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ORIGINAL RESEARCH

Epidemiology of head and neck cancer in the United States

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BACKGROUND: Cancer rates of the head and neck are traditionally linked to public health issues.
OBJECTIVE: To describe the epidemiology of head and neck cancer in the United States.
DESIGN AND SETTING: National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.
RESULTS: A total of 75,000 cases of head and neck cancer were diagnosed in 2001. Incidence is rising in thyroid (up 52%), bone (43%) soft tissues (20%), salivary (20%), tongue (16%), tonsil (12%), and nose (12%). Incidence is falling in lip (down 58%), hypopharynx (35%), cervical esophagus (32%), oropharyngeal mucosa (26%), and larynx (26%). There were 30,000 deaths from head and neck cancer in 2001. Mortality has decreased to some degree at all sites except thyroid where it was stable.
CONCLUSION: Many head and neck cancers have changing incidence and mortality rates contrary to expected changes given trends in public health issues. Further investigation of risk factors, diagnostic practices, and management strategies is warranted.
EBM rating: 2C

The epidemiology of head and neck cancer receives limited attention in the general medical literature. This is surprising because these cancers are often the result of exposure to important public health risks, including alcohol, tobacco, wood dust, and nickel. However, cancers of this region are relatively rare, and virtually every tissue type is represented in the head and neck, from bony sinuses to salivary glands, pharyngeal epithelium to laryngeal synovial joints, and smooth muscle to lymphoid tonsil. The range of tissue types means that almost any cancer histology may be found in this region. The relatively small number of cases, combined with the variety of histologies makes detection of trends difficult in all but the largest of databases.

In this article, we use the nationwide, population-based data from National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program to describe all malignant cancers of the head and neck that SEER records, outside the central nervous system (brain, eye, spinal cord). We first present the current epidemiology of head and neck cancer in the United States, and then go on to consider the trends in incidence and mortality over time.

METHODS

Inclusion Criteria for the Head and Neck Region

There is considerable variability in the definition of head and neck cancer. Generally, cancers of the head and neck are considered to include all lesions of the mucosal surfaces from the internal nose and nasopharynx to the thoracic inlet level of the trachea and esophagus. The salivary glands are routinely added, and less regularly the thyroid and parathyroid glands. Cancers of the central nervous system and the eye are typically excluded, as are cancers of the temporal

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bone, maxilla, mandible, lymph nodes, blood vessels, and peripheral nerves.[1-3] These separations appear to derive largely from the way medical practice has developed, so that tumors that were once either less understood or treatable are ignored, and the remainder are separated according to which medical specialty treats the cancers of the particular structure.

The conventional definitions are limiting not only because of their variability, but also because they do not include sites that nevertheless still fall within the domain of diagnostic thinking by most otolaryngologists when a patient first presents for diagnosis. Patients who present with a neck lump may ultimately be diagnosed with metastatic squamous cell carcinoma of the hypopharynx (conventionally included as a head and neck cancer) or lymphoma (not conventionally included as a head and neck cancer). Similarly, patients who present with facial pain may have a salivary cancer (conventionally included) or cancer of the mandibular bone (not conventionally included).

Our approach to the categorization of head and neck cancer differs from the conventional approach in 2 important ways. First, we avoid broad categories that obscure important details of incidence and mortality; for example, inclusion of hypopharyngeal cancer with oral cancer when hypopharyngeal cancer is acknowledged by head and neck surgeons to be more difficult to treat and cure than oral cancer. Second, we include sites that are often left out when head and neck cancer is described on the basis of the treating medical specialty (eg, exclusion of soft tissue cancers because these are often treated with chemotherapy rather than surgery). We attempt to include all sites that have similar or overlapping initial presentations. Therefore, our analysis includes the traditional head and neck structures: the mucosal surfaces of the aerodigestive tract, and the thyroid, parathyroid and salivary glands, but also the mandible, maxilla, and temporal bones, and the internal soft tissues of the head and neck: vessels, nerves, lymph nodes, and connective tissues. We exclude cancers of the brain and eye, which present in a clinically distinct fashion, and primary skin cancers, because these are known to be incompletely and underreported in cancer registries.[4,5]

