

First a Little History

“TNM classification is a means of recording facts observed by the clinician whereas staging implies interpretation of these facts regarding prognosis.”

UICC:TNM Classification of Malignant Tumors. Geneva; 1968.

Fundamentals of Stage Grouping

Survival is

Monotonically decreasing

Distinctive between groups

Homogeneous within groups

Main Analytic Goal of the 8th Edition

**Determine if TNM classifications can
be shared?**

**8th Edition Staging
Esophagus and
Esophagogastric Junction**

Category Changes

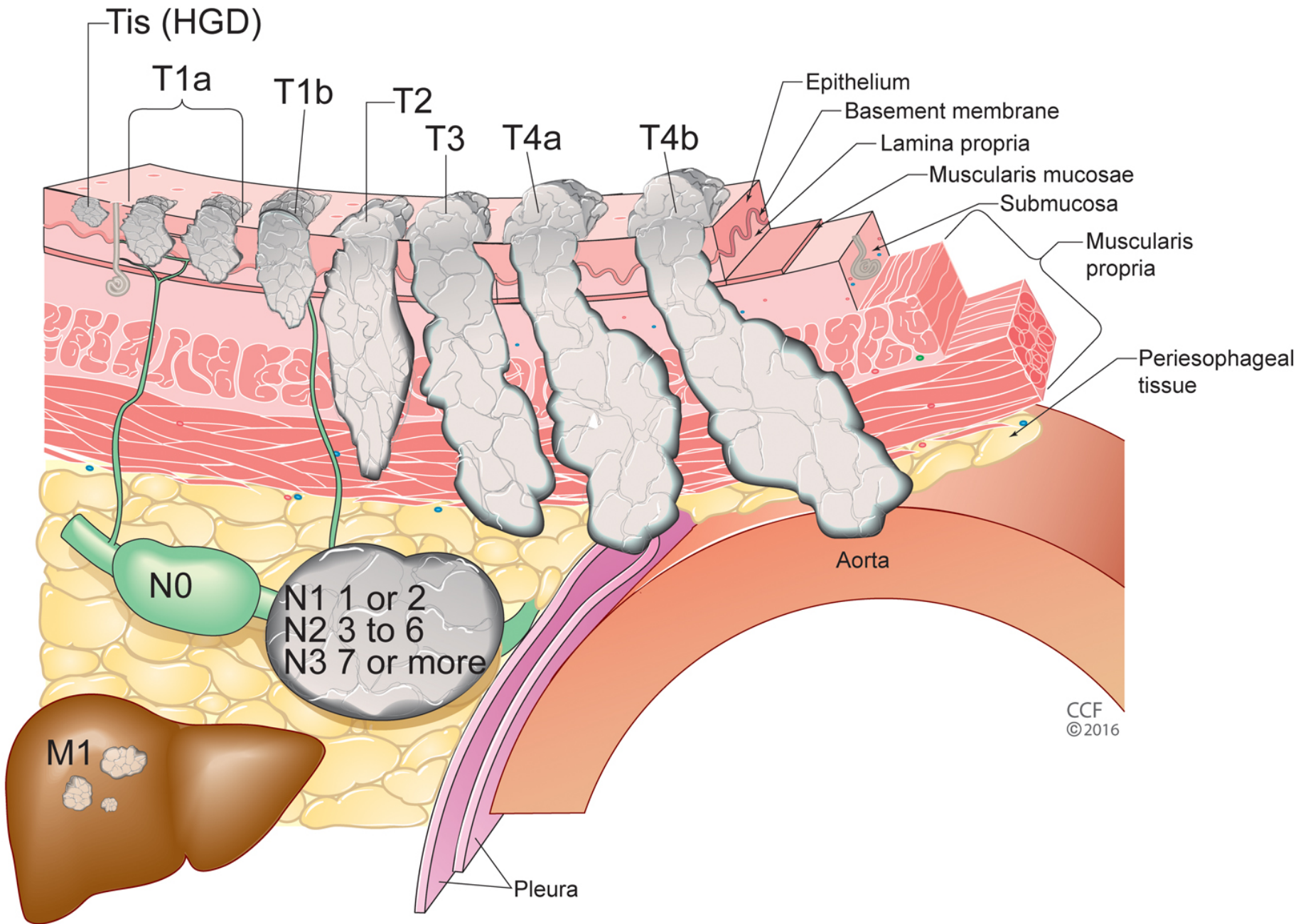
T **peritoneum = T4a**

N and M: **unchanged**

Grade: **no G4**

Location: **2 cm rule!**

**awaits genomic
confirmation**

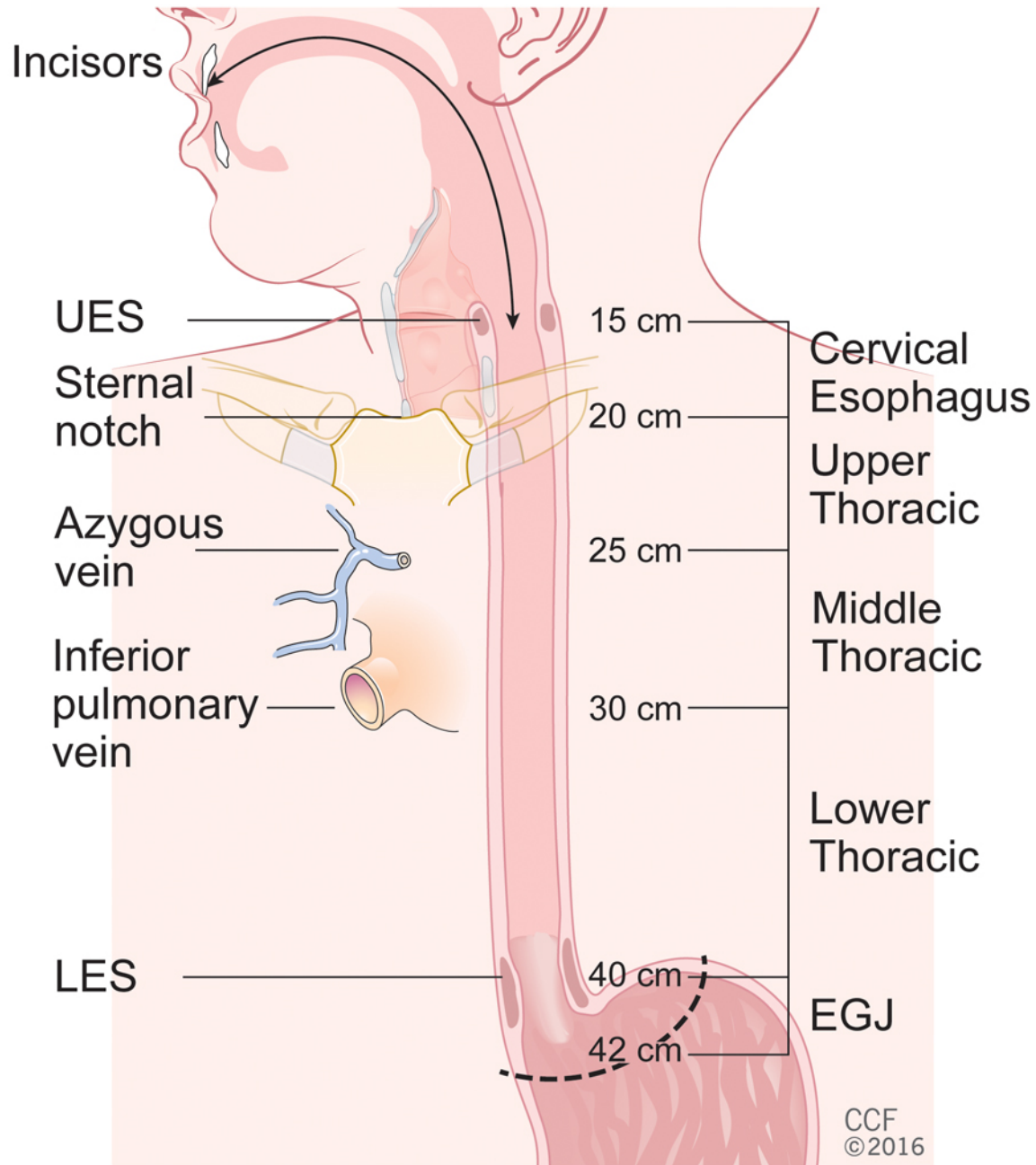


