Following is a sample of breed-specific core tests and protocols. Additionally, don't forget to consult AAHA guidelines for life-stage care, vaccinations, nutrition, dental care, senior care, and more at http://tinyurl.com/hovc69z.

Further Customize Your Program by Types of Patients and Species

Breed care can also be made specific to the type of patients a practice sees. For example, working dogs, which may be defined as those involved in agility, show, hunting, and service, may require additional workup. In addition to a complete physical exam, these patients may also require orthopedic examinations, regular radiographic evaluations, and specific blood tests.

Additionally, dogs used for breeding require specific initial and routine screens for breeding safety and suitability, such as coagulation testing for genetic, as well as acquired, bleeding disorders. Dogs used for breeding also require ongoing health checks such as routine infectious disease screens, blood work, and appropriate thyroid evaluation.

Breed preventive programs can also be tailored to species-specific prevention. For instance, cat-only and feline-friendly hospitals are carving out a unique niche for their clientele. These clients look for feline-friendly, low-stress environments to make their pets more comfortable.

Hospitals can create a more cat-friendly practice by designing more comfortable surroundings that include aquariums, quieter lobbies, cat-pheromone-scented regions, and an environment free of dogs.

For more information on this topic, please refer to AAHA’s Fear Free™ Certification Program, which helps teach veterinary professionals how to reduce the fear, anxiety, and stress that pets, including felines, experience when they visit the veterinarian (www.fearfreepets.com).

Step 5  Customizing Your Equipment, Staffing, and Training Needs

Once you have identified your core tests and protocols for the breeds you will serve, order and/or update the equipment you’ll need to run the tests. Then, identify those who will run the breed-specific preventive care tests, and determine any additional training needs they may have.

Implementing a preventive care program impacts every part of the hospital, including the front desk, the website and social media administrator, the veterinary technicians, the practice manager, and others. Everyone must be educated on how to communicate your preventive care program, including any tasks and messaging unique to specific roles.
### Examples of Breed-Specific Preventive Care Programs

#### Juvenile Dogs

*All breeds unless specifically noted*

- Thorough physical examination
- First surgery: Presurgical +/- coagulation screens (see *Implementing State-of-the-Art Preventive Care: A Primer*, aaha.org/professional/resources/abaxis.aspx, for specifics)
- Bile acids: Yorkshire terriers and other breeds predisposed to portosystemic shunts
- Von Willebrand’s disease testing, presurgical: Black and tan breeds
- Gastropexy: Giant and large breeds during spay/neuter
- Genetic testing examples
  - Cardiomyopathy (boxers/Doberman pinschers)
  - Progressive retinal atrophy (PRA) (dachshunds and English springer spaniels)
  - Ascending myelopathy (boxers, Cardigan Welsh corgis, Chesapeake Bay retrievers, German shepherd dogs, and other breeds)

#### Adult Dogs

*All breeds unless specifically noted*

- Thorough physical examination
- Ocular pressures: Cocker spaniels, basset hounds, and brachycephalic breeds
- Adult blood screens (e.g., complete blood count [CBC], chemistry, T4): Baselines, anesthesia, drug monitoring
- Hip/elbow radiographs: Large and giant breeds
- Electrocardiograms (from four years on): Boxers, Doberman pinschers, cocker spaniels, and other breeds
- Dental care
  - Complete oral health assessment and treatment (COHAT)
  - Dental radiographs

#### Geriatric Dogs

*All breeds*

- Thorough physical examination
- Comprehensive blood work diagnostics
  - CBC
  - Chemistry
  - Urinalysis
  - Thyroid profile
  - Urine protein/creatinine ratio
- Dental care
  - COHAT
  - Dental radiographs

#### All Dogs

*All breeds*

- Thorough physical examination
- Cancer screens
  - Blood work with ionized calcium levels
  - Thoracic and abdominal radiographs
- Complete cardiac evaluation
  - Cardiac troponin
  - Full EKG
  - Chest radiographs and echocardiograms
  - Blood pressure
- Complete ophthalmic care
  - Thorough ocular examination
  - Ocular pressures
  - Schirmer tear tests
  - Dilated fundic exams

©istock.com/MDAimages
Several factors go into your pricing structure. One factor, of course, is your actual costs. But your priorities also play a role. For instance, if your hospital’s priority is to boost compliance, you may choose to offer lower fees to meet that priority.