Site Definitions

We categorized the ICD-O-3 location codes for head and neck cancers into 13 anatomic sites shown in Table 1. For presentation purposes, we have further categorized the 13 sites into 3 groups by mode of clinical examination: 1) readily visualized: lip, tongue, tonsil, and oropharyngeal mucosa; 2) not readily visualized: nose, sinuses, hypopharynx, larynx, and cervical esophagus; and 3) potentially palpable: thyroid, salivary, soft tissue, and bone.

Table 1
Definitions of sites in the head and neck

Site	Structures or locations	ICD-0-3 codes
Readily visualized		
Lip	Vermillion, mucosal surfaces, both commisures	0-9
Tongue	Mobile tongue, base of tongue, lingual tonsil, Waldeyer's ring	19-29, 142
Tonsil	Palatine tonsil, tonsillar fossa, tonsillar pillars	90-99
Oropharyngeal mucosa	Floor of mouth, retromolar trigone, hard and soft palate, gum, mouth, buccal mucosa, vestibule, oropharynx, pharynx, pharyngoepiglottic folds, glossoepiglottic folds, vallecula, lingual surface of the epiglottis, overlapping lesions of mouth	30-39, 40-49, 60-69, 50-59, 100-109, 140, 148
Not readily visualized		
Nose	Nasal cavity, nasopharynx	110-119, 300
Paranasal sinuses	Maxillary, frontal, ethmoid, sphenoid sinuses	310-319
Hypopharynx	Pyriform sinus, postcricoid region, lateral pharyngeal wall, posterior pharyngeal wall	129-139
Larynx	Laryngeal cartilage, supraglottis, glottis, subglottis, trachea above bifurcation	320-329, 339
Cervical esophagus	Cervical esophagus, upper 1/3 of esophagus	150, 153
Potentially palpable		
Thyroid	Thyroid gland	739
Soft tissue	Lymph nodes, connective/subcutaneous tissue of the head and neck, peripheral nerves, autonomic nerves	470, 490, 754, 770
Salivary	Parotid gland, submandibular gland, sublingual gland, other minor salivary gland, overlapping lesions of salivary gland	79-89
Bone	Calvarium, temporal bone, facial bones, temporomandibular joint, mandible	410, 411

Data Source

We obtained population-based data for each of the 13 anatomic sites from the SEER program. This is a group of cancer registries in 9 distinct areas of the United States, representing approximately 10% of the US population. Participants include 5 states: Connecticut, Iowa, New Mexico, Hawaii, and Utah, and four areas: Atlanta, Detroit, San Francisco, and Seattle. SEER collects data on each resident diagnosed with a malignancy, including tumor site, histology, stage, initial treatment, and survival information including cause of death.

Current Distribution by Site and Histology: 1999 to 2001

Because cancer is relatively rare in a number of the head and neck sites, there is considerable year to year fluctuation in the number of new cases. To mitigate this, we use 3-year windows in the following results: current site distribution, current histology distribution, and also the starting and ending points for calculation of changes in incidence and mortality trends (see below).

Current site distribution is based on data from 1999-2001. The proportion of cancers arising in each site is simply the ratio of the number of new cancers diagnosed at 1 site during 1999 to 2001 divided by the total number of head and neck cancers at all 13 sites diagnosed during 1999 to 2001.

Current histology distribution was calculated by retrieving from SEER a complete list of ICD-O3 histology codes for each site. For these calculations, we only included cases for which a specific histologic diagnosis was made or available, excluding the 2.8% of cases classified as "carcinoma, NOS" or "neoplasm, NOS." We collapsed the histologies within a site, combining histology codes with similar names and behaviors (Appendix A, http://journal.entnet.org). This was necessary because the same histology often appears under more than 1 name. For example, papillary carcinoma of the thyroid was classified about half the time as a subgroup of squamous cell cancer and the other half of the time as a subgroup of ductal/lobular cancer. Thus, we combined these into 1 group named papillary carcinoma. To qualify for listing in the table, the histology had to represent at least 0.5% of cases at that site.

