

## Lymphoma

### What is cancer?

Cancer is the uncontrolled growth of a small population of abnormal cells. These abnormal cells form by a mutation during the normal division cycle and are able to escape detection by the body's immune system. They have an intrinsic capacity to divide rapidly and uncontrollably leading to the development of tumours.

Lymphoma accounts for 10-20% of all canine cancers and is by far the most common canine blood cancer.

Lymphoma is a cancer of a white blood cell called a lymphocytes. Lymphocytes are the second most important white blood cell behind neutrophils. They are an important part of your pet immune system involved in fighting infection and disease. There are two major types of lymphocytes: T cell and B cell. This distinction becomes important when diagnosing lymphoma as the type of cell (T or B) that is neoplastic can have a major impact on treatment and outcome.

There are many different forms of lymphoma depending on where the cancer cells originate. The most common form which occurs in 80% of dogs involves an enlargement of all the lymph glands in the body. Other less common forms involve a mass in the chest, cancer of the liver and spleen, cancer of the gastrointestinal tract, skin, bone marrow, central nervous system and the eye.

### What are the signs your pet has lymphoma?

There is a lot of variation in the presenting signs of dogs with lymphoma. Because the cancer can pop up in almost any part of the body, the signs will vary accordingly. The most common signs are general vague signs of illness including anorexia, vomiting, lethargy, weight loss and diarrhoea. Depending on the specific part of the body involved, signs such as difficulty breathing and diarrhoea may be present.

### How is it diagnosed?

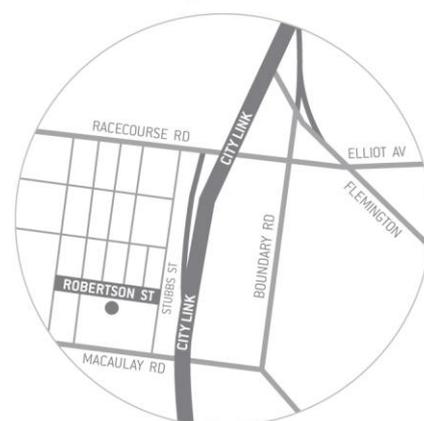
Lymphoma can be diagnosed in many different ways depending upon where the cancer is. Palpating enlarged peripheral lymph nodes behind the knee or under the chin can be suggestive of lymphoma. Sometimes a fine needle is passed into these lymph nodes and the cells are examined microscopically for evidence of cancer. If the lymphoma is in a more difficult place to obtain a needle sample, than a surgical,

Specialist Surgery  
Physiotherapy  
Hydrotherapy

Specialist Medicine  
Behaviour  
Ophthalmology

24hr Emergency Centre  
Critical Care  
CT Scanning

Melway Ref: 2A, A4



endoscopic biopsy may be required or fluid around the spinal cord may need to be collected. For absolute confirmation the sample from the needle or a biopsy obtained should be sent off to a pathologist.

### How is Lymphoma tumours graded?

Lymphoma is graded according to the World Health Organisation into 5 grades and two substages

#### Grading

1	One affected lymph node
2	Regional lymph node involvement
3	Generalised lymph node involvement
4	Liver and spleen involvement
5	Bone marrow involvement

#### Substage

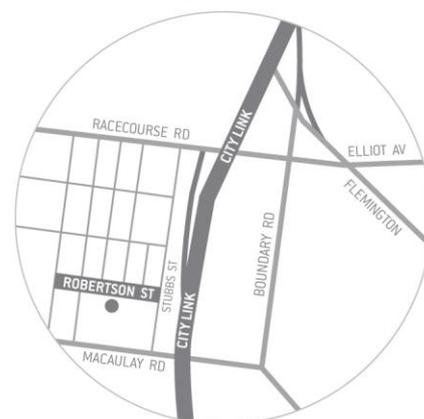
A	Eating and healthy
B	Vomiting, off food, lethargic etc.

Grading becomes very important when determining the prognosis for lymphoma. See later for discussion on prognosis

### What are your pet options for treatment?

Because lymphoma is a systemic cancer, surgical removal of the tumour is not an option. This leaves us with chemotherapy or palliation as the only options for treatment.

Melway Ref: 2A, A4



Specialist Surgery  
 Physiotherapy  
 Hydrotherapy

Specialist Medicine  
 Behaviour  
 Ophthalmology

24hr Emergency Centre  
 Critical Care  
 CT Scanning

## Chemotherapy

There is more than one option for chemotherapy. The two main options are to go for multi agent protocols or single agent protocols.

Single agent protocols are nowhere near as effective as multi agent protocols. The most effective single agent used is Doxorubicin and is given as an intravenous injection every three weeks for five treatments. The mean survival time (MST) for this treatment is 6-8 months.

Multi agent Chemotherapy for dogs with lymphoma is based around 4 drugs called Cyclophosphamide, Vincristine, Doxorubicin and Prednisolone. The protocol runs for approximately 25 weeks with 16 treatments in that time. The overall cost for this treatment is in the vicinity of \$3000-4000 – this is paid on a visit by visit basis. This will vary a little bit with how your pet copes with the chemotherapy and if your pet becomes sick and needs intensive hospital care. A copy of the protocol is attached at the end

If you do not want to undertake chemotherapy, than palliation with prednisolone alone is an option. This will give you some quality time with your pet. On average palliation with prednisolone will give anywhere from 1-2 months.

