Golden Retriever – Genetic predispositions

All creatures carry the genes of their ancestors - for good and bad. Sometimes there is no outward evidence of a particular physical trait, caused by a “recessive gene.” Other times, the gene is “dominant” and your pet will manifest the symptoms of that gene, sometime in his or her lifetime. Some of the diseases caused by those genes are listed below. Your Veterinarian will recommend checking your pet for genetically transmitted diseases, at specific times in your pet’s life. Simple awareness can help prevent or postpone many of these diseases and improve the quality of your pet’s health.

We highly recommend pet health insurance. Early detection is the key to effective treatment for diseases. Many animals may not exhibit symptoms until many diseases are in the more advanced stages. The screening tests recommended below are for the owners who want to prevent disease and detect it in the early stages.

TESTS/RECOMMENDATIONS:

<table>
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<th>Age Range</th>
<th>Tests/Recommendations</th>
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<tr>
<td>2 months or older</td>
<td>- Gene testing for Ichthyosis, Progressive Retinal Atrophy, Muscular Dystrophy, &amp; Renal Dysplasia</td>
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| 4 months of age   | - Penn Hip X-ray - Hip Dysplasia – for candidates of Pubic Symphysiodesis  
|                   | - Eye Exam for Distichiasis, Entropion, Progressive Retinal Atrophy, & Retinal Dysplasia                                                                                                                        |
| 6-10 months of age| - X-ray screening for Hip & Elbow Dysplasia (if Penn Hip X-rays were not performed)  
|                   | - Blood & Urine tests prior to any surgery - von Willebrand Disease & Portosystemic Shunt - recheck yearly                                                                                                           |
| 1 year of age     | - X-rays for Hip Dysplasia & Elbow Dysplasia – for OFA preliminary screening prior to breeding  
|                   | - Blood & Urine tests - von Willebrand Disease , Portosystemic Shunt, & Renal Dysplasia  
|                   | - Eye Exam - for Cataracts, Eyelid Entropion, Distichiasis - recheck yearly  
|                   | - Electrocardiogram & Heart X-rays for Cardiomyopathy – recheck yearly                                                                            |
| 2 years of age    | - X-rays for Hip Dysplasia & Elbow Dysplasia - OFA final certification prior to breeding  
|                   | - Blood & Urine tests - von Willebrand Disease , Portosystemic Shunt & Renal Dysplasia  
|                   | - Skin Exam and allergy evaluation for Atopy.  
|                   | - Eye Exam - for Cataracts & Progressive Retinal Atrophy  
|                   | - Electrocardiogram & Heart X-rays for Cardiomyopathy – recheck yearly                                                                            |
| 3 years of age    | - Teeth Cleaning & Dental X-rays – repeat every 2-3 years as needed  
|                   | - Blood tests and urinalysis - Diabetes, von Willebrand Disease , Portosystemic Shunt, Lymphoma, & Renal Dysplasia                                                                                               |
|                   | - Eye Exam - for Cataracts & Progressive Retinal Atrophy                                                                                              |
| 3 ½ years         | - CBC blood test - for Lymphoma -Repeat at 6 month intervals                                                                                           |
| 4 years of age    | - Blood tests and urinalysis – Hypothyroidism, Diabetes, Portosystemic Shunt, Lymphoma, von Willebrand Disease , & Renal Dysplasia                                                                                   |
|                   | - Eye Exam - for Cataracts & Progressive Retinal Atrophy                                                                                              |
| 5 years of age    | - Blood tests and urinalysis - for Hypothyroidism, Diabetes, Portosystemic Shunt, von Willebrand Disease, & Lymphoma                                                                                             |
|                   | - Eye Exam - for Cataracts  
|                   | - Skin Exam for cancers – recheck every 6 months                                                                                                                                                               |
| 6 -7 years of age | -Teeth Cleaning & Dental X-rays – repeat every 2-3 years as needed  
|                   | - Blood tests and urinalysis - for Hypothyroidism, Diabetes, & Lymphoma  
|                   | - Eye Exam - for Cataracts                                                                                                                             |
| 8 years of age    | - Blood test & Abdominal X-ray – Hemangioma  
|                   | - Blood tests and urinalysis - for Hypothyroidism, Diabetes, & Lymphoma  
|                   | - Eye Exam - for Cataracts                                                                                                                             |
Hip Dysplasia    Age:  4 months and older  Reference: 1,2,3,4,6,7,9,11

