WHEATEN HEALTH INITIATIVE

An Independent Health Group

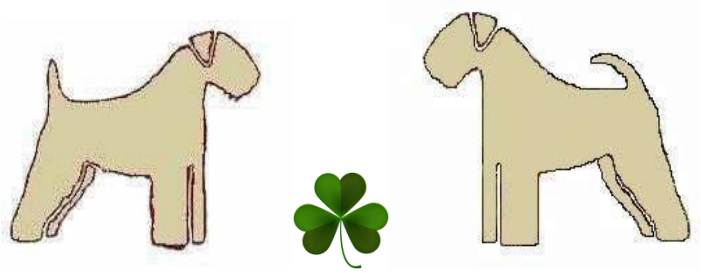
'To provide a platform for the reception and transmission of information about the health and well-being of the Soft-Coated Wheaten Terrier'

The

Soft-Coated Wheaten Terrier

HEALTH HANDBOOK

FINAL UPDATE



Important Notice from Wheaten Health Initiative (WHI):

Wheaten Health Initiative Steering Group announce that this is the **last update** of the Health Handbook.

Wheaten Health Initiative (WHI) was formed on the 16 February 2003. Twenty One years later, with the Steering Group well past retirement, we feel that we have more than fullfilled our Mission Statement:

> *'To provide a platform for the reception and transmission of information about the health and well-being of the Soft-Coated Wheaten Terrier'*

We want to thank all Founder members, SCWT Club of America (SCWTCA), SCWTCA Endowment Inc and not forgetting all our supporters who have given time, assistance and donations over the years.

Over the time of WHI existence, knowledge and attention to wheaten health has progressed so much, thanks to pro active breeders and owners and of course, with the research and assistance of the Wheaten Terrier Key Researchers USA: Prof Meryl Littman, Prof Shelly Vaden, Prof Paula Henthorn and UK Prof Karin Allenspach (now at the University of Georgia, USA).

Therefore, WHI will no longer be active as a steering group from the 16 February 2024, and this Health Handbook will no longer be updated and available after the website closes on the 31 March 2024.

However, our Grooming Videos will continue to be available on the Wheaten Terrier Grooming YouTube Channel: https://www.youtube.com/@wheatengroom

Please be aware, health information especially regarding ***annual testing*** may change in the future. Therefore, always check on your Breed Club's website for updates and health recommendations:

UK Health
SCWT Club of GB website: https://wheaten.org.uk/

USA Health
SCWT Club of America (SCWTCA) website: https://scwtca.org/

Webinars: There are 'Hereditary' and 'Other Health Conditions' webinars now available to watch on: https://scwtca.org/education/webinars/

SCWTCA Endowment Inc.
Funding of Health research and projects and owners of The Endowment Health & Pedigree Database website: http://www.wheatenhealthendowment.org/

SCWT Health & Pedigree Database: owned and operated by SCWTCA Endowment Inc. Wheaten pedigrees, ancestry, COI, health information, test results and photographs visit: website: https://scwtdb.org/

Finally, one of our first seminars was called 'Towards A Brighter Future' and we want to wish our wonderful breed a continued brighter future.

Thank you
Ian Carter, Chairman
Current Steering Group:
Lynn Carter, Kate Watkins, Jan Thackray, Malcolm Jeffries & San Jeffries

WHEATEN HEALTH INITIATIVE

An Independent Health Group

'To provide a platform for the reception and transmission of information about the health and well-being of the Soft-Coated Wheaten Terrier'

Wheaten **H**ealth **I**nitiative (**WHI**) is a UK based organisation which was formed on 16 February 2003 and is an autonomous health group working independently of any other organisation or club. Our sole aim is to provide health information and education for the well-being of the Soft-Coated Wheaten Terrier (SCWT).

Preface

The majority of Soft-Coated Wheaten Terriers will live long and active lives, because on the whole they **are healthy and robust dogs.** However, there is a genetic predisposition to certain diseases and owners and vets need to be aware of these.

All hereditary information and testing protocols for the breed are provided by the Key Researchers and therefore relevant worldwide.

We hope that the information written in this **Health Handbook** will help you to understand the known **Hereditary Diseases**, which can affect the breed, and it is written within the context of the body systems that they affect.

Also included is 'Other Medical Conditions' which have occasionally been known to affect the breed.

Please inform your breeder if your dog has a hereditary or other medical condition and consider sharing your health & testing information with your respective breed club.

The SCWTCA Endowment Inc. Health and Pedigree Database: https://scwtdb.org/ records health information which is of great benefit for the monitoring of health conditions by researchers, veterinarians and breed clubs.

Disclaimer:

As this is the last update of the Health Handbook, every effort has been made to ensure that there are no errors in this document.

Therefore after the 16 February 2024, any information held in this Health Hanbook will not be corrected and it is possible that the information may become obsolete due to new developments. Therefore, always check with your respective Wheaten breed clubs for all current and updated health information.

All Links within this Health Handbook are reproduced in good faith to provide a diversity of Wheaten and other canine related information. However WHI cannot verify the robustness and accuracy of these sites and the links may become obsolete.

Wheaten Health Initiative

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References and Acknowledgements

INTRODUCTION

Have you ever thought that you really should know more about the problems which may affect your Wheaten, started to read information, and suddenly found that it is not written in the same language that you normally use?

Wheaten **H**ealth **I**nitiative (WHI), hope that the information within this Health Handbook will help you to understand more about the words and terms that are used by the professionals caring for your dog.

Educating and providing information are WHI's principal objectives, aiming in this way to keep breeders, owners and the veterinary professionals up to date with the latest research and testing procedures.

We believe EVERYONE needs the facts about the hereditary diseases that can affect the breed.

"Their Health In Our Hands"

Our Logo is designed to remind us **all** that the health of this beautiful breed, is literally, in our hands, **owners** and **breeders** alike. It also depicts our vision of global co-operation.

In owning a Wheaten, you take on not just a dog, but a shared responsibility for the future of the breed.

Why do you need to monitor your dog's health?

It is important owners learn to recognise the signs of the diseases that may affect their Wheaten. In this way the chances of catching a disease in its early stages are increased and therefore the opportunity to do something to prevent the situation from becoming more serious or life threatening may present itself.

- Firstly educate yourself about your breed
- Read the material available on Wheaten health and canine health in general
- Learn the symptoms of the diseases and illnesses that could affect your dog's health
- Test your adult dog at around 12-15 months, to establish a baseline for your dog and then test annually thereafter, even if your Wheaten is not showing signs of it being unwell
- Learn how to monitor your Wheaten's health using the various tests available
- Familiarize yourself with the purpose of each test and learn what each result means
- Keep records of all testing in a file or by using the WatchDog* Health Tracker, it is available from: http://www.wheatenhealthendowment.org/healthtracker.htm
- Please inform your breeder if your dog has a hereditary or other medical condition and consider sharing your health information with your respective breed club.
- Please record your dogs health tests and health conditions on the SCWTCA Endowment Inc. Health and Pedigree Database: https://www.scwtdb.org

Why it is important for you to establish what is the baseline for your dog?

Every dog is an individual in its own right and what may be considered "normal" for one dog may differ slightly for another. If you were to compare any of your dog's test results, including temperature and respiration rates, with another owner's results, you might find this was the case. Therefore, there should be no cause for alarm, although any large discrepancies in values may need further investigation.

Wheatens have a predisposition to certain diseases therefore, since these conditions can remain hidden for years without showing any signs, every Wheaten should have an annual veterinary examination. Your Wheaten's annual check-up, should include:
Biochemical profile
Complete Blood Count (CBC)
Urinalysis test to include UPC. In particular, Urinalysis is your Wheaten's best friend!
In many cases, ***early diagnosis and treatment can prolong your dog's quality and length of life.***

However, having done that first blood/urine test you will have established a 'baseline' for your own dog. Each test you do can be seen as a "snap shot" of your Wheaten's health. So, in order to monitor your dog's health correctly, it is important to **ask for a copy of the test results from your vet** and to keep them on file or use the WatchDog Health Tracker, so that you can compare later test results with earlier ones.

In this way you will be able to monitor and identify any variations that may indicate a change, either up or down, in your Wheaten's health. Again there is no cause for alarm, bearing in mind that your dog may just be having an "off" day at the time of the test. However, if later testing shows a developing trend, you would be wise to consult with your vet.

You and Your Vet

- Try to develop a good working relationship with your vet
- When choosing a vet ask if they are familiar with the Soft-Coated Wheaten Terrier and its known hereditary medical conditions
- If your vet is not familiar with the breed, ask if he/she would be happy to receive further information from you on Wheaten health issues
- A copy of the 'Annual Testing Protocols' should be taken to your Vet and you should ask if they are able to follow the breed testing protocols
- Keep clear records to ensure that testing takes place annually

Provide your vet with a copy of the following two documents:

1. Recommended Annual Health Testing
2. 'Recommendations Concerning Protein Losing Nephropathy in the SCWT' by Dr Meryl Littman:

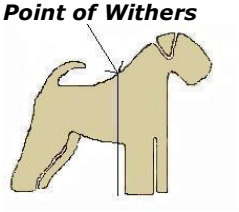
   https://scwtca.org/wp-content/uploads/2019/04/PLN-in-SCWT-2016-08.pdf

Normal Parameters for a Healthy Dog

Body Height/Weight Ratio:

Kennel Club Breed Standards state:

Point of Withers



Height: *measured at the point of the withers*

Dogs:

- **UK** 18-19½ inches/46-49cms
- **IKC & USA** 18-19 inches/46-48cms

Bitches:

- **IKC & UK** Somewhat less
- **USA** 17-18 inches/43-46cms

Weight:

Dogs:

- **UK** 35-45 pounds/16-20.5kg
- **IKC** 40-45 pounds/18-20.5kg
- **USA** 35-40 pounds/16-18kg

Bitches:

- **IKC & UK** Somewhat less
- **USA** 30-35 pounds/13.6-16kg

Note: Weight should be in relation to height.

Every dog is an individual therefore the following are approximations:

Normal Canine Body Temperature:

- 38-39.2°C
- 100.5-102.5°F

A dog's body temperature can vary between 38°C to 39.2°C (100.5°F to 102.5°F), this can be dependent on a number of reasons; emotional state, level of activity, environment and even time of day.

Please remember – Temperatures outside these values do not automatically indicate that a disease or disorder is present.

However, if your dog's temperature drops below 37.2 (99°F) or rises above 40°C, (104°F), then this could give cause for concern and **you should contact your vet immediately**.

What Your Dog's Temperature may mean

Degrees Centigrade (°C)	**Degrees Fahrenheit** (°F)	**Possible cause**
36.6	98	Hypothermia keep your dog warm
37.2	99	Abnormal
38 – 39.2	**101.5 – 102.5**	**Normal temperature**
39.4	103	Moderate fever
40	104	High fever
40.5	105	Dangerous
41.1	106	Heatstroke cool down immediately

Overheating
Dogs do not have sweat glands, other than on their footpads, they have to pant in order to reduce their body temperature. Be aware that panting would not help in reducing the dog's temperature if a dog is suffering from heatstroke.

What you should do
Remove your dog from the direct sunlight and try to establish a good flow of air around the dog – use an electric fan if possible. The dog should **not** be immersed in ice or ice-cold water. To decrease the dog's temperature use cool water and damp towels or use a spray bottle, if available. Cool under the front armpits, the groin and the flanks. **Contact your Vet immediately** and follow their instructions, they may want to check the core body temperature and give further treatment.

Never leave your dog **in a car**.

Pulse Rate = 70-120 beats/minute
Pulse Rate is the number of heart beats per minute.
Larger dogs have slower rates than small dogs, and dogs that are in good physical condition will have lower heart rates than dogs of similar size and age that are not physically fit.
Puppies up to one year of age, typically have higher heart rates.

Respiration Rate = 18-34 breaths/minute
Respiration rate is the number of breaths per minute. Normal respiratory rates are taken when a dog is *resting*. A dog that is in pain, having heart or respiratory problems, or suffering from heatstroke, or is excited will usually have an increased respiratory rate. It is therefore important to look at the overall situation, and condition to assess the respiratory rate correctly.

Diet & Nutrition:
There are as many answers to what to feed your Wheaten as there are different dog foods. We do not recommend any specific dog food or feeding method.

We do want to explode a couple of myths:

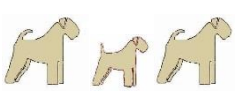
Myth 1 – Wheatens must be fed a special diet to avoid PLE or PLN.

- There is no specific diet that will avoid your dog getting one of these diseases. Dogs that are diagnosed with these or any other illnesses may be prescribed a specific diet by their veterinarian.

Myth 2 – Wheatens are allergic to certain foods and ingredients.

- Just because your dog is a Wheaten does not mean it is allergic to, or has intolerance for certain ingredients such as chicken or grains. Individual dogs of any breed can have an allergy or intolerance for any one of the many ingredients that are in dog foods.

As with anything concerning your dog's health, WHI and the Wheaten Breed Clubs encourage you to consult with your veterinarian and breeder.



HEREDITARY DISEASES

Digestive System

Your dog's body produces a number of extremely important proteins, called enzymes. One group of these are the digestive enzymes that participate in the breakdown and digestion of food.

In humans digestion begins in the mouth where saliva contains digestive enzymes. Dogs, however, don't chew their food they gulp it down in chunks. Dog saliva serves in digestion only to moisten and lubricate the mouth and food as it is pushed back into the oesophagus for its journey to the stomach.

The gastro intestinal tract has to perform many functions in order to absorb food then excrete the waste products. The mucosal layer lines the inner surface of the tube and is responsible for secretion and absorption of nutrients to the body. The surface area of the mucosa contains villi. Damage to the villi can cause villous atrophy which leads to malabsorption and diarrhoea.

The major digestive and absorption processes occur in the small intestine. Several digestive enzymes are mixed into the food along with bile. These secretions are used to break down carbohydrates, proteins and fats into smaller molecules. These molecules are absorbed by special cells while the mixture is churned and pushed along by intestinal muscle contractions. Dogs intestines are relatively short (about five times their body length) so complex foods have a short time to be broken down and absorbed.

By the time this mixture reaches the large intestine, the final leg of its journey, there should be little nutritional value left. The large intestine completes the absorption of water and electrolytes and any remaining undigested food is then filtered and stored for elimination in the colon.

When a dog suffers from malabsorption, as in the case of PLE, digestive enzymes fail to absorb protein into the body and it is, therefore, passed through the large intestine into the faeces. A forerunner to PLE can be Malabsorption and Inflammatory Bowel Disease (IBD).

Protein Losing Enteropathy (PLE)

PLE is characterised as a loss of protein from the bloodstream into the gastrointestinal tract. There can be many causes of PLE but it's important to note that there may be a hereditary component in Wheatens, predisposing them to Inflammatory Bowel Disease (**IBD**) and/or **intestinal lymphangiectasia**.

- PLE is a condition in which protein is lost excessively into the intestine and can represent a number of abnormalities, which result in the loss of plasma proteins from the gastrointestinal tract
- The loss of the healthy mucosal layer allows the leakage of vital protein-rich fluids. This is a hallmark of PLE
- The liver and other cleansing systems are unable to compensate for the loss
- Mechanisms for gastrointestinal protein loss include lymphatic obstruction, mucosal disease with erosions, or ulcerations
- PLE is probably related to immunological defence of the intestinal tract
- The average age of onset is 4½ years (range 0.5 to 11 years)

- A PLE dog may exhibit diarrhoea, vomiting, edema/ascites, picky appetite and weight loss. Since these are symptoms of many types of illness, serious and minor, proper diagnosis is important. Left untreated, PLE can quickly become serious and fatal
- Treatment is with medication and diet and can result in extended life
- Tests necessary to detect the presence of PLE are blood, urine and, if necessary, endoscope biopsy and Faecal investigation
- Please refer to the Comparison Chart of Hereditable Diseases for signs and symptoms of this disease
- Wheaten Webinar on PLE IBD Food Allergies and the Guplies – Meryl Littman VMD, DACVIM https://scwtca.org/education/webinars/
- Wheaten Webinar on PLE Early Marker Study – Katie Tolber, DVM, PhD, DACVIM https://scwtca.org/education/webinars/

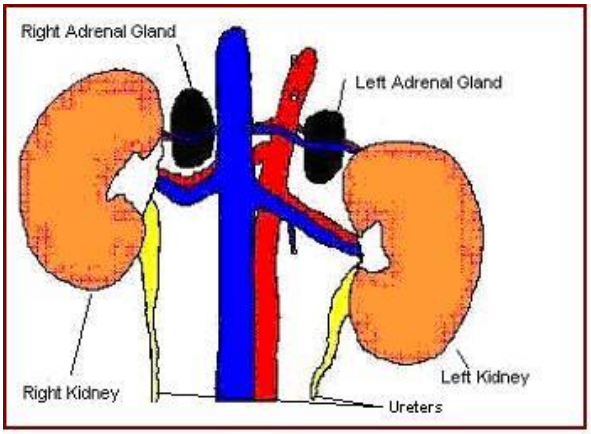
The mode of inheritance for PLE is not known and a*t the present time there is **no test** available to show if dogs are carrying the deleterious (bad) mutations which cause this disease.*

Learn more about PLE on this link:
https://veterinarypartner.vin.com/default.aspx?pid=19239&id=4951862

Learn more about IBD on this link:
https://veterinarypartner.vin.com/default.aspx?pid=19239&catId=102899&id=4951476&ind=130&objTypeID=1007

Please note that links given to articles that are general in nature on external websites are not a substitute for your own Veterinarian's advice.

Endocrine System



Endocrine Organs

Include the pancreas, thyroid gland, parathyroid glands and adrenal glands. Diseases of the endocrine system may lead to the production of too much or too little hormone.

Adrenal Glands

The adrenal glands are in close proximity to the kidneys. The outer portion of the adrenal glands are located on top of each kidney, this is called the adrenal cortex. The adrenal cortex produces, among other things, steroid hormones which regulate carbohydrate and fat.

Addison's Disease

Addison's disease is the common name for **Hypo**adrenocorticism. It is the insufficient production and secretion of certain endocrine hormones made by the adrenal gland cortex. Wheatens are predisposed to two types of Addison's disease: typical and atypical. It can occur in dogs of any age, sex or breed although more females are affected than males. It usually is a disease of young and middle aged dogs.