Incidence Trends: 1975 to 2001

Trends in head and neck cancer are calculated as incidence rates for each site during each year from 1975 to 2001, and all rates are age-adjusted to the year 2000 standard US population. To obtain the overall percentage change in cases during this time period, the average incidence rate of 1999 to 2001 (subsequently referred to as 2001) was divided by the average incidence rate of 1975 to 1977 (subsequently referred to as 1975).

Trends in Mortality: 1990 to 2001

Trends in cancer-specific mortality come from the incidence-based mortality database recently constructed by SEER. In the incidence-based mortality method, a cancer death requires that an individual both have the incident cancer reported in SEER and have the cancer coded as the underlying cause of death on the death certificate (because SEER tracks all cases until death, a person need not reside in the SEER area at the time of death). Thus, incidence-based mortality differs from conventional cancer mortality data, which are solely derived from the death certificate. Because the incidence-based mortality data include the additional detail collected on each new case of cancer (eg, squamous cell carcinoma of the tonsil), it allows us to report mortality for a specific head and neck site that might otherwise be obscured by imprecise death certificate reporting (eg, "throat cancer").

To qualify as a cancer death in our analysis, an individual must first have been diagnosed with cancer at 1 of the 13 sites detailed above. Our method to determine cause of death depended on whether the patient had 1 or more than 1 cancer listed in SEER.

Persons who had only 1 cancer reported in SEER qualified as a head and neck cancer death if the death certificate underlying cause of death involved any malignancy. The rationale for this is that having only 1 cancer diagnosis in SEER and dying from cancer by death certificate data is likely to be an accurate representation of that cancer as the cause of death.

Persons who had more than 1 cancer were counted as a death only if they were said to die of a cancer in that site or an adjacent site. This strategy yields a more conservative estimate, but helps prevent double counting of cancer deaths. For example, a person may be diagnosed with a cancer of the lip and sometime later be diagnosed with prostate cancer, either of which could ultimately cause their death. To deal with this ambiguity, we required that the patient have a cause of death on the death certificate listed as a cancer of the lip or an adjacent site before attributing the death to lip cancer. Details of the adjacent site decision rules are contained in Appendix B (http://journal.entnet.org).

One disadvantage of the incidence-based method to calculate mortality is that it only includes those whose diag-

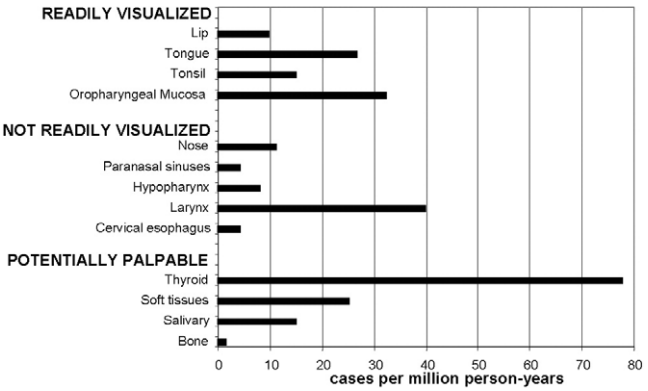

Figure 1 1999-2001 distribution of the indidence of cancer in the head and neck, grouped by mode of clinical examination in the office setting.

Table 2
Distribution of malignant head and neck cancer histologies: 1999-2001. Amounts listed are mean percentages for each site. Totals may not equal 100 due to rounding