Penn Hip X-ray Age: 4 months    Hip Dysplasia is a genetic malformation of the hip joints, causing arthritis with symptoms usually occurring around 3-5 years of age. A Penn Hip X-ray is the most valuable early detection tool, requiring specialized training and certification of the veterinarian. A surgery called pubic symphsiodesis can be performed at 4 months of age that may decrease the severity of hip dysplasia development. The Penn Hip X-ray requires anesthesia and the purpose is to determine if your pet is a candidate for surgical correction before 5 months of age. Test: Anesthesia and X-ray.

Hip Dysplasia Screening X-ray Age 6-10 months    For the owners who wish to assess the likelihood of, and potential severity of Hip Dysplasia in their dog. A surgery is available called a TPO that may be very beneficial as a treatment for hip dysplasia. A TPO surgery is most effective prior to your dog developing degenerative joint disease in the hips joints. Note: this X-ray can be done when your dog is under the anesthesia during an ovariohysterectomy or castration. Test: X-ray of Hips

OFA X-ray Ages: 1 & 2 years   A second option for Hip Dysplasia diagnosis is an OFA (Orthopedic Foundation for Animals) hip certification x-ray. The first x-ray at 1 year of age, gives a preliminary evaluation of the hips. A second x-ray at 2 years of age enables breeding certification of your dog to have “normal hips.” Test: Anesthesia and X-ray.

Muscular Dystrophy Age: 2-4 months  An inherited lack of a specific protein necessary for muscle development and function. Symptoms are difficulty in suckling and swallowing with progressive muscle weakness and generalized inactivity. Tests: 1. Muscle biopsy and blood enzyme testing. 2. Genetic testing : Healthgene, Cost = $85  Reference: 1,2,3,4,5,7,13,14

Myasthenia Gravis Age: 2-6 months   A muscle weakness disease due to decreased nerve conduction enzymes. Symptoms are difficulty walking, chewing, and swallowing.
Tests: Nerve conduction study, Response to medication, & X-ray for Megaesophagus.  Reference: 3,4,6,7

Ciliary Dyskinesia Age: 3 months – 1 year  Cilia, the fine hairs that line the respiratory tract, are improperly formed and do not move together to remove dust and mucus out of the air passageways. The normal cleaning of the respiratory tract is impaired, resulting in more frequent lung and bronchial infections. Reference: 2, 4, 7

von Willebrand Disease Age: 4 months–5 years   A bleeding disorder caused by a lack of “von Willebrand factor,” an essential part in the blood clotting process. Symptoms are prolonged bleeding with surgery or trauma (gum or nose bleeds, heat cycles, whelping). Look for blood in the stool or urine or on bedding. Concurrent conditions such as Hypothyroidism can make the bleeding even worse. Recommendation: Test for von Willebrand Disease prior to a surgery. This disease cannot be cured but it can be successfully managed.
Tests: Three tests- 1) von Willebrand factor blood level, 2) Buccal Mucosal Bleeding Time test or Blood clotting test, 3) Thyroid test - Repeat yearly.  Reference: 1,2,4,7

Hemophilia Age: 4 months–5 years   An inherited bleeding disorder – usually this is not detected until an injury or surgery occurs, resulting in severe bleeding.  Reference: 2,3,4
Tests: Buccal Mucosal Bleeding Time test or Bleeding profile and CBC Blood tests prior to any surgery.