The adrenal gland can be damaged by approximately 90% before signs of the disease are seen. The hormones produced by the adrenal glands are important for life. This disease, once diagnosed, **can be treated** by replacing the hormones produced by the glands which are required for survival.

The adrenal glands secrete adrenal hormones which modify the body's response to inflammation, stimulate the liver to raise the blood sugar, and also help to control the amount of water and salt in the body which affects blood volume and blood pressure. Addison's disease is a severe or total deficiency of the adrenal hormones.

Adrenal insufficiency can be primary or secondary. Primary adrenocorticism affects the salt/potassium balance in the body and glucocorticoid as well. Secondary adrenocorticism usually affects glucocorticoids. It is not known why primary adrenocorticism occurs but it is thought it might be an immune mediated process. Secondary adrenocorticism probably occurs most often when prednisone or other cortisones being administered for medical reasons are suddenly withdrawn. It can occur if, for example, pituitary cancer interferes with the production of hormones that stimulate the adrenal glands.

Signs can be vague; more severe signs occur when a dog with **hypo**adrenocorticism is stressed or when potassium levels get high enough to interfere with heart function. Dogs will sometimes suffer severe shock symptoms when stressed which can lead to rapid death. When potassium reaches high levels heart stoppage can occur which can be fatal. In some cases, particularly regarding secondary Addison's disease, there are no detectable electrolyte changes.

Signs & Symptoms:

Initially the signs may be mild and very vague

- Lethargy & weakness
- Poor appetite
- Vomiting
- Diarrhoea
- Weight loss
- Depression
- Dehydration
- Excessive thirst and water intake (polydipsia
- Low body temperature, shaking, collapse, low heart rate
- Addison's is referred as "the great pretender" because the symptoms are typical of other illnesses. A dog may have Gastro Intestinal (GI) upsets, listlessness. Addison's can mimic signs and blood test changes that are seen in renal failure cases (but reversible with treatment)
- Left untreated a dog can go into an "Addisonian crisis" - a collapse, often after an exciting or stressful event. *Addisonian crisis are life threatening emergencies*
- Once suspected by your veterinarian based on a combination of symptoms and blood test abnormalities, a specific blood test (ACTH stimulation test) confirms Addison's disease
- Treatment with medication for life can result in a long, good quality of life span
- Please refer to the Comparison Chart of Hereditable Diseases for signs and symptoms of this disease.

Learn more about Addison's on this site:
https://veterinarypartner.vin.com/default.aspx?pid=19239&catId=102899&id=4951484

Diagnosis

This disease can be hard to differentiate from renal failure as the symptoms and even the blood work can be similar. Electrolyte levels can show as normal but Addison's can sometimes be diagnosed by picking up the changes in the ratio between sodium and potassium levels, this can be easily missed unless it is specifically looked for.

ACTH Response Test –The ACTH response test will be necessary to make an accurate diagnosis.
Dogs are usually admitted to the vet's surgery for a couple of hours. Blood is taken for analysis, followed by an injection which stimulates the production of adrenal hormones. After approximately 1½ -2 hours blood is again taken for analysis, if the production of the adrenal hormones is negative then Addison's disease (hypoadrenocorticism) is diagnosed.

Treatment

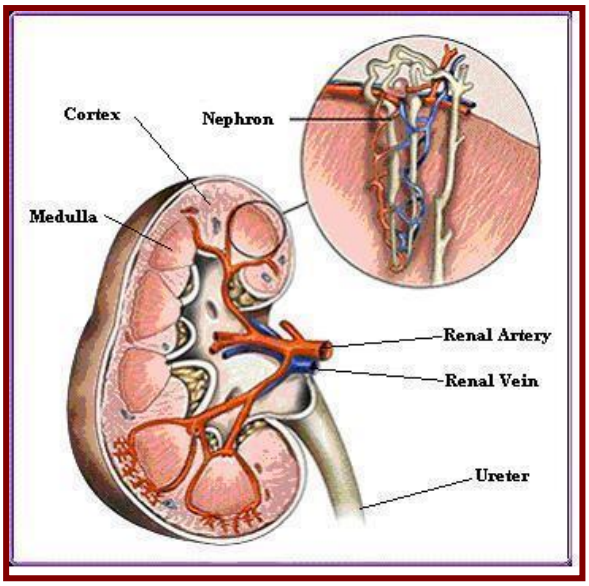
This depends on whether the onset of illness is acute with severe symptoms, or whether more mild chronic signs are present. For acute signs, i.e. Addisonian crisis, treatment would be administered by emergency admittance to the vet's surgery. This may include intravenous fluid therapy, electrolyte and acid-base monitoring, and corticosteroid and mineralocorticoid replacement therapy.

For chronic disease it may include corticosteroid and mineralocorticoid replacement therapy and daily salt supplementation. Hopefully, the disease will be diagnosed before an Addisonian crisis occurs and treated with prescribed medications.

At home the dog needs a stress reduced environment since its glands cannot produce the hormone that helps it handle stress. Stress can cause relapses of symptoms if not properly treated.

Please note that links given to articles that are general in nature on external websites are not a substitute for your own Veterinarian's advice

Urinary System



Kidney Anatomy

The kidneys filter waste and extra fluid from the blood. The filtering process takes place in the nephron where microscopic blood vessel filters called glomeruli, are attached to fluid-collecting tubules.

A number of different disease processes can damage the glomeruli, thereby causing kidney failure.

Glomerulonephritis and glomerulosclerosis are broad terms that include many forms of damage to the glomeruli.

PLN is also known as glomerular disease. It causes significant protein loss through the glomerulus, a structure of the kidneys.

While PLN can have several causes, it's important to note that Wheatens can have familial PLN due to podocytopathy causing glomerulosclerosis.

Note: PLN is **not** "old age" kidney disease and is different to Renal Dysplasia. PLN can be associated with systematic hypertension, thromboembolic events, edema/ascites and eventually chronic renal failure.

Some forms of kidney failure can be slowed down but scarred glomeruli can never be repaired. This is what makes early detection so vital. Treatment given in the early stages of kidney failure depends on the disease causing the damage.

Kidney failure may be 'silent' for many years. Approximately 70% of the kidney can be damaged before any physical signs show themselves.

Glomeruli

The glomeruli are the filters of the kidneys (imagine a water filter in a jug), they filter the blood and make urine. Normally, large molecules such as proteins, and cells such as red blood cells or white blood cells, do not pass through the filters and are retained within the blood because they are so important for health.

Small molecules pass completely through the filters. Some of these are completely reabsorbed back into the blood since they are so important in maintaining the right chemical balance of the body e.g. glucose, salt etc. Other molecules, which are not required for body functions are passed freely into the urine, for example Urea, Uric Acid and Creatinine.

There are two main effects of damage to the glomeruli. Substances, which are normally retained in the circulation escape into the urine through the filtration mechanism, one of these is Albumin. As a consequence, protein and red cells appear in the urine and can be detected by a dipstick urine test. Protein in the urine is called proteinuria. Normally there is very little protein in the urine. If the damage gets worse, the filter shuts down and that function of the kidney is lost. If sufficient damage occurs to enough glomeruli kidney failure may occur.

Glomerulonephritis

Glomerulonephritis is the inflammation of the membrane tissue in the kidney that serves as a filter, separating wastes and extra fluid from the blood. Glomerulosclerosis describes the scarring or hardening of the tiny blood vessels within the kidney.

Protein Losing Nephropathy (PLN)

- The average age of onset is 6 years (range 2 to 11 years)
- *Dogs will not usually exhibit symptoms until the disease is very advanced*
- Left untreated, PLN is usually fatal
- Treatment is with medication and diet. Early intervention can result in a longer lifespan
- PLN is a condition in which plasma protein is lost to excess in the kidney
- In the SCWT the most common disease causing PLN syndrome is glomerulonephritis
- The term "glomerulonephritis" defines a group of inflammatory diseases of the kidneys affecting the most important functional components of renal tissue, the glomeruli and adjacent structures
- There are several immune mechanisms involved in this inflammatory disease
- SCWTs affected with PLN have damaged glomeruli because the 'holes' in the sieve (basement membrane) are too large and allow more than waste to pass through
- One of the larger molecules that pass through the faulty sieve is protein. That is why excess protein (Albumin) is found in the urine of SCWTs who have one of the diseases that causes PLN
- Tests necessary to detect the presence of PLN are blood, urinalysis, to include UPC and if necessary, endoscope wedge biopsy
- Please refer to the Comparison Chart of Hereditable Diseases for signs and symptoms of this disease

The mode of inheritance **for PLN** is not known, but in 2012, Dr Meryl Littman and Dr Paula Henthorn identified mutations associated with PLN. As a result, there is now a test using a non-invasive cheek swab, which an owner can use and submit to the University Of Pennsylvania School Of Veterinary Medicine for interpretation**.**

Clear by Parentage:

OFA: https://ofa.org/about/ofa-policies/

SCWT Database Policy: https://scwtdb.org/ClearByParentagePolicy_rev2.pdf

Learn more about PLN (Glomerulonephritis):
https://veterinarypartner.vin.com/default.aspx?pid=19239&id=4951842

Please note that links given to articles that are general in nature on external websites are not a substitute for your own Veterinarian's advice

Proteinuria or Protein Losing Nephropathy (PLN)?
Dr Littman's Criteria for the SCWTCA Open Registry:

To meet the criteria for PLN as Dr Littman defined in the *SCWTCA Open Registry the dog must have:

1. Protein loss in the **urine**
2. Low Albumin (Alb) in the **blood**
3. Low Total Protein (TP) in the **blood**

The dog has Proteinuria first and as the disease progresses it affects the Albumin and Total Protein.

Many Wheatens have Proteinuria that is controlled by medications and diets and the Albumin and Total Protein does not dip below the normal levels in the blood.

Vets might still consider the dog has PLN but actually the criteria Dr Littman set is defined by those three values and Dr Littman still uses this criteria.

So, you can have a dog with Proteinuria and it not develop into PLN.

For the SCWTCA Endowment Inc. Health and Pedigree database www.scwtdb.org we use Dr Littman's criteria. If Albumin and Total Protein stay normal they will be listed only as Proteinuria.

If you want to understand the history of this disease in the SCWT you should read what responsible breeders and the Breed Club do when confronted with a health problem in the breed - SCWTCA breeders set the bar high!
https://scwtca.org/health/health-research/openregistry

Anna Marzolino
Chair, SCWTCA Endowment Inc., 2022

In Dr Littman's 2016 document - 'Recommendations Concerning Protein Losing Nephropathy in the SCWT', she states:

" …. When a dog has proteinuria:
It could be due to pre-renal, renal, or post-renal causes. Even if the dog is a carrier of one or two copies of the PLN-Associated Variant Alleles, it should not be assumed to have PLN (renal cause) and will need a work-up, for instance to rule out urinary tract infection (UTI) tickbourne/heartworm disease, neoplasia, hypertension and consideration of other causes for PLN such as amyloidosis, lupus, shigatoxin (raw meat diet) etc …."
This document in full is available on the SCWTCA website https://scwtca.org/health/

*Since the retirement of Dr Littman in 2016, the SCWTCA Open Registry is no longer active. However, should a Wheaten be diagnosed or die of an hereditary disease then the SCWTCA Endowment Inc., Health & Pedigree database has now replaced the Open Registry to record all health information.

Dr Littman, VMD, DACVIM, Professor Emeritus of Medicine (Clinician-Educator), University Of Pennsylvania School Of Veterinary Medicine, is still available for paid consultations.

Some useful links for your Veterinarian:
International Renal Interest Society ("IRIS") Consensus Clinical Practice Guidelines for Glomerular Disease in Dogs https://onlinelibrary.wiley.com/toc/19391676/2013/27/s1

Please note that links given to articles that are general in nature on external websites are not a substitute for your own Veterinarian's advice

PLN-Associated Variant Genes Test - please use PennGen Laboratory as this enables continuity of research. In Europe and Scandinavia, Laboklin Laboratories also offer the test but the result does not directly aid this research.

Testing for variant alleles associated with a risk for PLN ('DNA test') was initially developed at Penn based on Drs. Littman and Henthorn's research. That research showed that a DNA variant occurred in each of two genes, NPHS1 and KIRREL2. These genes are positioned next to each other on dog chromosome 1. The presence of these two variants on both copies of chromosome 1 indicated significantly increased risk for developing PLN (Protein Losing Nephropathy). In all Wheatens examined in the research study, these genes always showed the same patterns:

- All dogs that were 1/1 for NPHS1 were also 1/1 for KIRREL2 (both copies each gene normal)
- All dogs that were 1/2 for NPHS1 were also 1/2 for KIRREL2 (heterozygous for both genes)
- All dogs that were 2/2 for NPHS1 were also 2/2 for KIRREL2 (both copies of each gene are variant)

In other words, the normal versions of these two genes were always inherited together, and the variant versions to these genes were always inherited together. Because of this, it is not known with 100% certainty which gene variant puts a dog at high risk for developing PLN, or whether or not they both act together (although, based on what is known about those two genes and proteins they encode, it is thought that NPHS1 is more likely).

Among the well over 4,000 Soft Coated Wheaten Terrier samples that Penn has analyzed since the test was introduced in 2012, there have been 3 Wheaten Terriers with results in which both genes had different genotypes (for example 1/1 for NPHS1 and 1/2 for KIRREL2). In these cases, Penn reports the results more specifically, and discusses the ramifications of these results with the dog's owner.

In the research leading to this test, 16 of the 145 Wheaten 2/2's lived into their teens (over 13 years of age) with no signs of disease. *(these numbers are correct as of October 2022)*

Penn's DNA testing continues to test both genes for two reasons. It is not 100% certain which of the two gene variants is most important in the PLN disease process. Running two tests for each sample increases the quality control in the testing process.
The websites of some commercial labs indicate that they only test for one of the genes, usually NPHS1.

Clear by Parentage: OFA: https://ofa.org/about/ofa-policies/

SCWT Database policy: https://scwtdb.org/ClearByParentagePolicy_rev2.pdf

Please share your health & testing information with your respective breed club and also recording it on the SCWTCA Endowment Inc. Health and Pedigree Database: https://scwtdb.org/

Please note that links given to articles that are general in nature on external websites are not a substitute for your own Veterinarian's advice

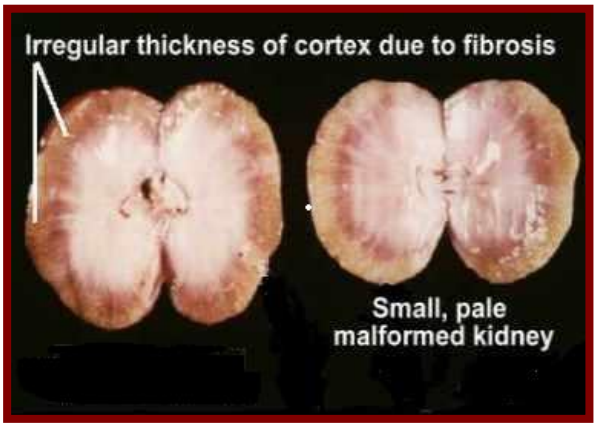
PLN-Associated Variant Genes Test Result Definitions - this table clarifies the reporting formats between PennGen and Laboklin:

Genetic term	Definition	What does this mean?	Other Common Terms	Results Penn Vet	Results Laboklin
Homozygous Negative	A dog **without any** of the variant alleles	A dog that has no copies of the variant alleles is at the least risk of developing PLN **Health Test:** Annually	• 0 • 0/0 • No copies • 'Normal' • 'Clear' • Homozygous	1/1	N/N (Clear)
Heterozygote	A dog **with one copy** of the variant alleles	A dog with one copy of the variant allele is at medium risk of developing PLN **Health Test:** Up to age 4 – test annually as long as results are within normal range After age 4 – in addition to annual testing, do a UPC or MA every 6 months	• 1 • 0/1 • 'Carrier' • 1 Copy • Heterozygous	1/2	N/PLN (Carrier)
Homozygous Positive	A dog with **two copies** of the variant alleles	A dog with two copies of the variant alleles is at the highest risk of developing PLN, but this does not mean it will develop PLN **Health Test:** Bi-annually beginning at age 2 years	• 2 • Both copies • Homozygous for the PLN causative mutation	2/2	PLN/PLN (Affected) Affected refers to both copies of the allele, it **does not** mean the dog is currently or will be affected with PLN

Renal Dysplasia (RD)

Renal Dysplasia is the abnormal development of the kidney (also known as **J**uvenile **R**enal **D**isease). Dogs affected with renal dysplasia have kidneys that did not properly develop when the foetus grew in the uterus.

This malformation can result in early renal failure.



Unhealthy or malformed nephrons in the kidney are replaced by fibrous tissue and microscopic cystic lesions in the renal cortex and decreased immature foetal glomeruli and cystic glomeruli. Eventually the kidney cannot do its job of cleansing the blood.

There are various levels of arrested development in affected puppies. Therefore, some puppies show symptoms of kidney disease at, or shortly after birth, while others develop symptoms later in life.

Up to 70% of the kidney can be damaged before any signs of illness can occur.

- Average age of onset is under 1 year, although it may not be detected until years later
- Puppies are often characterised as "poor doers"; they are not good eaters, are depressed and do not thrive. They need to drink and urinate frequently and cannot concentrate their urine making it very dilute and pale in colour
- Tests necessary to detect the presence of RD are blood, urine and if necessary a wedge biopsy
- Treatment for chronic renal failure may help prolong the quality of life
- Please refer to the Comparison Chart of Hereditable Diseases for signs and symptoms of this diseas.
- The disease is genetic and the mode of inheritance is thought to be caused by a recessive mutation. This means that both parents must carry the gene for a puppy to be affected. (Inheritance of Recessive Genes chart refers)

Because of the small gene pool available within the breed the gene is still present within the dog population, consequently breeders must remain vigilant and careful breeding is required to try to prevent this disease re-occurring.

At the present time there is no test available to show if dogs are carrying the deleterious (bad) mutations which cause this disease.