Site	Most common			Least common	
Readily visualized					
Lip	Sq. Cell Ca. 93.6	Other adenoca 2.8	Mucoepideroid 1.4	Adenoid cystic 1.0	Lymphoma 0.1
Tongue	Sq. Cell Ca. 93.2	Lymphoma 3.4	Mucoepideroid 1.0	Adenoid cystic 0.6	Other adenoca 0.2
Tonsil	Sq. Cell Ca. 84.8	Lymphoma 13.8	Basaloid 0.3	Plasmacytoma 0.3	Undifference carcinoma 0.3
Oroph. mucosa	Sq. Cell Ca. 81.6	Mucoepideroid 5.5	Lymphoma 3.8	Other adenoca 3.2	Adenoid cystic 2.1
Not readily visualized					
Nose	Sq. Cell Ca. 56.8	Lymphoma 13.6	Undifferentiated carcinoma 7.5	olf. n blastoma 3.6	Other adenoca 3.5
Paranasal sinuses	Sq. Cell Ca. 38.5	Lymphoma 20.7	Other adenoca 11.4	Adenoid cystic 5.9	olf. n blastoma 4.5
Hypopharynx	Sq. Cell Ca. 96.3	Lymphoma 0.5	Other adenoca 0.5	Adenoid cystic 0.3	—
Larynx and trachea	Sq. Cell Ca. 97.4	Ep/Comp. Ep. 1.0	Other adenoca 0.5	Adenoid cystic 0.2	Lymphoma 0.2
Cervical esophagus	Sq. Cell Ca. 85.7	Other adenoca 9.4	Ep/Comp. Ep. 3.2	Small cell 2.4	Adenoid cystic 0.4
Potentially palpable					
Thyroid	Papillary 83.2	Follicular 6.5	Hurthle Cell 3.2	Medullary 1.7	Anaplastic 1.0
Soft tissue	Lymphoma 89.7	Sarcomas 1.5	Leiomyosarcoma 1.4	MF histiocytoma 1.3	Hemangiosarcoma 1.3
Salivary	Mucoepidermoid 21.7	Lymphoma 17.2	Sq. Cell Ca. 16.1	Other adenoca 12.8	Acinar 10.3
Bone	Chondrosarcoma 20.8	Chordoma 18.8	Osteosarcomas 13.9	Lymphoma 10.9	Ameloblastic 6.9

Sq. Cell Ca, squamous cell carcinoma; *oroph*, oropharyngeal; *Ep/Comp. Ep*, Epithelial and complex opith; *olf. n blastoma*, olfactory neuroblastoma; *MF histiocytoma*, Mal. fibrous histiocytoma; *undiff. carcinoma*, undifferentiated carcinoma.

nosis was recent enough to be included in SEER. A woman who was diagnosed with cancer in 1970 and died from it 10 years later, for example, would not be captured in 1980 incidence-based mortality because she never had the opportunity to be included in the SEER database.

Consequently, incidence-based mortality rates in SEER tend to rise during the 1970s and early 80s as the database matures and is increasingly likely to include diagnostic information for all diagnoses and deaths in a given year. To minimize the effect of this problem, we only report mortality data from 1990 onward. We calculate percentage change by comparing 1990 to 1992 (subsequently referred to as 1990) with 1999 to 2001 (subsequently referred to as 2001).

Total Case Estimates

Finally, we estimated the total number of new cases and deaths in the United States during 2001. The SEER registries are designed to be representative of the entire United States, and we used this assumption to derive our calculations. We multiplied the 2001 age-specific incidence rates (with 19 5-year age categories as obtained from the SEER registry areas) by the corresponding population size listed in the 2001 US Census estimate. We then summed the counts across the age categories to obtain the total number of new cases. We used a similar approach to calculate the number of deaths, substituting the 2001 age-specific death rate for age-specific incidence rate.

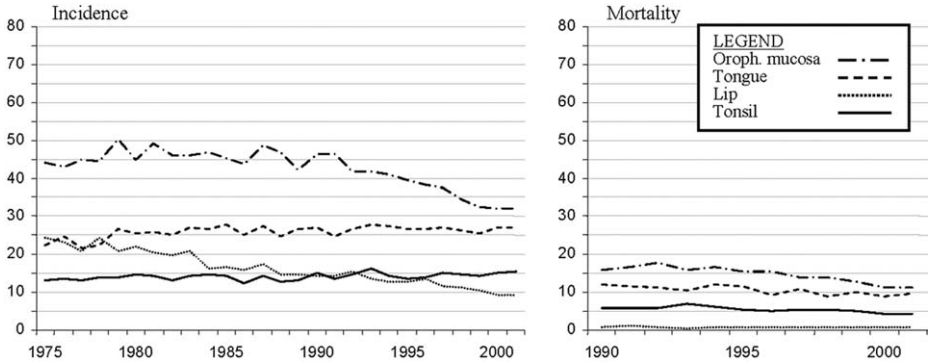

Figure 2 Incidence and mortality trends of head and neck cancers in readily visualized areas; rates are per million people-years.

