



National
Comprehensive
Cancer
Network®

NCCN Clinical Practice Guidelines in Oncology™

Head and Neck Cancers

V.1.2009

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[NCCN Guidelines Panel Disclosures](#)

Table of Contents

[NCCN Head and Neck Cancers Panel Members](#)

[Summary of Guidelines Updates](#)

- [Multidisciplinary Team Approach \(TEAM-1\)](#)
- [Support Modalities \(TEAM-1\)](#)
- [Ethmoid Sinus Tumors \(ETHM-1\)](#)
- [Maxillary Sinus Tumors \(MAXI-1\)](#)
- [Salivary Gland Tumors \(SALI-1\)](#)
- [Cancer of the Lip \(LIP-1\)](#)
- [Cancer of the Oral Cavity \(OR-1\)](#)
- [Cancer of the Oropharynx \(ORPH-1\)](#)
- [Cancer of the Hypopharynx \(HYPO-1\)](#)
- [Occult Primary \(OCC-1\)](#)
- [Cancer of the Glottic Larynx \(GLOT-1\)](#)
- [Cancer of the Supraglottic Larynx \(N0\) \(SUPRA-1\)](#)
- [Cancer of the Nasopharynx \(NASO-1\)](#)
- [Unresectable Head and Neck Cancer \(ADV-1\)](#)
- [Recurrent Head and Neck Cancer \(ADV-2\)](#)
- [Radiation Techniques \(RAD-A\)](#)
- [Principles of Systemic Therapy \(CHEM-A\)](#)

[Guidelines Index](#)

[Print the Head and Neck Cancers Guideline](#)

These guidelines are a statement of evidence and consensus of the authors regarding their views of currently accepted approaches to treatment. Any clinician seeking to apply or consult these guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment. The National Comprehensive Cancer Network makes no representations or warranties of any kind, regarding their content use or application and disclaims any responsibility for their application or use in any way. These guidelines are copyrighted by National Comprehensive Cancer Network. All rights reserved. These guidelines and the illustrations herein may not be reproduced in any form without the express written permission of NCCN. ©2009.

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[Staging](#)

[Discussion](#)

[References](#)

Clinical Trials: The NCCN believes that the best management for any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

To find clinical trials online at NCCN member institutions, [click here: nccn.org/clinical_trials/physician.html](#)

NCCN Categories of Evidence and Consensus: All recommendations are Category 2A unless otherwise specified.

See [NCCN Categories of Evidence and Consensus](#)

Summary of the Guidelines updates

Summary of changes in the 1.2009 version of the Head and Neck Cancer guidelines from the 2.2008 version include:

Global Changes

- In the follow-up section, alcohol counseling was added to smoking cessation counseling.
- Unresectable was changed to T4b or unresectable nodal disease.
- A page titled “Radiation Techniques” ([RAD-A](#)) was added to the Guidelines.

TEAM-1

Support and Services

- The follow-up providers were expanded to include “other healthcare professionals”.
- The following were added: Speech and swallowing therapy, audiology.

Ethmoid Sinus Tumors

ETHM-2

- Newly diagnosed, unresectable was changed to “Newly diagnosed, T4b.”

Maxillary Sinus Tumors

MAXI-2

- For T1-2, N0 Adenoid cystic tumors, the recommendations for treatment are based on “infrastructure” or “suprastructure” presentation. Footnote “e” added to define the terms.

MAXI-3

- It was clarified that the treatment recommendations on this page are for squamous cell histologies.

MAXI-A

- Altered fractionation schedules added to RT recommendations.

Salivary Gland Tumors

SALI-1

The following clarifications were made:

- Submaxillary was changed to “submandibular”.
- After resection, “to primary” was added after Adjuvant RT.
- “Not resectable” was changed to T4b.

Salivary Gland Tumors

SALI-2

- Untreated resectable, clinically benign and < 4 cm, “CT/MRI if clinically indicated” was added to the workup section.

SALI-4

- A category for metastatic disease was added with the treatment recommendations of chemotherapy, clinical trial, or expectant management.
- Clinical trial was added as a treatment option for locoregional disease that is not resectable and “expectant management” replaced best supportive care.

Cancer of the Lip

LIP-2

- “Preferred” was added to the recommendation for surgery.

LIP-3

- “Preferred” was added to the recommendation for surgery.
- For extracapsular spread and/or positive margins, the recommendations of “re-excision” and “RT in selected patients” were added.
- Footnote “d” is new to the page, recommending re-excision for “positive margin” if technically feasible.
- A post-treatment evaluation with imaging was added to assist with patient selection for neck dissection.

LIP-A

- The option for brachytherapy alone was removed. The doses of radiation therapy were modified based upon the addition of brachytherapy. The recommended RT dose is 50-60 Gy with brachytherapy and 50-66 Gy without brachytherapy.

[Continued on next page](#)

Summary of the Guidelines updates

Summary of changes in the 1.2009 version of the Head and Neck Cancer guidelines from the 2.2008 version include:

Cancer of the Oral Cavity

OR-2 and OR-3

- For extracapsular spread and/or positive margins, the recommendations of “re-excision” and “RT in selected patients” were added.
- Footnote “b” is new to the page, recommending re-excision for “positive margin” if technically feasible.

OR-A

- Altered fractionation schedules added to RT recommendations.

Cancer of the Oropharynx

ORPH-1

- In the workup section, “or PET-CT and CT with contrast” was added to the CT or MRI recommendation.

ORPH-3

- The clinical staging was changed by adding N1 disease.

ORPH-4

- T3-4a, N+ was removed from the clinical staging.
- A post-treatment evaluation with imaging was added to assist with patient selection for neck dissection.

ORPH-A

- Accelerated IMRT schedule added to RT recommendations.

Cancer of the Hypopharynx

HYPO-1

- In the workup section, “or PET-CT and CT with contrast” was added to the CT or MRI recommendation.
- Footnote “a” is new to the page, stating PET-CT is recommended for stage III-IV disease.

HYPO-3 and HYPO-4

- A post-treatment evaluation with imaging was added to assist with patient selection for neck dissection.

Cancer of the Hypopharynx

HYPO-5

- The option of RT was added after surgery and comprehensive neck dissection.
- The option of induction chemotherapy was modified to include sequential therapy recommendations.
- A post-treatment evaluation with imaging was added to assist with patient selection for neck dissection.

HYPO-A

- Altered fractionation schedules added to RT recommendations.

Occult Primary

OCC-1

- Thyroglobulin staining was added to the workup of adenocarcinoma and anaplastic undifferentiated tumors.
- Footnote “a” was clarified: Patient should be prepared for neck dissection at time of *open* biopsy, if *indicated*.

OCC-2

- Adenocarcinoma was clarified as “thyroglobulin negative”.
- For Node level IV, lower V, EUA was added.

OCC-3

- A post-treatment evaluation with imaging was added to assist with patient selection for neck dissection.

OCC-4

- Patients post neck dissection with level 1 only nodes, “observation” was added with a category 3 designation.

OCC-6

- Footnote “f” was added, recommending RT for satellitosis, positive nodes, or extracapsular spread.

OCC-A

- Footnote “1” is new to the page defining the histologies for the RT recommendations.
- Altered Fractionation schedules added to RT recommendations.

[Continued on next page](#)

Summary of the Guidelines updates

Summary of changes in the 1.2009 version of the Head and Neck Cancer guidelines from the 2.2008 version include:

Cancer of the Glottic Larynx

GLOT-1

- In the workup section, “or PET-CT and CT with contrast and thin cuts through larynx” was added to the CT or MRI recommendation.

GLOT-3

- This page only addresses N0-1 disease; N2-3 disease was moved to page GLOT-4.
- RT was added as a treatment option for patients who are not candidates for concurrent chemo/RT.

GLOT-4

- This is a new page to address N2-3 disease.
- The treatment option of induction therapy followed by chemoradiation was added with the designation of category 2B; page GLOT-5 now contains the sequential therapy.
- A post-treatment evaluation with imaging was added to assist with patient selection for neck dissection.

GLOT-5

- The option of induction chemotherapy was modified to include sequential therapy recommendations.

GLOT-6

- The treatment option of induction therapy followed by chemoradiation was added with the designation of category 2B; page GLOT-5 now contains the sequential therapy.
- A post-treatment evaluation with imaging was added to assist with patient selection for neck dissection.

Cancer of the Supraglottic Larynx

SUPRA-1

- In the workup section, “or PET-CT and CT with contrast and thin cuts through larynx” was added to the CT or MRI recommendation.

SUPRA-3

- RT was added as a treatment option for patients who are not candidates for concurrent chemo/RT.

SUPRA-6

- The clinical stage was clarified by adding N0-1 to T3-4a.

Cancer of the Supraglottic Larynx

SUPRA-7

- The clinical stage was clarified by changing to T3, N2-3.
- The category designation for induction chemotherapy followed by chemoradiation was changed from a 3 to a 2B; page SUPRA-8 now contains the sequential therapy.
- A post-treatment evaluation with imaging was added to assist with patient selection for neck dissection.

SUPRA-8

- The option of induction chemotherapy was modified to include sequential therapy recommendations.

SUPRA-9

- The clinical stage was clarified by changing N+ to N2-3.
- The clinical stage was clarified by adding “Massive tongue base invasion”.

SUPRA-A

- Altered fractionation schedules added to RT recommendations.
- Chemoradiation schedule added to recommendations.

Cancer of the Nasopharynx

NASO-1

- In the workup section, “or PET-CT and CT with contrast” was added to the CT or MRI recommendation.

NASO-2

- The cisplatin regimen of 40 mg/m² every week was added as an option for T1-2a, N1-3; T2b-4, Any N.

Advanced Head and Neck Cancer

ADV-1

- The recommendation for induction chemotherapy for PS 2 patients was deleted.

ADV-2

- Locoregional recurrence with prior RT - the recommendation was removed for reirradiation following surgery for resectable patients.

MULTIDISCIPLINARY TEAM

The management of patients with head and neck cancers is complex. All patients need access to the full range of specialists and support services with expertise in the management of patients with head and neck cancer for optimal treatment and follow-up.

- Head and neck surgery
- Radiation oncology
- Medical oncology
- Plastic and reconstructive surgery
- Specialized nursing care
- Dentistry/prostodontics
- Physical medicine and rehabilitation
- Speech and swallowing therapy
- Clinical Social work
- Nutrition support
- Pathology
- Diagnostic radiology
- Adjunctive services
 - ▶ Neurosurgery
 - ▶ Ophthalmology
 - ▶ Psychiatry
 - ▶ Addiction Services
 - ▶ Audiology

SUPPORT AND SERVICES

Follow-up should be performed by a physician and other health care professionals with expertise in the management and prevention of treatment sequelae. It should include a comprehensive head and neck exam. The management of head and neck cancer patients may involve the following:

- General medical care
- Pain and symptom management
- Nutritional support
 - ▶ Enteral feeding
 - ▶ Oral supplements
- Dental care for RT effects
- Xerostomia management
- Smoking and alcohol cessation
- Speech and swallowing therapy
- Audiology
- Tracheotomy care
- Wound management
- Depression assessment and management
- Social work and Case management
- Supportive Care ([See NCCN Palliative Care Guideline](#))

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

WORKUP

- H&P
- CT and/or MRI
- Chest imaging

Biopsy

PATHOLOGY

- Squamous cell carcinoma
- Adenocarcinoma
- Salivary gland tumor
- Sarcoma (non-rhabdomyosarcoma)
- Esthesioneuroblastomas^a
- Undifferentiated carcinoma (SNUC, small cell neuroendocrine)^a

Lymphoma ([See NCCN Non-Hodgkin's Lymphoma Guidelines](#))

[See Primary Treatment and Follow-up \(ETHM-2\)](#)

Diagnosed with incomplete excision

- H&P
- CT and/or MRI
- Pathology review
- Chest imaging

[See Primary Treatment and Follow-up \(ETHM-2\)](#)

^aFor sinonasal undifferentiated carcinoma (SNUC), esthesioneuroblastoma, and small cell neuroendocrine histologies, systemic therapy should be a part of the overall treatment.

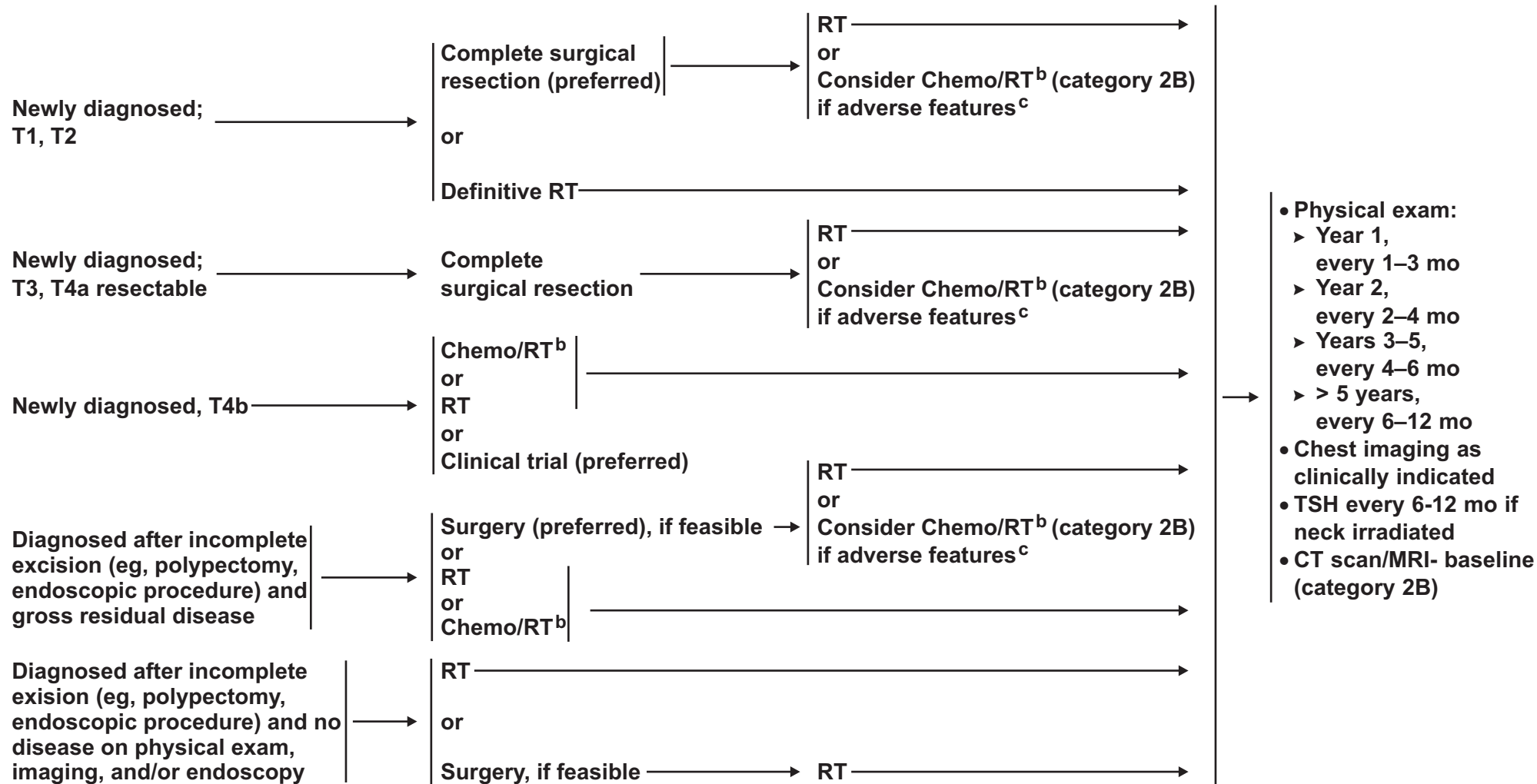
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CLINICAL
PRESENTATION

PRIMARY TREATMENT

ADJUVANT TREATMENT

FOLLOW-UP



[Recurrence \(see ADV-2\)](#)

^bSee Principles of Systemic Therapy (CHEM-A).

^cAdverse features include positive margins and intracranial extension.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

WORKUP

- H&P
- Complete head and neck CT with contrast and/or MRI
- Dental/prosthetic consultation as indicated
- Chest imaging

Biopsy^a

PATHOLOGY

Lymphoma

[See NCCN Non-Hodgkin's Lymphoma Guidelines](#)

- Squamous cell carcinoma
- Adenocarcinoma
- Salivary gland tumor
- Sarcoma (non-rhabdomyosarcoma)
- Esthesioneuroblastoma^b
- Undifferentiated carcinoma (SNUC, small cell neuroendocrine)^b

T1-2, N0
All histologies

[See Primary Treatment \(MAXI-2\)](#)

T3-4, N0, Any T, N+
All histologies

[See Primary Treatment \(MAXI-3\)](#)

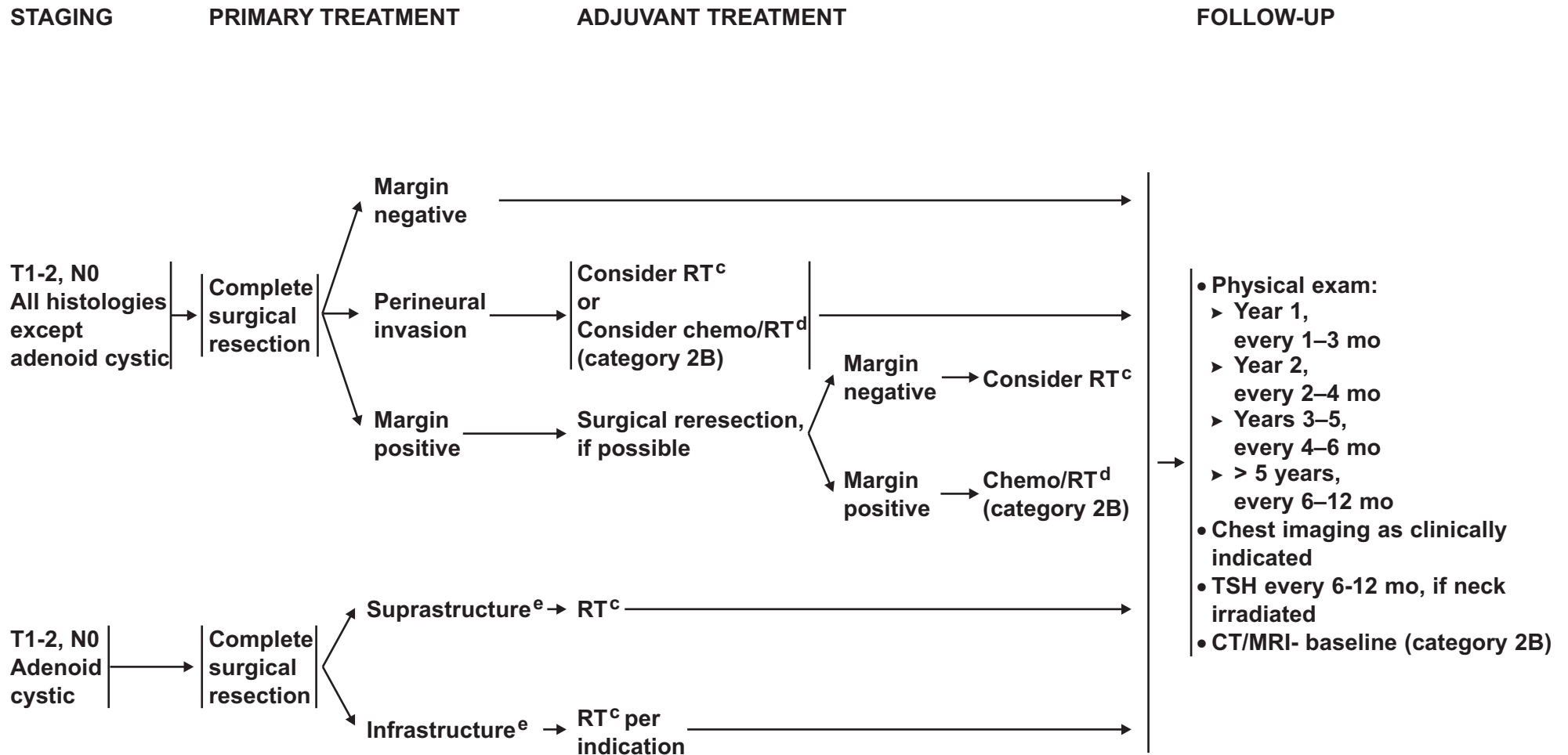
^aBiopsy:

- Preferred route is transnasal.
- Needle biopsy may be acceptable.
- Avoid canine fossa puncture or Caldwell-Luc approach.

^bFor sinonasal undifferentiated carcinoma (SNUC), esthesioneuroblastoma, and small cell neuroendocrine histologies, systemic therapy should be a part of the overall treatment.

Note: All recommendations are category 2A unless otherwise indicated.

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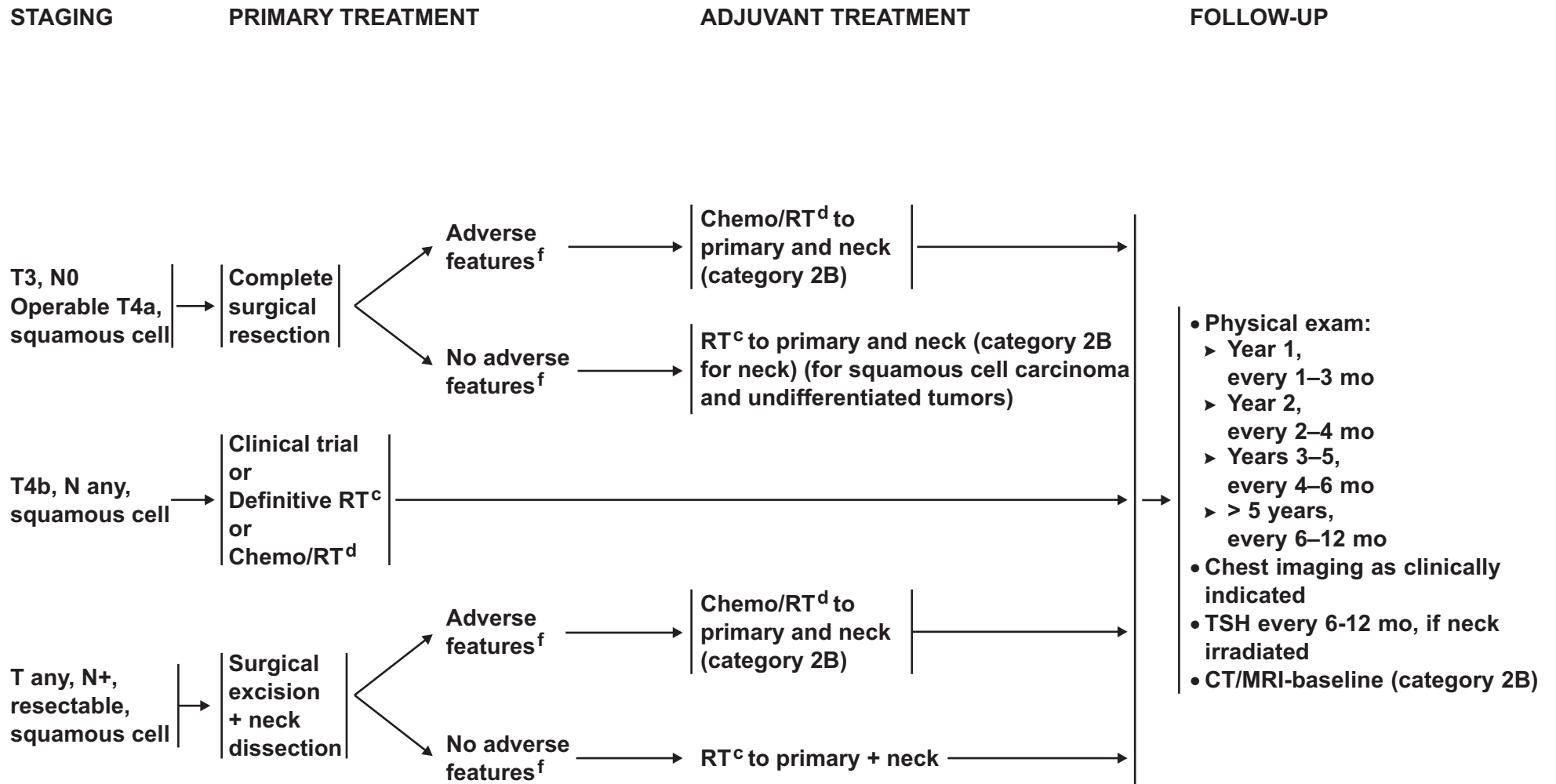


^cSee Principles of Radiation Therapy (MAXI-A).

^dSee Principles of Systemic Therapy (CHEM-A).

^e"Ohngren's line" runs from the medial canthus of the eye to the angle of the mandible, helping to define a plane passing through the maxillary sinus. Tumors "below" or "before" this line involve the maxillary infrastructure. Those "above" or "behind" Ohngren's line involve the suprastructure.

Note: All recommendations are category 2A unless otherwise indicated.
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^cSee Principles of Radiation Therapy (MAXI-A).

^dSee Principles of Systemic Therapy (CHEM-A).

^fAdverse features include positive margins or extracapsular nodal spread.

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PRINCIPLES OF RADIATION THERAPY¹**Definitive RT****• Primary and gross adenopathy:****Conventional: ≥ 66 Gy (2.0 Gy/fraction; daily Monday-Friday)****Altered fractionation:**

- ▶ **6 fractions/week accelerated during weeks 2-6; 70 Gy to gross disease, ≥ 50 Gy to subclinical disease.**
- ▶ **Concomitant boost accelerated RT: 72 Gy/6 weeks (1.8 Gy/fraction, large field; 1.5 Gy boost as second daily fraction during last 12 treatment days)**
- ▶ **Hyperfractionation: 81.6 Gy/7 weeks (1.2 Gy/fraction, twice daily)**

• Neck**Uninvolved nodal stations:****≥ 50 Gy (2.0 Gy/day)****Postoperative RT****• Primary: ≥ 60 Gy (2.0 Gy/day)****• Neck**

- ▶ **Involved nodal stations:
≥ 60 Gy (2.0 Gy/day)**
- ▶ **Uninvolved nodal stations:
≥ 50 Gy (2.0 Gy/day)**

¹[See Radiation Techniques \(RAD-A\).](#)

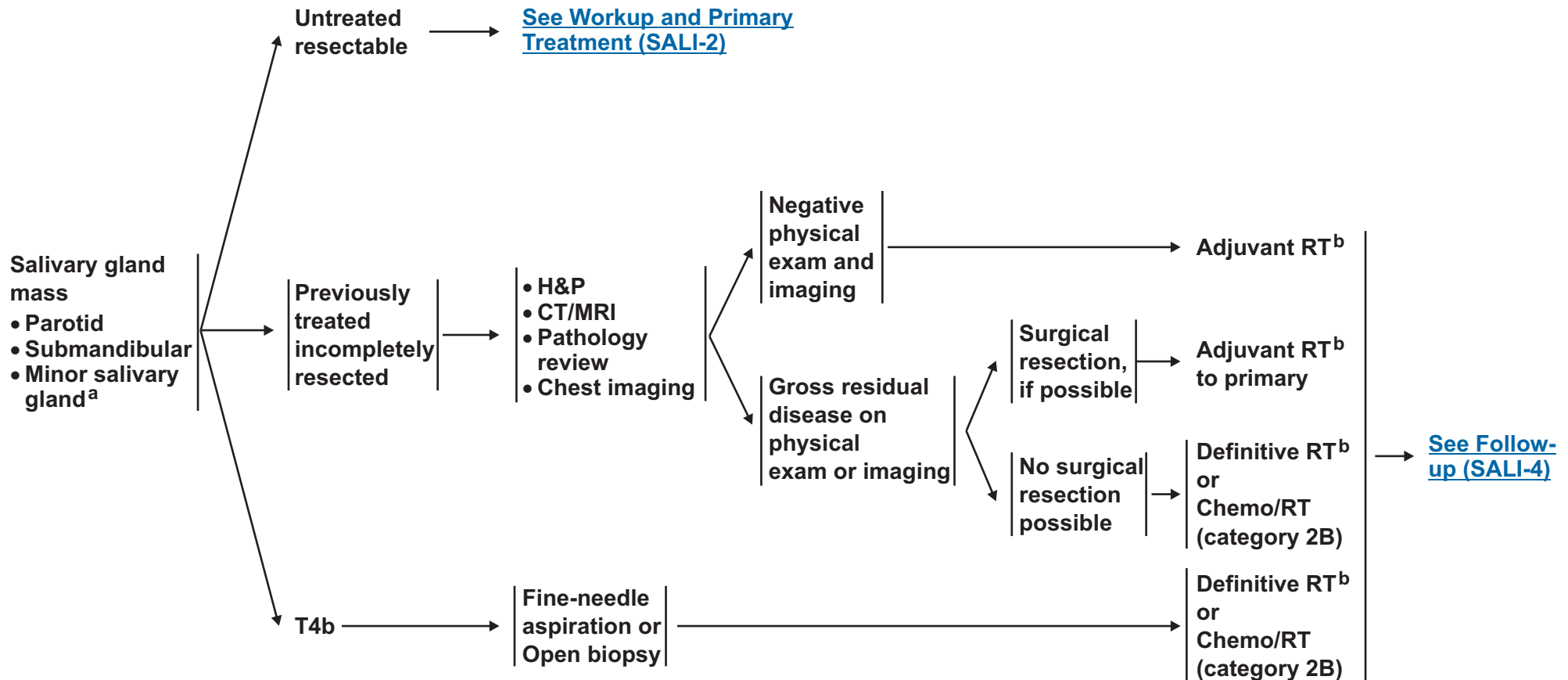
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CLINICAL PRESENTATION

WORKUP

TREATMENT



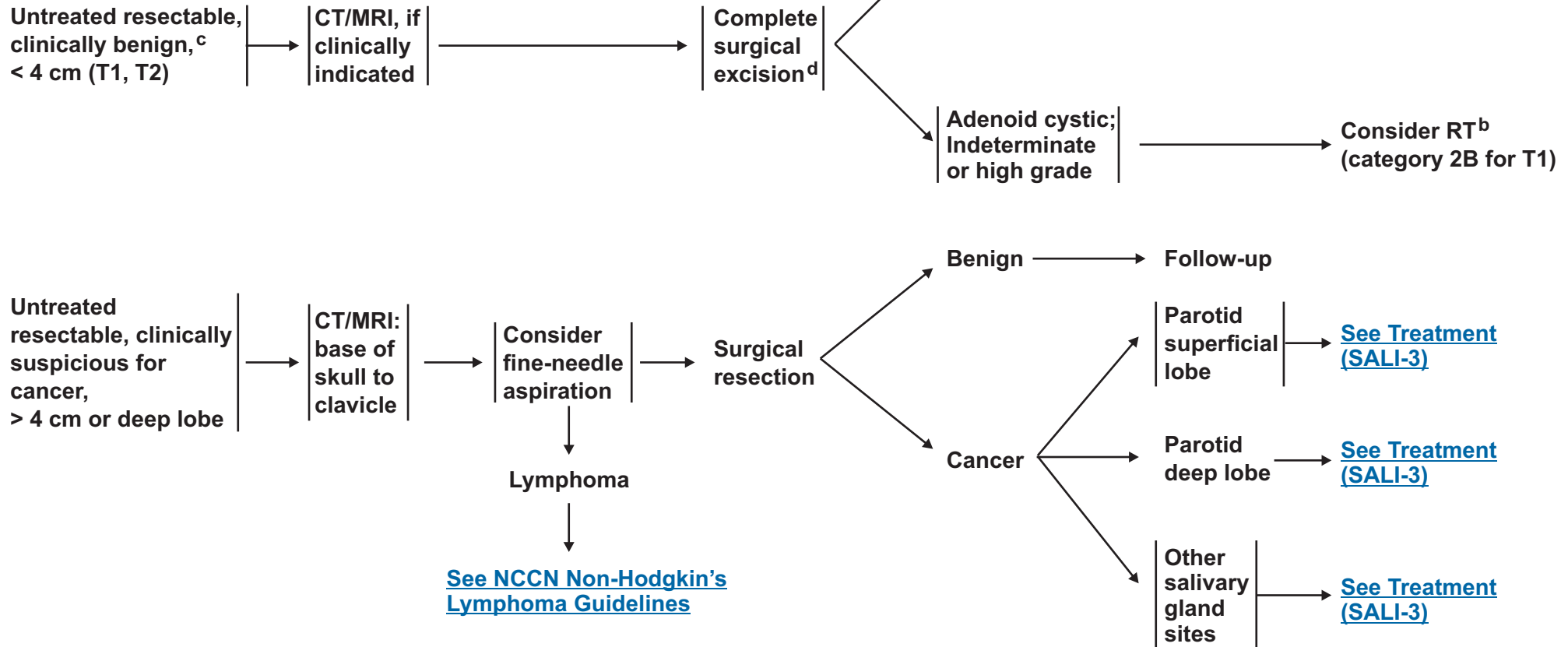
^aSite and stage determine therapeutic approaches.

^b[See Principles of Radiation Therapy \(SALI-A\)](#).

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WORKUP

PRIMARY TREATMENT



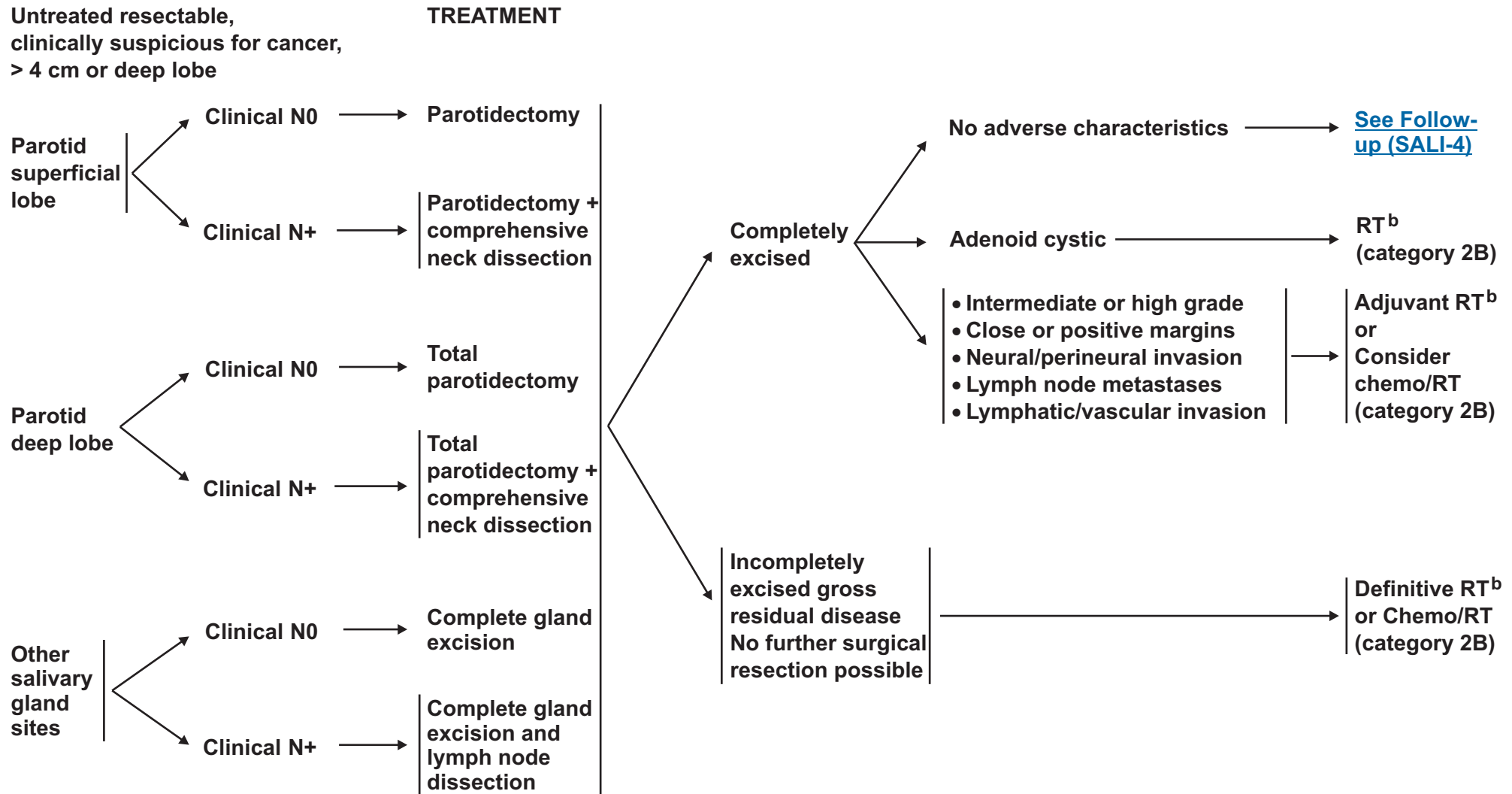
^bSee Principles of Radiation Therapy (SALI-A).