Learn more about kidney failure on this site:
https://veterinarypartner.vin.com/default.aspx?pid=19239&id=4951452

Chronic Kidney Disease (CKD): http://www.iris-kidney.com/

Please note that links given to articles that are general in nature on external websites are not a substitute for your own Veterinarian's advice

Wheatens who exhibit signs of kidney failure need to have careful diagnosis made, as RD and PLN can be mistaken for each other in the later stages of the disease process. The following chart assists with this comparison.

Differences between RD and PLN

Renal Dysplasia (RD)	Protein Losing Nephropathy (PLN)
Usually referred to as Juvenile Renal Disease (JRD). Dogs *generally* die between the ages of 6 weeks to 3 years. Milder forms of JRD may be seen in older dogs.	Dogs tend to show their illness at 5-7 years old, but onset can be both earlier and later than this.
Dogs drink large amounts of water. Their **U**rine **S**pecific **G**ravity (USG) is often low (the urine is dilute).	Dogs may not have these symptoms and can usually concentrate their urine until they reach end stage renal failure.
Dogs tend to lose little protein in the urine and the serum albumin usually stays normal.	Dogs lose large quantities of protein in the urine, i.e., they have a high urine protein/creatinine ratio (UPC), and their serum albumin drops.
Dogs eventually have high serum creatinine and Urea (BUN). Dogs generally **do not** have low albumin or high cholesterol.	Dogs may eventually have high serum creatinine and Urea (BUN). Dogs have low albumin readings and high cholesterol (unless they have concurrent PLE, in which the cholesterol may be normal or low).
Severely affected dogs may be born with small, malformed kidneys.	Usually have normal sized kidneys until later stages of the disease.
In the renal cortex are microscopic cystic lesions, decreased and immature fetal glomeruli and cystic glomeruli. These fetal changes are abnormal in dogs over 16 weeks of age.	Dogs show glomerular changes, such as glomerulosclerosis and/or glomeruloscleronephritis. They do not have many fetal glomeruli.
Dogs are not usually predisposed to effusions or thromboembolic events (clots).	Dogs can throw clots, e.g., in the lung, heart, brain, portal vein or distal aorta (saddle thrombus).

This chart is not intended to alarm you or to suggest that your Soft-Coated Wheaten Terrier has inherited any of the diseases it describes. It is purely to provide information for your Vet and yourself.

Comparison Chart of Hereditable Diseases

There are four hereditary diseases known to affect the breed that may mimic one another.

DISEASE	SYMPTOMS	LABORATORY ABNORMALITIES OFTEN ASSOCIATED WITH THIS DISEASE
Renal Dysplasia (RD)		
Renal dysplasia is a congenital or neonatal disease which causes maldevelopment of the kidneys in utero, or early in life.	Increased water consumption Increased urination (dilute urine) Poor doer, decreased appetite Vomiting Possibly prone to urinary tract infection.	Low urine specific gravity Elevated creatinine and BUN Small kidneys Small, hyperechoic kidneys with or without cysts seen via abdominal ultrasound
Protein Losing Enteropathy (PLE)		
PLE is usually caused by inflammatory bowel disease or lymphangitis/lymphangiectasia. In affected Wheatens there is a stimulation of the immune system in the bowel wall	Vomiting Diarrhea Weight loss Ascites, edema, pleural effusion	Note that not all of the laboratory abnormalities are seen in every case. The most important are indicated by an asterisk. Hypoalbuminemia* Hypoglobulinemia* Hypocholesterolemia, eosinophilia, lymphopenia
Protein Losing Nephropathy (PLN)		
PLN is difficult to diagnose. The initial stages of the disease may be mistaken for liver, glandular or other enteric or kidney diseases. Wheatens with PLN may have serious thromboembolic events before renal failure starts, even before there is increased serum creatinine or BUN. An abnormality of the glomeruli usually causes PLN	Listlessness/depression Decreased appetite, vomiting, weight loss Ascites, edema, pleural effusion Thromboembolic phenomena and hypertension (less common) Late – Increased water consumption, increased urination	Note that not all of the laboratory abnormalities are seen in every case. The most important are indicated by an asterisk. Hypoalbuminemia*, hypercholesterolemia Elevated MA (Microalbuminuria) Elevated urine protein/creatinine ratio* Late - Elevated SDMA, creatinine, BUN
Addison's Disease		
Addison's disease (Hypoadrenocorticism) is the insufficient production and secretion of hormones (glucocorticoids, mineralocorticoids) by the adrenal gland cortex. The clinical signs are often non-specific and can mimic those of multiple other medical disorders	Listlessness/depression. Decreased appetite, vomiting, diarrhea, weight loss. Inability to handle stress Sudden collapse Slow heart rate	Decrease in Na/K ratio (Sodium/potassium ratio) Low resting cortisol and Abnormal ACTH stimulation test Possibly elevated SDMA, creatinine, BUN Possibly low urine specific gravity
Further information on all of these diseases can also be found on the The SCWT Club of America's website: https://scwtca.org/health		**WHEATEN HEALTH INITIATIVE**

Health Information

The Key Veterinary Researchers recommend that you perform an annual health screen on your Soft-Coated Wheaten Terrier. This gives a 'snap-shot' for you and your Veterinarian on the general health of your Wheaten, but more specifically it can indicate if your Wheaten has any evidence of the hereditary diseases.

Quick Definitions of the hereditary diseases**:**

- **JRD/RD** – **J**unior **R**enal **D**ysplasia/**R**enal **D**ysplasia is the abnormal development of the kidney. This malformation can result in early renal failure.

- **PLE & PLN** are syndromes characterised by the loss of proteins from the gastrointestinal tract (**PLE**); or the kidneys (**PLN**).

- **Addison's Disease** - Addison's Disease (Hypoadrenocorticism) is the insufficient production and secretion of hormones (glucocorticoids, mineralocorticoids) by the adrenal gland cortex.

Clinical Signs of a disease are the things you can see or that your veterinarian may discover on his/her physical examination of your Wheaten.

Therefore, testing is important as with many conditions and clinical signs do not show up until well after tests show signs of the disease. Also, many clinical signs of one disease can also be signs of another.

Annual Health Testing Protocols:

Every Wheaten needs an annual veterinary checkup. Wheaten Researchers recommend owners take their Wheaten to the vet for health testing even if the dog is happy, exuberant and shows no signs of illness. All dogs hide pain associated with disease and instinctively hide pain from their owners. Many illnesses don't present symptoms until they are quite advanced. In many cases, ***early diagnosis*** *and treatment can prolong your dog's quality of life and even the length of life.*
Please don't wait until your dog shows outward signs of illness!

Blood and urine tests cannot predict if a dog will develop these diseases. But they can determine if or not a dog is clear of signs of disease and establish baseline values for future comparison.

Your Veterinarian can check for signs of diseases and can undertake blood and urine tests 'in-house', or they may use an external Laboratory service.

Your Wheaten should be 'fasted' (**not eat** for **eight hours)** before the blood test, otherwise spurious results may occur.
Important - drinking water should be available at all times.

Key Researchers recommend (from 12 months of age)**:**

- Biochemical profile to include:

Albumin (Alb)	**B**lood **U**rea **N**itrogen (BUN)	Cholesterol (Chol)
Creatinine (Cr)	Globulin	Phosphorus (Phos)
Potassium (K+)	Sodium (Na)	SDMA
Total protein (TP)		

- Complete Blood Count (CBC) to include Cytopenias & Eosinophilia

- Routine Urinalysis is **very important** for Wheaten Terriers and shows protein loss associated with PLN years prior to the disease showing in blood results. It is imperative the disease is caught in the early stages to ensure a longer life.

  Urinalysis test to include**:**
  - Specific gravity
  - Dipstick
  - Urinary sediment
  - **U**rine **P**rotein/**C**reatinine Ratio (UPC) or a Microalbuminuria (MA) Test

  UPC and/or MA are add on tests and therefore must be requested

  Vets *– if proteinuria is found it is advised to undertake a 3 day Pooled UPC:* *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5787151/*

  If there is an indication of Protein loss, a 3 day pooled urine test should be undertaken as follows:

  Owners - as UPC varies daily, owners should collect three samples ask your vet to supply you with 3 sample collection vials:

  A. First thing in the morning for three consecutive days. If this is not possible, then the sample should be taken about the same time each day for three days.

  B. The samples should be saved separately in a refrigerator.

  C. Take the three samples to the Vet (do **not** pool them in one jar).

  Vet - Take 1ml from each sample, gently mix the result and send this one (3ml) sample to your Lab. for one UPC determination. This will provide an average result for the 3 days.

  Note: UPC on urine samples collected at the clinic are often higher than those collected at home, probably because of anxiety/stress and increased blood pressure at the clinic.

- In tick or heartworm endemic areas, a SNAP-4DxPlus or AccuPlex4 test

If you are concerned about finicky appetite, Gulpies, occasional gastrointestinal signs, inflammatory bowel disease (IBD), or PLE in the dog, or its relatives, ask your vet about additional testing such as Fecal examinations.

North America only (Recommended/Optional)

- **The TAMU GI Panel plus (B12/folate TLI/PLI with resting cortisol added -** From Texas A & M University (TAMU)
- **The TAMU Alpha1-proteinase inhibitor (A1-PI) Fecal Test -** is available now through TAMU. Go to www.wheatenhealthendowment.org to order your kit to detect GI protein loss.

The above 'North America only' tests may have an equivilent test in each respective country, please consult with your veterinary practice.

- **Blood Pressure Measurement (BPM)** – ideally, the vet will obtain the dog's BPM during each health visit (starting 1 year of age), in order to get a baseline and to get the dog used to having the procedure done.

- ***The PLN-Associated Variant Alleles DNA test -** (this only need be undertaken once in a dog's lifetime) it is recommended for each Wheaten Terrier. The test is available from PennGen or Laboklin in UK and Europe. Links are at the end of this handbook
  **Check with your breeder that they have not already undertaken the test*

A printable pdf copy for your vet is available on:
https://scwtca.org/wp-content/uploads/2021/11/Annual-Health-Testing-2021.pdf

If you or your veterinarian suspects JRD/RD or Addison's, the following tests can be undertaken:

Junior Renal Dysplasia (JRD) and Renal Dysplasia (RD)
- Abdominal radiographs/Ultrasound
- Final confirmation of RD, kidney biopsy (wedge, not Tru-cut)

Addison's
- ACTH stimulation test

*There are **no genetic tests** available yet for**: PLE, IBD, JRD/RD or Addison's disease***

Testing is important as with many conditions, clinical signs may not show up until well after laboratory tests show changes. Also, many clinical signs of one disease can also mimic signs of another disease.

RD	PLE[1]	PLN[1]	Addison's[2]
• Increased water consumption • Increased urination (dilute urine) • "Poor doer" • Decreased appetite • Vomiting • Possibly prone to urinary tract infection	• Vomiting • Diarrhea • Weight loss • Ascites • Edema • Plural effusion • Thrombo embolic events	• Listlessness/ depression • Decreased appetite, vomiting, weight loss • Ascites, edema, pleural effusion • Increased water consumption • Increased urination (less common) • Thromboembolic events • hypertension	• Listlessness/ depression • Decreased appetite, vomiting, weight loss • Inability to handle stress • Sudden collapse • Slow heart rate • Signs can be intermittent, recurrent, or sudden

[1]**PLE and PLN** can be difficult to diagnose. The initial stages of the disease may be mistaken for liver, glandular or other enteric or kidney diseases. Wheatens with PLE and/or PLN may have serious thromboembolic events - lung, heart, brain, portal vein or distal aorta (saddle) before symptoms of renal failure start, and even before there is increased SDMA, creatinine or BUN.

[2]The clinical signs of **Addison's Disease** are often non-specific and can mimic those of multiple other medical disorders.

Diagnosing: RD, PLN & PLE & Addison's Disease
These diseases can be difficult to diagnose and can be confused with each other. Here are some of the similarities and differences.

	RD	PLN	PLE	Addison's
Age of Onset	<1-3years	Mean ~ 6 years	Mean ~ 4.5 years	Mean ~3.5 years
Sex Predilection	None noted	Female: male=1.6	Female: male=1.7	None
Polyuria/Polydipsia	Yes	Only25% had PU/PD	No, unless on steroids	Yes
Vomiting/Diarrhea	Yes	Yes	Yes	Yes
Ascites/Edema	No	Possibly	Possibly	No
Azotemia (elevated SDMA, BUN, creatinine)	Yes	Eventually	No	Possibly (pre-renal)
Kidney Size	Small	May be normal	Normal	Normal
Hypoalbuminemia	No	Yes	Yes	Possibly (melena)
Hypoglobulinemia	No	No	Yes	Possibly (melena)
Hypercholesterolemia	No	Yes	Hypocholesterolemia	No
Low Na/K ratio	Not noted	Rarely (~10%)	Rarely (~10%)	If typical
Urine Specific Gravity	Isosthenuria	Mean 1.023	Mean 1.033	Low (medullary washout)
Proteinuria (elevated UPC)	None or mild	Yes	No	No
Histopathology **K = kidney** **I = intestine**	Fetal Glomeruli, Fetal mesenchyme (K)	Glomerulosclerosis, Glomerulonephritis (K)	Inflammatory Bowel Disease (IBD), lymphangiectasia, lymphangitis (I)	Not indicated

Adapted from 1999 ACVIM PROCEEDINGS Soft Coated Wheaten Terrier PLE-PLN; Dr Meryl P. Littman VMD DACVIM, Philadelphia PA

Notes:
There are no genetic tests available yet for PLE, IBD, JRD/RD or Addison's Disease.

Dogs that are carrying one or two copies of the PLN-Associated Variant Alleles should be checked for proteinuria more often, perhaps 2-4 times a year, especially after age 3 years.

Abnormal Results
If your Wheaten has abnormal test results **do not panic.** There are multiple causes besides genetic diseases why there may be abnormalities. In many cases, one lab result or even one set of results is insufficient for diagnosis. Your vet may wish to repeat testing in a few weeks to see what's going on and to do additional testing to rule out other causes.

Treatment for JRD/RD, PLE, PLN, and Addison's disease are often part of a veterinarian's standard practice.

If you or your vet needs additional resources concerning these diseases, ask them to please contact:

Key Researchers – based in America but will consult with Vets from any country.
Meryl Littman, AB, VMD, Professor Emeritus of Medicine (Clinician-Educator), University Of Pennsylvania School Of Veterinary Medicine. Although retired Dr Littman is available for paid consultations, contact: **merylitt@vet.upenn.edu**

Shelly L. Vaden, DVM, PhD, DACVIM, Professor of Internal Medicine, North Carolina State University is available for consultation **ONLY with veterinarians.** If you wish a consultation, please have your vet contact her at: **slvaden@ncsu.edu**

Karin Allenspach, Dr.med.vet. PhD, Diplomate ECVIM-CA, Professor, Department of Pathology, University of Georgia is available for consultation **ONLY with veterinarians.** If you wish a consultation, please have your vet contact her.

Paula S. Henthorn, BS Ph.D, Professor of Medical Genetics, University Of Pennsylvania School Of Veterinary Medicine

What to do next?
Should the blood/urinalysis tests confirm abnormalities, you and your vet need to take immediate action.

- **You** - Contact your breeder immediately, he/she will want to know in order to help you and to take action on other dogs in their breeding program
- **Your veterinarian** – Contact a Veterinary Specialist in your area or a Key Researcher
- If your Wheaten is diagnosed with a hereditary disease, then you will be advised to test more frequently.
- If your tests are normal, continue to test every year and have your veterinarian compare results
- Keep a copy of all test results in a file at home. This could be a paper copy, or a spreadsheet on your computer. The *Watchdog Health Tracker is available in the USA through the SCWTCA Endowment Inc.
- Consider sharing your health & testing information with your respective breed club and also recording it on the SCWTCA Endowment Inc. Health and Pedigree Database: https://scwtdb.org/

Further Reading:
UK follows the testing recommendations of the Key Researchers:
https://scwtca.org/health/health-testing/annual-testing/

'Recommendations Concerning Protein Losing Nephropathy in the SCWT'
https://scwtca.org/wp-content/uploads/2019/04/PLN-in-SCWT-2016-08.pdf

Standard of Care for Proteinuria Dr Shelly Vaden:
https://www.sciencedirect.com/science/article/abs/pii/S0195561616300456?via%3Dihub

Three Day pooled urine – home collection:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5787151/

Chronic Kidney Disease (CKD): http://www.iris-kidney.com/

Efficacy of Telmisartan for the treatment of persistant proteinuria in dogs:
This is available on The Journal of Veterinary Internal Medicine (ACVIM)
DOI: 10.1111/jvim.15958 Accepted 23 October 2020

Care of dogs with PLE:
https://www.dvm360.com/view/care-dogs-with-protein-losing-enteropathy-proceedings

WHI would like to thank: Dr Littman and the ©Soft-Coated Wheaten Terrier Club of America (SCWTCA – visit https://www.scwtca.org) for their kind permission to reproduce the 'Annual Testing Protocol' information.

LABORATORY RESULTS

Blood Chemistry

Blood tests are often performed as a biochemistry profile, or chemistry panel, which is a collection of blood tests to screen several organs at one time. The makeup of a biochemical profile varies with the laboratory in which it is performed. The following are some of the most commonly performed chemical tests.

Albumin – is a small protein produced by the liver. Albumin acts as a sponge to hold water in the blood vessels. When blood albumin is decreased, the pressure created by the heart forcing blood through the blood vessels causes fluid to leak out. This fluid then accumulates in body cavities such as the abdominal cavity or in tissues as oedema.

Albumin is decreased if the liver is damaged and cannot produce an adequate amount of albumin or if albumin is lost through damaged intestine or the urine due to kidney disease. The only cause of increased albumin is dehydration.

AG Ratio – A ratio of albumin compared to globulin

Alkaline phosphatase – is an enzyme made by the biliary tract (liver), bone and placenta and normally present in high concentrations in growing bone and in bile. It originates from many tissues in the body. When alkaline phosphatase is increased in the bloodstream of the dog the most common causes are liver disease, bone disease or increased blood cortisol either because Prednisone or similar drug is being given to the pet because the animal has Cushing's disease.

Alanine Aminotransferase (ALT) – is an enzyme normally present in liver and heart cells that is released into the bloodstream when the liver or heart is damaged. ALT is also called serum glutamic pyruvic transaminase (SGPT). Liver damage causes ALT to increase in the bloodstream. ALT elevation does not provide information as to whether the liver disease is reversible or not.