Your clients’ needs also factor into your pricing structure. For instance, in a rural community where discretionary income may be low and there are few hospitals in your area, your fees may be lower than they would be in a metropolitan area. Regardless, however, your pricing should be competitive and reasonable, that is, in line with what other practices are charging and what your clients can afford to pay.

Tiered pricing, that is, breaking down diagnostic fees by the level of care and the tests involved, as well as staff/veterinarian time, is an effective strategy. Such tiers and their related pricing are based on the level of complexity and the investment of time to interpret the tests and to communicate the results to clients.

**EXAMPLE OF PACKAGED PRICING**
**CBC/CHEMISTRY/THYROID PANEL (COST $40 [US])**

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-cost diagnostics</td>
<td>$150</td>
</tr>
<tr>
<td>Preventive care cost</td>
<td>$99</td>
</tr>
<tr>
<td>Recheck blood work</td>
<td>$75</td>
</tr>
</tbody>
</table>

To keep costs competitive and easy to understand for your clients, consider group pricing. This involves identifying the tests and examinations a patient will need during the next year and then offering a reduced rate for the entire package, which the client can elect to pay in full initially or spread out over the course of the year.

One example is a preventive care package that includes two physical examinations a year, full blood work, and chest and abdominal radiographs. The cost of the package would be less than the individual costs of the tests and examinations.

Another way to manage preventive care costs is to recommend pet insurance to your clients, and work with select veterinary insurance companies to provide it so that out-of-pocket preventive care expenses can be reduced for your clients.

To do this, select one to three insurance plans that include preventive care testing, such as blood work, urinalysis, and fecal exams, and discuss with clients the differences, as well as why you recommend the insurance.

Finally, by working with your distributors and purchasing diagnostic testing supplies in bulk, you can further reduce the overall costs of diagnostics.

The advantage of preventive care is that it can be scheduled, thus enabling a hospital to maximize resources and reduce the overall cost of the services. For hospitals, it is also easy to integrate preventive care appointments within the hospital’s daily routine with little interruption. For example, preventive care appointments can be set up for specific times of the day, or on the weekends, similar to surgeries.
The advantage of preventive care is that it can be scheduled, thus enabling a hospital to maximize resources and reduce the overall cost of the services.

Additionally, the reception team can schedule preventive care appointments for days that are typically slower, thus balancing out revenue fluctuations.

By scheduling preventive care appointments, your hospital team can also become more efficient. For instance, three patients can be scheduled at the same time for blood work, radiographs, and other diagnostics that your team can perform in one coordinated effort.

**Step 7 Customizing Your Preventive Care Protocol**

To customize your preventive care protocol for specific breeds, you will need to develop internal monitoring protocols, that is, diagnostic tests typically run in combination when doing a workup, including for monitoring chronic illness.

By systematically grouping these protocols, the hospital team can effectively obtain a thorough medical database each time, educate the client about the need for regular evaluations, and set client expectations of when diagnostic testing will need to be completed.

These programs will vary from hospital to hospital; however, the education elements and client messaging should remain consistent.

The following are examples of illness protocols for diseases common to specific breeds.
**Common Illness Protocol Monitoring**

**Chronic Renal Patients**

Renal disease is a common older-age concern in canines and felines. It can be seen in 1.5% of older cats and 0.5% of older canines (>15 years of age). By testing potential renal patients early in the disease process and beginning treatment and evaluation of these patients quickly, the disease progress may be slowed down and the quality of life increases.

As the kidneys begin to fail, multiple body systems are affected. Overall physiological changes can include the following:

- Elevation of kidney analytes (azotemia)
- Lack of erythropoietin (anemia)
- Increased production of the renin–angiotensin system (hypertension)
- Lack of calcitriol production (secondary hyperparathyroidism and resulting hypercalcemia)
- Electrolyte derangements (changes in phosphorus, potassium, and other electrolytes)
- Protein loss (albumin) through the kidneys (producing hypoalbuminemia)
- Alterations in blood pH causing metabolic acidosis (producing alteration in blood pH, pCO₂, bicarbonate, and TCO₂)

Once the patient is diagnosed with chronic renal disease, evaluation of treatment should occur at regular intervals, for example, every 30 days, to assess the response to medications and diet and to make treatment changes as needed.

