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The American Experience

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Acknowledgement

- Dorina Kallogjeri, MD, MPH- Senior Data Control Coordinator
- Lori Grove, CTR, Barnes-Jewish Hospital Cancer Registry Manager
- Research support
 - National Cancer Institute
 - Longer Life Foundation

Introduction

- Barnes-Jewish Hospital/Siteman Cancer Center third largest US cancer center -- 9000 newly diagnosed cases/year
- 1995 – Director of Oncology Data Services requested addition of comorbidity as new element
- Feedback from registrars informed need to modify existing chart-based comorbidity with purpose of increase relevance for adult cancer patients

Criteria for Inclusion of Ailments

- Comorbid ailments identified by registrars and clinical experts
 - Clinically Important - Impact on treatment and prognosis
 - Prevalence - 1% of patients or greater
 - Significant predictor of outcome
- No additional costs for capture
 - Registrars already abstracting data
 - No need to obtain additional data

JAMA 2004;291:2441-2447

Adult Comorbidity Evaluation-27

ACE-27

- Chart-based comorbidity index for patients with cancer
- Developed through modification of the
Kaplan-Feinstein Comorbidity Index (KFI)
- Modifications were made through discussions with clinical experts and a review of the literature
- Validated in study of 19,268 cancer patients treated at Barnes-Jewish Hospital

Adult Comorbidity Evaluation-27

Cogent comorbid ailment	Grade 3 Severe Decompensation	Grade 2 Moderate Decompensation	Grade 1 Mild Decompensation
Cardiovascular System			
Myocardial Infarct	<ul style="list-style-type: none"> ▪ MI ≤ 6 months 	<ul style="list-style-type: none"> ▪ MI > 6 months ago 	<ul style="list-style-type: none"> ▪ Old MI by ECG only, age undetermined
Angina / Coronary Artery Disease	<ul style="list-style-type: none"> ▪ Unstable angina 	<ul style="list-style-type: none"> ▪ Chronic exertional angina ▪ Recent (≤ 6 months) Coronary Artery Bypass Graft (CABG) or Percutaneous Transluminal Coronary Angioplasty (PTCA) ▪ Recent (≤ 6 months) coronary stent 	<ul style="list-style-type: none"> ▪ ECG or stress test evidence or catheterization evidence of coronary disease without symptoms ▪ Angina pectoris not requiring hospitalization ▪ CABG or PTCA (>6 mos.) ▪ Coronary stent (>6 mos.)
Congestive Heart Failure (CHF)	<ul style="list-style-type: none"> ▪ Hospitalized for CHF within past 6 months ▪ Ejection fraction < 20% 	<ul style="list-style-type: none"> ▪ Hospitalized for CHF >6 months prior ▪ CHF with dyspnea which limits activities 	<ul style="list-style-type: none"> ▪ CHF with dyspnea which has responded to treatment ▪ Exertional dyspnea ▪ Paroxysmal Nocturnal Dyspnea (PND)
Arrhythmias	<ul style="list-style-type: none"> ▪ Ventricular arrhythmia ≤ 6 months 	<ul style="list-style-type: none"> ▪ Ventricular arrhythmia > 6 months ago ▪ Chronic atrial fibrillation or flutter ▪ Pacemaker 	<ul style="list-style-type: none"> ▪ Sick Sinus Syndrome
Hypertension	<ul style="list-style-type: none"> ▪ DBP ≥ 130 mm Hg ▪ Severe malignant papilledema or other eye changes ▪ Encephalopathy 	<ul style="list-style-type: none"> ▪ DBP 115-129 mm Hg ▪ Secondary cardiovascular symptoms: vertigo, epistaxis, headaches 	<ul style="list-style-type: none"> ▪ DBP 90-114 mm Hg ▪ DBP <90 mm Hg while taking antihypertensive medications
Venous Disease	<ul style="list-style-type: none"> ▪ Recent PE (≤ 6 mos.) ▪ Use of venous filter for PE's 	<ul style="list-style-type: none"> ▪ DVT controlled with Coumadin or heparin ▪ Old PE > 6 months 	<ul style="list-style-type: none"> ▪ Old DVT no longer treated with Coumadin or Heparin
Peripheral Arterial Disease	<ul style="list-style-type: none"> ▪ Bypass or amputation for gangrene or arterial insufficiency < 6 months ago ▪ Untreated thoracic or abdominal aneurysm (≥6 cm) 	<ul style="list-style-type: none"> ▪ Bypass or amputation for gangrene or arterial insufficiency > 6 months ▪ Chronic insufficiency 	<ul style="list-style-type: none"> ▪ Intermittent claudication ▪ Untreated thoracic or abdominal aneurysm (< 6 cm) ▪ s/p abdominal or thoracic aortic aneurysm repair

Web-Based Comorbidity Education Program

 Washington
University in St. Louis
SCHOOL OF MEDICINE

 SITEMAN CANCER CENTER

 BARNES JEWISH
Hospital

 BJC HealthCare™



Welcome to the Coding Comorbidity Course

Patients with cancer often have other diseases, illnesses, or conditions in addition to their index cancer. These other conditions are generally referred to as comorbidities. Although not a feature of the cancer itself, comorbidity is an important attribute of the patient. Survival rates are lower for patients with a greater number and severity of comorbid conditions. Comorbidity also has direct impact on the care of patients, selection of initial treatment, and evaluation of treatment effectiveness. When reporting statistical survival data, hospital-based and national cancer registries do not routinely take into account these coexisting medical ailments.

The goal of this online coding course is to assist in the education and training of Certified Tumor Registrars and other individuals dedicated to collecting and reporting information on patients with cancer. The website should also serve as a resource to answer questions and to guide continued accurate and valid collection of comorbid information. We are most interested in all comments from users of this website so we may improve this work for future users.

Thank You,

[Jay F. Piccirillo, MD](#)

[Dorina Kallogjeri, MPH](#)

[Clinical Outcomes Research Office](#)

[Lori Grove, CTR](#)

Coordinator of BJC Oncology Data Services

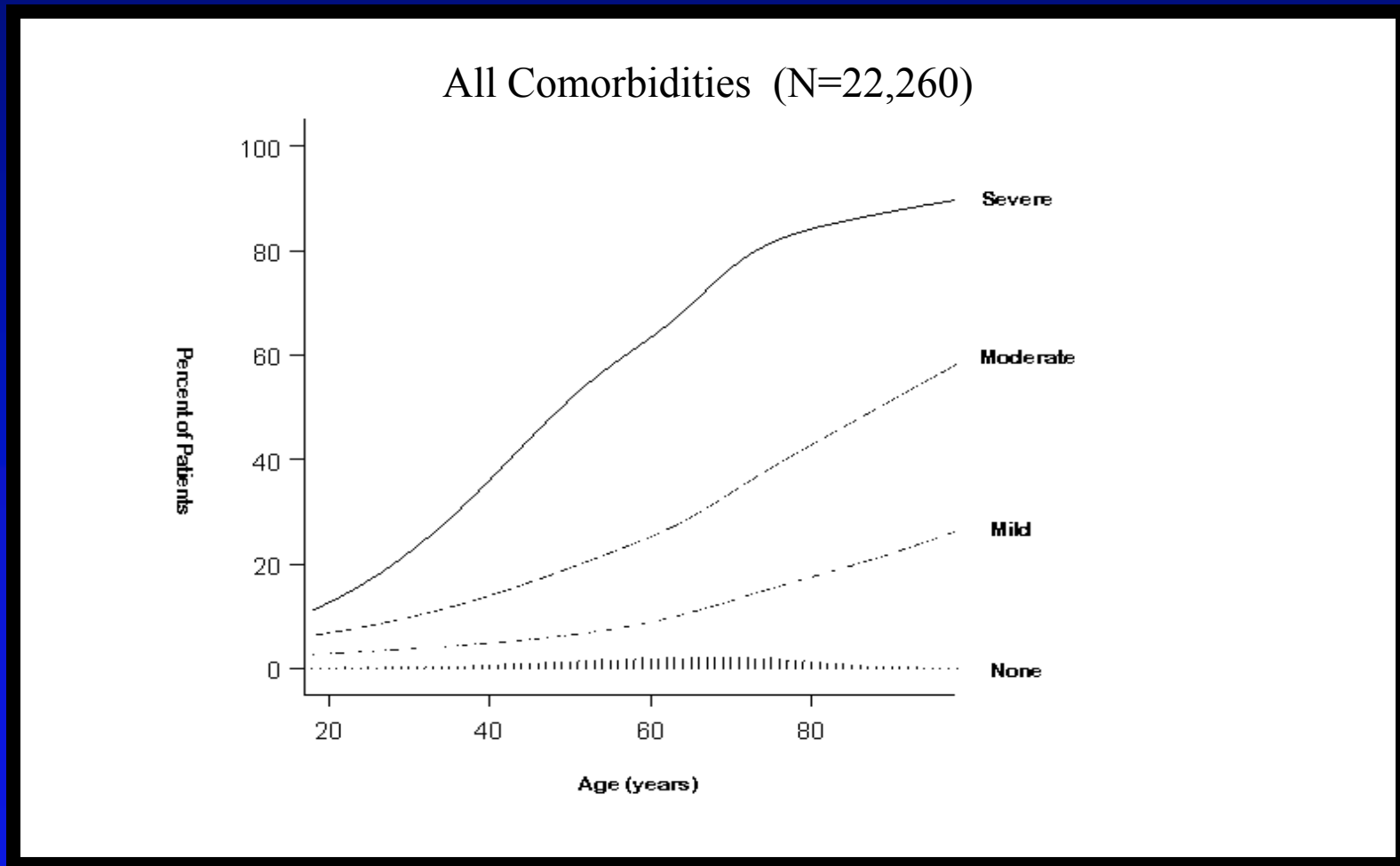
Program sponsored by the National Cancer Institute Cancer Education Grant.

*Prevalence of Comorbidity Across
the Age Groups*

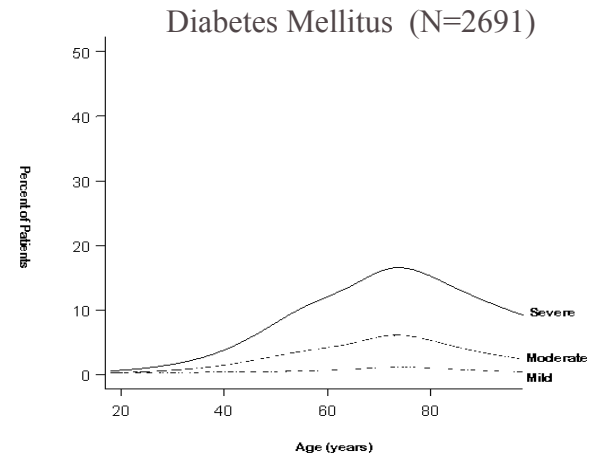
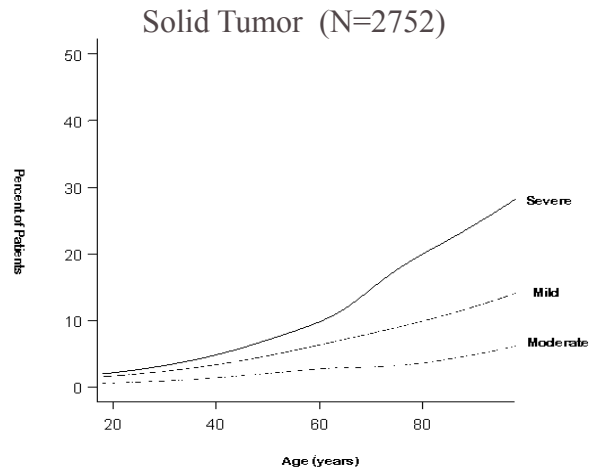
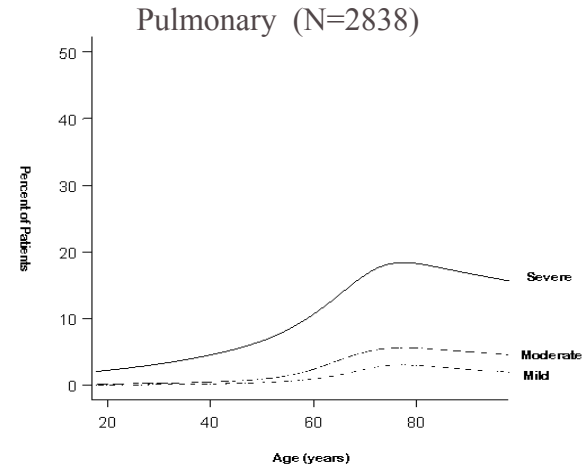
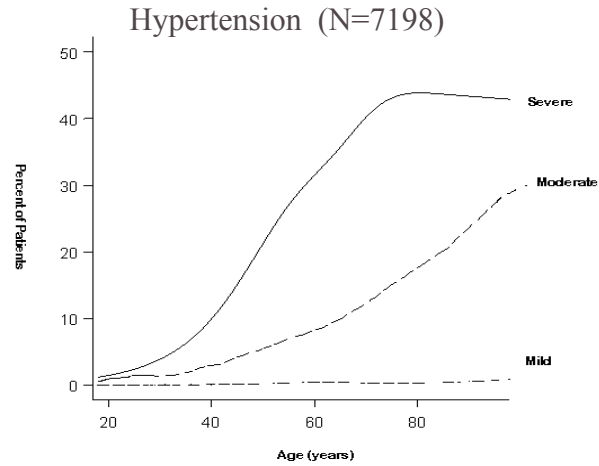
Introduction

- Prospective observational cohort study
- 22,620 adult cancer patients
- 10,851 \geq age 65 (48%)
- Treated at 8 US hospitals