Aspartate Aminotransferase (AST) – is an enzyme normally in liver and heart cells. AST is released into blood when the liver and heart is damaged.

Amylase – is a digestive enzyme formed in the pancreas. Amylase helps the body breakdown sugars. In cases of pancreatitis high levels of amylase are found in the blood.

B/C Ratio (BUN/Creatinine Ratio) – is the ratio of BUN and Creatinine in the urine. This is a very important ratio for Wheatens, since an improper ratio is one of the key indicators of protein losing syndromes.

Bile acids – are produced by the liver and are involved in fat breakdown. A bile acid test is used to evaluate the function of the liver and the blood flow to the liver. Patients with abnormal blood flow to the liver, a condition known as portosystemic shunt will have abnormal levels of bile acids.

Blood Urea Nitrogen (BUN) or Urea – is nitrogen in the blood. This is a waste product produced by the liver from proteins from the diet, and is eliminated from the body by the kidneys. A low BUN can be seen with liver disease and an increased BUN is seen in pets with kidney disease. The kidneys must be damaged to the point that 75% of the kidneys are non-functional before BUN will increase. Pets that are severely dehydrated will have an increased BUN, as the kidneys of a dehydrated patient do not get a normal amount of blood presented to them, so the waste products do not get to the kidneys to be eliminated.

Bilirubin – is a yellow fluid produced when red blood cells break down. Bilirubin is further broken down and eliminated in both the urine and stool. Bilirubin is increased in the blood in patients with some types of liver disease, gallbladder disease or in patients who are destroying the red blood cells at a faster than normal rate (haemolysis). Large amounts of Bilirubin in the bloodstream will give a yellow colour to non-furred parts of the body, which is called icterus or jaundice. Icterus is most easily recognised in the tissues around the eye, inside the ears and on the gums.

Calcium – is a mineral found mainly in the hard part of bones. The body has hormones, which cause bone to release calcium into the blood and to remove calcium from the blood and place it back into bone. Abnormally high calcium in the blood occurs much more commonly than low calcium. High blood calcium is most commonly associated with cancer. Less common causes of elevated calcium are chronic kidney failure, primary hyperparathyroidism, which is over-function of the parathyroid gland, poisoning with certain types of rodent bait and bone disease. One cause of low blood calcium is malfunction of the parathyroid glands, which produce a hormone (PTH) that controls blood calcium levels. Animals poisoned with antifreeze may have very low blood calcium.

Carbon Dioxide (CO_2) - measures a buffer system in the blood. A normal CO_2 level keeps the blood acidity at the correct level.

Chloride – is the major anion found in the fluid outside of cells and in blood. An anion is the negatively charged part of certain substances. Elevations in chloride may be seen in diarrhoea, certain kidney diseases and sometimes in over activity of the parathyroid glands. Decreased chloride is normally lost in the urine, sweat and stomach secretions. Excessive loss can occur from heavy sweating, vomiting and adrenal gland and kidney disease.

Cholesterol – is the most common type of steroid in the body. Cholesterol is carried in the bloodstream as lipoproteins. Cholesterol can be increased in the bloodstream for many reasons in dogs. Some of the diseases that cause elevated cholesterol are hypothyroidism, Cushing's disease, diabetes and kidney diseases that cause protein to be lost in the urine. High cholesterol does not predispose dogs to heart and blood vessel disease as it does in people.

Creatinine Phosphatase (CK) – is a muscle enzyme.

Creatinine – is a waste product in the blood that results from the normal breakdown of muscle. Healthy kidneys filter creatinine from the blood. An elevation of creatinine is due to kidney disease or dehydration. Both creatinine and Urea (BUN), increase in the bloodstream at the same time in patients with kidney disease. An elevation of Phosphorus with Creatinine and Urea (BUN) indicate a long standing kidney problem.

Electrolytes – are related to fluid balance in your cells. They are especially important if you become dehydrated or have kidney problems. Electrolytes include sodium, potassium, chloride, and bicarbonate.

Gamma Glutamyl Transpeptidase (GGT) – is a liver enzyme. High level can indicate liver damage.

Globulin – measures the protein in antibodies produced by the immune system.

Glucose – is the sugar that is the chief source of energy. Glucose is considered a simple sugar. Found in the blood, it is the main sugar that the body manufactures. High glucose levels in the blood indicate diabetes. It may be mildly increased in dogs with Cushing's disease. Glucose can temporarily increase in the blood if the dog is excited by having a blood sample drawn. Low blood sugar occurs less

commonly and can be a sign of pancreatic cancer or overwhelming infection (sepsis). Low blood sugar can cause depression or seizures.

Lactic Dehydrogenase (LDH) – is an enzyme that is elevated if kidney, skeletal muscles, liver or myocardium is injured.

NA/K Ratio – A low sodium potassium ratio can be a very important indicator for Addison's Disease, although it is possible to have a normal sodium and potassium values. Note: To confirm Addison's disease you may require the ACTH Stimulation test.

Phosphate (Phosphorus in USA) – is an essential element in the diet and a major component of bone. Phosphorus in the bloodstream originates from bones. Phosphorus is increased in the bloodstream in patients with chronic kidney disease. Like BUN and creatinine, phosphorus increases in these patients when about 75 percent of both kidneys are damaged.

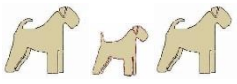
Potassium – affects several major organs including the heart. Potassium is increased in the bloodstream in the pet with acute kidney failure such as kidney failure caused by antifreeze poisoning, in dogs with Addison's disease and in animals with a ruptured or obstructed bladder. Potassium is lost from the body in vomit, diarrhoea and urine. Pets that are not eating may have low blood potassium. Low blood potassium can cause the pet to feel weak.

Sedimentation Rate or Sed Rate – measures how quickly red blood cells settle in a tube of blood. A high sed rate indicates some type of inflammation.

Sodium – levels indicate your balance of salt and water. They also are a sign of the functioning of your kidneys and adrenal glands. Sodium may be slightly increased in the blood if the patient is dehydrated although many dehydrated dogs have normal blood sodium. Low blood sodium is most commonly seen with Addison's disease.

Total Protein (TP) – protein includes albumin and larger proteins called globulins. Included in the globulins are antibodies, which are protein molecules. Total protein can be increased if the dog is dehydrated or if the pet's immune system is being stimulated to produce large amounts of antibody. Total protein is decreased in the same situations which reduce albumin or if the pet has an abnormal immune system and cannot produce antibodies.

Uric Acid – comes from the breakdown of DNA (genetic material in the cells), the kidneys normally remove it. High levels of uric acid are fairly common. Very high levels can be caused when the kidneys are unable to remove uric acid from the blood or by leukaemia or lymphoma.



Complete Blood Count (CBC)

The complete blood count measures the number of cells of different types circulating in the bloodstream. There are three major types of blood cells in circulation; red blood cells (RBC); white blood cells (WBC) and platelets. Red blood cells are produced in the bone marrow, which is the soft centre of bones. RBC's pick up oxygen brought into the body by the lungs, and bring that oxygen to cells throughout the body.

The complete blood count also includes a measure of haemoglobin, which is the actual substance in the red blood cell that carries oxygen.

Basophils (Bas) – are not well understood but they are involved in long-term allergic reactions such as asthma or skin allergies. It is a component of Granulocytes and is calculated as a % of WBC.

Blood Cell Count (RBC) – is the total number of red blood cells.

Eosinophils (Eos) – are normally 1% to 4% of WBC's. They are involved with reactions to parasites (flea infestation); allergies; inflammation of the GI, urogenital or respiratory tract; or inflammation of the skin.

Haemoglobin (HGB) – is the actual carrier of the oxygen on the red blood cell. It is a measurement of the red cell mass.

Hematocrit (HCT) – measures the percentage of blood volume taken up by the red blood cells.

Lymphocytes (lymphs) – are white blood cells produced in the lymph glands of the body. Lymphocytes fight infection and produce antibodies against infectious agents.

Lymphopenia – is a decrease in the number of proportion of lymphocytes (one of the white blood cells) in the blood.

Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) – measure the average concentration of haemoglobin in erythrocytes. The MCH is calculated by dividing total haemoglobin by the total number of red blood cells.

Mean Corpuscular Volume (MCV) – measures the average volume (size) of individual red blood cells. A low MCV means that the cells are smaller than normal. This is usually caused by an iron deficiency or chronic disease.

Mean Platelet Volume (MPV) – is a measurement of the average size of platelets found in blood.

Monocytes or Macrophages (Monos) – make up 2% to 8% of WBC's. They fight infection by "eating" germs and telling the immune system what germs they have found.

Neutrophils or polymorphonuclear cells (Polys) – is the most common type of white blood cells and cause the body to fight bacterial infections. Neutrophils can be decreased in pets with bone marrow disease, in some viral diseases and in some pets receiving cancer chemotherapy drugs. Neutrophils are increased in pets with inflammation or infection of any part of the body and in pets receiving Prednisone or other cortisone type drugs.

Packed Cell Volume (PCV) – is another measure of red blood cells. A small amount of blood is placed in a tiny glass tube and spun in a centrifuge. The blood cells pack to the bottom of the tube and the fluid floats on top. The PCV is the percent of blood that is cells, compared to the total volume of blood. In normal dogs, 40–50% of the blood is made up of blood cells and the remainder is fluid.

Platelets (PT) – are the third type of blood cell examined in CBC, which are produced in the bone marrow and are involved in the process of making blood clot.

Red blood cells (RBC) – are produced by the bone marrow, and are responsible for carrying oxygen throughout the body. This is measured by three main tests.

Red Blood Cell Distribution Width (RDW) – is a measure of the variation of red blood cell (RBC) width that is reported as part of a standard complete blood count.

White blood cells (also called leukocytes) – are produced in the bone marrow and are important for the immune system as they help fight infections in the body.

White Blood Cell Count (WBC) – is the total number of white blood cells. A high WBC usually means that the body is fighting an infection. A very low WBC can be caused by problems with the bone marrow.

Urinalysis

Explanation of Urinalysis:

A urine sample can provide information about several organ systems. The concentration, colour, clarity and microscopic examination of the urine sample can provide diagnostic information.

Urine may be obtained by catching a sample during normal urination, or alternatively, by your vet passing a catheter into the bladder or by placing a small needle through the body into the bladder, a procedure called cystocentesis.

Depending upon why the urine sample is being collected, one collection method may be preferred over another. Enquire at the time you make an appointment for veterinary care if a urine sample may be collected. Preventing your pet from urinating prior to the appointment will assure that your pet's bladder will contain urine for sampling.

Urine Protein - Proteinuria is excess protein in the urine and is usually only seen in trace amounts, as the kidney normally does not allow protein to leak through. When protein is present it indicates there's possible damage to the kidneys, most often through the glomeruli.
The main protein in blood and the key to the regulation of the osmotic pressure of blood is albumin. Proteinuria is synonymous with albuminuria.

Creatinine - Creatinine is a chemical waste molecule that is generated from the muscle metabolism. Creatinine is produced from creatine, a molecule of major importance for energy production in muscles. Approximately 2% of the body's creatine is converted to creatinine every day. Creatinine is transported through the bloodstream to the kidneys. The kidneys filter out most of the creatinine and dispose of it in the urine.

Although it is a waste, creatinine serves a vital diagnostic function. Creatinine has been found to be fairly reliable indicator of kidney function. As the kidneys become impaired the creatinine will rise. Abnormally high levels of creatinine warn of possible malfunction or failure of the kidneys, sometimes even before symptoms are evident.

Urine Colour – Normal colour is yellow to amber. Red is caused by blood, dark yellow to brown is caused by Bilirubin, reddish brown is caused by haemoglobin/myoglobin.

Urine Transparency – Normal is clear. Cloudy urine is caused by crystals, bacteria, cells, blood, mucous or casts.

Urine Specific Gravity (USG) – Specific gravity is a measurement of how concentrated the urine is. Renal impairment and diabetes insipidus affect a dog's ability to concentrate urine.

Urine sediment - can be examined for solid material such as cells, bacteria, crystals and casts. Red blood cells in the urine indicate inflammation, certain tumours or blood clotting disorders. White blood cells and bacteria are seen in infection. Crystals may be normal or may indicate infection, liver disease, toxin ingestion or bladder stones.

Glucose - should not be seen in the urine. However, when blood sugar levels become very high as with diabetes mellitus, it exceeds the kidney's capacity to keep sugar out and glucose is seen in the urine.

PH Levels – should be a little on the acidic side, i.e. 6.2 – 6.5

Urine Protein/Creatinine Ratio (UPC), *Vets* – if proteinuria is present also research information on home client collection of 3 day pooled UPC:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5787151/

Guide to Interpretation of Urine Protein/Creatinine Ratio (UPC) Results

0-0.2: Non-proteinuric - Normal Result.

0.2–0.5: Borderline Proteinuric. May or may not reflect abnormality, monitor proteinuria.

>0.5: Proteinuric Consistent with loss of protein within urinary system. Monitor proteinuria.

Further Reading:
https://www.idexx.co.uk/en-gb/veterinary/reference-laboratories/upc/

https://ahdc.vet.cornell.edu/sects/clinpath/test/urine/protein.cfm

http://www.iris-kidney.com/about/projects_cpk.html

https://vcahospitals.com/know-your-pet/urine-proteincreatinine-ratios

Please note that links given to articles that are general in nature on external websites are not a substitute for your own Veterinarian's advice

Tests recommended prior to Breeding

The average canine gestation period is approximately 63 days.
Good breeders undertake their countries recommeded annual health & DNA testing and some breeders excede this.

SCWT Club of GB – health testing https://wheaten.org.uk/health/testing/
Breeding information https://wheaten.org.uk/health/breeding/

GB – Required testing Protocols for Wheatens prior to breeding:

- **Blood** and **urinalysis** in accordance with the 'Annual Testing Protocols – Adult Dogs'
- *Hip scored (this only need be undertaken once in a dog's lifetime)
- *Eye tested (annually)

DNA tests:

- Genetic PLN-Associated Variant Genes Test (**required** -this test only needs to be done once in a dog's lifetime) please visit the PLN-Associated Variant Genes Test page
- Degenerative Myelopathy Test (DM) (optional)
- Paroxysmal Dyskinesia (PxD) (optional)
- Microphthalmia Eye Test (optional)
- DNA Storage – see the Genetics section in this Handbook

*Eye & Hip Testing are part of the **B**ritish **V**eterinary **A**ssociation (**BVA**) Health Schemes. Contact details are listed at the back of this Handbook.

USA – Required testing Protocols for Wheatens prior to breeding

SCWTCA members must follow the requirements of the SCWTCA Code of Ethics.
Full Health Testing requirements for Breeders is available on this link:
https://scwtca.org/health/health-testing/breeding-stock/

All Countries DNA Testing - Clear By Parentage:
Both parents need to be DNA tested clear for a disease with a Genetic Testing Company and testing needs to be submitted to the SCWTdatabase. Clear By Parentage applies for 1 generation only.
OFA: https://ofa.org/about/ofa-policies/
SCWT Database Policy: https://scwtdb.org/ClearByParentagePolicy_rev2.pdf

All Countries:
PLN-Associated Variant Genes Test – Is ***recommended*** for ***every Wheaten*** (this only need be undertaken once in a dog's lifetime). No matter what the result of your dog's PLN-Associated Variant Gene Test is, annually health testing, Bloods & Urinalysis is strongly recommended.

- *If your dog's results are **Homozygous Negative*** (no copies of the variant alleles), **Health Test:** Annually.
- *If your dog's results are **Heterozygous*** (i.e. having 1 copy of the variant alleles). **Health Test:** Before age 4 years, test annually if no abnormalities are found. After age 4, in addition to annual testing do a UPC (or MA if in USA), every 6 months
- *If your dog's results are **Homozygous Positive*** (i.e. having 2 copies of the variant alleles). **Health Test:** beginning at age 2 years, is recommended **minimally** every 6 months.
- *If you have **not had** DNA testing done,* it is recommended you follow the testing guidelines for a Homozygous Positive dog. For more information on DNA testing visit the DNA testing page https://scwtca.org/health/health-testing/dna-testing/
- Understanding Breeding Combinations A Breeder's Tool: https://scwtca.org/wp-content/uploads/2019/01/SCWT-Genetic-Test-Breeders-Tool-2015-10-13.pdf

Health Testing Puppies

As puppies' body systems are immature, to undertake a complete blood and urinalysis before the age of 15 to 18 months could possibly produce spurious results. Therefore, unless a Vet advises a full blood and urinalysis it is not required.

In most countries, responsible breeders undertake tests on their litters prior to placing their puppies.

- **Basic kidney function** - This is a blood test taken at approximately 7 weeks of age to assess kidney function and can usually be completed by your vet 'in-house'
    - ***Creatinine***
    - ***Urea (BUN)***
    - ***Phosphate levels*** *(not usually significant if elevated in young, healthy, growing dogs)*
    - ***Ultrasound puppy kidneys*** (Instead of taking blood)
- **UK Eye test** - At approximately 6-8 weeks of age by a BVA approved Ophthalmic Vet, who checks for retinal folds and other eye diseases. (For more information, go to the section on 'Eyes' within this Health Handbook
- **Genetic PLN-Associated Variant Genes Test** - Check if your breeder has done this test on either the parents or on your pup. This test only needs to be undertaken once in a dog's lifetime. If your breeder has not undertook this test on the parents or pups and you would like to test then request a Form and Swab kit. For more information please go to the PLN-Associated Variant Genes Test page.

Clear By Parentage – Both parents need to be DNA tested clear for a disease with a Genetic Testing Company and testing needs to be submitted to the SCWTdatabase. Clear By Parentage applies for 1 generation only.
OFA: https://ofa.org/about/ofa-policies/
SCWT Database Policy: https://scwtdb.org/ClearByParentagePolicy_rev2.pdf

Post Mortem Information - UK

Dear Owner

No one likes to think of the time when we might lose our Wheaten companion. The moment we do lose them is very emotional and sensitive and a time when the pain of grief can cloud our better judgement.

