THE IMPORTANCE OF COMORBIDITY DATA TO CANCER STATISTICS AND ROUTINE COLLECTION BY CANCER REGISTRARS – 5TH ANNUAL NATIONAL VA ONCOLOGY SYMPOSIUM PRESENTATION COPYRIGHT NOTICE

Washington University grants permission to use and reproduce the *The Importance of Comorbidity Data to Cancer Statistics and Routine Collection by Cancer Registrars – 5th Anuual National VA Oncology Symposium Presentation* as it appears in the PDF available here without modification or editing of any kind solely for end user use in investigating rhinosinusitis in clinical care or research (the "Purpose"). For the avoidance of doubt, the Purpose does not include the (i) sale, distribution or transfer of the *The Importance of Comorbidity Data to Cancer Statistics and Routine Collection by Cancer Registrars – 5th Anuual National VA Oncology Symposium Presentation* or copies thereof for any consideration or commercial value; (ii) the creation of any derivative works, including translations; and/or (iii) use of the *The Importance of Comorbidity Data to Cancer Statistics and Routine Collection by Cancer Registrars – 5th Anuual National VA Oncology Symposium Presentation* as a marketing tool for the sale of any drug. All copies of the *The Importance of Comorbidity Data to Cancer Statistics and Routine Collection by Cancer Registrars – 5th Anuual National VA Oncology Symposium Presentation* shall include the following notice: "All rights reserved. Copyright 2000. Washington University in St. Louis, Missouri." Please contact Jay F. Piccirillo (314-362-8641) for use of the *The Importance of Comorbidity Data to Cancer Statistics and Routine Collection by Cancer Registrars – 5th Anuual National VA Oncology Symposium Presentation* for any other intended purpose.

The Importance of Comorbidity Data to Cancer Statistics and Routine Collection by Cancer Registrars

5th Annual National VA Oncology Symposium
Washington, D.C.
October 5, 2000

Washington University School of Medicine
St. Louis, Missouri

Acknowledgement

This research was supported through a grant from the National Cancer Institute

Grant number R25 CA 68304

Acknowledgement

Jay Piccirillo, MD

Peter Claybour, BA

Rosangie Zequeira, MD

Benjamin Littenberg, MD

Edward L. Spitznagel, Jr, PhD

Donna Jeffe, PhD

Cynthia Creech, CTR

Lori Grove, CTR

Scott Anderson, CTR

Introduction

- 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
- Direct impact on the care of patients, cancer statistics, and the assessment of quality of care

Comorbidity Impact on Therapy

- The use of preferred therapy might be contraindicated due to the presence of comorbid ailments
- The comorbid ailment(s) may render an overall prognosis so poor for the patient that an otherwise desirable treatment for the index cancer may be denied
- A particular type of comorbid ailment(s) may affect the patient's ability to tolerate a particular type of therapy

Prostate Cancer Example

- Desch et al studied treatment recommendations for local or regional prostate cancer
- As comorbidity increased, the proportion of men receiving no treatment rose correspondingly
- Fewer than 30% of men with the most significant level of comorbidity received surgery, radiation therapy, or combinations of aggressive therapy as compared with almost 55% of men who had no comorbid ailments

J Clin Epidemiol 1996; 34:152-162.

Advanced Stage Head and Neck Cancer Example

Severe Comorbidity	Initial Treatment Radiation Therapy Only	Odds Ratio (95% CI)
Absent	84/311 (27%)	1.0
Present	23/45 (51%)	2.82 (1.50-5.29)
Total	107/356 (30%)	

Quality of Care Example

- Greenfield et al studied differences in mortality rates for 969 patients with incident cases of breast, colorectal, and prostate cancers across seven hospitals in southern California

- Of the seven hospitals, the three with the highest mortality had been pinpointed by the *Los Angeles Times* as high mortality outliers

JAMA 1988; 260:2253-2255

- The percentage of patients with severe comorbidity scores ranged from 9% to 18% across the seven hospitals ($p<0.01$)