Changing Prevalence of Comorbidity Across Age Groups

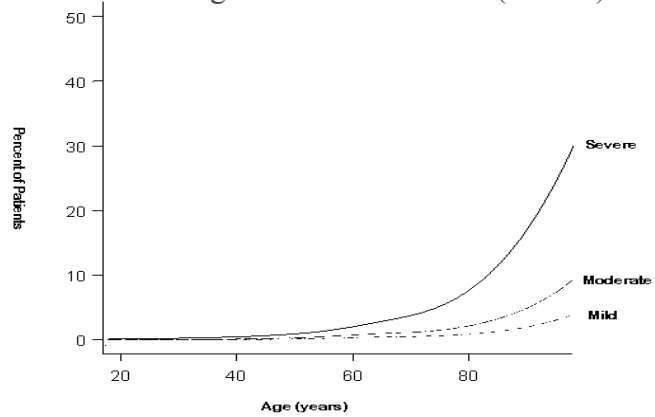


Changing Prevalence of Individual Comorbid Ailments

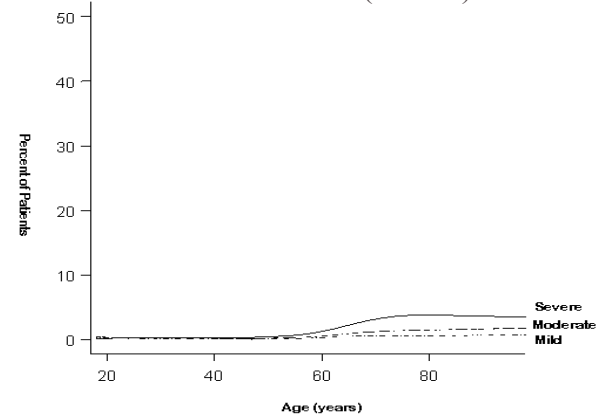


Changing Prevalence of Individual Comorbid Ailments

Congestive Heart Failure (N=793)

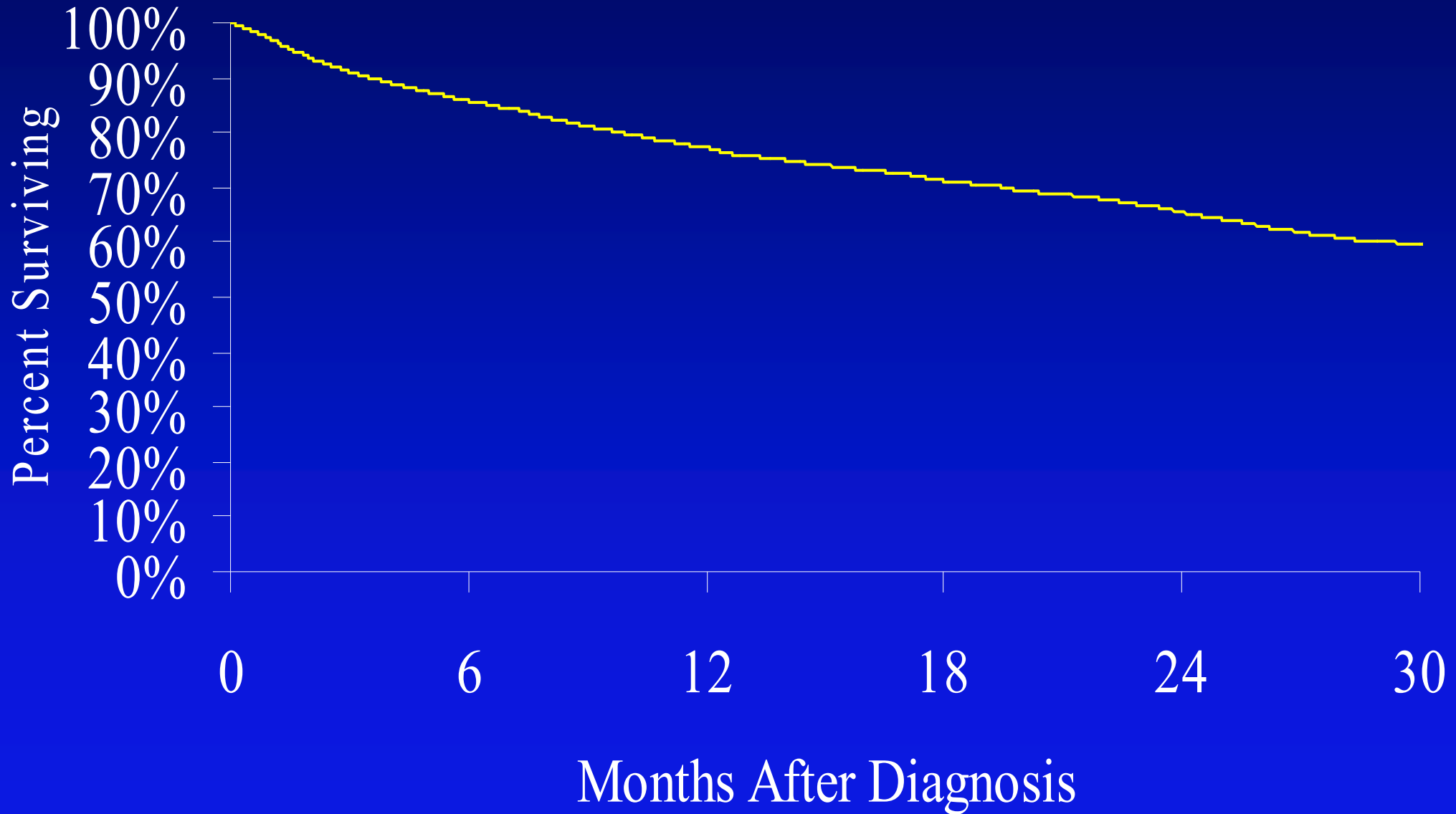


Vascular Disease (N=457)