Portosystemic Shunt Age: 4 months-5 years   A blood vessel abnormality that leads to a portion of the blood bypassing the liver and not being cleansed of metabolic toxins, prior to being re-circulated. The build-up of toxins leads to bladder stones and, in severe cases, neurologic symptoms like seizures. The poor blood supply to the liver causes typical signs of liver disease like decreased appetite, vomiting, diarrhea, and drug sensitivity. Because this problem is usually present from birth, the dog is much smaller than his littermates. Many male dogs with a liver shunt are also cryptorchid (one or both testicles fail to descend from the abdomen to the scrotum). While this disease is usually serious, about 20% of affected dogs have no symptoms. Tests: Blood testing, Urinalysis, Abdominal Ultrasound, Colorectal Scintigraphy to confirm. Reference: 1,2,3,7
Renal Dysplasia  **Age: 6 months-4 years**  A genetic kidney disease that leads to abnormal development of the kidneys before birth, and then early kidney failure. Symptoms are excessive water drinking and urine production, poor appetite and weight loss, vomiting. Early diagnosis is essential for a longer life and often is discovered with pre-surgical blood and urine tests. A genetic DNA test is available. **Tests: DNA gene test, Blood test, & Urinalysis.**  Reference: 1,2,3,4,6,7

Aortic Stenosis  **Age: 6 months– 5 years**  This is a partial obstruction of the blood flow from the left side of the heart to the rest of the body. Symptoms: tiring with exercise, difficulty breathing, coughing, fainting with exercise, and poor growth. Changes in the heart muscle can also lead to abnormal heart rhythms and sudden death. Once this is diagnosed, this condition can be medically managed resulting in a normal life span. **Tests: Heart Murmur detection, X-ray, Electrocardiogram, Ultrasound, CT scan.**  Reference: 1,2,3,4,9

Elbow Dysplasia  **Age: 7-10 months**  The term elbow dysplasia refers to several developmental conditions that affect the elbow joint, causing lameness and arthritis. Over-feeding, with fast weight gain and growth, can contribute to the development of this condition. The best treatment results are seen with early diagnosis and intervention, before joint damage begins. **Tests: X-ray both elbows – possible CT scan.**  Reference: 1,2,3,4,9,11

Osteochondritis Dessicans  **Age: 8-12 months**  A developmental joint disease in which there is a portion of the cartilage in the joint surface that does not adhere properly to the bone below it. That portion gets torn with exercise and results in severe lameness, requiring surgery to remove the damaged piece of cartilage. Gaining weight too rapidly is a predisposing factor - avoid over-feeding your dog. It is better to be thinner, as a puppy, than being overweight. **Test: X-ray of painful joint.**  Reference: 2,3,4,6,7

Dilated Cardiomyopathy  **Age: 1 year & older**  A degenerative disease of the heart. The signs are acting tired, fainting and collapse, labored breathing with any exercise. Yearly Electrocardiograms after age 1 are recommended and if any abnormal heart rhythms are detected, an echocardiogram is needed to confirm the diagnosis. There is a definite link to Taurine Deficiency with cardiomyopathy in some breeds. Your dog may need increased dietary taurine than present in the average diet. Supplementation may be recommended (Taurine at 500-1000mg daily). **Test: Blood taurine test & yearly Electrocardiogram.**  Reference: 2,4,7

ACL Knee Injury (Anterior Cruciate Ligament)  **Age: 1 year and older**  A sudden, severe twisting injury, or chronic tearing of ligament fibers in the knee. It is painful to bear weight. The danger is “waiting for it to get better with rest,” without surgically repairing the injury. The other knee now carries the entire body weight, causing the ligament in the other knee to also rupture, usually within 6 months of the first knee injury. This is more common in over-weight dogs. **Tests: X-rays and an instability test called “Tibial Thrust.”**  Reference: 4,6

Wobbler’s Syndrome (Cervical Vertebral Instability)  **Age: 1-9 years**  Unstable vertebrae in the neck, causes spinal cord pressure resulting in weakness and incoordination of all 4 legs (hence the name “Wobbler”). Sometimes severe neck pain can also be a symptom. Unless diagnosed and treated, this is progressive, possibly leading to paralysis. Prevention: Avoid feeding a high calorie diet with extra mineral supplementation, in the first year of life. Too rapid of growth is thought to be a contributing factor in this spinal instability disease. Switching to an adult diet at 6 months of age has been suggested, rather than feeding a higher protein “puppy food”. **Tests: X-rays, Myelogram, CT scan.**  Reference: 1,4,7