RESULTS

Current Distribution by Site

In 2001, there were approximately 75,000 new cases of head and neck cancer and about 30,000 deaths due to the disease. Figure 1 shows the distribution of these new cases by site; 44% occur at potentially palpable sites, followed by the readily visualized sites (31%) and not readily visualized sites (25%). The 5 most common sites were thyroid (29%), larynx (15%), oropharyngeal mucosa (12%), tongue (10%), and soft tissue (9%). Cancers at all other sites were rarer. Extremely rare and not included in figures are parathyroid cancer and cancer of the ear (including the middle ear, eustachian tube, and mastoid) that accounted for 0.1% and 0.8% of new cases, respectively.

Current Distribution by Histology

Table 2 (and Appendix C, http://journal.entnet.org) shows that most head and neck cancer sites are dominated by 1 histologic type. Eight sites are dominated by squamous cell carcinoma, which accounts for greater than 80% of cancers at lip, tongue, tonsil, oropharyngeal mucosa, hypopharynx, larynx, and cervical esophagus, and 57% of cancers in the nose.

Two other sites are dominated by 1 histologic type: thyroid and soft tissue. The dominant histologic type for thyroid cancer is papillary carcinoma. The most feared and aggressive histologies, medullary and anaplastic, together account for less than 3% of diagnosed cases. Not surprisingly, because soft tissue cancers largely involve the lymph nodes (as opposed to the connective tissues, vessels, or nerves), the dominant histologic type for a malignant mass in the soft tissues of the neck is lymphoma.

The remaining 3 sites, paranasal sinuses, bone, and salivary glands, have a relatively wide distribution of cancer types. Cancers in the paranasal sinuses are typically either lymphoma or adenocarcinoma (more familiarly associated with salivary cancers). Bone cancers, which usually involve the facial bones or the temporal bone (as opposed to the mandible), are occasionally squamous cell carcinoma or lymphoma, but are also often diagnosed as chondrosarcoma, chordoma, or osteosarcoma. The salivary cancers have the most diverse histologies of all the head and neck sites. This is partly because salivary tissues in different areas tend toward different cancers, eg, at the submandibular gland adenoid cystic adenocarcinoma predominates and at the parotid gland mucoepidermoid adenocarcinoma is most common.

Incidence Trends: 1975 to 2001

Incidence has fallen in most of the readily and not readily visualized areas of the head and neck (Figs 2 and 3). Between 1975 and 2001, cancer of the lip fell (down 58%), as did the hypopharynx (35%), cervical esophagus (32%), oropharyngeal mucosa (26%), and larynx (26%). The sites with

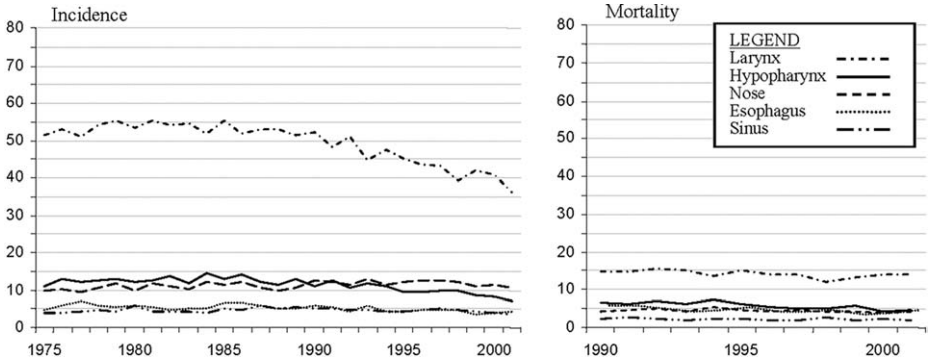

Figure 3 Incidence and mortality trends of head and neck cancers in areas not readily visualized; rates are per million people-years.

