

Survival Trends by Socioeconomic Status, 1998-2012:

A Shift in Disparities for Colorectal Cancer Survival

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Background

Colorectal Cancer – Incidence

3rd Most Common Cancer in Men & Women

Incidence Rate Overall,
2000 – 2013

47.6 per 100,000

Incidence Rate Trend,
2000 – 2013

-2.9 APC

Background

Colorectal Cancer – Socioeconomic Disparities

Incidence

Mortality

Survival

Background

Colorectal Cancer – *Healthy People*

Healthy People 2010 Objectives

- Increase 5-Year Survival for Cancer Survivors
- Eliminate Health Disparities

Healthy People 2020 Objectives

- Increase 5-Year Survival for Cancer Survivors
- Eliminate Health Disparities AND Improve Health for ALL groups

Purpose

Research Questions

- Within each SES stratum, has survival increased, decreased, or remained the same?
- Between different SES strata, have disparities in survival persisted or changed since 1998?

Methodology

Cohort Selection

Source:

- 18 SEER Registries – November 2015 Submission
- N = 465,455

Included:

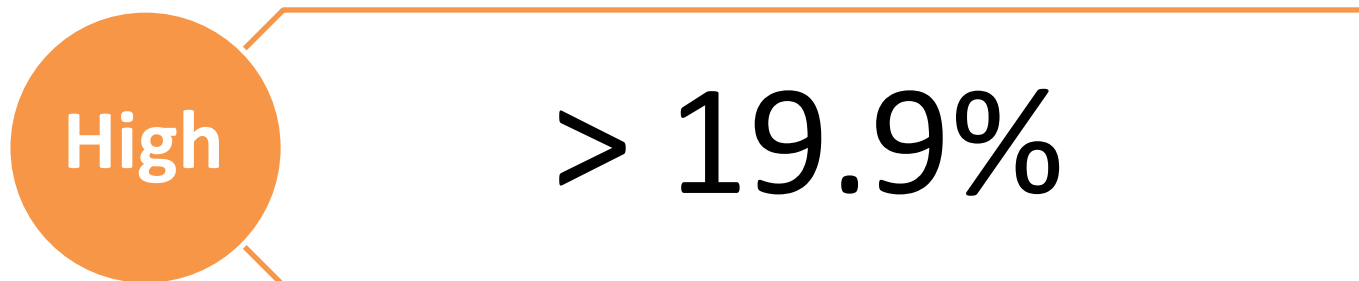
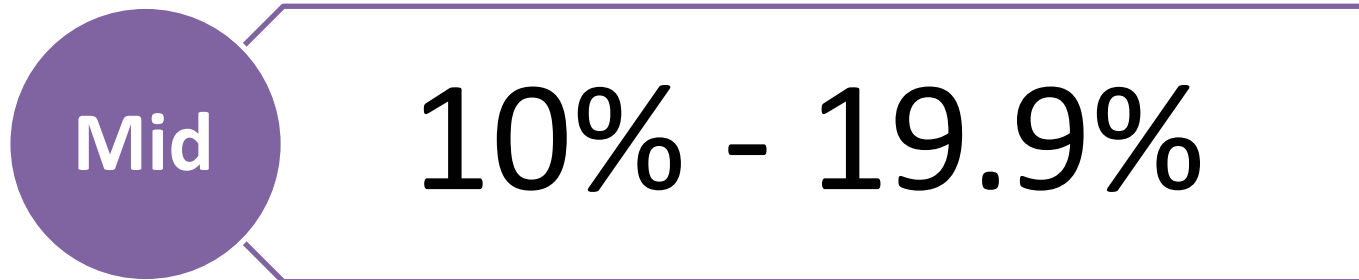
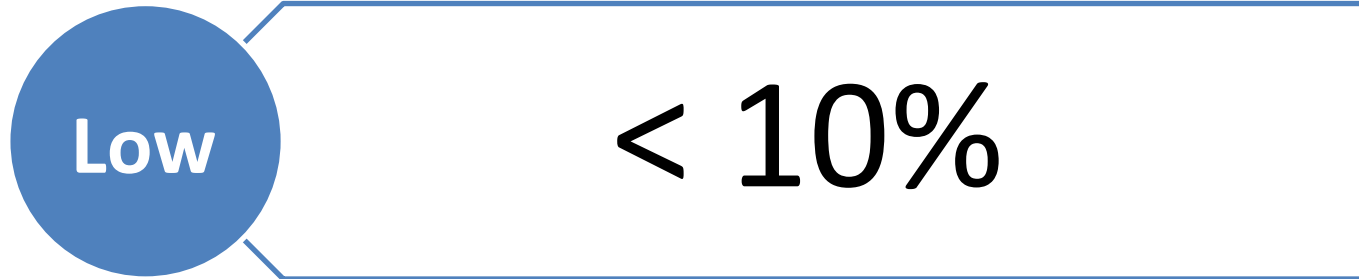
- Active Follow-Up
- Microscopically Confirmed