Although elements of a thorough recheck examination can depend on the patient and the disease abnormalities, a renal evaluation should include the following:

- **CBC:** To evaluate blood cell populations for changes suggestive of anemia or infection
- **Renal analytes:** To evaluate blood urea nitrogen (BUN)/creatinine markers for progression of disease
- **Electrolytes (phosphorus, sodium, potassium, and calcium):** To monitor for derangements that can occur with loss of kidney function
- **Albumin:** To monitor protein loss through the kidneys
- **Ionized calcium:** To evaluate if the patient has alterations of blood calcium levels secondary to kidney disease
- **Blood pressure:** To evaluate if the patient has high blood pressure secondary to renal disease
- **Urinalysis:** To evaluate whether the kidney is able to concentrate urine and to evaluate the urine for any changes that support other underlying diseases

**Urine protein-to-creatinine ratio:** To evaluate the amount of blood protein that is being excreted in the urine compared to the normal levels of urinary creatinine (an increasing ratio suggests worsening kidney damage)

**Weight monitoring:** Increasing weight loss in the face of ongoing renal disease can support a poor prognosis

**Chronic Liver Disease Patients**

Multiple disease entities can affect the liver’s ability to detoxify the body, produce chemicals for normal body function, and maintain normal blood glucose levels. Liver disease can be seen in all dogs from two to ten years of age (with a mean age of six years). It is most common in Bedlington terriers, Doberman pinschers, poodles, cocker spaniels, and Labrador retrievers. As the disease progresses, patients lose normal liver function.

Because multiple systems are affected, it is extremely important to fully assess all potential parameters. With liver disease, it is important to evaluate both liver damage and the potential for dysfunction. Thorough blood work fully evaluates the patient for any possible analyte derangements while helping the veterinarian to provide an accurate prognosis and evaluate the patient’s response to care.

Hepatic function evaluations can include the following:

- **CBC:** To evaluate blood cell populations for changes suggestive of infection or bleeding
- **Liver enzymes:** To evaluate liver damage markers for progression of the disease
- **Albumin:** To evaluate if liver dysfunction has decreased the amount of body protein produced
- **BUN:** To evaluate if liver dysfunction has decreased the amount of blood urea nitrogen produced
- **Glucose:** To evaluate if the patient has hypoglycemia, which is common with severe liver dysfunction
- **Bile acids:** An extremely important parameter specific to liver function
- **Drug levels:** To monitor for specific drugs (e.g.,
phenobarbital) in the body for potential toxicity

- **Urinalysis**: To evaluate changes in the urine and sediment that would support ongoing liver dysfunction, e.g., biurate or bilirubin crystalluria, bilirubin urinary concentration, etc.
- **Clotting times**: Important in treatment or when performing a liver fine needle aspirate, liver biopsy, or presurgical evaluation, because the liver is responsible for producing clotting factors.

**Hyperthyroid Patients (Feline)**

Hyperthyroidism is most common in older cats (usually >eight years of age) and is rare in dogs. There is no sex or breed predilection. Once the patient is diagnosed, evaluation of treatment should occur at regular intervals, for example, every 30 days initially, to evaluate response to medications and diet and make changes as needed.

Although elements of a thorough recheck examination can depend on the patient and the disease abnormalities, a thyroid evaluation can include the following:

- **CBC**: To evaluate blood cell populations for changes suggestive of anemia or infection
- **Renal analytes**: As the patient is treated for hyperthyroidism, secondary chronic renal disease can develop. Monitoring renal analytes initially is very important to make sure that a life-threatening disease process is not occurring and predict how the kidneys will respond with treatment for thyroid disease.
- **Thyroid profile**: Evaluating total T4 levels at regular intervals and the response to therapy is key to controlling thyroid disease.
- **Blood pressure**: To assess for hypertension, which is a common sequela to hyperthyroidism, evaluating blood pressure may initially be warranted.
- **Echocardiogram**: To evaluate heart valves and other structures and hyperthyroidism’s effects, if any, on cardiac function.
- **Weight monitoring**.

**Hypothyroid Patients (Canine)**

Hypothyroidism is found commonly in dogs and very rarely in cats. Canine breeds overrepresented include Airedale terrier, golden retriever, boxer, Great Dane, cocker spaniel, Irish setter, dachshund, miniature schnauzer, Doberman pinscher, Old English sheepdog, Pomeranian, poodle, and Shetland sheepdog.