^cCharacteristics of benign tumor include mobile superficial lobe, slow growth, painless, VII intact, and no neck nodes.

^dSurgical excision of clinically benign tumor: no enucleation of lateral lobe, intraoperative communication with pathologist if indicated.

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^bSee Principles of Radiation Therapy (SALI-A).

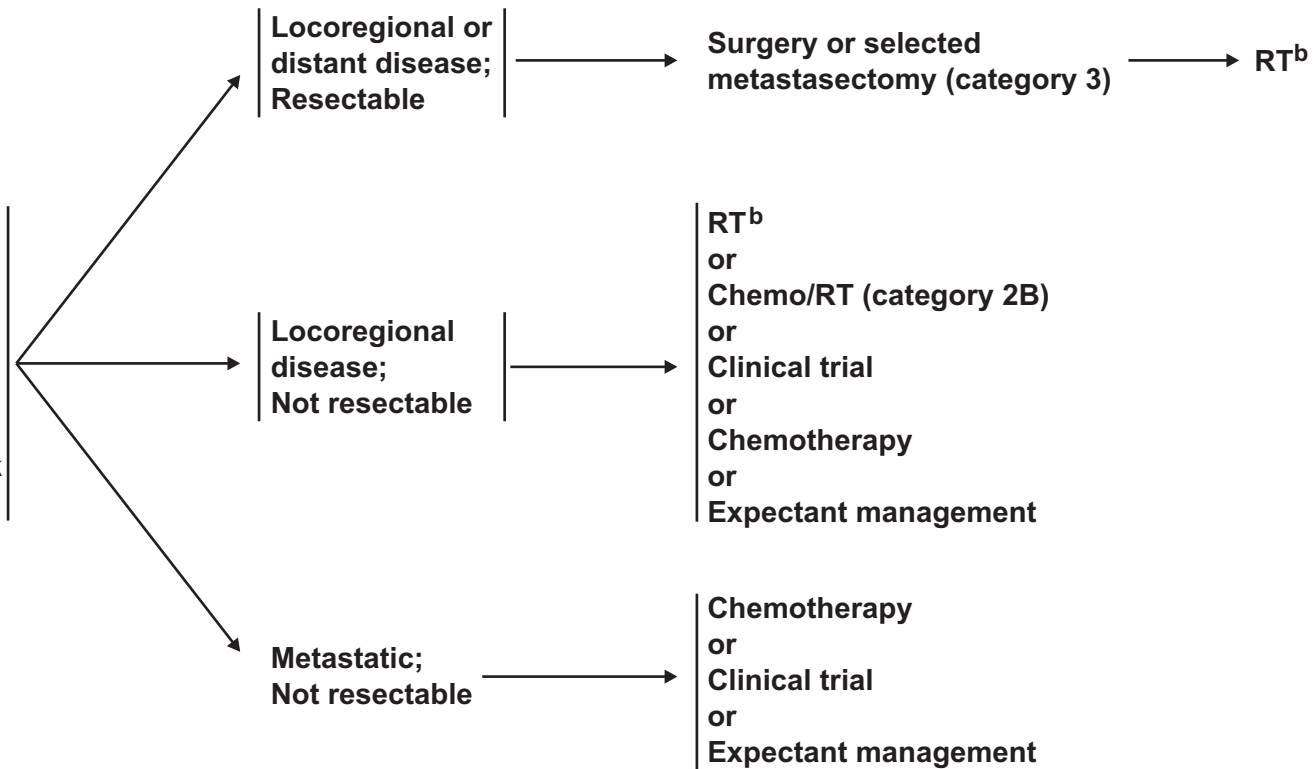
[Follow-up and Recurrence \(see SALI-4\)](#)

Note: All recommendations are category 2A unless otherwise indicated.
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FOLLOW-UP

RECURRENCE

- Physical exam:
 - ▶ Year 1, every 1–3 mo
 - ▶ Year 2, every 2–4 mo
 - ▶ Years 3–5, every 4–6 mo
 - ▶ > 5 yr, every 6–12 mo
- Chest imaging as clinically indicated
- TSH every 6-12 mo, if neck irradiated



^bSee Principles of Radiation Therapy (SALI-A).

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PRINCIPLES OF RADIATION THERAPY¹**Definitive RT****Unresectable disease or gross residual disease**

- Photon/electron therapy or neutron therapy

- Dose

- ▶ Primary and gross adenopathy:

≥ 70 Gy (1.8-2.0 Gy/day)² or
19.2 nGy (1.2 nGy/day)

- ▶ Uninvolved nodal stations:

45-54 Gy (1.8-2.0 Gy/day)² or
13.2 nGy (1.2 nGy/day)

Postoperative RT

- Photon/electron therapy or neutron therapy

- Dose

- ▶ Primary: ≥ 60 Gy (1.8-2.0 Gy/day)²
or 18 nGy (1.2 nGy/day)

- ▶ Neck: 45-54 Gy (1.8-2.0 Gy/day)²
or 13.2 nGy (1.2 nGy/day)

¹See [Radiation Techniques \(RAD-A\)](#).

²Range based on grade/natural history of disease (eg, 1.8 Gy fraction may be used for slower growing tumors).

Note: All recommendations are category 2A unless otherwise indicated.

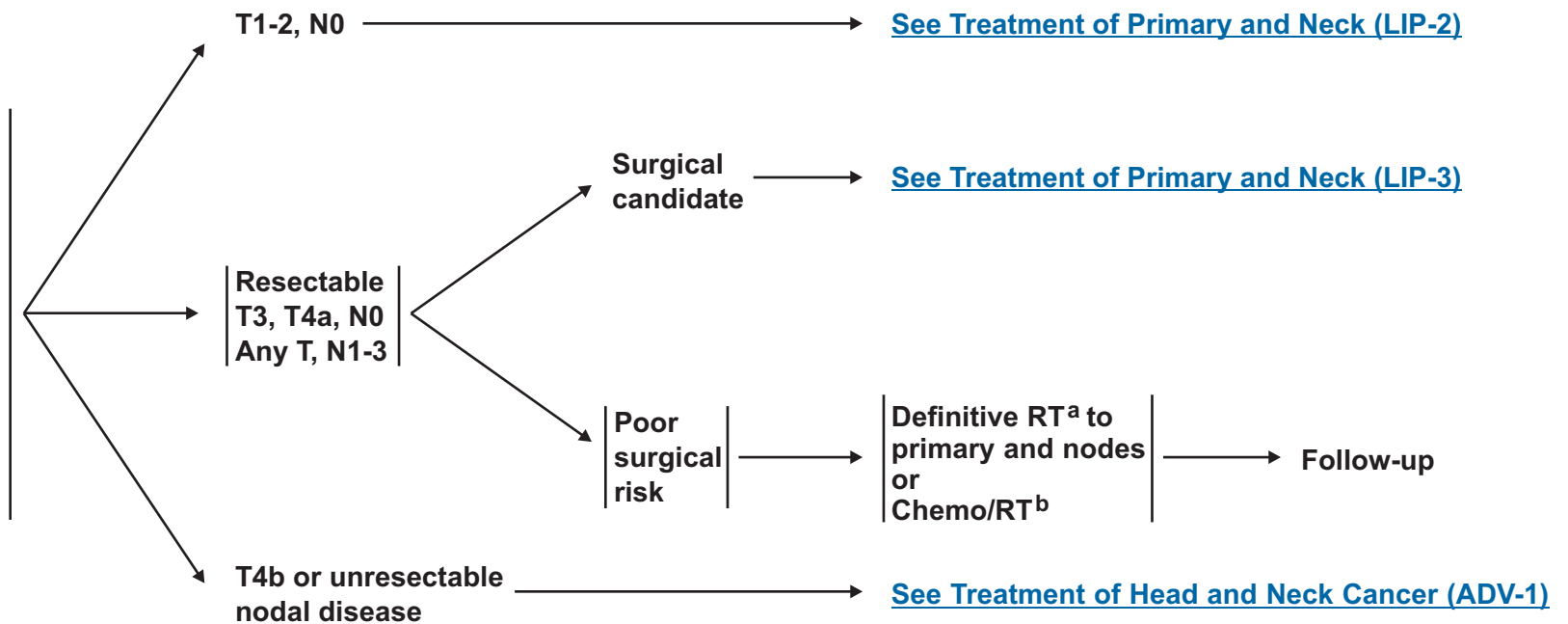
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[Back to Workup and
Primary Treatment
\(SALI-1\)](#)

WORKUP

- H&P
 - Biopsy
 - Chest imaging
 - As indicated for primary evaluation
 - Panorex
 - CT/MRI
 - Preanesthesia studies
 - Dental evaluation
- Multidisciplinary consultation as indicated

CLINICAL STAGING



^aSee Principles of Radiation Therapy (LIP-A).

^bSee Principles of Systemic Therapy (CHEM-A).

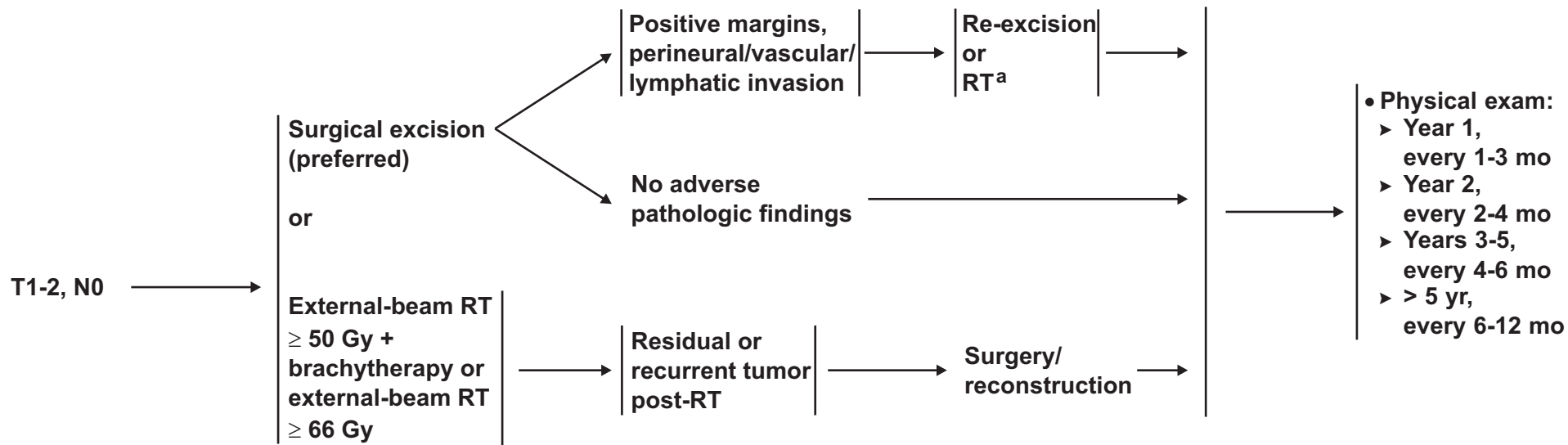
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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT TREATMENT

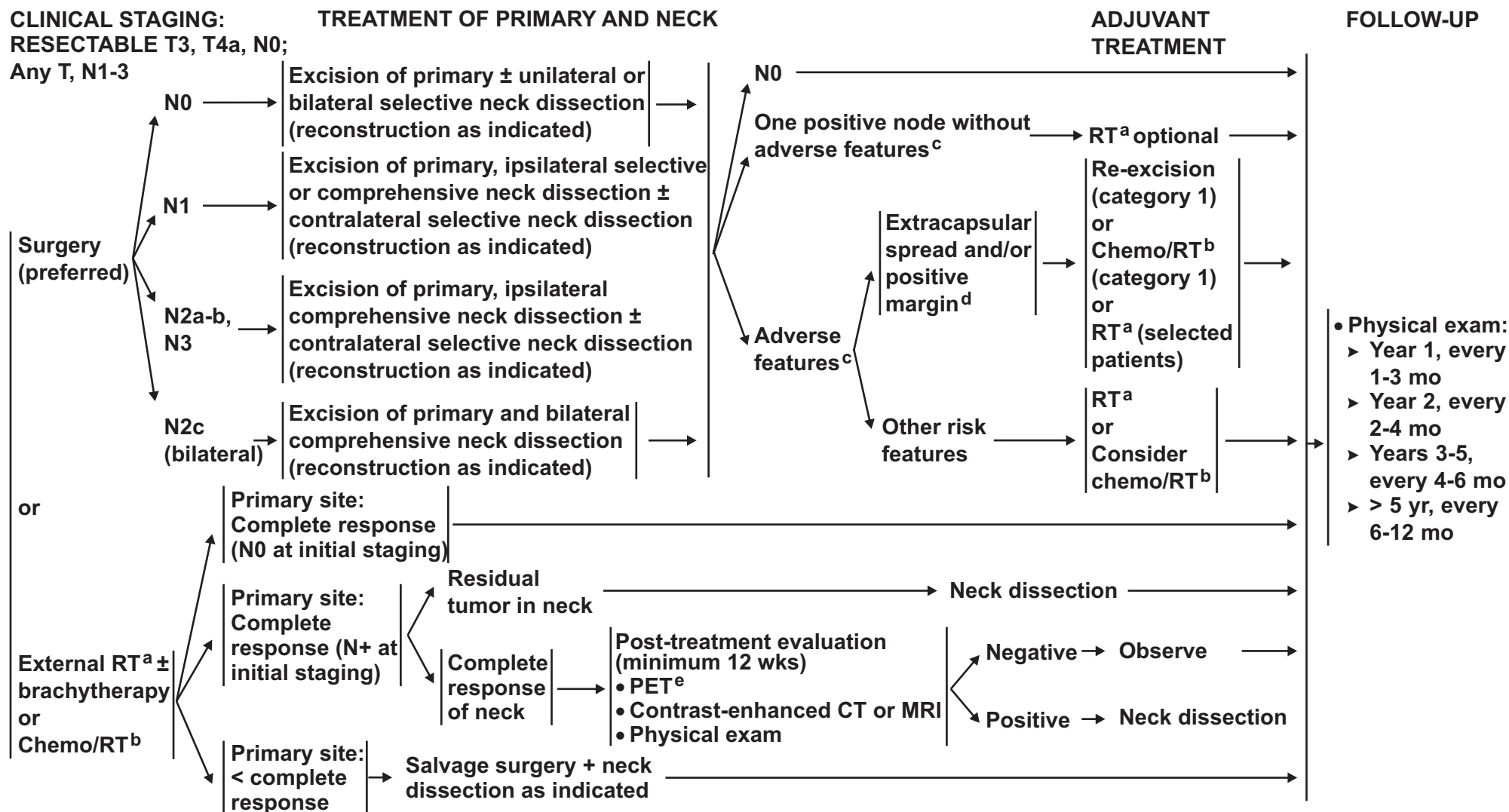
FOLLOW-UP



^a[See Principles of Radiation Therapy \(LIP-A\).](#)

[Recurrence \(see ADV-2\)](#)

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.



^aSee Principles of Radiation Therapy (LIP-A).

^bSee Principles of Systemic Therapy (CHEM-A).

^cRisk features: extracapsular nodal spread, positive margins, multiple positive nodes or perineural/lymphatic/vascular invasion.

^dFor positive margin only, re-excite if technically feasible.

^eIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

[Recurrence \(see ADV-2\)](#)

Note: All recommendations are category 2A unless otherwise indicated.

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PRINCIPLES OF RADIATION THERAPY¹**Definitive RT**

- **Primary and gross adenopathy:**
≥ 66 Gy (2.0 Gy/day)
External-beam RT ± brachytherapy
50-60 Gy with brachytherapy
50-66 Gy without brachytherapy
- **Neck**
Uninvolved nodal stations:
≥ 50 Gy (2.0 Gy/day)

Postoperative RT

- **Primary:** ≥ 60 Gy (2.0 Gy/day)
- **Neck**
 - ▶ **Involved nodal stations:**
≥ 60 Gy (2.0 Gy/day)
 - ▶ **Uninvolved nodal stations:**
≥ 50 Gy (2.0 Gy/day)

¹[See Radiation Techniques \(RAD-A\).](#)

[Back to Clinical Staging \(LIP-1\)](#)

Note: All recommendations are category 2A unless otherwise indicated.

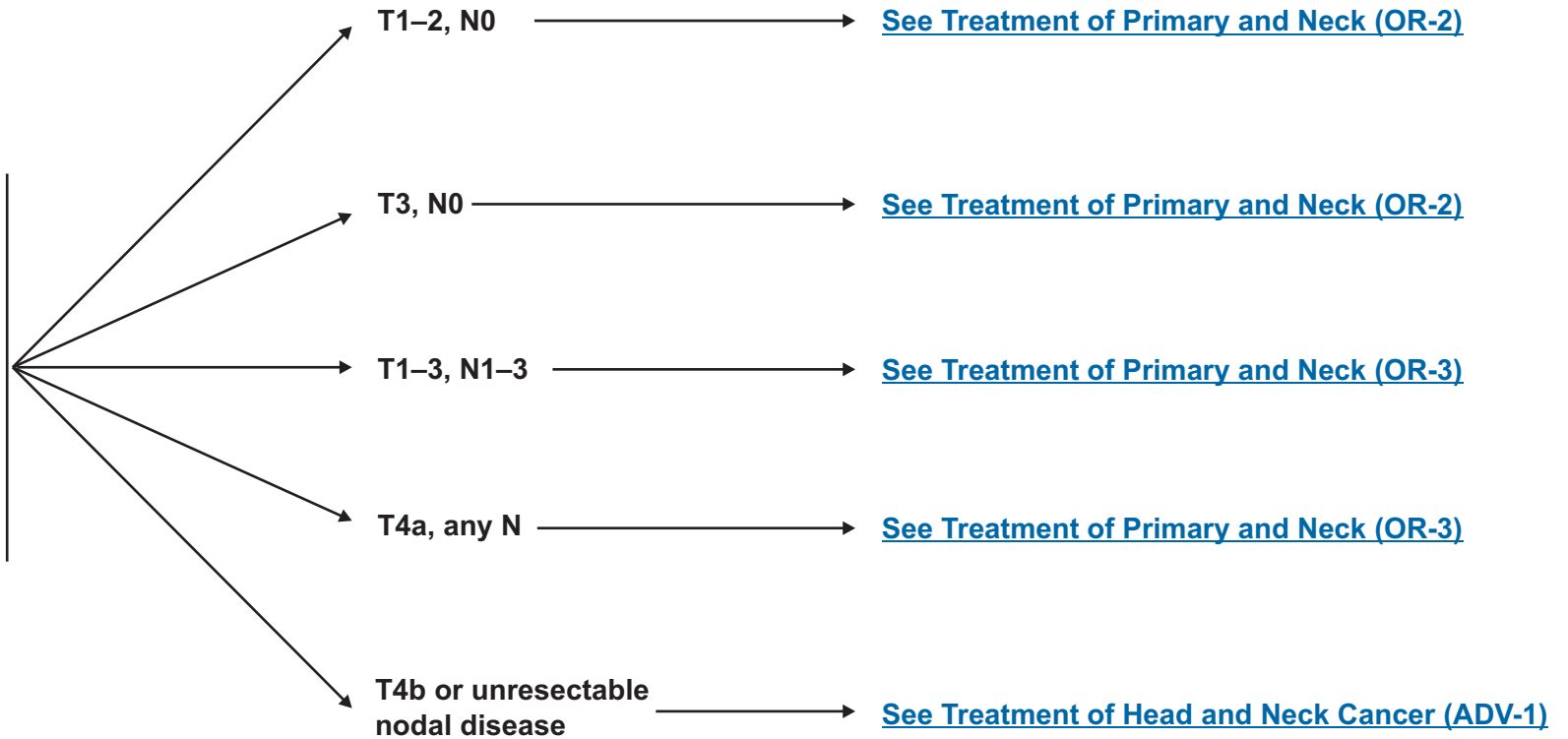
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Buccal mucosa, floor of mouth, anterior tongue, alveolar ridge, retromolar trigone, hard palate

WORKUP

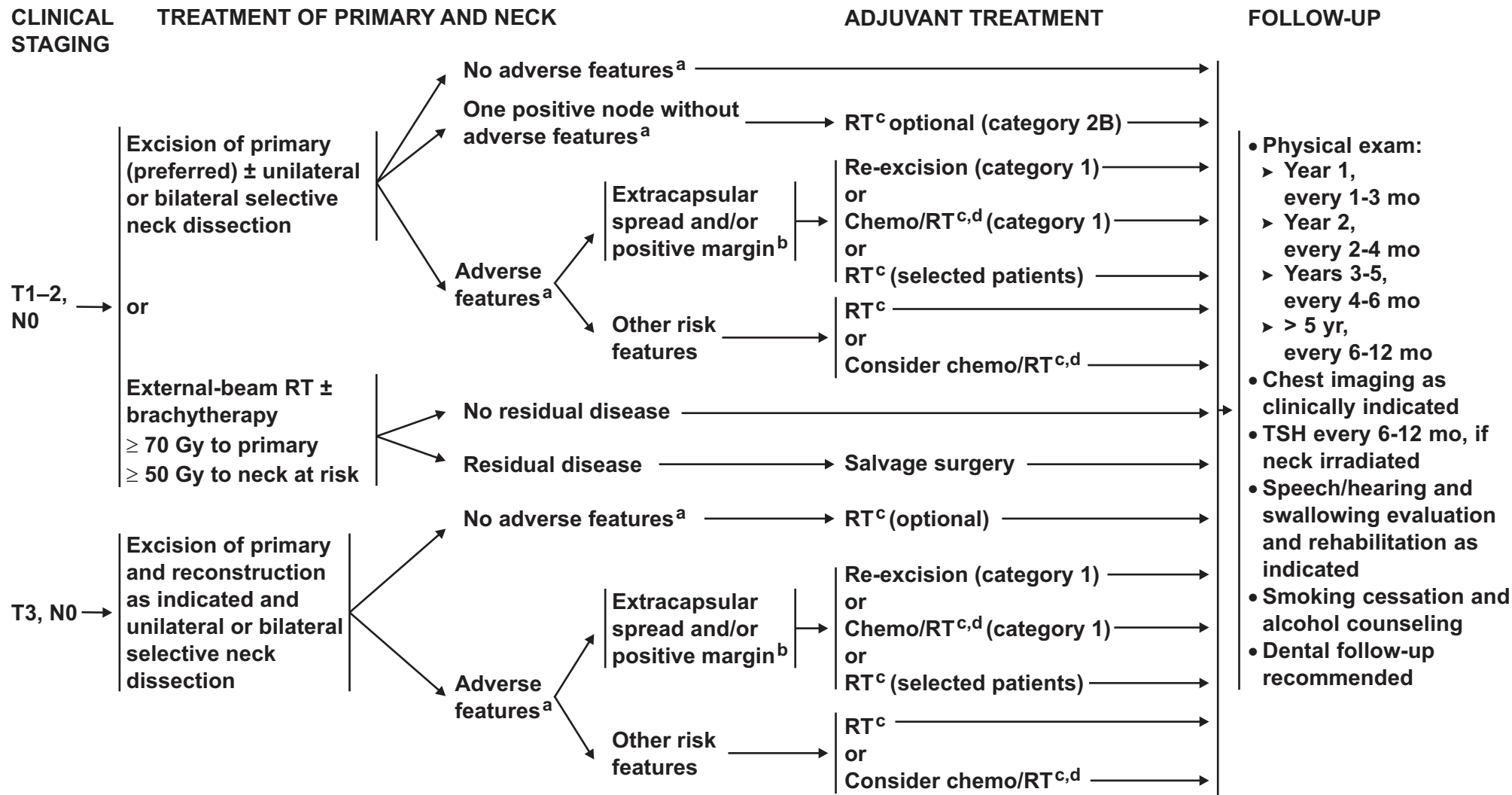
- H&P
 - Biopsy
 - Chest imaging
 - CT/MRI as indicated
 - Examination under anesthesia, if indicated
 - Preanesthesia studies
 - Dental evaluation, including panorex as indicated
- Multidisciplinary consultation as indicated

CLINICAL STAGING



Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

Buccal mucosa, floor of mouth, anterior tongue, alveolar ridge, retromolar trigone, hard palate



^aRisk features: extracapsular nodal spread, positive margins, pT3 or pT4 primary, N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.

^bFor positive margin only, re-excite if technically feasible.

^cSee [Principles of Radiation Therapy \(OR-A\)](#).

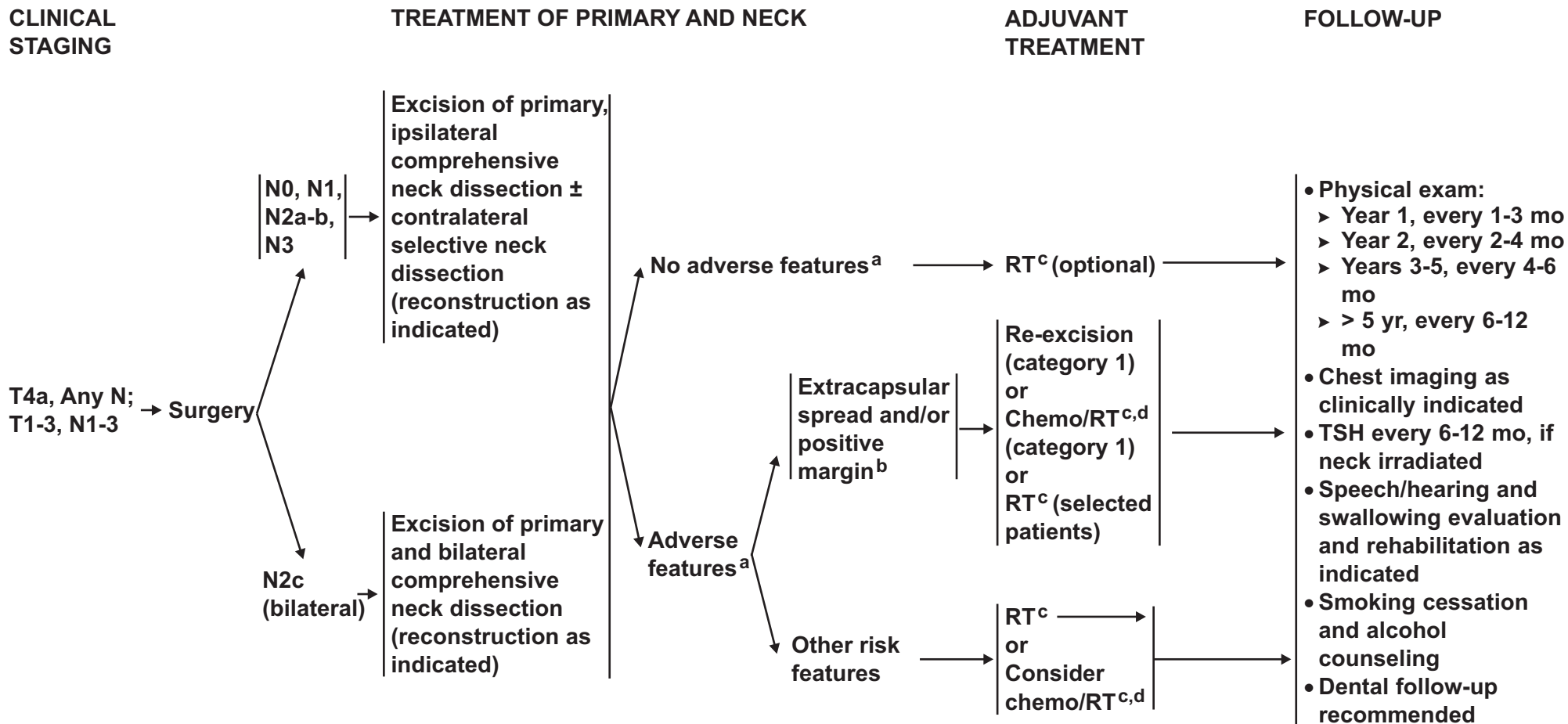
^dSee [Principles of Systemic Therapy \(CHEM-A\)](#).

[Recurrence \(see ADV-2\)](#)

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

Buccal mucosa, floor of mouth, anterior tongue, alveolar ridge, retromolar trigone, hard palate



^aRisk features: extracapsular nodal spread, positive margins, pT3 or pT4 primary, N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.

^bFor positive margin only, re-excise if technically feasible.

^cSee [Principles of Radiation Therapy \(OR-A\)](#).

^dSee [Principles of Systemic Therapy \(CHEM-A\)](#).

[Recurrence \(see ADV-2\)](#)

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRINCIPLES OF RADIATION THERAPY¹**Definitive RT**• **Primary and gross adenopathy:**Conventional: ≥ 66 Gy (2.0 Gy/fraction; daily Monday-Friday)

Altered fractionation:

- ▶ 6 fractions/week accelerated during weeks 2-6; 70 Gy to gross disease, ≥ 50 Gy to subclinical disease.
- ▶ Concomitant boost accelerated RT: 72 Gy/6 weeks (1.8 Gy/fraction, large field; 1.5 Gy boost as second daily fraction during last 12 treatment days)
- ▶ Hyperfractionation: 81.6 Gy/7 weeks (1.2 Gy/fraction, twice daily)

• **Neck**

Uninvolved nodal stations:

 ≥ 50 Gy (2.0 Gy/day)**Postoperative RT**

• Indicated for pT3 or pT4 primary; N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.

• Preferred interval between resection and postoperative RT is ≤ 6 weeks.• **Primary:** ≥ 60 Gy (2.0 Gy/day)• **Neck**

▶ Involved nodal stations:

 ≥ 60 Gy (2.0 Gy/day)

▶ Uninvolved nodal stations:

 ≥ 50 Gy (2.0 Gy/day)**Postoperative chemoradiation**• Indicated for extracapsular nodal spread and/or positive margins²⁻⁴

• Consider for other risk features: pT3 or pT4 primary; N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.

• Concurrent single agent cisplatin at 100 mg/m² every 3 wks is recommended.¹ See [Radiation Techniques \(RAD-A\)](#).² Bernier J, Domezge C, Ozsahin M et al. Postoperative irradiation with or without concomitant chemotherapy for locally advanced head and neck cancer. N Engl J Med 2004;350:1945-1952.³ Cooper JS, Pajak TF, Forastiere AA et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. N Engl J Med 2004;350(19):1937-1944.⁴ Bernier J, Cooper JS, Pajuk TF, et al. Defining risk levels in locally advanced head and neck cancers: A comparative analysis of concurrent postoperative radiation plus chemotherapy trials of the EORTC (#22931) and RTOG (#9501). Head Neck 2005;27:843-850.**Note:** All recommendations are category 2A unless otherwise indicated.**Clinical Trials:** NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

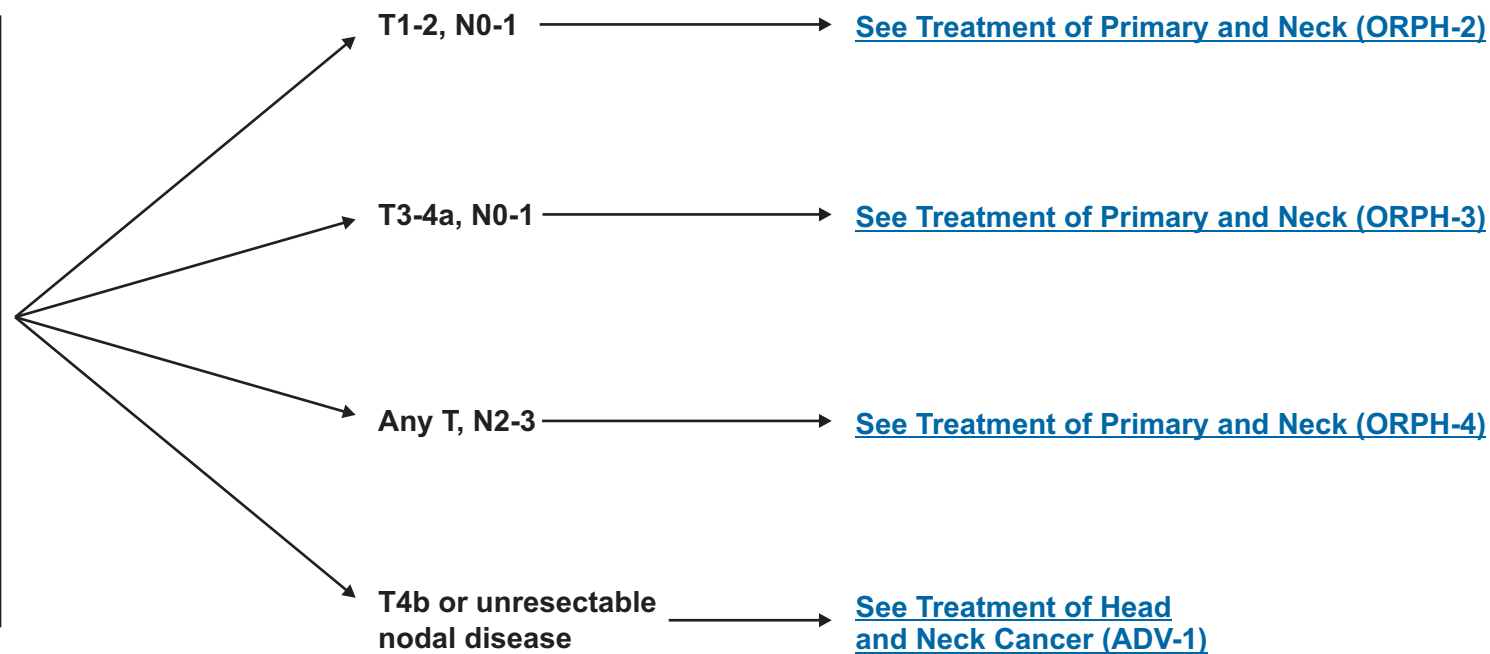
Base of tongue/tonsil/posterior pharyngeal wall/soft palate

WORKUP

- H&P
- Biopsy
- HPV testing suggested
- Chest imaging
- CT with contrast or MRI or PET-CT and CT with contrast of primary and neck
- Dental evaluation, including panorex as indicated
- Speech & swallowing evaluation as indicated
- Examination under anesthesia with endoscopy
- Preanesthesia studies

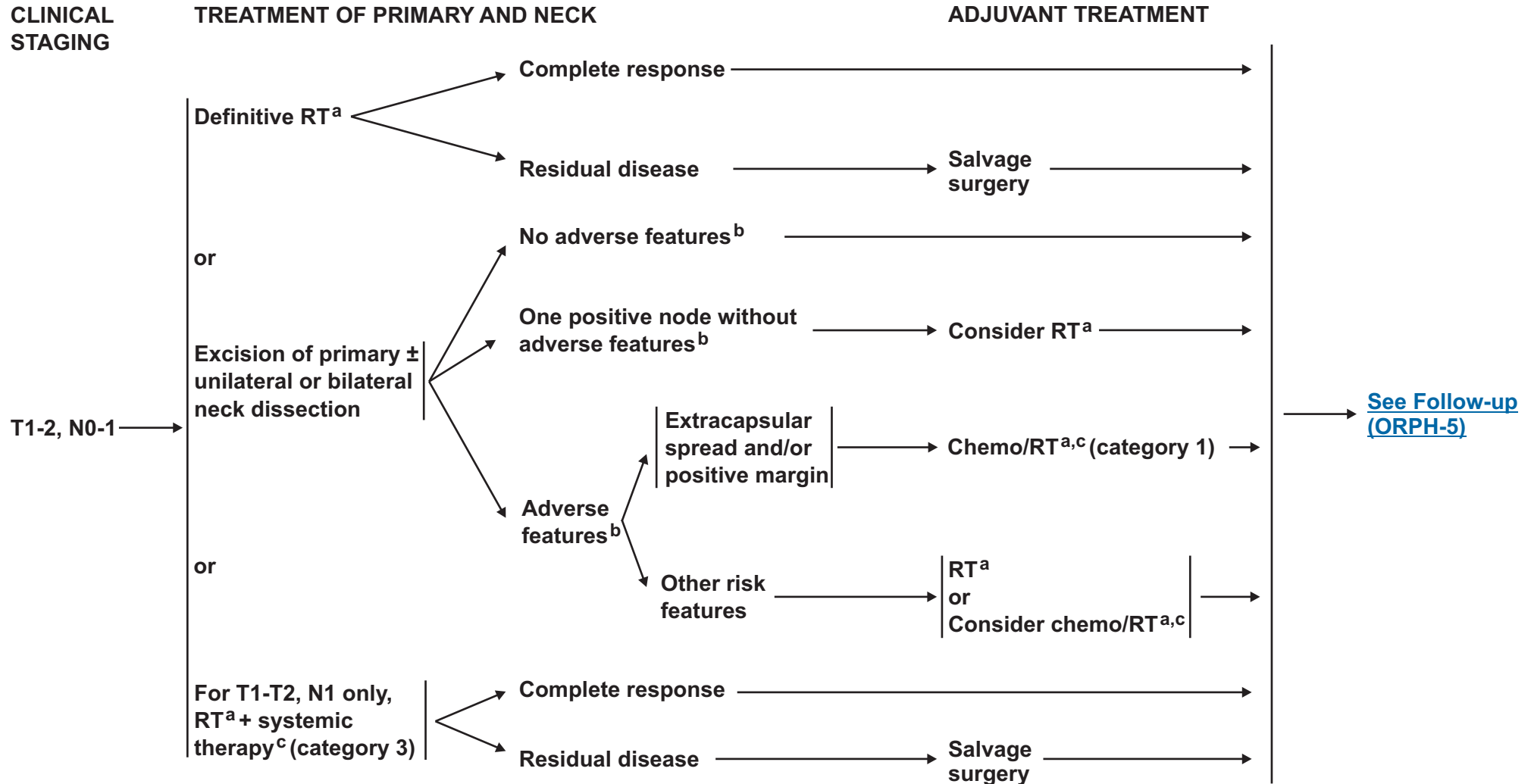
Multidisciplinary consultation as indicated

CLINICAL STAGING



Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

Base of tongue/tonsil/posterior pharyngeal wall/soft palate



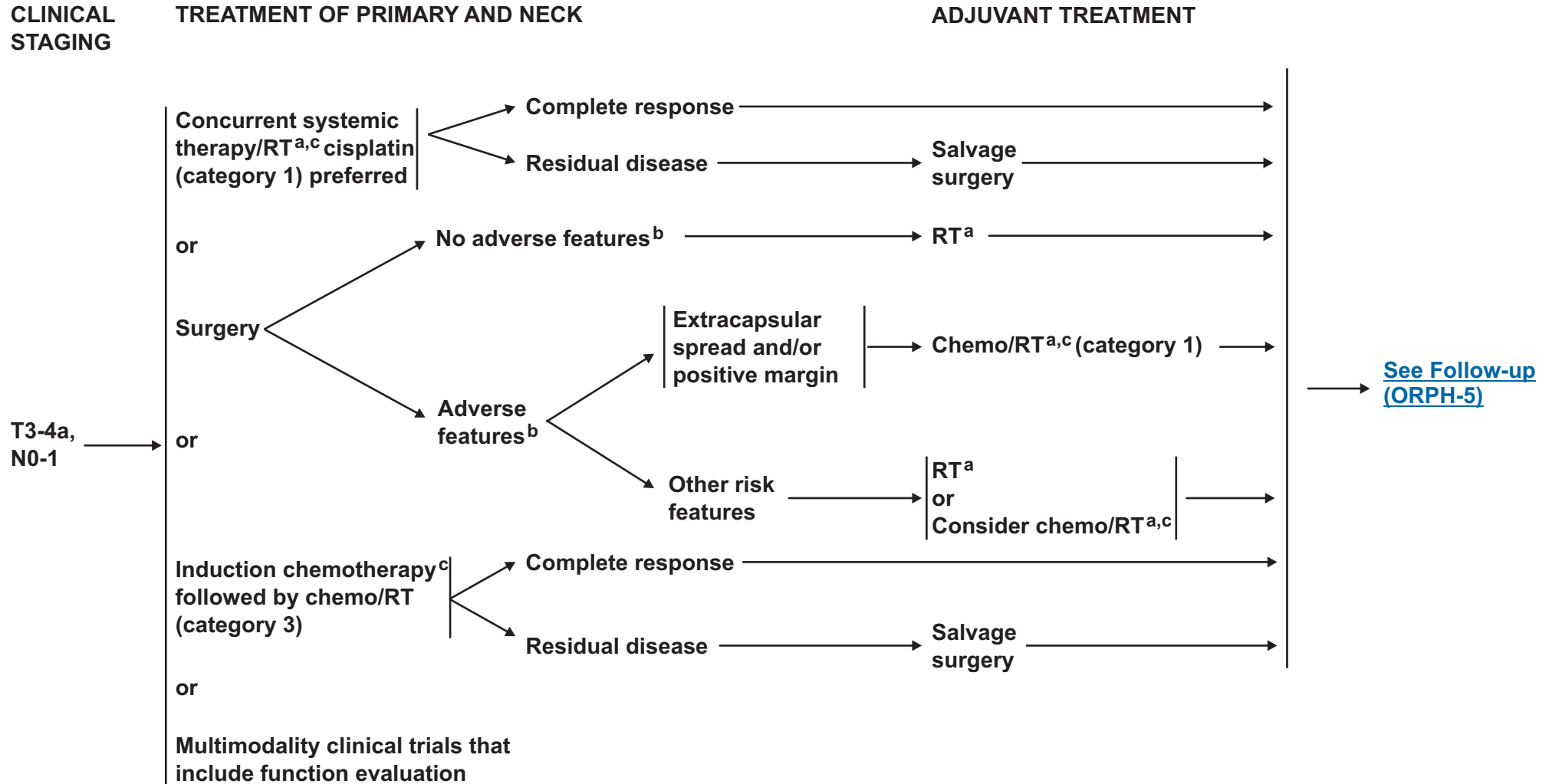
^aSee Principles of Radiation Therapy (ORPH-A).