Location

Location – Esophagogastric Junction

epicenter of cancer \leq 2 cm into
cardia = Esophagus

epicenter of cancer $>$ 2 cm into
cardia = Stomach



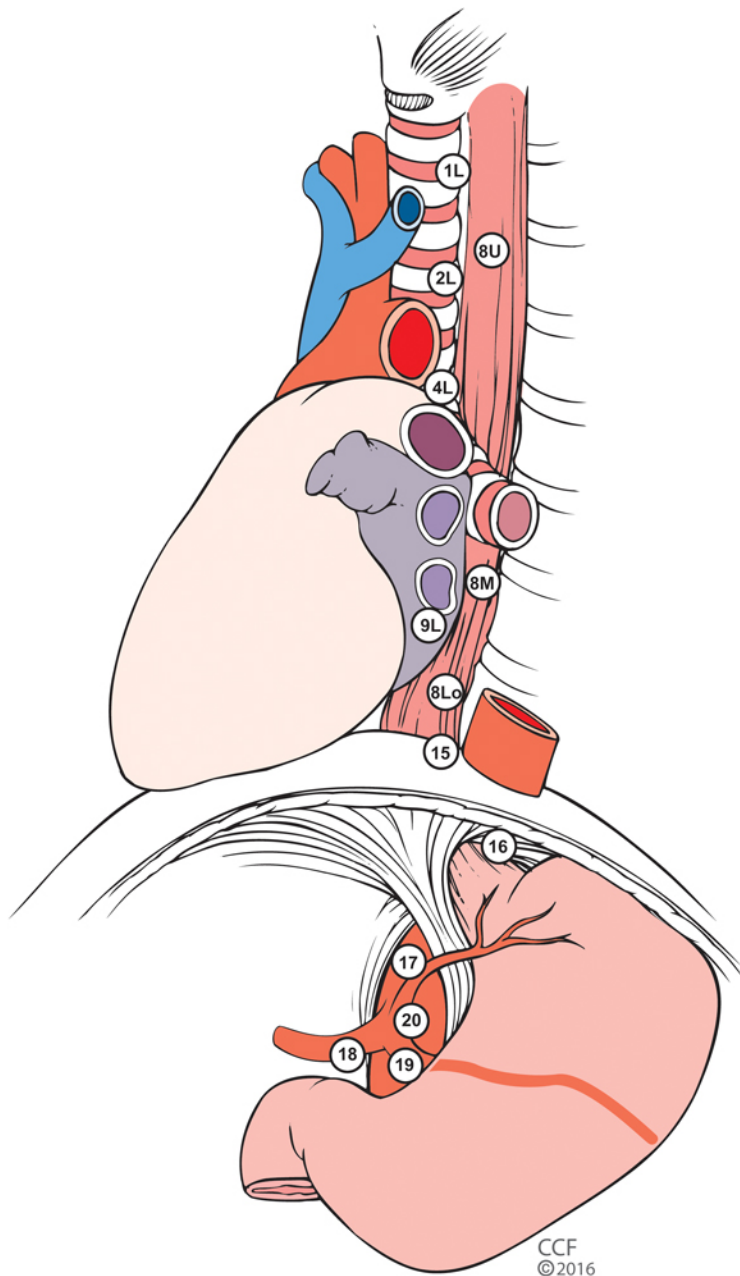
Regional Lymph Nodes

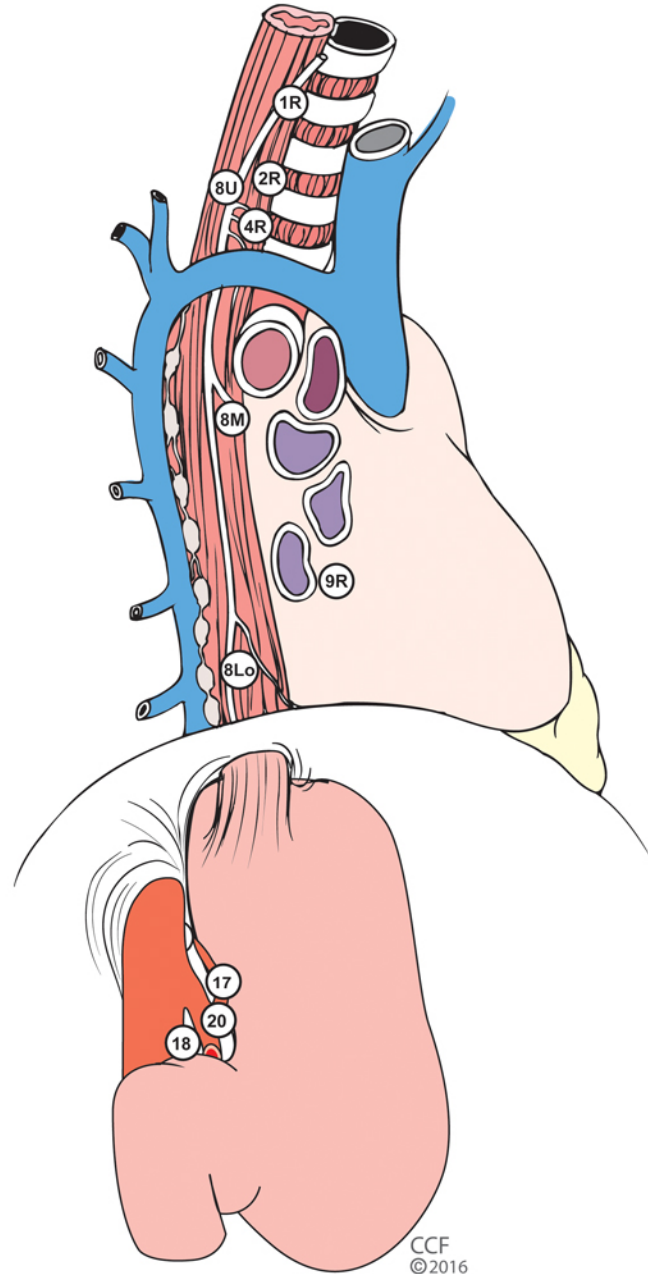
Regional lymph node

Simplified

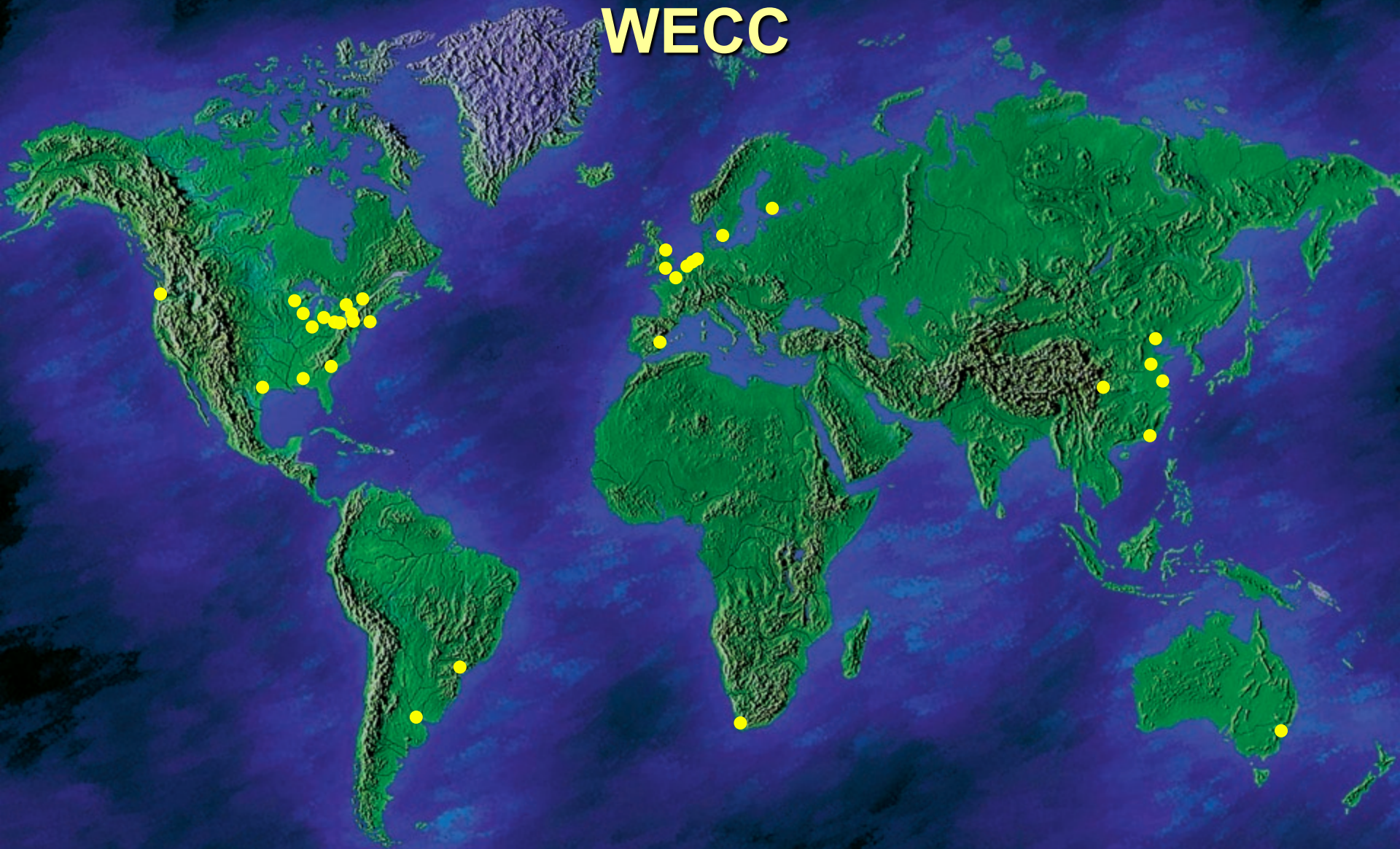
Specific

Stations





WECC



WECC Centers

	Center	N
Africa	1	38
South America	2	498
Australia	1	1,936
Asia	5	4,448
Europe	9	5,849
North America	15	9,885
Total	33	22,654

Stage Grouping Analysis

Machine learning analysis using Random Forest techniques

Risk-adjusted for 39 variables

Outcome: All cause mortality, hard end-point that is superior to soft end-point of cancer recurrence or disease specific mortality once multiple non-cancer-related risk factors for mortality are taken into account