Once diagnosed, evaluation of treatment should occur at regular intervals, such as initially every 30 days and then every 6–12 months, to evaluate response to medications.

Although elements of a thorough recheck examination can depend on the patient and the disease abnormalities, a thyroid evaluation can include the following:

- **Thyroid profile**: Evaluating thyroid levels and the response to therapy is key to controlling thyroid disease. Evaluations should include total T4, free T4, and TSH for initial definitive diagnosis, followed by regularly scheduled total T4 rechecks.
- **Cholesterol**: Elevations are observed in up to 80% of hypothyroid dogs.
- **Weight monitoring**.
Cardiac Patients
There are many potential causes of congestive heart failure, including an underlying disease of the heart, metabolic disease, hypertension, and more. Once diagnosed, evaluation of treatment should occur at regular intervals to evaluate responses to medications and diet.6

Although elements of a thorough recheck evaluation can depend on the patient and the disease abnormalities, a cardiac evaluation can include the following:

- **CBC:** To evaluate blood cell populations for changes suggestive of anemia or infection
- **Chemistry:** It is important to ensure that no other organ systems are affected. Kidney disease is commonly a secondary concern due to decreases in blood flow to the kidney and medications needed to manage the disease. Cardiac medications can also cause electrolyte derangements.
- **Thyroid level:** Hyperthyroidism can predispose pets to arrhythmias.
- **Cardiac troponin:** Spikes in troponin, a cardiac enzyme that increases when heart muscle becomes damaged or injured, can suggest cardiac muscle trauma and heart disease.
- **Radiographs (chest and abdomen):** To help evaluate heart shape and size, lung fields, and any abnormal masses or fluid accumulation in either area.
- **Electrocardiogram:** Allows detection of any abnormal electrical rhythms or patterns.
- **Blood pressure:** Checking for hypertension.

Protocol Monitoring via Trending
Once the patient has been seen regularly for disease monitoring and evaluation, being able to trend the results is a useful tool for the hospital team. It provides important information for the veterinarian and the client.

Trending test results allows the hospital team to easily evaluate the progress of treatment, and communicate the importance of regular monitoring with owners.

By monitoring specific laboratory values for a patient over a period of time, you can also assess the patient’s test results for subtle changes. In so doing, you can identify problems early and monitor disease progression or stability.

You can also monitor responses to treatment and potentially identify warranted changes to medications/treatments. By carefully and consistently controlling the disease, you can also minimize emergencies and disease crises.

**Questions to Ask When Reviewing Trends**
- What does the trending suggest?
- Are all the patient’s needs being met?
- Is the treatment protocol controlling the illness?

Trending results can start with as few as two tests. Regardless, trending is best when monitoring is done at regular intervals. Also, fluctuations in test results should be identified on trending curves to assist in addressing changes to treatment protocols.

**Step 8 Customizing Client Education Materials**

Educating clients about the value of preventive care is key to its success, and the same holds true for breed-specific preventive care programs and the related client education material.

There are several ways to develop client material. One option is to purchase premade client materials from independent organizations such as AAHA or other veterinary associations.

Otherwise, if you create your own materials, write in simple, understandable language that demystifies preventive care for breed-specific populations. Don’t forget to also provide step-by-step guidance for clients. (See the first booklet for specific how-to information.)

The first step is to develop client information sheets specific to the breed populations your practice serves. These information sheets should be succinct and to the point, and...
Trending: A Case Study

The Patient
Puddle Romper is a nine-and-a-half year-old female domestic Maine coon cat who has been spayed and weighs five kilograms. She has been slowly losing weight for the last three to four months and chronically vomiting. She was diagnosed with chronic kidney disease in November and was started on medication and a diet.