^bRisk features: extracapsular nodal spread, positive margins, pT3 or pT4 primary, N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.

^cSee Principles of Systemic Therapy (CHEM-A).

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

Base of tongue/tonsil/posterior pharyngeal wall/soft palate



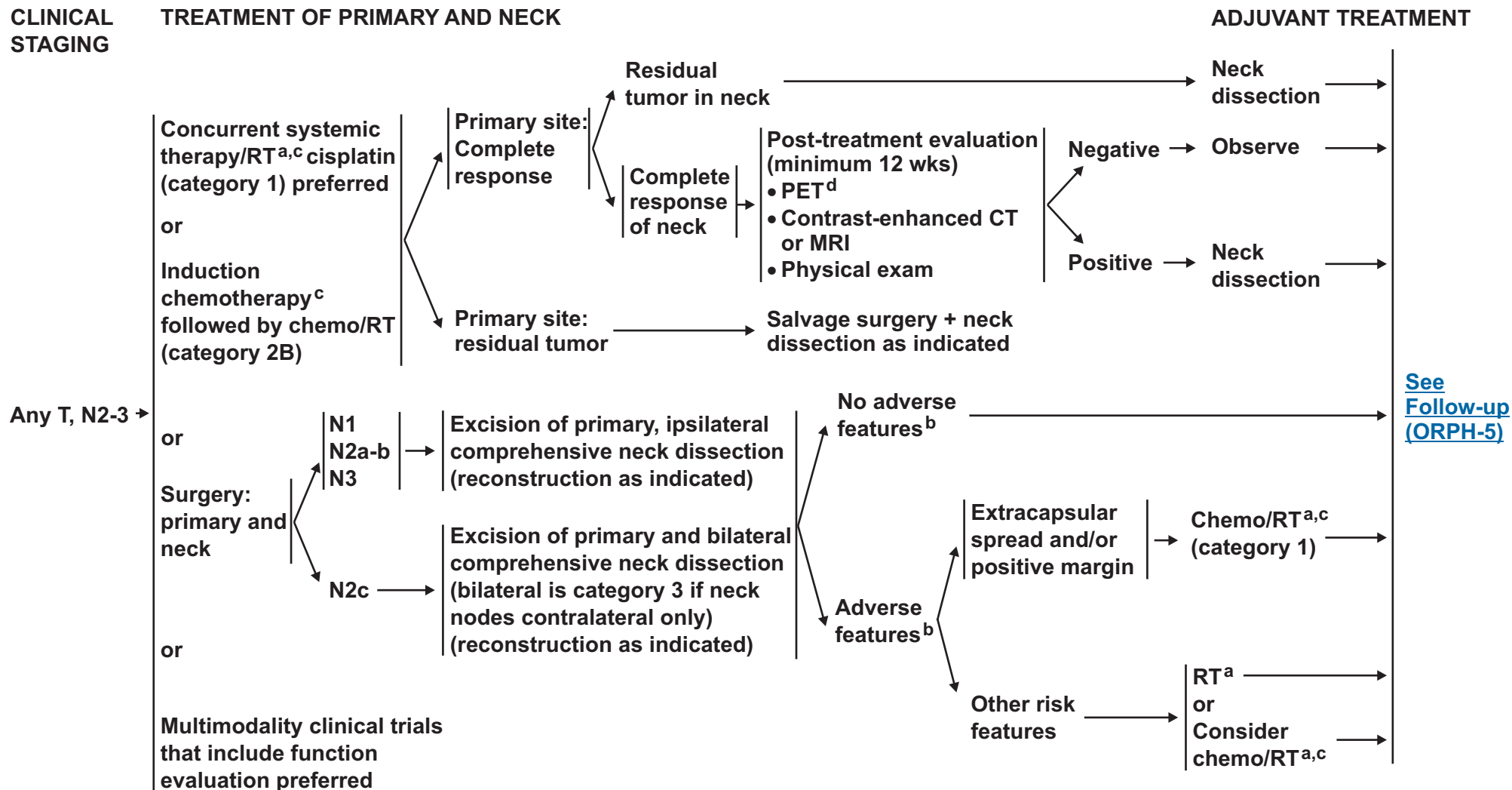
^aSee Principles of Radiation Therapy (ORPH-A).

^bRisk features: extracapsular nodal spread, positive margins, pT3 or pT4 primary, N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.

^cSee Principles of Systemic Therapy (CHEM-A).

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Base of tongue/tonsil/posterior pharyngeal wall/soft palate



^aSee Principles of Radiation Therapy (ORPH-A).

^bRisk features: extracapsular nodal spread, positive margins, pT3 or pT4 primary, N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.

^cSee Principles of Systemic Therapy (CHEM-A).

^dIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

FOLLOW-UP

- Physical exam:
 - ▶ Year 1, every 1-3 mo
 - ▶ Year 2, every 2-4 mo
 - ▶ Years 3-5, every 4-6 mo
 - ▶ > 5 yr, every 6-12 mo
- Post-treatment baseline imaging of primary and neck recommended within 6 mo of treatment¹
 - ▶ Reimaging as indicated only by signs/symptoms on physical examination
- Chest imaging as clinically indicated
- TSH every 6-12 mo, if neck irradiated
- Speech, hearing and swallowing evaluation and rehabilitation as indicated
- Smoking cessation and alcohol counseling
- Dental evaluation as indicated

→ [Recurrence \(see ADV-2\)](#)

¹Recommended for T3-4 and N2-3 disease only.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRINCIPLES OF RADIATION THERAPY¹**Selected T1-2, N0**

- Conventional fractionation: 70 Gy (2.0 Gy/day)

Selected T1, N1; T2, N0-1**Definitive RT**

- Altered fractionation:
 - ▶ 6 fractions/week accelerated during weeks 2-6; 70 Gy to gross disease, ≥ 50 Gy to subclinical disease.
 - ▶ Concomitant boost accelerated RT: 72 Gy/6 weeks (1.8 Gy/fraction, large field; 1.5 Gy boost as second daily fraction during last 12 treatment days)
 - ▶ Hyperfractionation: 81.6 Gy/7 weeks (1.2 Gy/fraction, twice daily)

Postoperative RT

- Indicated for pT3 or pT4 primary; N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.
- Preferred interval between resection and postoperative RT is ≤ 6 weeks.
- Primary: ≥ 60 Gy (2.0 Gy/day)
- Neck
 - ▶ Involved nodal stations: ≥ 60 Gy (2.0 Gy/day)
 - ▶ Uninvolved nodal stations: ≥ 50 Gy (2.0 Gy/day)

T2-4a, N0-3

- Concurrent chemoradiation
Conventional fractionation:²
 - ▶ Primary and gross adenopathy: ≥ 70 Gy (2.0 Gy/day)
 - ▶ Neck
Uninvolved nodal stations: 44-50 Gy (2.0 Gy/day)

Postoperative chemoradiation

- Indicated for extracapsular nodal spread and/or positive margins³⁻⁵
- Concurrent single agent cisplatin at 100 mg/m² every 3 wks x 3 doses is recommended.
- Consider for other risk features: pT3 or pT4 primary; N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, vascular embolism.

¹ See [Radiation Techniques \(RAD-A\)](#).

² Based on published data, concurrent chemoradiation typically uses conventional fractionation at 2.0 Gy per fraction to ≥ 70 Gy in 7 wks with single agent cisplatin given every 3 wks at 100 mg/m² x 3 doses. Use of other fraction sizes (eg, 1.8 Gy, conventional), multiagent chemotherapy, or altered fractionation with chemotherapy has been evaluated with no consensus on the optimal approach. In general, the use of concurrent chemoradiation carries a high toxicity burden--altered fractionation or multiagent chemotherapy will likely further increase toxicity burden. For any chemoradiation approach, close attention should be paid to published reports for the specific chemotherapy agent, dose, and schedule of administration. Chemoradiation should be performed by an experienced team and should include substantial supportive care.

³ Bernier J, Domezge C, Ozsahin M, et al. Postoperative irradiation with or without concomitant chemotherapy for locally advanced head and neck cancer. *N Engl J Med* 2004;350:1945-1952.

⁴ Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937-1944.

⁵ Bernier J, Cooper JS, Pajuk TF, et al. Defining risk levels in locally advanced head and neck cancers: A comparative analysis of concurrent postoperative radiation plus chemotherapy trials of the EORTC (#22931) and RTOG (#9501). *Head Neck* 2005;27:843-850.

Note: All recommendations are category 2A unless otherwise indicated.

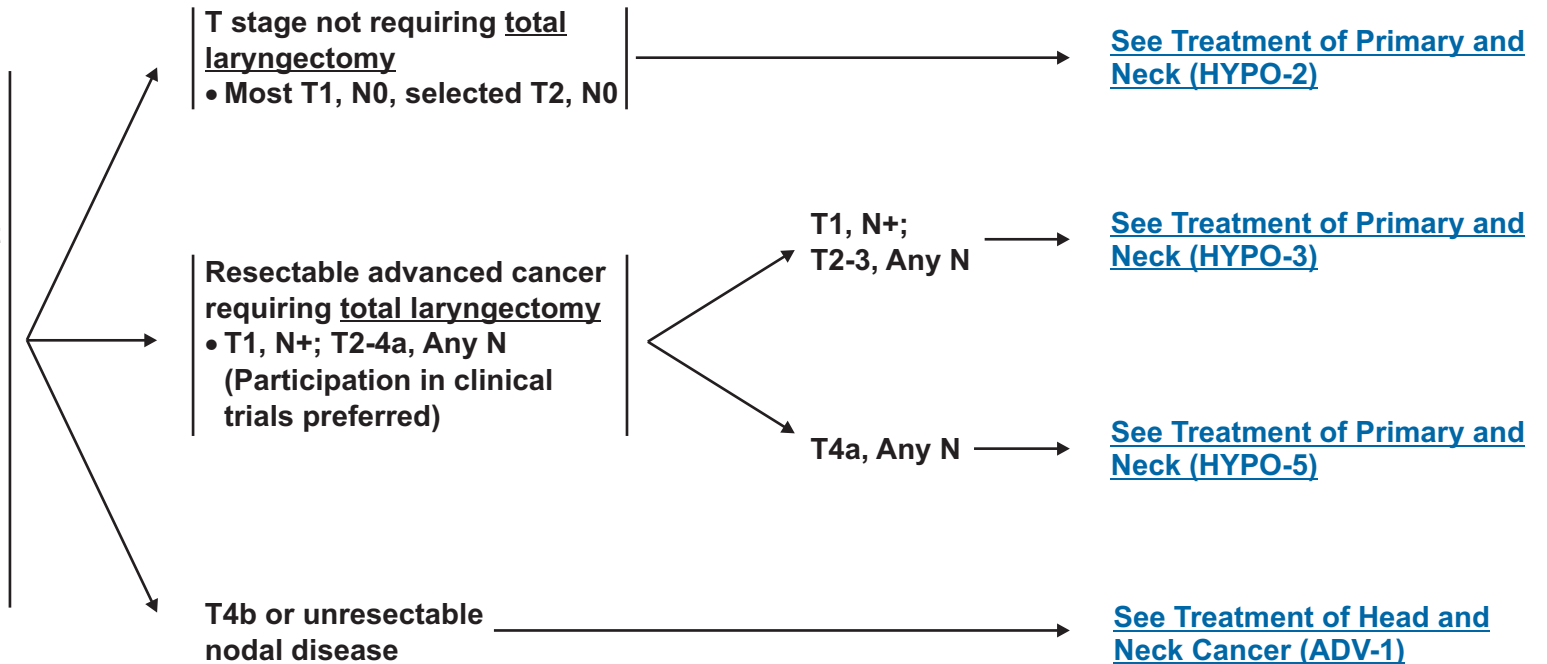
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

WORKUP

- H&P
- Biopsy
- Chest imaging
- CT with contrast or MRI or PET-CT^a and CT with contrast of primary and neck
- Examination under anesthesia with endoscopy
- Preanesthesia studies
- Speech & swallowing evaluation as indicated
- Dental evaluation

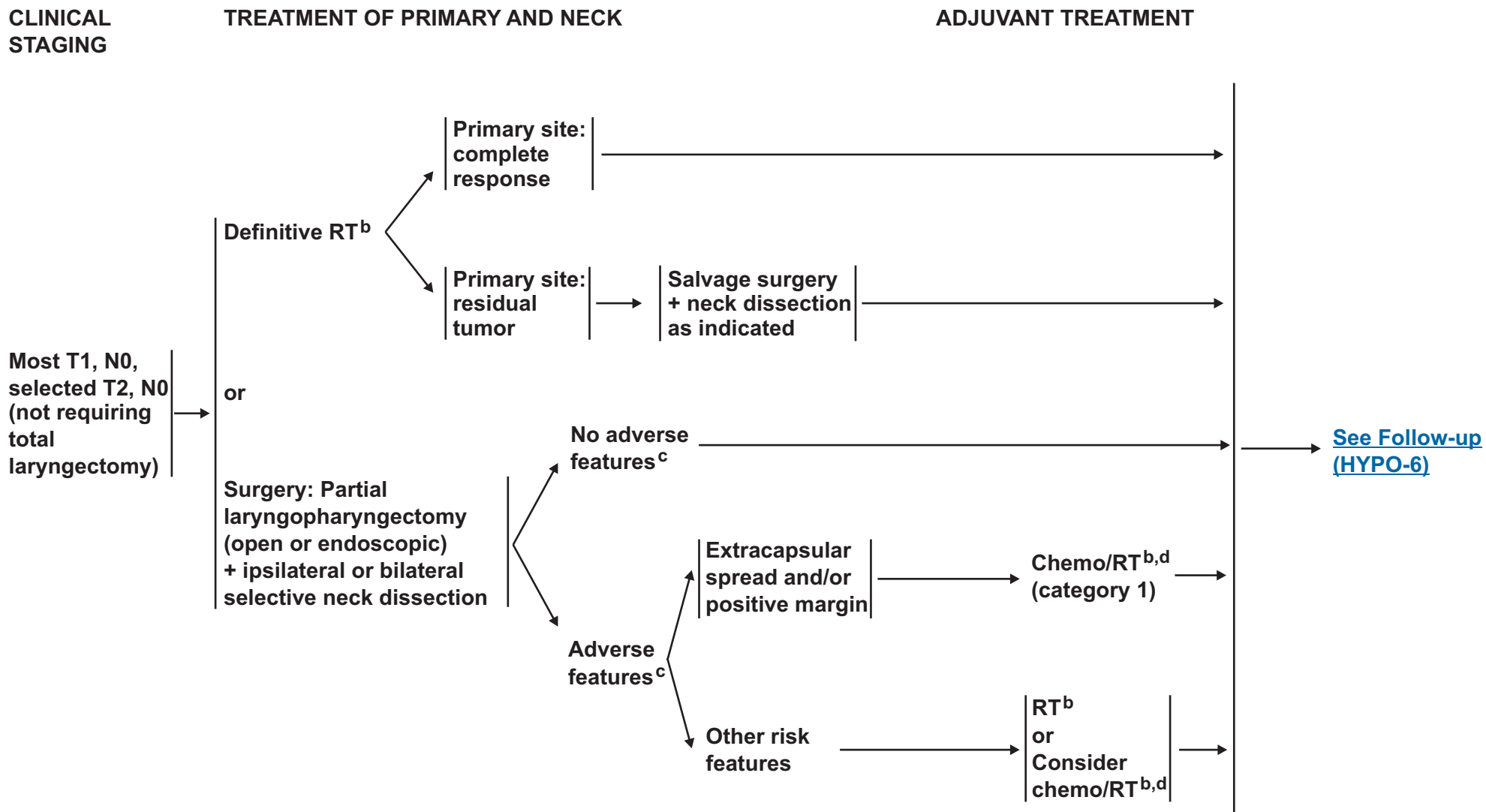
Multidisciplinary consultation as indicated

CLINICAL STAGING



^aPET-CT recommended for stage III-IV disease.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

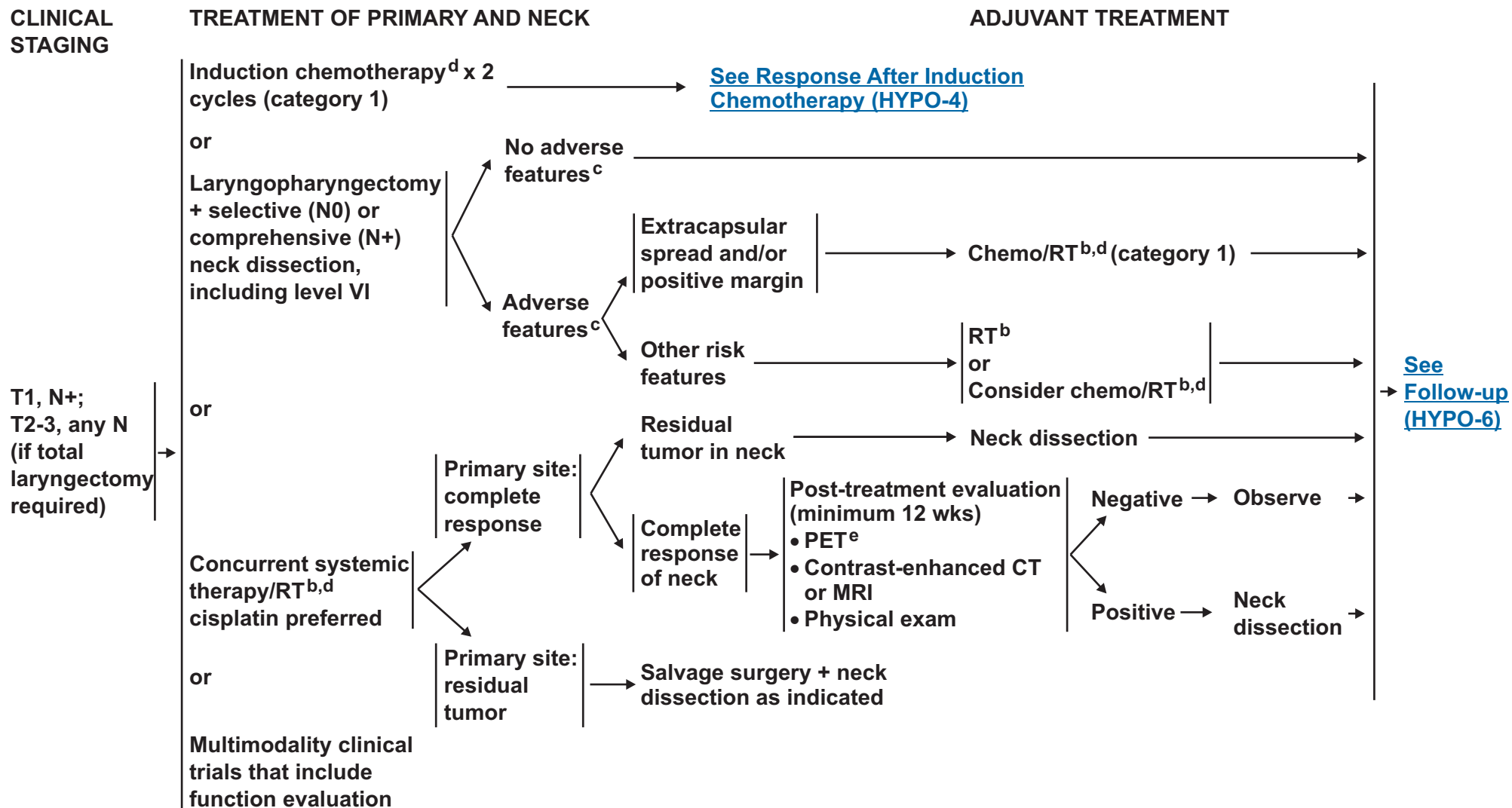


^bSee Principles of Radiation Therapy (HYPO-A).

^cRisk features: extracapsular nodal spread, positive margins, pT3 or pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.

^dSee Principles of Systemic Therapy (CHEM-A).

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.



^bSee Principles of Radiation Therapy (HYPO-A).

^cRisk features: extracapsular nodal spread, positive margins, pT3 or pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.

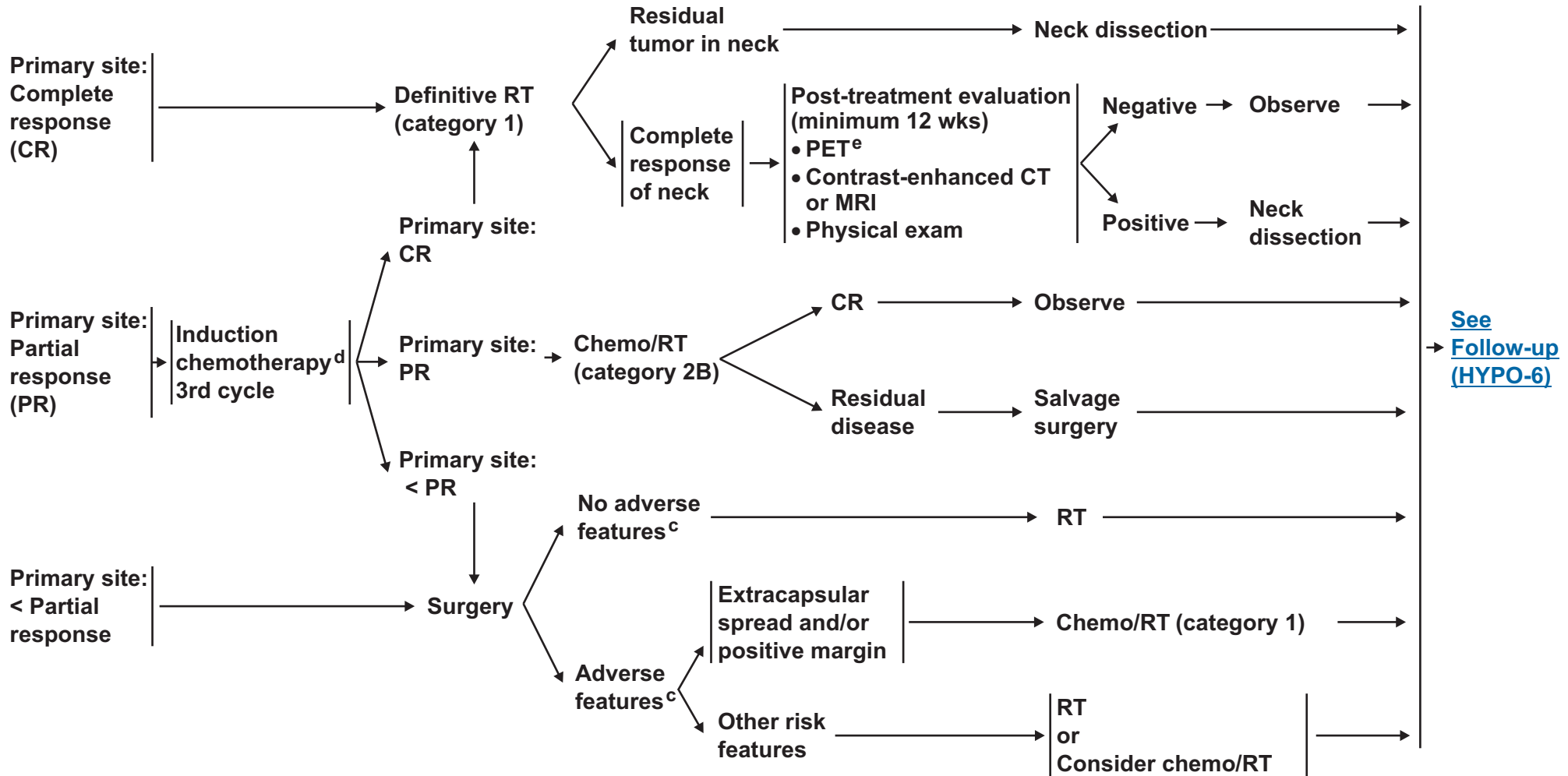
^dSee Principles of Systemic Therapy (CHEM-A).

^eIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

RESPONSE AFTER INDUCTION CHEMOTHERAPY^d
FOR T1, N+; T2-3, ANY N TUMORS



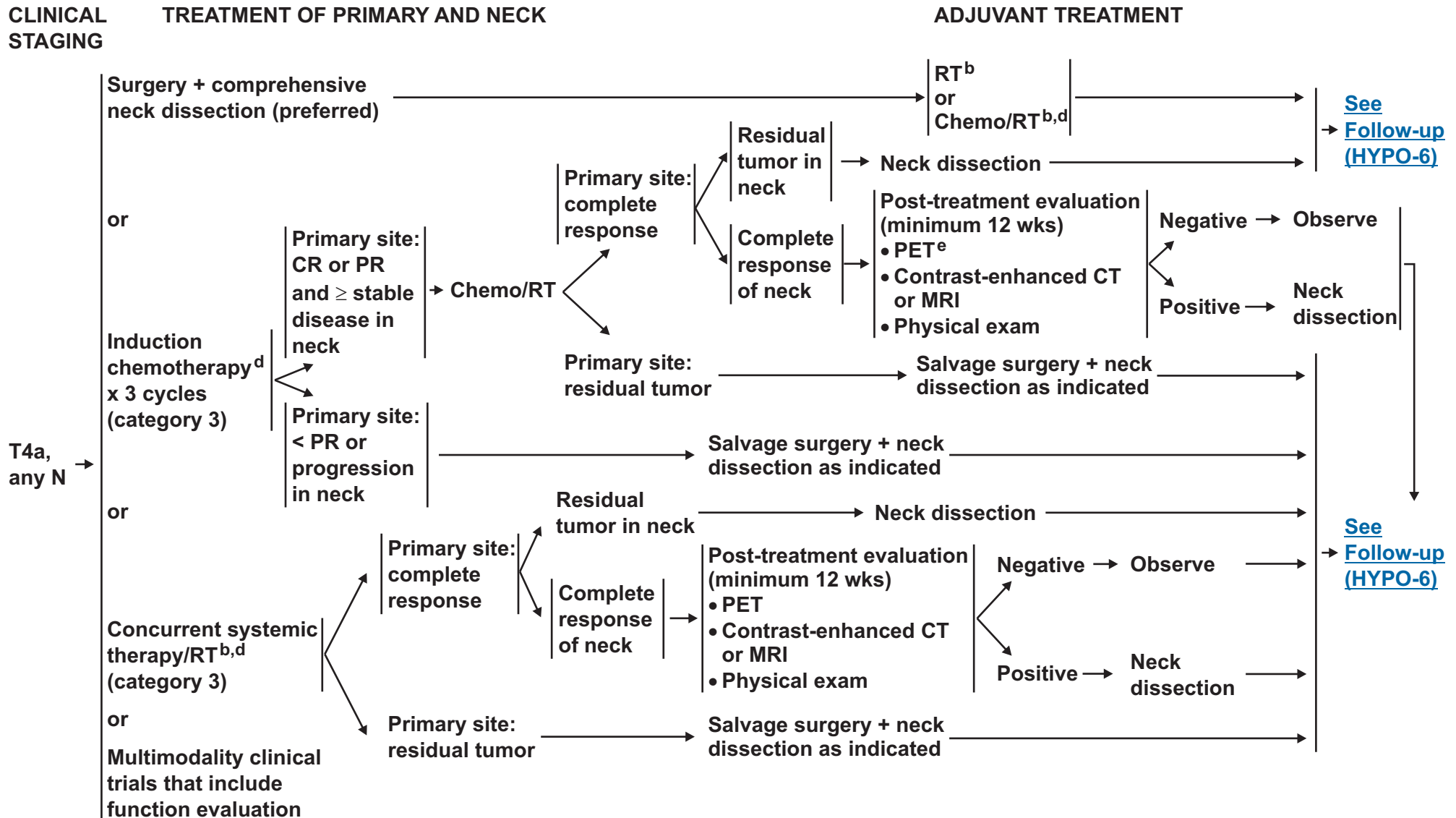
^cRisk features: extracapsular nodal spread, positive margins, pT3 or pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.

^dSee [Principles of Systemic Therapy \(CHEM-A\)](#).

^eIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.



^b See Principles of Radiation Therapy (HYPO-A).

^d See Principles of Systemic Therapy (CHEM-A).

^e If a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

FOLLOW-UP

- Physical exam:
 - Year 1, every 1-3 mo
 - Year 2, every 2-4 mo
 - Years 3-5, every 4-6 mo
 - > 5 yr, every 6-12 mo
- Post-treatment baseline imaging of primary and neck recommended within 6 mo of treatment¹
 - Reimaging as indicated only by signs/symptoms on physical examination
- Chest imaging as clinically indicated
- TSH every 6-12 mo, if neck irradiated
- Speech, hearing and swallowing evaluation and rehabilitation as indicated
- Smoking cessation and alcohol counseling
- Dental evaluation as indicated

→ [Recurrence \(see ADV-2\)](#)

¹Recommended for T3-4 and N2-3 disease only.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRINCIPLES OF RADIATION THERAPY¹**Definitive RT****• Primary and gross adenopathy:****Altered fractionation:**

- ▶ 6 fractions/week accelerated during weeks 2-6; 70 Gy to gross disease, \geq 50 Gy to subclinical disease.
- ▶ Concomitant boost accelerated RT: 72 Gy/6 weeks (1.8 Gy/fraction, large field; 1.5 Gy boost as second daily fraction during last 12 treatment days)
- ▶ Hyperfractionation: 81.6 Gy/7 weeks (1.2 Gy/fraction, twice daily)

• Neck**Uninvolved nodal stations:**

- \geq 50 Gy (2.0 Gy/day)

Postoperative RT**• Indicated for pT3 or pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.****• Preferred interval between resection and postoperative \leq RT is 6 weeks.****• Primary: \geq 60 Gy (2.0 Gy/day)****• Neck**

- ▶ Involved nodal stations:
 \geq 60 Gy (2.0 Gy/day)
- ▶ Uninvolved nodal stations:
 \geq 50 Gy (2.0 Gy/day)

Postoperative chemoradiation**• Indicated for extracapsular nodal spread and/or positive margins²⁻⁴****• Consider for other risk features: pT3 or pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.****• Concurrent single agent cisplatin at 100 mg/m² every 3 wks is recommended.**

¹ See [Radiation Techniques \(RAD-A\)](#).

² Bernier J, Domezge C, Ozsahin M, et al. Postoperative irradiation with or without concomitant chemotherapy for locally advanced head and neck cancer. N Engl J Med 2004;350:1945-1952.

³ Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. N Engl J Med 2004;350:1937-1944.

