



Oral cancers develop on the tongue, the oral mucosa (tissue lining the mouth and gums), the floor of the mouth, the base of the tongue, and the oropharynx (area of the throat at the back of the mouth). There are several types of lesions (growths) that have the potential to become oral cancers. These include white lesions called leukoplakia (the most commonly diagnosed precancerous lesions in the mouth) and red, velvet-like lesions called erythroplakia. Smoking and the frequent consumption of alcohol typically cause these lesions. Of those that become cancerous, about 90 % are a type of cancer called squamous cell carcinoma. The complications of oral cancer and its treatment can have serious adverse effects on patients, their families, and society.

Yesterday

- When doctors or dentists noticed a lesion in a patient's mouth, they could recommend a painful biopsy, which would be followed by a long wait for laboratory results indicating whether the lesion was cancerous. Alternatively, they could monitor the lesion every few months to look for changes indicating cancer.
- Deciding whether to order a biopsy was difficult because chair-side equipment to visualize lesions early in their development, when many are small and hard to identify, was not available.
- Health professionals knew little about the specific causes of oral cancer. Aside from two known risk factors—tobacco use and drinking alcohol—health professionals were also uncertain whether oral cancer was a viral or a genetic disease. Oral cancer remained a molecular black box that scientists could not open or explore.
- Most oral cancers were advanced by the time they were diagnosed. Treatment options usually consisted of shrinking the tumor with radiation, followed by head and neck surgery to remove it. The surgery was sometimes disfiguring.

Today

- Oral cancers are the sixth most common cancers in the world. In the United States, it is estimated that approximately 91,200 persons are living with oral cancer, and current estimates suggest that approximately 37,000 new cases are diagnosed every year. Men have more than twice as many oral cancers as women. The incidence of these cancers is slightly higher among African-American men than among white men.
- It is estimated that approximately 8,000 Americans die of oral cancer each year. These deaths are particularly tragic because, in many cases, they could have been prevented with early diagnosis and treatment.
- The known risk factors for oral cancer are tobacco use and alcohol consumption. Recently, infection with certain types of human papillomavirus (HPV) has been linked to oropharyngeal cancer.
- Early detection is important. The 5-year survival rate for oral cancer diagnosed early is 75% compared to 20% for oral cancer diagnosed late.
- Increased outreach to those at greatest risk—African American men, people who regularly use tobacco products or consume alcohol, and those infected with HPV—has increased awareness of the early signs of oral cancer and the benefits of early intervention.
- Scientists know that oral cancers, like all forms of cancer, arise from a series of acquired mutations that disrupt specific genes that control the normal growth cycle of our cells. Building on this awareness, scientists are creating a comprehensive catalogue of the genes involved in oral cancer development and progression. This information may produce specific prognostic and diagnostic markers for oral cancers
- The combination of scientific discovery and technological progress has resulted in the development of new chair-side tools that allow health professionals to better visualize and evaluate the characteristics of oral lesions before suggesting a biopsy.

- Treatment also continues to improve. The past five decades have brought needed refinements in radiation therapy and surgical interventions, and the introduction of chemotherapy has been helpful in fighting the spread of the oral cancer to sites elsewhere in the body. For the first time, scientists also know enough about the molecular defects in oral cancer cells to begin to design targeted molecular therapies to kill the cancer cells with greater precision and efficiency.
- Research studies funded by NIH in 2010 include “Genome-wide discovery of molecular alterations in head and neck cancer” and “Comprehensive analysis of genetic alterations in oral cancer.”

For additional information contact: NIDCR Office of Communications and Health Education at (301) 496-4261.

National Institute of Dental and Craniofacial Research

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Tomorrow

- As public awareness and education about oral cancers increase early detection will improve.
- As the tools to detect precancerous lesions in the mouth continue to improve, fewer Americans than ever will die needlessly from oral cancer. For instance, scientists are now harnessing the power of nanotechnology to engineer devices to analyze human fluids and tissues for abnormal molecules that are indicative of a developing oral tumor. Other scientists are developing in-office diagnostic devices to detect abnormal cells and proteins in saliva that are associated with a developing oral tumor.
- Treatment will improve as targeted molecular therapy and personalized medicine become a reality. Emerging evidence from clinical trials is expected to guide treatment decisions for the individual patient on the basis of tumor HPV status. Research is also defining the signaling pathways and networks that drive the growth of oral cancer cells. This information will result in novel anticancer treatments that target the particular molecular deficiencies in each individual oral cancer patient.
- Unlike tumors of the kidneys, prostate, or other internal organs, oral cancers are readily accessible. Therefore, research on these more easily studied cancers may allow for rapid accumulation of valuable information for developing improved cure rates for both oral and other cancers.