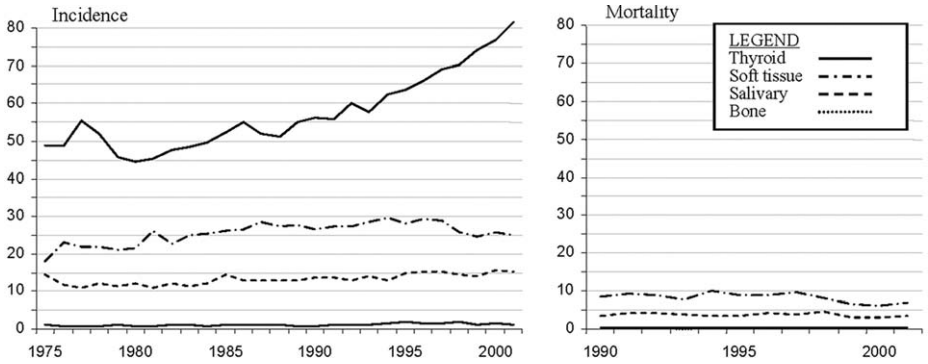

Figure 4 Incidence and mortality trends of potentially palpable head and neck cancers; rates are per million people-years.

increasing rates were tongue (up 16%), tonsil (12%), and nose (12%).

All cancers in the potentially palpable category (Fig 4) have increased in incidence, led by thyroid (up 52%) and bone (43%) with smaller increases in soft tissue (20%) and salivary (20%). The dramatically increased rates of bone cancer should be interpreted with caution because the number of cases is very small and therefore relatively unstable.

Mortality Trends: 1990 to 2001

Cancer mortality has decreased at all sites of the head and neck except for thyroid, where mortality has remained steady (Figs 2 to 4). The change in mortality from 1990 to 2001 in order of decreasing magnitude is: bone (down 75%), oropharyngeal mucosa (down 70%), tonsil (54%), parathyroid (50%), lip (38%), soft tissue (33%), hypopharynx (down 30%), esophagus (26%), tongue (16%), sinus (down 11%), larynx (6%), salivary (6%), and nose (4.5%).

DISCUSSION

Head and neck cancer occurs in a wide variety of tissue types and sites, resulting in a complex range of malignancies cared for by physicians in multiple specialties. Although less common (overall incidence 270 cases/million) than some more familiar cancers, such as lung (620 cases/million) and colon cancer (550 cases/million), the numbers do not fully capture the impact of the disease. Patients with head and neck cancer, for example, typically live longer with their disease than lung cancer patients and arguably have more morbidity than colon cancer patients.[6-8] Therapies for head and neck cancer can have profound effects on basic aspects of the human experience: patients' facial appearance, their capacity to communicate, and their ability to eat. Furthermore, the patients dealing with these cancers include those with the fewest resources to do so; head and neck cancer disproportionately affects those with the lowest income and the least education.[9] The combination of these factors may explain why nearly half of head and neck cancer patients screen positive for depression,[10] a rate almost 10 times that in the general population.[11]

In this descriptive epidemiologic study of head and neck cancers, the incidence and mortality rates are decreasing at about the same rate for 2 of 13 sites: hypopharynx and esophagus. The combination of falling incidence and mortality suggest a decrease in the underlying initiation of disease and thus subsequent mortality, but not necessarily any improvement in survival due to treatment.