Excluded:

- Death Certificate
- Autopsy Only

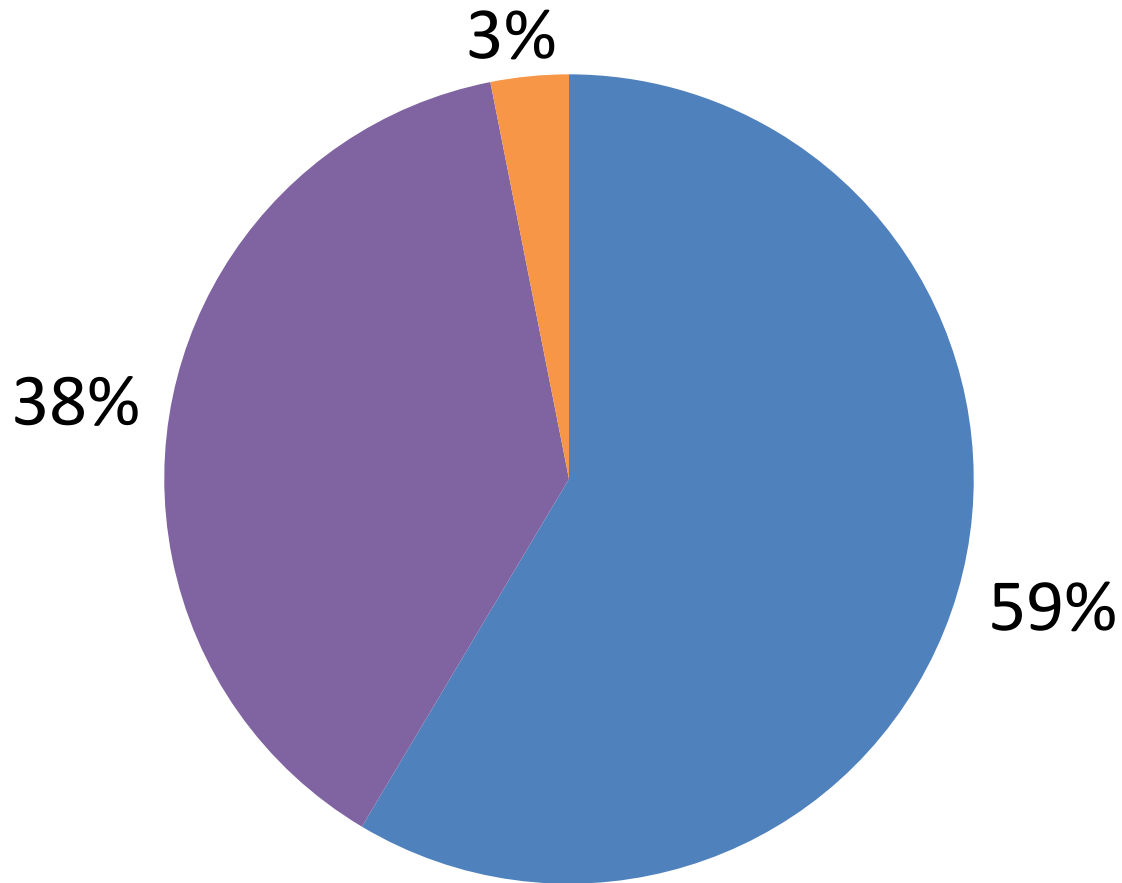
Methodology