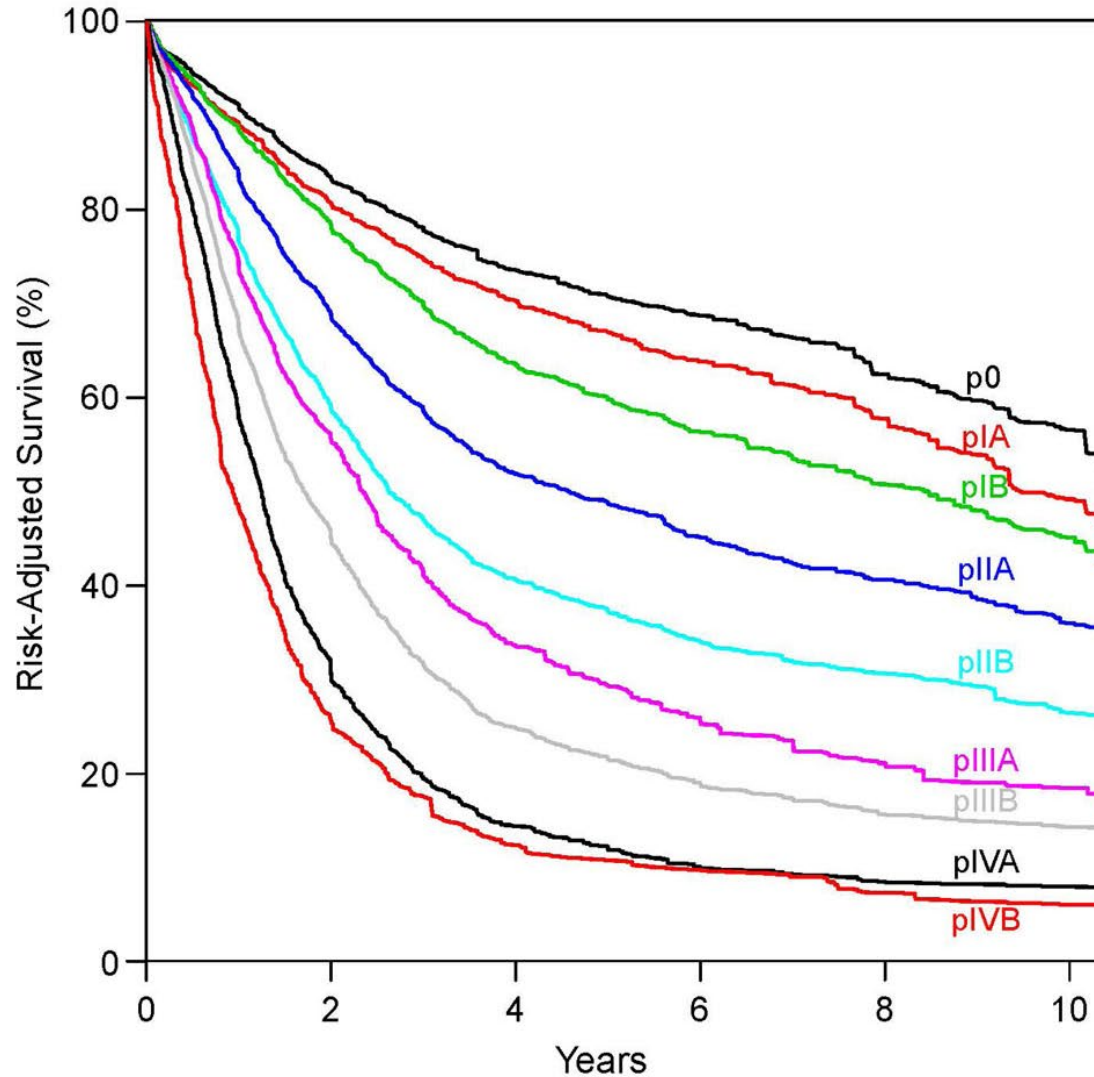
Analytic Strategy

3-step step Random Forest Analyses

- 1) From individual patient risk-adjusted survival curves, create clusters of survival curves separated by 5%**
- 2) Label curves with specific TNM and non-anatomical categories and coalesce around those curves**
- 3) Confirm homogeneity within the groups by lack of important variables associated with mortality**

pTNM

Squamous Cell Carcinoma - pTNM



What's New – pTNM Squamous Cell Ca

Stage 0

Consensus vs Data-driven

Stage I

T1 sub-category analysis – IA-IB

Stage IB, IIA, IIB

pT2N0M0 (G1 - IB, IIA)

pT3N0M0 (IIA, IIB - G2-3 U/M)