The Tests
The following blood work has been documented from November through March:
- BUN
- Albumin
- Phosphorus
- Creatinine
- Hematocrit
- Potassium

Test Trends/Results | November–March | Patient: Puddle Romper

**BUN**

<table>
<thead>
<tr>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>66</td>
<td>47</td>
<td>53</td>
<td>70</td>
</tr>
</tbody>
</table>

**Albumin**

<table>
<thead>
<tr>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**Phosphorus**

<table>
<thead>
<tr>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.3</td>
<td>10</td>
<td>8.4</td>
<td>9</td>
<td>9.2</td>
</tr>
</tbody>
</table>

**Creatinine**

<table>
<thead>
<tr>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**Hematocrit**

<table>
<thead>
<tr>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>24</td>
<td>22</td>
<td>20</td>
<td>18</td>
</tr>
</tbody>
</table>

**Potassium**

<table>
<thead>
<tr>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>2.9</td>
<td>2.4</td>
<td>2.6</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Trending: A Case Study, continued on next page
should discuss the disease process, clinical signs of concern, and elements that diagnostics monitor.

Information sheets should also include evaluation intervals/timing and the due date of the next evaluation. Ideally, staff should also forward book the patient’s next screening at the time of the current appointment.

Most importantly, in client educational materials, the blood work results should be available to the client with explanations of what each element reflects.

A face-to-face discussion of test results with the veterinarian dispels alarm. It also allows for improved understanding and compliance with medications and diets, as well as recheck appointments.

Client materials should also include preventive health concerns, that is, congenital diseases or medical concerns, including definitions of such diseases.

---

**Analysis**

**What the Trending Suggests**
Initially, kidney analytes (BUN/creatinine) begin to decrease toward normal levels. However, in the fourth and fifth months of treatment, kidney levels begin to rise, suggesting that the kidney’s ability to filter toxins may be decreasing. Further, blood protein levels are also decreasing, potentially due to a loss of albumin through the kidneys. (This suggests a worsening of disease.) Blood phosphorus levels are also increasing in the fourth and fifth months, further supporting the hypothesis that the kidneys’ filtration ability is being affected.

**Are the Patient’s Needs Being Met?**
The patient’s needs are not being met. In evaluating the patient’s hematocrit and potassium, there is a general decrease to below-normal levels on both parameters. A decrease in the hematocrit would support an ongoing anemia secondary to renal disease. A general decrease in potassium could suggest a key loss of electrolyte. As the patient deals with this issue, it drinks more water and urinates more. This causes an increased loss of potassium through greater urine volume.

**Is the Treatment Protocol Effective?**
Based on the above trends, this patient’s disease is not being well controlled. Other medications and treatments may be recommended to help kidney function overall.

**Next Steps**
By following diagnostic trends overall, combined with physical exam parameters and history, the hospital team and the client can understand the disease pattern, its response to treatment, and the importance of reevaluating this patient regularly.

*A face-to-face discussion of test results with the veterinarian dispels alarm.*
Environmental health concerns, that is, diseases the patient may contract from your specific environment or region, should also be included in client materials. Related tests can be positioned as a way to diagnose any such illnesses.

It is key to educate the client on the importance of recheck evaluations. Through client materials and in-room conversations, the hospital team can help the client understand the disease concerns and the related analytics that enable you to track the disease process.

Articulate to clients that once the disease is diagnosed, the hospital team can generate a medical protocol to track these analytics, evaluate response to treatment, and outline new medical options.

The frequency of recheck evaluations is based on the medical recommendations and the disease itself. You can also group these testing elements together in a tiered pricing structure that makes it cost effective for the client to return. (See Page 8 of this booklet.)

Breed-specific preventive care programs should be well advertised and marketed. Assume that your clients are educated and that most have researched their pet’s clinical signs prior to seeing a professional. Because of that, it pays to invest in online and social media campaigns that will enable your clients to hear your voice and see your practice’s expertise in these online conversations.
BREED-SPECIFIC HEALTH CONCERNS

Newfoundland Dogs

Congenital Disease

This dog breed is predisposed to the following medical conditions:

- **Congenital subaortic stenosis**: A narrowing of the outflow tract of the left ventricle of the heart
- **Congenital mitral valve dysplasia**: A malformation of one of the heart valves
- **Congenital megaesophagus**: An enlargement of the esophagus, resulting in the inability to move food into the stomach
- **Congenital kidney disorder**: A malformation of the kidneys that can lead to renal failure
- **Hip and elbow dysplasia**: A malformation of the hip and elbow joints that will cause arthritis

While the breed is generally healthy, a complete family history should be obtained to be reviewed by your veterinarian when your pet has its first physical examination.