Defining Poverty Level



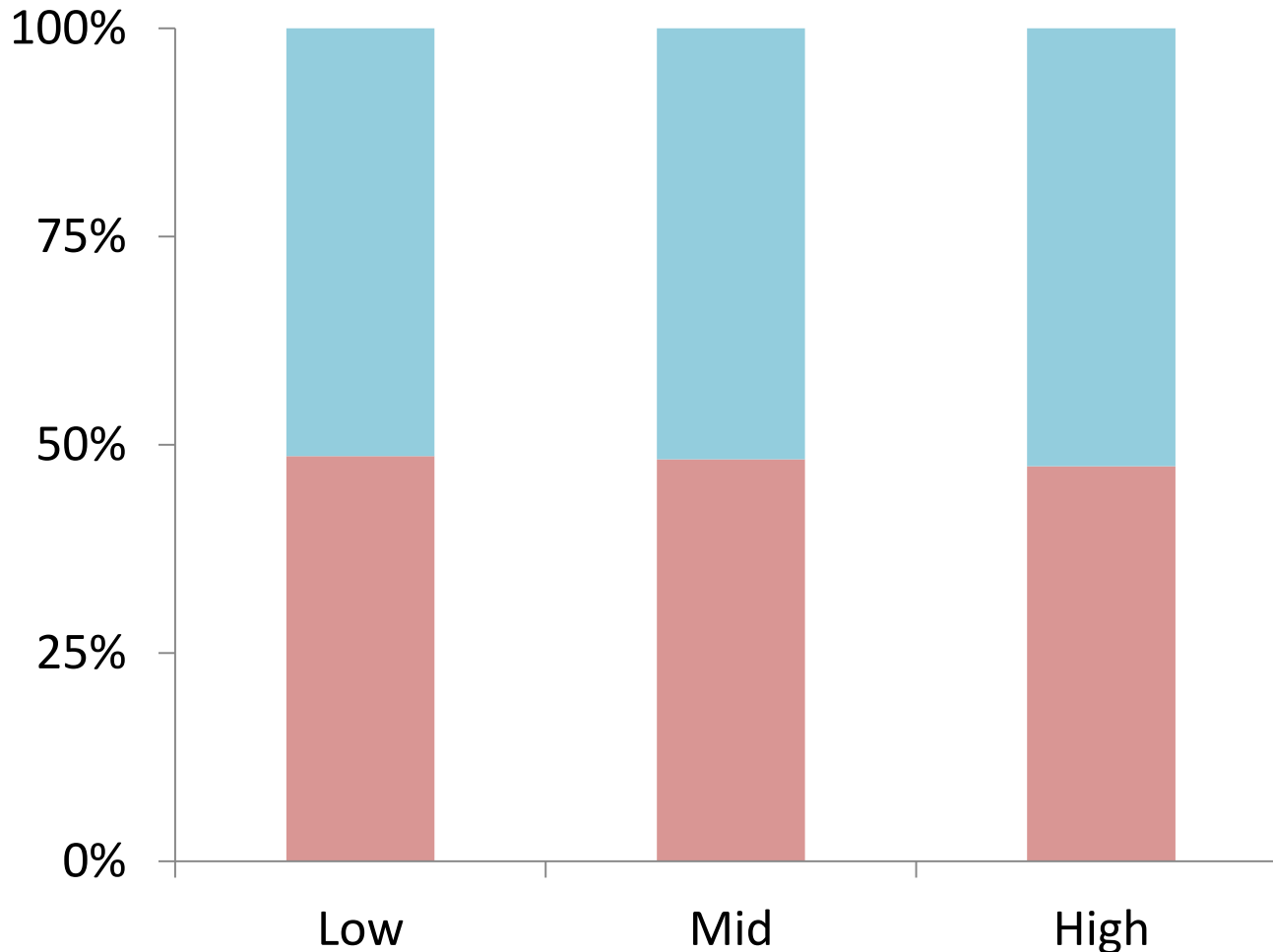
Cohort Distribution, Combined 1998 - 2012