Stage III

regrouping and redistribution – no IIIC

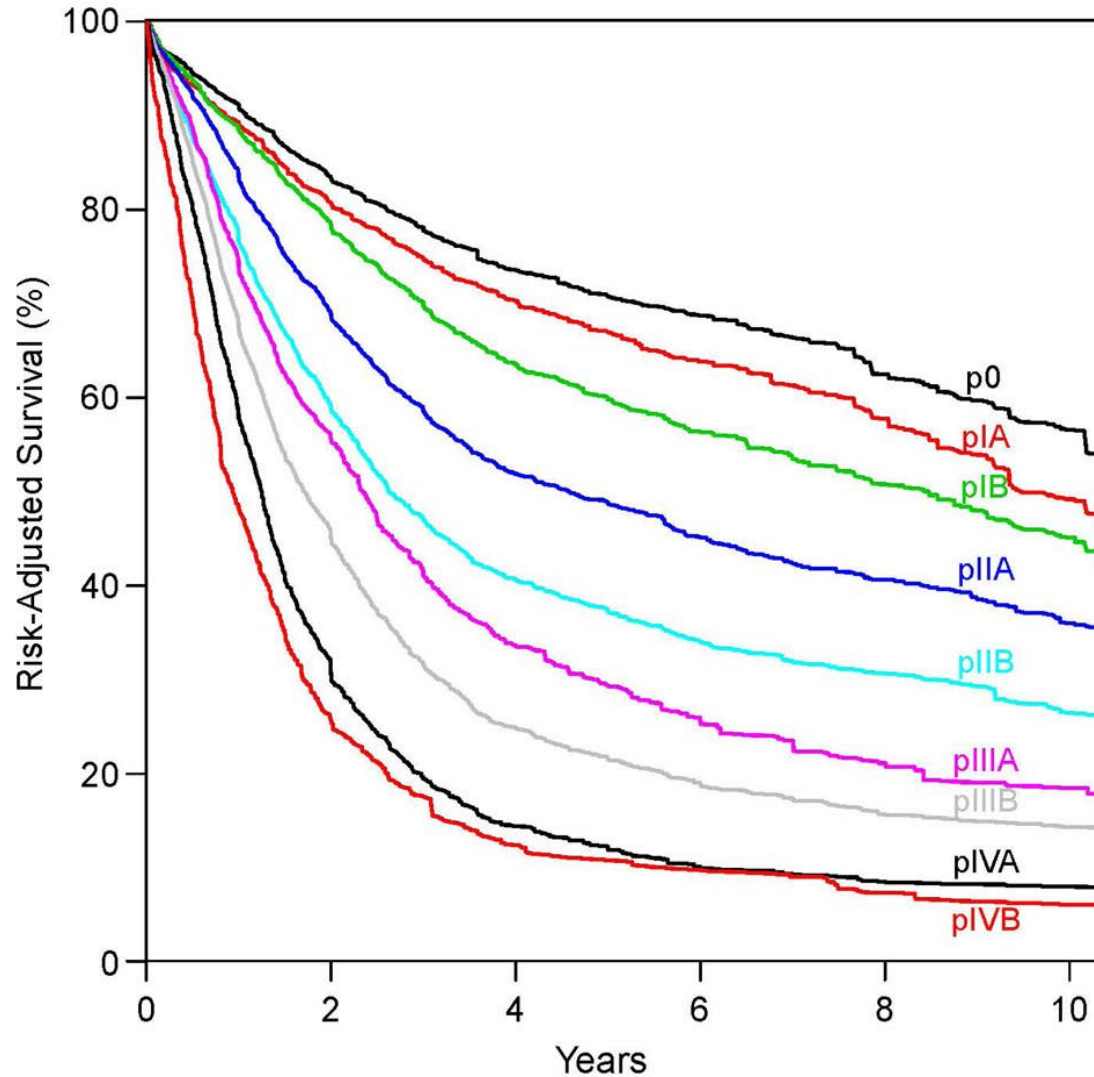
Stage IV

sub-grouping Consensus vs **Data-driven**

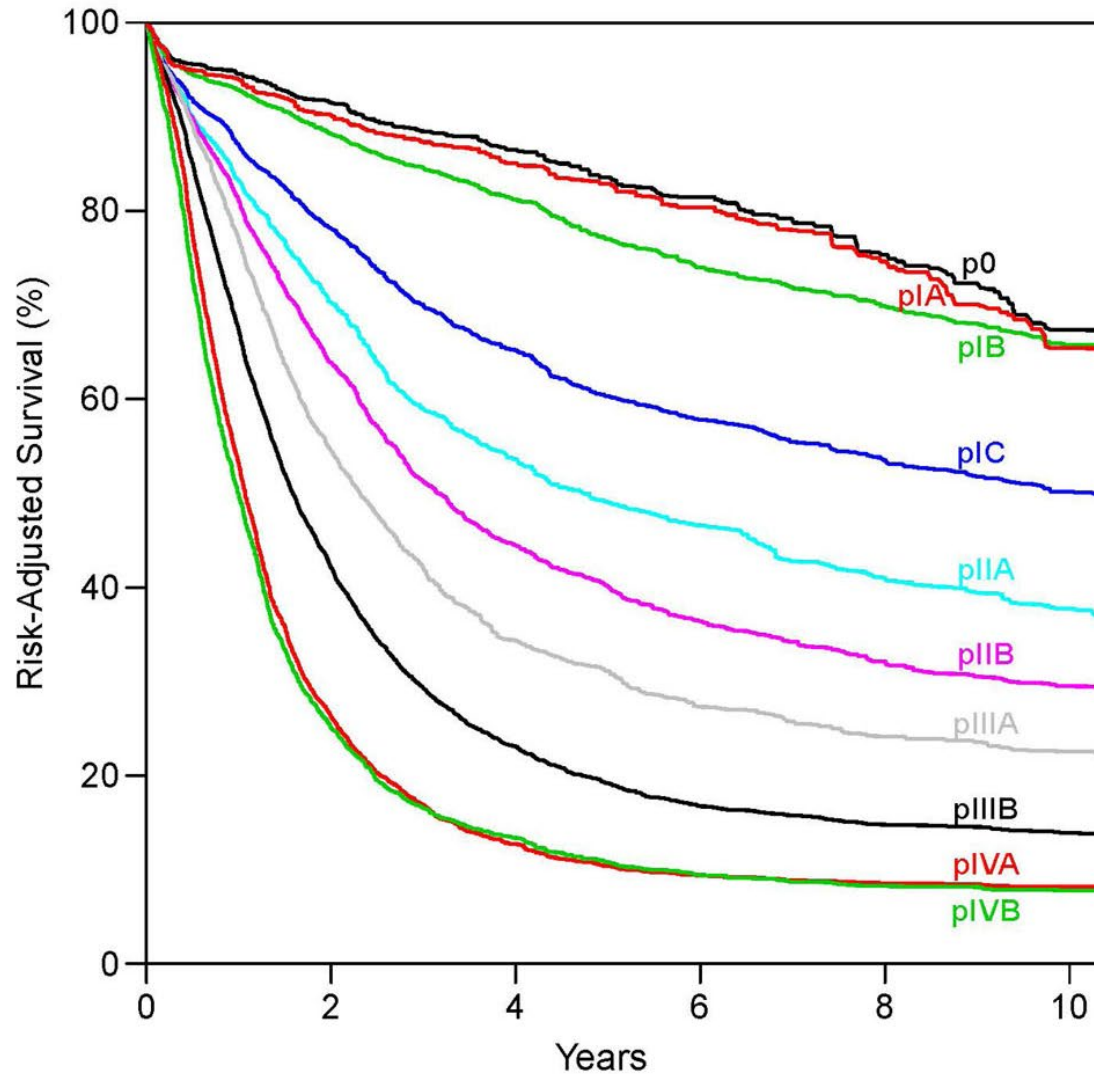
pTNM Squamous Cell Carcinoma

		N0					
		L	U/M	N1	N2	N3	M1
	Tis	0					
T1a	G1	IA	IA	IIB	IIIA	IVA	IVB
	G2-3	IB	IB				
	T1b	IB		IIB	IIIA	IVA	IVB
T2	G1	IB	IB	IIIA	IIIB	IVA	IVB
	G2-3	IIA	IIA				
T3	G1	IIA	IIA	IIIB	IIIB	IVA	IVB
	G2-3	IIA	IIB				
	T4a	IIIB		IIIB	IVA	IVA	IVB
	T4b	IVA		IVA	IVA	IVA	IVB

