



Frequently Asked Questions Devil Facial Tumour Disease

1. What is Devil Facial Tumour Disease?

Devil Facial Tumour Disease (DFTD) is a term used to describe a fatal condition in Tasmanian devils which is characterised by the appearance of obvious facial cancers. The tumours or cancers are first noticed in and around the mouth as small lesions or lumps. These develop into large tumours around the face and neck and sometimes even in other parts of the body. Adults appear to be most affected by the disease - males the first affected, then females. Badly affected devils have many cancers throughout the body.

As the cancers develop in affected devils, they find it hard to ingest food. The animal weakens further making it difficult to compete with other animals for food. Affected animals appear to die within three to five months of the lesions first appearing, from starvation and the breakdown of body functions.

2. Do you treat the Devil Facial Tumour Disease in individuals?

Treatment for individuals has not yet been trialled for the following reasons:

- Initially we needed to make the best use of available resources by investing time into the study of the disease.
- Most importantly, if a cure for this disease is found, we need to be able to use it from a wildlife management point of view rather than on individual animals - we want to keep the devils wild and in the wild.
- Surgery and chemotherapy would be difficult, if not impossible, to implement from a population point of view. Nevertheless, nothing is ruled out that may help to save the devil, and research is proposed to investigate the possibility and feasibility of cancer treatment for devils in some limited situations.

3. Can Devil Facial Tumour Disease spread to other animals?

The Mount Pleasant Laboratories, in Launceston, are the only animal health laboratories in Tasmania, and handle all cases concerning farmed and wild animals. To date, they have found no evidence of Devil Facial Tumour Disease in other animals.

The Program's field team trapping surveillance has caught many species that showed no clinical signs of the disease. Species include possums, quolls, cats and even a sausage dog.

4. Are Tasmanian devils endangered?

In May 2009, the Australian Government listed the Tasmanian devil as Endangered under national environmental law. It is also listed as Endangered under the Tasmanian Government's Threatened Species Protection Act 1995. The Tasmanian devil has also been listed as Endangered on the Red List of the International Union for the Conservation of Nature and Natural Resources (IUCN) – the benchmark for the global conservation status of plant and animal species.

In the mid 1990s, the first signs were observed of the fatal and infectious cancer, Devil Facial Tumour Disease. Sightings of the Tasmanian devil have since declined by more than 70%. As at October 2009, DFTD can be found at 64 locations across more than 60% of the State.

In September 2006, Devil Facial Tumour Disease was gazetted under the Animal Health Act 1995 as a List B notifiable disease.

5. Could the devil facial tumours be caused by an accumulation of exposure to the UV rays radiating through our ozone depleted skies?

There is no evidence to date that this is the case. It's true that there is growing evidence to suggest that squamous cell carcinoma (SCC) and melanomas are initiated by solar damage. Also, osteosarcoma of large breed dogs is thought to be initiated or promoted by repetitive trauma.

Animals in parks and zoos (including those in Tasmania) are less "shy" and do sunbake. But there has been no evidence to date to suggest that Devil Facial Tumour Disease has spontaneously arisen in captive populations. We have also not had cases of melanomas or SCCs.

Neoplasms initiated/promoted from trauma and UV damage usually occur as a result of having a degree of chronicity of exposure. There was support for this hypothesis when it was found that older animals were initially the only ones affected by the disease (three to four year olds), however it has now been shown that one to two year olds are affected. We have found evidence supporting our theory that the disease is acting as a contagious allograft – a "parasite" in effect.

6. How do Tasmanian devils catch Devil Facial Tumour Disease?

Trials are under way to examine the transmission of Devil Facial Tumour Disease. Preliminary results support the increasingly accepted hypothesis that we are dealing with a transmissible cancer and that cancerous cells are passed directly between devils as an allograft. Put more simply, we are getting more and more evidence to support the theory that DFTD is spread by the cancer cells themselves being passed from one animal to another.

7. If Devil Facial Tumour Disease is a form of cancer, how can it be contagious?

Devil Facial Tumour Disease is extremely rare. It is one of only three recorded cancers that can spread like a contagious disease.

Under normal circumstances cancer cannot be "caught". The cancer cells from one individual are completely different to another individual, and when transferred should be rejected by the immune system. So the fact that DFTD breaks this rule raises many questions about the immune system of the Tasmanian devil.