At a time like this, suggestions of a post mortem are almost unthinkable, but the last loving act could be to allow your Wheaten to provide valuable medical information that may benefit the breed in future. Therefore, if your dog is suspected as having or has died of an hereditary disease, please inform your breeder and the SCWT Club of GB

We appreciate this is a difficult task to take on board so soon after death, but it could help and reassure you that it may not be necessary for a 'full body' post mortem to be carried out. Often, all that may be required, unless there are serious concerns over the cause of death, is to take the kidneys and/or intestine.

If you would like your Wheaten to make this valuable contribution it may help to discuss the possibility with your Veterinary Practice so that they are aware of your wishes in advance.

Thank you for taking the time to consider this matter.

Regards
Wheaten Health Initiative

UK Post Mortem Information for Owners and Veterinarians:

The request for pathological examination should be made through your veterinary surgeon, to a suitable veterinary facility with experience in performing Post Mortems on Wheaten Terriers. The Club of Great Britain has arrangements with The University of Cambridge (details below) to undertake post mortems.

They will charge for their services, as will your Vet and the cost of the process will depend on whether a whole body or tissue samples are required.

The SCWT Club of GB Health Fund is available to help with post mortem costs in cases where inheritable disease may be present. The Club in return requires a copy of the post mortem report.

For more information contact the SCWT Club of GB Health Team on:
health@wheaten.org.uk

Your post mortem report will go back to the referring veterinarian, who would then relay the report to you.

Important - Please give your Vet all this information so he/she knows the correct storage procedure and who to contact – *this is very important*.

Ideally the post mortem needs to take place:

- Within 48 hours of death or euthanasia. ***However, in the case of samples of the intestine, it is important that these are taken as soon as possible after death***
- The body should be refrigerated (*not frozen*)
- If death occurs over a weekend, please do not send to Cambridge until Monday morning
- Please include a summary of the clinical history leading up to death, or euthanasia, with the body/tissue samples
- If a whole body post mortem is not necessary, advice regarding the appropriate tissues required for collection can be obtained by contacting one of the pathologists at the RVC or other suitable Veterinary facility
- Veterinary facilities are able to give advice to the referring veterinary surgeon, on a case by case basis, submission of the whole body or parts thereof and the cost of the procedure

Post Mortem Requirements:

Renal Dysplasia (RD)
The **tissue sample** required is: -
Two **kidneys**, cut in half, and preserved in 10x volume of 10% buffered formalin.

The following should be collected **before euthanasia** and sent with the other items:
Blood: 5ml serum **AND** a maximum of 5ml in EDTA (anticoagulant).

Urine: A sample of at least 5ml from the bladder should be included.

Please note: If there has been a presence of GI disease previous to clinically evident PLN, this could be a sign of both conditions (PLE and PLN). In this case intestinal samples should be included.

Protein Losing Nephropathy (PLN) and Protein Losing Enteropathy (PLE):

The **tissue samples** required are: -
Two **kidneys,** cut in half, and preserved in 10x volume of 10% buffered formalin.

Half-inch long sections of the **duodenum, jejunum and ileum** preserved in neutral buffered formalin solution.
Please Note: these samples should be taken within an hour or two after death due to rapid deterioration of the gut.

The following should be collected **before euthanasia** and sent with the other items:
Blood: 5ml serum **AND** a maximum of 5ml in EDTA (anticoagulant).
If possible, the following should be included:

Urine: A sample of at least 5ml.

The following details should accompany all post mortem samples:

- Name of dog (pet name and pedigree name)
- Date of birth
- Owner's name and address
- 5 generation pedigree *(contact the SCWT Club of GB Health Team if you require a copy)*
- Daily fluid intake and diet fed
- Dog's approximate weight
- Copies of any tests undertaken on the dog during its recent illness (blood, urine etc.)
- Any other information the owner/vet may think appropriate

All samples should be carefully packed and sent first class post to:

As this is a new service, arranged following the closure of the AHT, we ask that you notify The Club of GB Health Team : health@wheaten.org.uk so they can alert Cambridge Diagnostic Services that a Wheaten Sample will be arriving.

The University of Cambridge
Central Diagnostic Services
Department of Veterinary Medicine
Madingley Road
Cambridge
CB3 0ES

Tel: 01223 337625 Email: clinpath@vetcam.ac.uk Fax: 01223 339090

It is advisable that your veterinarian notifies Cambridge that a sample is being sent for post mortem.

USA Post Mortem (Necropsy) information is available on:
https://scwtca.org/health/health-testing/necropsy-protocol/

Additional questions and answers relating to the hereditary diseases

Soft-Coated Wheaten Terrier health information refers to PLE and PLN as syndromes. What is the difference between a Disease and a Syndrome?
Disease *– illness or sickness often characterised by typical patient problems (symptoms) and physical findings (signs).*
Syndrome *– a combination of signs and symptoms that occur together.*

What is a sub-clinical disease?
A sub-clinical disease is an illness that stays below the surface of clinical detection. A sub-clinical disease has no recognisable clinical findings. It is distinct from a clinical disease which has signs and symptoms that can be recognised. Many diseases, including diabetes, hypothyroidism, and rheumatoid arthritis, can be sub-clinical before surfacing as clinical diseases. Both PLE and PLN are sub-clinical diseases.

What is Protein Loss?
When a dog is losing protein into the urine or faeces there are several possible reasons. If the protein is being lost via the kidney (PLN) then damage to the glomeruli is the cause. If the protein is being lost from the intestine PLE) it is a result of either malabsorption or maldigestion.

If my dog is diagnosed with JRD/RD, PLE or PLN what should I do?
If your dog is diagnosed with JRD/RD, PLE or PLN then ask your vet to contact a Veterinary Specialist in these diseases to provide your vet with advice on testing and treatment and discuss with him/her a course of treatment and diet suitable for the dog.

What should I do if my dog is diagnosed with Addison's Disease?
Your vet, (or a veterinary specialist) and you can develop a diet and medication regime that, if followed, should allow your dog to lead a normal, active life.

Does stress affect how my dog feels if it has JRD/RD, PLE, PLN or Addison's Disease?
Yes it does. Dogs should be maintained with a modified normal lifestyle. They will feel their best for the longest period of time if stress is managed and moderate exercise and play is provided.

Can a dog have JRD/RD and a Protein-losing disease at the same time?
A dog can have one or any combination of the diseases. Wheatens have been diagnosed with both JRD/RD and PLN and with PLN and PLE.

How do I know if my dog has PLN and not JRD/RD?
The kidneys of a dog with JRD/RD are quite different from a dog with PLN. The damage to the glomeruli in JRD/RD cases is, under microscopy, different to the damage shown with dogs with PLN. There are differences seen with blood chemistry and urinalysis. *See Diagnostic Chart "Differences Between RD & PLN"*

How can I find out if my dog has PLE?
PLE may be present in your dog long before clinical signs manifest, or urine and blood testing show protein loss. See Recommended Health Testing
An Endoscopic biopsy can be an additional aid to help confirm the diagnosis, this is the safest way as surgical biopsy can carry more risk.

How does my dog feel if he has PLE?
Since PLE can be a disease in which symptoms occur in mid to late life, we must assume that early stage PLE is not unpleasant for your dog. When clinical signs occur the dog does feel some physical symptoms. These symptoms vary with each dog and with the progression of the disease.

Symptoms can include: chronic diarrhoea, vomiting, bloody stools, abdominal pain and weight loss. Your dog may have one or several of these symptoms or other symptoms. How many and which symptoms and the severity of the symptoms depends on the type and severity of the disease.

My dog hasn't had regular bouts of diarrhoea or vomiting, could it have PLE or PLN?
These are classic signs that something is wrong but they are by no means always seen. Vomiting and diarrhoea are only two of the many signs, which might indicate PLE and or PLN. The absence of such symptoms does not necessarily indicate the absence of hereditary disease.

My dog is middle-aged and appears healthy but could he/she still develop PLE or PLN?
Dogs as old as 14 and previously healthy have been diagnosed with PLE or PLN. Many of the older dogs are asymptomatic (do not show physical signs of the illness), only bloods, urinalysis and in some cases biopsy can tell if a dog is affected.

What is the point of testing if my dog is going to get PLE or PLN it will still do so?
The outlook for dogs diagnosed with PLE and PLN is improving constantly due to ongoing research. Early diagnosis is essential; diet, medication, etc. can in many cases improve a dog's lifestyle and its longevity. Dogs have been known to live a normal lifespan, years after diagnosis.

My puppy got sick at 7 months so will this be JRD?
In the SCWT, JRD is more common between the ages 7 weeks to 3 years. Protein losing diseases occurs in adult dogs.

Does a dog need a post-mortem before a definite diagnosis can be given?
Although post mortems can provide additional proof, a diagnosis can be made while the dog is still living by blood tests, urinalysis, wedge biopsy, ultrasound and endoscopy.

A lot of old dogs die of kidney disease – could it be just old age not PLN?
Changes in the kidney due to old age cannot be mistaken for those caused by PLN. Examination of the kidney in post mortem procedures will identify the distinct changes due to deterioration in old age from those caused by PLN.

My dog is very healthy and does not drink a lot, so it does not need to be tested?
A dog in the early stages of disease will not drink a lot. At this stage the dog is frequently in a state of 'compensation' where signs such as excessive drinking will not be apparent.

My dog is healthy and does not pass urine frequently so it does not need to be tested?
A dog in the early stages of disease will often not show obvious signs. This is not an indication that the dog is clear of hereditary disease.

Could my dog be a 'carrier' because it is a parent of a dog diagnosed with PLE or PLN?
There is no such certainty as we do not fully understand how PLE & PLN is inherited. For PLE the only way of being absolutely certain of whether a dog is a 'carrier' lies in the future with the identification of the gene(s) responsible. For PLN there is the PLN-Associated Variant Gene Test – please refer to the PLN page for further details.

Can I use my dog for breeding as a litter-mate has been diagnosed with a protein-losing disease?
There is no way of knowing at present if the litter-mate of a sibling affected with either JRD/RD or PLE is 'safe' to breed from or not. It might be wise not to breed from a litter mate of an affected animal but, as the mode of inheritance is not yet established; it is not certain if every other dog in a litter could pass on the deleterious mutations. For PLN there is the PLN-Associated Variant Gene Test, please refer to the PLN page for further details.

Do I need to worry about protein-losing disease as I don't have North American dogs in my pedigree?
There is NO foundation for assuming that only dogs born in North America are at risk of PLE/PLN. ALL the diseases are recognised hereditary diseases of ALL Soft-Coated Wheaten Terriers, no matter what their nationality or place of birth or coat type is.

Should I stop giving vaccines if my dog is affected by PLE, PLN or RD?
The research vets working on the SCWTCA health projects advise vaccines should not be given to a dog suffering from PLE, PLN or JRD/RD. The vets have determined that vaccines cause too much stress to the system of affected dogs. However, you may titre test to make certain your dog has immunity to those diseases for which you would normally vaccinate. Consult with your vet about titre testing.

Can anything be done to stop these diseases in Wheaten Terriers?

- *Keep up to date with the latest health information*
- *Test regularly (annually) and repeatedly throughout the dog's life*
- Undertake the PLN-Associated Variant Gene Test

  Clear by Parentage –what does it mean?:
  OFA: https://ofa.org/about/ofa-policies/
  SCWT Database Policy: https://scwtdb.org/ClearByParentagePolicy_rev2.pdf
- *Choose not to breed from affected dogs, or littermates of affected dogs with JRD/RD or PLE, however, for PLN you can check your Wheaten's DNA usiing the PLN-Associated Variant Gene Test*
- *Make your breeding choices with care and use dogs from other people who are taking the same precautions with regard to their dogs*
- *Be open and honest about the results and health of your dogs. Please add their health information and test results to the SCWTCA Endowment Inc. Health and Pedigree Database:* https://scwtdb.org

Only by taking part in this collective effort and working together openly and honestly, can we safeguard the future of the Soft-Coated Wheaten Terrier.

Glossary of terms:

Key words with regard to SCWT health:

a. Junior Renal Dysplasia (JRD)
b. Renal Dysplasia (RD)
c. Protein Losing Nephropathy (PLN) - *Glomerulonephritis* and G*lomerulosclerosis*
d. Protein Losing Enteropathy (PLE) - *Inflammatory bowel disease (IBD)*, *Lymphangiectasia* and *Lymphangitis*.
e. Addison's disease
f. **Hyper** – *high (too much)*
g. **Hypo** – *low (too little)*

Effusion – an outpouring or escape of fluid into a part or tissue. Ascites (also called hydroperitonia) is the abnormal build-up of effused fluid in the abdomen.

Embolism – the obstruction of the blood vessel by a foreign substance or a blood clot blocking the vessel. Something travels through the bloodstream, lodges in a vessel and plugs it. Blood clots are the most common cause of embolism. A pulmonary embolus is a blood clot that has been carried through the blood into the pulmonary artery (the main blood vessel from the heart to the lung), or one of its branches, plugging that vessel. The term "embolus" refers to the plug itself obstructing the blood vessel while "embolism" refers to the process by which this happens.

Enteric – of/or relating to the small intestine.

Enteritis - is the inflammation of the small intestine.

Eosinophil – is a type of white blood cell. The numbers of Eosinophils in blood often rise when there is an allergic reaction in progress. Eosinophilia is the formation and accumulation of an abnormally large number of eosinophils in the blood. Eosinopenia is a deficiency of eosinophilic cells in the blood.

Granulomatous - a granuloma is one of a number of forms of localised nodular inflammation found in tissues.

Granulomatous Enteritis - (Crohn's Disease in humans) is a chronic inflammatory disorder, primarily involving the small intestine only. In mild form, it causes small, scattered shallow crater-like areas (erosions) called apthous ulcers in the inner surface of the bowel. In more serious cases, deeper and larger ulcers can develop, causing scarring, stiffness and possibly narrowing of the bowel, sometimes leading to obstruction.

Granulomatous Peritonitis - is a severe affect of Granulomatous enteritis in which deep ulcers puncture holes in the bowel wall, leading to infection in the abdominal cavity (peritonitis) and in adjacent organs.

Hyperphosphatemia – is higher than normal blood level of phosphate. Hyperphosphatemia is generally a condition in dogs with chronic or end stage renal failure. It is often a key diagnostic tool in evaluating renal function.

Hypoproteinemia – low blood protein in the blood. Sometime resulting in oedema and fluid accumulation.

Inflammatory Bowel Disease (IBD) - the term used to describe a group of chronic intestinal diseases characterised by inflammation of the bowel – the large or small intestine. (Also see Lymphocytic/Plasmacytic Enteritis and Lymphangiectasia below).

Isosthenuria - the excretion of urine with fixed specific gravity. It may occur in terminal renal disease when the specific gravity reaches that of the glomerular filtrate, 1.010.

Lipogranulomatosis - is a condition of faulty lipid (fat) metabolism in which nodules of lipoid matter are deposited in the skin and mucosa, causing granulomatous reactions.

Lymph – an almost colourless fluid that travels through vessels called lymphatics in the lymphatic system and carries cells that help fight infection and disease. Lymphangitis involves the lymph vessels/channels, with inflammation of the channel and resultant pain and systemic and localised symptoms.

Lymphangiectasia - is obstruction and dilation of the lymphatic vessels in the digestive system. It is a congenital or acquired disorder of the lymphatic system resulting in fat and protein malabsorption and a protein losing enteropathy. It is another form of IBD that often underlies PLE in the SCWT.

Lymphocyte – a small white blood cell (leukocyte) that plays a large role in defending the body against disease.

Lymphocytic-plasmacytic enteritis – is a form of Inflammatory Bowel Disease. This form of IBD is one of the diseases that can develop into PLE.
Although the exact cause is unknown, one favoured by most academicians is that this disease is an immune-mediated hypersensitivity to some enteric bacteria and dietary components. It is characterised by the presence of inflammation of the cells lining the intestine.

Maelena (Melena) - a darkening of the faeces by blood pigments. Typically the faeces have a black colour with a red tinge at the edges and are soft and almost slimy.

Malabsorption – is poor intestinal absorption of nutrients. This is caused by any blockage of properly digested nutrients. It may be a symptom of a number of diseases which manifest as PLE, or PLE and PLN.

Maldigestion - indicates the system is not properly breaking down nutrients. This is caused by a lack of Pancreatic enzyme. This is not generally a factor of either PLE or PLN.
This disorder is directly related to the excessive leakage of plasma proteins into the lumen of the gastrointestinal tract. The liver and other cleansing systems are unable to compensate for the loss. Mechanisms for gastrointestinal protein loss include lymphatic obstruction, mucosal disease with erosions, or ulcerations.

Mesenchyme - is the meshwork of embryonic connective tissue in the mesoderm, from which are formed the muscular and connective tissues of the body and also the blood vessels and lymph vessels.

Nephron – one of a million tiny filtering units in each kidney. Each nephron is made up of both glomerulus and a fluid collecting tubule that processes extra water and wastes.

Nephropathy – is a medical word for kidney disease. Nephropathy can be applied to any disease of the kidney.

Pancreas – the organ that makes pancreatic juices and hormones, including insulin. Pancreatic juices, also called enzymes, help digest food in the small intestine. Insulin controls the amount of sugar in the blood. Both enzymes and hormones are needed to keep the body working correctly. Pancreatitis is an inflammation of the pancreas.

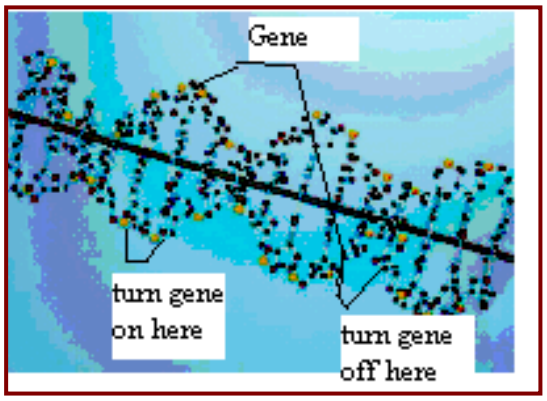
Proteinuria – large amounts of protein in the urine. Some protein is normal in the urine. Too much means protein is leaking through the kidney, most often through the glomeruli. The main protein in human blood and the key to the regulation of the osmotic pressure of blood is albumin. Proteinuria is synonymous with albuminuria.

Thrombus - a clot in a blood vessel or the heart. The formation, development or presence of a thrombus is called Thrombosis.