The incidence and mortality are falling at substantially different rates at 4 of the 13 sites: lip, larynx, oral mucosa, and sinuses. In the case of lip and larynx, where mortality did not fall as much as incidence, these trends suggest a decrease in the underlying initiation of disease, and either less successful treatment, changing risk factors, changing tumor biology, or a combination of the 3. At the oral mucosa and sinus sites, because mortality is falling more than incidence, the overall interpretation shifts slightly to suggest that although there is likely a decrease in the underlying initiation of disease, treatment might be better, or risk factors and tumor biology are changing to result in lower mortality.

The incidence is increasing and mortality is falling at 5 sites: tongue, tonsil, nose, salivary, and soft tissue Rising incidence in the face of falling mortality suggests changing risk factors and/or tumor biology. For example, the cancers might be arising in a different population or the cancer is less aggressive when it does occur. The rate of rise in the incidence of tongue, tonsil, and nose are all very similar, which suggests that there may be one particular factor at work in these sites. The increased incidence of salivary cancers may be associated with higher dose dental x-rays performed before 1988, but no association has been found with cell phone or cordless phone use.[12-14] A rising rate of head and neck soft tissue cancers (which are mostly non-Hodgkin lymphomas) has been noted at other sites in the body in addition to the head and neck and may be due to an as yet unidentified risk factor. Changing diagnostic patterns and HIV have been rejected as a possible cause of this pattern.[15]

The incidence is increasing, while mortality remains unchanged, at 2 sites: thyroid and bone. The increase in bone cancer should be interpreted with caution because the numbers are small and volatile, making interpretation of trends difficult. However, two general explanations are compatible

with the combination of trends seen at these two sites. First, the underlying rate of disease is rising, yet concurrent improvements in treatment (including early detection and early treatment) are sufficient to ward off increasing mortality. Alternatively, increased diagnostic scrutiny (examination, testing, and biopsy) identifies previously undetected disease.[16]

Although the SEER data are the best source for trends in US cancer epidemiology, it still has limitations for our study. Despite including all incident cancers for a population that now encompasses over 27 million people, there are only a small number of cases each year at some of our sites. Of our 13 sites, 4 have incidence rates below 1 per 100,000 (hypopharynx, cervical esophagus, paranasal sinuses, and bone) and their trend data should be interpreted with caution. In addition, some will note that there is no category for head and neck mass from an unknown primary site, a frustrating and familiar entity in which clinicians face metastatic disease in the lymph nodes of the neck, with no identifiable primary site. Although SEER does collect data on unknown primary sources, it does not report data on the location of the metastases (eg, zone II neck lymph nodes), which makes it impossible to describe here.

Lastly, our use of incidence-based mortality poses a small risk of double counting head and neck cancer deaths. This is relevant only for the 5% of cases in which patients had 2 or more head and neck primaries We minimized the risk of double counting by using narrow anatomic qualification criteria before assigning a death to a specific site.

Despite the foregoing limitations, we believe our results represent the most comprehensive summary of the current epidemiology of head and neck cancer in the United States. Further investigation is warranted for those cancers in which the observed incidence is increasing, or the mortality rate is not decreasing as we would expect with recent treatment advances. We hope these data prove useful to researchers investigating both the cause of and treatment efficacy for head and neck cancer.

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APPENDIX A

Categorization of histology by ICD-03 code

Histology	ICD-0-3 code(s)
Thyroid cancer	
Anaplastic carcinoma	8021
Epithelial/complex epithelial neoplasms	8011-8019, 8022-8046, 8560-8570
Follicular carcinoma	8330-8331
Hurthle cell carcinoma	8290
Medullary carcinoma	8345-8346
Other adenocarcinoma	8140-8199, 8201-8259, 8261-8289, 8291-8329, 8332-8339, 8347-8380, 8525, 8480
Papillary carcinoma	8050, 8052, 8260, 8340-8344
Squamous cell carcinoma	8051, 8053-8084
All other sites	
Acinar adenocarcinoma	8550
Adenoid cystic adenocarcinoma	8200
Ameloblastic carcinoma	9270-9310
Carcinoma ex pleomorphic adenoma	8941
Chordoma	9370-9371
Chondrosarcomas	9220-9240
Epithelial/complex epithelial neoplasms	8011-8019, 8021-8046, 8560-8570
Ewing sarcoma	9260
Fibrosarcoma	8810
Hemangiosarcoma	9120
Kaposi's sarcoma	9140
Leiomyosarcoma	8890
Lymphoma	9590-9729
Malignant fibrous histiocytoma	8830
Malignant mixed tumor	8940
Melanoma	8720
Mucoepidermoid carcinoma	8430
Olfactory neuroblastoma	9522
Osteosarcomas	9180-9192
Other adenocarcinoma	8140-8199, 8201-8380, 8525, 8480
Plasmacytoma	9731,9734
Primitive neuroectodermal tumor	9473
Rhabdomyosarcoma	8900-8902, 8910-8921
Sarcomas	8800-8805
Squamous cell carcinoma	8050-8084
Undifferentiated carcinoma	8020