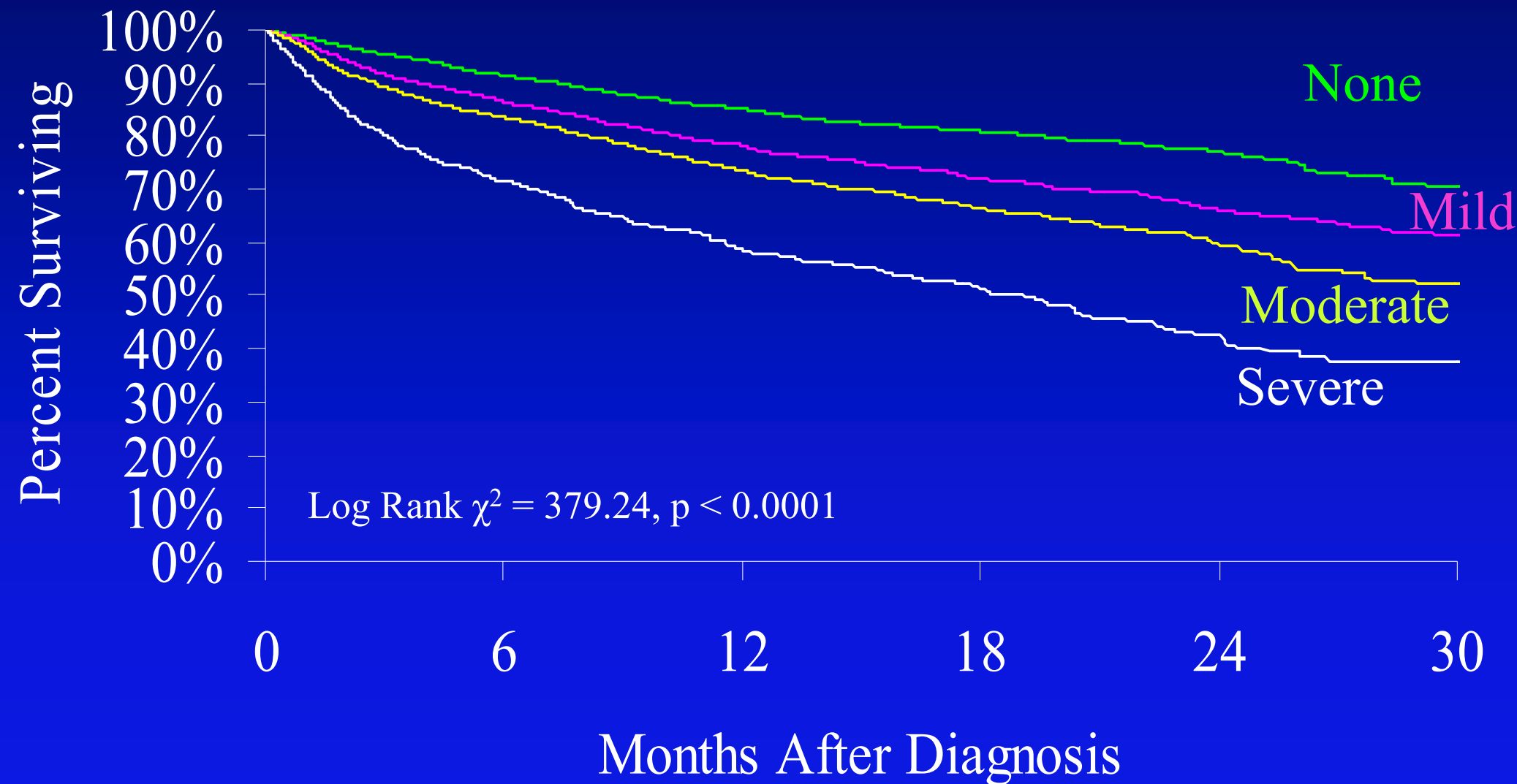


Impact of Comorbidity on Prognosis

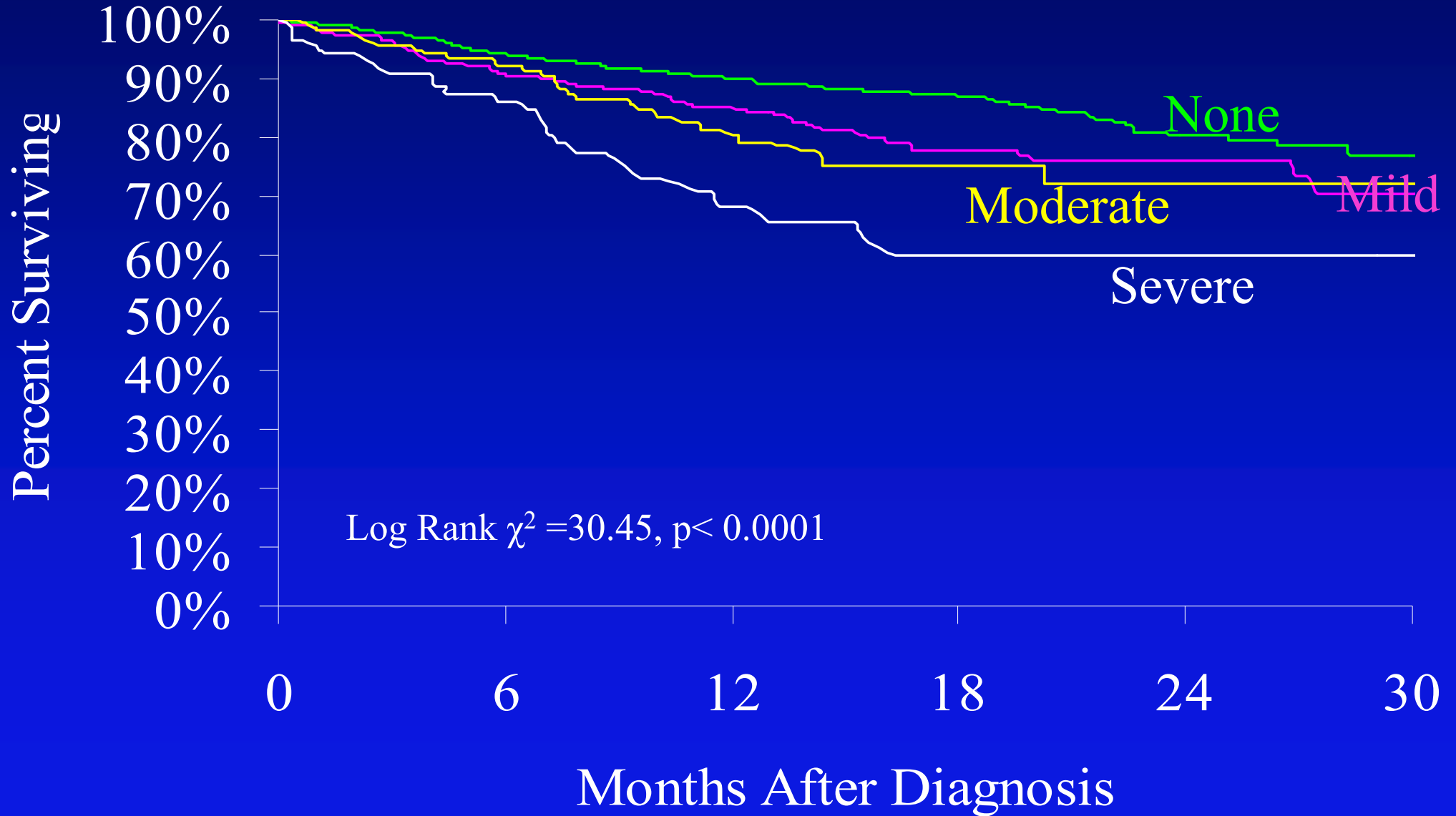
Overall Survival



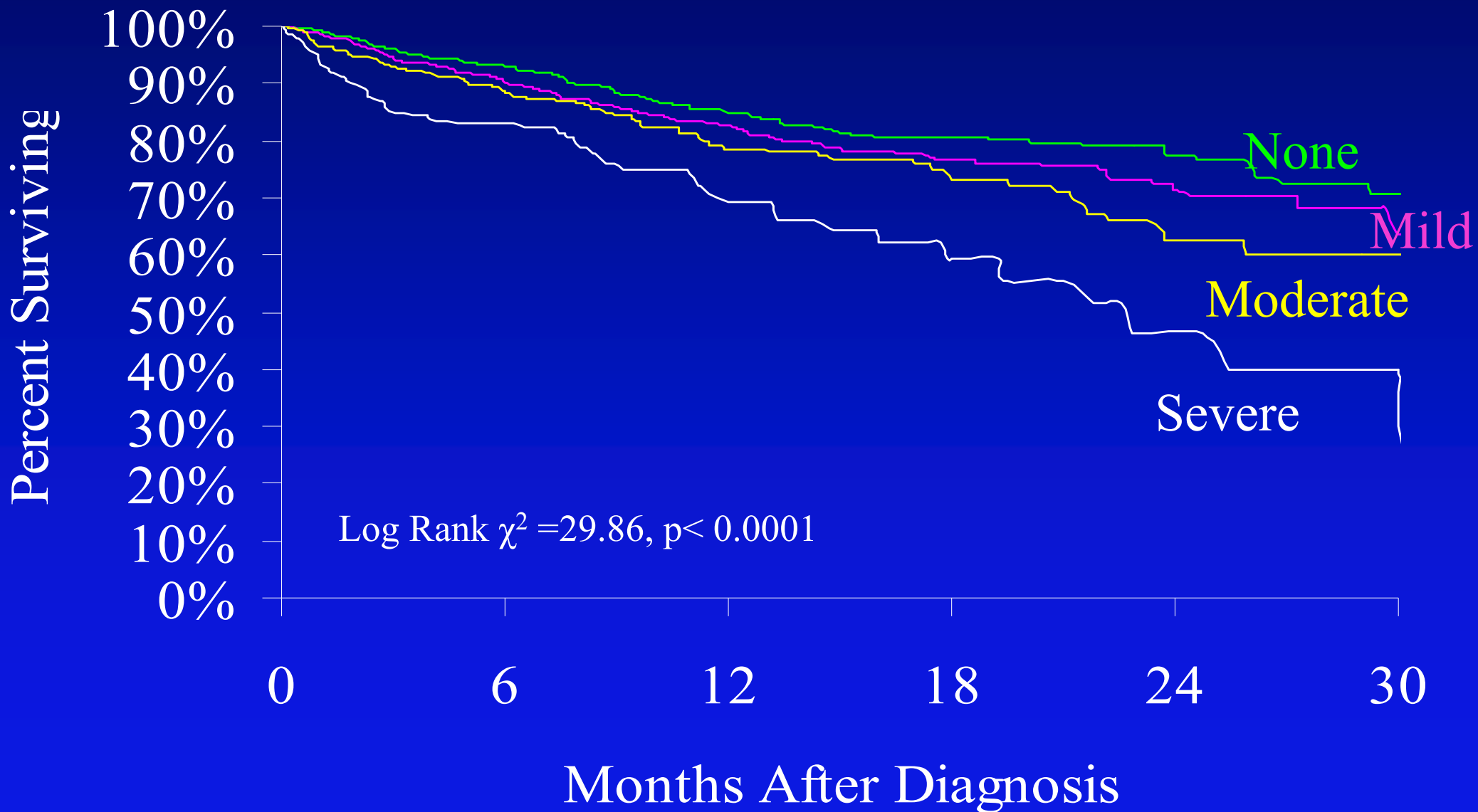
Prognostic Impact of Comorbidity



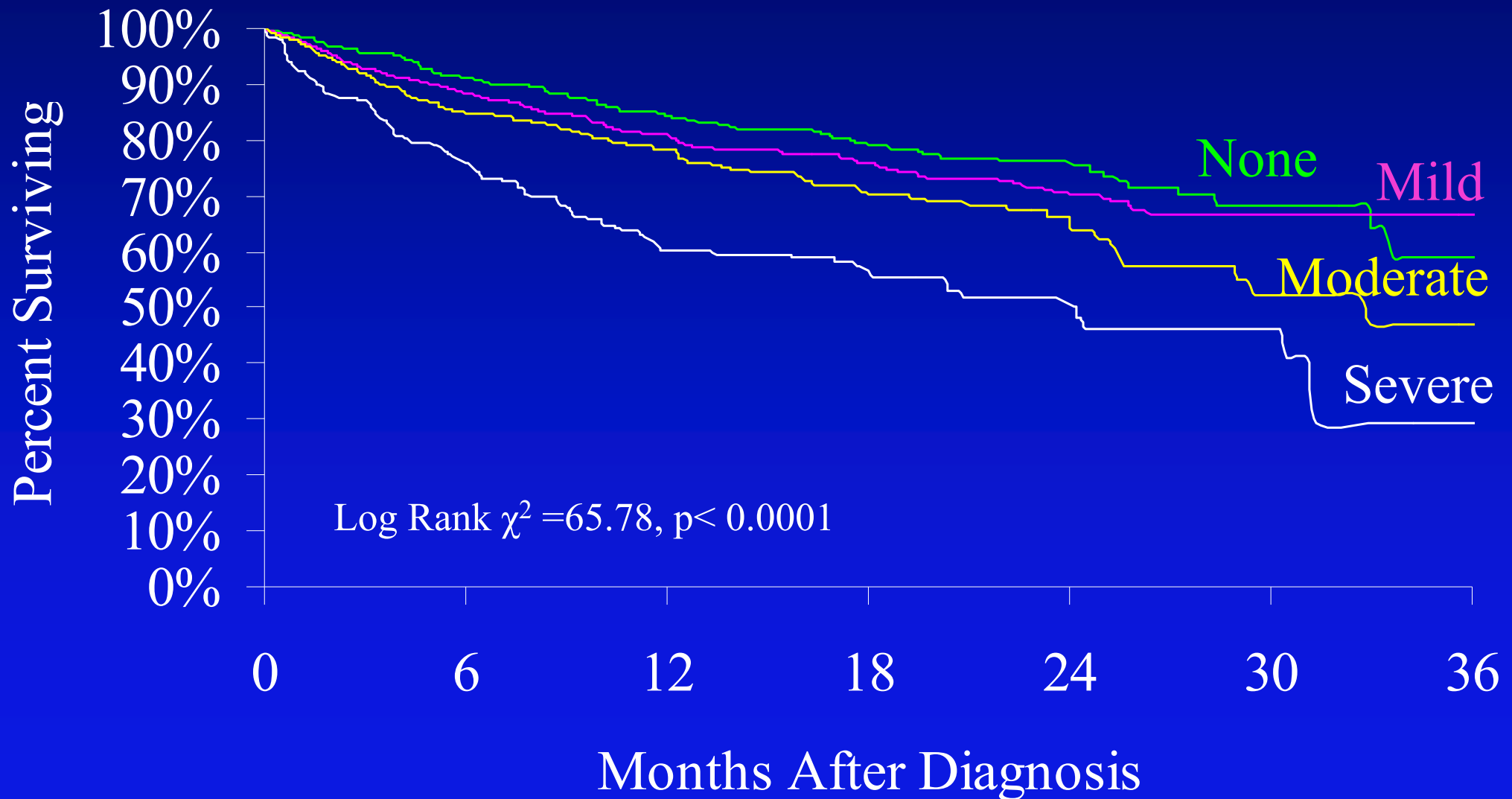
Age <50



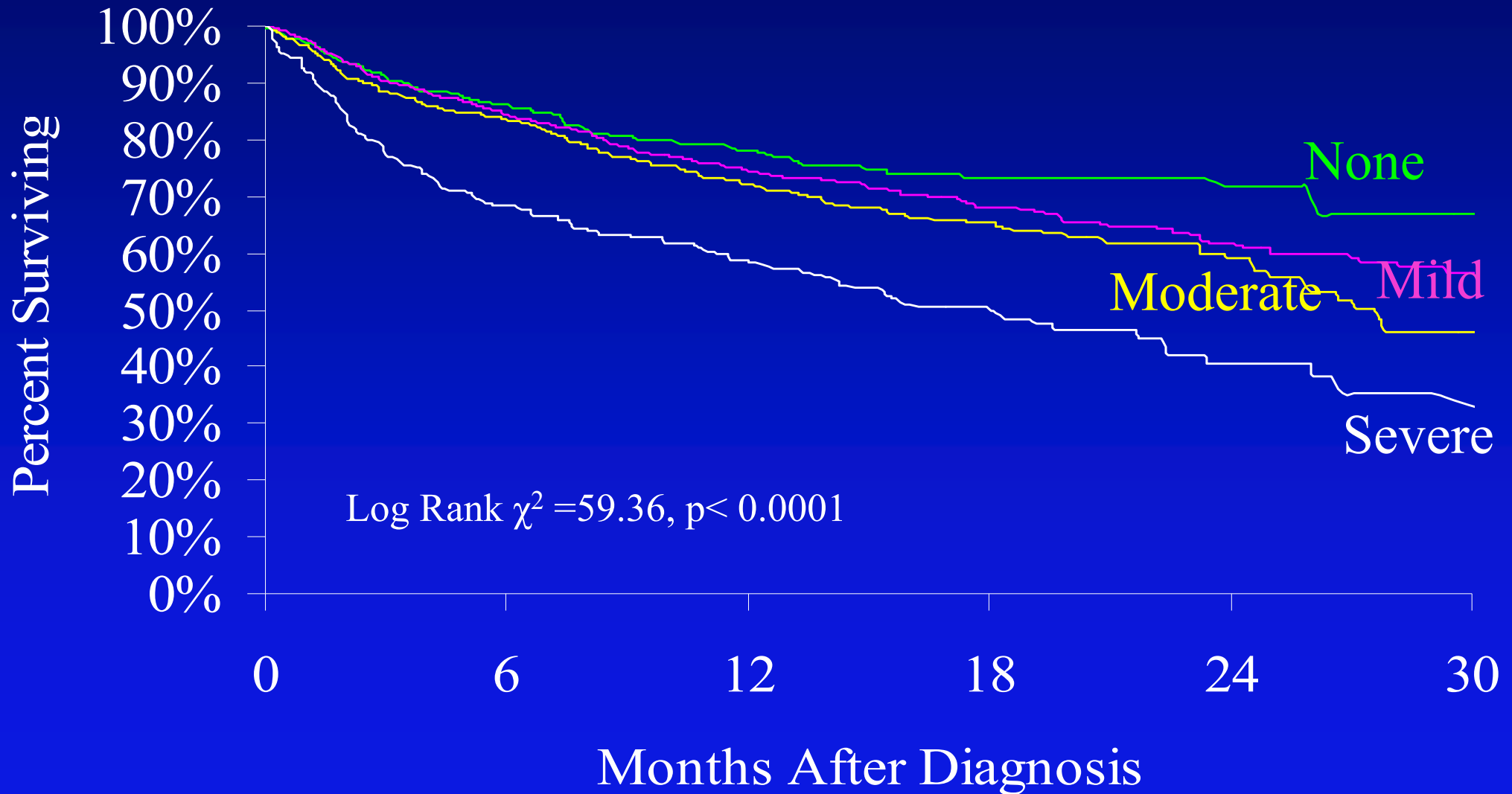
$50 \leq \text{Age} < 60$



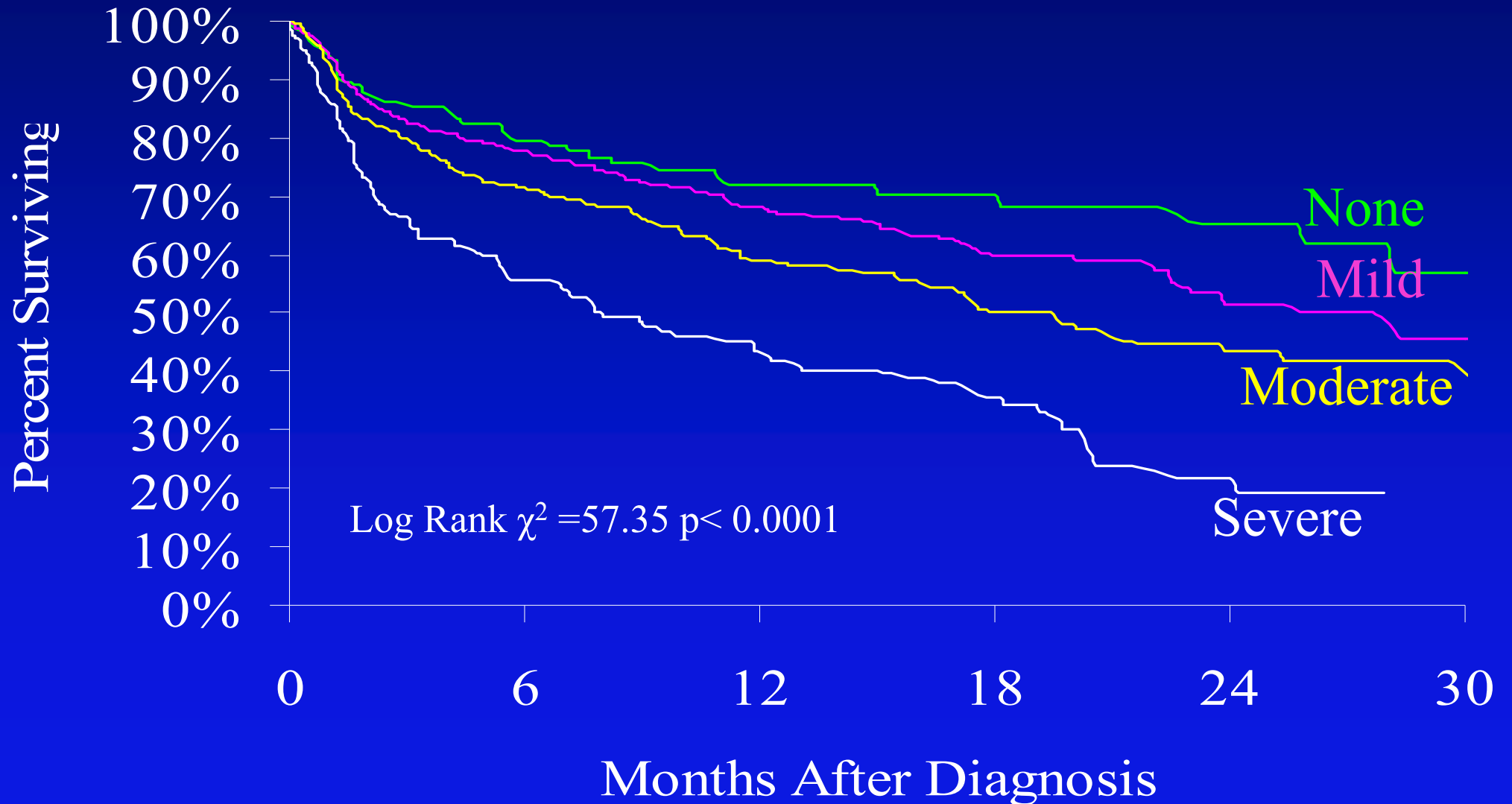
$60 \leq \text{Age} < 70$



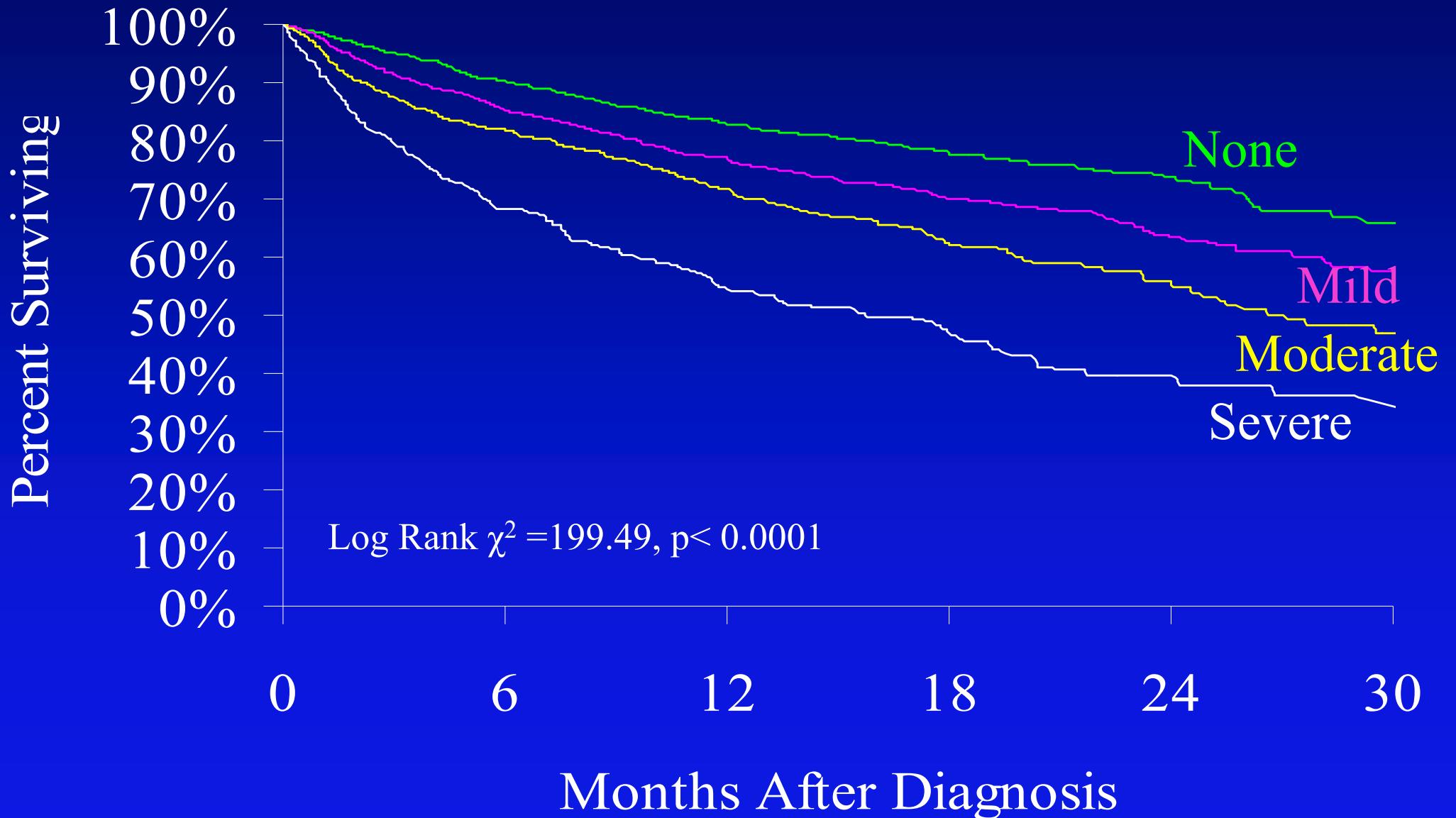
$70 \leq \text{Age} < 80$



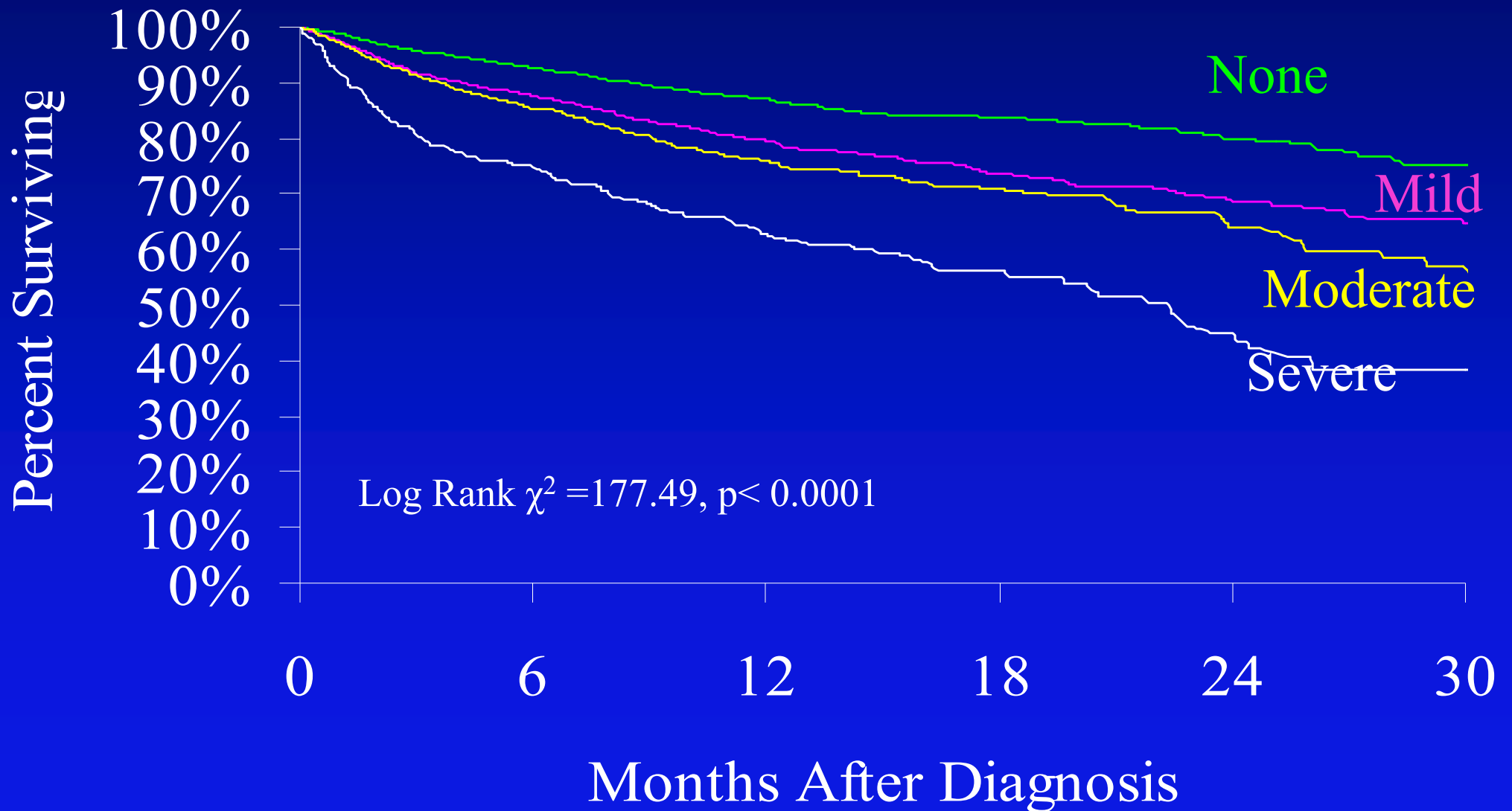
Age ≥ 80



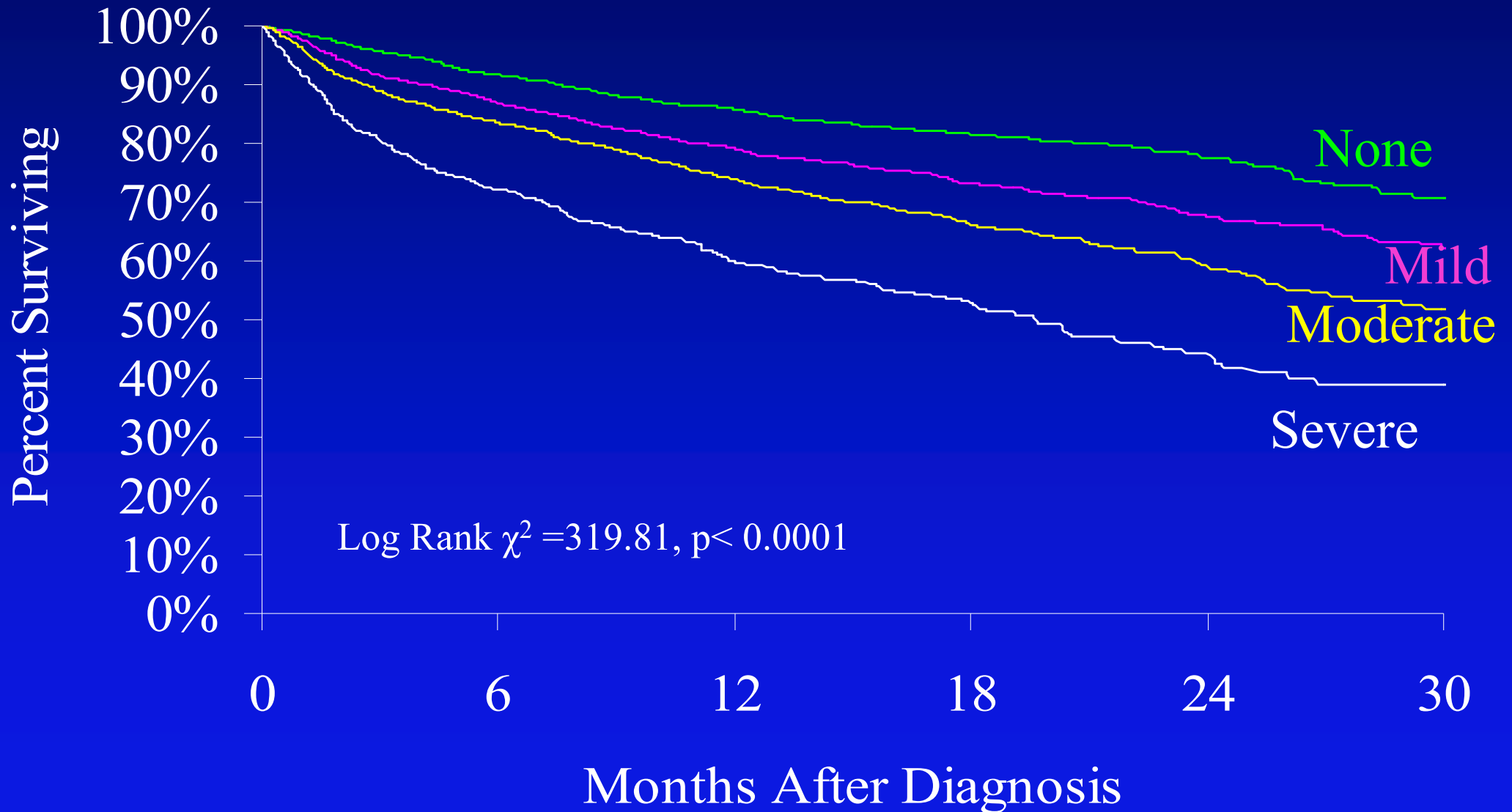
Men



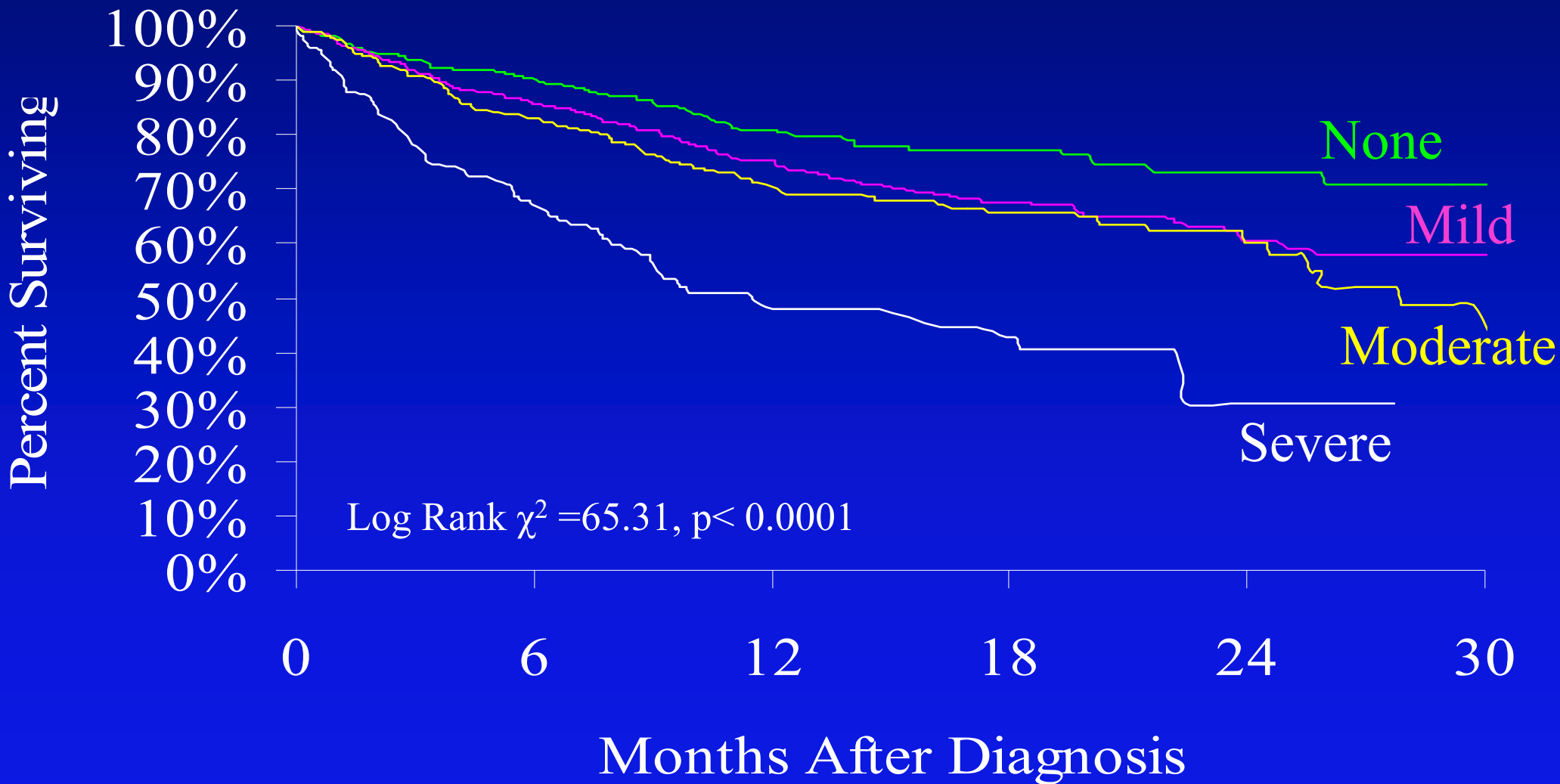
Women



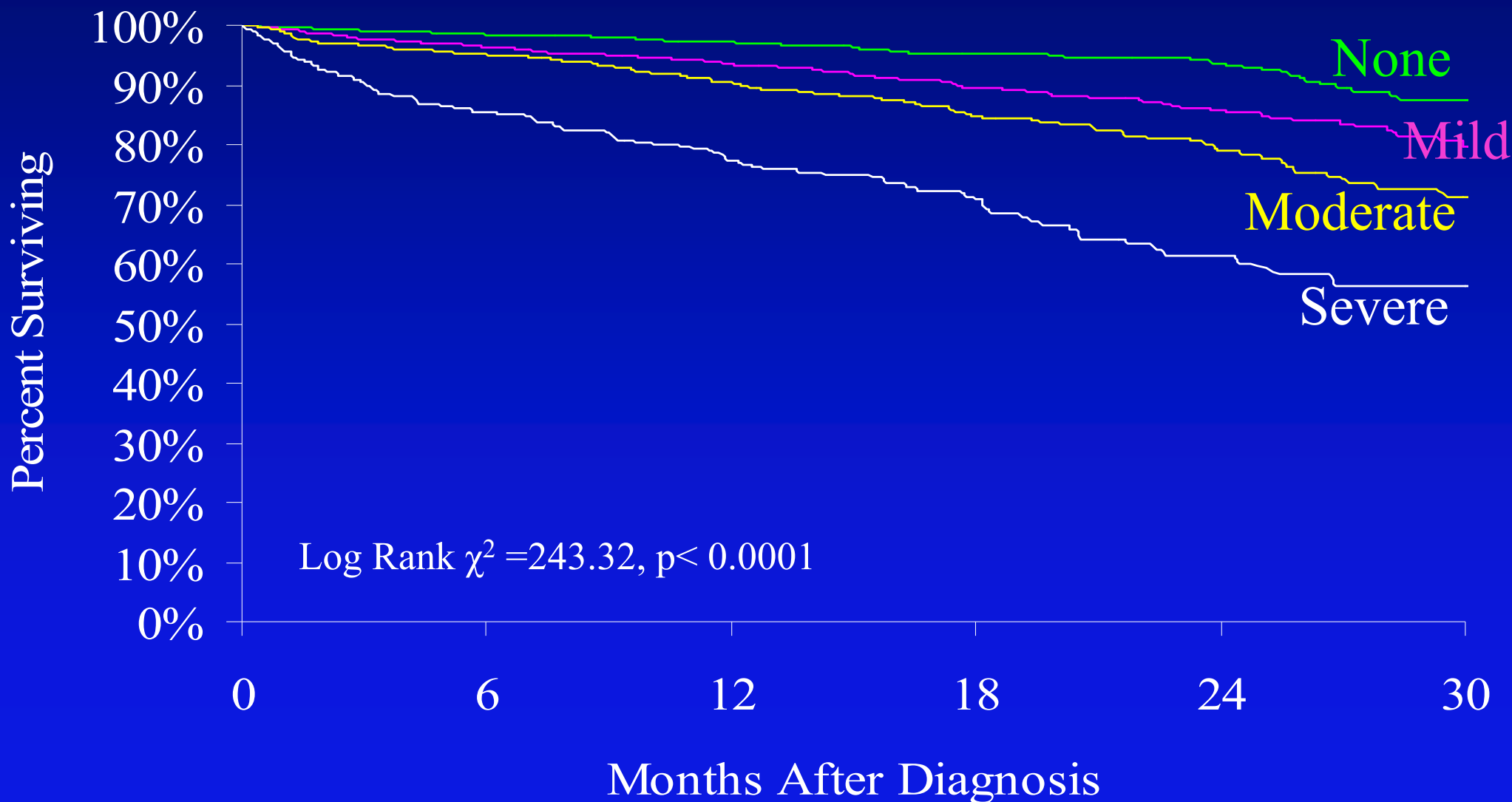
White



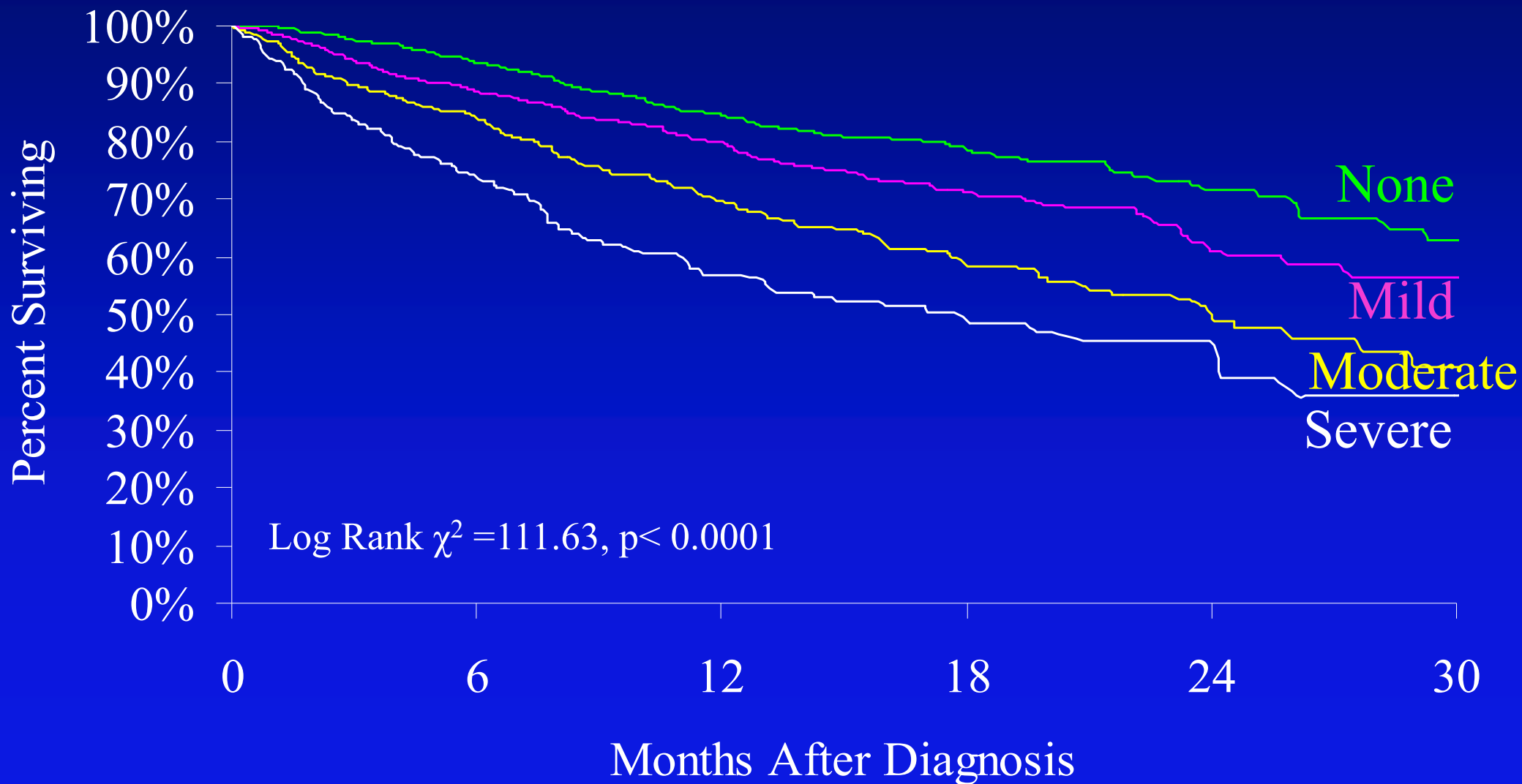
Black



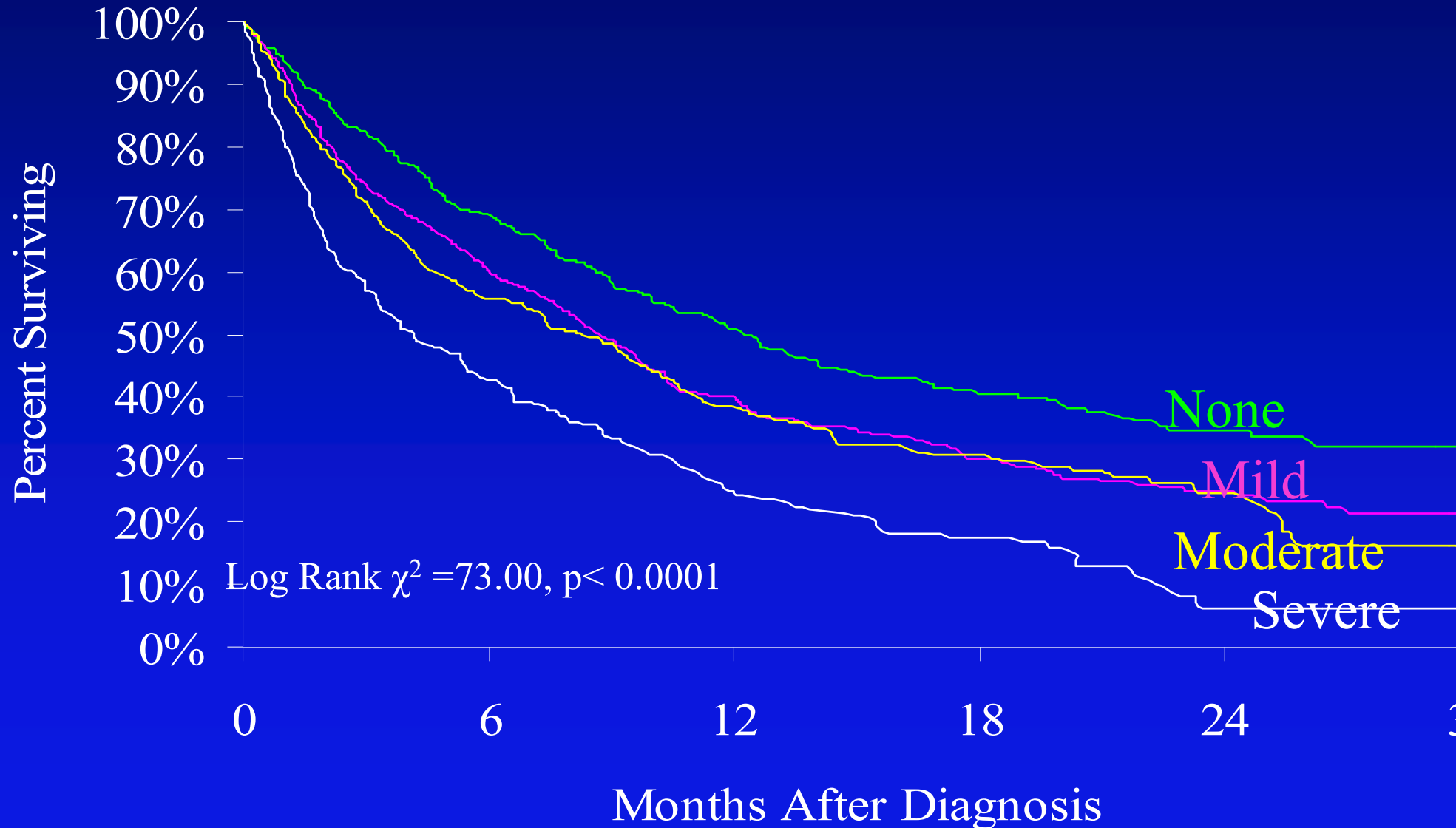
Localized



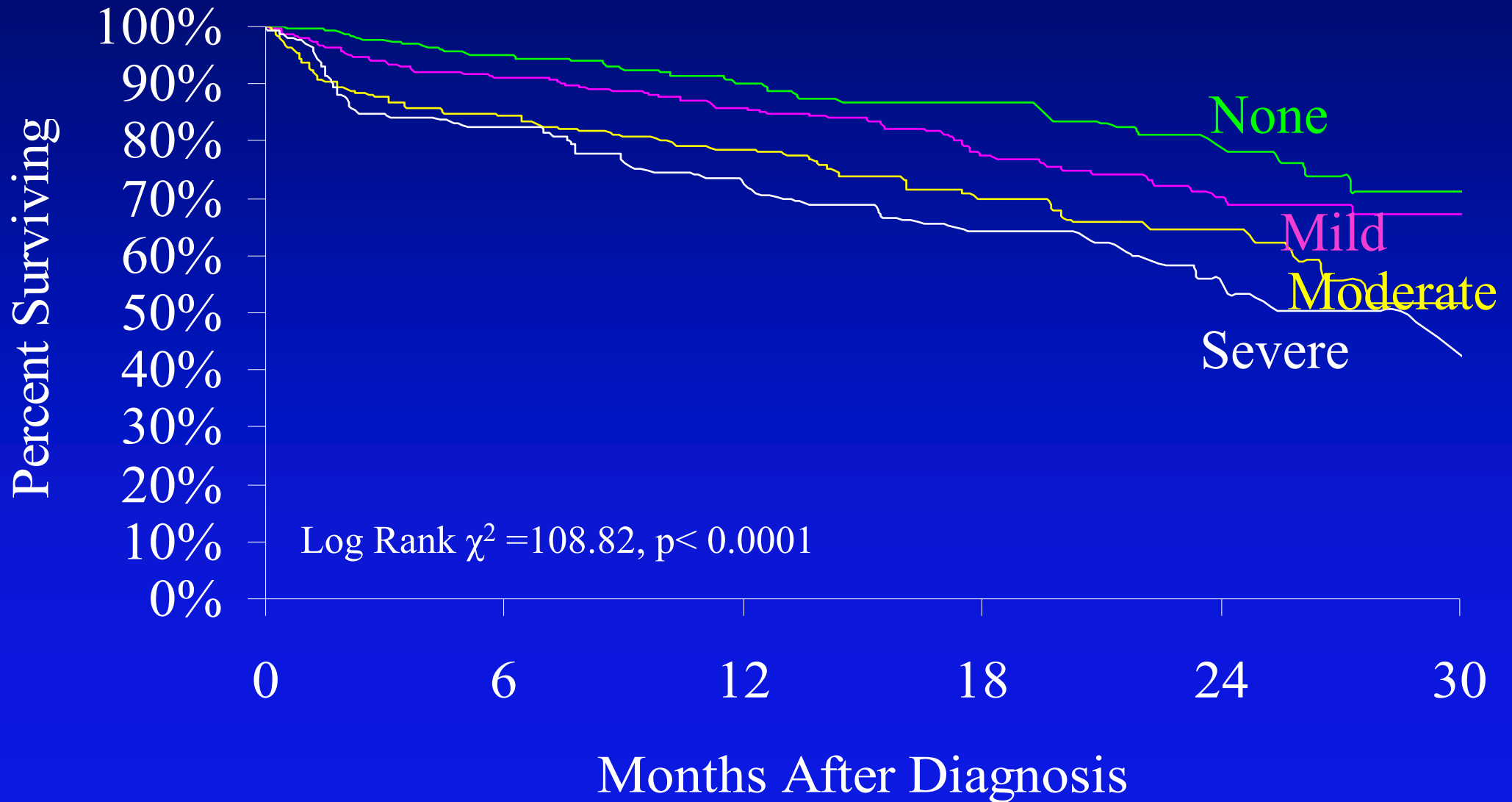
Regional



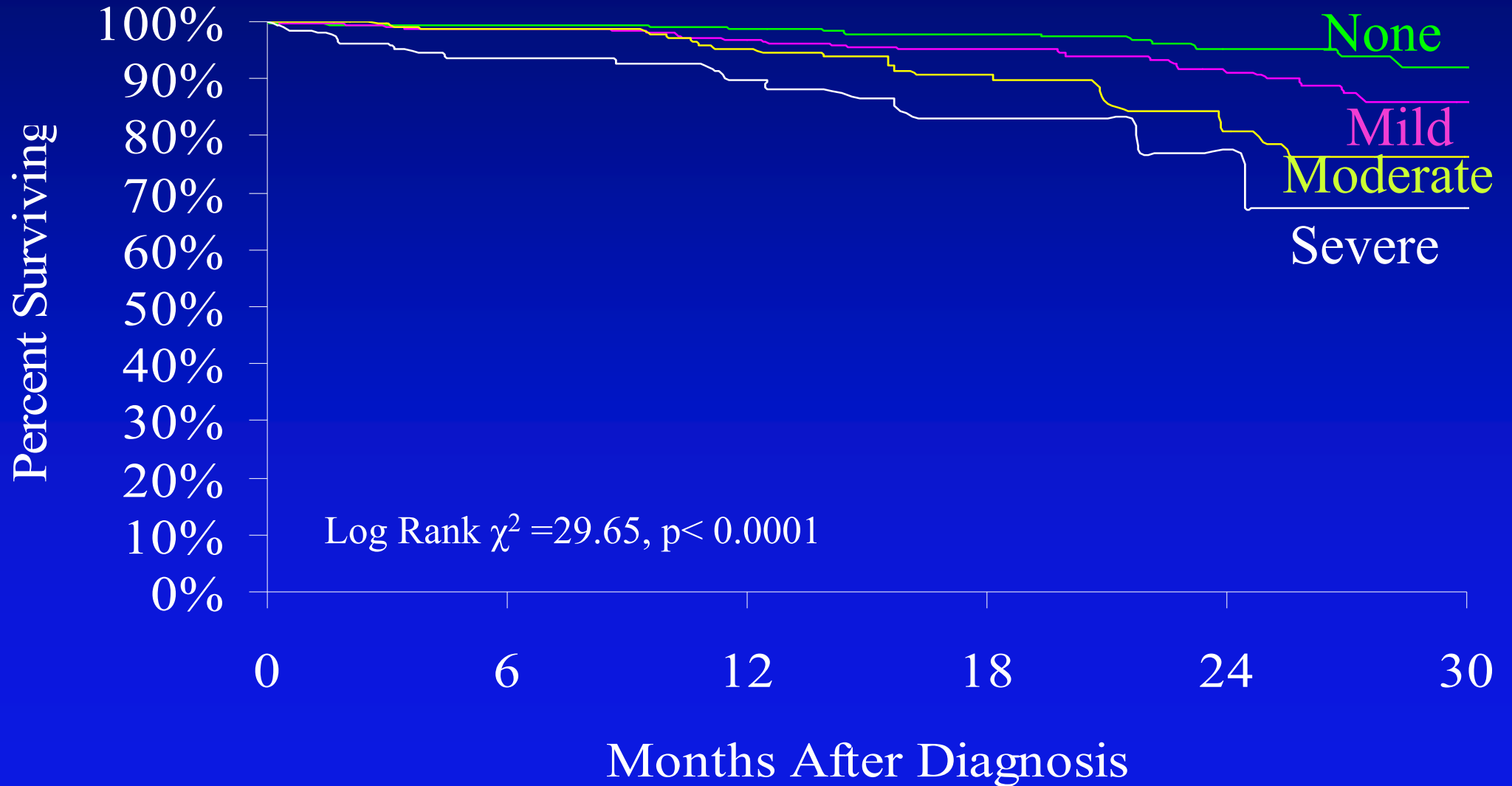
Distant



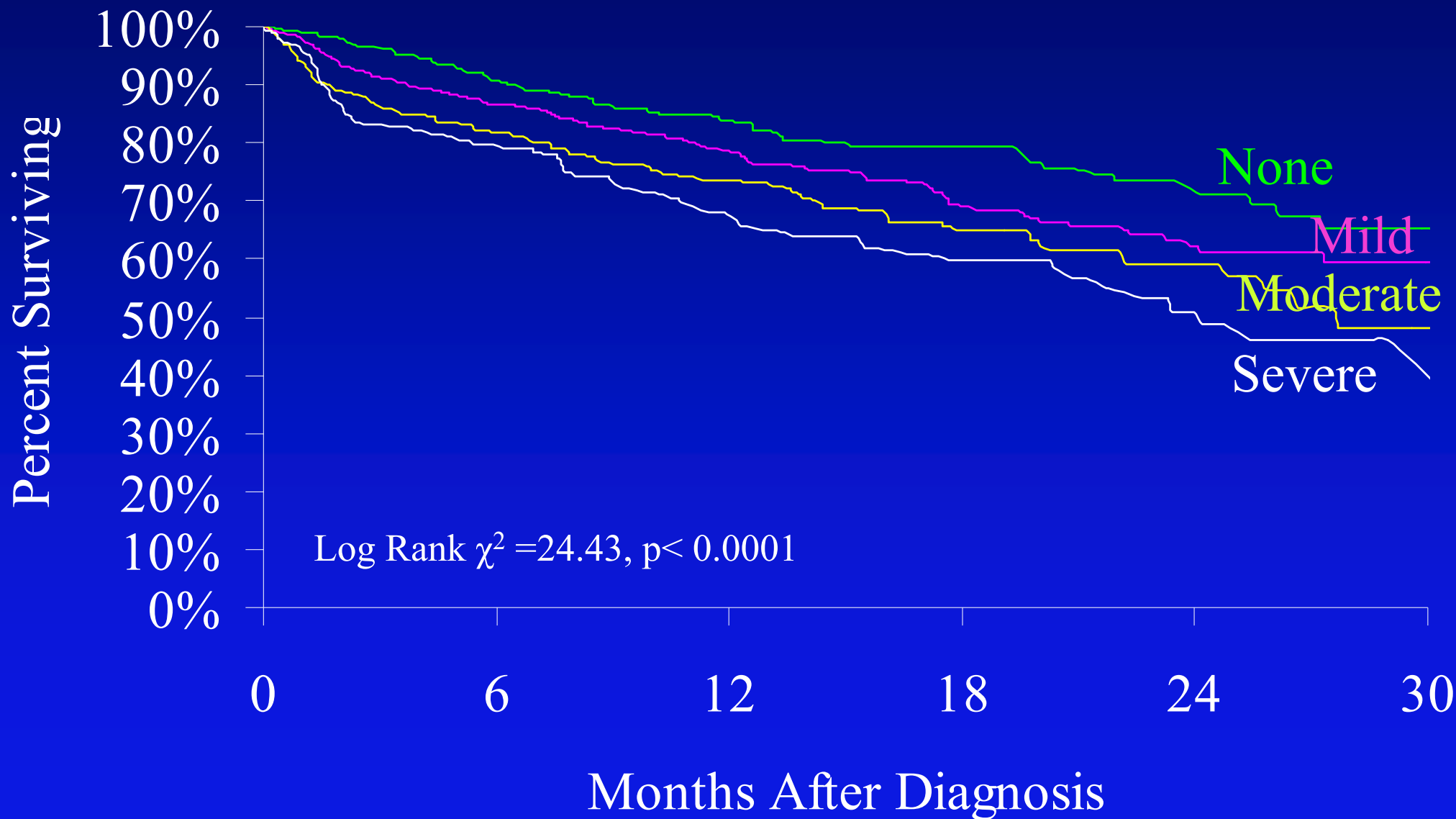
Prostate



Breast



Colorectal



Comparison of Comorbidity Indices for Patients With Head and Neck Cancer

- The goal of this study was to compare 2 general comorbidity indices with 2 disease-specific indices