Researchers at the Menzies Research Institute, led by A/Prof Greg Woods, confirmed that blood sample analysis shows that Tasmanian devils have a fully functional immune system.)

The devil-to-devil transmission suggests that this cancer is similar to a transplant - but rather than a transplant of a life-saving organ, such as a heart or kidney, the transplant is a life-threatening cancer.

Further laboratory tests investigated whether the Tasmanian devil has the correct genes to allow recognition of foreign cells. This was performed by mixing lymphocytes (the key cell in the immune system) from many devils to see if they reacted to each other. The results from these studies clearly showed that Tasmanian devils failed to recognise cells from other devils as different. This provides strong evidence that a lack of genetic diversity contributes to the cancer being infectious. When a healthy devil is infected with DFTD from another animal, the infected devil's immune system assumes that the new cancer cells are the same as its own cells and fail to reject them.

The daunting task ahead is to learn how to persuade the devil's immune system to recognise the cancer cells as hostile infectious agents, which will then alert the devil's immune system to destroy these cancer cells.

8. If there are still thousands of Tasmanian devils left in the wild, then how can they be classified as 'endangered'?

There has been a decline across Tasmania of more than 70% in average sightings per spotlighting survey

since DFTD emerged. In the north-east region, where signs of the disease were first reported, there has been a 95% decline (approximately) of average sightings.

Due to its alarming rate of decline, the Tasmanian devil has been listed as Endangered under Tasmania's Threatened Species Protection Act 1995, as well as the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999. The Tasmanian devil has also been listed as Endangered on the Red List of the International Union for the Conservation of Nature and Natural Resources (IUCN) – the benchmark for the global conservation status of plant and animal species.

It's hard for us to know exactly how many Tasmanian devils remain in the wild, but our best estimate is between 20,000 – 50,000 mature individuals (which is assumed to be about half the overall number). One of the reasons why it's difficult to be more precise is that there are population number estimates for only a few places across the State. Good estimates for anywhere in the World Heritage Area, for instance, aren't available because there are no roads and it's hard to check traps on a daily basis. As with all our information, we are reviewing these figures as we learn more, so they may change.

9. Why is it so important that Tasmanian devils don't become extinct in the wild?

We are already seeing the early signs of changes in the landscape from the decreasing devil population, impacting on our agricultural industries as well as our environment.

The decline in devil numbers means there are now large amounts of surplus carrion in the landscape (up to 100 tonnes/day) - and other carnivores are already responding to that surplus. One of the biggest threats is posed by introduced, invasive species – such as feral cats and dogs - which now have an opportunity for major expansion.

Most significant of all is the fox threat that is facing Tasmania. Devils have probably previously acted as a buffer to fox establishment in Tasmania. With their decline, that measure of protection for the State is drastically reduced.

A fully established fox population would prey on at least 70 vertebrate species, directly endangering seven. In short, the annual cost to the Tasmanian economy of the fox establishing here would be up to \$20 million. This figure includes the on-going damage to our ecology, primary industries, eco-tourism and market image.

10. Is Devil Facial Tumour Disease and the Platypus Mucormycosis disease in Tasmania related or caused by the same thing?

No. While affected devils and platypus can suffer from similar external symptoms (both can develop ugly ulcers or lesions), the diseases are caused by completely different mechanisms, and occur on different parts of the body. Diseased devils suffer from facial tumours, while the lesions on diseased platypus are generally around the tail, back or back legs.

Devil Facial Tumour Disease is an infectious cancer, where malignant growths or tumours are caused by abnormal and uncontrolled cell division. DFTD is contagious and thought to be spread by infected devils biting other devils. There is currently no evidence that the disease has spread to other species of wildlife or domestic animals.

Mucormycosis, the disease affecting Tasmanian platypus populations, is caused by the fungus *Mucor amphibiorum*. Currently little is known about how the fungus is transferred between platypuses, how it is spread, or what impacts it is having. DFTD has had a devastating effect on devil populations throughout Tasmania in just over a decade since it was first detected. However in the 25 years since Mucormycosis was first detected in Tasmania we still don't know what impact it is having on platypus populations, or how far it has spread. These questions are being addressed in a research program within Tasmania's Department of Primary Industries, Parks, Water and Environment. Read more about Mucormycosis and the platypus conservation program at www.dpiw.tas.gov.au/inter.nsf/WebPages/SSKA-7AH66E.