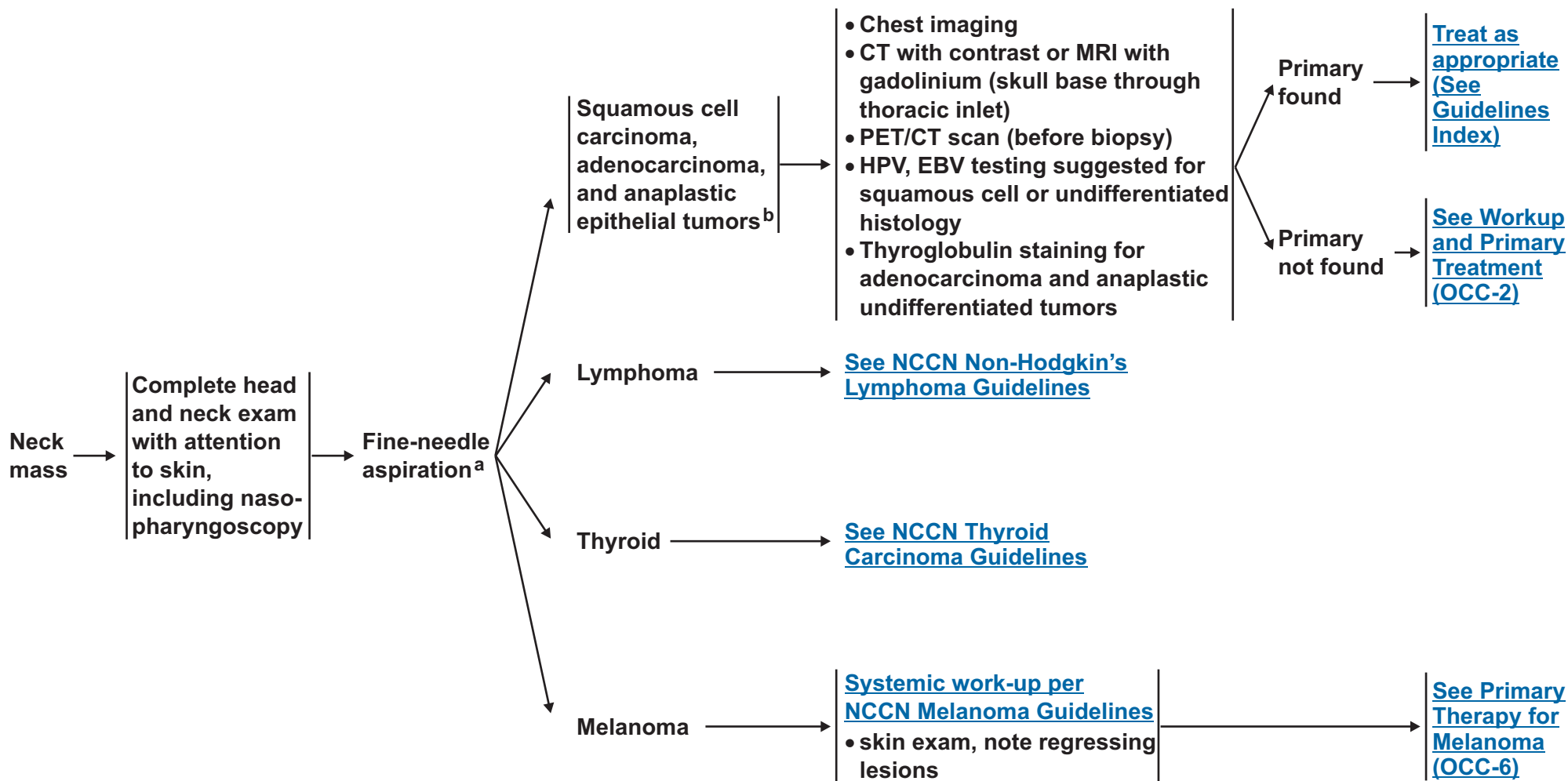
⁴ Bernier J, Cooper JS, Pajak TF, et al. Defining risk levels in locally advanced head and neck cancers: A comparative analysis of concurrent postoperative radiation plus chemotherapy trials of the EORTC (#22931) and RTOG (#9501). Head Neck 2005;27:843-850.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRESENTATION

WORKUP



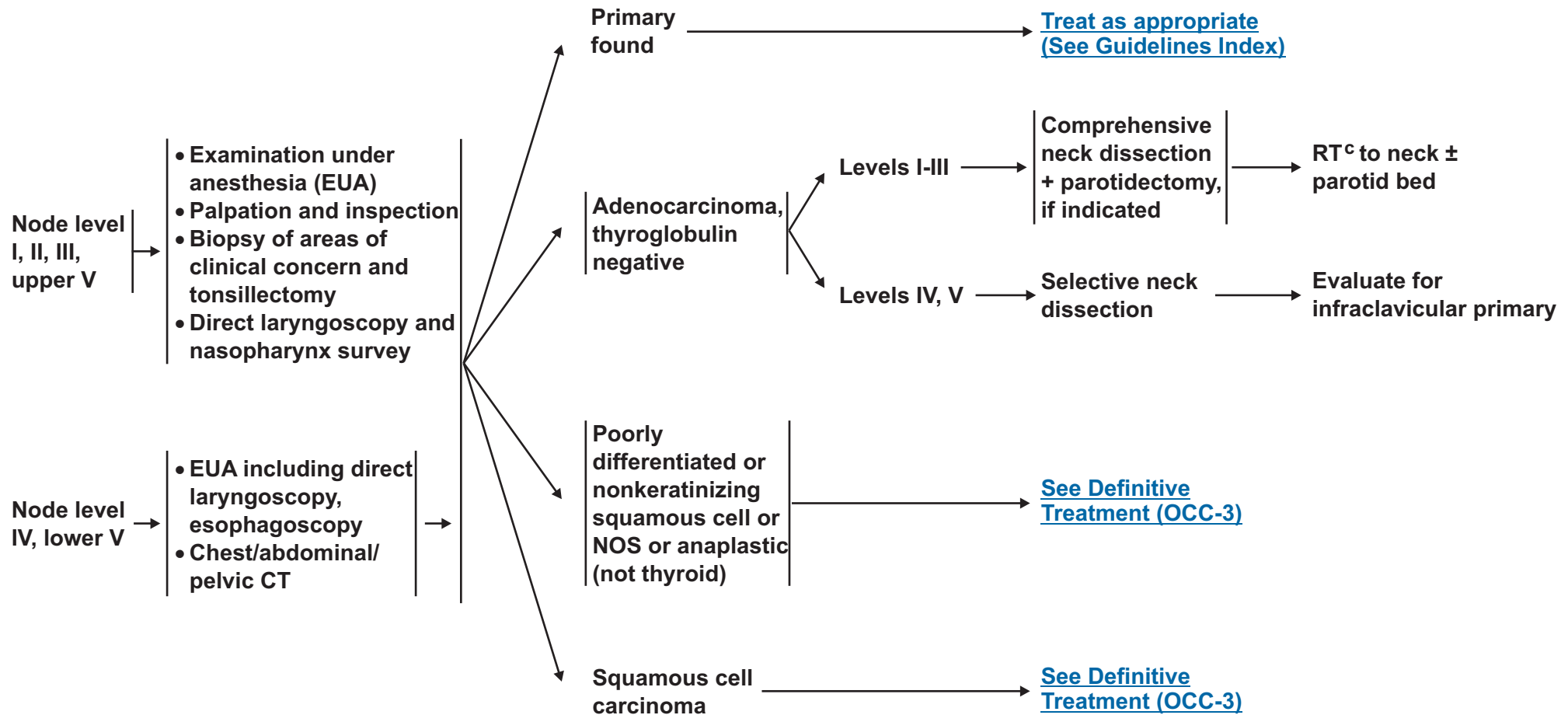
^aRepeat FNA, core or open biopsy may be necessary for uncertain histologies. Patient should be prepared for neck dissection at time of open biopsy, if indicated.

^bDetermined with appropriate immunohistochemical stains.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

**PATHOLOGIC WORKUP
FINDINGS**

DEFINITIVE TREATMENT

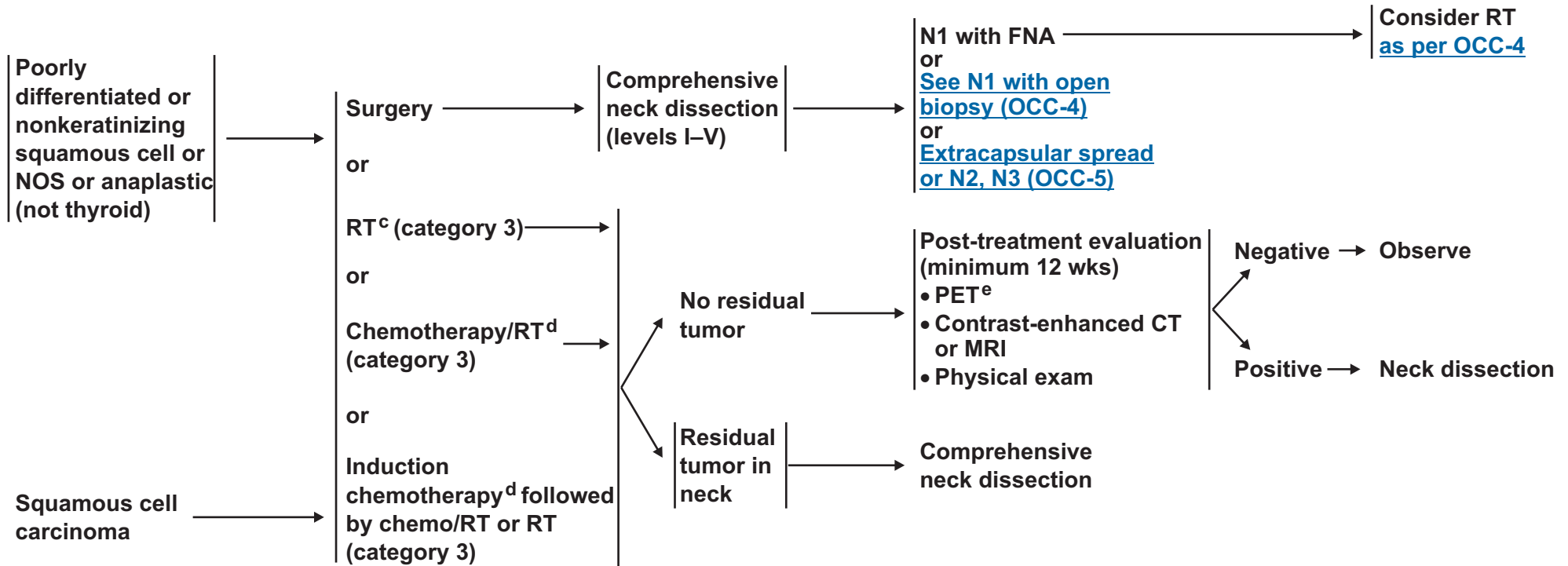


^cSee Principles of Radiation Therapy (OCC-A).

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

HISTOLOGY

DEFINITIVE TREATMENT

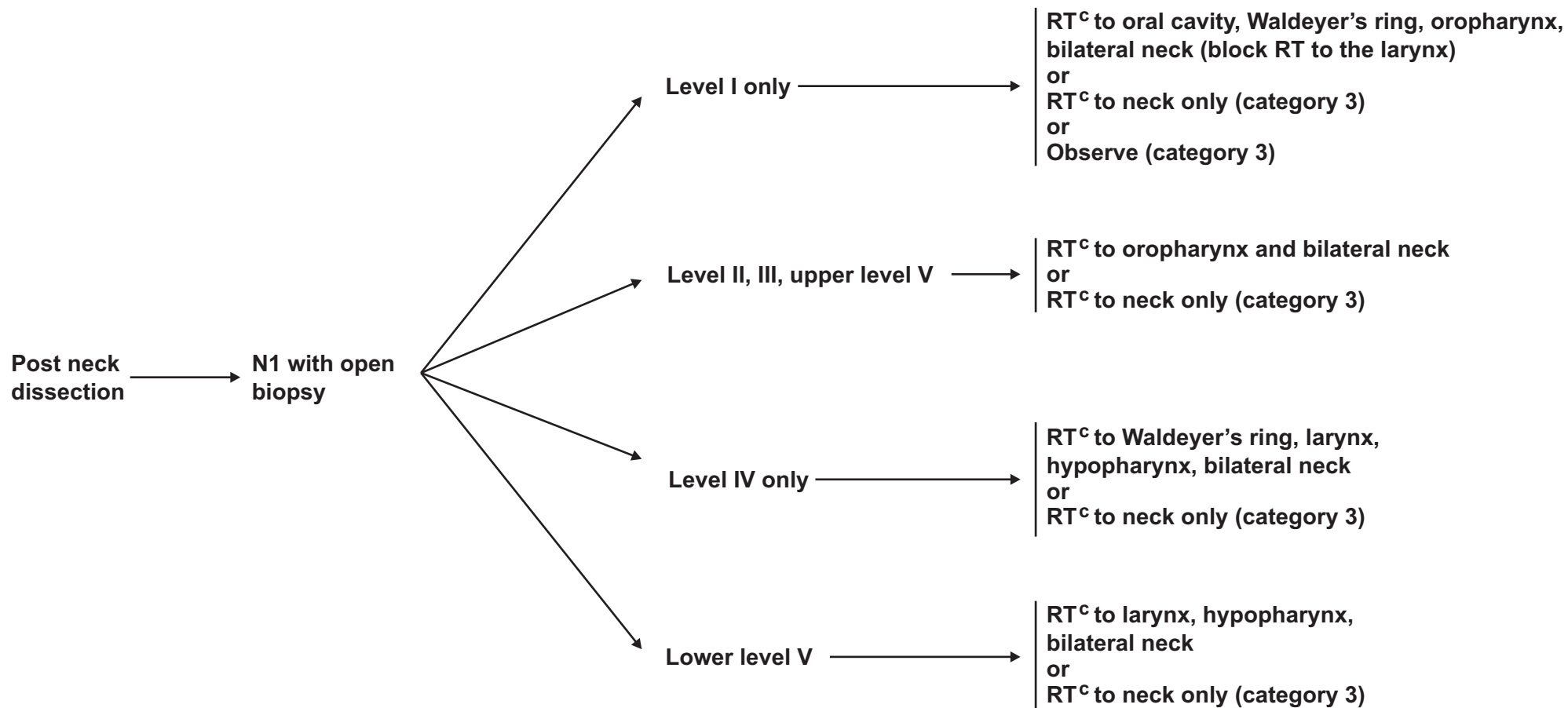


^cSee Principles of Radiation Therapy (OCC-A).

^dSee Principles of Systemic Therapy (CHEM-A).

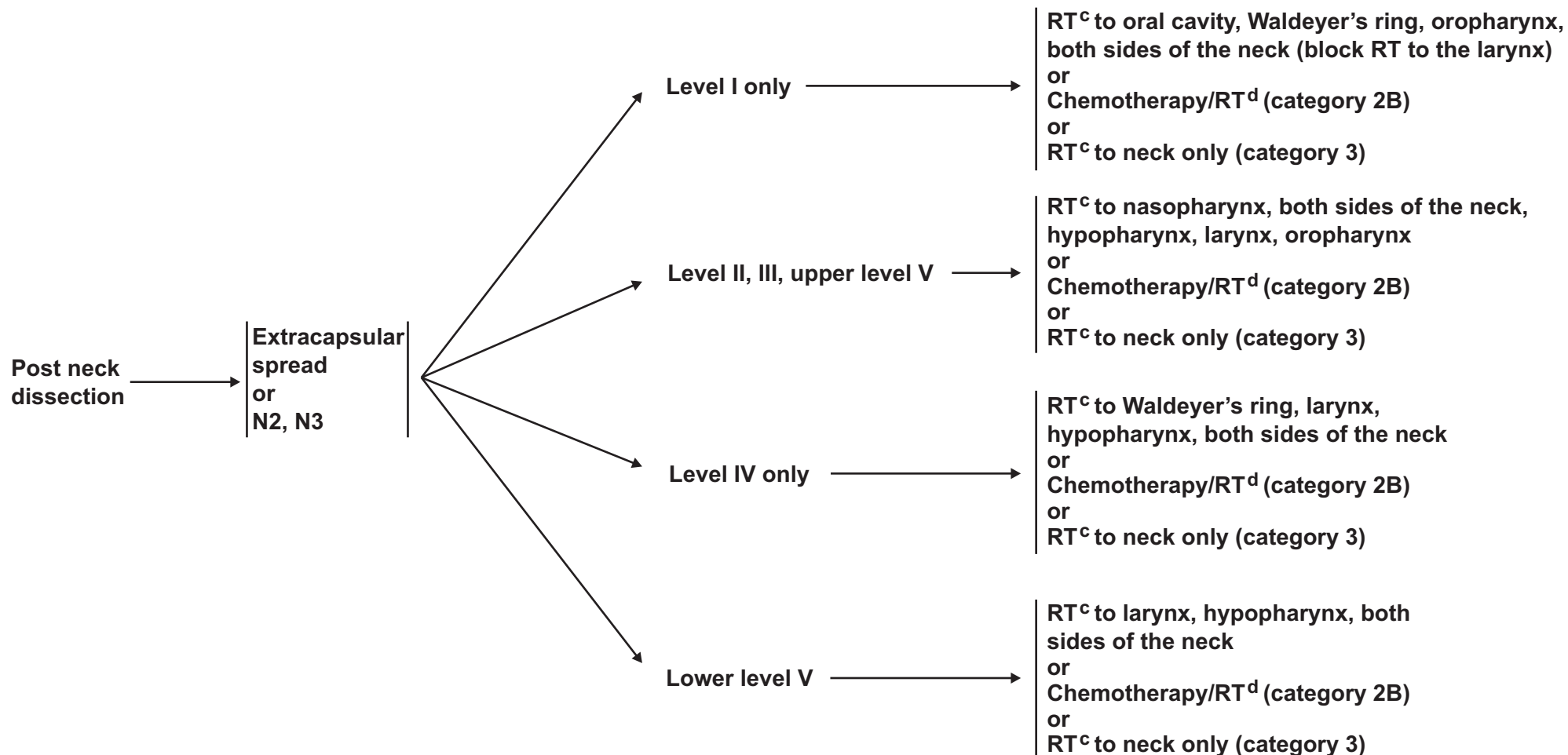
^eIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.



^cSee Principles of Radiation Therapy (OCC-A).

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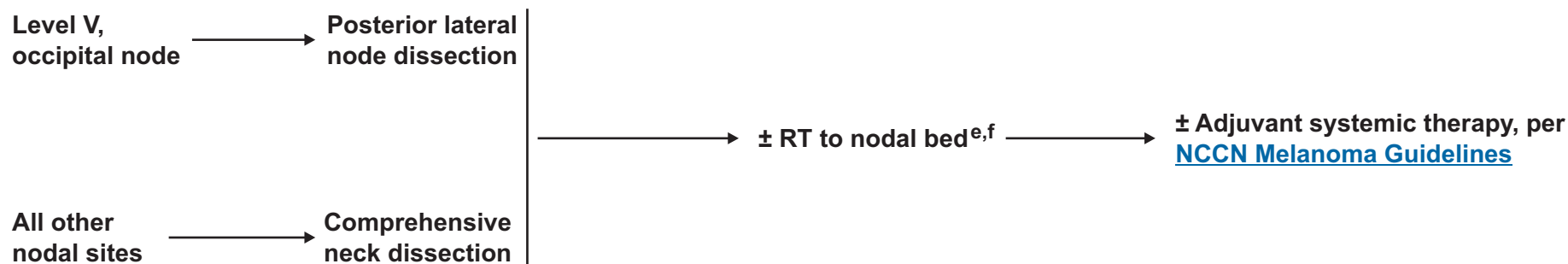


^cSee Principles of Radiation Therapy (OCC-A).

^dSee Principles of Systemic Therapy (CHEM-A).

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRIMARY THERAPY FOR OCCULT PRIMARY- MELANOMA



^eAdjuvant radiotherapy: 30 Gy/5 fx over 2.5 weeks (6.0 Gy/fx). Careful attention to dosimetry is necessary. (Ang KK, Peters LJ, Weber RS, et al. Postoperative radiotherapy for cutaneous melanoma of the head and neck region. International Journal of Radiation Oncology, Biology, Physics 30:795-798, 1994).

^fRT is indicated for satellitosis, positive nodes, or extracapsular spread.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRINCIPLES OF RADIATION THERAPY^{1,2}**Gross Adenopathy:****Altered fractionation:**

- ▶ 6 fractions/week accelerated during weeks 2-6; 70 Gy to gross disease, \geq 50 Gy to subclinical disease.
- ▶ Concomitant boost accelerated RT: 72 Gy/6 weeks (1.8 Gy/fraction, large field; 1.5 Gy boost as second daily fraction during last 12 treatment days)
- ▶ Hyperfractionation: 81.6 Gy/7 weeks (1.2 Gy/fraction, twice daily)

Mucosal sites:

- 50-66 Gy (2.0 Gy/day) to mucosa, depending on field size and use of chemotherapy. Consider higher dose to 60-66 Gy to particularly suspicious areas

Neck

- Uninvolved nodal stations: \geq 50 Gy (2.0 Gy/day)

¹For squamous cell carcinoma, adenocarcinoma, and poorly differentiated carcinoma.

²See [Radiation Techniques \(RAD-A\)](#).

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

WORKUP^a

- H&P
 - Biopsy
 - Chest imaging
 - CT with contrast and thin cuts through larynx or MRI or PET-CT and CT with contrast and thin cuts through larynx of primary and neck
 - Examination under anesthesia with endoscopy
 - Preanesthesia studies
 - Dental evaluation as indicated
 - Speech & swallowing evaluation as indicated
- Multidisciplinary consultation as indicated

CLINICAL STAGING

Carcinoma in situ

- Total laryngectomy not required
- Most T1-2, N0

- Resectable
- Requiring total laryngectomy
- Most T3, N0-1

- Resectable
- Requiring total laryngectomy
- Most T3, N2-3

T4a disease

T4b or unresectable nodal disease

TREATMENT OF PRIMARY AND NECK

[See Treatment and Follow-up \(GLOT-2\)](#)

[See Treatment and Follow-up \(GLOT-2\)](#)

[See Treatment of Primary and Neck \(GLOT-3\)](#)

[See Treatment of Primary and Neck \(GLOT-4\)](#)

[See Treatment of Primary and Neck \(GLOT-6\)](#)

[See Treatment of Head and Neck Cancer \(ADV-1\)](#)

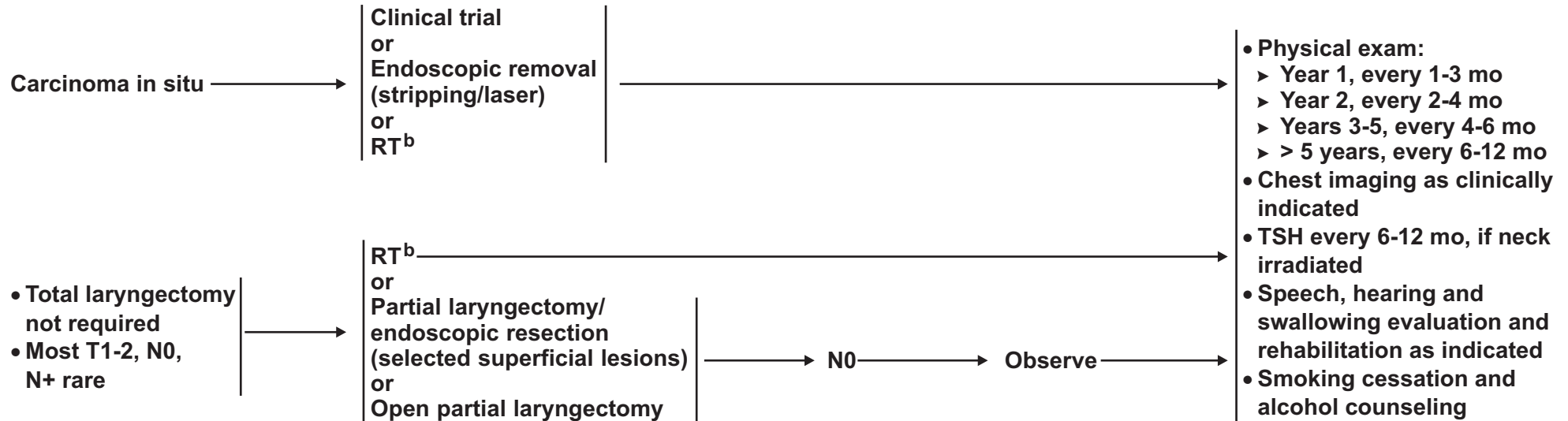
^aComplete workup not indicated for Tis, T1.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

FOLLOW-UP



^bSee Principles of Radiation Therapy (GLOT-A).

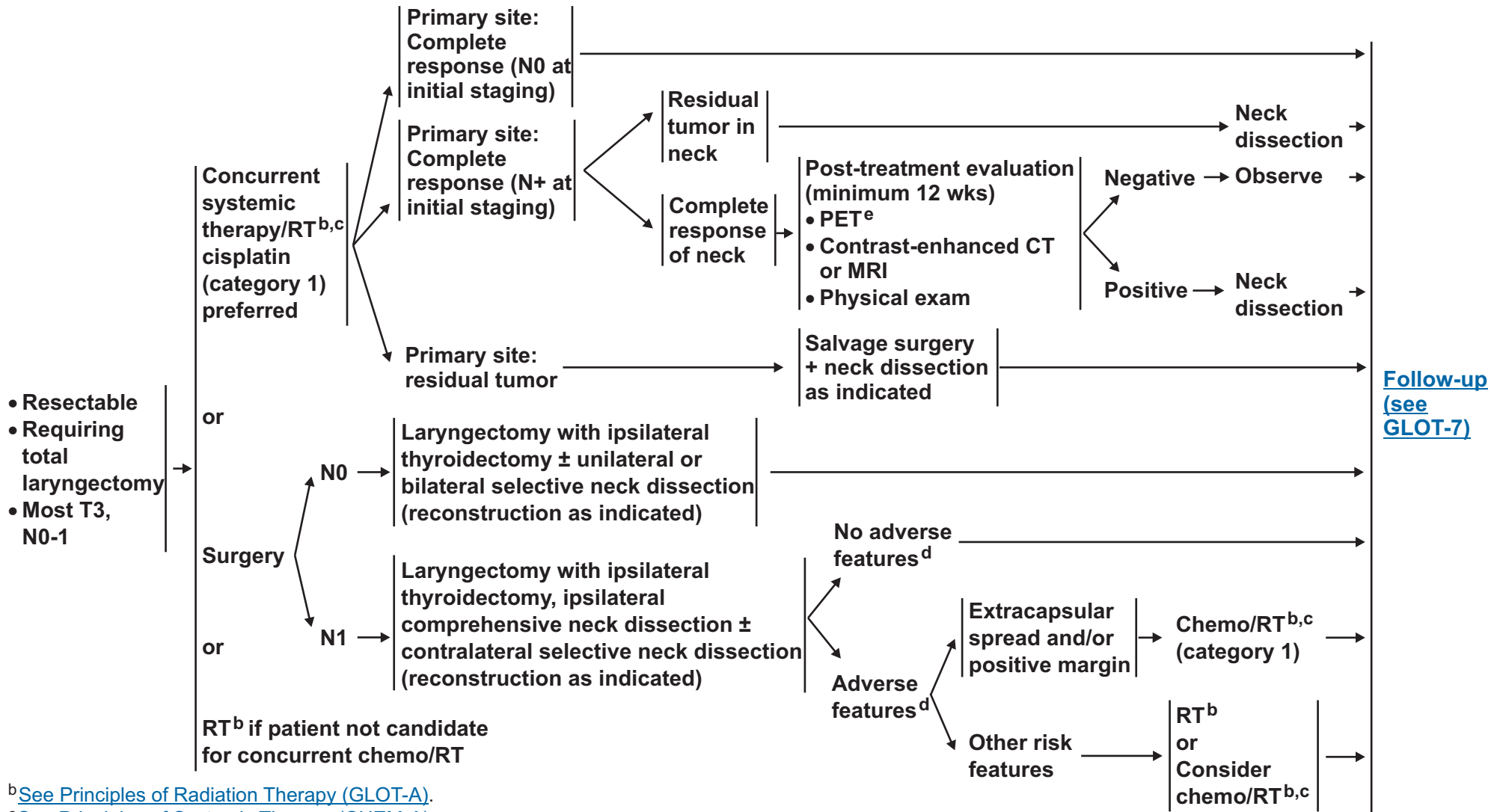
[Recurrence \(see ADV-2\)](#)

Note: All recommendations are category 2A unless otherwise indicated.
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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT TREATMENT



^bSee Principles of Radiation Therapy (GLOT-A).

^cSee Principles of Systemic Therapy (CHEM-A).

^dRisk features: extracapsular nodal spread, positive margins, pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.

^eIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

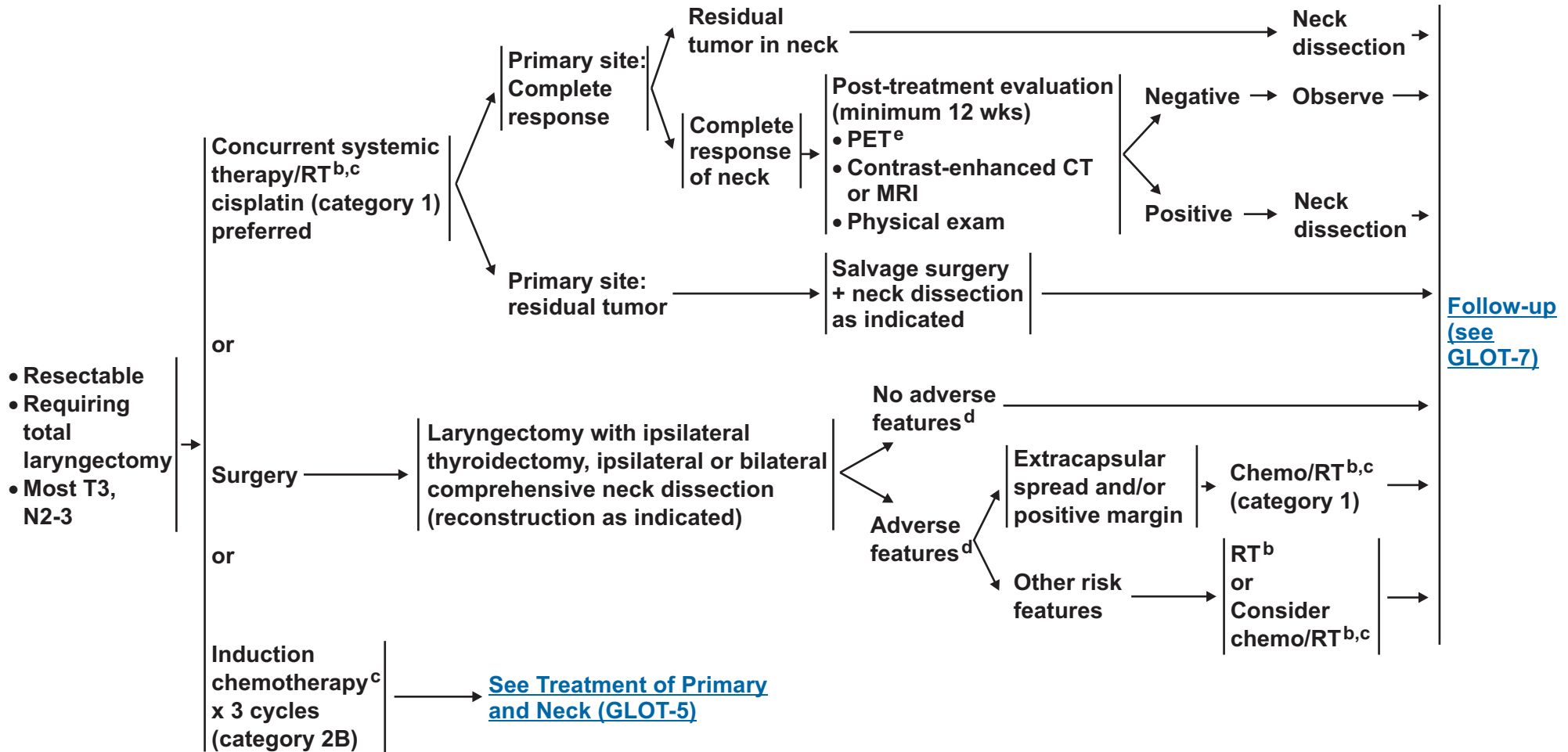
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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT TREATMENT



^bSee Principles of Radiation Therapy (GLOT-A).

^cSee Principles of Systemic Therapy (CHEM-A).

^dRisk features: extracapsular nodal spread, positive margins, pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.

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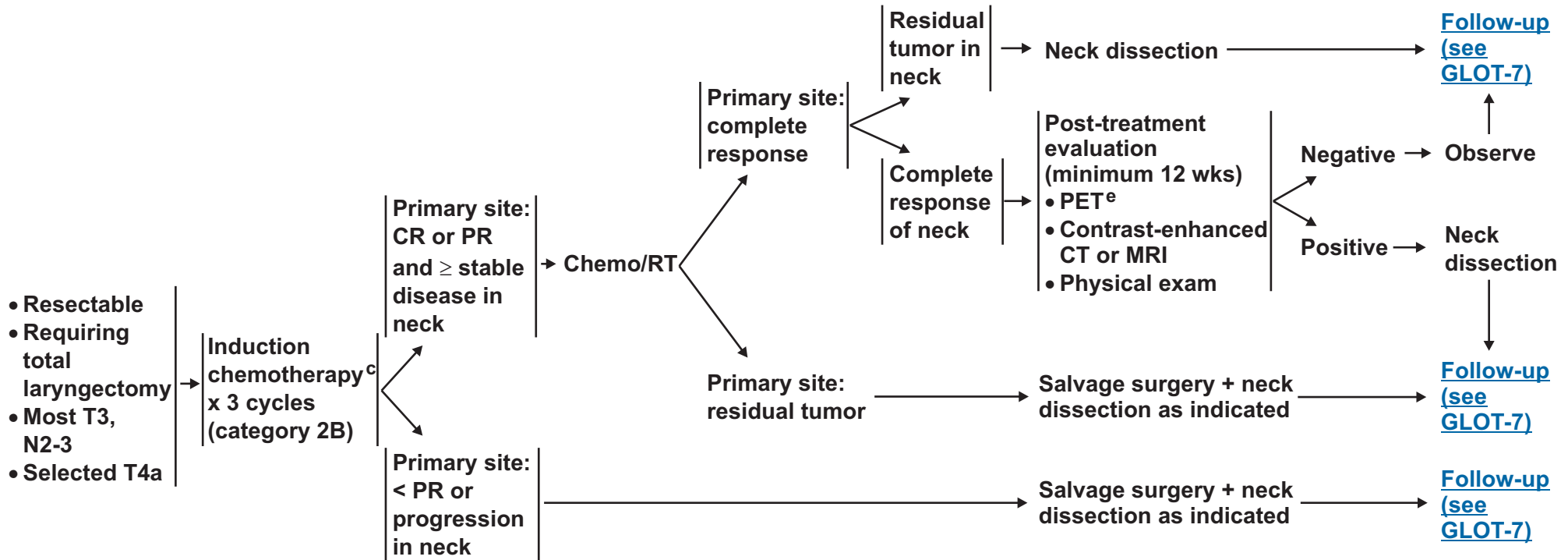
Note: All recommendations are category 2A unless otherwise indicated.

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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

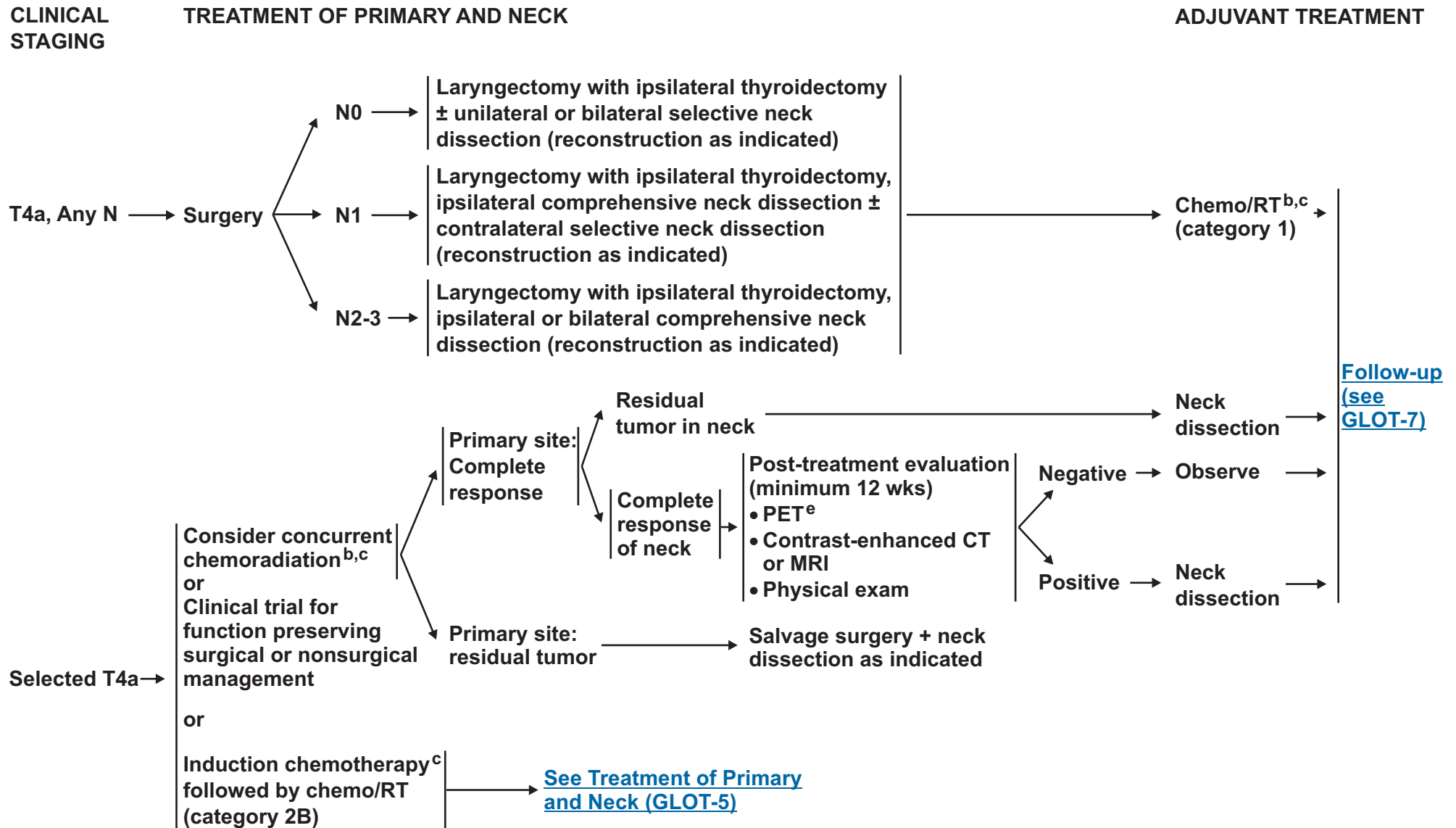
ADJUVANT TREATMENT



^cSee Principles of Systemic Therapy (CHEM-A).

^eIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.



^bSee Principles of Radiation Therapy (GLOT-A).

^cSee Principles of Systemic Therapy (CHEM-A).

^eIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

FOLLOW-UP

- Physical exam:
 - Year 1, every 1-3 mo
 - Year 2, every 2-4 mo
 - Years 3-5, every 4-6 mo
 - > 5 years, every 6-12 mo
- Post-treatment baseline imaging of primary and neck recommended within 6 mo of treatment¹
 - Reimaging as indicated only by signs/symptoms on physical examination
- Chest imaging as clinically indicated
- TSH every 6-12 mo, if neck irradiated
- Speech, hearing and swallowing evaluation and rehabilitation as indicated
- Smoking cessation and alcohol counseling

→ [Recurrence \(see ADV-2\)](#)

¹Recommended for T3-4 and N2-3 disease only.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRINCIPLES OF RADIATION THERAPY¹**Definitive RT**

- T1, N0: 63-66 Gy in 2.25-2.0 Gy/day
- T1-2: > 66 Gy using conventional fractionation (2.0 Gy/fraction)
- ≥ T2 and gross adenopathy:
 - Conventional: 70 Gy (2.0 Gy/day) in 7 weeks
 - Altered fractionation:
 - ▶ Concomitant boost accelerated RT: 72 Gy/6 weeks (1.8 Gy/fraction, large field; 1.5 Gy boost as second daily fraction during last 12 treatment days)
 - ▶ Hyperfractionation: 79.2-81.6 Gy/7 weeks (1.2 Gy/fraction, twice daily)
- Elective nodal RT
 - ▶ ≥ 50 Gy (2.0 Gy/day)

Postoperative RT

- Indicated for pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.
- Preferred interval between resection and postoperative RT is ≤ 6 weeks.
- Primary: ≥ 60 Gy (2.0 Gy/day)
- Neck
 - ▶ Involved nodal stations:
 - ≥ 60 Gy (2.0 Gy/day)
 - ▶ Uninvolved nodal stations:
 - ≥ 50 Gy (2.0 Gy/day)

Postoperative chemoradiation

- Indicated for extracapsular nodal spread and/or positive margins²⁻⁴
- Consider for other risk features: pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism
- Concurrent single agent cisplatin at 100 mg/m² every 3 wks is recommended.

¹See [Radiation Techniques \(RAD-A\)](#).

²Bernier J, Dometge C, Ozsahin M, et al. Postoperative irradiation with or without concomitant chemotherapy for locally advanced head and neck cancer. N Engl J Med 2004;350:1945-1952.

³Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. N Engl J Med 2004;350:1937-1944.

⁴Bernier J, Cooper JS, Pajak TF, et al. Defining risk levels in locally advanced head and neck cancers: A comparative analysis of concurrent postoperative radiation plus chemotherapy trials of the EORTC (#22931) and RTOG (#9501). Head Neck 2005;27:843-850.

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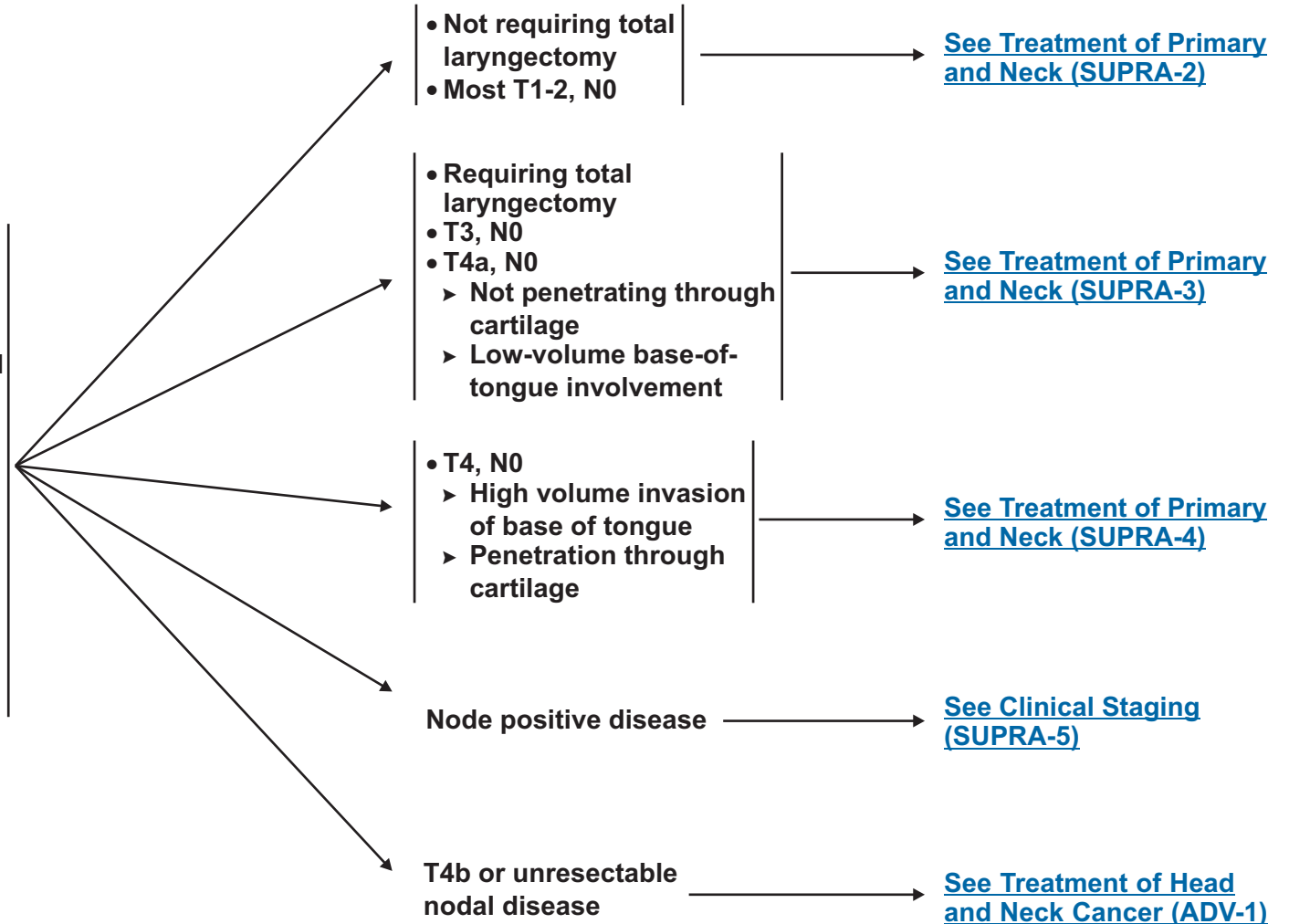
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

WORKUP

- H&P
- Biopsy
- Chest imaging
- CT with contrast and thin cuts through larynx or MRI or PET-CT and CT with contrast and thin cuts through larynx of primary and neck
- Examination under anesthesia with endoscopy
- Preanesthesia studies
- Dental evaluation as indicated
- Speech & swallowing evaluation as indicated

Multidisciplinary consultation as indicated

CLINICAL STAGING



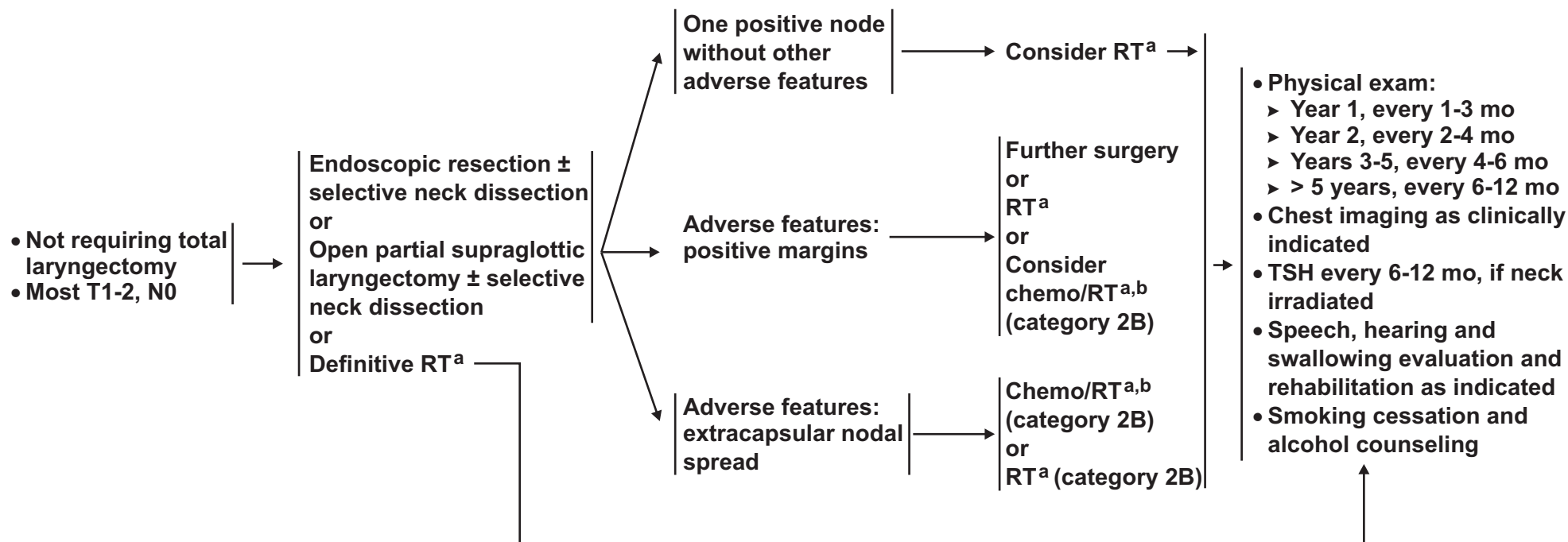
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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT
TREATMENT

FOLLOW-UP



[Recurrence \(see ADV-2\)](#)

^a[See Principles of Radiation Therapy \(SUPRA-A\).](#)

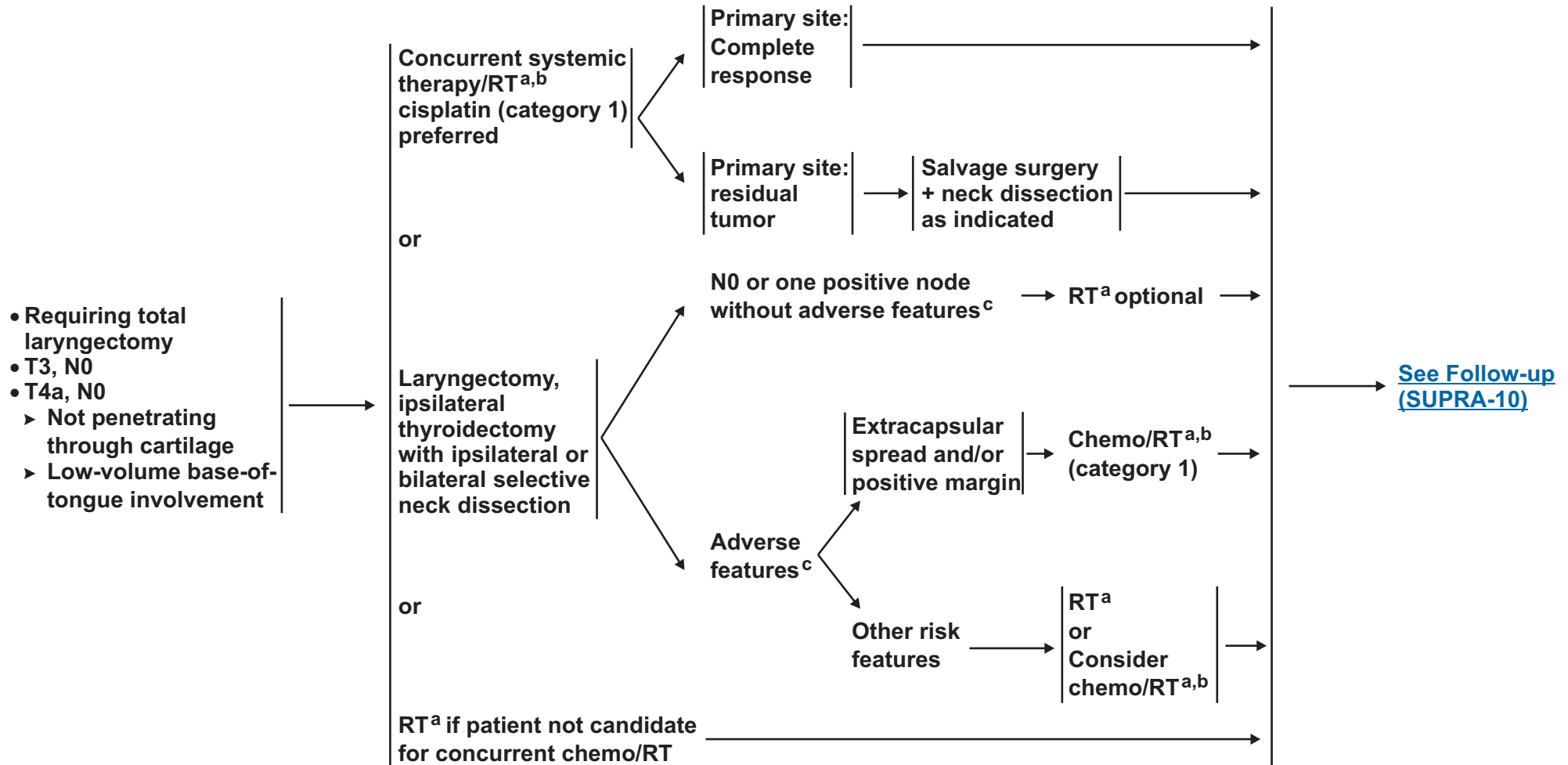
^b[See Principles of Systemic Therapy \(CHEM-A\).](#)

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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT TREATMENT



[Recurrence \(see ADV-2\)](#)

^aSee Principles of Radiation Therapy (SUPRA-A).

^bSee Principles of Systemic Therapy (CHEM-A).

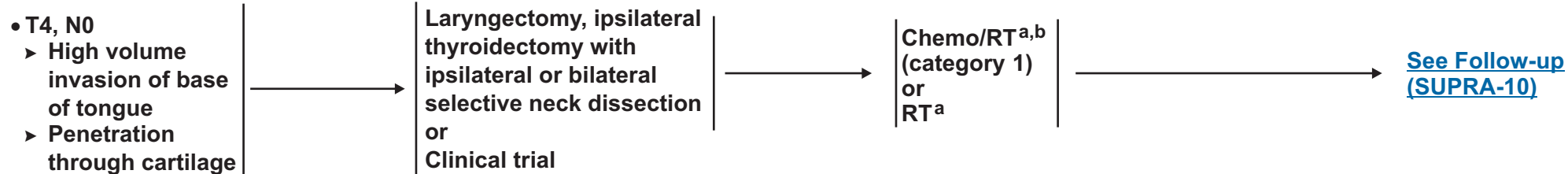
^cRisk features: extracapsular nodal spread, positive margins, pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT TREATMENT

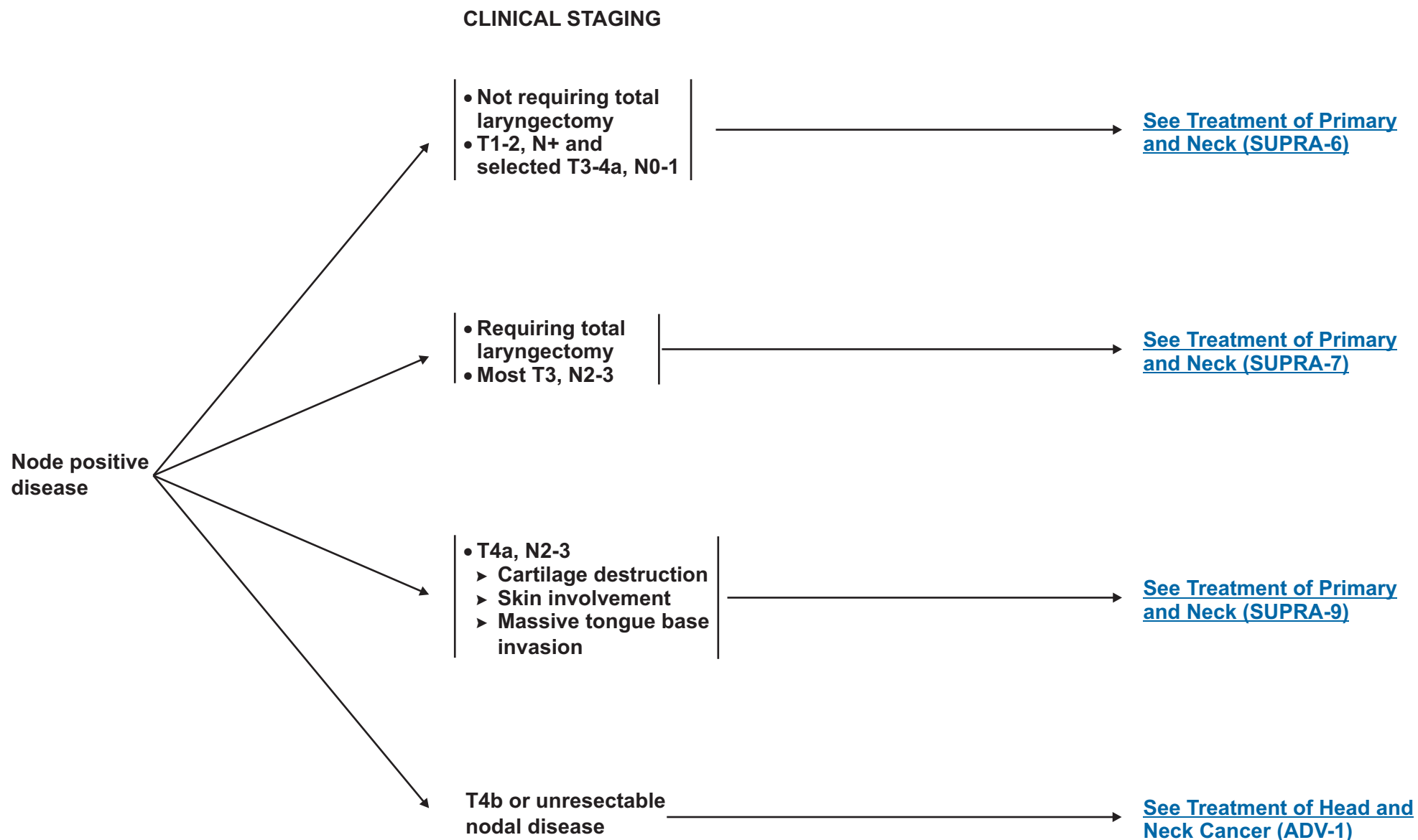


[Recurrence \(see ADV-2\)](#)

^a[See Principles of Radiation Therapy \(SUPRA-A\).](#)

^b[See Principles of Systemic Therapy \(CHEM-A\).](#)

Note: All recommendations are category 2A unless otherwise indicated.
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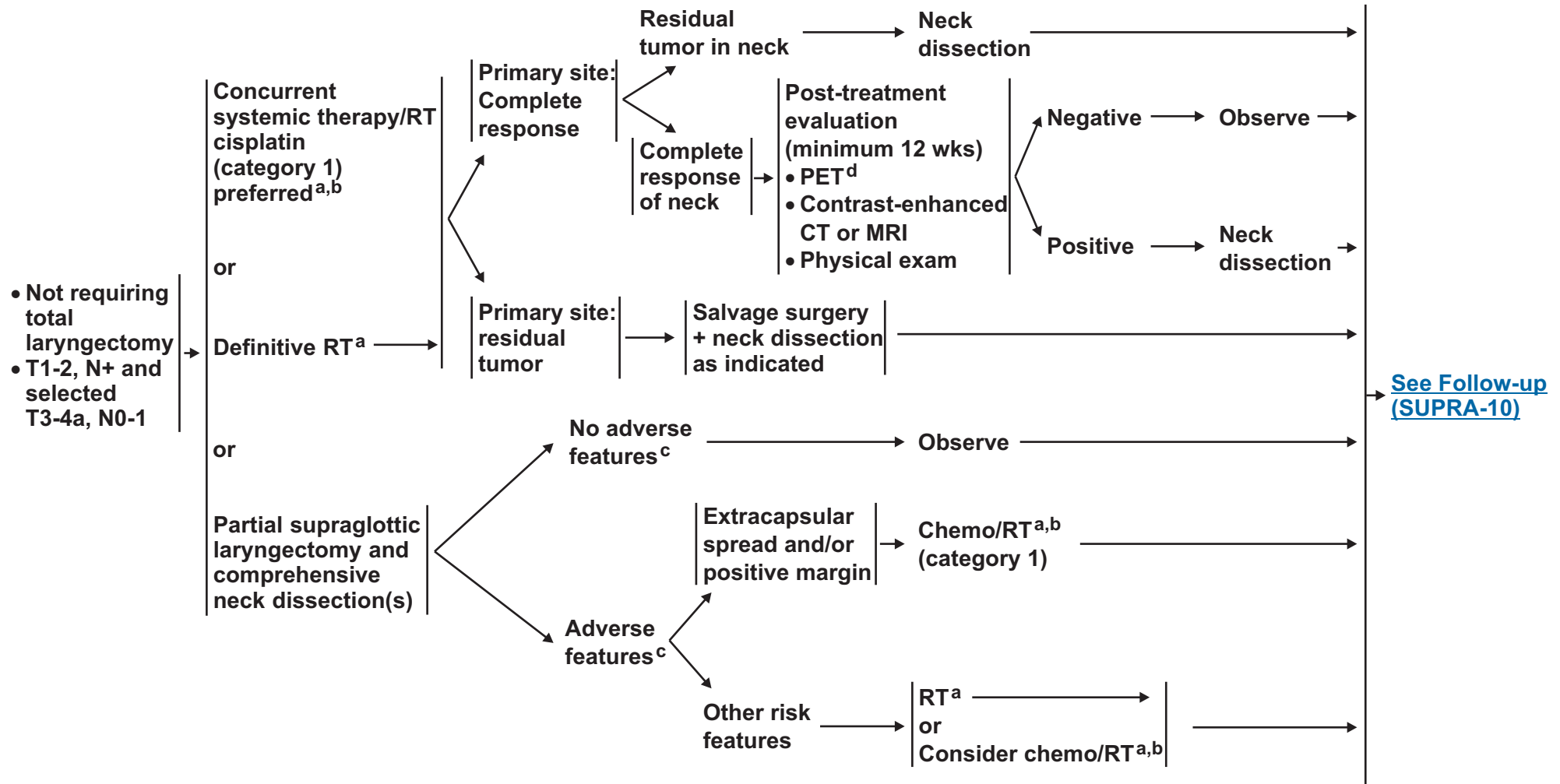


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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT TREATMENT



^aSee Principles of Radiation Therapy (SUPRA-A).

^bSee Principles of Systemic Therapy (CHEM-A).

^cRisk features: extracapsular nodal spread, positive margins, pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.

^dIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

[Recurrence \(see ADV-2\)](#)

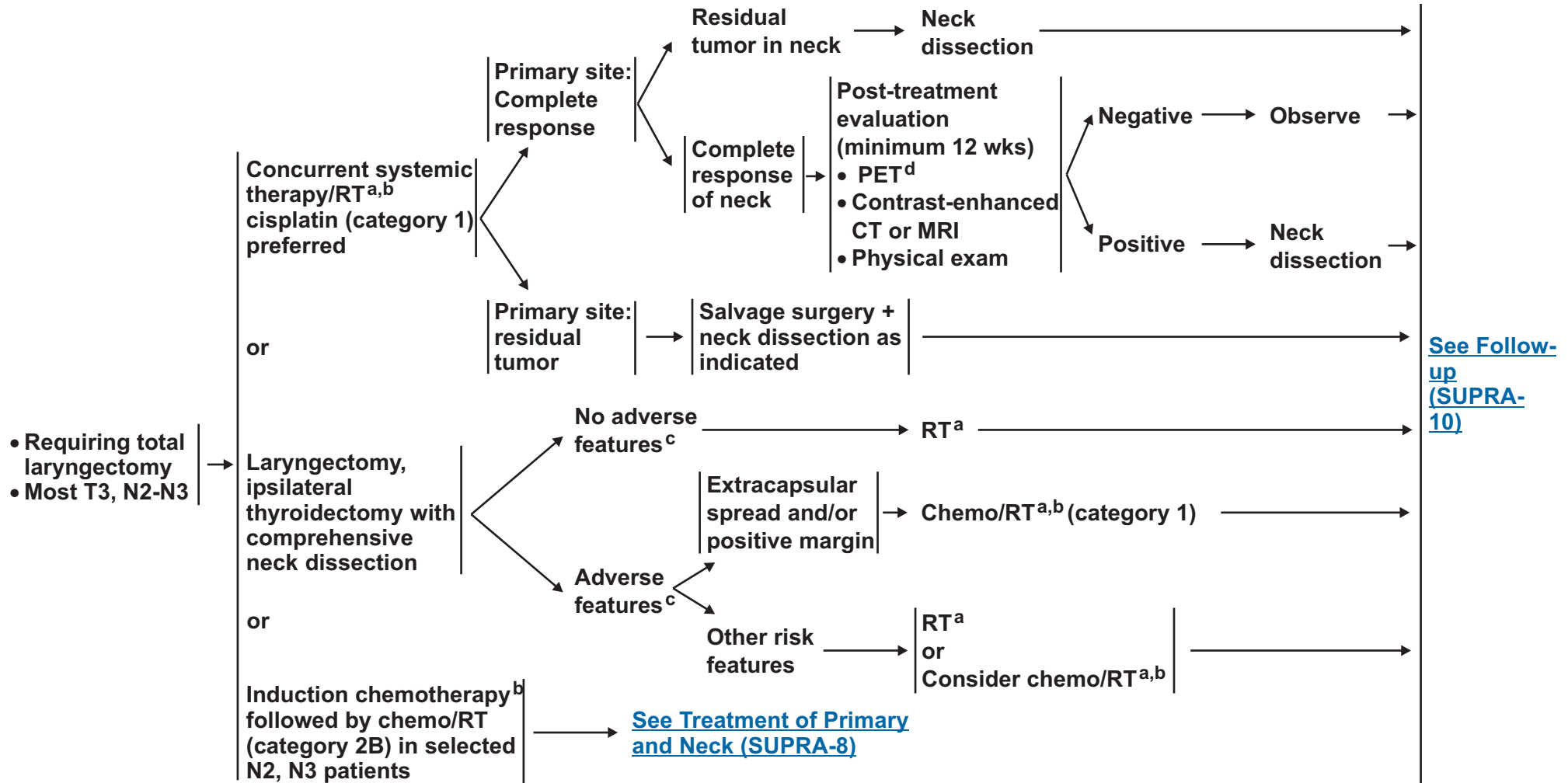
Note: All recommendations are category 2A unless otherwise indicated.

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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT TREATMENT



^aSee Principles of Radiation Therapy (SUPRA-A).

^bSee Principles of Systemic Therapy (CHEM-A).

^cRisk features: extracapsular nodal spread, positive margins, pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.

^dIf a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

[Recurrence \(see ADV-2\)](#)

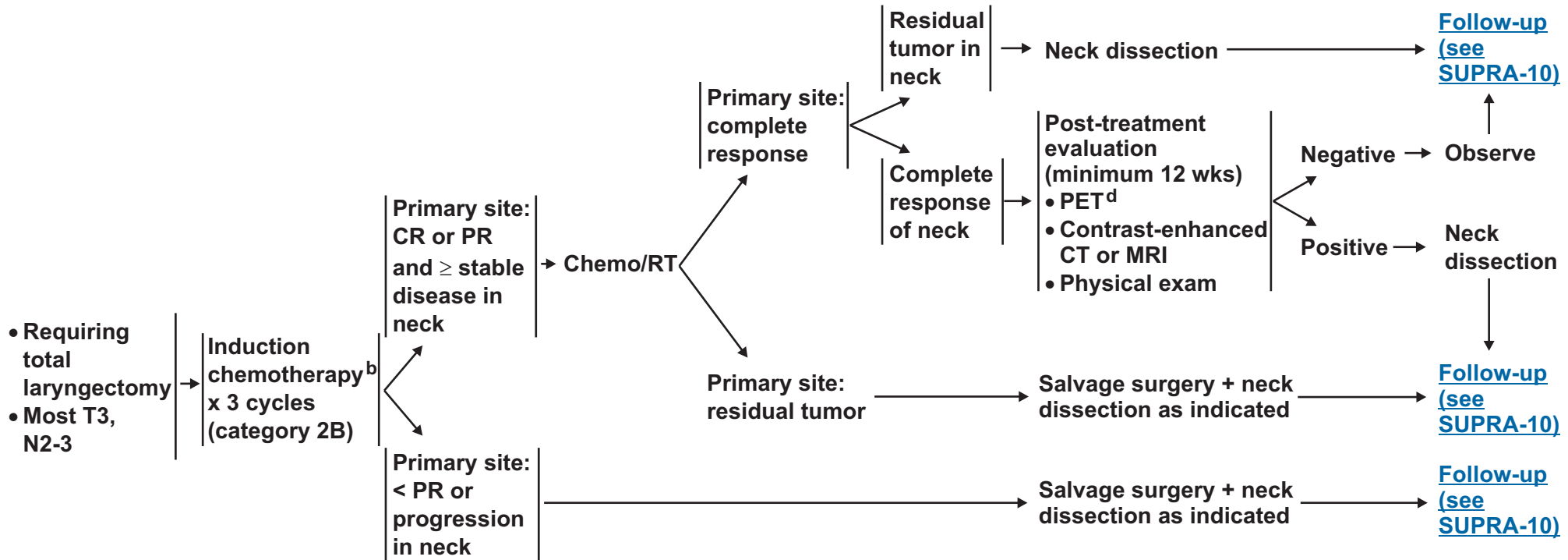
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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT TREATMENT



^b See Principles of Systemic Therapy (CHEM-A).

^d If a PET-CT is performed and negative for suspicion of persistent cancer, further cross-sectional imaging is optional.

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CLINICAL
STAGING

TREATMENT OF PRIMARY AND NECK

ADJUVANT
TREATMENT

T4a, N2-N3
 ▶ Cartilage destruction
 ▶ Skin involvement
 ▶ Massive invasion of base of tongue

Laryngectomy, ipsilateral thyroidectomy with ipsilateral or bilateral neck dissection
 or
 Clinical trial

Chemo/RT^{a,b}
 (category 1)

[See Follow-up \(SUPRA-10\)](#)

^a[See Principles of Radiation Therapy \(SUPRA-A\).](#)

^b[See Principles of Systemic Therapy \(CHEM-A\).](#)

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

FOLLOW-UP

- Physical exam:
 - Year 1, every 1-3 mo
 - Year 2, every 2-4 mo
 - Years 3-5, every 4-6 mo
 - > 5 years, every 6-12 mo
- Post-treatment baseline imaging of primary and neck recommended within 6 months of treatment¹
 - Reimaging as indicated only by signs/symptoms on physical examination
- Chest imaging as clinically indicated
- TSH every 6-12 mo, if neck irradiated
- Speech, hearing and swallowing evaluation and rehabilitation as indicated
- Smoking cessation and alcohol counseling

→ [Recurrence \(see ADV-2\)](#)

¹Recommended for T3-4 and N2-3 disease only.

Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

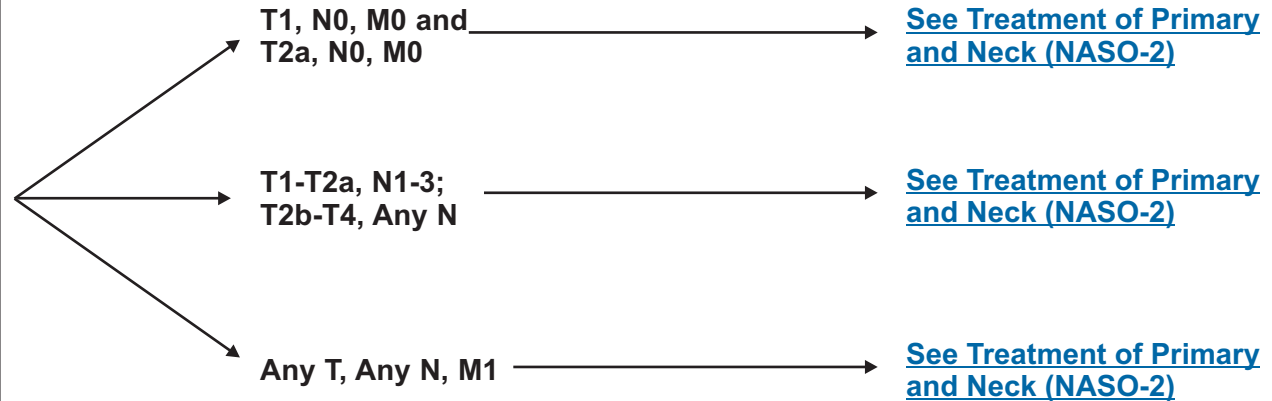
PRINCIPLES OF RADIATION THERAPY¹**Definitive RT****T1-2, N0: ≥ 66 Gy conventional (2.0 Gy/fraction)****T2-3, N0-1:****• Conventional fractionation:****Primary and gross adenopathy: ≥ 70 Gy (2.0 Gy/day)****Neck, uninvolved nodal stations: ≥ 50 Gy (2.0 Gy/day)****• Altered fractionation:****▶ 6 fractions/week accelerated during weeks 2-6; 70 Gy to gross disease, ≥ 50 Gy to subclinical disease.****▶ Concomitant boost accelerated RT: 72 Gy/6 weeks (1.8 Gy/fraction, large field; 1.5 Gy boost as second daily fraction during last 12 treatment days)****▶ Hyperfractionation: 81.6 Gy/7 weeks (1.2 Gy/fraction BID)****• Neck, uninvolved nodal stations: ≥ 50 Gy (2.0 Gy/day)****Chemoradiation****Concurrent platinum plus 70 Gy/7 weeks conventional****Postoperative RT****• Indicated for pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.****• Preferred interval between resection and postoperative RT is ≤ 6 weeks.****• Primary: ≥ 60 Gy (2.0 Gy/day)****• Neck****▶ Involved nodal stations: ≥ 60 Gy (2.0 Gy/day)****▶ Uninvolved nodal stations: ≥ 50 Gy (2.0 Gy/day)****Postoperative chemoradiation****• Indicated for extracapsular nodal spread and/or positive margins²⁻⁴****• Consider for other risk features: pT4 primary, N2 or N3 nodal disease, perineural invasion, vascular embolism.****• Concurrent single agent cisplatin at 100 mg/m² every 3 wks is recommended.**¹[See Radiation Techniques \(RAD-A\).](#)²Bernier J, Dommene C, Ozsahin M, et al. Postoperative irradiation with or without concomitant chemotherapy for locally advanced head and neck cancer. N Engl J Med 2004;350:1945-1952.³Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. N Engl J Med 2004;350:1937-1944.⁴Bernier J, Cooper JS, Pajak TF, et al. Defining risk levels in locally advanced head and neck cancers: A comparative analysis of concurrent postoperative radiation plus chemotherapy trials of the EORTC (#22931) and RTOG (#9501). Head Neck 2005;27:843-850.**Note: All recommendations are category 2A unless otherwise indicated.****Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.**

WORKUP

- H&P
- Nasopharyngeal exam and biopsy
- Chest imaging
- MRI with gadolinium of nasopharynx and base of skull to clavicles and/or CT with contrast or PET-CT and CT with contrast
- Dental evaluation as indicated
- Speech & swallowing evaluation as indicated
- Imaging for distant metastases (chest, liver, bone) for WHO class 2-3/N2-3 disease (may include PET scan and/or CT)

Multidisciplinary consultation

CLINICAL STAGING



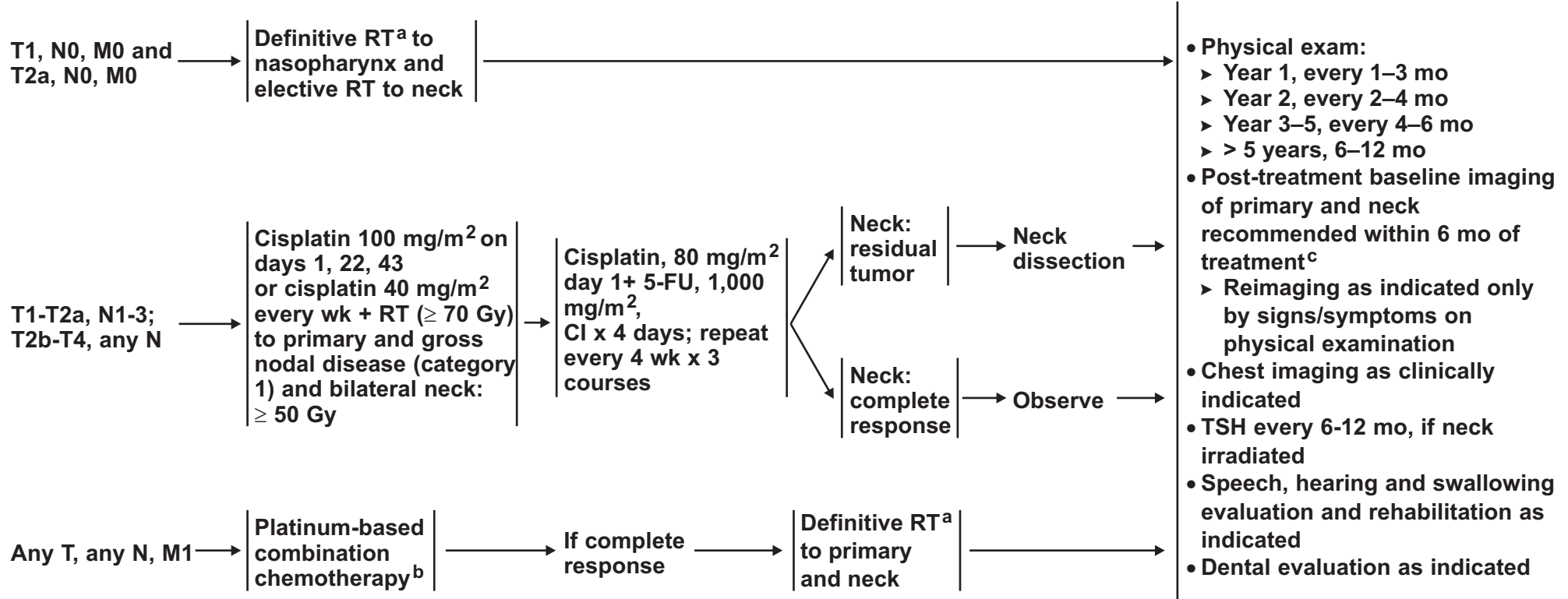
Note: All recommendations are category 2A unless otherwise indicated.