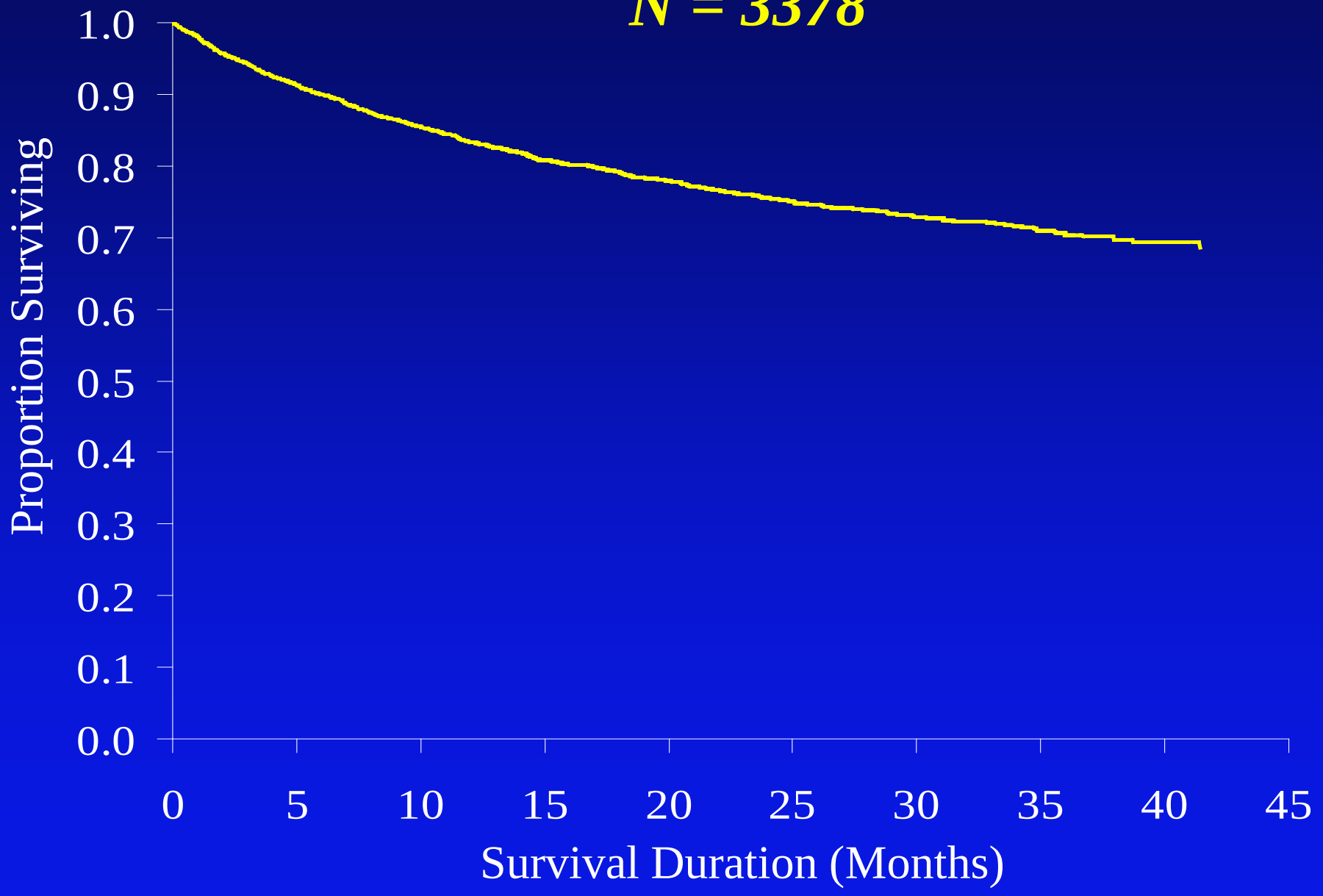
- The rankings of hospitals varied depending on whether one adjusted for age, comorbidity level, or cancer stage

Impact of Comorbidity on Prognosis

- In many cancers, comorbidity prognostically more important than tumor size or TNM stage
- Particularly important for slow growing cancers and cancers which affect older people
- Comorbidity can create significant prognostic differences in patients with the same morphologic and histologic manifestations of the index disease

