



Cancer Research Wales aims to reduce the impact of cancer on the people of Wales through supporting world class cancer research and education. Head and Neck cancers represent a varied mix of closely related tumours that can differ remarkably in their clinical course and treatment response. Local tumour control is often difficult with recurrence occurring in up to 50% of all cases. H&N cancers are caused by several different causative agents such as smoking, alcohol and HPV infection, each of which can influence treatment response and survival. Therefore at Cancer Research Wales we believe it will be critical to:

-  Improve methods that increases the accuracy at which the location and volume of Head and Neck Cancers can be determined for treatment planning.
-  Discover biomarkers that can better predict outcome and determine treatment choice.
-  Understand the mechanisms by which HPV infection gives rise to Head and Neck cancers in young adults.



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Cancer Research Wales
Velindre Hospital, Whitchurch, Cardiff CF14 2TL
Please call us on **029 2031 6976** or
visit **www.cancerresearchwales.co.uk**





Head and Neck (H&N) cancers are classified as those malignancies occurring within the larynx, oral cavity, salivary glands, regions of the pharynx and the paranasal sinuses. There are over 4,700 cases of H&N cancers reported annually in the UK. The overall aims of Cancer Research Wales (CRW) funded Head and Neck Cancer Research are:

-  Determine the prevalence of Human Papilloma Virus (HPV) in head and neck cancers in Wales and the relationship with treatment response and overall survival.
-  Develop standard protocols for Positron Emission Tomography (PET) imaging in head and neck radiotherapy planning to improve treatment.

Recent studies have shown an increase in the incidence of head and neck cancers in younger people (20-45 years) which arise mainly in the tonsils and at the base of the tongue. These cancers are not related to the use of tobacco or alcohol, the two major risk factors for H&N

cancer, but are linked to infection with the HPV. CRW fund projects to assess the prevalence of HPV in patients with H&N cancers in Wales. These studies will specifically determine the treatment response and clinical outcome of patients whose tumours harbour HPV. This assessment is important since existing evidence indicates that H&N tumours linked to HPV infection are more responsive to chemo- and radiotherapy. Therefore, in future, patients with HPV positive scores may be offered less aggressive chemo-radiotherapy that can still achieve a cure, yet reduce the risk of treatment associated side effects.

Despite credible cure rates for H&N cancers achieved through the combined use of chemo- and radiotherapy, local regional control of the disease is often difficult. Disease recurrence in or around the site of the original primary tumour following treatment is common. Positron Emission Tomography (PET) is an emerging technology that is used alongside conventional imaging/scanning techniques such as computerised tomography (CT) for cancer detection and measurement of treatment response. PET is used to generate a “heat map” image which can better define tumour shape, volume and location for more accurate targeting of radiation beams. PET has received intense interest for the detection and outline of H&N cancers tumours, both before and after therapy in order to assess treatment response. However, unsatisfactory image acquisition and inter-observer variability has prevented the inclusion of PET into standard radiotherapy planning for this cancer type.

CRW supports exciting projects that aim to construct standard protocols and procedures to improve PET/CT image capture and clarity in H&N cancer and reduce reporting differences that can occur between individual operators. The clinical use of the developed protocols will

be assessed through a small clinical trial involving patients undergoing radiotherapy for H&N cancer. In this, the effect of tumour type, smoking behaviour and HPV status on PET-based radiotherapy planning will be considered. Importantly, these novel techniques and protocols may be equally applied to other tumour types, in order to further improve survival rates where the use of PET in radiotherapy planning has shown benefit. These include cancers of the lung, breast, brain, prostate and oesophagus.