Laryngeal Paralysis  **Age: 1-12 years**  One or sometimes both vocal cords become paralyzed and interfere with normal breathing. Symptoms are noisy breathing, especially with exercise, and with greater intensity in hot and humid weather; change in the sound of the bark. With severe cases, dogs can collapse due to lack of oxygen. Pneumonia can develop because of accidental aspiration of food material. **Test: Anesthesia & Endoscopy. Recommendation: Surgery.**  Reference: 6,7

Lymphoma/Lymphosarcoma  **Age: 3 years & older**  This is a disease of a specific type of white blood cell, called a lymphocyte, and sometimes can be detected in the early stages with a blood test. This cancer can be present anywhere in the body, but is most common in the lymph nodes, intestine, spleen, or liver. Symptoms are swollen lymph nodes, panting, weight loss, and labored breathing. It has an 80% success rate with treatment, so early detection is important. **Tests: CBC Blood Counts (CBC is not diagnostic but it can give an early indication of disease) - repeat every 6 months.**  Reference: 3,4,9

From Breed Risk Prevention in Dogs by Craig Dixon DVM  Copyright © 2013
Diabetes Mellitus  Age: 3 years & older  The pancreas supplies insulin to the blood anytime the blood sugar level rises, when eating and digestion is occurring. When the pancreas can no longer supply the amount of insulin needed, “sugar diabetes” occurs. Symptoms are increased water drinking and increased urination with weight loss, in spite of a good appetite. Eye cataracts are a common result of diabetes in later stages.  Reference: 1,3


Periodontal Disease  Age: 3-15 years  The frequency of dental cleanings will depend upon your success in feeding a diet that helps decrease dental tartar and daily teeth brushing, but also on the shape of your dog's mouth, how he chews, and other factors you can't control. Animals and humans produce plaque, followed by tartar, on their teeth. Food particles often become trapped under the gums by the tartar buildup, leading to gum infection and tooth loss. The bacteria from gum infections can spread into the blood stream, sometimes causing kidney, liver, joint, and heart valve disease. Your pet's life expectancy may decrease by 1-3 years and the quality of life lessened, if the gum disease is left untreated.

Recommendation: Dental cleaning and X-rays every 1-3 years.

Hypothyroidism  Age: 4 -12 years  A decreased secretion from the thyroid gland of the hormone that regulates the cell activities of the body. Symptoms are weight gain, dull hair coat, dry skin, hair loss, increased infections, and excessive sleeping. Tests: Blood panel with CBC & Thyroid tests. - Repeat yearly.  Reference: 1,3,4,6,7

Hemangioma/Hemangiosarcoma  Age: 8 years and older  A Hemangioma is a benign cancer compared to a Hemangiosarcoma, which is a malignant cancer (spreads elsewhere). These may occur anywhere in the body, but most commonly in the spleen. If the tumor is in the spleen, internal bleeding will occur when it ruptures, resulting in severe anemia. The symptoms are weakness, fatigue, and ultimately pale gums when and if it ruptures in the spleen.

Tests:  Blood testing & Abdominal X-rays– repeat yearly after age 8.  Reference: 2,3,4,6

Degenerative Myelopathy (DM)  Age: 5 years and older  A non-painful but progressive neurologic disorder. Weakness begins in one hind leg or both hind legs with progression to a loss of control of the bowels and urination, and ultimate paralysis of all 4 legs. A simple genetic test will diagnose the condition. However, other diagnostic tests should be considered in the early stages to determine if other manageable aging conditions are worsening the situation. DM has been compared to the human diseases of Multiple Sclerosis (MS) and Amyotrophic Lateralizing Sclerosis (ALS) or Lou Gehrig's Disease. DM is like Multiple Sclerosis in humans in that the myelin or outer covering of the nerves is destroyed. However, DM is not painful like Multiple Sclerosis. The gene mutation leading to DM is the same one that causes ALS in people. This discovery has led to the DNA test, and will likely soon lead to treatments for people and dogs.