Titre - tells if an animal has had an immune response to the material (antigen) in the vaccine and that it has made antibodies (which we measure in the titre). Immunologists have equated the presence of certain levels of titre to immunity.

GENETICS

We hope that the following information which includes a two page chart and glossary of terms will help you to understand the complex and complicated subject of Genetics.



DNA

DNA is a long fine fibre made up from two strands that stick together with a slight twist to form a helix shape.

DNA is found in cells and is organised into stretches of genes where the base proteins attach to coil the DNA to fit into each cell, giving rise to structures known as chromosomes.

Along these stretches are instructions to 'turn a gene on' and 'turn a gene off'; and large stretches whose purpose is not even known.

Genes

Genes are made from Deoxyribonucleic Acid (DNA). DNA is made up of four **nucleotides** which are individual chemical structures known as **bases**. These four nucleotides are, Adenine 'A', Thymine 'T', Cytosine 'C' and Guanine 'G', they are joined end to end.

Genes carry the instructions or 'plans', for the making of thousands of proteins that are found and deciphered by the cell. The random combination of these bases determines what the cell will look like and what job that cell will do and how the many different cells of the body will be arranged.

Each cell has a nucleus containing 78 chromosomes, the exception to this being red blood cells (which have no chromosomes), and the reproductive cells, eggs and sperm (which have 39 chromosomes each). For example, how to make haemoglobin; haemoglobin is the protein that carries oxygen around the bloodstream. The body needs to constantly make haemoglobin.

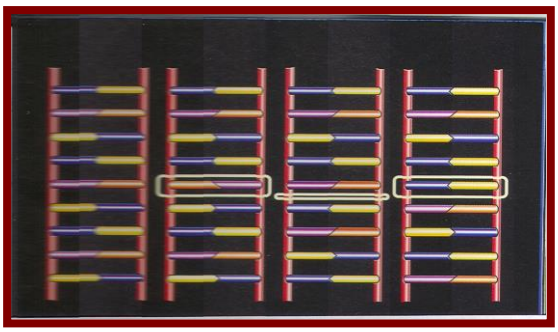
Chromosomes

A chromosome is made up of DNA and the proteins attached to it. Each chromosome has a thread of DNA running along its length and the genes are arranged along this thread.

This resembles beads on a string. Chromosomes are arranged in pairs and in each cell of a dog there are a total of 78 chromosomes; 39 from the sire and 39 from the dam. These are 38 pairs of autosomes and two chromosomes involved in specifying sex, i.e. X or Y chromosomes.

Sex determination in canines is exactly the same as in humans; bitches have two X chromosomes whilst the dog has one X and one Y chromosome.

Each set of 39 chromosomes contain approximately 20,000 genes, representing a sequence of 3 billion bases. These 20,000 different genes are required to specify the dog.



Gene Mutations

The 'plan' embedded in the gene can become altered by a process called mutation. This can involve change in the sequence of the **bases** by adding or removing some of the base sequence within the gene. Considering the times a gene has to copy and reproduce itself it's not surprising that mistakes (mutations) can occur.

On the first 'ladder' is a 'normal' strand of DNA. The other three show various mutations, as indicated by the boxes. On the second strand, a substitution has occurred, changing a base pair. On the third strand, a deletion has occurred, removing a base pair. On the fourth strand, an insertion has occurred so there is an extra base pair in the sequence. These mutations can cause changes in amino acid sequences.

Consequences of gene mutations

This depends on the gene in which the mutation has occurred. Some mutations are silent and have no consequences; others affect the gene so that the plan can no longer be used to make a functional protein. In the Wheaten this could be the effect the mutated gene has on kidney formation, the consequence being Renal Dysplasia (RD). Once a mutation has occurred within a gene, it is fixed and cannot be reversed. The dog carrying the mutation will pass this mutant gene onto its offspring, if the consequence of the mutation is a disease state, like RD, then this is an inherited disease.

Note: Not all mutations are bad (deleterious), occasionally, some mutations can be beneficial. This is how evolution has progressed to make the individual fitter and enabling them to have the advantage in their environment.

There are two types of mutation that can occur in genes and the different effects are determined by the fact that dogs have two copies of every gene.

If a recessive mutation occurs in a gene the effect is not initially noticed because the second, normal copy of the gene masks the presence of the recessive mutant gene. A disease caused by a recessive mutant will only be seen in a dog that has two copies of the recessive mutant.

If a dominant mutation occurs the consequences will be felt despite the fact that there will also be a normal gene present. An animal that inherits a dominant mutation will be affected.

Inheritance and genetic mutations:

Autosomal Dominant Trait

Both parents do not have to have the gene for the disorder to cause the trait to occur. However, since the trait is expressed in the heterozygous state, one parent must show the trait in order for it to occur among the offspring.
There are few exceptions to this rule.
At the present time it is not known why a dominant gene masks or hides the recessive alleles and it may be that the concept of dominance is operational and may not reflect any intrinsic property of the gene. Nevertheless, the fact that dominant traits are expressed in certain ratios can be easily demonstrated.

The general characteristics of an autosomal or simple dominant trait follow:

1. The gene is located on any one of the thirty-eight pairs of autosomes.
2. The gene is generally present in the heterozygous state.
3. At least one parent of an affected offspring must show the trait, unless a new mutation is involved.
4. The trait occurs in successive generations (no skipping).
5. About 50% of the offspring of an affected dam or sire will also be affected.
6. On the average males and females are equally affected.
7. Dogs that are phenotypically normal are also genotypically normal.

Autosomal Recessive Inheritance

The general characteristics of an autosomal simple recessive trait follow

1. The gene is located on any one of the 38 pairs of autosomes.
2. To be expressed (to show the trait) the gene must be present in the homozygous state (both genes must be identical).
3. The trait tends to occur in one generation and then skips one or two generations until carrier descendants are again mated allowing the genes to be expressed.
4. Each of the parents of an affected puppy is a proven carrier (heterozygote) of the abnormal gene but generally show no phenotypic manifestation of the trait.
5. If the given trait is rare in a breed (one affected amongst 2,000 or 3,000 normal dogs) there may be increased inbreeding among the parents (increased consanguinity) of affected dogs.
6. Matings between heterozygotes (carriers), on average, produce 25% affected (homozygous recessive), 50% carriers (heterozygous) and 25% that do not have the mutant gene (homozygous dominant or wild type).
7. On the average males and females are affected equally.

Polygenic Trait

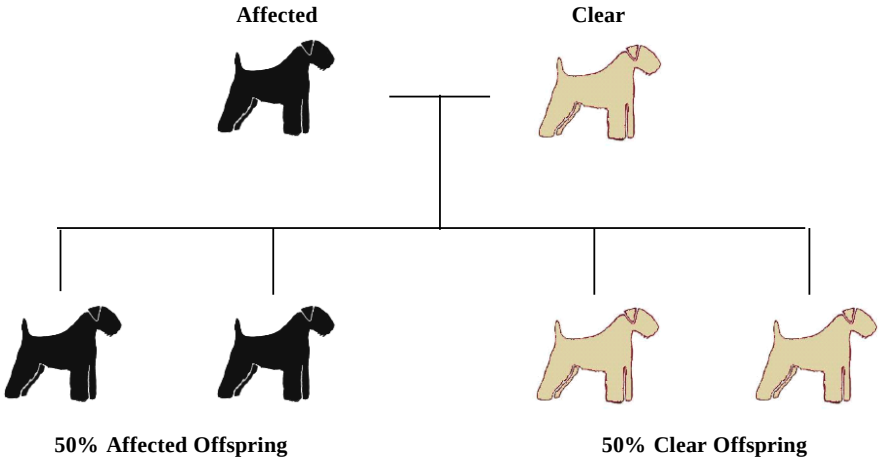
The general characteristic of a polygenic trait follow

1. As with a recessive trait, both the sire and the dam must contribute one or more of the genes that cause the abnormal phenotype in the offspring.
2. Unlike recessive traits, the contribution from the sire and dam need not be equal.
3. Since we do not know the number or the specific effect the genes involved in polygenic traits have in dogs, no predictable Mendelian ratios are associated with these traits.
4. Both sexes are affected with polygenic traits (excluding sex-limited traits) but not necessarily in equal numbers.
5. The trait may skip generations and may appear to be erratic in occurrence.

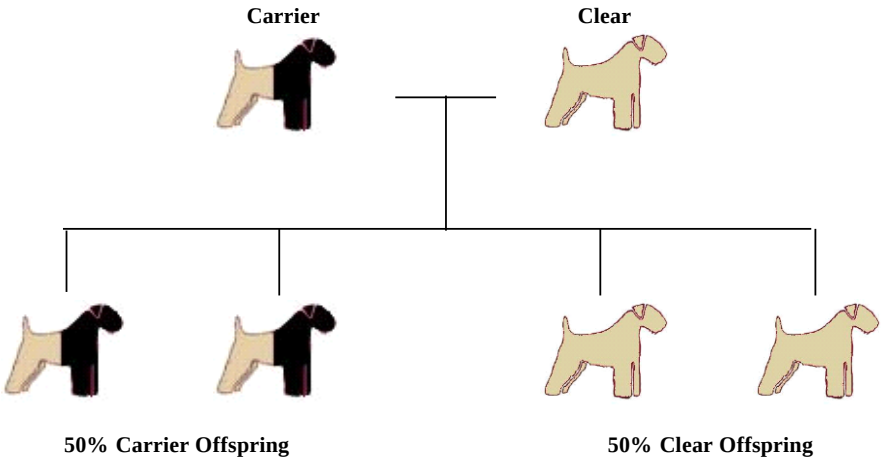
"...there is no hope for control without knowledge."
Dr George Padgett DVM, Professor of Pathology at Michigan State University

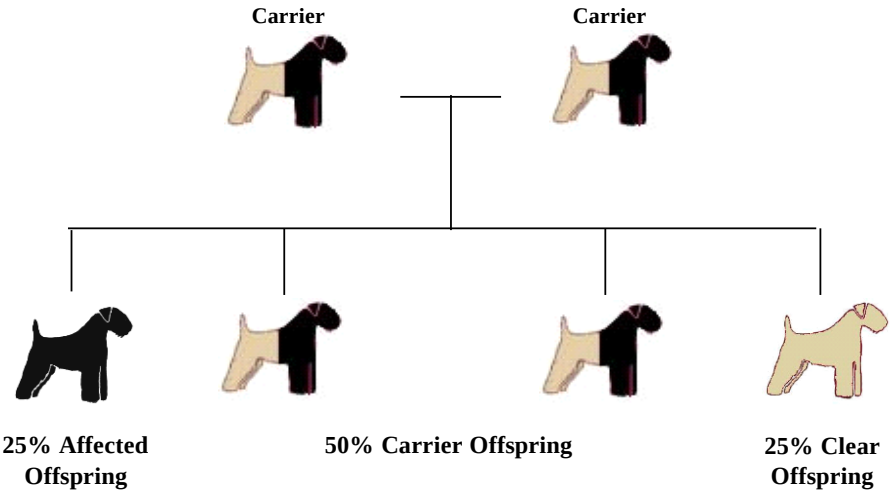
INHERITANCE OF AUTOSOMAL MUTATIONS

Dominant Mutation:



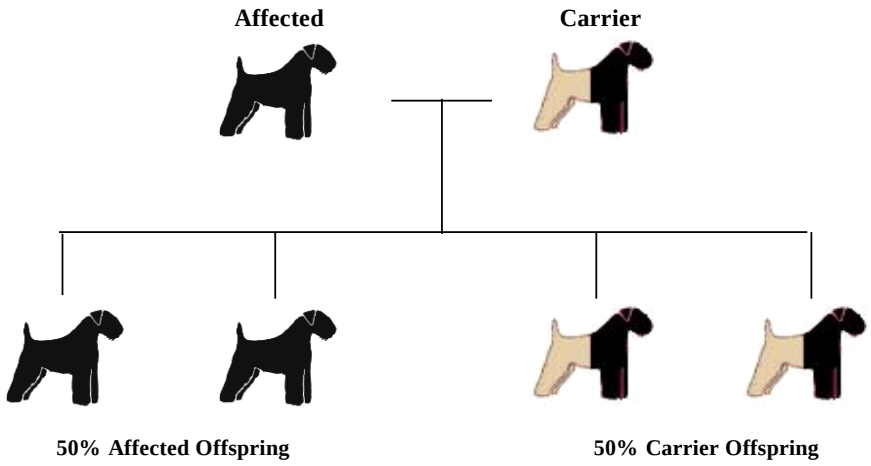
Recessive Mutation:



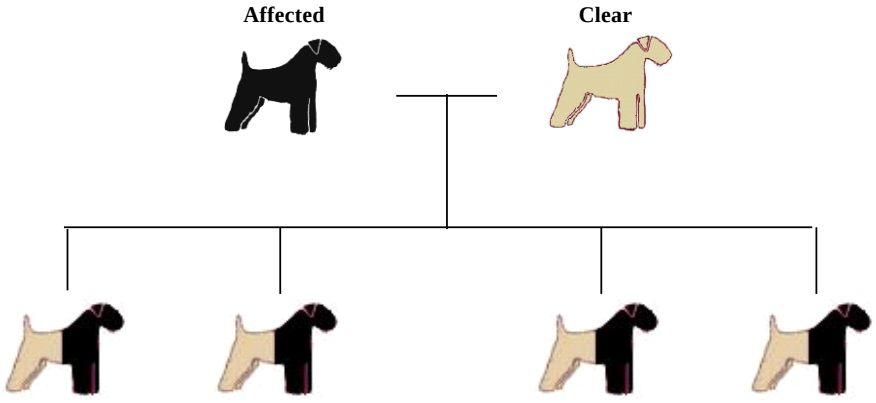


INHERITANCE OF AUTOSOMAL MUTATIONS

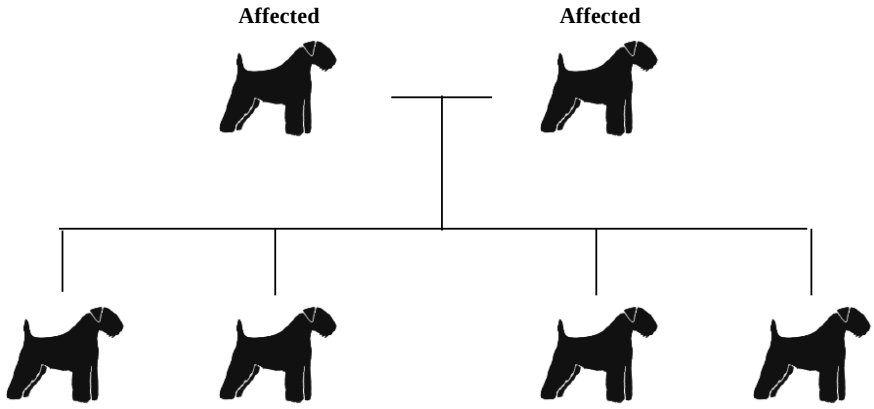
Recessive Mutations Cont:



50% Affected Offspring **50% Carrier Offspring**



100% Carrier Offspring



100% Affected Offspring

Note: The figures quoted are, in all probability, estimates. Reality can be different. In principle if you flip a coin it has a 50% chance of coming down 'heads' and 50% chance of coming down 'tails'. So the proportion of offspring in individual litters can differ from the expected outcomes given above.

Glossary of Genetic Terms

Alleles – One of two or more alternative versions of the same gene.

Amino acids – One of the chemical compounds that are the building blocks of proteins.

Autosomes – The name given to all chromosomes other than the two involved in determining the sex of an individual (the X and Y chromosomes). The dog has 38 pairs of autosomes and one pair of sex chromosomes.

Bases - There are four bases which join together to form DNA, Adenine, Guanine, Thymine and Cytosine, identified by their initials A, G, T and C. The bases join end to end to give a molecule of DNA. These bases join in a specific sequence and it is this base sequence that represents the genetic plan.

Candidate gene – A gene involved in a particular inherited disease in the dog which has been identified because the same gene is known to be the cause of a similar disease in man or other animals.

Carrier – With regard to hereditary disease this is a dog that carries a recessive, mutant allele that is matched by the presence of a normal allele. On average, it will pass on this mutant allele to half of its offspring.

Cells – One of the tiny living units from which organisms are made.

Cell membrane – The thin protective membrane that surrounds a cell.

Characteristic – A feature such as brown or blue eyes.

Chromosome – This is the body that carries the DNA within the nucleus. A thread of DNA runs along the length of each chromosome carrying individual genes.

Clear by Parentage – OFA: https://ofa.org/about/ofa-policies/
SCWT Database Policy: https://scwtdb.org/ClearByParentagePolicy_rev2.pdf

Code – Cells use the genetic code to convert the DNA's sequence of bases into a sequence of amino acids.

Congenital – Present at birth. May be inherited, but not necessarily.

Cytoplasm – The thick fluid that forms most of the inside of a cell.

DNA (Deoxyribonucleic Acid) – The chemical found in the nucleus of a cell that makes up chromosomes and genes. DNA consists of two chemical strands which twist around each other in the form of a helix. Each strand is made up by the joining together of the chemical units called bases.

DNA Sample – DNA can be collected in a number of ways. The most common methods used with dogs are by blood sample or a scraping of cheek cells, this is called a buccal sample.

Dominant Mutation – A mutation that can express itself when present only as a single copy, even in the presence of a normal allele.

Effective Population Size – The number of breeding animals in a hypothetical population that would deliver the same rate of inbreeding as the population in question.

Enzyme – A type of protein found in the body that greatly speeds up the rate of chemical reactions inside and outside cells.

Gamete – A reproductive cell. At fertilisation, the male gamete (the sperm) and female gamete (the egg), unite and the genetic material combines.

Gene – A part of the DNA which controls the hereditary characteristics of an organism. Individual genes consist of a unique sequence of about 2000 bases which permits the cell to make a particular protein. Each individual has two sets of genes (one set from each parent) and passes this on to each of its offspring.

Genetic – Describes something to do with genes and inheritance.

Gene pool – All of the genes that exist within an inbreeding population.

Genome – A complete set of chromosomes, i.e. genes within a living organism.

Genotype – The genes found in the cells on an individual. The genetic makeup of an individual will influence the appearance of phenotype of the individual.