## **What are some side effects or complications associated with treatment?**

Please see the chemotherapy handout for further information on chemotherapy.

## **How long can [Pet's name] survive with Lymphoma?**

The main factors we consider when giving you an estimate of how long your pet has to live is based upon the WHO grade, type of cell (T or B) and substage (A or B). If the lymphoma is Grade 3 or less, if it is a B cell rather than a T cell and if the dog is substage A rather than B, than the prognosis is better. Also, rapidly growing tumours tend to respond better to chemotherapy but relapse quicker, where as slower growing indolent tumours tend to have a poor response to chemotherapy but an overall survival advantage.

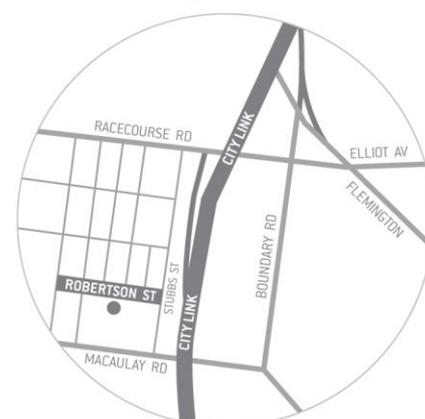
The MST for lymphoma in dogs treated with a multiagent chemotherapy protocol for 25 weeks is 12-14 months. 25% of dogs will be alive at 2 years. 80-90% of dogs will be in complete remission within a few treatments however a complete cure is extremely rare.

Specialist Surgery  
Physiotherapy  
Hydrotherapy

Specialist Medicine  
Behaviour  
Ophthalmology

24hr Emergency Centre  
Critical Care  
CT Scanning

Melway Ref: 2A, A4



**What happens once your pet is in remission?**

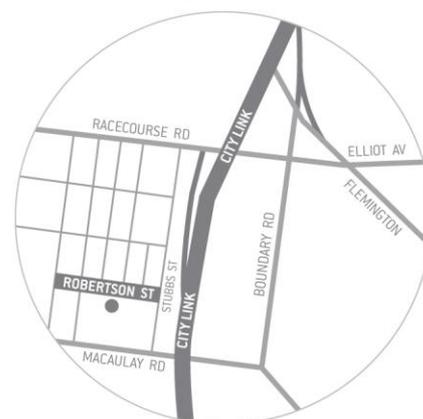
Complete remission is not a cure and unfortunately the day will come when the tumour relapses. Once this occurs there are a few options. One of the reasons why this occurs is that the tumour becomes resistant to the chemotherapy drugs. When the tumour comes back, sometimes we will try to commence the initial chemotherapy program again or we may commence a rescue protocol with a potent drug the tumour has never seen before. If your pet does respond the second time around, than the time in remission is much reduced from the first time and is approximately half a long. With a rescue protocol, 1-2 more months is possible

Specialist Surgery  
Physiotherapy  
Hydrotherapy

Specialist Medicine  
Behaviour  
Ophthalmology

24hr Emergency Centre  
Critical Care  
CT Scanning

Melway Ref: 2A, A4



Week	Drug	Dose	Route
1	Vincristine	0.7mg/m <sup>2</sup>	IV
	L-Asparaginase	400IU/Kg	SC
	Prednisolone	1mg/kg BID	PO
2	Cyclophosphamide	250mg/m <sup>2</sup>	IV
	Prednisolone	1.5mg/kg SID	PO
3	Vincristine	0.7mg/m <sup>2</sup>	IV
	Prednisolone	1.0mg/m <sup>2</sup>	PO
4	Doxorubicin	30mg/m <sup>2</sup>	IV
	Prednisolone	0.5mg/kg SID	PO
6	Vincristine	0.7mg/m <sup>2</sup>	IV
7	Cyclophosphamide	250mg/m <sup>2</sup>	IV
8	Vincristine	0.7mg/m <sup>2</sup>	IV
9	Doxorubicin	30mg/m <sup>2</sup>	IV
11	Vincristine	0.7mg/m <sup>2</sup>	IV
13	Cyclophosphamide	250mg/m <sup>2</sup>	IV
15	Vincristine	0.7mg/m <sup>2</sup>	IV
17	Doxorubicin	30mg/m <sup>2</sup>	IV
19	Vincristine	0.7mg/m <sup>2</sup>	IV
21	Cyclophosphamide	250mg/m <sup>2</sup>	IV
23	Vincristine	0.7mg/m <sup>2</sup>	IV
25	Doxorubicin	30mg/m <sup>2</sup>	IV

IV = intravenous injection

SC = injection under the skin

PO = oral tablet

Melway Ref: 2A, A4



Specialist Surgery  
 Physiotherapy  
 Hydrotherapy

Specialist Medicine  
 Behaviour  
 Ophthalmology

24hr Emergency Centre  
 Critical Care  
 CT Scanning