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CLINICAL STAGING

TREATMENT OF PRIMARY AND NECK

FOLLOW-UP



- Physical exam:
 - ▶ Year 1, every 1–3 mo
 - ▶ Year 2, every 2–4 mo
 - ▶ Year 3–5, every 4–6 mo
 - ▶ > 5 years, 6–12 mo
- Post-treatment baseline imaging of primary and neck recommended within 6 mo of treatment^c
 - ▶ Reimaging as indicated only by signs/symptoms on physical examination
- Chest imaging as clinically indicated
- TSH every 6-12 mo, if neck irradiated
- Speech, hearing and swallowing evaluation and rehabilitation as indicated
- Dental evaluation as indicated

^aSee Principles of Radiation Therapy (NASO-A).

^bSee Principles of Systemic Therapy (CHEM-A).

^cRecommended for T3-4 and N2-3 disease only.

[Recurrence \(see ADV-2\)](#)

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRINCIPLES OF RADIATION THERAPY¹**Definitive RT**

- **Primary and gross adenopathy:**
≥ 70 Gy (2.0 Gy/day)
- **Neck**
 - ▶ **Uninvolved nodal stations:**
≥ 50 Gy (2.0 Gy/day)

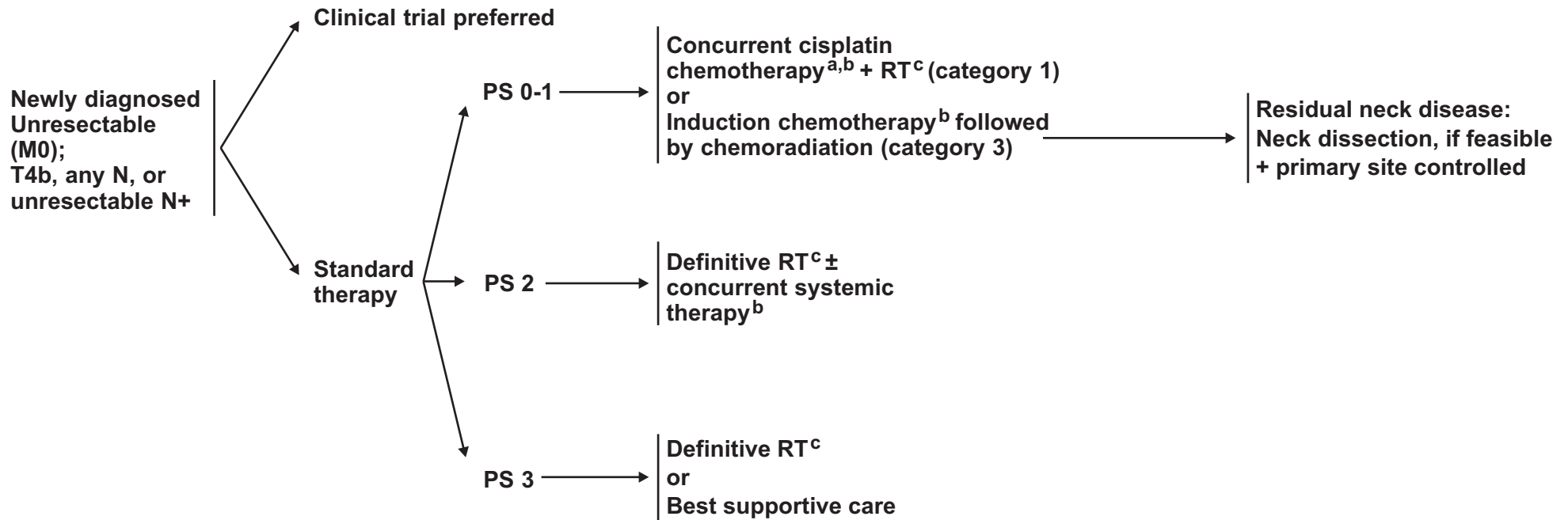
¹[See Radiation Techniques \(RAD-A\).](#)

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DIAGNOSIS

TREATMENT OF HEAD AND NECK CANCER



^aThe single-agent cisplatin or carboplatin chemoradiotherapy regimens have not been compared in randomized trials. Therefore, no optimal standard regimen is defined. Combination chemotherapy regimens are more toxic and have not been directly compared to single-agent regimens.

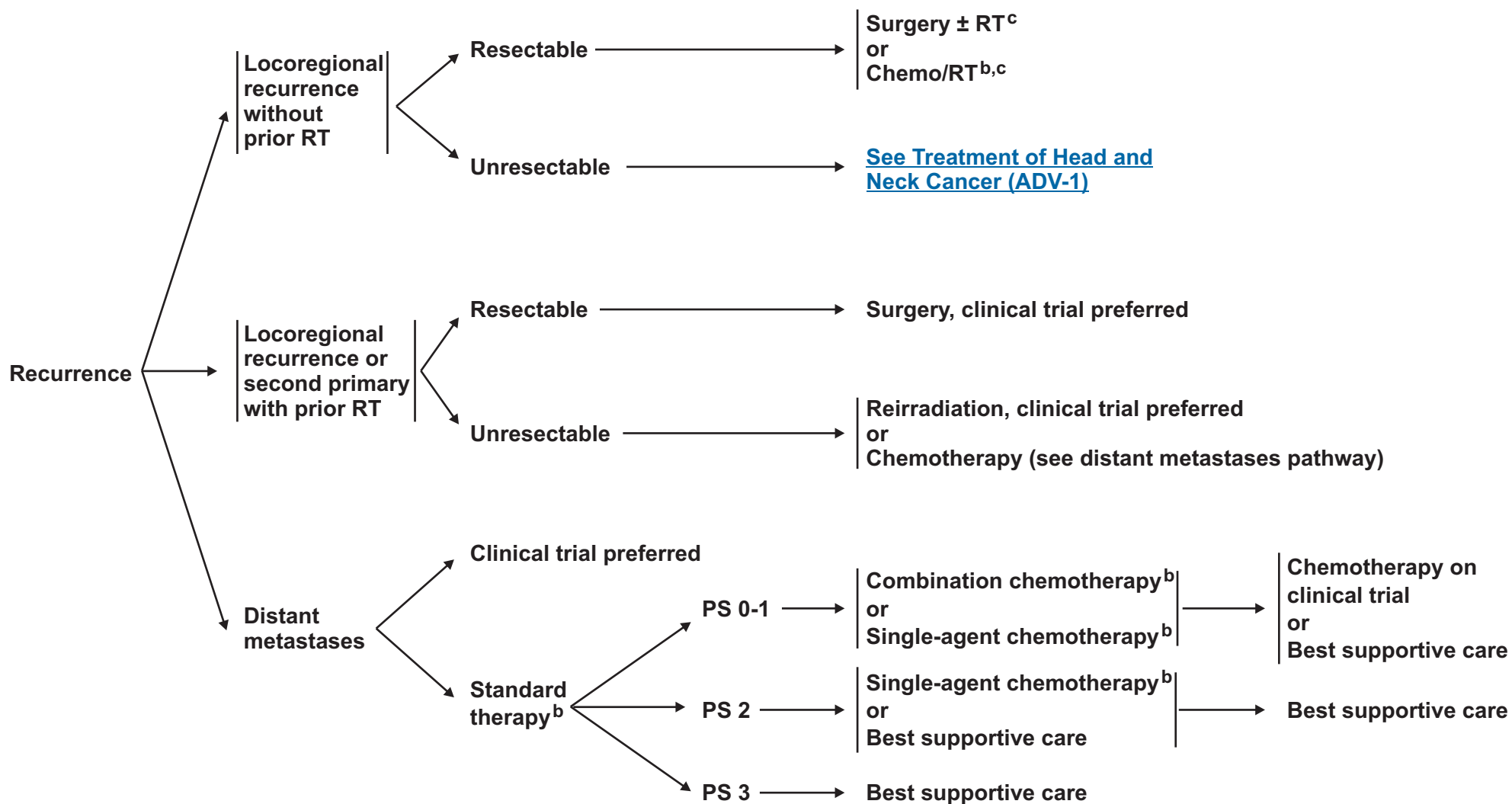
^b[See Principles of Systemic Therapy \(CHEM-A\).](#)

^c[See Principles of Radiation Therapy \(ADV-A\).](#)

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DIAGNOSIS

TREATMENT OF HEAD AND NECK CANCER



^bSee Principles of Systemic Therapy (CHEM-A).

^cSee Principles of Radiation Therapy (ADV-A).

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

PRINCIPLES OF RADIATION THERAPY¹**Concurrent chemoradiation (preferred)****Conventional fractionation:**

- Primary and gross adenopathy: ≥ 70 Gy (2.0 Gy/day)

- Neck

Uninvolved nodal stations:

44-60 Gy

Definitive RT

- Conventional fractionation:

- ▶ Primary and gross adenopathy: ≥ 70 Gy (2.0 Gy/day)

- ▶ Neck

Uninvolved nodal stations:

≥ 50 Gy (2.0 Gy/day)

- Altered fractionation:

- ▶ 6 fractions/week accelerated during weeks 2-6; 70 Gy to gross disease, ≥ 50 Gy to subclinical disease.

- ▶ Concomitant boost accelerated RT:

72 Gy/6 wks (1.8 Gy/fraction, large field; 1.5 Gy boost as second daily fraction during last 12 treatment days)

- ▶ Hyperfractionation:

81.6 Gy/7 wks (1.2 Gy/fraction, twice daily)

- ▶ Modified fractionation total dose > 70 Gy and treatment course < 7 wks

Chemoradiation

Based on published data, concurrent chemoradiation typically uses conventional fractionation at 2.0 g per fraction to ≥ 70 Gy in 7 wks with single agent cisplatin given every 3 wks at $100 \text{ mg/m}^2 \times 3$ doses. Use of other fraction sizes (eg, 1.8 Gy, conventional), multiagent chemotherapy or altered fractionation with chemotherapy has been evaluated with no consensus on the optimal approach. In general, the use of concurrent chemoradiation carries a high toxicity burden--altered fractionation or multiagent chemotherapy will likely further increase toxicity burden. For any chemoradiation approach, close attention should be paid to published reports for the specific chemotherapy agent, dose and schedule of administration. Chemoradiation should be performed by an experienced team and include substantial supportive care.

¹[See Radiation Techniques \(RAD-A\).](#)

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RADIATION TECHNIQUES¹⁻⁸

Target delineation and optimal dose distribution require experience in head and neck imaging, and a thorough understanding of patterns of disease spread. Standards for target definition, dose specification, fractionation (with and without concurrent chemotherapy), and normal tissue constraints are still evolving. IMRT, 3D, and 2D conformal techniques may be used as appropriate depending on the stage, tumor location, physician training/experience, and available physics support. Close interplay exists between radiation technology, techniques, fractionation, and chemotherapy options resulting in a large number of combinations that may impact toxicity or tumor control.

Intensity-Modulated Radiotherapy (IMRT)

IMRT has been shown to be particularly useful in reducing long-term toxicity in oropharyngeal, paranasal sinus, and nasopharyngeal cancers by reducing the dose to salivary glands, temporal lobes, auditory structures (including cochlea), and optic structures. The application of IMRT to other sites (eg, oral cavity, larynx, hypopharynx, salivary glands) is evolving and may be used at the discretion of treating physicians.

IMRT and Fractionation

A number of ways exist to integrate IMRT, target volume dosing, and fractionation. The Simultaneous Integrated Boost (SIB) technique uses differential “dose painting” (66-74 Gy to gross disease; 50-60 Gy to subclinical disease) for each fraction of treatment throughout the entire course of radiation.⁴ SIB is commonly used in conventional (5 fractions/week) and the “6 fractions/week accelerated” schedule.⁵ The Sequential (SEQ) IMRT technique typically delivers the initial (lower dose) phase (weeks 1-5) followed by the high-dose boost volume phase (weeks 6-7) using 2-3 separate dose plans, and is commonly applied in standard fractionation and hyperfractionation. The Concomitant Boost Accelerated schedule may utilize a “Modified SEQ” dose plan by delivering the dose to the subclinical targets once a day for 6 weeks, and a separate boost dose plan as a second daily fraction for the last 12 treatment days.⁶

¹Dogan N, King S, Emami B, et al. Assessment of different IMRT boost delivery methods on target coverage and normal-tissue sparing. *Int J Radiat Oncol Biol Phys* 2003;57(5):1480-1491.

²Lee NY, de Arruda FF, Puri DR, et al. A comparison of intensity-modulated radiation therapy and concomitant boost radiotherapy in the setting of concurrent chemotherapy for locally advanced oropharyngeal carcinoma. *Int J Radiat Oncol Biol Phys* 2006;66(4):966-974.

³Lee NY, O'Meara W, Chan K, et al. Concurrent chemotherapy and intensity-modulated radiotherapy for locoregionally advanced laryngeal and hypopharyngeal cancers. *Int J Radiat Oncol Biol Phys* 2007;69(2):459-468. Epub 2007 May 9.

⁴Mohan R, Wu Q, Morris M, et al. “Simultaneous Integrated Boost” (SIB) IMRT of advanced head and neck squamous cell carcinomas—dosimetric analysis. *Int J Radiat Oncol Biol Phys* 2001;51(3):180-181.

⁵Overgaard J, Hansen HS, Specht L, et al. Five compared with six fractions per week of conventional radiotherapy of squamous-cell carcinoma of head and neck: DAHANCA 6 and 7 randomised controlled trial. *Lancet* 2003;362(9388):933-940.

⁶Schoenfeld GO, Amdur RJ, Morris CG, et al. Patterns of failure and toxicity after intensity-modulated radiotherapy for head and neck cancer. *Int J Radiat Oncol Biol Phys* 2008;71(2):377-385. Epub 2007 Dec 31.

⁷Wolden SL, Chen WC, Pfister DG, et al. Intensity-modulated radiation therapy (IMRT) for nasopharynx cancer: update of the Memorial Sloan-Kettering experience. *Int J Radiat Oncol Biol Phys* 2006;64(1):57-62. Epub 2005 Jun 2.

⁸Wu Q, Manning M, Schmidt-Ullrich R, Mohan R. The potential for sparing of parotids and escalation of biologically effective dose with intensity-modulated radiation treatments of head and neck cancers: a treatment design study. *Int J Radiat Oncol Biol Phys* 2000;46(1):195-205.

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PRINCIPLES OF SYSTEMIC THERAPY (Page 1 of 2)

The choice of chemotherapy should be individualized based on patient characteristics (performance status, goals of therapy).

Squamous Cell Cancers

Maxillary Sinus, Ethmoid Sinus, Lip, Oral Cavity, Oropharynx, Hypopharynx, Glottic larynx, Supraglottic larynx, Occult Primary

Primary Systemic Therapy + concurrent RT

- Cisplatin alone^{1,2} (preferred)^{3,4}
- 5-FU/hydroxyurea⁵
- Cisplatin/paclitaxel⁵
- Cisplatin/infusional 5-FU⁵
- Carboplatin/infusional 5-FU⁶
- Cetuximab⁷

Postoperative Chemoradiation

- Cisplatin alone^{8,9,10}

Induction chemotherapy

- Docetaxel/cisplatin/5-FU^{11,12,13}

Nasopharynx

Chemoradiation followed by adjuvant chemotherapy

- Cisplatin + RT followed by Cisplatin/5-FU¹⁴

Recurrent, unresectable or Metastatic (incurable)**Combination therapy**

- ▶ Cisplatin or carboplatin + 5-FU^{15,16} ± cetuximab¹⁷
- ▶ Cisplatin or carboplatin + docetaxel or paclitaxel¹⁵
- ▶ Cisplatin/cetuximab¹⁸

Single agent

- ▶ Cisplatin
- ▶ Carboplatin
- ▶ Paclitaxel
- ▶ Docetaxel
- ▶ 5-FU
- ▶ Methotrexate
- ▶ Ifosfamide
- ▶ Bleomycin
- ▶ Gemcitabine¹⁹ (nasopharyngeal)
- ▶ Cetuximab²⁰

[See References on page CHEM-A 2 of 2](#)

Note: All recommendations are category 2A unless otherwise indicated.

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PRINCIPLES OF SYSTEMIC THERAPY (Page 2 of 2)
REFERENCES

- ¹Forastiere AA, Goepfert H, Maor M, et al. Concurrent chemotherapy and radiotherapy for organ preservation in advanced laryngeal cancer. *N Engl J Med* 2003;349:2091-8.
- ²Adelstein DJ, Li Y, Adams GL, et al. An intergroup phase III comparison of standard radiation therapy and two schedules of concurrent chemoradiotherapy in patients with unresectable squamous cell head and neck cancer. *J Clin Oncol* 2003;21(1):92-98.
- ³Bachaud JM, Cohen-Jonathan E, Alzieu C, et al. Combined postoperative radiotherapy and weekly cisplatin infusion for locally advanced head and neck carcinoma: final report of a randomized trial. *Int J Radiat Oncol Biol Phys* 1996;36(5):999-1004. (cisplatin 50 mg IV weekly)
- ⁴Jeremic B, Milicic B, Dagovic A, et al. Radiation therapy with or without concurrent low-dose daily chemotherapy in locally advanced, nonmetastatic squamous cell carcinoma of the head and neck. *J Clin Oncol* 2004;22(17):3540-3548. (cisplatin 6 mg/m² daily)
- ⁵Garden AS, Harris J, Vokes EE, et al. Preliminary results of Radiation Therapy Oncology Group 97-03: A randomized phase II trial of concurrent radiation and chemotherapy for advanced squamous cell carcinomas of the head and neck. *J Clin Oncol* 2004;22:2856-2864.
- ⁶Denis F, Garaud P, Bardet E, et al. Final results of the 94-01 French Head and Neck Oncology and Radiotherapy Group randomized trial comparing radiotherapy alone with concomitant radiochemotherapy in advanced-stage oropharynx carcinoma. *J Clin Oncol* 2004;22(1):69-76.
- ⁷Bonner JA, Harari PM, Giralt J, et al. Radiotherapy plus cetuximab for squamous cell carcinoma of the head and neck. *N Engl J Med* 2006;354:567-78.
- ⁸Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937-44.
- ⁹Bernier J, Dommene C, Ozsahin M, et al. Postoperative irradiation with or without concomitant chemotherapy for locally advanced head and neck cancer. *N Engl J Med* 2004;350:1945-52.
- ¹⁰Bernier J, Cooper JS, Pajak TF, et al. Defining risk levels in locally advanced head and neck cancers: A comparative analysis of concurrent postoperative radiation plus chemotherapy trials of the EORTC (#22931) and RTOG (#9501). *Head Neck* 2005;27:843-850.
- ¹¹Schrijvers D, Van Herpen C, Kerger J, et al. Docetaxel, cisplatin and 5-fluorouracil in patients with locally advanced unresectable head and neck cancer: a phase I-II feasibility study. *Annals of Oncology* 2004;15:638-645.
- ¹²Vermorken JB, Remenar E, van Herpen C, et al; EORTC 24971/TAX 323 Study Group. Cisplatin, fluorouracil, and docetaxel in unresectable head and neck cancer. *N Engl J Med* 2007;357(17):1695-1704.
- ¹³Posner MR, Hershock DM, Blajman CR, et al. Cisplatin and fluorouracil alone or with docetaxel in head and neck cancer. *N Engl J Med* 2007;357(17):1705-1715.
- ¹⁴Al-Sarraf M, LeBlanc M, Giri PG, et al. Chemoradiotherapy versus radiotherapy in patients with advanced nasopharyngeal cancer: phase III randomized Intergroup study 0099. *J Clin Oncol* 1998;16:1310-1317.
- ¹⁵Gibson MK, Li Y, Murphy B, et al. Randomized phase III evaluation of cisplatin plus fluorouracil versus cisplatin plus paclitaxel in advanced head and neck cancer (E1395): An Intergroup Trial of the Eastern Cooperative Oncology Group. *J Clin Oncol* 2005;23(15):3562-3567.
- ¹⁶Forastiere AA, Metch B, Schuller DE, et al. Randomized comparison of cisplatin plus fluorouracil and carboplatin plus fluorouracil versus methotrexate in advanced squamous cell carcinoma of the head and neck: A Southwest Oncology Group Study. *J Clin Oncol* 1992;10(8):1245-1251.
- ¹⁷Vermorken JB, Mesia R, Rivera F, et al. Platinum-based chemotherapy plus cetuximab in head and neck cancer. *N Engl J Med* 2008;359:1116-1127.
- ¹⁸Burtness B, Goldwasser MA, Flood W, et al. Phase III randomized trial of cisplatin plus placebo versus cisplatin plus cetuximab in metastatic/recurrent head and neck cancer: An Eastern Cooperative Oncology Group Study. *J Clin Oncol* 2005;23:8646-8654.
- ¹⁹Zhang L, Zhang Y, Huang PY, et al. Phase II clinical study of gemcitabine in the treatment of patients with advanced nasopharyngeal carcinoma after the failure of platinum-based chemotherapy. *Cancer Chemother Pharmacol* 2008;61(1):33-38. Epub 2007 Mar 20.
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Note: All recommendations are category 2A unless otherwise indicated.

Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

Staging

Table 1: 2002 American Joint Committee on Cancer (AJCC) TNM Staging System for the Lip and Oral Cavity

(Nonepithelial tumors are not included, such as those of lymphoid tissue, soft tissue, bone, and cartilage)

Primary Tumor (T)

TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma <i>in situ</i>
T1	Tumor 2 cm or less in greatest dimension
T2	Tumor more than 2 cm but not more than 4 cm in greatest dimension
T3	Tumor more than 4 cm in greatest dimension
T4 (lip)	Tumor invades through cortical bone, inferior alveolar nerve, floor of mouth, or skin of face (ie, chin or nose)
T4a	(oral cavity) Tumor invades adjacent structures (eg, through cortical bone, into deep [extrinsic] muscle of tongue [genioglossus, hyoglossus, palatoglossus, and styloglossus], maxillary sinus, skin of face)
T4b	Tumor invades masticator space, pterygoid plates, or skull base and/or encases internal carotid artery

*Note: Superficial erosion alone of bone/tooth socket by gingival primary is not sufficient to classify as T4.

Regional Lymph Nodes (N)

NX	Regional nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N2	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a	Metastasis in single ipsilateral lymph node more than 3 cm but not more than 6 cm in greatest dimension

N2b	Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N2c	Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3	Metastasis in a lymph node more than 6 cm in greatest dimension

Distant Metastasis (M)

MX	Distant metastasis cannot be assessed
M0	No distant metastasis
M1	Distant metastasis

Stage Grouping

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T1	N1	M0
	T2	N1	M0
	T3	N1	M0
Stage IVA	T4a	N0	M0
	T4a	N1	M0
	T1	N2	M0
	T2	N2	M0
	T3	N2	M0
	T4a	N2	M0
Stage IVB	Any T	N3	M0
	T4b	Any N	M0
Stage IVC	Any T	Any N	M1

Histologic Grade (G)

GX	Grade cannot be assessed
G1	Well differentiated
G2	Moderately differentiated
G3	Poorly differentiated

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Table 2: 2002 American Joint Committee on Cancer (AJCC) TNM Staging System for the Pharynx (Including Base of Tongue, Soft Palate, and Uvula)

(Nonepithelial tumors are not included, such as those of lymphoid tissue, soft tissue, bone, and cartilage)

Primary Tumor (T)

- TX** Primary tumor cannot be assessed
T0 No evidence of primary tumor
Tis Carcinoma *in situ*

Nasopharynx

- T1** Tumor confined to the nasopharynx
T2 Tumor extends to soft tissues
T2a Tumor extends to the oropharynx and/or nasal cavity without parapharyngeal extension*
T2b Any tumor with parapharyngeal extension*
T3 Tumor invades bony structures and/or paranasal sinuses
T4 Tumor with intracranial extension and/or involvement of cranial nerves, infratemporal fossa, hypopharynx, orbit, or masticator space

*Note: Parapharyngeal extension denotes posterolateral infiltration of tumor beyond the pharyngobasilar fascia.

Oropharynx

- T1** Tumor 2 cm or less in greatest dimension
T2 Tumor more than 2 cm but not more than 4 cm in greatest dimension
T3 Tumor more than 4 cm in greatest dimension
T4a Tumor invades the larynx, deep/extrinsic muscle of tongue, medial pterygoid, hard palate, or mandible
T4b Tumor invades lateral pterygoid muscle, pterygoid plates, lateral nasopharynx, or skull base or encases carotid artery

Hypopharynx

- T1** Tumor limited to one subsite of hypopharynx and 2 cm or less in greatest dimension
T2 Tumor invades more than one subsite of hypopharynx or an adjacent site, or measures more than 2 cm but not more than 4 cm in greatest diameter without fixation of hemilarynx

- T3** Tumor more than 4 cm in greatest dimension or with fixation of hemilarynx
T4a Tumor invades thyroid/cricoid cartilage, hyoid bone, thyroid gland, esophagus, or central compartment soft tissue*
T4b Tumor invades prevertebral fascia, encases carotid artery, or involves mediastinal structures

*Note: Central compartment soft tissue includes prelaryngeal strap muscles and subcutaneous fat.

Regional Lymph Nodes (N)**Nasopharynx**

The distribution and the prognostic impact of regional lymph node spread from nasopharynx cancer, particularly of the undifferentiated type, are different from those of other head and neck mucosal cancers and justify the use of a different N classification system.

- NX** Regional lymph nodes cannot be assessed
N0 No regional lymph node metastasis
N1 Unilateral metastasis in lymph node(s), 6 cm or less in greatest dimension, above the supraclavicular fossa*
N2 Bilateral metastasis in lymph node(s), 6 cm or less in greatest dimension, above the supraclavicular fossa*
N3 Metastasis in a lymph node(s)* more than 6 cm and/or to supraclavicular fossa
N3a More than 6 cm in dimension
N3b Extension to the supraclavicular fossa**

*Note: Midline nodes are considered ipsilateral nodes.

**Supraclavicular zone or fossa is relevant to the staging of nasopharyngeal carcinoma and is the triangular region originally described by Ho. It is defined by three points: (1) the superior margin of the sternal end of the clavicle; (2) the superior margin of the lateral end of the clavicle, and (3) the point where the neck meets the shoulder. Note that this would include caudal portions of levels IV and V. All cases with lymph nodes (whole or part) in the fossa are considered N3b.

[Continued...](#)

Table 2 - Continued

Oropharynx and Hypopharynx

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N2	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension, or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension, or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a	Metastasis in a single ipsilateral lymph node more than 3 cm but not more than 6 cm in greatest dimension
N2b	Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N2c	Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3	Metastasis in a lymph node more than 6 cm in greatest dimension

Distant Metastasis (M)

MX	Distant metastasis cannot be assessed
M0	No distant metastasis
M1	Distant metastasis

Stage Grouping: Nasopharynx

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage IIA	T2a	N0	M0
Stage IIB	T1	N1	M0
	T2	N1	M0
	T2a	N1	M0
	T2b	N0	M0
	T2b	N1	M0
Stage III	T1	N2	M0
	T2a	N2	M0
	T2b	N2	M0

	T3	N0	M0
	T3	N1	M0
	T3	N2	M0
Stage IVA	T4	N0	M0
	T4	N1	M0
	T4	N2	M0
Stage IVB	Any T	N3	M0
Stage IVC	Any T	Any N	M1

Stage Grouping: Oropharynx, Hypopharynx

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T1	N1	M0
	T2	N1	M0
	T3	N1	M0
Stage IVA	T4a	N0	M0
	T4a	N1	M0
	T1	N2	M0
	T2	N2	M0
	T3	N2	M0
	T4a	N2	M0
Stage IVB	T4b	Any N	M0
	Any T	N3	M0
Stage IVC	Any T	Any N	M1

Histologic Grade (G)

- **Oropharynx**
- **Hypopharynx**
- GX** Grade cannot be assessed
- G1** Well differentiated
- G2** Moderately differentiated
- G3** Poorly differentiated

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**Table 3: 2002 American Joint Committee on Cancer (AJCC)
TNM Staging System for the Larynx**

(Nonepithelial tumors are not included, such as those of lymphoid tissue, soft tissue, bone, and cartilage)

Primary Tumor (T)

- TX** Primary tumor cannot be assessed
T0 No evidence of primary tumor
Tis Carcinoma *in situ*

Supraglottis

- T1** Tumor limited to one subsite of supraglottis with normal vocal cord mobility
T2 Tumor invades mucosa of more than one adjacent subsite of supraglottis or glottis or region outside the supraglottis (eg, mucosa of base of tongue, vallecula, medial wall of pyriform sinus) without fixation of the larynx
T3 Tumor limited to larynx with vocal cord fixation and/or invades any of the following: postcricoid area, pre-epiglottic tissues, paraglottic space, and/or minor thyroid cartilage erosion (eg, inner cortex)
T4a Tumor invades through the thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus)
T4b Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

Glottis

- T1** Tumor limited to the vocal cord(s) (may involve anterior or posterior commissure) with normal mobility
T1a Tumor limited to one vocal cord
T1b Tumor involves both vocal cords
T2 Tumor extends to supraglottis and/or subglottis, and/or with impaired vocal cord mobility
T3 Tumor limited to the larynx with vocal cord fixation and/or invades paraglottic space, and/or minor thyroid cartilage erosion (eg, inner cortex)
T4a Tumor invades through the thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft

tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus)

- T4b** Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

Subglottis

- T1** Tumor limited to the subglottis
T2 Tumor extends to vocal cord(s) with normal or impaired mobility
T3 Tumor limited to larynx with vocal cord fixation
T4a Tumor invades cricoid or thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus)
T4b Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

Regional Lymph Nodes (N)

- NX** Regional lymph nodes cannot be assessed
N0 No regional lymph node metastasis
N1 Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N2 Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a Metastasis in single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension
N2b Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N2c Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3 Metastasis in a lymph node, more than 6 cm in greatest dimension

Distant Metastasis (M)

- MX** Distant metastasis cannot be assessed
M0 No distant metastasis
M1 Distant metastasis

[Continued...](#)

Table 3 - Continued

Stage Grouping

				Histologic Grade (G)
Stage 0	Tis	N0	M0	
Stage I	T1	N0	M0	GX Grade cannot be assessed
Stage II	T2	N0	M0	
Stage III	T3	N0	M0	G1 Well differentiated
	T1	N1	M0	G2 Moderately differentiated
	T2	N1	M0	G3 Poorly differentiated
Stage IVA	T3	N1	M0	
	T4a	N0	M0	
	T4a	N1	M0	
	T1	N2	M0	
	T2	N2	M0	
Stage IVB	T3	N2	M0	
	T4a	N2	M0	
	T4b	Any N	M0	
Stage IVC	Any T	N3	M0	
	Any T	Any N	M1	

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Table 4

**2002 American Joint Committee on Cancer (AJCC)
TNM Staging System for the Major Salivary Glands (Parotid,
Submandibular, and Sublingual)**

Primary Tumor (T)

TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
T1	Tumor 2 cm or less in greatest dimension without extraparenchymal extension*
T2	Tumor more than 2 cm but not more than 4 cm in greatest dimension without extraparenchymal extension*
T3	Tumor more than 4 cm and/or tumor having extraparenchymal extension*
T4a	Tumor invades skin, mandible, ear canal, and/or facial nerve
T4b	Tumor invades skull base and/or pterygoid plates and/or encases carotid artery

*Note: Extraparenchymal extension is clinical or macroscopic evidence of invasion of soft tissues. Microscopic evidence alone does not constitute extraparenchymal extension for classification purposes.

Regional Lymph Nodes (N)

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N2	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension
N2b	Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension

N2c	Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3	Metastasis in a lymph node, more than 6 cm in greatest dimension

Distant Metastasis (M)

Mx	Distant metastasis cannot be assessed
M0	No distant metastasis
M1	Distant metastasis

Stage Grouping

Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T1	N1	M0
	T2	N1	M0
	T3	N1	M0
Stage IVA	T4a	N0	M0
	T4a	N1	M0
	T1	N2	M0
	T2	N2	M0
	T3	N2	M0
	T4a	N2	M0
Stage IVB	T4b	Any N	M0
	Any T	N3	M0
Stage IVC	Any T	Any N	M1

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Table 5: 2002 American Joint Committee on Cancer (AJCC) TNM Staging System for the Nasal Cavity and Paranasal Sinuses

(Nonepithelial tumors are not included, such as those of lymphoid tissue, soft tissue, bone, and cartilage)

Primary Tumor (T)

TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in situ

Maxillary Sinus

T1	Tumor limited to maxillary sinus mucosa with no erosion or destruction of bone
T2	Tumor causing bone erosion or destruction including extension into the hard palate and/or middle nasal meatus, except extension to posterior wall of maxillary sinus and pterygoid plates
T3	Tumor invades any of the following: bone of the posterior wall of maxillary sinus, subcutaneous tissues, floor or medial wall of orbit, pterygoid fossa, ethmoid sinuses
T4a	Tumor invades anterior orbital contents, skin of cheek, pterygoid plates, infratemporal fossa, cribriform plate, sphenoid or frontal sinuses
T4b	Tumor invades any of the following: orbital apex, dura, brain, middle cranial fossa, cranial nerves other than maxillary division of trigeminal nerve (V ₂), nasopharynx, or clivus

Nasal Cavity and Ethmoid Sinus

T1	Tumor restricted to any one subsite, with or without bony invasion
T2	Tumor invading two subsites in a single region or extending to involve an adjacent region within the nasoethmoidal complex, with or without bony invasion
T3	Tumor extends to invade the medial wall or floor of the orbit, maxillary sinus, palate, or cribriform plate

T4a	Tumor invades any of the following: anterior orbital contents, skin of nose or cheek, minimal extension to anterior cranial fossa, pterygoid plates, sphenoid or frontal sinuses
T4b	Tumor invades any of the following: orbital apex, dura, brain, middle cranial fossa, cranial nerves other than (V ₂), nasopharynx, or clivus

Regional Lymph Nodes (N)

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N2	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension
N2b	Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N2c	Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3	Metastasis in a lymph node, more than 6 cm in greatest dimension

Distant Metastasis (M)

MX	Distant metastasis cannot be assessed
M0	No distant metastasis
M1	Distant metastasis

[Continued...](#)

Table 5 - Continued

Stage Grouping

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T1	N1	M0
	T2	N1	M0
	T3	N1	M0
Stage IVA	T4a	N0	M0
	T4a	N1	M0
	T1	N2	M0
	T2	N2	M0
	T3	N2	M0
	T4a	N2	M0

Histologic Grade (G)

- GX** Grade cannot be assessed
- G1** Well differentiated
- G2** Moderately differentiated
- G3** Poorly differentiated

Stage IVB	T4b	Any N	M0
	Any T	N3	M0
Stage IVC	Any T	Any N	M1

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Discussion

This discussion is being updated to correspond with the newly updated algorithm. Last updated 05/22/08

NCCN Categories of Evidence and Consensus

Category 1: The recommendation is based on high-level evidence (e.g. randomized controlled trials) and there is uniform NCCN consensus.