Heritability – The transmission, or passing on, of features controlled by genes from both parents to their offspring. The proportion of phenotypic variation that is due to genetic variation.

Heterozygous – An individual that has two different alleles of a gene for a particular characteristic. If one allele is recessive and the other dominant, then the effect caused by the dominant allele will be apparent.

Homozygous – An individual that has identical alleles for a particular characteristic. Recessive characteristics will only show if an individual is homozygous for that characteristic.

Inbreeding – The breeding of individuals more closely related than average in the population.

Locus – Position on matching maternal and paternal chromosomes at which alleles of the same gene are found.

Marker – A component of a genetic map which uniquely identifies a locus.

Maternal – Something belonging to, or coming from, the mother (dam)

Microsatellite – A region of DNA which possesses an unusual base sequence where, two, three or four bases are continually repeated.

Monogenic – A characteristic controlled by a single gene.

Mutation – A change in the base sequence of DNA caused by an error in copying or some other factor. A mutation may be passed onto offspring.

Nucleus – The control centre of the cell which contains the chromosomes.

Paternal – Describes something belonging to, or coming from the father (sire).

Phenotype – The phenotype is the physical expression of an individual's genotype. Observable, or measurable, properties of an organism, e.g. hip score, weight.

Polygenic – Descriptive of a trait which is under the control of many genes.

Protein – One of a group of chemical substances that build and run cells. Proteins are built of amino acids using instructions encoded in genes.

Recessive Mutation – A mutation that is masked by the presence of a normal counterpart. These are only expressed when there are two copies of the mutation.

Selection – The process of varying relative individual reproductive success in propagation of a population.

Sex chromosomes – Chromosomes involved in determining the sex of the animal, i.e. females have two X chromosomes and males possess one X and one Y chromosome.

Sex linked inheritance – Inheritance of characteristics that are determined by genes present on either the X or Y chromosome.

Somatic – All cells in the body apart from the reproductive cells (gametes).

Storage of DNA *(UK)*:

Please consider having DNA stored for all Wheaten's that you own or breed.

Why is DNA storage important?
DNA is important for the future of the breed. ***ALL*** dogs, even those who are never bred from, are ***important***.

What will this mean for breeders and owners?
DNA from family groups will be vital for future research and breeders should consider storing DNA from parents (sire and dam) and their puppies, prior to the pups leaving for their new homes.

Stored DNA will enable researchers to find the deleterious (bad) mutations which cause hereditary diseases so they can be eliminated from the breed gene pool.

How often do I have to collect DNA from my dog?
Just **once**, DNA can be stored indefinitely.

Submission Forms:
Submission Forms for single dogs and litters are available from SCWT Club of GB. Contact the Health Team by email for more information: health@wheaten.org.uk

*The Club of GB can supply a pedigree upon request, and will require your dog's Kennel Club name, date of birth and parent names (sire and dam). Or go to the SCWTCA Endowment Health and Pedigree online database and search for the dog: https://www.scwtdb.org

Who should I inform if I store DNA?

- Your breeder
- SCWT Club of GB.
- SCWT Database - any DNA stored at The University of Cambridge or previously The Animal Health Trust (The
- AHT has now closed and the DNA has been transferred to Cambridge), should submit details of these records to the SCWTCA Endowment Health and Pedigree database https://www.scwtdb.org This is important as it provides valuable information for Researchers.


Any Wheaten that has its DNA stored will receive a Shamrock against its record.

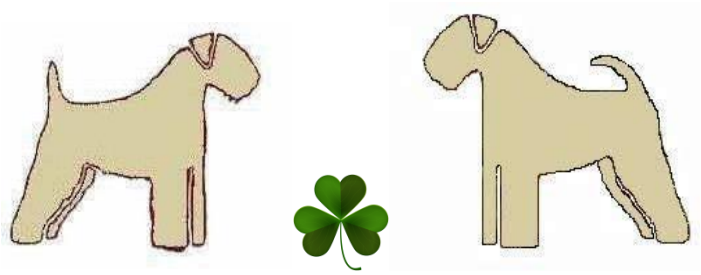
OTHER HEALTH CONDITIONS

This section of the Health Handbook provides details of health conditions that can affect dogs in general and some of these conditions have occasionally been diagnosed in the Wheaten Terrier. However, a few of these do have an hereditary component.

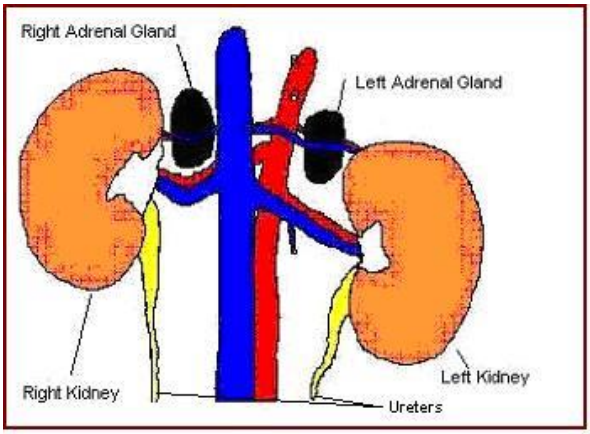
TOPICS:

- Cushing's Disease
- Deafness
- Degenerative Myelopathy/Failing Back Legs *(research is being undertaken to check if it is hereditary in the SCWT)*
- Ectopic Ureter & Vulvovaginal Stenosis *(slightly higher incidence than other breeds)*
- Eyes *(some Eye conditions can be hereditary)*
- 'Gulpies' (Acid Reflux)
- Hips
- Luxating Patella
- Skin Conditions

Important: *Please inform your breeder if your dog has a hereditary or other medical condition and consider sharing your health & testing information with your respective breed club. Also submit the information to the SCWTCA Endowment Inc. Health and Pedigree Database:* www.scwtdb.org which records health and testing information to enable the monitoring of health conditions by breed clubs and veterinary researchers.



Endocrine System



Endocrine Organs

Include the pancreas, thyroid gland, parathyroid glands and adrenal glands. Diseases of the endocrine system may lead to the production of too much or too little hormone.

Adrenal Glands

The adrenal glands are in close proximity to the kidneys. The outer portion of the adrenal glands are located on top of each kidney, this is called the adrenal cortex.

The adrenal cortex produces, among other things, steroid hormones which regulate carbohydrate and fat.

Cushing's Disease

Cushing's disease is the common name for **Hyper**adrenocorticism, (Addison's Disease is **Hypo**adrenocorticism).

Cushing's Disease is caused by a hyperactive adrenal gland that secretes too many glucocorticoids, (steroids), into the bloodstream. The adrenal gland produces a wide range of hormones and Cushing's can cause the overproduction of any one or more of them. The symptoms of the disease vary widely and because of this it is difficult to detect, however this is a treatable disease.

There are three basic causes of Cushing's disease:

1. A tumour in the adrenal gland
2. A tumour in the pituitary gland
3. Medically induced by administration of long term cortisone drugs. These medications are used to treat a variety of illnesses in dogs.

About 85% of dogs with Cushing's have an overactive pituitary gland which is a small pea sized gland in the brain producing an excessive secretion of the hormone ACTH. This in turn over stimulates the adrenal glands and produces an excess of cortisol. The majority of the remaining cases result from adrenal tumours. Approximately 50% of these adrenal tumours are benign.

Signs & Symptoms

- Increased/excessive water consumption (polydipsia)
- Increased/excessive urination (polyuria)
- Urinary accidents in previously housetrained dogs
- Increased/excessive appetite (polyphagia)
- Appearance of food stealing/guarding, begging & scavenging
- Sagging, bloated, pot-bellied appearance
- Weight gain or its appearance, due to fat redistribution
- Loss of muscle mass, giving an appearance of weight loss
- Bony, skull-like appearance of the head
- Exercise intolerance, lethargy, general hind leg weakness
- Reluctance to jump on furniture or people
- Excessive panting, seeking cool surfaces to rest on
- Symmetrically thinning hair or baldness (alopecia) on the body
- Dullness and dryness to coat
- Slow re-growth of hair

- Thin, wrinkled, fragile and/or darkly pigmented skin
- Easily damaged/bruised skin that heals slowly
- Hard calcified lumps in the skin
- Susceptibility of infections (especially skin or urinary)
- Diabetes, pancreatitis, seizures

Diagnosis

Cushing's disease is difficult to diagnose, there is no single test to identify it. Vets generally undertake several blood and urine tests to compare the results to normal levels. They may follow up with x-rays and/or ultrasound to reveal the presence or absence of a tumour.

Treatment

This depends how severe the symptoms are and on the general health of the animal. It can be treated both surgically and medically. These two options are, surgically removing the tumour (if one is present), and the prescribing of medications that slow down the adrenal gland. The majority of dogs are treated medically.

Deafness

The last reported cases of deafness or hearing impairment to the SCWT Club of GB were in 1998. This information is for historical reference only.

History

In 1997 and 1998 a very small number of Wheatens were identified with varying degrees of deafness.

Out of 81 Wheatens tested:

- 5 had a hearing defect
- 8 had an ear infection

This was confined to a group of dogs who had a common male ancestor, Harwelden Casey No, on both sides of their pedigree. Geneticist Dr Bruce Cattenach felt it was possibly hereditary and the mode of inheritance likely to be an autosomal recessive gene.

As a result, the Committee of the SCWT Club of GB obtained professional guidance from Celia Cox, BvetMed, Cert VR, FRCVS who carried out the BAER (**B**rainstem **A**uditory **E**voked **R**esponse) test on the hearing impaired dogs and their close relatives. It is still encouraged to have puppies of approximately 6 weeks of age BAER hearing tested if the pedigree has this male ancestor on both sides.

Degenerative Myelopathy (DM)/Failing Back Legs

Degenerative Myelopathy (DM) is a disease that causes progressive deterioration of the spinal cord in older dogs, eventually resulting in total rear end paralysis.

Symptoms:

- Loss of coordination (ataxia) in the hind limbs
- Wobbling when walking, rear feet dragging and 'knuckling' of toes, worn nails
- Hind end weakness (failing back legs), tremors of rear legs
- Difficulty rising, walking up steps, getting in the car, or squatting to defecate
- Weakness can initially occur in one hind limb but both will become affected
- Loss of urinary and faecal continence
- Weakness to front legs

This condition is associated with a number of breeds and Wheatens can also be affected with this condition.

Research

GB: please read the articles and recommendations regarding this condition in The Club of GB Bulletins, Winter 2017, page 28 and there's a further update in the Spring Bulletin 2022, pages 44-46.

Contact the Health Team for more information: health@wheaten.org.uk

USA: The SCWTCA has information on DM:

https://scwtca.org/health/degenerative-myelopathy-dm/

There's also a breed specific research article printed in the Spring 2009 "Wheaten Health News" by The Soft Coated Wheaten Terrier Club of America (SCWTCA). It indicated that research by the Missouri College of Veterinary Medicine was continuing in an attempt to determine if environmental or other factors may also be involved in the development of DM.

DM is thought to be genetic in nature, being caused by a gene mutation, and a DNA test is now available to identify this gene.

Because the DNA test has not been validated specifically for Wheaten Terriers only further genetic testing of affected dogs will help to verify the validity of it.

2017 News University of Missouri clinical trial for CDM:
http://www.veterinarypracticenews.com/canine-degenerative-myelopathy-test-moves-toward-trial/

PennGen Laboratories also offer a DNA test for DM:

https://scwtca.org/health/health-testing/dna-testing/

Further reading on this condition:

http://www.fitzpatrickreferrals.co.uk/neurology/canine-degenerative-myelopathy/

http://www.thekennelclub.org.uk/services/public/glossary/screening-scheme.aspx?id=DNA+test+-+DM&ReturnUrl=%2Fservices%2Fpublic%2Fglossary%2Fscreening-all.aspx

http://www.dogsnaturallymagazine.com/degenerative-myelopathy-in-dogs/

http://www.laboklin.co.uk/laboklin/showGeneticTest.jsp?testID=8158D

Ectopic Ureter

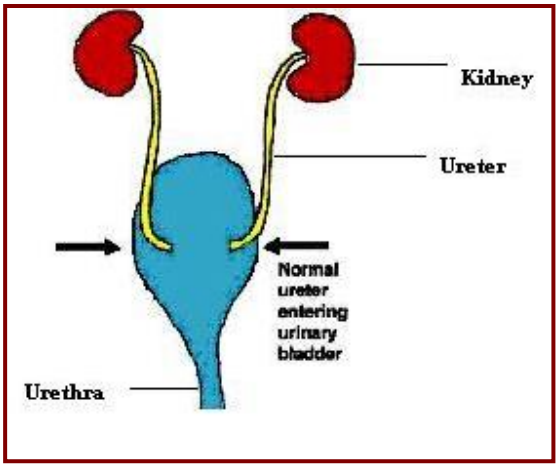
Ectopic ureter can affect dogs in general and studies have shown a slightly higher incidence in the Soft-Coated Wheaten Terrier compared to other breeds.

A small number of Wheatens have been born with congenital Ectopic Ureter. This condition can affect one or both Ureters. An Ectopic Ureter bypasses the bladder and can open into the urethra, vagina spincter muscle or uterus. Any of these malformations result in the puppy constantly dribbling urine.

This condition is present from birth so the problem may not be noticed at first as the mother constantly cleans the puppy. Many puppies have problems house training and can have bladder infections.

Signs of an Ectopic Ureter

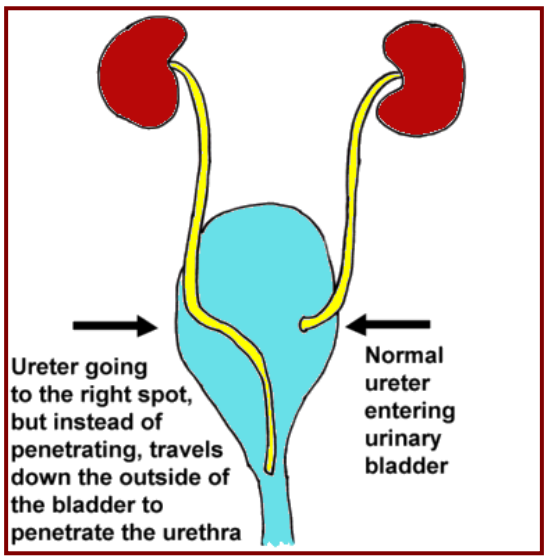
- Almost exclusively diagnosed in females
- Incontinence i.e. urine leaking or dribbling at times but normal urination at other times
- Frequent urination
- If infection is present blood tinged urine can sometimes be seen
- Excessive licking of the genital area. Often the urine leakage will cause a rash in this area
- A shortened Urethra is sometimes seen
- Vaginal Bands or Bifid Vaginas may be present



Normal Anatomy

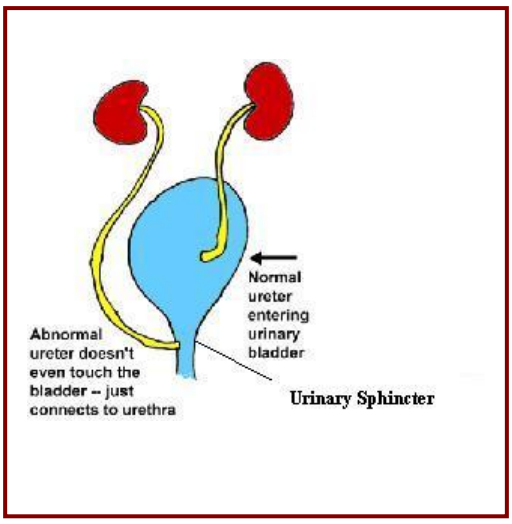
The kidney is made up of very small filters called nephrons, these filter blood and the final waste result is urine. The tube that carries urine from the kidney to the bladder is called a Ureter.

The urine is stored in the bladder until the dog needs to expel it to the outside via the urethra.



Anatomy showing Ectopic Ureter

This diagram shows the right Ureter opening into the bladder as normal but the left Ureter is totally bypassing the bladder and entering via the Urethra.



Anatomy showing Ectopic Ureter

This diagram shows the abnormal Ureter separated from the bladder and only connecting at the Urethra

At the neck of the bladder is a valve called the urinary sphincter, which controls the release of urine. Dogs that have Ectopic ureters can also have weak urinary sphincters.

How to Diagnose

- Verify unconcious leaking of urine
- Prone to Urinary Tract Infection (UTI)
- Culture the urine to avoid use of unecessary Antibiotics
- Use imaging such as contrast Radiographs or Ultrasound to visualise anatomy
- Cytopcopy is the best way to visualise from the inside the possibly correct during the procedure
- Laser ablation can often correct the anatomy
- Follow up medications may be needed

Although surgery is possible for ectopic ureters, in many cases it is not successful and the puppy continues to leak urine.

Sadly, in extreme cases this condition may result in the euthanasia of the puppy.

Who to Contact for help

USA - There are Centers of Excellence around the USA, American Veterinary Society of Nephrology and Urology www.asvnu.org will have a listing of facilities and their locations.

UK & Other countries – Ask your Veterinarian's advice

There is a recorded **Webinar** on Ectopic and Urogenital Disorders on the SCWTCA website: https://scwtca.org/education/webinars/ scroll to the Webinar link for these conditions:

Vulvovaginal Stenosis

A less common cause of incontinence in female dogs is call vulvovaginal stenosis. It is a condition in which the vagina at the level where the urethra ends is narrowed. Occasionally when the bitch urinates, some urine will be trapped in the vagina in front of this narrowed area. When the dog rises from lying down the urine seeps out. This condition can be diagnosed by veterinary examination. In some dogs the narrowing can be stretched under anaesthesia. The incontinence may or may not resolve as sometimes other defects are also present.

Eyes

Eye testing is recommended; especially for breeding stock. Breeders usually test their litter of puppies at about 6 to 8 weeks old. An eye certificate is current for one year. Ophthalmic Vets perform this test; and you can find one in your area by contacting the BVA (*whose details are at the back of this Handbook*).

The following conditions have occasionally been found in Wheaten Terriers, therefore, breeders and owners should be constantly vigilant.

Retinal Folds: The small 'folds' are found on the retina at about 5 weeks of age to approximately 4 months. It is important for breeders to eye test their puppies between the ages of 6 to 8 weeks. The folds can 'flatten out' and may not be detected later than this. It is recommended by the SCWT Club of GB that any puppy diagnosed as having 'folds' should not be bred from.