By **Low**, **Mid**, and **High** Poverty Counties



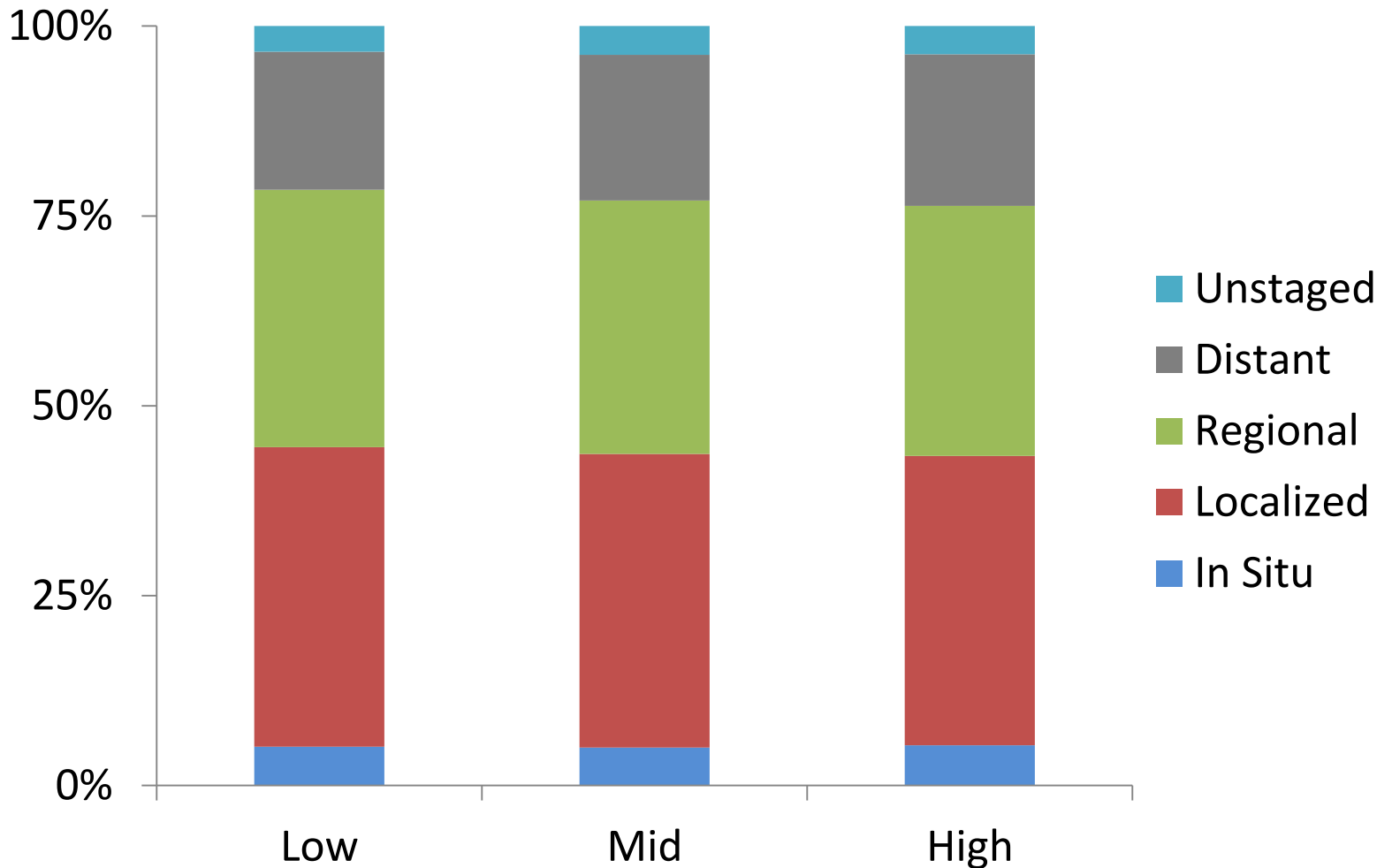
Cohort Distribution, Combined 1998 - 2012