Tests:  DNA test, Spinal X-rays.  Reference: 4

Epilepsy  Age: Anytime  Seizures can be caused by multiple diseases. Epilepsy is diagnosed after other causes have been ruled out. If the seizures are confirmed as epilepsy, they can be controlled with medications, in most cases.

Tests:  Blood and Urine tests, X-rays, Blood pressure, sometimes MRI or CT scan.  Reference: 1,2,4,6,7

Gastric Dilation and Volvulus (“Bloat”)  Age: Anytime  Usually occurs in dogs with deep and narrow chests. The stomach twists on itself, trapping the gas in the stomach, resulting in decreased blood flow to the stomach and spleen. Symptoms:  severe abdominal pain, retching, restlessness, and bulging of the abdomen.  This is an emergency requiring surgery. Death will ensue rapidly, if untreated. Pet insurance is very valuable, before your pet has this problem.

Test:  Abdominal X-ray  Reference: 4,7

Hemangioma/Hemangiosarcoma  Age: 8 years and older  A Hemangioma is a benign cancer compared to a Hemangiosarcoma, which is a malignant cancer (spreads elsewhere). These may occur anywhere in the body, but most commonly in the spleen. If the tumor is in the spleen, internal bleeding will occur when it ruptures, resulting in severe anemia. The symptoms are weakness, fatigue, and ultimately pale gums when and if it ruptures in the spleen.

Tests:  Blood testing & Abdominal X-rays– repeat yearly after age 8.  Reference: 2,3,4,6
Skin:  **Sebaceous Adenitis  Age: 1-8 years**  Symmetrical partial hair loss with dull, brittle hair, often along the top-middle of the chest and back, usually with a strong “doggy” odor.  
**Tests:** Skin biopsy, Skin scraping, Fungal culture.  
Reference: 1,3,4

**Acral Lick Dermatitis  Age: 1 year and older**  Obsessive licking of a skin spot usually on the paw or upper leg, resulting in ulceration and infection of the skin.  Boredom or anxiety is thought to be a contributing factor.  
**Tests:** Cytology, Bacterial culture, &/or Skin Biopsy.  
Reference: 3,4

**Ichthyosis  Age: 1-12 months**  The name is derived from the Greek word for “fish” due to the skin scaling that resembles fish skin.  These dogs develop white scales on the skin soon after birth that become darker and dryer with age but usually not accompanied with itching.  Secondary infections of bacteria, fungus, or parasites sometimes occur.  
**Test:** 1) Genetic testing [Optigen, cost is $120] or 2) Skin Biopsy, skin scraping/cytology.  
Reference: 1,4

**Lip Fold Dermatitis  Age: 1 year and older**  Some dogs have increased facial folds under the lower jaw that can be chronically moist from saliva.  Secondary skin infections occur resulting in smelly skin.  Medical treatment is topical ointments and cleansing, or a surgical correction may be necessary for a permanent solution.  
Reference: 3,6

**Nodular Dermatofibrosis  Age: 2-8 years**  A non-cancerous disease of the skin that occurs prior to or concurrently with cancer of the kidney or uterus.  Early detection and surgical removal of the underlying kidney or uterine cancer can save the dog’s life.  Skin lumps (nodules) are most often seen between the toes and on the legs, ears, and back.  They are round in shape and can cause hair loss and ulceration of the skin over the lump.  
**Test:** Surgical Biopsy.  
Reference: 4

**Atopy  Age: 2-10 years**  An allergic response to inhaled pollens, mold, mildew, or mites.  Symptoms include itchy face, ears, and feet or whole body itching.  
**Tests:** Stool sample, Skin Scrapings, Skin Biopsy, Blood tests, Allergy Testing, Elimination Diets, or change of environment (if contact allergies are suspected).  
Reference: 1,2,3,4,6,7,9