- Surveillance, Epidemiology, and End Results Medicare-linked database used to identify 15,493 patients with incident squamous cell carcinomas of the oral cavity, pharynx, and larynx
- Comorbid ailments were identified through the use of the ICD-9 edition codes in the Medicare inpatient and outpatient claims for 7131 patients

Results

- The general indices performed as well as the disease-specific indices
- No instrument clearly performed better than the others
- In this claims-based analysis, no apparent advantage to using a disease-specific index when attempting to predict overall survival

Commission on Cancer Comorbidity Initiative

2003 - COC mandated the collection of comorbidity information as defined by the ICD-9-CM codes from the hospital discharge attestation sheet as a new data element in *Facility Oncology Registry Data Standards*.

Journal Registry Management. 2003;30:117-122.

Instructions

“Comorbid conditions and complications can only be reported for patients that have inpatient hospitalizations at your facility.”

Problems

“Comorbid conditions and complications can only be reported for patients that have inpatient hospitalizations at your facility.”

- “We anticipate that only 60% of patients will be hospitalized and have ICD-9-CM face sheets available”.
- The main problem is the introduction of bias by a high degree of selectively incomplete information as a result of the nonrandom use of inpatient hospitalization

Instructions

“Code the comorbid conditions and complications in the sequence in which they appear in patient record as secondary diagnoses”

Problem

“Code the comorbid conditions and complications in the sequence in which they appear in patient record as secondary diagnoses”

Sequencing order is generally selected to maximize reimbursement and may not necessarily reflect the relationship between these conditions and treatment and outcomes of cancer care

Instructions

“Comorbidities are preexisting medical conditions or conditions that were present at the time the patient was diagnosed with cancer. Comorbid conditions are identified by ICD-9-CM codes 001-139.8 and 240-999.9.”

Problems

“Comorbidities are preexisting medical conditions or conditions that were present at the time the patient was diagnosed with cancer. Comorbid conditions are identified by ICD-9-CM codes 001-139.8 and 240-999.9.”

