

# HEAD & NECK / ORAL CANCER SCREENING ALGORITHM

## INTENT

Screening is intended for asymptomatic individuals who are candidates for and willing to undergo curative treatment.

### Presentation

### Risk

### Screening

Proceed to diagnostic evaluation.

Yes

**Low Risk:** Individuals who do not meet criteria for increased risk.

### Increased Risk

Screening not recommended<sup>5</sup>

### Recommendation

- Oral self-examination.
- Avoidance of tobacco, areca/betel nut, and excessive alcohol.

Prompt evaluation is advised for any:

- Non-healing oral ulcer.
- Persistent oral lesion.
- Neck swelling or voice change.

Any  
concerning  
lesion

No

#### Patient Phenotype and Clinical Characteristics

- Male sex, particularly over 40 years of age.
- Poor oral hygiene or chronic periodontal disease.
- Presence of oral mucosal alterations suggestive of chronic epithelial injury.
- Long-standing oral submucous fibrosis or mucosal atrophy.

#### Personal Medical History

- Personal history of head and neck squamous cell carcinoma (HNSCC).

#### History of oral potentially malignant disorders (OPMDs), including:

- Oral leukoplakia.
- Erythroplakia.
- Oral lichen planus (atrophic or erosive forms).
- Oral submucous fibrosis.

#### History of immunosuppression, including:

- HIV infection.
- Solid organ transplantation.
- Hematopoietic stem cell transplantation.
- Prior radiation therapy involving the head and neck region.
- History of hematologic malignancy or childhood cancer treated with cytotoxic therapy.

#### Behavioral and Lifestyle Risk Factors

##### Tobacco exposure in any form:

- Cigarette, bidi, cigar, or pipe smoking.
- Smokeless tobacco (snuff, chewing tobacco, naswar, gutka).
- Areca nut / betel quid use, with or without tobacco.
- Chronic or heavy alcohol consumption.
- Combined exposure to tobacco and alcohol (synergistic risk).

##### Viral and Infectious Risk Factors

- High-risk human papillomavirus (HPV) infection, particularly HPV-16.
  - Especially relevant for oropharyngeal squamous cell carcinoma.
- Epstein-Barr virus (EBV) infection (notably for nasopharyngeal carcinoma).

#### Genetic and Inherited Predisposition

##### Known inherited cancer susceptibility syndromes, including:

- Fanconi anemia.
- Dyskeratosis congenita.
- Li-Fraumeni syndrome (TP53 mutations).

- Personal or family history suggestive of inherited genomic instability or DNA repair defects

##### Environmental and Occupational Exposures

##### Occupational exposure to carcinogens, including:

- Wood dust.
- Nickel or chromium compounds.
- Asbestos.
- Chronic exposure to environmental air pollutants.
- Poor socioeconomic conditions associated with limited access to preventive oral healthcare.

##### Molecular Biomarkers and AI-Assisted Risk Stratification

- Increased-risk individuals may also be identified through molecular and digital risk indicators, including:
  - Persistent high-risk HPV positivity (p16 overexpression, HPV DNA/RNA detection)
  - Dysplastic lesions exhibiting high-risk molecular alterations (e.g., TP53 mutation, loss of heterozygosity at 3p/9p)
  - AI-assisted oral image analysis identifying high-risk mucosal patterns
  - Digital pathology algorithms flagging epithelial dysplasia or malignant transformation risk
- Such tools are adjunctive and do not replace standard clinical examination, but may enhance early detection in high-risk populations<sup>4</sup>.

#### DISCLAIMER:

This screening algorithm is based on expert consensus and current evidence. It is not intended to replace independent clinical judgment or diagnostic evaluation of symptomatic patients.

**Note:** Screening should be offered only to asymptomatic individuals who are suitable candidates for curative treatment and are prepared to proceed with such intervention.

## References:

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3. Gillison, M.L., Koch, W.M., Capone, R.B., et al. (2000) 'Evidence for a causal association between human papillomavirus and a subset of head and neck cancers', *Journal of the National Cancer Institute*, 92(9), pp. 709–720. <https://doi.org/10.1093/jnci/92.9.709>
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5. World Health Organization (WHO) (2022) *WHO Classification of Head and Neck Tumours*. 5th edn. Lyon: IARC Press.

## **DEVELOPMENT CREDITS**

This Head and Neck / Oral Cancer Screening framework is based on expert consensus and evidence-informed clinical practice in cancer prevention and early detection. The algorithm was developed using a multidisciplinary public health and pathology driven approach, tailored to community-based screening and high-risk population settings.

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