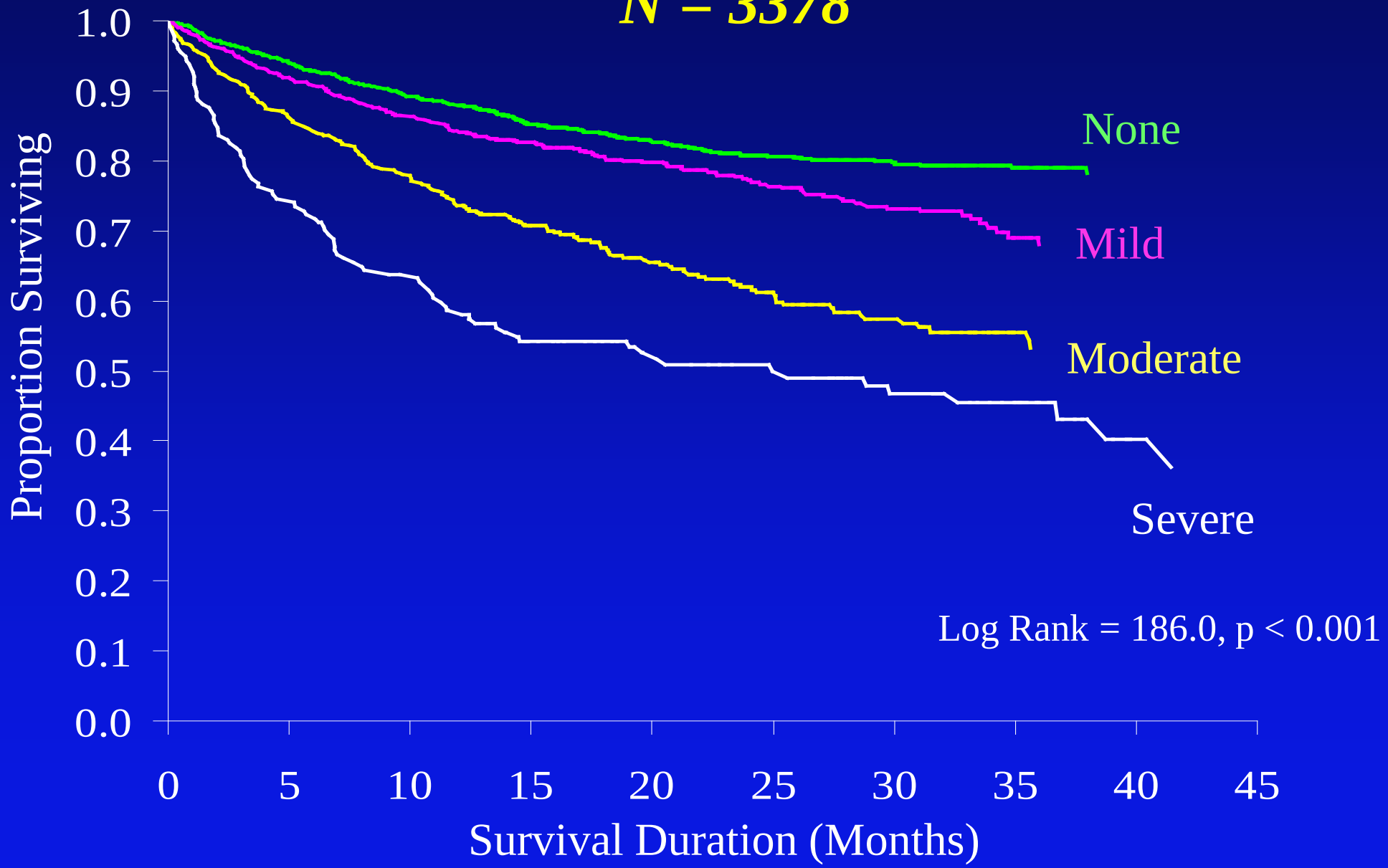
Overall Survival

N = 3378



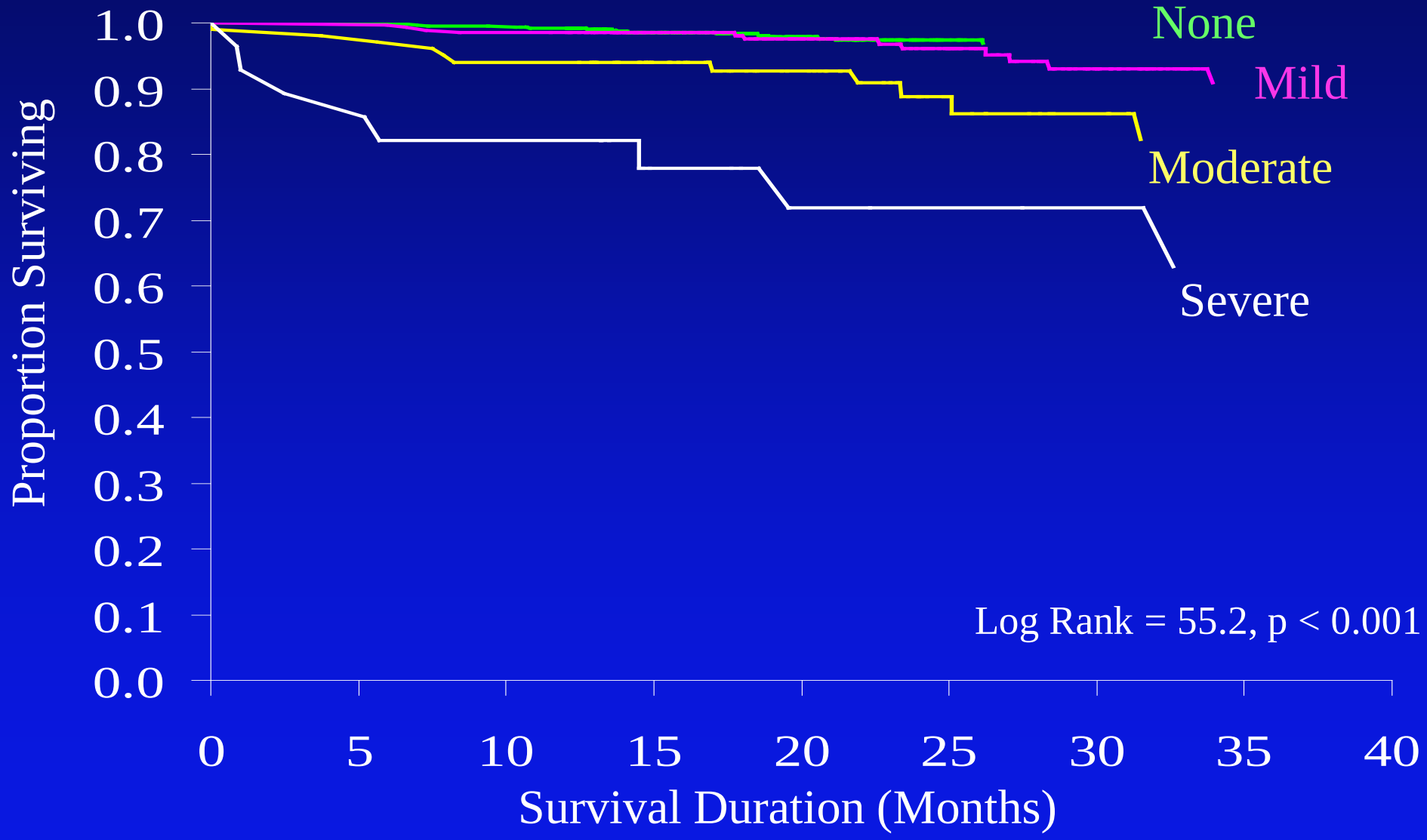
Impact of Comorbidity on Survival

N = 3378



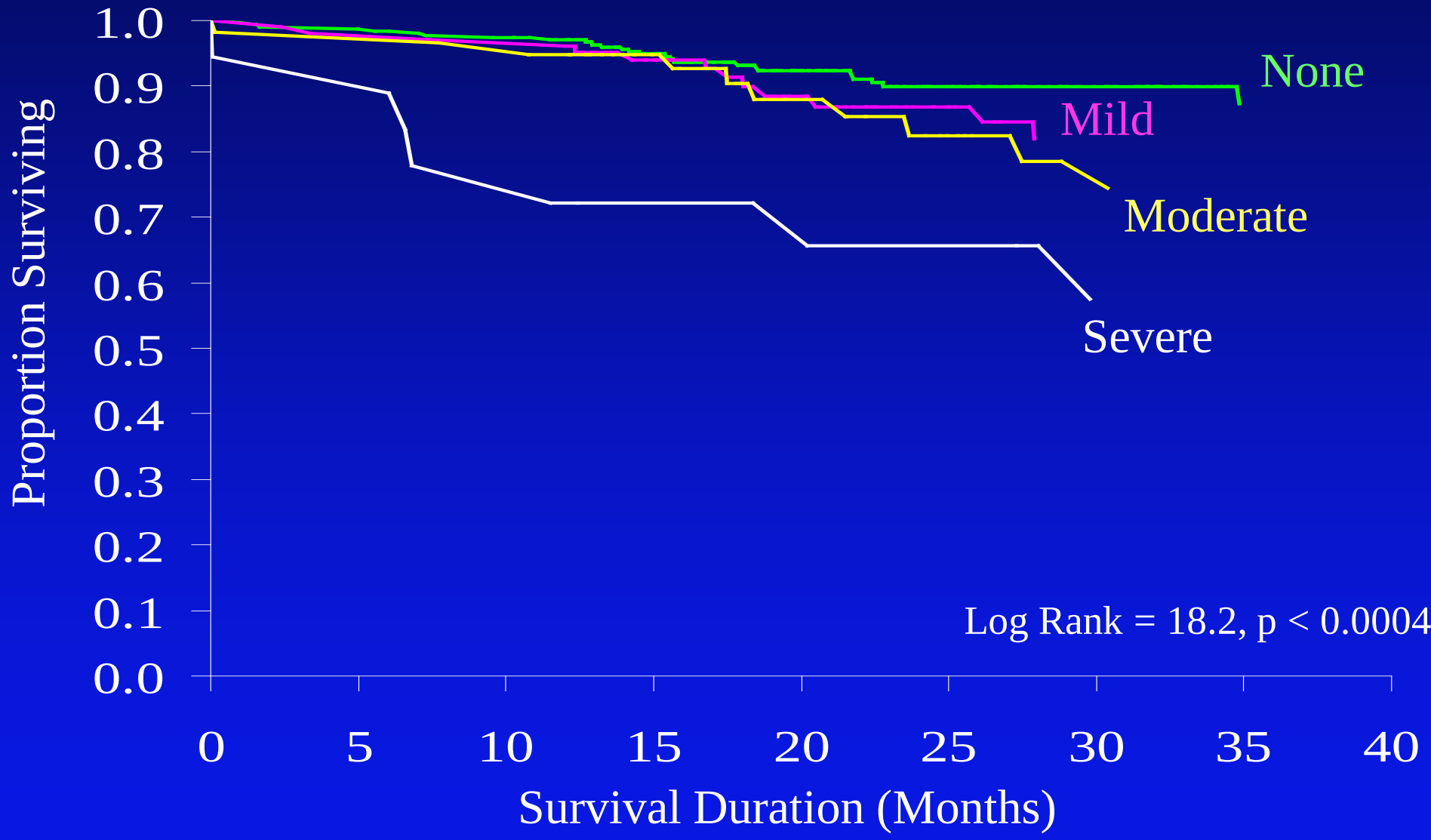
Prostate Cancer

N = 1687



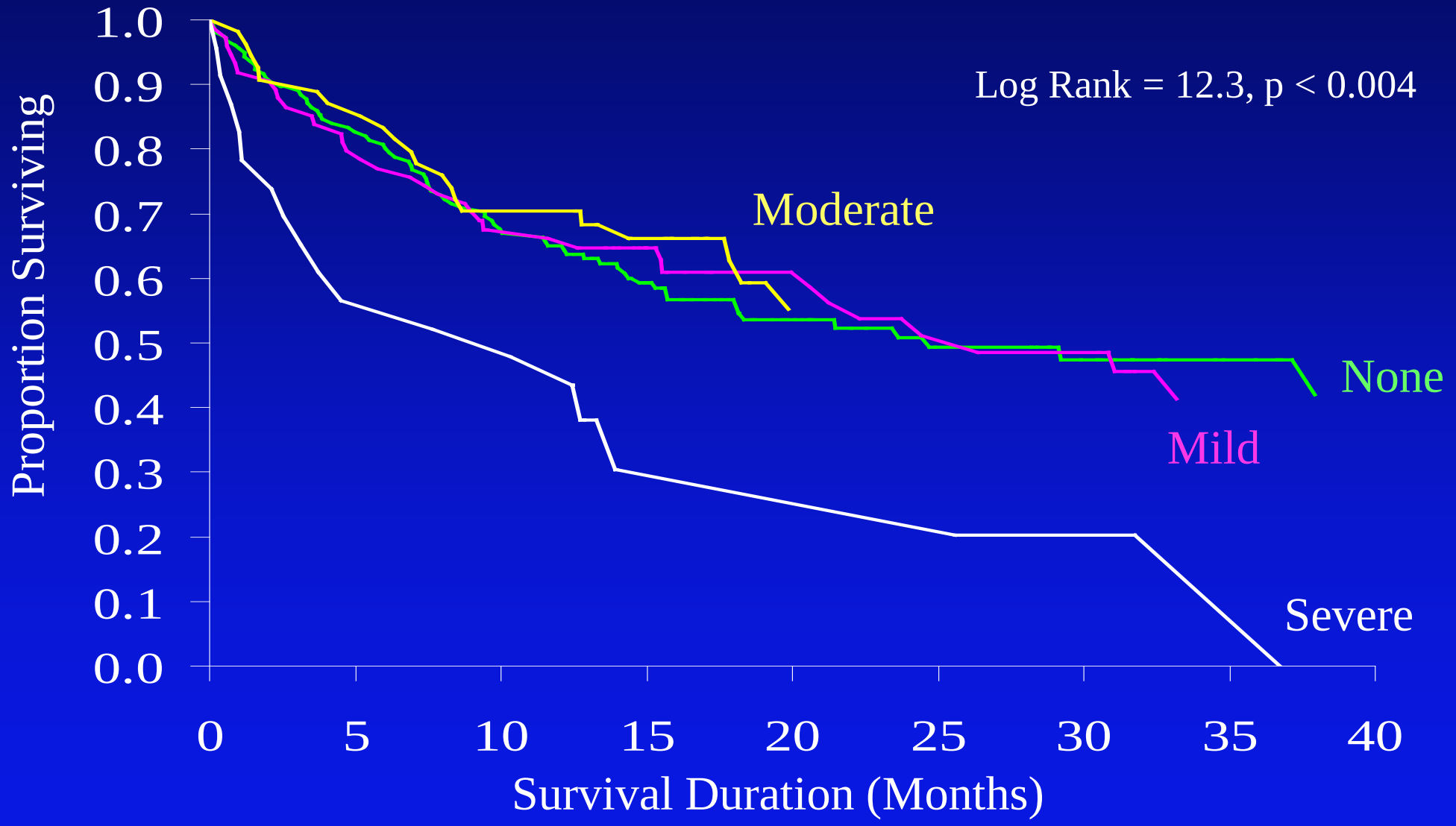
Breast Cancer

N = 665



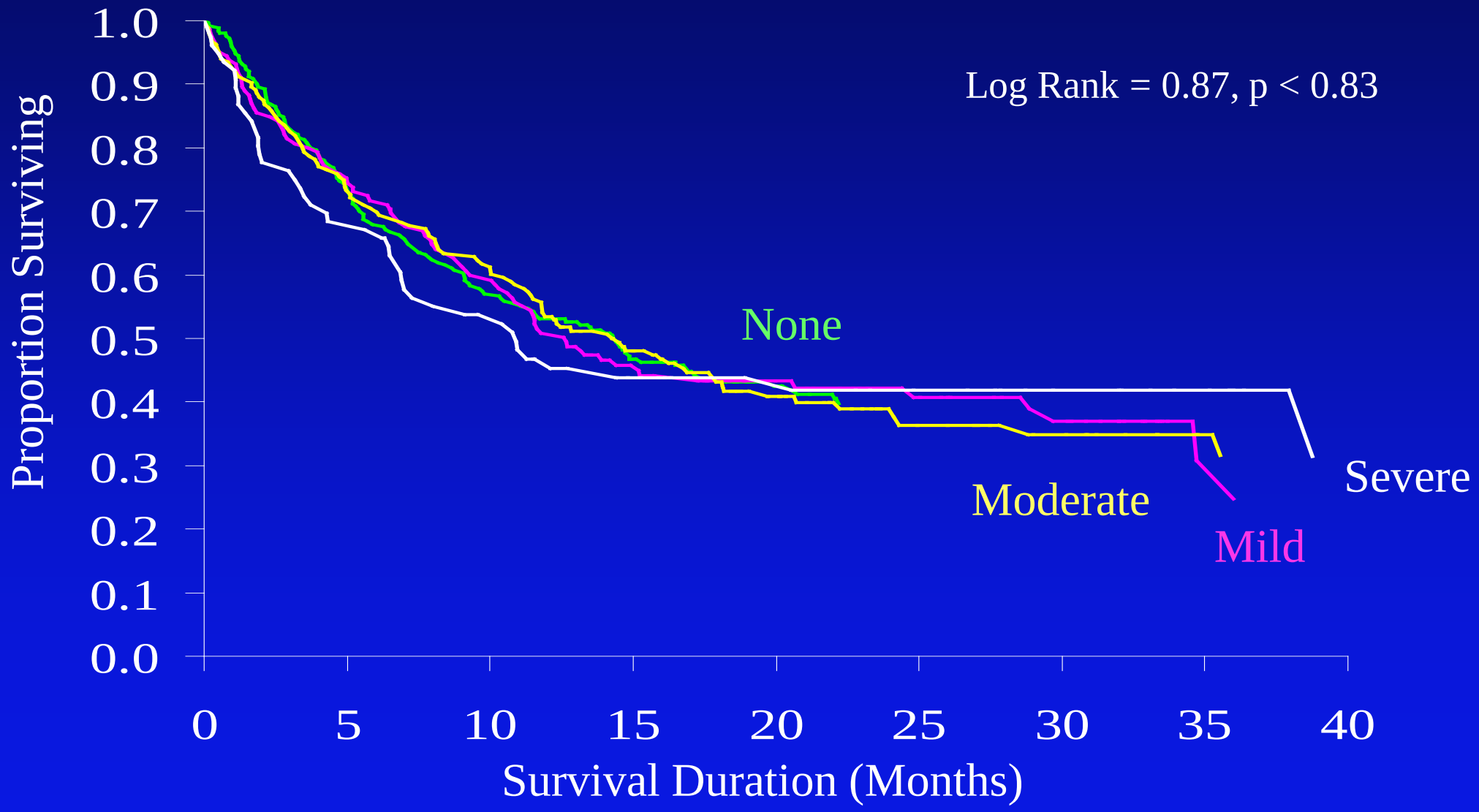
Colorectal Cancer

N = 469



Lung Cancer

N = 984



Results of Logistic Regression: Multivariable Analysis of Comorbidity

Category	Adjusted RR*	95% CI
None	Reference	
Mild	1.0	0.9 – 1.2
Moderate	1.6	1.3 – 1.9
Severe	1.6	1.3 – 2.0

* Adjusted for Age, Gender, Race, Site, and TNM Stage

Adult Comorbidity Evaluation-27

- 27-item 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 190 cancer patients treated at Barnes-Jewish Hospital

Adult Comorbidity Evaluation-27