**Skin Cancers  Age: 5 years & older**  Anytime you feel a skin lump that does not go away, it should be checked.  There are many different kinds of skin cancers, such as Mast Cell Tumors, Melanomas, and Hemangiomas.  With early detection and removal, the survival rate is very high.  Skin cancer is the most successfully treated form of cancer.  Dark skin spots should be removed before they have a chance to become cancerous.  Sun exposure causes skin cancer in dogs, so keep light skinned pets out of the sun.  Keep your pets from becoming fat, as obese pets have higher cancer rates.  Feed a high quality diet, high in anti-oxidants and fatty acids, to help prevent cancer.  
**Tests:** Skin exam & Biopsy – Recheck every 6 months.  
Reference: 2,4,6,7,9

**Food Allergies  Age: Anytime**  Symptoms are skin itching and infections, reoccurring ear infections, vomiting & diarrhea, occasionally seizures.  
**Test/Treatment:** Hypoallergenic/Elimination diet recommended by your veterinarian; test and treat secondary infections.  
Reference: 3,6

**Pododermatitis  Age: Anytime**  This disease is an inflammation of the skin between the toes and pads leading to blisters and ulcers.  Symptoms – licking feet.  This is common in pets with allergies, bacterial or fungal skin infections.  
**Tests:** Allergy testing, Fungal culture, Bacterial culture.  
Reference: 3,6

**Ear Infections  Age: Anytime**  Head shaking with reddened ear canal openings and dark brown ear wax discharge indicates the presence of bacteria or yeast infections.  If there is a foul odor from the ears, an infection is brewing.  Do not wait long before the veterinary exam, as this infection can damage the ear drum, causing permanent hearing loss.  After a bath or swimming, use ear cleansing and drying products in the ears to remove water residue.  Underlying allergies are often contributing factors.  
**Tests:** Ear cytology, bacterial culture, allergy testing.  
Reference: 1,2,3,4,6,7,9
Eyes: Retinal Dysplasia Age: 3-4 months  The eye retina transmits images thru the optic nerve to the brain. If the retina is missing some cellular elements or is detached or folded, the retina will not be functional, resulting in partial or complete blindness.  Symptoms: Puppy is less active and frequently bumps into objects.  Test: Eye Retinal Exam  Reference: 1,2,4

Corneal Dystrophy Age: 4 months & older  This is a condition in which cholesterol (fat) deposits occur inside the cornea (the clear, front surface of the eye). Vision is rarely affected and is similar to having a scratch on the lens of your eye glasses.  Test: Tear Test, Eye Stain, and Eye Pressure testing  Reference: 1,3,7

Distichiasis Age: 4-12 months  Extra eyelashes that grow from abnormal follicles located on the inside edge of the eyelid. Ask your veterinarian to magnify the eyelid margins, as they are difficult to see. Chronic irritation from these eyelashes rubbing the corneal surface can lead to decreased vision, secondary to corneal inflammation and pigmentation.  Reference: 3,4,7

Progressive Retinal Atrophy Age: 4 months–4 years  An eye retinal degenerative disease that may progress to total blindness. The initial symptoms can be loss of night vision or peripheral vision. Complete eye retinal exam with pupil dilation, is recommended to be done by a veterinarian or veterinary ophthalmologist. Recheck retinal examinations are recommended yearly.  Test: DNA gene test (Optigen, Retinal eye exam – repeat yearly.  Reference: 1,2,3,4,7,11

Eyelid Entropion Age: 6 months - 1 year  An eyelid that rolls inward, with eyelashes rubbing on the corneal surface, often creating a corneal ulcer. Recommendation: Surgical repair.  Reference: 1,3,4,7

Cataracts Age: 1-5 years  A cataract is a progressive blockage of vision through the eye lens. It can occur from a physical injury or as a genetic cause. It may lead to total blindness, requiring surgery to remove the abnormal lens. Sometimes lens implants can be used, replacing the diseased lens, for better vision.  Test: Eye exam – Repeat yearly.  Reference: 1,2,3,4,7

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REFERENCES:
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