- There are over 15,000 ICD-9-CM codes representing a huge range of conditions
- No guidance provided for selecting cogent ailments

Instructions

**“Do not record any
neoplasms (ICD-9-CM-
CM codes 140-239.9)
listed as secondary
diagnoses for this data
item.”**

Instructions

“Do not record any neoplasms (ICD-9-CM-CM codes 140-239.9) listed as secondary diagnoses for this data item.”

Many patients with cancer will have one or more previous cancers and these previous cancers are considered comorbidities.

Comparison of Chart-Based With Claims-Based Approach

- To determine which comorbidity system—chart-based or claims-based—performed better in the setting of hospital-based cancer registry
- Random sample of 588 newly diagnosed cancer patients during one-year period

Results

- Important differences in both the number and agreement when identifying individual diseases
- Different methods yield large differences in the distribution of patients among comorbidity
 - Example, % of patients with “No” comorbidity
 - 71 % chart-based
 - 26% claims-based

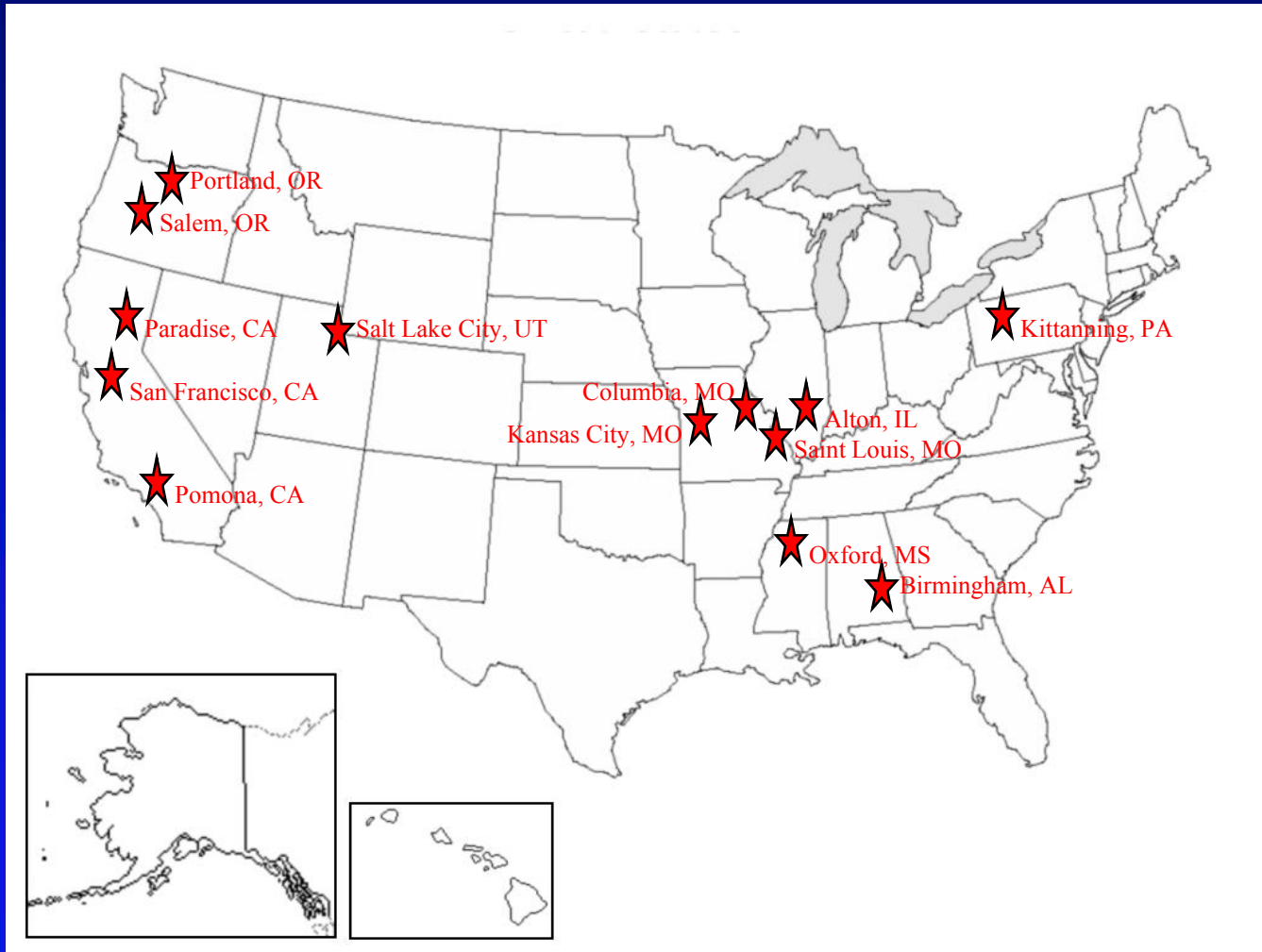
Comparison of Comorbidity Collection Methods