Newfoundlands are large-breed dogs that have the following preventive health concerns:

- **Cardiomyopathy**: Changes in the heart muscle that will lead to heart failure
- **Hypothyroidism**: A thyroid hormone deficiency that profoundly affects metabolism
- **Hip and elbow arthritis**: A malformation of the hip or elbow joints that will cause arthritis
- **Gastric dilatation and volvulus (GDV)**: Bloating and subsequent rotation of the stomach and spleen around its own axis that produces a life-threatening condition

Newfoundlands may not develop these medical concerns; however, each disease should be discussed with your veterinarian and preventive recommendations outlined and performed at regular intervals.
### Sample Breed-Specific Client Information Sheet

#### TEST TIMING

<table>
<thead>
<tr>
<th>Life Stage</th>
<th>Test</th>
<th>Concern</th>
</tr>
</thead>
</table>
| **Juvenile** (2–12 months of age) | A thorough physical exam and cardiac consultation  
|                          | Hip and elbow radiographs  
|                          | Chest radiographs  
|                          | Complete blood count and chemistry  
|                          | Prophylactic gastropexy  
|                          | Chest radiographs, electrocardiogram, cardiac ultrasound, blood lactate levels | Congenital kidney disease  
|                          | Complete blood count, organ function, and thyroid level | GDV  
|                          | Radiographs | Cardiomyopathy  |
| **Adult** (1–5 years of age) | Complete blood count, organ function, and thyroid level | Complete blood count, organ function, and thyroid level  
|                          | Radiographs | Hip and elbow arthritis |
The kidneys primarily function to filter out toxins from the body, reabsorb water, and concentrate the urine. With disease, the kidneys lose these functional abilities, your pet rapidly dehydrates, and toxins begin to build up in the blood. These toxins depress appetite and water consumption, which further dehydrates your pet and decreases nutrient intake. The kidneys are also responsible for maintaining normal red blood cell levels, blood pressure, and electrolyte balance. Severe or chronic kidney disease can produce high blood pressure (hypertension), low red blood cell count (anemia), anorexia, and lethargy.

**Cause of Disease:** The disease occurs when more than 75% of the kidney tissue is affected. Chronic forms of the disease can affect both dogs and cats, with chances increasing as the animal ages (mean age of onset is nine years old). Abyssinian and Persian cats, bull terriers, Cairn terriers, and German shepherd dogs can have a genetic predisposition for kidney disease.

**Monitoring:** Because many different diseases can cause kidney conditions and syndromes, regular recheck evaluations are necessary. The diagnostic tests will vary depending on your pet’s age, sex, history of disease, and geographic region. Tests recommended may include the following:

- **Red blood cell count (packed cell volume):** To make sure the kidneys are producing a hormone needed for red blood cell production
- **Kidney analytes (blood urea nitrogen/creatinine):** To evaluate how well the kidneys are removing toxins from the body
- **Electrolytes (phosphorus, ionized calcium/calcium, sodium, potassium):** With kidney disease, these elements can be altered abnormally, causing increasing kidney damage, lack of appetite, weakness, and other general signs
- **Blood pressure:** Often patients with kidney disease can develop secondary high blood pressure that may require treatment
- **Urinalysis**
- **Urine culture,** if we are concerned about bacterial infection
- **Urine protein ratio**

Regular rechecks are crucial to help control the disease and improve the quality of life of your pet.
Sample Client Monitoring Information Sheet