Persistent Pupillary Membranes – PPM: These are remnants of a foetal structure called the pupillary membrane. This membrane covers the pupil before the puppy is born. Normally the pupillary membrane is partially present and continues to disappear as the puppy develops.

Absorption may not be complete when the puppy's eyes first open at about 10-14 days old and a small web like structure can be seen across the pupil. This usually disappears by the time the puppy is 4-5 weeks of age. In some breeds these strands never disappear and become PPM. PPM's seem to be insignificant in the Wheaten and do not appear to affect their eye sight.

Progressive Retinal Atrophy (PRA) is the name given to a group of hereditary retinal diseases in dogs. There are several classifications of the disease according to the age of onset of the diseases and the types of retinal pathology which occur. PRA is not painful but the loss of sight is permanent.

Wheaten's have occasionally been reported with PRA. In breeds that have been investigated in sufficient detail, the mode of inheritance appears to be simple autosomal recessive.

PRA affects the retina (the 'film' in the camera). It occurs in both eyes simultaneously and results in the degeneration of the rod and cone cells in the retina.

Owners may notice their dog bump into objects, especially in a dimly lit room. This progresses to night blindness and usually within months, with a loss of daylight vision as well. Night blindness is first noticed because the rods (the cells which allow vision in reduced light) degenerate before the cones (the cells which allow vision in bright light). The dog will frequently have dilated pupils and the owner may notice increased shininess at the back of the eye.

Dogs with PRA can develop cataracts later as the disease progresses.

Most dogs adjust well to vision loss, they are usually happy as long as their routine is stable. It is more difficult for them if their surroundings become unfamiliar.

Microphthalmia - is an inherited condition in the SCWT. This condition is apparent in pups once their eyes have opened. It can be mild or severe. A defect early in development results in the smaller than normal eye (microphthalmia). Affected dogs have prominent third eyelids and small eyes which appear recessed in the eye socket (enophthalmos). This is often associated with other eye abnormalities, including defects of the cornea, anterior chamber, lens and/or retina. At worse puppies can be blind, or may have cataracts which may be progressive, resulting in worsening vision.

Microphthalmia is also seen with coloboma – a cleft in a portion of the eye.

Research & Breeding
May 2018 - An article about the research in SCWT's has now been published.
Maria Kaukonen, Sean Woods, Saija Ahonen, Seppo Lemberg, Maarit Hellman, Marjo K. Hytönen, Perttu Permi, Tom Glaser, Hannes Lohi. Maternal Inheritance of a Recessive RBP4 Defect in canine congenital eye disease. Cell Reports 2018 May 29;23(9). doi: 10.1016/j.celrep.2018.04.118.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0295851

In 2012 - The Finnish Kerry Blue and Wheaten Terrier Club have also published an article written by Veterinary Opthalmologist, Marjukka Sarkanen, who has given permission to reproduce part of the text (*see below).* The article is written in Finnish but there are images of Wheaten puppies with this condition.

This following translation has the second and third pages omitted, since they mainly contain specific information on how Finnish breeders should act if they should have a litter with this problem.

From the Breeding Committee of the Finland Kerry Blue and Soft Coated Wheaten Terrier Club: http://www.kerryvehna.net/

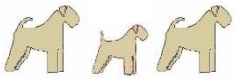
> *"…. Ocular anomalies and Microphthalmia found and reported in a Finnish SCWT litter. The puppies' eyes seemed abnormal and the eyeballs small (see pictures). They were checked by an eye-specialist, who diagnosed the puppies with various ocular anomalies, e.g. microphthalmia, coloboma and PPM's (Persistent Pupillary Membrane).*
>
> *The puppies were practically blind, and had to be put to sleep. The breeder of the litter passed the information to the Breeding Committee. Blood samples taken from the sick puppies, their siblings and parents were sent to the Canine Genetic Studies group led by Prof. Hannes Lohi (www.koirangeenit.fi).*
>
> *There have been rumours of similar litters in Canada, Sweden and The Netherlands. In Finland, this was the first litter brought to the attention of the Breeding Committee. In 1995, a research article published in The Netherlands reported a similar syndrome in two closely related SCWT litters (Van der Woerdt, A. Stades, F.C. Linde-Sipman, J.S van der Boeve, M.H. 1995. "Multiple ocular anomalies in two related litters of Soft-Coated Wheaten Terriers" Veterinary and Comparitive Opthalmology.*
>
> *The Finnish Breeding Committee strongly recommends that all puppies should have their eyes examined, even if there are no abnormalities visible…"*

Your Vet may recommend visiting a Specialist Veterinary Ophthalmologist.

PennGen Laboratories offer a DNA test for Microphthalmia:
https://www.vet.upenn.edu/docs/default-source/research/penngen/mosdmannouncement042920finalv2.pdf?sfvrsn=8d74edba_0

Webinar available on: https://scwtca.org/education/webinars/

Laboklin Laboratories also offers a test for this condition.



'Gulpies'

Is a Gastro Intestinal (GI) acid reflux which is a build-up of 'gas' and/or acid. The medical term is Aerophagia.

This can occur in any breed of dog and is commonly referred to as 'Gulpies', or 'Lick Fits'.

Key Researcher, Professor Meryl Littman wrote a Gulpies article in October 2019, There is a **Webinar** covering this condition on the SCWTCA website: www.scwtca.org/education/webinars scroll to the Webinar link dated May 18, 2021

Dogs with 'Gulpies' may have one of the following
Uncontrolled licking of their lips, 'gurgling' in the stomach, gulping in air, they may also vomit and can be quite distressed.
When the dog has one of these episodes it wants to eat anything in a frenzied manner but ***it is important to stop*** *your dog ingesting:* grass, leaves, twigs, paper, carpet, dog blankets/beds or anything else!

- For some dogs the cause may be an allergy to certain foods
- Feeding a low fat diet
- It is helpful to split food into smaller portions and feed, if possible, 2 or 3 or 4 times a day. Feed the last meal later in the evening so that the dog does not have an empty stomach for too long
- Increasing the height of food and water bowls
- Using a 'Slow Feeder' bowl
- Lightly rubbing the throat and tummy
- Taking the dog for a walk on a lead

Suggested Over the Counter (OTC) Remedies

- Pepcid, Imodium, Sulcrate and Pepto Bismol with their recommended dosage can be found on the American Kennel Club website https://www.akc.org/expert-advice/health/is-pepto-bismol-safe-for-dogs/
- Using a daily pro-biotic helps, Fortiflora or Plain Organic Goat Kefir are popular products
- Slippery Elm Capsules - dosage 2 capsules
- Slippery Elm Powder – ½ teaspoon per 10 pounds of body weight
- Homeopathic Nux Vomicus - Three of the Nux 30C, (do not touch with your hand), crush between two spoons and put into the pouch at the side of the mouth. No food or drink 10 minutes before or after. Repeat if needed

Videos
'Causes of Gastroesophageal Reflux Disease in Pets' (also known as GERD) Dr Karen Becker: https://www.youtube.com/watch?v=G9dR-SO73uo

YouTube (just google), has quite a number of videos showing dogs with 'Gulpies'/'Lick fits': https://www.youtube.com/watch?v=tpYAC9IfZjo

Facebook 'Read only' Support Group – 'Dog Gulping Disorder Awareness & Owner Support' https://www.facebook.com/gulpydogs/about/

Hips

Hip Dysplasia is a term which describes developmental and other abnormalities involving the hip joint.

Genetically it is complex, and it can also be caused by environmental factors; an injury, or if a puppy is exercised too much, too soon, and allowed to run up and down stairs and jump of beds and/or furniture etc.

To perform a hip X-ray a Vet usually anaesthetises the dog so that there is no movement during the procedure. Some Vets are now performing hip scoring using sedation rather than full anaesthetic.

In the UK, the X-ray is sent to the British Veterinary Association (BVA), where specialists examine each hip and give it a number (score). The panel meet regularly, but the score result can take up to 8-12 weeks before notification is returned to the submitting Vet.

Please note the following:

- Hip scoring is only required once in a dog's lifetime
- Hip scoring should only be undertaken on dogs over the age of 12 months, there is no upper age limit
- Hip scoring should be undertaken if you are using your Wheaten for breeding
- To check if the dog is in good health, the Vet may also undertake a blood and urine test prior to this procedure
- If a bitch is to be scored, it is thought by many that this is best undertaken as near to the mid-point between her seasons, otherwise the change in hormone levels could possibly result in a higher score

The minimum best score per hip is zero, the maximum is 53, and this gives a total range of 0-106. The SCWT breed mean score in the UK is about 13.

BVA - full and up to date information and documents available on the BVA website whose details are at the back of this Health Handbook.

Hip Scoring Comparisons

There are different methods for scoring hips, so you need to check with your own Breed Club and/or Kennel Club for full details.

The Table below gives an **approximate correlation** between different schemes

FCI (Europe)	OFA (N America)	UK (1 hip)	Germany	Switzerland
A Normal hip	Excellent	0	A1	0
	Good	1-3	A2	1-2
B Borderline	Fair	4-6	B1	3-4
	Borderline	7-8	B2	5-6
C Mild HD	Mild	9-12	C1	7-9
	Mild	13-18	C2	10-12
D Moderate HD	Moderate	19-30	D1	13-15
	Moderate		D2	16-18
E Severe HD	Severe	>30	E1	19-21
	Severe		E2	22-44

Luxating Patella

Luxating Patella is a condition which can affect dogs in general, in particular Toy Breeds.

Very occasionally a Wheaten has received this diagnosis, but it is not thought to be hereditary.

It can be caused by a congenital abnormality but some cases of the condition can be the result of environmental causes; such as, an accident, or over exercising a young puppy!

It is therefore important that young puppies are not allowed to run up and down stairs, and jump off furniture. Wheaten puppies should be exercised for no more than 10 minutes, twice daily until 6 months of age, and 20 minutes, twice daily, up to 12 months. After this, the bones and joints should have matured enough to take normal exercise.

Clinical signs

- Lameness
- A skipping gait
- Pain
- Stiffness of the hind limb
- Some dogs show only a single sign, whereas others show many signs of the condition
- Failure to treat the condition could lead to progressive debilitating arthritis of the joint

The patella (commonly known as the kneecap) becomes displaced from its normal position which is over the centre of the lower part of the thighbone. The patella slides up and down in a groove in the femur, or thigh bone, when the knee bends or extends. If the patella is not positioned correctly, the leg cannot function properly.

The problem is caused by an abnormal development of the bones and joints when the dog is growing, especially an abnormal position of the tibia. This leads to a more than normal wear and tear of the joint and may lead to arthritic changes in the long term. It can also cause other problems of the knee joint, such as torn cruciate ligaments.

Treatment
There are four levels of severity of a Luxating Patella; Grade 1 is the mildest and Grade 4 is the most severe. Therefore, treatment will depend on the severity of the condition.

If the condition is severe then your vet *may* recommend an operation to correct the position of the patella.

Internet Search for more information: Luxating Patella in dogs – there are supplements and minerals which can help dogs who have this condition.

Skin Allergies

Like any dog, Wheatens can be prone to allergies, itchy skin, in particular, excessive biting, licking and nibbling of the paws.

Atopic Dermatitis – an allergic skin disease of dogs, known as canine atopic dermatitis, is caused by the dog's immune system hypersensitivity to common substances in the environment such as dust mites or moulds.

The signs of atopic dermatitis usually appear within the first two years of a dog's life. If the dog begins to groom excessively, with licking or chewing of the paws, abdomen and hindquarters, then it may suffer from atopic dermatitis. Another indicator is the ears are reddened and hot to the touch.

A hidden sign that a dog is atopic is in the armpits, groin, or between the toes of the paws. Check to see if there is saliva staining. In light coloured dogs it appears as a red-brown staining. In chronic cases the skin, mostly in the abdomen, may change colour from a pinkish, to angry red, to black mottling.

Food allergy and parasitic infestations may mimic the symptoms of atopic dermatitis making it difficult to diagnose. Once fleas, foods, and parasitic infestations are eliminated, then an allergy skin testing for dust mites, pollens, and moulds may be done to determine what causes the dog's atopic dermatitis.

Flea treatments can also cause allergic reactions.

Inhalant Allergy – just like humans, canine inhalant allergies are caused by pollens (tree, grass and weed), dust mites, moulds and chemicals. Any dogs can acquire inhalant allergies the most common breeds that are affected include terriers.

The symptoms of an inhalant allergy include sneezing, runny nose and eyes, scratching, biting, chewing at feet and constant licking. The itching may be most severe on feet, flanks, groin and armpits. Inhalant allergies are often the reason for recurrent ear infections in your dog.

Aerosols, 'plug ins' and powders used to make a room or furniture/carpets smell good can cause inhalant and skin allergies also be careful of products used to wash bedding and floors.

Food Allergy – dogs can become allergic to a food they have eaten for years this means many people overlook the possibility of a food allergy. Food allergies only account for approximately 10 per cent of allergy problems in dogs.

Food sensitivities in a dog may manifest as itchy skin, scratching at ears, shaking of the head, licking and biting at the hind quarters or feet, rubbing faces on carpeting, ear inflammations, coughing, diarrhoea, flatulence, sneezing, asthma like symptoms, behavioural changes, seizures, gagging, 'gulpies' and vomiting.

If food contains chicken this could well be the cause. Some foods are 'sprayed' with hydrolysed chicken fat which makes it more palatable to dogs, but they can still be allergic to this. Also take care with feeding wheat/gluten and other grains.

Allergy Testing – Your Vet may recommend testing for allergies.
One such facility is Hemopet (Dr Jean Dodds): http://www.nutriscan.org/

Hemopet on Facebook: https://www.facebook.com/DrJeanDoddsHemopetNutriScan/?fref=ts

Links – others are available - just google!
There is lots of information on Dog's Naturally, we have listed a few below:
https://www.dogsnaturallymagazine.com/dog/remedies/

Apple Cider Vinegar: http://www.dogsnaturallymagazine.com/3-simple-ways-apple-cider-vinegar-can-help-your-dog/

Coconut Oil: http://www.dogsnaturallymagazine.com/?post_type=post&s=coconut+oil

Fish Oil – is it safe? http://www.dogsnaturallymagazine.com/fish-oil-for-dogs-the-good-the-bad-and-the-ugly/

Turmeric Paste: http://www.dogsnaturallymagazine.com/turmeric-dogs/

Dr Karin Becker discusses turmeric on YouTube:
https://www.youtube.com/watch?v=rkCz2MR-k_Q

Please note that links given to articles that are general in nature on external websites are not a substitute for your own Veterinarian's advice

References & Acknowledgements:

Special thanks go to Prof Meryl Littman (retired), for her dedication and work on behalf of the SCWT.

UK Contacts & websites:

SCWT Club of GB website: https://wheaten.org.uk/

UK Post Mortem:
The University of Cambridge
Central Diagnostic Services
Department of Veterinary Medicine
Madingley Road
Cambridge website: https://www.vet.cam.ac.uk
CB3 0ES Email: clinpath@vetcam.ac.uk

Royal Veterinary College
Hawkshead Lane
Brookmans Park
Hatfield
AL9 7TA website: https://www.rvc.ac.uk/

UK Organisations:

British **V**eterinary **A**ssociation (**BVA**) (For information on **Eye** and **Hip** Schemes)
7 Mansfield Street
London
W1G 9NQ website: https://www.bva.co.uk/

The Kennel Club
1 Clarges Street
Piccadilly
London, W1J 8AB website: www.the-kennel-club.org.uk

USA Health

SCWT Club of America (SCWTCA) website: https://scwtca.org/
Your vet should be able to find a Veterinary Internist in your area who is familiar with the hereditary diseases which can affect the SCWT. Visit SCWTCA for further information.

SCWTCA Endowment Inc.

Funding of Health research and projects and the Endowment Health & Pedigree Database
website: http://www.wheatenhealthendowment.org/

USA Organisations:

American Kennel Club website: http://www.akc.org/

AKC Canine Health Foundation (AKC CHF):
http://www.akc.org/dog-breeders/breeder-education/canine-health/

Canine Health Information Centre (CHIC): http://www.caninehealthinfo.org/chicinfo.html

Orthopaedic Foundation for Animals (OFA) - http://www.ofa.org/

Worldwide:

SCWT Health & Pedigree Database: owned and operated by SCWTCA Endowment Inc. Wheaten pedigrees, ancestry, COI, submit health information, test results and photographs visit: https://scwtdb.org/

Webinars: There are 'Hereditary' and 'Other Health Conditions' webinars now available to watch on https://scwtca.org/education/webinars/

PLN-Associated Variant Genes/Degenerative Myelopathy/Microphthalmia testing

Note: *only testing undertaken via PennGen aids Wheaten Research Projects*

PennGen Breed Testing - https://www.vet.upenn.edu/research/academic-departments/clinical-sciences-advanced-medicine/research-labs-centers/penngen/penngen-tests

Laboklin (UK): https://www.laboklin.co.uk/laboklin/GeneticDiseases.jsp?catID=DogsGD
This Lab is also available in Europe/Scandinavia

Dog's Naturally: natural remedies: https://www.dogsnaturallymagazine.com/dog/remedies/

Facebook Group: Wheaten Health Matters – this group is for Wheaten owners everywhere. It offers help and support with general health and hereditary diseases questions and advice where to get specialist help.

Grooming your Wheaten:

All the videos which where previously available on the WHI website can be viewed on the Wheaten Terrier Grooming Youtube Channel: https://www.youtube.com/@wheatengroom

Facebook Group: Wheaten Grooming Matters – Professional Groomer and Wheaten Breeder Lisa Lopez offers videos and helpful tuition for bathing, drying and trimming etc:

SCWT Club of America has detailed information on grooming:
https://scwtca.org/breed/groom/

SCWT Club of GB has information on grooming and run Grooming Workshops:
https://wheaten.org.uk/

Training Facebook Groups:
Wheaten Owners Online Fear-Free Training (WOOFT)

Common Sense Wheaten Training

Canines Can Do

Training Associations:
Association of Pet Dog Trainers: https://apdt.co.uk/

International Association of Animal Behavior Consultants: https://m.iaabc.org/