National Cancer Institute R01 CA114271

Introduction

- To assess the ability of cancer registrars in different hospitals and cancer care settings to learn to code comorbidity using the *Web-Based Comorbidity Education Program*
- To evaluate the reliability and validity of comorbidity coding using the approach taught in the *Web-Based Comorbidity Education Program*
- To compare chart-based comorbidity assessment with claims-based approach using the ICD-9 coding system

Participating Registries



Education of Registrars

■ Enrollment

- Obtain director/supervisor approval
- Informed consent

■ Pre-training Assessment

- 25-question examination of knowledge of comorbidity
- Submission of demographics, education, and work experience per each participating registrar

Education of Registrars

- *Web-Based Comorbidity Education Program*
 - Course accessed via the Internet
 - Pre-assessment, course, and final exam
- One and six-month re-assessment of comorbidity coding competency (20 fictitious charts to code at each time point)

Validation

Comorbidity score assigned from each registrar at 1 and 6 months post training assessment compared to the correct score

Average Weighted Kappa _{1 month} (\pm SD) = 0.83 (0.09)

Average Weighted Kappa _{6 months} (\pm SD) = 0.84 (0.10)

Reliability

- **Intra-registrar reliability-** Scores assigned to 10 charts at 1-month assessment were compared with scores of the same charts at 6-month assessment

Average Weighted Kappa (\pm SD) = 0.76 (0.18)

- **Inter-registrar reliability-** Scores assigned from each registrar are compared to the scores of each of the other registrars

Average Weighted Kappa (\pm SD) = 0.78 (0.10)

- Compare the number of patients for whom comorbidity can be determined, the distribution of *None, Mild, Moderate, and Severe* comorbidity based on the two different collection methods
- Compare the prognostic accomplishments of each approach
- Qualitatively and quantitatively describe and compare the comorbid ailments recorded in the two systems

*Comparison of Different
Comorbidity Coding Schemes*

Introduction

- 14,702 patients aged 65 years or older, diagnosed with cancer between 1998 and 2007 at 7 different medical centers
- Base prognostic model included age, gender, race, cancer site, and tumor stage
- All comorbidity schemes were considered in addition to this base model

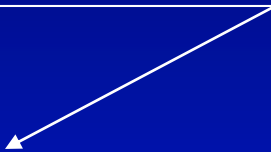
Different Comorbidity Coding Schemes

Baseline Model=Age + Gender + Race+ CA Site + Ca stage

Different Comorbidity Coding Schemes

Baseline Model=Age + Gender + Race+ CA Site + Ca stage

K-F Scoring
(linear)



Different Comorbidity Coding Schemes

Baseline Model=Age + Gender + Race+ CA Site + Ca stage

K-F Scoring

(linear)



K-F

(categorical)

Different Comorbidity Coding Schemes

Baseline Model=Age + Gender + Race+ CA Site + Ca stage

K-F Scoring

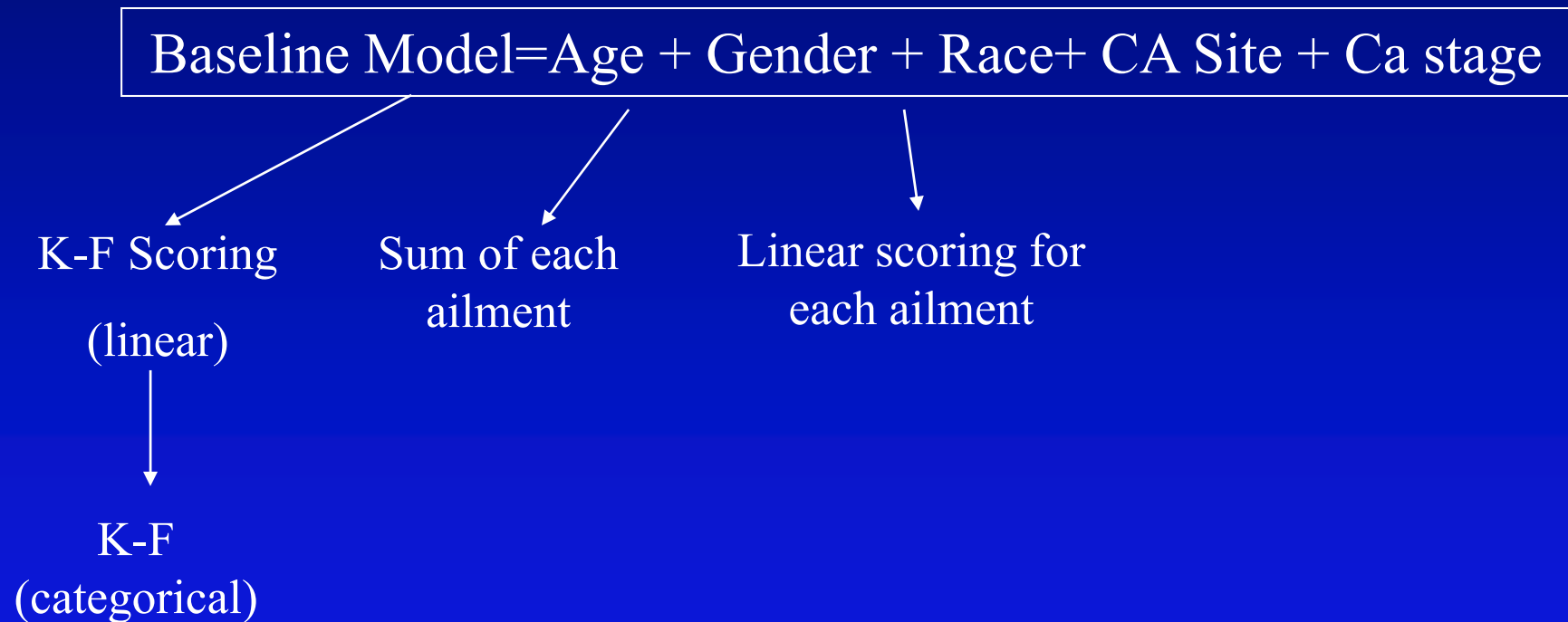
(linear)



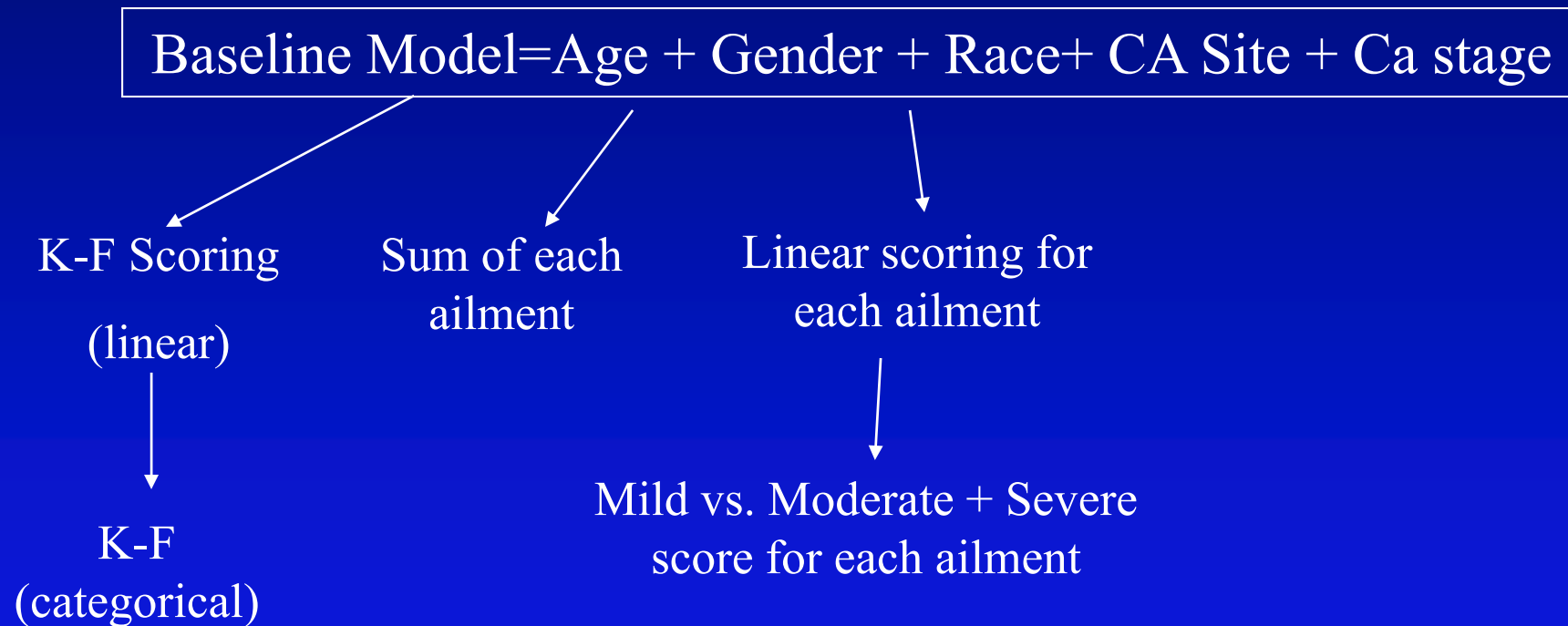
K-F
(categorical)