Identify the important medical comorbidities and grade severity using the index. Overall Comorbidity Score is defined according to the highest ranked single ailment, except in the case where two or more Grade 2 ailments occur in different organ systems. In this situation, the overall comorbidity score should be designated Grade 3.

Cogent comorbid ailment	Grade 3 Severe Decompensation	Grade 2 Moderate Decompensation	Grade 1 Mild Decompensation
Cardiovascular System			
Myocardial Infarct	▪ MI ≤ 6 months	▪ MI > 6 months ago	▪ Old MI by ECG only, age undetermined
Angina / Coronary Artery Disease	▪ Unstable angina	▪ Chronic exertional angina ▪ Recent (≤ 6 months) Coronary Artery Bypass Graft (CABG) or Percutaneous Transluminal Coronary Angioplasty (PTCA) ▪ Recent (≤ 6 months) coronary stent	▪ 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)	▪ Hospitalized for CHF within past 6 months ▪ Ejection fraction < 20%	▪ Hospitalized for CHF >6 months prior ▪ CHF with dyspnea which limits activities	▪ CHF with dyspnea which has responded to treatment ▪ Exertional dyspnea ▪ Paroxysmal Nocturnal Dyspnea (PND)
Arrhythmias	▪ Ventricular arrhythmia ≤ 6 months	▪ Ventricular arrhythmia > 6 months ago ▪ Chronic atrial fibrillation or flutter ▪ Pacemaker	▪ Sick Sinus Syndrome
Hypertension	▪ DBP>130 mm Hg ▪ Severe malignant papilledema or other eye changes ▪ Encephalopathy	▪ DBP 115-129 mm Hg ▪ Secondary cardiovascular symptoms: vertigo, epistaxis, headaches	▪ DBP 90-114 mm Hg ▪ DBP <90 mm Hg while taking antihypertensive medications
Venous Disease	▪ Recent PE (≤ 6 mos.) ▪ Use of venous filter for PE's	▪ DVT controlled with Coumadin or heparin ▪ Old PE > 6 months	▪ Old DVT no longer treated with Coumadin or Heparin
Peripheral Arterial Disease	▪ Bypass or amputation for gangrene or arterial insufficiency < 6 months ago ▪ Untreated thoracic or abdominal aneurysm (>6 cm)	▪ Bypass or amputation for gangrene or arterial insufficiency > 6 months ▪ Chronic insufficiency	▪ Intermittent claudication ▪ Untreated thoracic or abdominal aneurysm (< 6 cm) ▪ s/p abdominal or thoracic aortic aneurysm repair

Example

Congestive Heart Failure

- Mild – Exertional or paroxysmal dyspnea which has responded to treatment
- Moderate – Hospitalized more than six months ago
- Severe – Hospitalized within last 6 months or ejection fraction < 20%

Overall Comorbidity Score

- Highest ranked single ailment
- In cases where two or more Moderate ailments occur in different organ systems, the Overall Comorbidity Score should be designated as Severe

Example

CONDITION	DECOMPENSATION
Myocardial Infarct more than 6 months ago	Moderate
DBP 90-114 mm Hg	Mild
History of alcohol abuse, but not presently drinking	Mild
Overall Comorbidity Score	Moderate

Example

CONDITION	DECOMPENSATION
Chronic exertional angina	Moderate
Major depression controlled with medication	Mild
Diabetes requiring insulin	Moderate
Overall Comorbidity Score	Severe

Let's Try Coding Comorbidity!