Squamous Cell Carcinoma - pTNM



Adenocarcinoma - pTNM



What's New – pTNM Adenocarcinoma

Stage 0

Consensus vs Data-driven

Stage I

T1 sub-category analysis – IA-IC

Stage II

pG3T2N0M0 - IIA

pT1N1M0 meets pT3N0M0 – IIB

Stage III

regrouping and redistribution – no IIIC

Stage IV

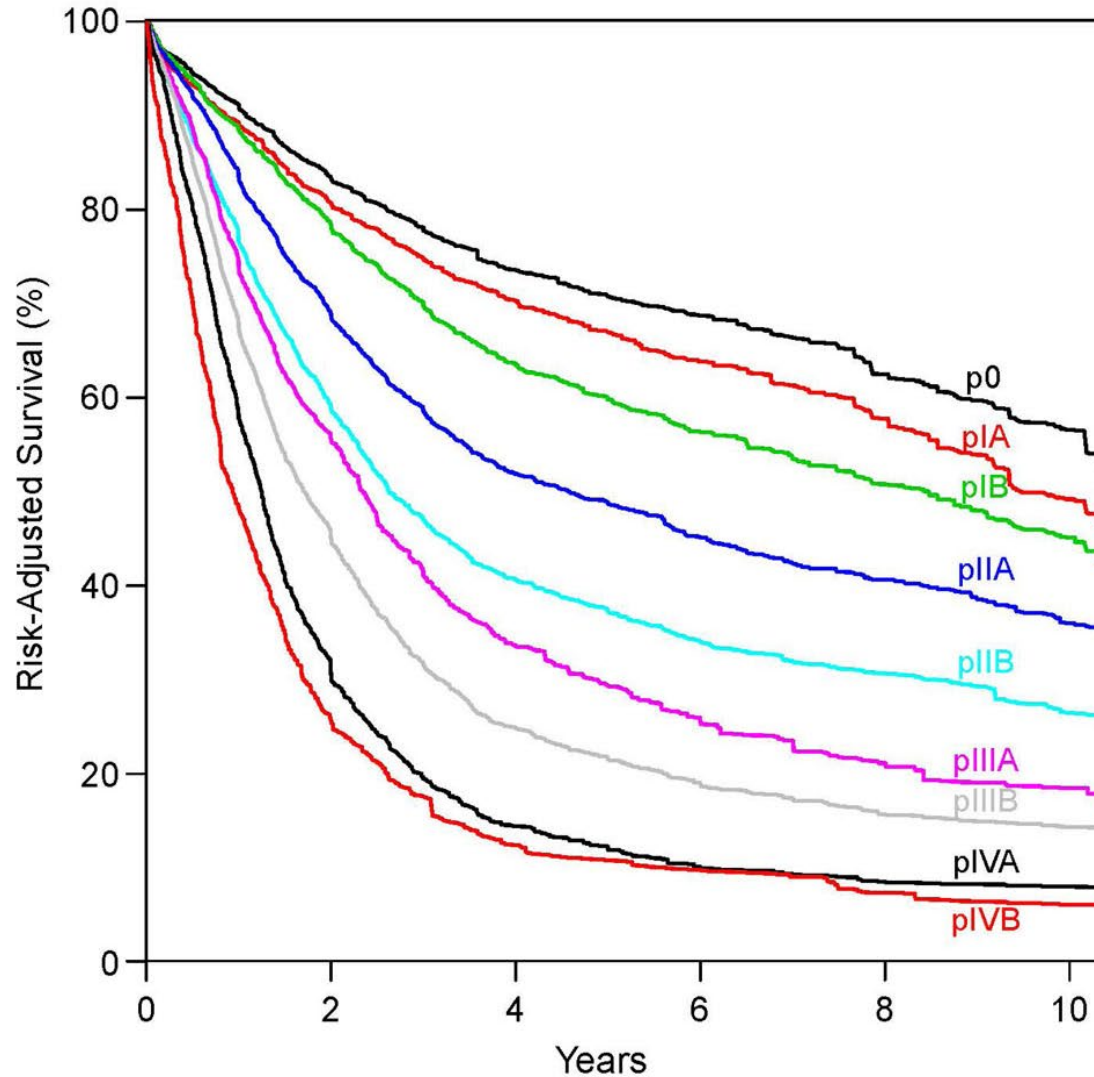
sub-grouping Consensus vs **Data-driven**

pTNM Adenocarcinoma

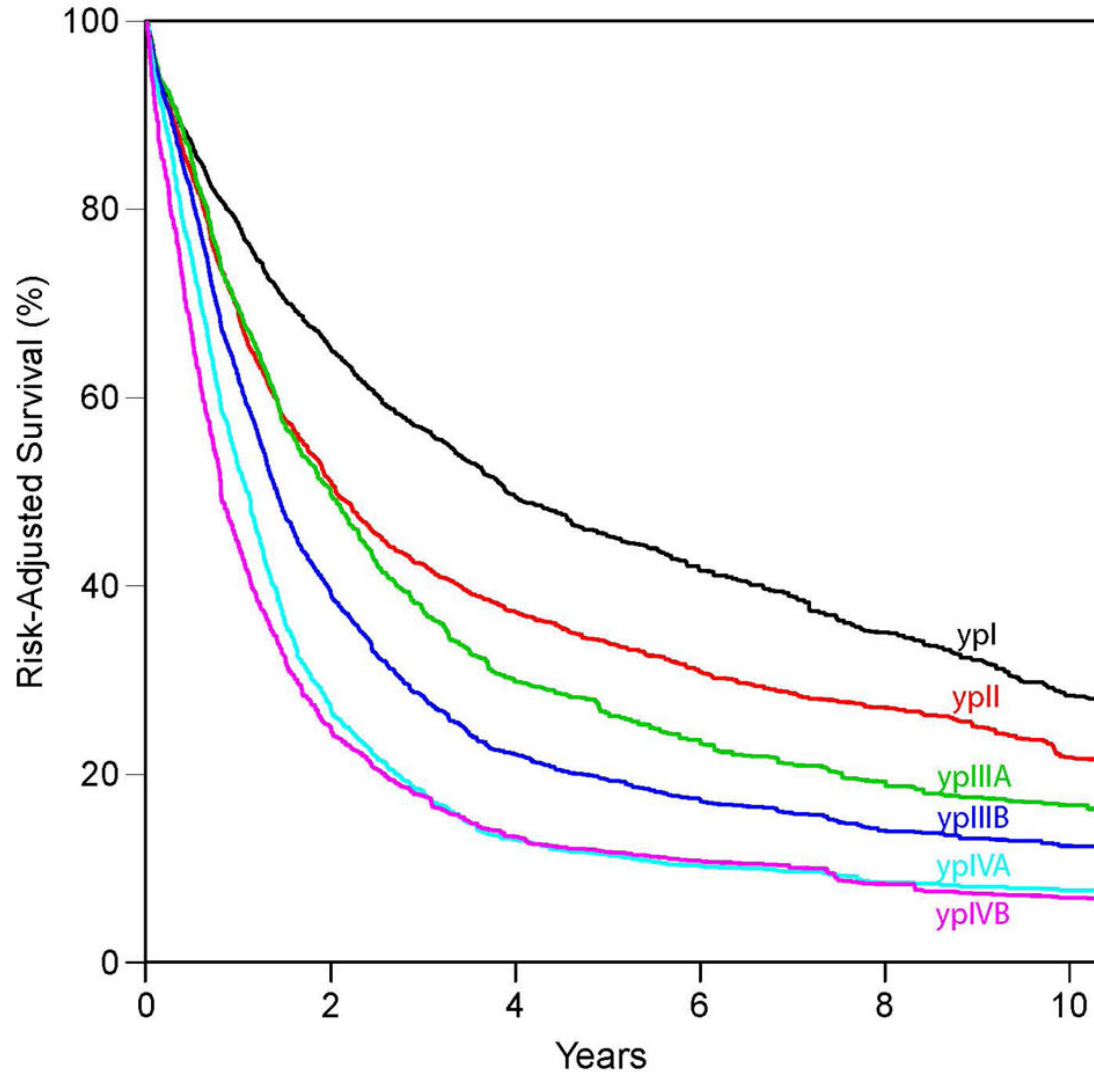
		N0	N1	N2	N3	M1
Tis	O					
T1a	G1	IA	IIB	IIIA	IVA	IVB
	G2	IB				
	G3	IC				
T1b	G1	IB	IIB	IIIA	IVA	IVB
	G2	IC				
	G3	IC				
T2	G1	IC	IIIA	IIIB	IVA	IVB
	G2	IIA				
	G3	IIB				
T3	IIB	IIIB	IIIB	IVA	IVB	
T4a	IIIB	IIIB	IVA	IVA	IVB	
T4b	IVA	IVA	IVA	IVA	IVB	