Sum of each
ailment

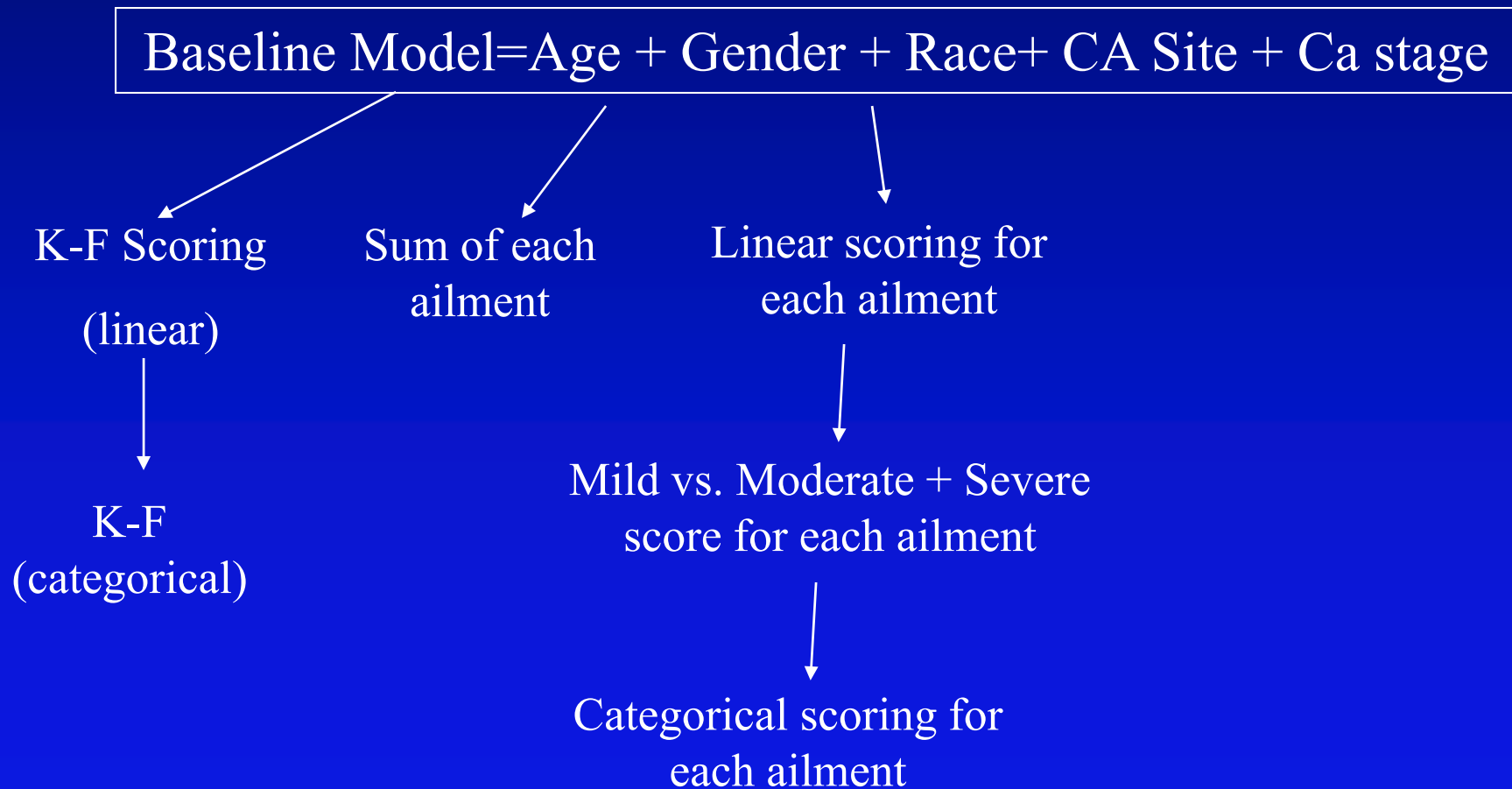
Different Comorbidity Coding Schemes



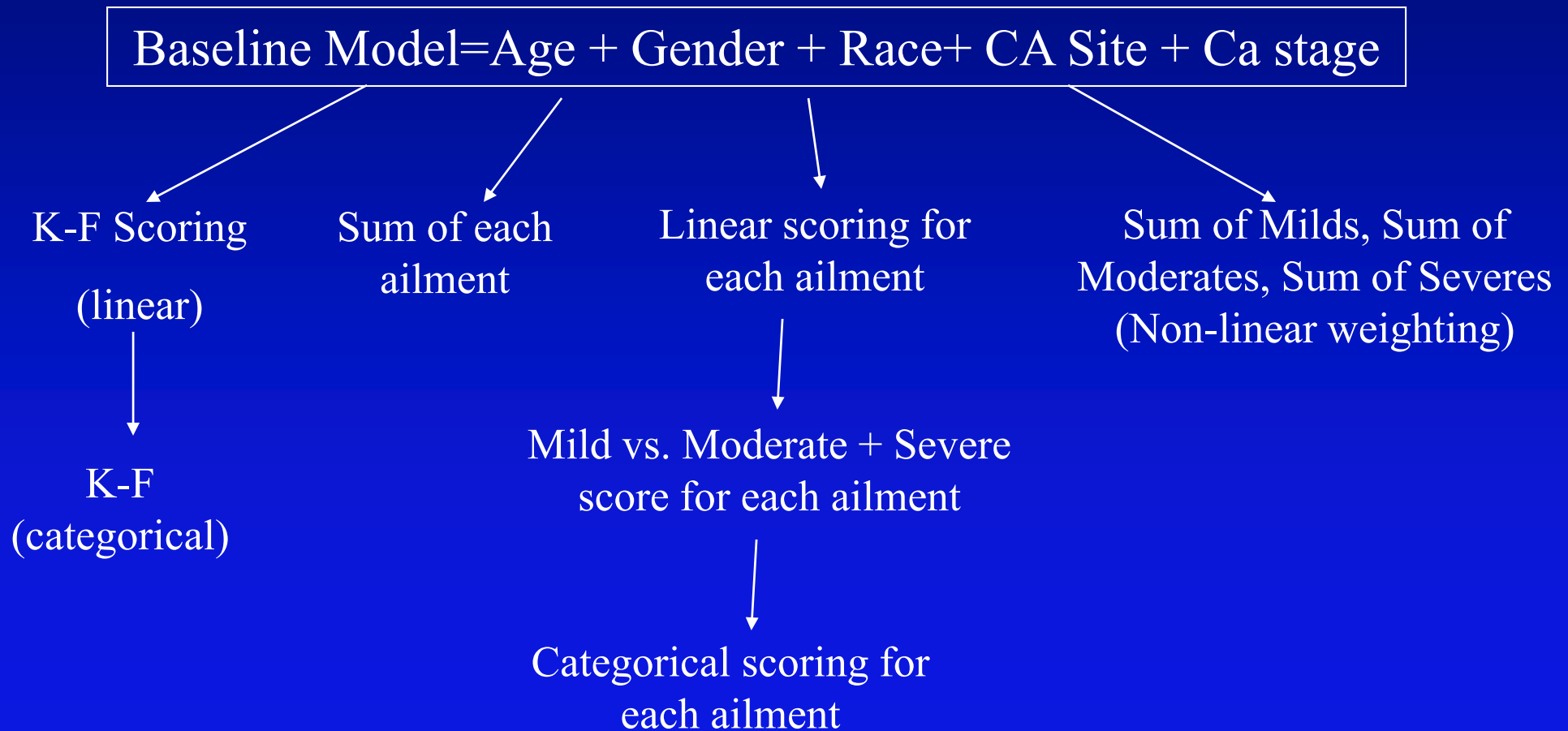
Different Comorbidity Coding Schemes



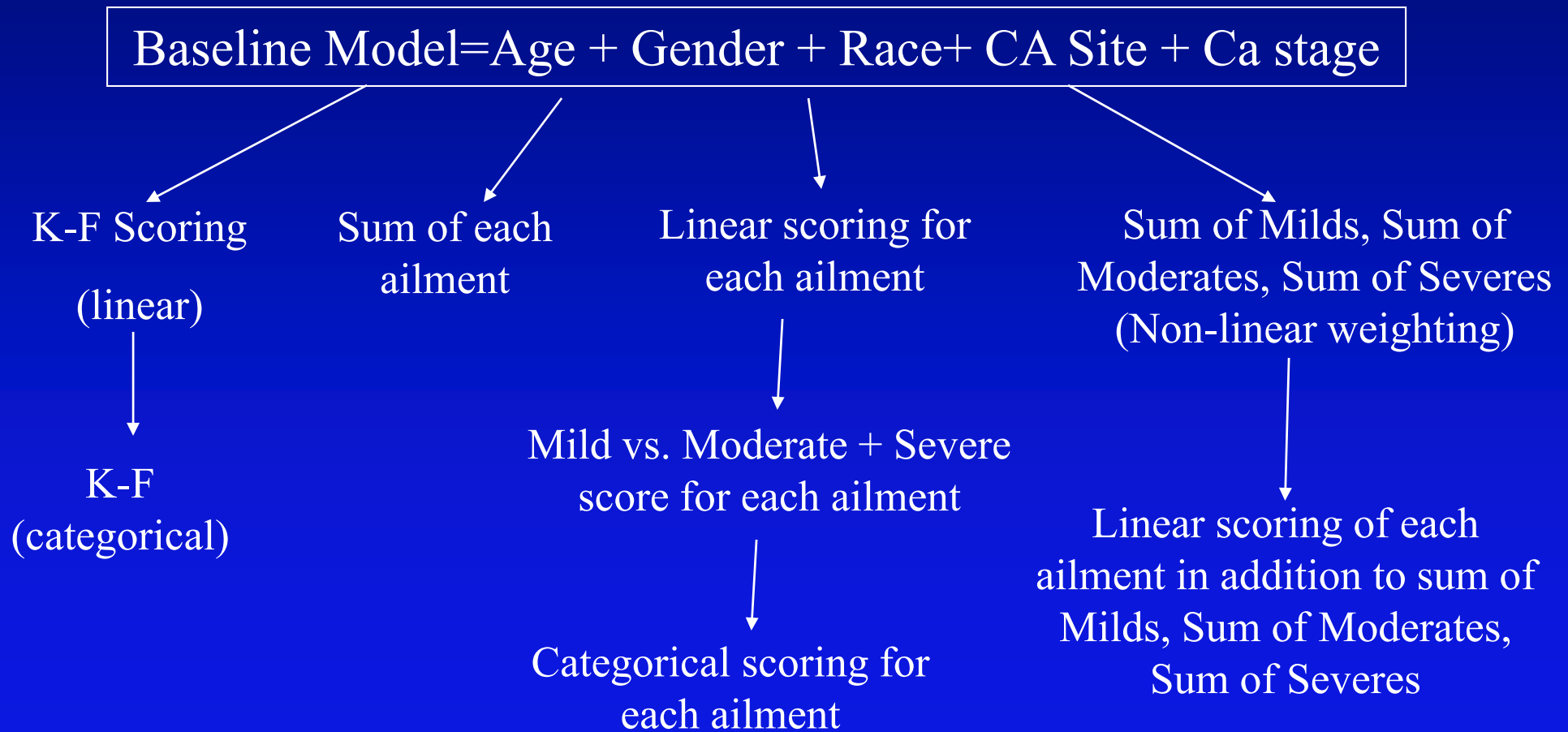
Different Comorbidity Coding Schemes



Different Comorbidity Coding Schemes



Different Comorbidity Coding Schemes



Conclusion

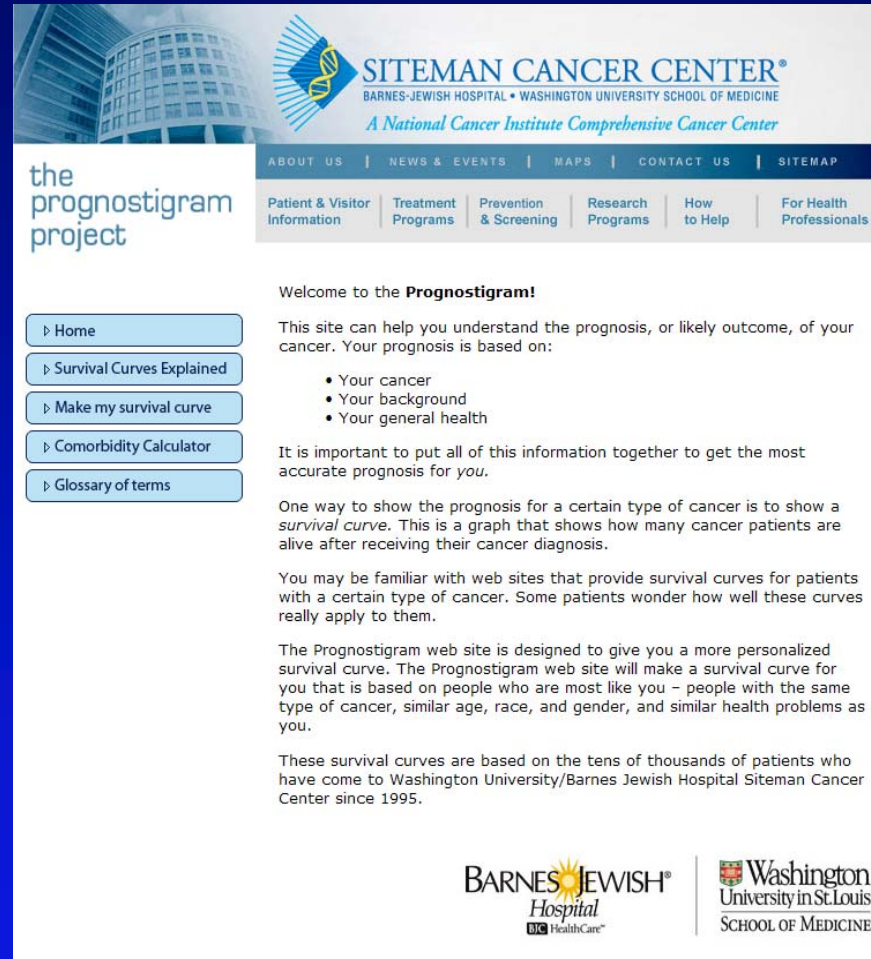
- Comorbidity information, regardless of scheme, added prognostic value to the baseline model
- No scheme performed significantly better than the others
- Adding complexity to the scoring scheme did not improve the prognostic estimates or clinical value

Prognostigram

Introduction

- Interactive web-based computer program that generates patient-specific survival information based on:
 - Patient characteristics - Age, gender, race, comorbidity
 - Tumor characteristics - Tumor site, stage, and histologic grade
- Uses real-time clinical outcomes data
- Available to patients, families, health care professionals, administrators to improve decision-making and quality of care

Prognostigram



The screenshot shows the homepage of the Prognostigram project. At the top, there is a header for the SITEMAN CANCER CENTER, which is part of Barnes-Jewish Hospital and Washington University School of Medicine. Below the header is a navigation menu with links for 'ABOUT US', 'NEWS & EVENTS', 'MAPS', 'CONTACT US', and 'SITEMAP'. A secondary navigation bar includes 'Patient & Visitor Information', 'Treatment Programs', 'Prevention & Screening', 'Research Programs', 'How to Help', and 'For Health Professionals'. The main content area features a sidebar with a vertical list of buttons: 'Home', 'Survival Curves Explained', 'Make my survival curve', 'Comorbidity Calculator', and 'Glossary of terms'. The main text area contains a welcome message, a brief explanation of the site's purpose, a list of factors used for prognosis (cancer type, background, and general health), and a detailed description of how the prognostigram works by comparing a user's profile to a large database of patients. At the bottom, there are logos for Barnes-Jewish Hospital and Washington University in St. Louis School of Medicine.

SITEMAN CANCER CENTER®
BARNES-JEWISH HOSPITAL • WASHINGTON UNIVERSITY SCHOOL OF MEDICINE
A National Cancer Institute Comprehensive Cancer Center

ABOUT US | NEWS & EVENTS | MAPS | CONTACT US | SITEMAP

the prognostigram project

▶ Home
▶ Survival Curves Explained
▶ Make my survival curve
▶ Comorbidity Calculator
▶ Glossary of terms

Welcome to the **Prognostigram!**

This site can help you understand the prognosis, or likely outcome, of your cancer. Your prognosis is based on:

- Your cancer
- Your background
- Your general health

It is important to put all of this information together to get the most accurate prognosis for *you*.

One way to show the prognosis for a certain type of cancer is to show a *survival curve*. This is a graph that shows how many cancer patients are alive after receiving their cancer diagnosis.

You may be familiar with web sites that provide survival curves for patients with a certain type of cancer. Some patients wonder how well these curves really apply to them.

The Prognostigram web site is designed to give you a more personalized survival curve. The Prognostigram web site will make a survival curve for you that is based on people who are most like you – people with the same type of cancer, similar age, race, and gender, and similar health problems as you.

These survival curves are based on the tens of thousands of patients who have come to Washington University/Barnes Jewish Hospital Siteman Cancer Center since 1995.

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<http://www.fourthtime.com/wustl/prognostigram>

Conclusions


- Comorbidity is important
 - The selection of treatment
 - Estimates of prognosis
 - Evaluation of quality of care
- Valid instruments exist for time-efficient collection of comorbid information
- Investigators should choose instrument based on availability, comfort with the methodology, and outcomes of interest

Conclusions

- Continued exclusion of comorbidity impedes the scientific study of cancer and the humanistic care of patients
- Valid comorbidity assessment should be added as a required data element to hospital-based and central cancer registries

JUST DO IT.





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AT WASHINGTON UNIVERSITY MEDICAL CENTER