Scenario #1

Condition	Decompensation

Overall Comorbidity Score

Scenario #1

Condition	Decompensation
Hypertension controlled with medication	
Insulin Dependent Diabetes poorly controlled	
Bipolar Disorder on medication	
Overall Comorbidity Score	

Scenario #1

Condition	Decompensation
Hypertension controlled with medication	Mild
Insulin Dependent Diabetes poorly controlled	Moderate
Bipolar Disorder on medication	Mild
Overall Comorbidity Score	

Scenario #1

Condition	Decompensation
Hypertension controlled with medication	Mild
Insulin Dependent Diabetes poorly controlled	Moderate
Bipolar Disorder on medication	Mild
Overall Comorbidity Score	**Moderate**

Scenario #2

Condition	Decompensation

Overall Comorbidity Score

Scenario #2

Condition	Decompensation
Ulcers requiring surgery	
Mild Chronic Obstructive Pulmonary Disease	
Active alcohol abuse	
Overall Comorbidity Score	

Scenario #2

Condition	Decompensation
Ulcers requiring surgery	Moderate
Mild Chronic Obstructive Pulmonary Disease	Mild
Active alcohol abuse	Moderate
Overall Comorbidity Score	

Scenario #2

Condition	Decompensation
Ulcers requiring surgery	Moderate
Mild Chronic Obstructive Pulmonary Disease	Mild
Active alcohol abuse	Moderate
Overall Comorbidity Score	**Severe**

Comorbidity Education Program

- To demonstrate that the teaching program has broad generalizability to cancer registrars at five different oncology data centers across the United States (i.e., small, rural, community and large, urban centers)
- The intended outcome of this project is the demonstration of the validity and generalizability of the educational program created at Barnes-Jewish Hospital

Nationwide Comorbidity Network

Hospital Name	City, State	# of Registrars	Estimated cases/year	Commission on Cancer Program
Washington Hospital Center	Washington, D.C.	3	818	Teaching Hospital Cancer Program
North Kansas City Hospital	Kansas City, MO	1	583	Community Hospital Cancer Program
Queen of the Valley Hospital	Napa, CA	1	377	Community Hospital Cancer Program
Dakota Clinic	Fargo, ND	3	948	Community Hospital Cancer Program
Hannibal Regional Hospital	Hannibal, MO	1	216	Community Hospital Cancer Program

- The education materials included
  - comorbidity coding book
  - comorbidity video "The Whole Picture: Coding Comorbidity"
  - 40 medical records of cancer patients with varying comorbidity severity from Barnes-Jewish Hospital
- 15 medical records of cancer patients from the participating centers

Education of Cancer Registrars at the Five Participating Hospitals

- The RA traveled to each of the five participating sites to train the cancer registrars to code comorbidity in June 1999
- A total of nine cancer registrars participated in the program

- The RA spent three days at each site
- Prior to the RA coming to the sites, the participating oncology data centers recorded the number of new cases and the time spent abstracting each case for one week

One and Six- Month Reassessment

- To ensure continued accuracy of comorbidity coding, the RA traveled to each site one and six-months after the initial training session to review a random selection of medical records
- Each participating site sent completed comorbidity *ACE-27* forms to the PI each week
- The PI selected a random sample of sixteen charts for each cancer registrar at all sites for detail review by the RA

Post-Program Evaluation

- A questionnaire was sent to each cancer registrar at the completion of the project
- Gather feedback for improvements to the education program
- Questionnaires were returned anonymously to the Education Co-Investigator for evaluation

Quantitative Assessment of Cancer Registrars' Performance

- Reliability
  - Weighted Kappa Statistic
- Validity
  - Sensitivity
  - Specificity

- Weighted kappa statistic – the degree of agreement beyond what would be expected by chance
  - .41 - .60 Moderate
  - .61 - .80 Substantial
  - .81 - 1.00 Almost perfect
- Sensitivity – the proportion of correctly identified individuals with severe comorbidity
- Specificity – the proportion of correctly identified individuals without severe comorbidity

Reliability Results

Cancer Registrar	Weighted Kappa		
	Day 3 of Training	One-month Assessment	Six-month Assessment
1	0.92	1.0	1.0
2	0.96	0.83	----
3	0.96	0.97	0.94
4	1.0	0.88	0.95
5	0.87	0.81	0.68
6	0.96	1.0	----
7	0.96	0.86	0.97
8	0.96	0.94	1.0
9	0.96	0.94	0.97

Validity Results

Cancer Registrar	Sensitivity		
	Day 3 of Training	One-month Assessment	Six-month Assessment
1	2/2 (100%)	5/5 (100%)	5/5 (100%)
2	2/2 (100%)	1/1 (100%)	----
3	2/2 (100%)	2/2 (100%)	3/3 (100%)
4	2/2 (100%)	2/2 (100%)	4/5 (80%)
5	2/2 (100%)	5/5 (100%)	3/3 (100%)
6	2/2 (100%)	1/1 (100%)	----
7	2/2 (100%)	2/2 (100%)	3/3 (100%)
8	2/2 (100%)	5/5 (100%)	5/5 (100%)
9	2/2 (100%)	3/3 (100%)	4/4 (100%)