Category 2A: The recommendation is based on lower-level evidence and there is uniform NCCN consensus.

Category 2B: The recommendation is based on lower-level evidence and there is nonuniform NCCN consensus (but no major disagreement).

Category 3: The recommendation is based on any level of evidence but reflects major disagreement.

All recommendations are category 2A unless otherwise noted.

Overview

The NCCN Head and Neck (H&N) Cancers guidelines address tumors arising in the lip, oral cavity, oropharynx, hypopharynx, nasopharynx, glottic and supraglottic larynx, paranasal (ethmoid and maxillary) sinuses, and salivary glands; occult primary cancer is also addressed (see [Figure 1](#)). As background to the discussion of these guidelines, a brief overview of the epidemiology and management of H&N cancer is provided.

Incidence and Etiology

Approximately 47,560 new cases of oral cavity, pharyngeal, and laryngeal cancers are estimated to occur in 2008. This accounts for about 3% of new cancer cases in the United States. An estimated 11,260 deaths from H&N cancers will occur in 2008.¹ Alcohol and tobacco abuse are common etiologic factors in cancers of the oral

cavity, oropharynx, hypopharynx, and larynx. Moreover, because the entire aerodigestive tract epithelium may be exposed to these carcinogens, patients with H&N cancer are at risk for developing second primary neoplasms of the H&N, lung, and esophagus. Human papilloma virus (HPV) infection appears to be a risk factor for some squamous cancers of the oropharynx (predominately cancers of the lingual and palatine tonsils).²⁻⁷

Staging

Stage at diagnosis is the most predictive factor of survival. The TNM staging systems developed by the American Joint Committee on Cancer (AJCC) for the lip and oral cavity, pharynx (nasopharynx, oropharynx, and hypopharynx), larynx (glottis and supraglottis), major salivary glands (parotid, submandibular, and sublingual), and nasal cavity and paranasal sinuses are shown in [Tables 1, 2, 3, 4, and 5](#), respectively.⁸ The 2002 AJCC staging classification was used as a basis for the NCCN's treatment recommendations for the pharynx (see [Table 2](#)). Definitions for regional lymph node (N) involvement and spread to distant metastatic sites (M) are uniform except for N staging of nasopharyngeal carcinoma. Definitions for staging the primary tumor (T), based on its size, are uniform for the lip, oral cavity, and oropharynx. In contrast, T stage is based on subsite involvement and is specific to each subsite for the glottic larynx, supraglottic larynx, hypopharynx, and nasopharynx.

In general, stage I or stage II disease defines a relatively small primary tumor with no nodal involvement. Stage III and stage IV cancers include large primary tumors, which may invade underlying structures and/or spread to regional nodes. Distant metastases are uncommon at presentation. In general, the survival rate of patients with locally advanced (stage III or stage IV) disease is less than 50% of the survival rate of patients with early-stage disease.

Management Approaches

Treating the patient with H&N cancer is complex. Each specific site of disease, the extent of disease, and the pathologic findings dictate the appropriate surgical procedure, radiation fields, dose and fractionation, and indications for chemotherapy. Single-modality treatment with surgery or radiotherapy is generally recommended for the approximately 40% of patients who present with early-stage disease (stage I or stage II). The 2 modalities result in similar survival in these individuals. In contrast, for the 60% of patients with locally advanced disease at diagnosis, combined modality therapy is generally recommended.

As in other NCCN practice guidelines, participation in clinical trials is emphasized as a preferred or recommended treatment option, particularly for the population with locally advanced disease. In formulating these H&N guidelines, the panel has endeavored to make them evidence based while providing a statement of consensus as to the acceptable range of treatment options.

Multidisciplinary Team Involvement

The initial evaluation and development of a plan for treating the patient with H&N cancer require a multidisciplinary team of individuals with expertise in all aspects of the special care needs of these patients. Similarly, managing and preventing sequelae of radical surgery, radiotherapy, and chemotherapy require the involvement of various health care professionals familiar with the disease. Follow-up for these sequelae should include a comprehensive H&N examination. Adequate nutritional support can help to prevent severe weight loss in patients receiving treatment for H&N cancer.⁹ Patients should also be encouraged to stop smoking and drinking alcohol, because these habits decrease the efficacy of treatment.^{10,11} Programs using behavioral counseling combined with stop-smoking medications are useful for smoking cessation

(www.surgeongeneral.gov/tobacco/smokesum.htm#Findings). Specific components of patient support and follow-up are listed in the algorithm. Pain and symptom management, social work, and case management are included in this list because of their importance in addressing the late complications of disease and its therapy. The panel also recommends referring to the [NCCN Guidelines for Supportive Care](#).

Comorbidity and Quality of Life

Comorbidity

Comorbidity refers to the presence of concomitant disease (in addition to H&N cancer) that may affect the diagnosis, treatment, and prognosis for the patient.¹²⁻¹⁴ Documentation of comorbidity is particularly important in oncology, because the failure to identify comorbid conditions (such as renal, heart, or liver failure) may result in inaccurate attribution of poor outcomes to the cancer. Comorbidity is known to be a strong independent predictor for mortality in H&N cancer patients.¹⁴⁻²¹ Comorbidity has also been shown to influence costs of care, utilization, and quality of life.²²⁻²⁴ Numerous indices of comorbidity have been developed. Traditional indices include the Charlson index¹³ and the Kaplan-Feinstein index and its modifications.^{14,25} The Adult Comorbidity Evaluation-27 (ACE-27) is specific for H&N cancer and has excellent emerging reliability and validity.^{26,27}

Quality of Life

Health-related quality-of-life issues are paramount in H&N cancer. These tumors have a tremendous effect on basic physiological functions (such as the ability to chew, swallow, and breathe), the senses (taste, smell, and hearing), and uniquely human characteristics (such as appearance and voice). In informal use, the terms health status, function, and quality of life are frequently used interchangeably; however, these terms have important distinctions. *Health status* describes an individual's physical, emotional, and social capabilities and limitations. *Function* and *performance* refer to how well an

individual is able to perform important roles, tasks, or activities. On the other hand, *quality of life* differs, because the central focus is on the *value* (determined by the patient alone) that individuals place on their health status and function.²⁸ An National Institutes of Health (NIH)–sponsored conference²⁹ recommended the use of patient-completed scales to measure quality of life. For H&N cancer-specific issues, the 3 validated measures that have received the most widespread acceptance are: (1) the University of Washington Quality of Life scale (UW-QOL);³⁰ (2) the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC-HN35);³¹ and (3) the Functional Assessment of Cancer Therapy Head and Neck module (FACT-HN).³² A clinician-rated performance scale that has also achieved widespread use is the Performance Status Scale.³³ Numerous other instruments are available to measure generic cancer issues and other aspects of H&N cancer but are beyond the scope of this discussion.

Head and Neck Surgery

Resectable Versus Unresectable Disease

The various site-specific sections of these H&N guidelines pertain to patients with resectable disease. The treatment of patients with locally advanced unresectable disease, metastatic disease, or recurrent disease is addressed in the “Advanced Head and Neck Cancer” section of these guidelines.

The term “unresectable” has resisted formal definition by H&N cancer specialists for decades. No definition of surgical unresectability meets with universal approval. The experience of the surgeon and the support available from reconstructive surgeons, physiatrists, and prosthodontists often strongly influence recommendations. This is particularly common in institutions where few patients with locally advanced H&N cancer are treated. The NCCN member institutions have teams experienced in the treatment of H&N cancer and maintain

the multidisciplinary infrastructure needed for reconstruction and rehabilitation. A patient’s cancer is deemed unresectable if H&N surgeons at NCCN member institutions doubt their ability to remove all gross tumor on anatomic grounds or if they are certain local control will not be achieved after an operation (even with the addition of radiotherapy to the treatment approach). Typically, such tumors densely involve the cervical vertebrae, brachial plexus, deep muscles of the neck, or carotid artery. Unresectable tumors (that is, those tumors unable to be removed without imposing unacceptable morbidity) should be distinguished from those tumors in patients whose constitutional state precludes an operation (even if the cancer is readily resected with few sequelae). Additionally, a subgroup of patients will refuse surgical management, but these tumors should not be deemed unresectable. Although local and regional disease may be surgically treatable, patients with distant metastases are usually treated as though the primary tumor were unresectable. Thus, patient choice or a doctor’s expectations regarding cure and morbidity will influence or determine treatment.

Patients with resectable tumors who can also be adequately treated without an operation represent a very important group. Definitive treatment with radiation therapy (RT) alone or RT combined with chemotherapy may represent equivalent or preferable approaches to resection in these individuals. Although such patients may not undergo surgery, their tumors should not be labeled as unresectable. Their disease is usually far less extensive than disease that truly cannot be removed.

Cervical Lymph Node Dissections

Historically, cervical lymph node dissections have been classified as “radical” or “modified radical” procedures. The less radical procedures preserved the sternocleidomastoid muscle, jugular vein, and spinal accessory nerve. The panel prefers to classify cervical

lymphadenectomy differently, classifying cervical lymph node dissections as either “comprehensive” or “selective.”

A *comprehensive* neck dissection is one that removes all lymph node groups that would be included in a classic radical neck dissection. Whether the sternocleidomastoid muscle, jugular vein, or spinal accessory nerve are preserved does not affect whether the dissection is comprehensive.

Selective neck dissections have been developed based on an understanding of the common pathways for spread of H&N cancers to regional nodes (see [Figure 2](#)).^{34,35} A supraomohyoid neck dissection is designed to remove the nodes most commonly involved with metastases from the oral cavity. A supraomohyoid neck dissection includes nodes found above the omohyoid muscle (level I, level II, level III, and the superior parts of level V). Similarly, a lateral neck dissection removes the nodes most commonly involved with metastases from the pharynx and larynx. A lateral neck dissection includes nodes in level II, level III, and level IV. H&N squamous cell cancer with no clinical nodal involvement rarely presents with nodal metastasis beyond the confines of an appropriate selective neck dissection (<10% of the time).³⁶⁻³⁸ The chief role of neck dissections in these NCCN H&N guidelines is to select patients for possible adjuvant radiotherapy, although there has been some enthusiasm for the use of selective neck dissections as treatment when neck tumor burden is low. In general, patients undergoing selective neck dissection should not have clinical nodal disease. In the guidelines, patients with cervical node metastases who undergo operations are generally treated with comprehensive neck dissections, because often they have disease outside the bounds of selective neck dissections.

If a complete response has been achieved after radiotherapy for N1 disease, all of the panel members are satisfied with the strategy of observing the patient. Panelists also concur that any patient with

residual disease in the neck after radiotherapy should undergo a neck dissection. However, the surgeons had differing opinions regarding the management of the patient with N2 or N3 disease at initial staging who achieves a complete response to radiation. Some will observe such patients while other institutions recommend a planned neck dissection.

Many factors influence survival and locoregional tumor control in patients with H&N cancer. In most NCCN member institutions, patients with extracapsular nodal spread and/or positive surgical margins receive adjuvant chemoradiotherapy after resection.³⁹⁻⁴⁴ The presence of other adverse risk factors—multiple positive nodes (without extracapsular nodal spread), vascular/lymphatic/perineural invasion, T4a primary, and oral cavity primary with positive level 4 nodes—are established indications for postoperative RT. Because patients with these features were also included in the EORTC trial that showed a survival advantage for patients receiving cisplatin concurrent with postoperative radiotherapy compared to radiotherapy alone, the panel elected to add the choice to consider RT plus chemotherapy for these features.

Postoperative Management of High-Risk Disease

The role of chemotherapy in the postoperative management of the patient with adverse prognostic risk factors has been clarified by 2 separate multicenter randomized trials^{45,46} and a combined analysis of data from the 2 trials for patients with high-risk cancers of the oral cavity, oropharynx, larynx, or hypopharynx.⁴⁷ The US Intergroup trial R95-01 randomly assigned patients with 2 or more involved nodes, positive margins, or extracapsular spread of tumor to receive standard postoperative radiotherapy or the same radiotherapy plus cisplatin 100 mg/m² every 3 weeks for 3 doses. The European trial was designed using the same treatment but also included as high-risk factors the presence of perineural or perivascular disease and nodal involvement at levels 4 and 5 from an oral cavity or oropharynx cancer. The US trial

demonstrated statistically significant improvement in locoregional control and disease-free survival but not overall survival, whereas the European trial found significant improvement in survival and the other outcome parameters. Note that randomized trials support several schedules for cisplatin (for example, 50 mg IV weekly⁴⁸ or 6 mg/m² daily⁴⁹), but most centers use high-dose cisplatin (100 mg/m² every 3 weeks).

To better define risk, a combined analysis of prognostic factors and outcome from the 2 trials was performed. This analysis demonstrated that patients in both trials with extracapsular nodal spread of tumor and/or positive resection margins benefited from the addition of cisplatin to postoperative radiotherapy. For those with multiple involved regional nodes without extracapsular spread, there was no survival advantage.⁴⁷ These publications form the basis for the NCCN recommendations in this updated guideline. Chemoradiation is clearly indicated for adverse risk features or extracapsular nodal spread and/or microscopic positive mucosal margins (category 1). The management of patients with multiple nodes only, without extracapsular spread or other adverse risk features, was discussed by the panel and postoperative RT was recommended; however, chemoradiation can be considered based on clinical judgment. The panel noted that the combined analysis was considered exploratory by the authors, because it was not part of the initial protocol design.⁴⁷

Head and Neck Radiotherapy

Radiotherapy for H&N cancer is extremely complex. Only a specially trained team consisting of a radiation oncologist, physicist, dosimetrist, and radiation technologist can achieve optimal results. In addition, modern radiotherapy equipment and techniques should be used. Anatomic, tumor, and clinical circumstances dictate the use of radiation as primary treatment or as an adjuvant to surgery in combination with chemotherapy for H&N cancer. The NCCN radiotherapeutic guidelines

are not all inclusive. Much variation in practice exists among various countries and even within different institutions in the same country.

Radiation Doses

Selection of radiation doses depends on the tumor and neck node size, location of the tumor, and clinical circumstances. In general, primary and gross adenopathy require a total of 70 Gy or more at a dosage of 2.0 Gy/day. In contrast, radiation to low-risk nodal stations in the neck requires a total of 50 Gy or more, also at a dosage of 2.0 Gy/day. Postoperative irradiation is recommended based on the tumor stage, tumor histology, and surgical findings after tumor resection. In general, postoperative RT is recommended for risk features, including multiple positive nodes (without extracapsular nodal spread) or perineural/lymphatic/vascular invasion. Higher doses of radiation (60-65 Gy) are required for microscopic disease to decrease the chances of locoregional failure because of interruption of the normal vasculature, scarring, and relative hypoxia in the tumor bed. The preferred interval between resection and postoperative RT is 6 weeks.

Fractionation

No single fractionation schedule has proven to be best for all tumors. Historically, most radiation oncology departments in the United States deliver treatment once per day, 5 days per week, at 1.8 to 2.0 Gy/fraction. Data strongly indicate some squamous cancers can grow rapidly, especially in the face of cell depletion. The upper dose of 2.0 Gy/fraction, delivering 1000 cGy or greater per week, is now the most commonly used dose among the NCCN member institutions. Thus, the guidelines have been revised to indicate that the dose of 2.0 Gy/fraction is preferred, with the exception of salivary gland tumors, which may have slower cell kinetics.⁵⁰⁻⁵⁴ External radiation doses exceeding 75 Gy at conventional fractionation of 1.8 to 2.0 Gy/day may lead to unacceptable normal tissue injury.

Most of the published studies with concurrent chemoradiation have used conventional fractionation at 2.0 Gy per fraction to 70 Gy or more in 7 weeks with single-agent cisplatin given every 3 weeks at 100 mg/m². Use of other fraction sizes (for example, 1.8 Gy, conventional), multiagent chemotherapy, or altered fractionation with chemotherapy has been evaluated, but there is no consensus on the optimal approach. In general, the use of concurrent chemoradiation carries a high toxicity burden, and altered fractionation or multiagent chemotherapy will likely further increase the toxicity burden. For any chemotherapeutic approach, close attention should be paid to published reports for the specific chemotherapy agent, dose, and schedule of administration. Chemoradiation should be performed by an experienced team and should include substantial supportive care.

Altered fractionation includes accelerated treatment delivering more than 1000 cGy per week and hyperfractionation. The biological rationale for using hyperfractionation is based on the discovery by Withers and colleagues of a large, consistent difference in repair capacity of late and early responding tissues.^{55,56} Accelerated schedules attempt to compensate for rapid tumor proliferation by compressing the time-dose schedule. A number of phase II trials have suggested an advantage to the use of altered fractionation schemes in various H&N cancers.⁵⁷

Two large, randomized clinical trials have reported improved locoregional control using altered fractionation. The European Organization for Research and Treatment of Cancer (EORTC) protocol 22791 compared hyperfractionation (1.15 Gy twice daily, or 80.5 Gy over 7 weeks) with conventional fractionation (2 Gy once daily, or 70 Gy over 7 weeks) in the treatment of T2,T3,N0-1 oropharyngeal carcinoma. At 5 years, there was a statistically significant increase in local control in the hyperfractionation arm (38% versus 56%; $P=.01$) and no increase in late complications.⁵⁸ A long-term follow-up analysis

has also demonstrated a small survival advantage for hyperfractionation ($P=.05$).⁵⁹ Another EORTC protocol (22851) compared accelerated fractionation (1.6 Gy 3 times daily, or 72 Gy over 5 weeks) with conventional fractionation (1.8-2.0 Gy once daily, or 70 Gy over 7-8 weeks) in various intermediate to advanced H&N cancers (excluding cancers of the hypopharynx). Patients in the accelerated fractionation arm did significantly better with regard to locoregional control ($P=.02$) at 5 years. Disease-specific survival showed a trend ($P=.06$) in favor of the accelerated fractionation arm. Acute and late toxicity were increased in this fractionation arm, however, raising questions about the net advantages of accelerated fractionation.⁶⁰

In the United States, the Radiation Therapy Oncology Group (RTOG) reported the initial 2-year results and subsequent mature results (after a median follow-up of 8.5 years) of a large phase III clinical trial (protocol 90-03) comparing hyperfractionation and 2 variants of accelerated fractionation with standard fractionation.^{61,62}

After 2 years of follow-up, both accelerated fractionation with a concomitant boost (AFX-C) and hyperfractionation were associated with improved locoregional control and disease-free survival compared with standard fractionation. However, acute toxicity was increased. No significant difference was demonstrated in the frequency of grade 3 or worse late effects reported at 6 to 24 months after treatment start, among the various treatment groups. Long-term follow-up confirmed a statistically significant improvement in locoregional control with either AFX-C or hyperfractionation compared to standard fractionation. However, neither disease-free survival nor overall survival were significantly improved. Severe late toxicity was more frequently observed with AFX-C. A meta-analysis of updated patient data analyzing the effect of hyperfractionated or accelerated radiotherapy on survival of patients with head and neck cancer was recently published. This meta-analysis included 15 randomized trials that had standard

fractionation as the control group. An absolute survival benefit of 3.4% at 5 years (HR 0.92; 95% CI, 0.86-0.97; $P=0.003$) was reported. This benefit, however, was limited to patients younger than 60 years of age.⁶³ Consensus regarding altered fractionation schedules with concomitant boost or hyperfractionation for stage III or IV oral cavity, oropharynx, supraglottic larynx, and hypopharyngeal squamous cell cancers has not yet emerged among NCCN member institutions.⁶³⁻⁶⁵

Brachytherapy

Brachytherapy is used less often because of improved local control obtained with concurrent chemo/RT. However, brachytherapy still has a role primarily for lip cancer, cancer of the oral cavity, and oropharynx. Several European and North American medical centers have had extensive experience with brachytherapy.⁶⁶⁻⁷⁴ The success of brachytherapy techniques is partly dependent on the training, experience, and skills of the implant team.

Intensity-Modulated Radiation Therapy

The intensity of the radiation beam can be modulated in order to decrease doses to normal structures without compromising the doses to the target. Intensity-modulated radiation therapy (IMRT) is an advanced form of 3-D conformal RT with enormous potential to precisely target and to enable escalation of the radiation dose; the net effect is decreased radiation exposure to normal structures. During the past several years, an exponential growth has occurred in the use of IMRT for various malignancies, in particular, prostate and H&N cancers.

Several institutions have conducted phase II studies to explore the use of beam modulation in H&N cancer. The objective data from these institutions consistently show a decrease in acute and late toxicities without compromising tumor control.⁷⁵⁻⁸² However, no phase III studies have been done to substantiate the results from phase II studies.

RTOG 0022 and RTOG 0225 are single-arm studies exploring the feasibility of IMRT in the treatment of oropharyngeal and nasopharyngeal cancer.^{83,84} These trials are currently ongoing. At present, IMRT is not the standard of care for the treatment of H&N cancers; however, selected patients may benefit from this new technology if they are treated in centers that have expertise in IMRT.

Three-dimensional conformal techniques may be used depending on the stage, tumor location, physician training/experience, and available physics support. IMRT techniques are an area of active investigation among the NCCN institutions and others.⁸⁵⁻⁸⁸ Target delineation and optimal dose distribution require special training in H&N imaging, a thorough understanding of patterns of disease spread, and special training in IMRT techniques. Standards for target definition, dose specification, fractionation (with and without concurrent chemotherapy), and normal tissue constraints should emerge within the next few years.

Paranasal Tumors (Maxillary and Ethmoid Sinus Tumors)

Tumors of the paranasal sinuses are rare and often asymptomatic until late in the course of their disease. Although the most common histology for these tumors is squamous cell carcinoma, multiple histologies have been reported including sarcoma (excluding rhabdomyosarcoma), lymphoma, adenocarcinoma, esthesioneuroblastoma (also known as olfactory neuroblastoma), small cell neuroendocrine and undifferentiated carcinoma (sinonasal undifferentiated carcinoma [SNUC]).⁸⁹⁻⁹¹ Locoregional control and incidence of distant metastasis are dependent on both T stage and tumor histology. However, T stage remains the most reliable predictor of survival and local regional control (see [Table 5](#)).

Management of Ethmoid Sinus Cancer

Patients with early-stage cancer of the ethmoid sinus are asymptomatic. These neoplasms are often found after a routine nasal polypectomy or during the course of a nasal endoscopic procedure. For a patient with gross residual disease who has had a nasal endoscopic surgical procedure, the preferred treatment is complete surgical excision of the residual tumor. This procedure often entails an anterior craniofacial resection to remove the Cribriform plate and to ensure clear surgical margins. Most patients affected by ethmoid sinus cancer present after having had an incomplete excision. The patient who is diagnosed after incomplete excision (for example, polypectomy, endoscopic surgical procedure)—and has no documented residual disease on physical examination, imaging, and endoscopy—should be treated in a similar fashion if feasible. If no adverse pathologic factors are found, this treatment ensures clear surgical margins and obviates the need for postoperative radiotherapy. However, RT may be used as definitive treatment in patients if pre-biopsy imaging studies and nasal endoscopy demonstrate that the superior extent of the disease does not involve the skull base. Systemic therapy should be part of the overall treatment for patients with SNUC, esthesioneuroblastomas, or small cell neuroendocrine histologies.⁹²⁻⁹⁶

Treatment of Maxillary Sinus Tumors

Complete surgical resection for all T stages followed by postoperative therapy remains a cornerstone of treatment. In addition, RT or chemotherapy/RT (category 2B) should be considered for T1-2, N0 tumors with perineural invasion. Neck dissection is indicated in the treatment of the clinically positive neck. Finally, a combination of chemotherapy and RT or definitive RT alone (without chemotherapy) may be used to treat surgically unresectable disease. Patients with maxillary sinus tumors who have adverse characteristics (for example, positive margins, perineural invasion, or extracapsular nodal spread) should receive surgical resection (if possible) followed by

chemotherapy/RT to the primary and neck (category 2B). Participation in clinical trials is favored for patients with malignant tumors of the paranasal sinuses.

Salivary Gland Tumors

Salivary gland tumors can arise in the major salivary glands (parotid, submaxillary, or sublingual salivary glands) or in one of the minor salivary glands, which are widely spread throughout the aerodigestive tract. Many minor salivary gland tumors are located on the hard palate. Even though many salivary gland tumors are generally benign, approximately 20% of the parotid gland tumors are malignant; the incidence of malignancy in submandibular and minor salivary gland tumors is approximately 50% and 80%, respectively. These malignant tumors constitute a broad spectrum of histologic types, including mucoepidermoid, acinic, adenocarcinoma, adenoid cystic carcinoma, malignant myoepithelial tumors, and squamous carcinoma. The primary diagnosis of squamous carcinoma of the parotid gland is rare; however, the parotid is a frequent site of metastasis from skin cancer.⁹⁷ Prognosis and tendency to metastasize vary among these histologic types. Major prognostic factors are histologic grade, tumor size, and local invasion (see [Table 4](#)).

Treatment

The major therapeutic approach for salivary gland tumors is adequate and appropriate surgical resection. Surgical intervention requires careful planning and execution, particularly in parotid tumor surgery because of the presence of the facial nerve within the gland, which should be preserved if the nerve is not directly involved by the tumor. Most of the parotid gland tumors are located in the superficial lobe, and if the facial nerve is functioning preoperatively, the nerve can be preserved in most patients. The facial nerve should be sacrificed if there is preoperative facial nerve involvement with facial palsy or if there is direct invasion of the tumor into the nerve where the tumor

cannot be separated from the nerve. Malignant deep lobe parotid tumors are quite rare; however, they are generally a challenge for the surgeon where the patient may require superficial parotidectomy and identification and retraction of the facial nerve to remove deep lobe parotid tumor.

Most malignant deep lobe parotid tumors will require postoperative RT because of the limitations of surgical margins in the resection of these tumors. RT is used in an adjuvant setting for tumors with adverse characteristics; chemotherapy/RT (category 2B) can also be considered. Adjuvant radiotherapy is indicated after resection if adverse characteristics are present, such as positive or close margins, neural or perineural infiltration (often seen with adenoid cystic carcinomas), or lymph node metastases. Adjuvant RT is also recommended if the tumor is intermediate or high grade, or if lymphovascular invasion or extracapsular spread is present.⁹⁷

For unresectable tumors, RT alone (without chemotherapy) is used as definitive treatment; however, chemoradiation (cisplatin) is also an option (category 2B). The panel was not in agreement regarding chemoradiation, because there are no published trials of this approach for unresectable salivary gland tumors. Chemotherapy may be used for palliation in advanced disease. Various agents (for example, paclitaxel) and combinations (for example, cisplatin, doxorubicin, cyclophosphamide; carboplatin and paclitaxel) have been shown in small series to be active for some salivary gland malignant histologies.

Carcinoma of the Lip

The guidelines for squamous cell carcinoma of the lip generally follow accepted clinical practice patterns established over several decades. No randomized clinical trials have been conducted that can be used to direct therapy. In general, treatment strategies are determined by anticipated functional and cosmetic results. The incidence of lymph

node metastases, especially in early-stage lower lip cancer, is low, averaging less than 10%. The risk of lymph node metastases is related to the location, size, and grade of the primary tumor. Elective neck dissection or neck irradiation can be avoided in patients with early-stage disease and a clinically negative neck. Treatment recommendations are based on clinical stage, medical status of the patient, and patient preference.

Workup and Staging

The workup for patients with squamous cell carcinoma of the lip consists of a physical examination, biopsy, and chest imaging. A dental Panorex (panoramic x-ray) and computerized tomographic (CT) scan or magnetic resonance imaging (MRI) are done if bone invasion is suspected. The AJCC TNM staging system reflects tumor size, extension, and nodal disease (see [Table 1](#)). This system does predict the risk for local recurrence. The location of the primary tumor also is predictive. Tumors in the upper lip and commissural areas have a higher incidence of lymph node metastases at the time of diagnosis. Systemic dissemination is rare, occurring in approximately 10% to 15% of patients, most often in those with uncontrolled locoregional disease.

Treatment of the Primary

The treatment of lip cancer is governed by the stage of the disease. The choice of a local treatment modality is based on the expected functional and cosmetic outcome. In early-stage cancers, surgery and radiation are equivalent options in terms of local control. Some very small or superficial cancers are managed more expeditiously with a surgical excision without resultant functional deformity or an undesired cosmetic result. On the other hand, a superficial cancer that occupies most of the lower lip, for example, would be best managed with RT. Some advanced lip cancers can cause a great deal of tissue destruction and secondary deformity. Surgery is a more viable option in this clinical setting. Surgery is also the local modality of choice for

advanced cancers with extension into the bone. Patients with resectable T3, N0; T4a, N0; or any T, N1-3 disease who are a poor surgical risk can be treated with definitive RT (with or without brachytherapy) or with chemotherapy/RT.

Management of the Neck

The management of the neck is also governed by stage, but the location of the tumor should also be taken into account. For example, the lymphatics of the upper lip are very extensive. Thus, tumors in this location are more apt to spread to deep superior jugular nodes. The position of the tumor along the lip also can be helpful in predicting the pattern of lymph node spread. A midline location can place a patient at higher risk for contralateral disease. For patients with advanced disease (T3, T4a) and an N0 neck, a unilateral or bilateral selective neck dissection should be considered. When a patient presents with palpable disease, care is taken to ensure all appropriate nodal levels are dissected.

Radiation

Radiotherapy, when used as definitive treatment, may consist of external-beam RT or brachytherapy alone or in combination, depending on the size of the tumor. The dose required also depends on tumor size, but doses of 66 Gy or more are adequate to control the disease. For T1-2, N0 lesions, the total dose of external-beam RT may be decreased to 50 Gy or more when given in conjunction with brachytherapy. In the adjuvant setting, doses of 60 Gy or more are required, depending on the pathologic features. In both definitive and adjuvant settings, the neck is treated with doses that address adverse features, such as positive margins or invasion (perineural, vascular, and/or lymphatic).

Follow-up/Surveillance

Follow-up for patients with treated cancers of the lip relies solely on periodic physical examinations every 1 to 3 months during year 1, every 2 to 4 months during year 2, every 4 to 6 months during years 3 to 5, and every 6 to 12 months thereafter.

Cancer of the Oral Cavity

The oral cavity includes the following subsites: buccal mucosa, upper and lower alveolar ridge, retromolar trigone, floor of the mouth, hard palate, and anterior two thirds of the tongue. There is a rich lymphatic supply to the area, and initial regional node dissemination is to nodal groups at level I, level II, and level III.

Regional node involvement at presentation is evident in approximately 30% of patients, but the risk varies according to subsite. For example, primaries of the alveolar ridge and hard palate infrequently involve the neck, whereas occult neck metastasis is common (50% to 60%) in patients with anterior tongue cancers. In general, all patients undergo treatment of the neck with either unilateral or bilateral selective neck dissection or if primary RT is chosen for treatment of T1-2, N0 disease, at least 50 Gy is given to the neck at risk.

Workup and Staging

Imaging studies to evaluate mandibular involvement and a careful dental evaluation (including Panorex, as indicated) are particularly important for staging (see [Table 1](#)) and planning therapy for oral cavity cancers in addition to a physical examination, biopsy, and chest imaging.

Treatment

Surgery and RT represent the standards of care for early-stage and locally advanced resectable lesions in the oral cavity. The specific treatment is dictated by the TN stage and, if N0 at diagnosis, by the risk

of nodal involvement. Multidisciplinary team involvement is particularly important for this site because of the critical physiologic functions of mastication, deglutition, and articulation of speech, which may be affected. Most panelists prefer surgical therapy for resectable oral cavity tumors. Advances in reconstruction using microvascular techniques have led to improved functional outcomes for patients with locally advanced disease.

Postoperative chemotherapy/RT is recommended (category 1) for all patients with resected oral cavity cancers with the adverse pathologic features of extracapsular nodal spread and/or a positive mucosal margin⁴⁵⁻⁴⁷ (category 1). For other risk features—such as pT3 or pT4 primary, N2 or N3 nodal disease, nodal disease in levels IV or V, or perineural invasion or vascular embolism—clinical judgment should be utilized in the consideration of adding chemotherapy to RT or treating with RT alone. The concept of organ preservation using chemotherapy in the initial management of locally advanced resectable disease has not been studied in trials specifically designed for this site.

Follow-up/Surveillance

Follow-up for patients with treated cancers of the oral cavity consists of periodic physical examinations, chest imaging as clinically indicated, and, if the thyroid was irradiated, measurement of thyrotropin (TSH) every 6 to 12 months. Speech, hearing, & swallowing evaluation and rehabilitation may be useful, as indicated. Smoking cessation counseling and dental follow-up are also recommended.

Cancer of the Oropharynx

The oropharynx includes the base of the tongue, tonsils, soft palate, and posterior pharyngeal wall. The oropharynx is extremely rich in lymphatics. Depending on the subsite involved, 15% to 75% of patients present with lymph node involvement. Efforts to improve the outcome of

patients with locally advanced disease are ongoing. Participation in clinical trials is strongly recommended.

Workup and Staging

A multidisciplinary consultation is encouraged. Accurate staging depends on a thorough physical examination coupled with appropriate imaging studies. CT with contrast or MRI is recommended for the primary and the neck; chest imaging is also recommended. Examination of the H&N region should include an examination under anesthesia with endoscopy. Bronchoscopy and esophagoscopy are also recommended because of the relative frequency of simultaneous second primaries. A dental evaluation is recommended, with Panorex studies as indicated. Speech and swallowing evaluation may be useful, as indicated. Testing for high-risk oncogenic HPV types (HPV 16, -18, -31, -33, -35) is recommended (using either polymerase chain reaction [PCR] or in situ hybridization [ISH]) because of the strong association with oropharyngeal squamous cell carcinoma and the increasing incidence of cancers of the lingual and palatine tonsils.^{4,98,99} In patients with oropharyngeal carcinoma, recent data indicate that those with HPV-associated cancers have improved response to treatment and improved survival when compared with HPV-negative tumors.¹⁰⁰

Treatment

The treatment algorithm has been divided into 3 staging categories: (1) T1-2, N0-1; (2) T3-4a, N0; and (3) T3-4a, N+ or any T, N2-3. Early-stage (T1-2, N0-1) oropharyngeal cancers may be treated with primary surgery including neck dissection, as indicated, or with definitive radiotherapy (category 2B). The panel members strongly disagreed about the third option of RT plus systemic therapy (category 3). Surgery is also indicated for salvage in cases of residual or recurrent disease after definitive radiotherapy. Radiotherapy alone is appropriate management for patients with a T1 or T2 primary and N1 disease. For patients treated surgically who have adverse pathologic features that

warrant post-operative RT, the optimal time interval between resection and RT is not more than 6 weeks. Adjuvant chemotherapy/RT is recommended (category 1) for adverse pathologic features of extracapsular nodal spread and/or positive mucosal margin.¹⁰¹ For other risk features—such as pT3 or pT4 primary, N2 or N3 nodal disease, nodal disease in levels IV or V, or perineural invasion or vascular embolism—clinical judgment should be utilized in the consideration of adding chemotherapy to RT or treating with RT alone.

For advanced resectable disease (T3-4a, any N or any T, N2-3), there are 3 treatment approaches in the algorithms, in addition to enrollment in a multimodality clinical trial that includes function evaluation. The three approaches are : (1) concurrent systemic therapy/RT (for example, cisplatin [category 1] preferred) (salvage surgery is used for managing residual or recurrent disease);¹⁰¹ (2) surgery with neck dissection and reconstruction, as indicated, followed by radiotherapy with or without chemotherapy as dictated by the presence of pathologic adverse features; or (3) induction chemotherapy followed by chemo/RT (category 3) for which there was strong disagreement among panel members.¹⁰¹⁻¹⁰⁶

For the concurrent systemic therapy/RT approach, all patients are evaluated at completion of treatment for response in the primary site and in the neck. For patients with nodal involvement at initial staging who achieve a complete response in the primary and the neck, subsequent management is based on initial nodal stage. Patients who had N1 disease are observed, while patients who had N2 or N3 disease can be either observed or undergo a planned neck dissection. This is an area of controversy among NCCN institution surgeons. However, if residual neck disease is present (and the primary is controlled), there is uniform agreement to proceed to neck dissection. Patients with residual tumor in the primary should be offered salvage surgery with neck dissection as indicated.