APPENDIX B

If a person had more than one cancer diagnosis listed in SEER, they had to be diagnosed with a cancer at a site listed in the top row of the table, and be said to die of cancer at one of the sites listed in the left-hand column of the table

ICD site name	ICD 8/9	ICD 10	Lip	Tongue	Tonsil	Oropharyng. mucosa	Nose	Paranasal sinuses	Hypopharynx	Larynx	Cervical esophagus	Soft tissues	Salivary	Bone
Nose	147-147.9, 160	c11-c11.9, c30.0					X	X					X	X
Olfactory bulb	192	c72.2					X	X						X
Paranasal sinuses	160.2-160.9	c31-c31.9					X	X					X	X
Middle ear	160.1	C30.0-C30.1											X	X
Lip	140-140.9	c00-c00.9	X	X	X	X							X	
Tongue	141-141.9, 149.1	c02-c02.9, c010, c024, c14.2	X	X	X	X							X	X
Tonsil	146-146.2	c09-c09.9	X	X	X	X			X					X
Oropharyngeal mucosa	143-145.9, 146.5-146.9, 149, 149.8-149.9	c03-c069, c10, c10.2-c10.9, c14, c14.0, c14.8	X	X	X	X	X	X	X	X	X		X	X
Hypopharynx	148.0-148.9	C12-C13.9		X	X	X			X	X	X			X
Larynx	161-161.9	C32-C33		X	X	X			X	X	X			
Cervical esophagus	150.0, 150.3	C15.0, C15.3							X	X	X			
Overlapping esophagus	150.8	c15.8									X			
Esophagus unspecified	150.9	c15.9									X			
Salivary	142-142.9	c07-c08.9	X	X	X	X			X	X	X	X	X	
Soft tissues	196, 171	c49.0, c77.0										X	X	X
Any lymphoma	200-202.9	c81-c84										X		
Non-Hodgkin's lymphomas	202.0-202.9	c82-c84												
Skull and facial bones	170	c41.0												X
Mandible	170.1	c41.1												X
Head and neck ill-defined	195	c76.0	X	X	X	X			X	X	X	X	X	X

APPENDIX C

Distribution of malignant head and neck cancer histologies: 1999-2001. Amounts listed are mean percentages for each site. Totals may not equal 100 due to rounding

Other histology comprising 1% or more of cancers
None
None
None
1.0 Kaposi's sarcoma
3.4 Melanoma
2.0 Epithelial and complex epithelial neoplasms
1.9 Adenoid cystic
1.8 Plasmacytoma
2.4 Rhabdomyosarcoma
2.1 Melanoma
2.1 Undifferentiated carcinoma
1.7 Mucoepidermoid
1.4 Fibrosarcoma
1.0 Epithelial and complex epithelial neoplasms
None
None
None
1.9 Lymphoma
1.0 Other adenoca
None
9.0 Adenoid cystic
4.5 Epithelial and complex epithelial neoplasms
2.7 Carcinoma ex pleomorphic adenoma
1.1 Malignant mixed tumor
5.0 Sq. Cell Ca.
6.9 Plasmacytoma
5.0 Ewing sarcoma
3.0 Fibrosarcoma
3.0 Primitive neuro-ectodermal tumor