урТНМ

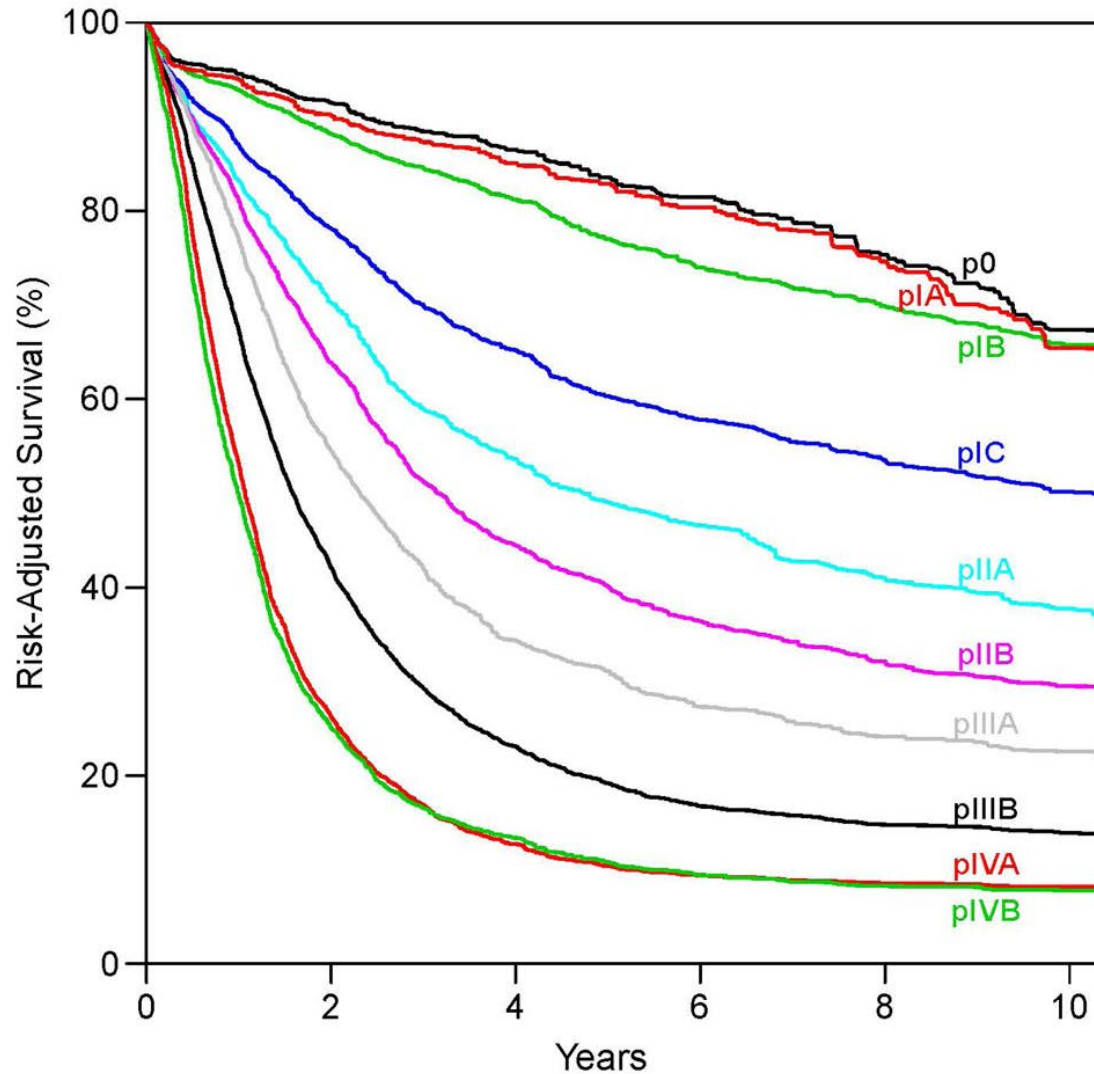
Squamous Cell Carcinoma - pTNM



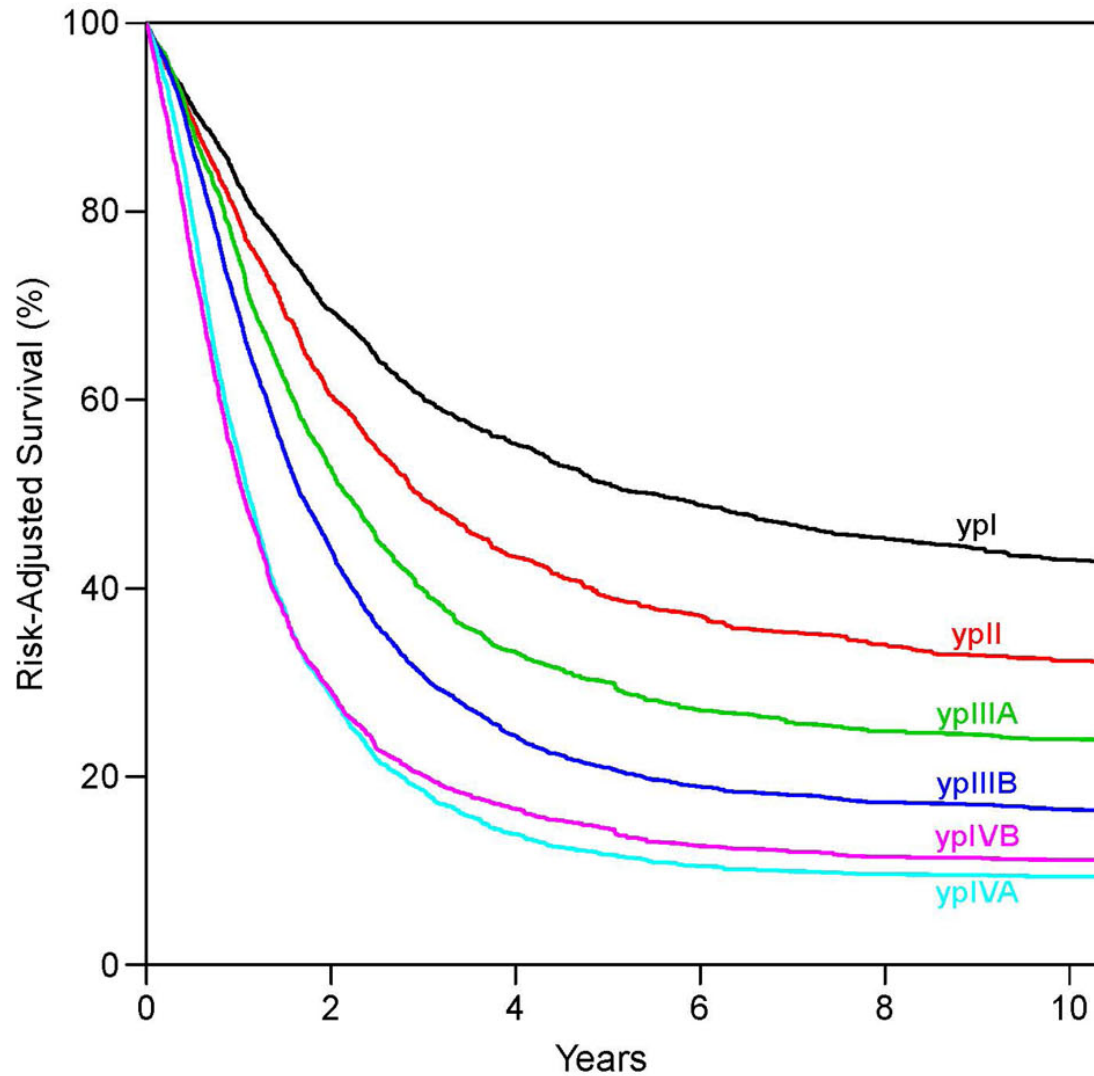
Squamous Cell Carcinoma - ypTNM



Adenocarcinoma - pTNM



Adenocarcinoma - ypTNM



What is New – ypTNM

Can ypTNM share pTNM staging?

1) Unique categories

(ypTisN1-3M0 and ypT0N0-3M0)