By Poverty Thresholds for **Males** and **Females**



Cohort Distribution, Combined 1998 - 2012

By Poverty Thresholds & Stage



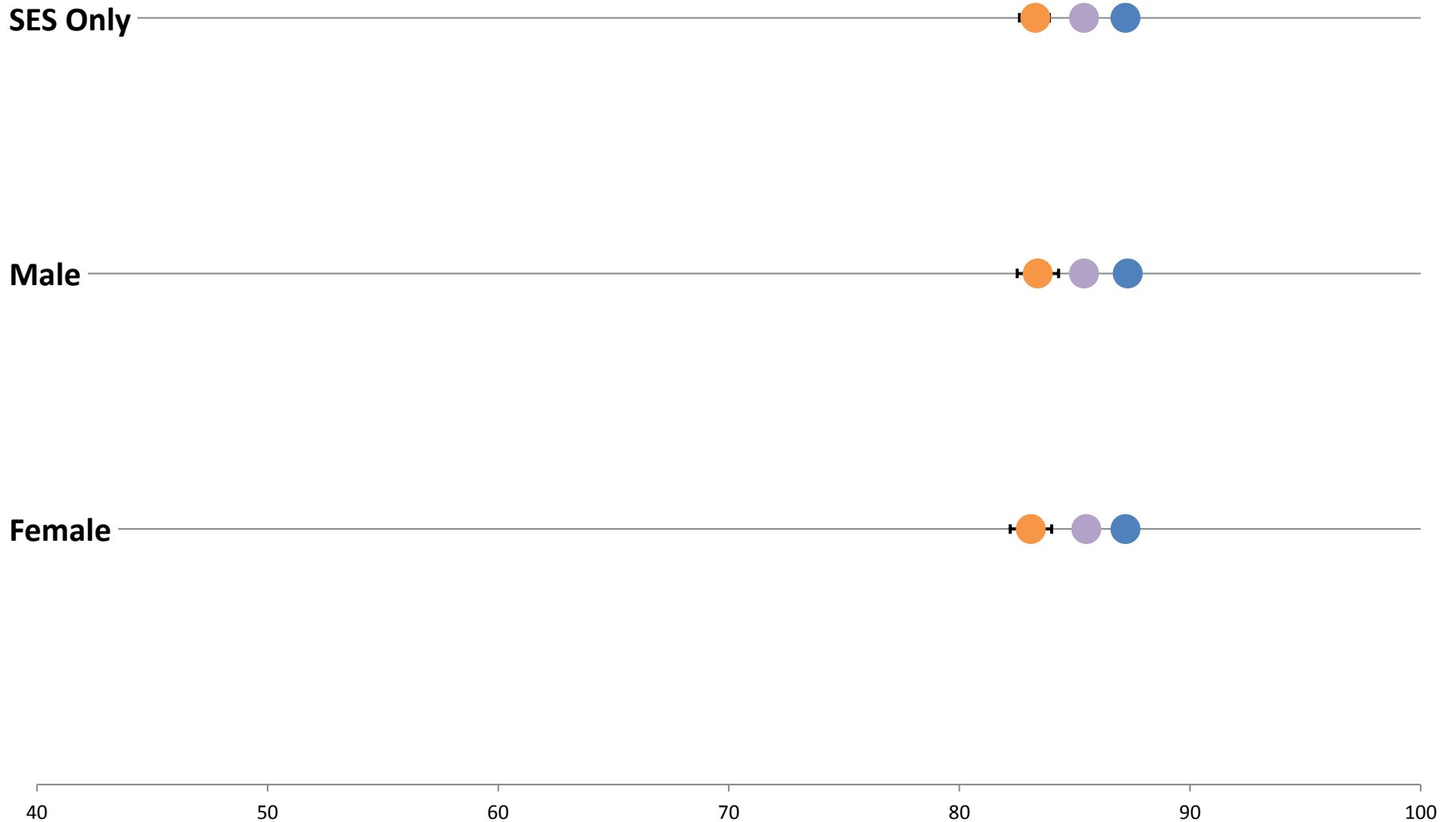
Methodology

Survival Analysis

- SEER*Stat
 - Age-Adjusted Cause-Specific One-Year Survival
 - Overall for each Stratum
 - By Year of Diagnosis for each Stratum
- JoinPoint
 - Trend Analysis
 - Average Annual Percent Change (AAPC)
 - Pairwise Comparisons