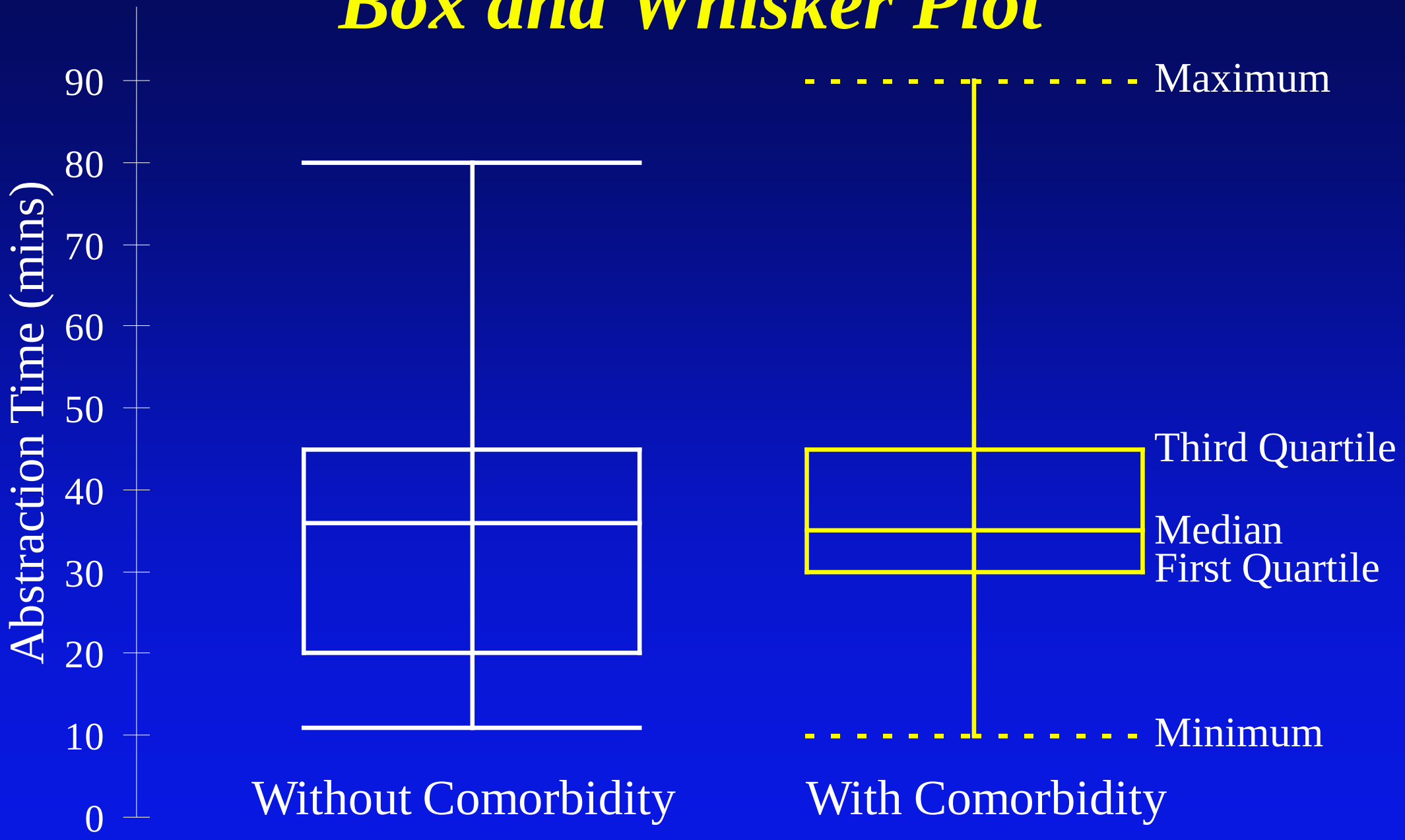
Validity Results

Cancer Registrar	Specificity		
	Day 3 of Training	One-month Assessment	Six-month Assessment
1	8/8 (100%)	11/11 (100%)	11/11 (100%)
2	7/8 (88%)	12/13 (92%)	----
3	8/8 (100%)	13/14 (93%)	12/13 (92%)
4	8/8 (100%)	14/14 (100%)	11/11 (100%)
5	7/8 (88%)	17/18 (94%)	12/13 (92%)
6	8/8 (100%)	12/12 (100%)	----
7	8/8 (100%)	12/14 (86%)	13/13 (100%)
8	7/8 (88%)	17/17 (100%)	11/11 (100%)
9	8/8 (100%)	12/13 (92%)	11/12 (92%)

Burden of Coding Comorbidity

- Amount of time required to abstract complete medical record, including comorbidity
- Before training program, cancer registrar estimated time required to abstract complete medical record
- After training program, cancer registrar estimated time required to abstract complete medical record, including comorbidity

Box and Whisker Plot



Qualitative Assessment of Cancer Education Program

	Extremely	Very	Somewhat	Slightly	Not at all
How difficult is it to code comorbidity?	0	0	0	4	3
How time consuming, on average, is coding comorbidity?	0	0	1	5	1
How burdensome is coding comorbidity?	0	0	0	4	3

"Comorbidity is no problem!"

Qualitative Assessment of Cancer Education Program

	Extremely	Very	Somewhat	Slightly	Not at all
How well did we meet our main objective of teaching cancer registrars to code comorbidity accurately?	5	2	0	0	0
Overall, how satisfied were you with the comorbidity education program?	4	2	1	0	0

"I feel that the education program is excellent."

Conclusions

- Results show that CTRs can code comorbidity efficiently and effectively
- Severity of comorbidity is associated with survival, selection of initial treatment, and assessment of quality of care
- Therefore, comorbidity coding should be included in hospital-based and national cancer registries

Future Work

- Obtain support from COC Committee on Standards to add comorbidity as a required data element
- With COC support, request NAACCR Data Standards Committee to add comorbidity as a required data element
- Development of a Web-based Comorbidity Education Program

Clinical Outcomes Research Web Site

http://oto.wustl.edu/clinepi/

The Whole Picture: Coding Comorbidity