2) Dissimilar stage group compositions

3) Markedly different survival profiles

Require separate ypStage groupings

Identical for Adenocarcinoma and
Squamous Cell Carcinoma

What is New – ypTNM

ypT0-2N0-3M0

Stage II **ypT3N0M0**

Stage IVB **ypM1**

What is New – ypTNM

Stage I **ypT0-2N0M0**

Stage II **ypT3N0M0**

Stage IIIA **ypT0-2N1M0**

Stage IIIB **ypT0-2N2M0**

+ypT3N1-2M0 and ypT4aN0M0

Stage IVA **ypT0-2N3**

+ yp T3N3M0, ypT4aN1-3M0, and
ypT4bN0-3M0

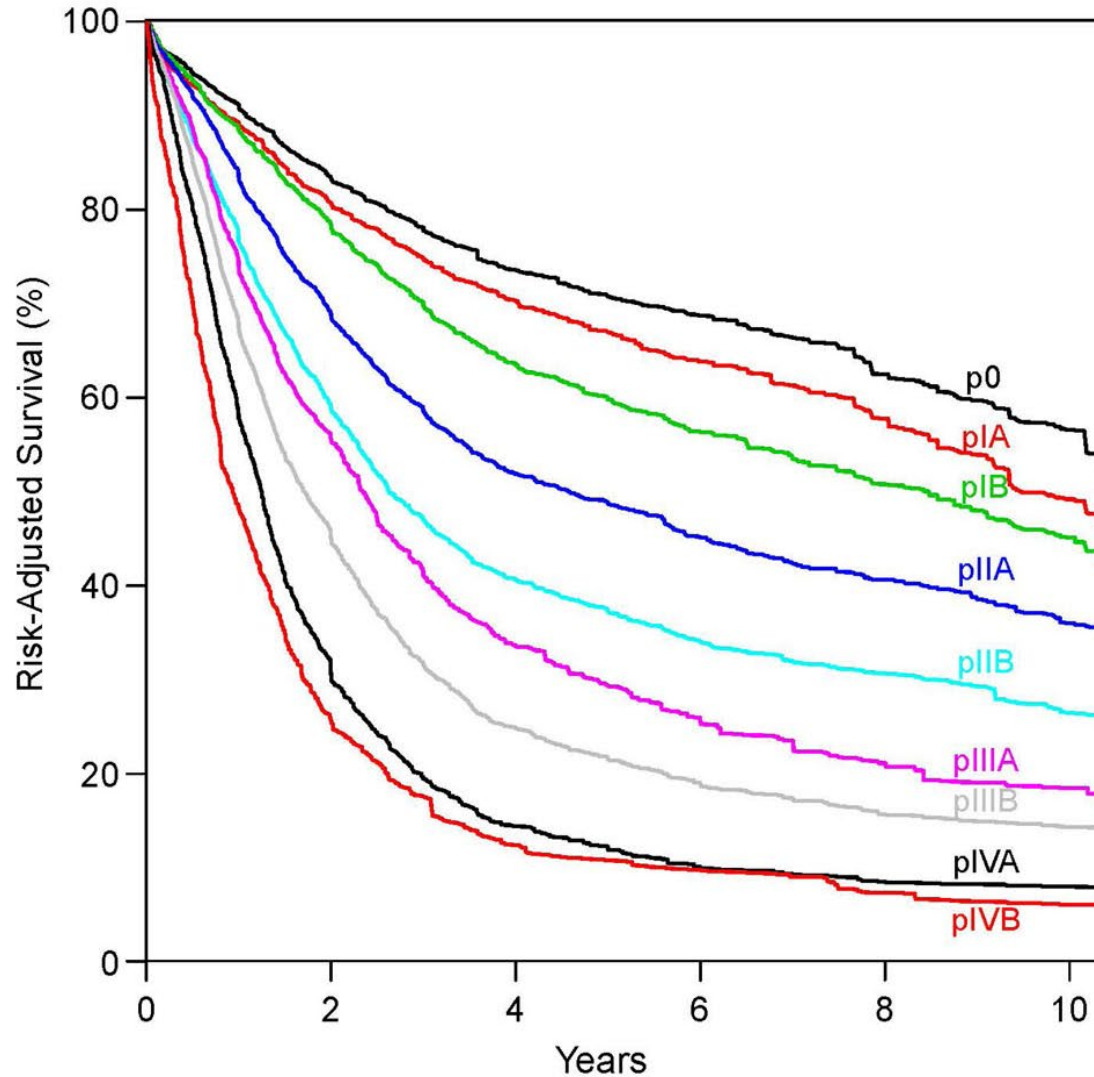
Stage IVB **ypM1**

ypTNM

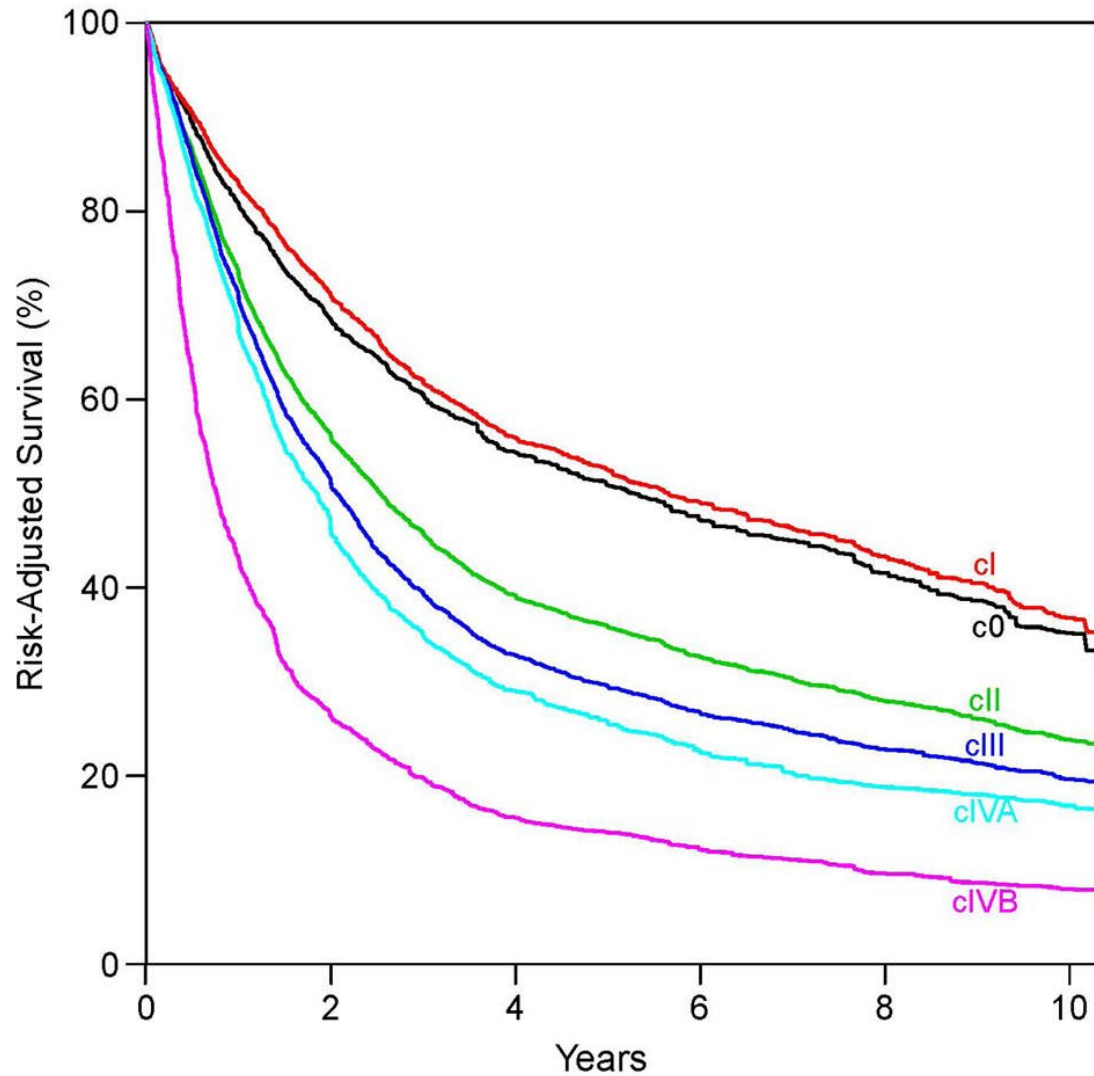
	N0	N1	N2	N3	M1
T0	I	IIIA	IIIB	IVA	IVB
Tis	I	IIIA	IIIB	IVA	IVB
T1	I	IIIA	IIIB	IVA	IVB
T2	I	IIIA	IIIB	IVA	IVB
T3	II	IIIB	IIIB	IVA	IVB
T4a	IIIB	IVA	IVA	IVA	IVB
T4b	IVA	IVA	IVA	IVA	IVB