Concurrent systemic therapy/RT with cisplatin (category 1) is preferred for treatment of locally advanced (T3-4a or N2-3) cancer of the oropharynx. The use of induction chemotherapy added to chemoradiotherapy (termed sequential therapy) is an area of controversy among the NCCN panelists. Most randomized trials of induction chemotherapy followed by radiotherapy or surgery (which were published in the 1980s and 1990s) did not demonstrate a survival advantage. Induction chemotherapy had no effect on local control; however, in many trials, it did reduce the distant metastatic rate. A rationale for reevaluating induction chemotherapy added to concurrent chemotherapy/RT is to reduce distant metastases as a site of failure now that improved local control can be achieved with concurrent chemotherapy/RT. Results from 3 phase III trials—that compared induction cisplatin plus infusional 5-FU with or without the addition of a taxane (docetaxel or paclitaxel)—showed significantly improved outcomes (response rates, disease-free survival or overall survival depending on the trial) for patients in the 3 drug induction group compared to those receiving 2 drugs (cisplatin plus 5-FU).^{104,106,107}

Taken together, these results show that a more effective triplet combination has been identified compared to the standard of cisplatin plus 5-FU used in the induction trials of the 1980s and 1990s. However, a survival advantage over concurrent chemoradiation has yet to be demonstrated. The NCCN panel uniformly agreed that clinical trials should be performed to directly answer the question of whether or not induction chemotherapy added to systemic therapy/RT improves survival in patients with locally advanced cancer of the oropharynx and other specified sites. Such trials are in progress, and the panel members uniformly agreed that patients should be enrolled in these trials. The panel members differed in their opinion as to whether or not this treatment should be considered a standard treatment option. A small minority of panel members do advocate this approach. This disagreement is reflected by a category 3 recommendation in the algorithms.

Altered fractionation is preferred when radiotherapy is used definitively for selected T1, N1 or T2, N0-1 tumors. For patients not receiving concurrent chemoradiation, altered fractionation is preferred. The recommended schedules are: (1) concomitant boost accelerated radiotherapy consisting of 72 Gy delivered over 6 weeks using 1.8 Gy/fractions to the large volume and 1.5 Gy boost as the second daily fraction 6 hours later during the last 12 treatments to a smaller volume; or (2) hyperfractionation consisting of 81.6 Gy given in 7 weeks with 1.2 Gy/fractions twice daily 6 hours apart. This change from standard radiotherapy for large lesions was made on the basis of the results of the RTOG 9003 protocol, which detected a local control advantage for patients who were treated with hyperfractionation and concomitant boost versus those treated with standard fractionation or accelerated fractionation with a break in the treatment schedule.^{61,62} Increased acute toxicity was demonstrated in both altered fractionation schedules when compared with standard radiotherapy. The concomitant boost schedule resulted in prolongation of acute symptoms 6 to 24 months after the initiation of treatment, but no significant difference was demonstrated in the frequency of late effects among schedules. In addition to the RTOG trial, 4 other randomized trials have demonstrated improved outcomes with hyperfractionation.^{58,108}

Salvage Surgery

Patients with advanced carcinoma of the oropharynx who undergo nonsurgical treatment, such as concurrent chemotherapy and RT, need very close follow-up both to evaluate for local recurrence and to assess for ipsilateral or contralateral neck recurrence. The patients who do not respond completely to chemotherapy/RT require salvage surgery to the primary and the neck. However, all panelists emphasized that it may be difficult to detect local or regional recurrence due to radiation-related tissue changes and, this may result in a delayed diagnosis of persistent or recurrent disease. The panelists also emphasized the increased risk of complications when salvage surgery is attempted. Additionally,

laryngectomy is occasionally required to obtain clear surgical margins or to prevent aspiration in patients with advanced oropharyngeal cancer. Some of these patients may require microvascular free flap reconstruction to cover the defects at the primary site. The patients undergoing neck dissection may develop complications related to delayed wound healing, skin necrosis, or carotid exposure. The patients requiring salvage laryngectomy may have high incidence of pharyngocutaneous fistula and may require either a free flap reconstruction of the laryngopharyngeal defect or if the pharynx can be closed primarily, buttressing the suture line with myocutaneous flap.

Follow-up/Surveillance

The follow-up of patients treated for oropharyngeal cancer continues to rely on physical examination. Chest imaging is recommended as clinically indicated as surveillance for second primary tumors. Post-treatment baseline imaging (3-6 months) of the primary and neck is recommended for disease that is difficult to follow (ie, patients who have had chemoradiation not surgery); repeat imaging if indicated by signs/symptoms on physical examination. If PET is used for follow-up, the first scan should be performed at not less than 12 weeks after treatment to reduce the false-positive rate. Patients whose thyroid gland has been irradiated should have TSH levels monitored every 6 to 12 months. Speech, hearing, & swallowing evaluation and rehabilitation and dental evaluation should be done as indicated. Smoking cessation counseling is also recommended.

Cancer of the Hypopharynx

The hypopharynx extends from the superior border of the hyoid bone to the lower border of the cricoid cartilage and is essentially a muscular, lined tube extending from the oropharynx to the cervical esophagus. For staging purposes, the hypopharynx is divided into 3 areas: (1) the pyriform sinus (the most common site of cancer in the hypopharynx);

(2) the lateral and posterior pharyngeal walls; and (3) the postcricoid area.

Workup and Staging

A multidisciplinary consultation is encouraged. Accurate staging depends on a thorough physical examination coupled with appropriate imaging studies, such as CT with contrast or MRI of the primary and neck and chest imaging. Examination of the H&N region should include an examination under anesthesia with endoscopy. Bronchoscopy and esophagoscopy are also recommended because of the relative frequency of simultaneous second primaries. A dental evaluation is recommended. Speech and swallowing evaluation should be performed in most patients.

At the time of diagnosis, approximately 60% of patients with cancer of the hypopharynx have locally advanced disease with spread to regional nodes. Furthermore, autopsy series have shown a high rate of distant metastases (60%) involving virtually every organ.¹⁰⁹ Thus, the prognosis for patients with cancer of the hypopharynx is quite poor. Despite standard radical surgery and radiotherapy, the persistent or recurrent locoregional disease and distant dissemination contribute to the poor outcome for these patients.

Treatment

Patients with resectable disease are divided into 2 groups: those patients with early-stage cancer (T1, N0; small T2, N0) who do not require a total laryngectomy and those patients with advanced resectable cancer (T1, N+; T2-4a, any N) who do require laryngectomy. The surgery and radiotherapy options for the former group represent a consensus among the panel members. For patients treated initially with definitive RT (without chemotherapy), surgery is indicated for residual neck disease. For patients with a complete response of the neck, observation is recommended.

Patients with more advanced disease (defined as T1, N+; T2-3, any N) (see [Table 2](#)) requiring total laryngectomy and partial or total pharyngectomy may be managed with 3 approaches in addition to enrollment in a multimodality clinical trial that includes function evaluation: (1) induction chemotherapy followed by definitive RT if a complete response was achieved at the primary site (category 1)¹¹⁰ or followed by concurrent chemoradiation if a partial response was achieved at the primary site (category 2B) or followed by surgery if the response to induction chemotherapy was less than partial; (2) surgery with neck dissection and post-operative radiation or chemoradiation as dictated by pathologic risk features; or (3) concurrent chemotherapy/RT cisplatin preferred (category 2B). Note that the panel uniformly supports the recommendation of induction chemotherapy (category 1) followed either by definitive RT (category 1) or by chemoradiation (category 2B) based upon the response achieved at the primary site for patients with (1) T1, N+, or (2) T2-3, any N disease.¹¹⁰ The standard induction regimen is docetaxel, cisplatin, and 5-FU (TPF).^{106,107,111} Given the functional loss resulting from this surgery and the poor prognosis, participation in clinical trials is emphasized.

The recommendation of the induction chemotherapy (cisplatin and 5-FU)/definitive radiotherapy option is based on the results of an EORTC randomized trial.¹¹⁰ This trial enrolled 194 eligible patients with stage II, stage III, or stage IV resectable squamous cell carcinoma of the pyriform sinus (152 patients) and aryepiglottic fold (42 patients), excluding patients with T1 or N2c disease. Patients were randomly assigned either to laryngopharyngectomy and postoperative radiotherapy, or to chemotherapy with cisplatin and 5-FU for a maximum of 3 cycles, followed by definitive radiotherapy. In contrast to a similar regimen used for laryngeal cancer, a complete response to induction chemotherapy was required in order to proceed with definitive radiotherapy. The published results showed equivalent survival, with median survival duration and 3-year survival rate of 25 months and

43%, respectively, for the surgery group versus 44 months and 57%, respectively, for the induction chemotherapy group. A functioning larynx was preserved in 42% of patients who did not undergo surgery. Local or regional failure rates did not differ between the surgery-treated patients and chemotherapy-treated patients, although the chemotherapy recipients did demonstrate a significant reduction in distant metastases as a site of first failure ($P=.041$). Adherence to the requirements for complete response to chemotherapy and for inclusion of only patients with the specified TN-stage are emphasized.

As noted in the algorithm, surgery is recommended if less than a partial response occurs after 3 cycles of induction chemotherapy. In this situation, or when primary surgery is the selected management path, postoperative chemotherapy/RT is recommended (category 1) for adverse pathologic features of extracapsular nodal spread and/or positive mucosal margin. For other risk features—such as pT3 or pT4 primary, N2 or N3 nodal disease, nodal disease in levels IV or V, or perineural invasion or vascular embolism—clinical judgment should be utilized in the consideration of adding chemotherapy to RT or treating with RT alone.

Options for patients with T4a, any N disease include (1) surgery plus comprehensive neck dissection (preferred) followed by adjuvant chemotherapy/RT (category 1); (2) multimodality clinical trials that include function evaluation; (3) concurrent systemic therapy/RT (category 3); or induction chemotherapy followed by chemotherapy/RT or RT (category 3).

Follow-up/Surveillance

The recommended schedule of follow-up evaluations for patients with cancer of the hypopharynx is the same as for patients with cancer of the oropharynx.

Occult Primary Cancer

When patients present with metastatic tumor in a neck node and no primary site can be identified after appropriate investigation, the tumor is defined as an “occult” or unknown primary cancer; this is an uncommon disease, accounting for about 5% of patients presenting to referral centers. While patients with very small tonsil and tongue base cancers frequently present with enlarged neck nodes and are classified as an “unknown primary”, most will be diagnosed by directed biopsy and tonsillectomy. H&N cancer of unknown primary site is a highly curable disease. After appropriate evaluation and treatment, most patients experience low morbidity and many will be cured. The primary tumor becomes apparent on follow-up only in a few cases. Patients and oncologists are often concerned when the primary cancer cannot be found. This concern may lead to intensive, fruitless, and costly diagnostic maneuvers.

Most patients older than 40 years who present with a neck mass prove to have metastatic cancer. The source of the lymphadenopathy is almost always discovered in the course of a complete H&N examination, which should be performed on all patients with neck masses before other studies are initiated. The following should be assessed during office evaluation: 1) antecedent history of malignancy and 2) prior excision, destruction, or regression of cutaneous lesions.

Workup

When patients present with a neck mass, fine-needle aspiration (FNA) should be the first study undertaken. Needle aspiration generally guides management and treatment planning. Core or open biopsy should be avoided, because it may alter or interfere with subsequent treatment.

When a needle biopsy demonstrates squamous cell carcinoma, adenocarcinoma, or anaplastic epithelial cancer and no primary site has been found, additional studies are needed. HPV-16 and Epstein

Barr Virus encoded RNA (EBER) testing are suggested for squamous cell or undifferentiated histology.^{98,99,112-114}

Nasopharyngolaryngoscopy, chest imaging, and either CT scan with contrast or MRI with gadolinium should be performed. A fused PET/CT scan should only be done if other tests do not reveal a primary. PET can be used to confirm clinical impressions, detect an unknown primary, and for surveillance. Other imaging studies have very low yield and should not be undertaken.

If the FNA proves nondiagnostic, then repeat FNA, core biopsy, or open biopsy may be needed. Open biopsy should not be performed unless the patient is prepared for definitive surgical management of the malignancy documented in the operating room. This management may entail a formal neck dissection. Therefore, an open biopsy of an undiagnosed neck mass should not be undertaken lightly, and patients should be thoroughly apprised of the potential sequelae.

When the imaging studies and thorough office examination (including examination of the nasopharynx, oropharynx, larynx, and hypopharynx and attention to the skin) do not reveal a primary tumor, then an examination under anesthesia should be performed. Mucosal sites should be inspected and examined. Appropriate endoscopies with directed biopsies of likely primary sites are recommended, but they seldom disclose a primary cancer. Many primary cancers are identified after tonsillectomy. However, the clinical significance of such tumors is uncertain. When patients have been treated without tonsillectomy, only a few develop a clinically significant primary tumor.

Treatment

Comprehensive neck dissection (including level I-III) is recommended for all patients with adenocarcinoma. If the metastatic adenocarcinoma presents high in the neck, parotidectomy may be included with the neck dissection. NCCN member institutions have major disagreements about

the management of patients with poorly differentiated or nonkeratinizing squamous cell, anaplastic cancer of unknown primary site, or other uncommon histologies. Some members believe such patients should be managed with comprehensive neck dissection (levels I-V), whereas others believe the following options can be used (all the following are category 3): (1) chemoradiation; (2) primary RT; or (3) induction chemotherapy followed by chemoradiation.

If an N1 node was excised in an open biopsy, then most NCCN institutions recommend radiation that encompasses the potential primary sites as determined by the neck node levels involved and both necks. Some institutions would radiate the neck only (category 3). When a neck dissection is performed, postoperative radiation and concurrent chemotherapy are recommended by all institutions if extracapsular nodal spread is present or if the patient presented with N2 or N3 disease. Some NCCN institutions would radiate the neck only (category 3), whereas most institutions would also radiate the likely occult primary sites based on the level of nodes involved; chemotherapy/RT to the likely primary site and the neck is also an option (category 2B). Extending the radiation field to encompass all possible mucosal primary sites is controversial and the source of much disagreement. There is little evidence to support a survival benefit from radiation to all possible primary sites.

Cancer of the Larynx

The larynx is divided into 3 regions: supraglottis, glottis, and subglottis. The distribution of cancers is as follows: 30% to 35% in the supraglottic region, 60% to 65% in the glottic region, and 5% in the subglottic region. The AJCC staging classification for laryngeal primary tumors is determined by the number of subsites involved, vocal cord mobility, and the presence of metastases (see [Table 3](#)).

The incidence and pattern of metastatic spread to regional nodes varies with the primary region. More than 50% of patients with supraglottic primaries present with spread to regional nodes because of an abundant lymphatic network that crosses the midline. Bilateral adenopathy is not uncommon with early-stage primaries. Thus, supraglottic cancer is often locally advanced at diagnosis. In contrast, the lymphatic drainage of the glottis is sparse and early-stage primaries rarely spread to regional nodes. Because hoarseness is an early symptom, most glottic cancers are in an early stage at diagnosis. Thus, glottic cancers have an excellent cure rate—in the range of 80% to 90%. As with other cancers of the H&N, nodal involvement decreases survival rates by approximately 50%.

Workup and Staging

The evaluation of the patient to determine tumor stage is similar for glottic and supraglottic primaries. In both sites, the algorithms now explicitly recommend CT scan with contrast and thin cuts through the larynx, or MRI of the primary and neck; chest imaging is also recommended. These imaging tests are considered particularly important for accurate staging. Examination under anesthesia with endoscopy is also recommended. A barium esophagram is recommended for patients with subglottic tumors. Speech, swallowing, and dental evaluation should be done if indicated. Multidisciplinary consultation is particularly important for both sites because of the potential for loss of speech and, in some instances, for swallowing dysfunction.

Treatment

The treatment of patients with laryngeal cancer is divided into 3 categories: (1) tumors of the glottic larynx, (2) tumors of the supraglottic larynx without positive nodes (N0), and (3) tumors of the supraglottic larynx with positive nodes (N+).

For patients with carcinoma in situ of the larynx, recommended treatment options include endoscopic removal (stripping, laser) or RT. NCCN also encourages participation in clinical trials. For invasive cancer, surgery (partial laryngectomy through either endoscopic or open approaches) and radiotherapy are equally effective for early-stage glottic or supraglottic cancers. The choice of treatment modality depends on functional outcome, the patient's wishes, reliability of follow-up, and general medical condition.

Management of the neck is dictated by the risk of occult nodal spread. Participation in clinical trials is preferred for patients with locally advanced laryngeal cancer requiring total laryngectomy. Resectable, advanced-stage supraglottic and glottic primaries can be managed surgically with a combined modality approach consisting of either (1) total laryngectomy, or (2) concurrent systemic therapy/RT cisplatin (category 1) preferred.¹¹⁵ In patients with laryngeal cancer, radiotherapy with concurrent administration of cisplatin is superior either to induction chemotherapy followed by radiotherapy or to radiotherapy alone for laryngeal preservation and locoregional control.¹¹⁵ Selected cases can be managed with conservation surgical techniques that preserve vocal function.

Patients with locally advanced disease who desire laryngeal preservation should receive treatment with concurrent chemotherapy consisting of cisplatin 100 mg/m² on days 1, 22, and 43 (category 1) preferred and radiotherapy;¹¹⁵ the second option is definitive RT (without chemotherapy) for patients who are medically unfit or refuse chemotherapy. Surgery is reserved for managing the neck as indicated, for those patients whose disease persists after radiotherapy, or those patients who develop a subsequent locoregional recurrence.

The NCCN recommendations for managing locally advanced, resectable glottic and supraglottic cancers requiring laryngectomy reflect the results of Intergroup trial R91-11.¹¹⁵ Before 2002, either

induction chemotherapy with cisplatin/5-FU followed by radiotherapy or definitive radiotherapy alone (without chemotherapy) were the standard of care options recommended in the NCCN H&N guidelines based on the results of the Veterans Administration (VA) Laryngeal Cancer Study Group trial published in 1991.¹¹⁶ In the 2002-2008 versions of the guidelines, concurrent radiotherapy and cisplatin 100 mg/m² is the recommended option for achieving laryngeal preservation. R91-11 was a successor trial to the Veterans Administration trial and compared 3 non-surgical regimens: (1) induction cisplatin/5-FU followed by RT (control arm and identical to that in the VA trial); (2) concurrent RT and cisplatin 100 mg/m² days 1, 22, and 43; and (3) RT alone. Radiotherapy was uniform in all 3 arms, 70 Gy/7 wks, 2 Gy/fx. Laryngectomy was used for salvage of treatment failures in all arms. Stage III and IV (M0) patients were eligible, excluding T1 primaries and high-volume T4 primaries (tumor extending more than 1 cm into the base of tongue or tumor penetrating through cartilage). The key findings of the trial were a statistically significant higher 2-year laryngeal preservation (local control) rate for concurrent RT with cisplatin of 88%, compared to 74% with induction chemotherapy and to 69% with RT alone; no significant difference in laryngeal preservation between induction and RT alone treatments; and similar survival for all treatment groups. These R91-11 results changed the standard of care to concurrent RT and cisplatin (category 1) preferred for achieving laryngeal preservation for T3, N0 and T4a, N0 supraglottic cancers and for most T3, any N glottic cancers.¹¹⁵

For patients with glottic T4a tumors, the standard approach is a laryngectomy with ipsilateral thyroidectomy and neck dissection as indicated. For selected patients with glottic T4a tumors, the panel recommends 1) considering concurrent chemoradiation, or 2) clinical trials testing function-preserving surgical or nonsurgical approaches.

For managing T4a, N0 supraglottic primaries, the panel made a distinction between (1) high-volume, base-of-tongue involvement (>1 cm) or tumor penetration through cartilage; and (2) low-volume disease with no cartilage penetration on imaging or with 1 cm or less extension into the base of the tongue. This later category of T4a supraglottic patients was eligible for Intergroup trial R91-11. The committee prefers nonsurgical, larynx-preserving treatment with concurrent RT and systemic therapy with cisplatin (category 1) for patients with low-volume disease whose tumor does not penetrate through cartilage.¹¹⁵ In contrast, the recommended options for those with high-volume T4a, N+ disease (for example, cartilage destruction, skin involvement, massive invasion of the base of the tongue) are either (1) laryngectomy, ipsilateral thyroidectomy with ipsilateral or bilateral neck dissection followed by chemotherapy/RT (category 1 for chemo/RT); or (2) a clinical trial. Definitive radiotherapy alone (without chemotherapy) is reserved for patients in the poor medical risk category.

Follow-up/Surveillance

It is particularly important for nonsurgically treated patients to have careful and regular follow-up examinations by a trained H&N surgical oncologist so that any local or regional recurrence is detected early, and salvage surgery (and neck dissection as indicated) is performed. Post-treatment baseline imaging (3-6 months) of the primary and neck is recommended for disease that is difficult to follow; repeat imaging if indicated by signs/symptoms on physical examination. If PET is used for follow-up, the first scan should not be performed sooner than 12 weeks after treatment. Follow-up examinations in many of these patients need to be supplemented with serial endoscopy or high-resolution, advanced radiologic imaging techniques because of the scarring, edema, and fibrosis that occur in the laryngeal tissues and neck after high-dose radiation. Speech, hearing, & swallowing evaluation and rehabilitation may be useful, as indicated. Smoking cessation counseling is recommended.

Carcinoma of the Nasopharynx

Carcinoma of the nasopharynx is uncommon in the United States. Among H&N cancers, it has the highest propensity to metastasize to distant sites. Nasopharyngeal cancer also poses a significant risk for isolated local recurrences after definitive radiation (without chemotherapy) for locally advanced disease.¹¹⁷⁻¹²⁰ Oddly enough, regional recurrences are uncommon in this disease, occurring in only 10% to 19% of patients.^{120,121}

The NCCN H&N guidelines for the evaluation and management of carcinoma of the nasopharynx attempt to address risk for both local and distant disease. RT was the standard treatment for all stages of this disease, until the mid-1990s, when trial data showed improved survival for locally advanced tumors treated with concurrent RT and cisplatin.¹²¹

Stage is accepted as prognostically important. The prognostic significance of histology is still controversial. Several retrospective reviews indicated local control and survival appear to depend on histologic subtypes,¹²⁰⁻¹²⁴ whereas one study found no association between histology and these outcomes.¹²⁵ The World Health Organization (WHO) classification for nasopharyngeal cancer is used most often. Type 1 represents well to moderately well-differentiated squamous cell cancers. Type 2 denotes nonkeratinizing tumors, including transitional carcinoma and lymphoepithelioma. Type 3 represents undifferentiated carcinomas, including lymphoepithelioma, anaplastic, clear cell, and spindle cell variants.

Workup and Staging

The workup of nasopharyngeal cancer includes a history, physical examination, nasopharyngeal examination and biopsy, dental evaluation if indicated, and appropriate diagnostic imaging studies (for example, MRI and/or CT with contrast). These studies are important to determine the full extent of tumor in order to assign stage appropriately

and to design radiation ports that will encompass all the disease with appropriate doses. Chest imaging should also be obtained. Multidisciplinary consultation is encouraged. The 2002 AJCC staging classification is used as the basis for treatment recommendations (see [Table 2](#)). For patients with WHO class 2-3/N2-3 disease, imaging for distant metastases (that is, chest, liver, bone) may include PET scan and/or CT.

Treatment

Treatment options are subdivided according to T, N, and M status, rather than by stage alone. Patients with early-stage nasopharyngeal tumors (T1, N0, M0, and T2a, N0, M0 tumors) may be treated with definitive RT alone (without chemotherapy) to the nasopharynx, with elective radiation to the neck. For early-stage cancer, radiation doses of at least 70 Gy given with standard fractions are necessary for control of gross tumor. The local control rate for these tumors ranges from 80% to 90%, whereas T3-4 tumors have a control rate of 30% to 65%.^{122,126}

The combination of RT and platinum-based chemotherapy has been shown to increase the local control rate from 54% to 78%. The Intergroup trial 0099, which randomly assigned patients to chemotherapy plus external-beam RT versus external radiation alone, closed early when an interim analysis disclosed a significant survival and progression-free survival advantage favoring the combined chemotherapy and radiation group.¹²⁷ The addition of chemotherapy also decreased local, regional, and distant recurrence rates. A similar randomized study conducted in Singapore, which was modeled after the Intergroup treatment regimen, continued to show the benefit of the addition of chemotherapy to radiation therapy. Adjuvant chemotherapy after combined chemotherapy and radiation was also given in this trial.¹²⁸ In addition, the administration of the cisplatin dose was spread out over several days, and this regimen appeared to reduce toxicity while still providing a beneficial antitumor effect.

The guidelines recommend combined chemotherapy (cisplatin) plus radiotherapy for T1-T2a, N1-3; and for T2b-T4, any N lesions (stages IIB, III, IVA, IVB). The scheduling and doses of chemotherapy are those used in the intergroup trial 0099. Although an unusual occurrence, a patient with residual disease in the neck and a complete response at the primary should undergo a neck dissection. Initial therapy for patients who present with metastatic disease (stage IV) should consist of a platinum-based combination chemotherapy regimen. If a complete response is achieved, definitive RT alone (without chemotherapy) should be administered to the primary tumor and neck area. For early-stage cancer, radiation doses of at least 70 Gy given with standard fractions are necessary for control of gross tumor. In patients with metastatic carcinoma who have failed platinum-based therapy, a triplet-based combination using paclitaxel, carboplatin, and gemcitabine may be useful.¹²⁹ Likewise, cetuximab plus carboplatin may be useful for patients with recurrent or metastatic nasopharyngeal cancer who have failed platinum-based therapy.¹³⁰ Gemcitabine monotherapy or in combination with cisplatin may also be useful.¹³¹⁻¹³³

Follow-up/Surveillance

For patients whose nasopharyngeal cancer has been treated, the recommended follow-up includes periodic physical examination and an assessment of thyroid function (that is, the TSH level should be determined every 6 to 12 months). Increased TSH levels have been detected in 20% to 25% of patients who received neck irradiation.¹³⁴ Post-treatment baseline imaging of the primary and neck is recommended; repeat imaging if indicated by signs/symptoms on physical examination. Speech, hearing, & swallowing evaluation and rehabilitation and dental evaluation may be useful, as indicated. Smoking cessation counseling is recommended.

Advanced Head and Neck Cancer

Advanced H&N cancer includes newly diagnosed but unresectable disease (see “Head and Neck Surgery”), recurrent disease, and metastatic disease. The treatment goal for patients with newly diagnosed but unresectable disease is cure. For the recurrent disease group, the goal is cure (if surgery or radiation remains feasible) or palliation (if the patient has received previous radiotherapy and the disease is unresectable). The goal for patients with metastatic disease is palliation or prolongation of life.

Treatment

Participation in clinical trials is preferred for all patients with advanced H&N cancer. For patients with unresectable disease, such trials include testing altered fraction radiotherapy schedules, concurrent chemoradiotherapy, and novel radiosensitizers. For patients with recurrent disease not amenable to curative therapy and patients with metastatic disease, studies include trials of new agents and re-irradiation.

Unresectable Disease

For patients with a performance status (PS) of 0 or 1, the standard treatment of newly diagnosed, unresectable disease is concurrent cisplatin (single agent) or carboplatin-based chemotherapy and radiotherapy (category 1).¹³⁵ The panel disagreed regarding whether induction chemotherapy (cisplatin) followed by chemoradiation should be used (category 3) for patients with a PS of 0 or 1. For those with a PS of 2, the recommended treatment is generally radiotherapy with or without concurrent chemotherapy; again, the panel disagreed about using induction chemotherapy followed by RT (category 3). For those with PS of 3, the recommended treatment is generally radiotherapy alone or, in some cases, best supportive care.

Many randomized trials¹³⁵⁻¹⁴⁴ and meta-analyses of clinical trials¹⁴⁵⁻¹⁴⁹ demonstrate significantly improved overall survival, disease-free survival, and local control when concomitant or alternating chemotherapy and radiation is compared with radiotherapy alone. All combined chemoradiotherapy regimens are associated with various degrees of enhanced mucosal toxicities, which require close patient monitoring, ideally provided by a team experienced in treating H&N cancer patients. The various single-agent chemoradiotherapy regimens have not been directly compared in randomized trials. Therefore, no optimal standard regimen is defined. Single-agent cisplatin plus RT is effective and relatively easy to administer.¹³⁵ In a phase III randomized trial, cetuximab-based chemoradiotherapy improved locoregional control and overall survival in patients with stage III/IV head and neck cancer;¹⁵⁰ however, there have been concerns about the method used to assess locoregional control.¹⁵¹ A randomized phase II study in patients with advanced H&N (oral cavity, oropharynx, or hypopharynx) suggested that cisplatin plus paclitaxel and RT may yield better overall survival than either cisplatin plus 5-FU and RT or hydroxyurea, 5-FU and RT, although statistical comparisons were not possible.^{152,153}

Based on published data, concurrent chemoradiation typically uses conventional fractionation at 2.0 Gy per fraction to 70 Gy or more in 7 weeks with single-agent cisplatin given every 3 weeks at 100 mg/m². Use of other fraction sizes (for example, 1.8 Gy, conventional), multiagent chemotherapy, or altered fractionation with chemotherapy has been evaluated, but there is no consensus on the optimal approach. In general, the use of concurrent chemoradiation carries a high toxicity burden, and altered fractionation or multiagent chemotherapy will likely further increase the toxicity burden. For any chemoradiation approach, close attention should be paid to published reports for the specific chemotherapy agent, dose, and schedule of administration. Chemoradiation should be performed by an experienced team and should include substantial supportive care.

Bonner and colleagues have randomly assigned 424 patients with locally advanced and measurable squamous cell carcinomas of the H&N to receive definitive radiotherapy with or without cetuximab.¹⁵⁰ Locoregional control and survival (49 months versus 29.3 months, $P=.03$) were significantly improved in patients treated with radiotherapy and cetuximab compared to radiotherapy alone. Radiotherapy and cetuximab may provide a therapeutic option for patients not considered medically fit for standard chemoradiotherapy regimens. However, more study is needed.

Recurrent Disease

Surgery is recommended for resectable recurrent locoregional disease, usually followed by radiation if it has not yet been administered. If the recurrence is unresectable and the patient did not have prior RT, then radiotherapy with concurrent cisplatin or carboplatin-based chemotherapy is recommended (category 1) for patients with PS of 0 or 1. For patients with recurrent disease not amenable to curative-intent radiation or surgery, the treatment approach is the same as that for patients with metastatic disease. For select patients, enrollment in a clinical trial of re-irradiation may be appropriate.

A study in patients with metastatic or recurrent H&N cancer found no significant difference in survival when comparing cisplatin plus 5-FU with cisplatin plus paclitaxel.¹⁵⁴ Other combination regimens used in this patient population include carboplatin plus 5-FU¹⁵⁵ and cetuximab plus cisplatin.^{156,157} These regimens are all listed as treatment options for this patient population.

Squamous cell carcinomas emerge after the accumulation of multiple genomic events. In a multistep process, there appear to be essential molecular alterations, which confer a survival advantage for cancer cells. The epidermal growth factor receptor (EGFR) is a transmembrane glycoprotein, activation of which triggers a cascade of downstream intracellular signaling events important for regulation of

epithelial cell growth. Overexpression of EGFR and/or common ligands has been observed in greater than 90% of squamous cell carcinomas of the H&N. This finding has led to the development of EGFR inhibitors, such as the monoclonal antibody cetuximab and small molecule tyrosine kinase inhibitors (such as erlotinib and gefitinib).

In phase II trials, cetuximab was combined with cisplatin in treating patients with recurrent disease that was refractory to platinum-based chemotherapy.¹⁵⁸⁻¹⁶⁰ Objective tumor response was observed in 12% to 14% of patients. Vermorken and colleagues reported response in 13% of platinum refractory patients, treated with cetuximab administered as a single agent.¹⁶¹ Burtness and colleagues¹⁵⁶ did a direct comparison of cisplatin plus cetuximab versus cisplatin plus placebo as first-line treatment of recurrent disease; they reported a significant improvement in response rate (26% versus 10%, respectively). Taken together, this data indicates that cetuximab does not overcome platinum resistance, the single-agent response rate is on the order of 12% to 14%. In combination with cisplatin as first-line treatment, a synergistic effect is observed. Moreover, the preliminary results of a phase III trial (Extreme) of 442 patients with recurrent or metastatic squamous cell carcinoma found that cetuximab plus cisplatin/5-FU or carboplatin/5-FU improved median survival when compared to the standard chemotherapy doublet (10.1 months versus 7.4 months, $P=.036$).¹⁶² Other recent phase II trials using either cisplatin/docetaxel/erlotinib or paclitaxel/cetuximab also suggest benefit from EGFR inhibition.^{163,164}

Metastatic Disease

Palliative adjunctive measures include radiotherapy to areas of symptomatic disease, analgesics, and investigational agents aimed at controlling locally advanced tumors. Single agents and combination systemic chemotherapy regimens are both used. Response rates to single agents range from 15% to 35%. The most active agents include cisplatin, carboplatin, paclitaxel, docetaxel, 5-FU, methotrexate,

ifosfamide, bleomycin, gemcitabine (for nasopharyngeal cancer), and cetuximab. The most active regimens include (1) cisplatin or carboplatin, plus 5-FU;^{154,155} or (2) cisplatin or carboplatin, plus a taxane.¹⁵⁴ These regimens result in higher response rates of 30% to 40%.

Randomized trials assessing a combination of cisplatin plus 5-FU versus single-agent therapy with cisplatin, 5-FU, or methotrexate have demonstrated significantly higher response rates for the combination regimen. No difference in overall survival, however, is demonstrable.^{154,155,165-167} The median survival with chemotherapy is approximately 6 months, and the 1-year survival rate is approximately 20%. Achievement of a complete response is associated with longer survival and, although infrequent, has been reported more often with combination regimens.

The standard treatment of patients with incurable, recurrent, or metastatic H&N cancer should be dictated, in large part, by the patient's PS. Individuals with a good PS (0-1) may be offered combination or single-agent chemotherapy. Patients should be fully informed about the goals of treatment, cost of combination chemotherapy, and potential for added toxicity. For patients with a PS of 2, single-agent chemotherapy or best supportive care is most appropriate. For patients with a good PS who relapse after first-line chemotherapy, second-line treatment in a clinical trial or best supportive care is appropriate. For patients with a PS of 3, best supportive care is appropriate.

Figure 1
Anatomic sites and subsites of the head and neck

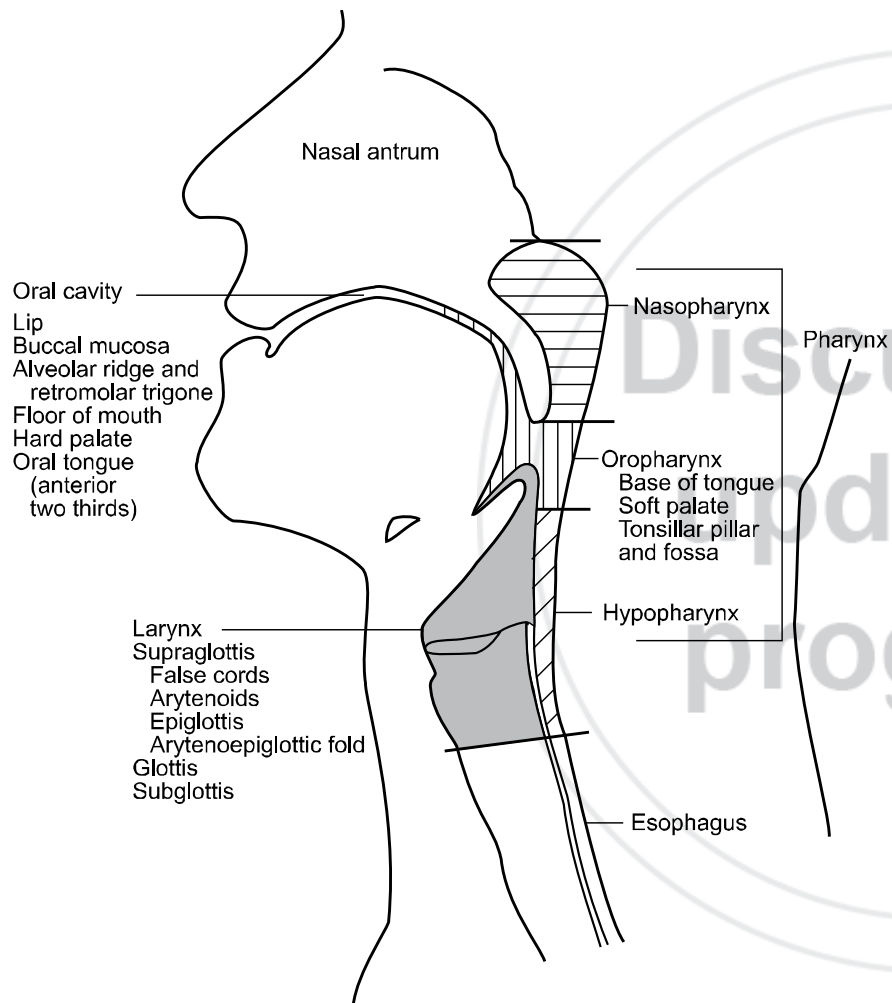


Figure 2
Level designation for cervical lymphatics in the right neck



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Discussion
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