**SAMPLE CLIENT MONITORING**

**Patient’s Name:** _______________________________________

**Date:** ________________________________________________

**Date of Recheck Appointment:** __________________________

<table>
<thead>
<tr>
<th>Test</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Packed cell volume:</strong> A percentage measurement of red blood cells in blood that carry oxygen to the tissues of the body and transport carbon dioxide to be exhaled by the lungs. Anemia results when red blood cells are not present in sufficient numbers. Determination of the cause of anemia is vital.</td>
<td></td>
<td></td>
<td></td>
<td>25–45% (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35–55% (canine)</td>
</tr>
<tr>
<td><strong>Albumin (Alb):</strong> Low levels can indicate liver, kidney, or intestinal disease.</td>
<td></td>
<td></td>
<td></td>
<td>2.5–4.4 (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.5–4.4 (canine)</td>
</tr>
<tr>
<td><strong>Calcium:</strong> Calcium is important to monitor for early signs of certain cancers. Imbalances of calcium and phosphorus levels are indicative of certain metabolic diseases.</td>
<td></td>
<td></td>
<td></td>
<td>8.0–11.8 (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.6–11.8 (canine)</td>
</tr>
<tr>
<td><strong>Electrolytes (Na+/K+):</strong> Potassium levels are important for normal muscle function and heart rate. Sodium levels are important for body fluid balance. Both are critical to your pet’s health.</td>
<td>Na:</td>
<td>Na:</td>
<td>Na:</td>
<td>142–164 (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>138–160 (canine)</td>
</tr>
<tr>
<td></td>
<td>K:</td>
<td>K:</td>
<td>K:</td>
<td>3.7–5.8 (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.7–5.8 (canine)</td>
</tr>
<tr>
<td><strong>Blood urea nitrogen (BUN):</strong> BUN is made by the liver and removed from the body by the kidneys. BUN values help evaluate for diseases of both organs.</td>
<td></td>
<td></td>
<td></td>
<td>10–30 (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7–25 (canine)</td>
</tr>
<tr>
<td><strong>Creatinine (Cre):</strong> It is important to monitor the value of creatinine to evaluate kidney function.</td>
<td></td>
<td></td>
<td></td>
<td>0.3–2.1 (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.3–1.4 (canine)</td>
</tr>
<tr>
<td><strong>Blood pressure:</strong> Many patients suffering from renal disease may also have high blood pressure. High blood pressure can be controlled with medication.</td>
<td></td>
<td></td>
<td></td>
<td>Systolic &gt; 180 (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Systolic &gt; 150 (canine)</td>
</tr>
<tr>
<td><strong>Urine specific gravity (USG):</strong> USG is a measurement of how well kidneys concentrate urine.</td>
<td></td>
<td></td>
<td></td>
<td>USG &gt; 1.035 (feline)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>USG &gt; 1.025 (canine)</td>
</tr>
</tbody>
</table>
Breed-Specific Preventive Care and Illness-Monitoring Programs

Sample Client Information Sheet for Blood Testing

KIDNEY FUNCTION BLOOD TESTING

Our greatest concern is the well-being of your pet, especially when dealing with a chronic disease. To help monitor the effectiveness of treatment, blood work is evaluated as part of our procedure to ensure the adequate care of your pet. Performing blood work helps us to monitor response to treatment and make changes to medication and diet if warranted.

It helps us to do the following:
- Evaluate kidney function by measuring toxins that should normally be excreted into the urine
- Monitor the red blood cell count for possible anemia associated with kidney disease
- Evaluate electrolytes for discrepancies that may cause worsening kidney damage and other clinical signs
- Evaluate blood pressure for the possibility of hypertension

Recommended Tests

Packed cell volume (red blood cell count): To make sure the kidneys are producing a hormone needed for red blood cell production

Kidney profile
- Kidney analytes (blood urea nitrogen/creatinine): To evaluate how well the kidneys are removing toxins from the body
- Electrolytes (phosphorus, calcium, sodium, and potassium): With kidney disease, these elements can be altered abnormally, causing increasing kidney damage, lack of appetite, weakness, and other general signs

Blood pressure: Often, patients with kidney disease can develop secondary high blood pressure that may require treatment

Urinalysis: Evaluates changes in kidney function, urinary tract infections, and other cellular changes
References
3. Tilley and Smith, *Blackwell’s Five-Minute Veterinary Consult*. 
4. Tilley and Smith, *Blackwell’s Five-Minute Veterinary Consult*. 
5. Tilley and Smith, *Blackwell’s Five-Minute Veterinary Consult*. 
6. Tilley and Smith, *Blackwell’s Five-Minute Veterinary Consult*. 

©AAHA/Robin Baker
The American Animal Hospital Association is an international organization of nearly 6,000 veterinary care teams comprising more than 48,000 veterinary professionals committed to excellence in companion animal care. Established in 1933, AAHA is recognized for its leadership in the profession, its high standards for pet health care, and, most important, its accreditation of companion animal practices. For more information about AAHA, visit aaha.org.

Abaxis Global Diagnostics is a leader in blood diagnostics, performing multiple tests from just two drops of whole blood, delivering point-of-care results in less than 12.5 minutes for Veterinary and Human Health Practices around the world. For more information about Abaxis Preventive Care Consulting Services and other business consulting needs, please visit www.abaxis.com/avc.