cTNM

Squamous Cell Carcinoma - pTNM



Squamous Cell Carcinoma - cTNM



What is New – cTNM Squamous Cell Carcinoma

cT1-T2 not distinctive by cN0-1

cT3 distinctive by cN0-1

cT4 cancers are not subcategorized

cTNM Squamous Cell Carcinoma

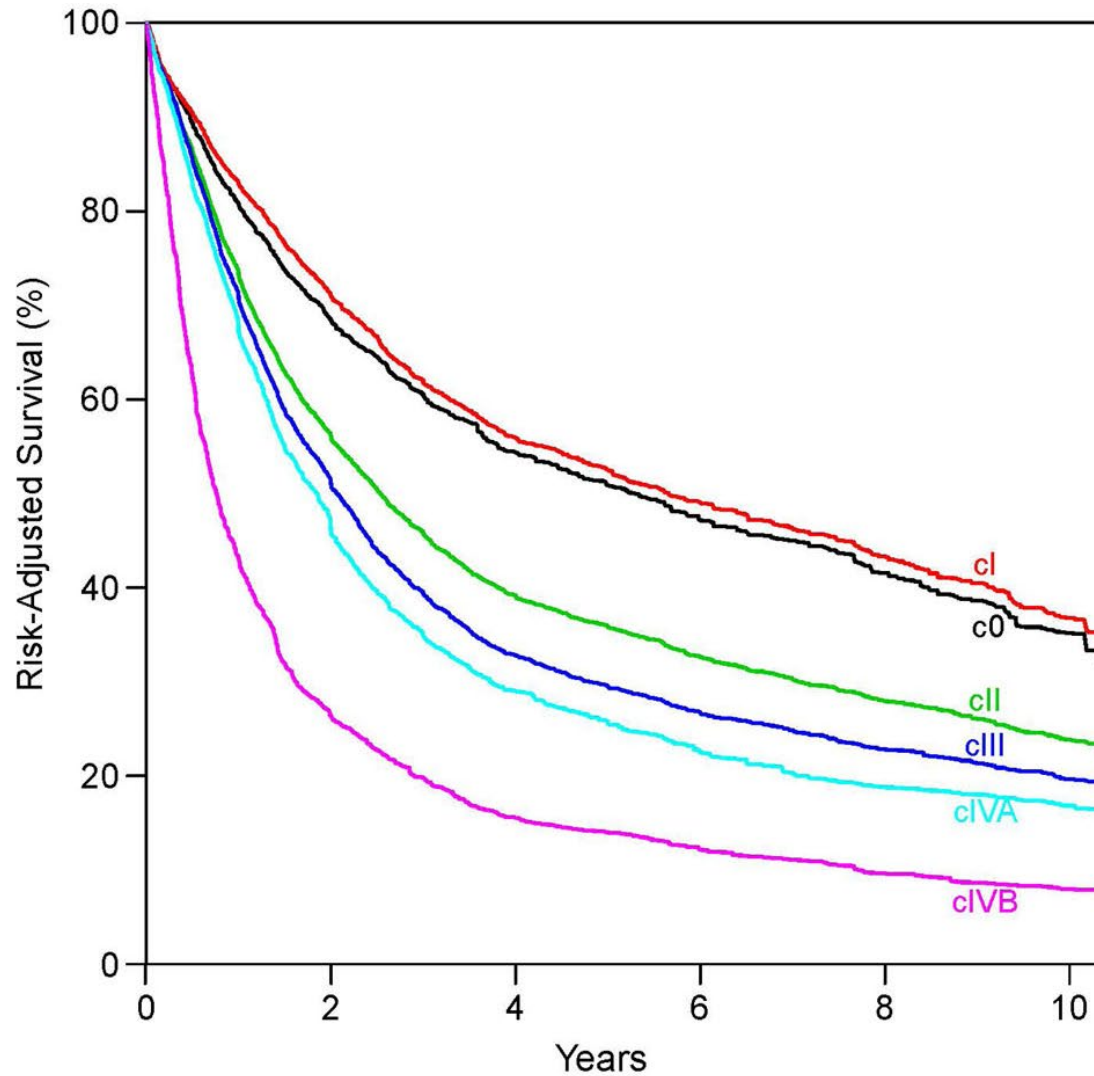
		N0	N1	N2	N3	M1
Tis	O					
T1		I	I	III	IVA	IVB
T2		II	II	III	IVA	IVB
T3		II	III	III	IVA	IVB
T4a		IVA	IVA	IVA	IVA	IVB
T4b		IVA	IVA	IVA	IVA	IVB

What is New – cTNM

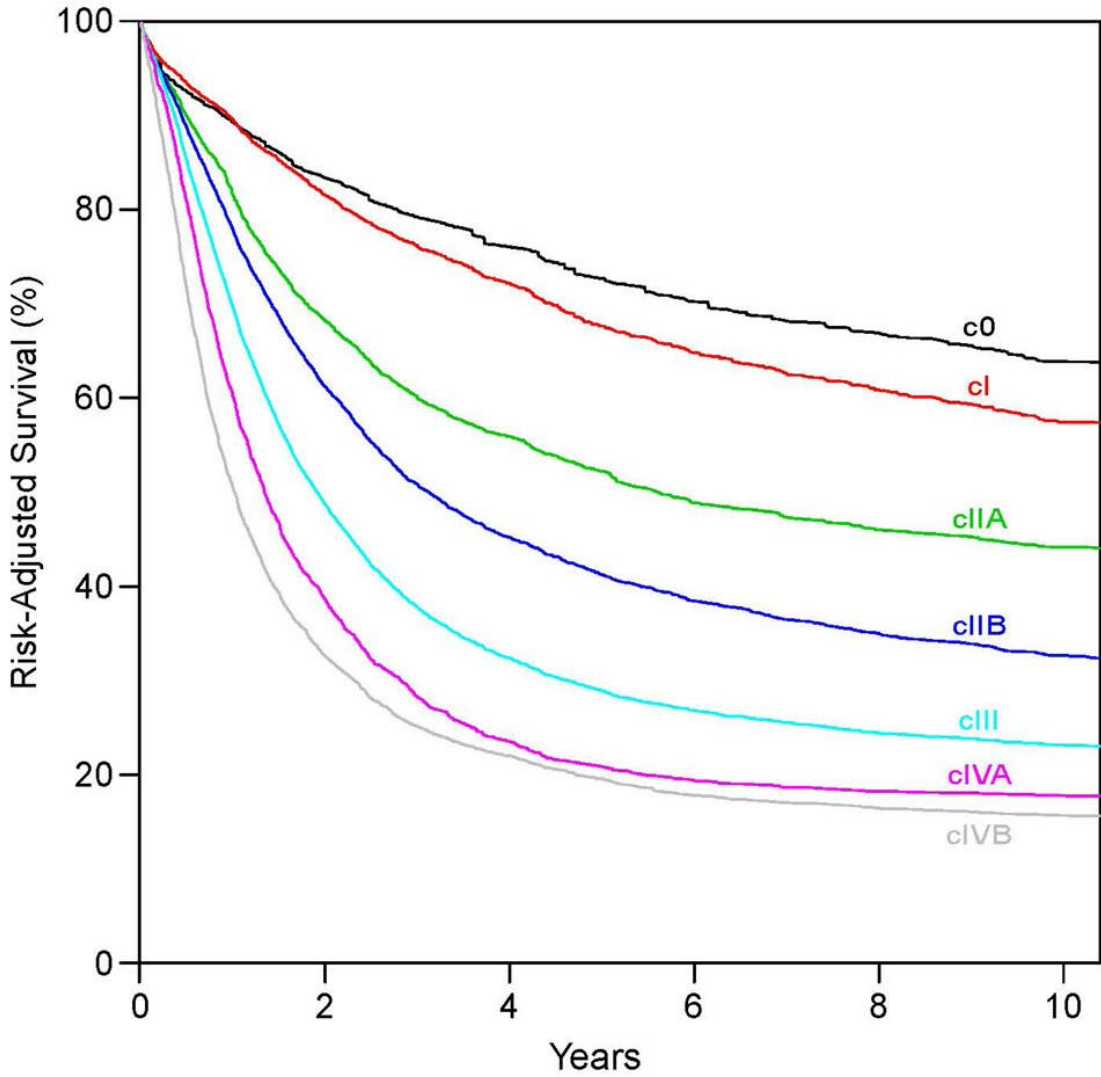
Squamous Cell Carcinoma

Stage 0	cTis
Stage I	cT1N0-1M0
Stage II	cT2N0-1M0 plus cT3N0M0 cT1-2N1M0 and cT3N0M0 are cStage III adenocarcinomas
Stage III	cT3N1M0 and cT1-3N2, mirroring pStage IIIA-B squamous cell carcinoma
Stage IVA	Most advanced cancers are subgrouped
Stage IVB	cM1

Squamous Cell Carcinoma - cTNM



Adenocarcinoma - cTNM



What is New – cTNM Adenocarcinoma

cT1-2 distinctive by cN0-1

cT3-4 not distinctive by cN0-1

cT4 subcategorization

cTNM Adenocarcinoma

	N0	N1	N2	N3	M1
Tis	0				
T1	I	IIA	IVA	IVA	IVB
T2	IIB	III	IVA	IVA	IVB
T3	III	III	IVA	IVA	IVB
T4a	III	III	IVA	IVA	IVB
T4b	IVA	IVA	IVA	IVA	IVB

What is New – cTNM Adenocarcinoma

Stage 0	cTis
Stage I	cT1N0M0
Stage II	subgrouped IIA cT1N1M0 and IIB cT2N0M0
Stage III	cT2N1M0 and cT3-4aN0M0 unlike cStage SCCa but mirroring pStage III adenocarcinoma
Stage IVA	merging of cN2-3



AJCC
American Joint Committee on Cancer

AJCC Cancer Staging Manual

Eighth Edition

 Springer

UICC 8th Edition - CAUTION

Borrowed (Incompletely) from AJCC
8th Edition

cTNM Identical to AJCC

pTNM 1) Pathologic Stage Groups*
 2) Prognostic Pathologic
 Stage Groups*

ypTNM not presented*

*** Problematic**

What's Next

9th Edition

Heightened collaboration?

cTNM improved staging and documentation

pTNM genetic signature
(? cTNM / ypTNM)

ypTNM precision cancer care