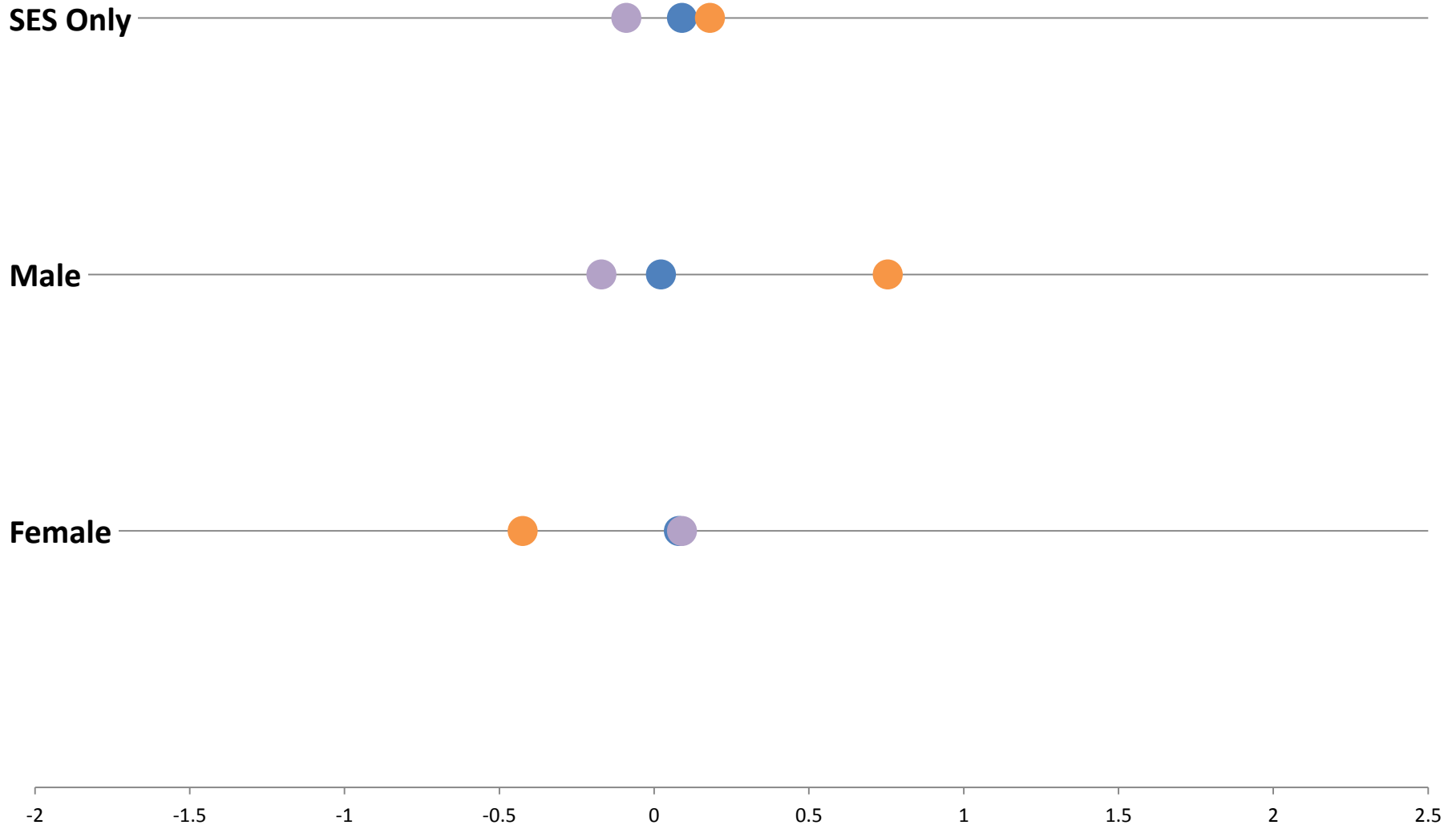
One-Year Survival, Combined 1998 – 2012

By **Low**, **Mid**, and **High** Poverty Counties



AAPC in One Year Survival during 1998 – 2012

By **Low**, **Mid**, and **High** Poverty Counties



Pairwise Comparisons in JoinPoint Tests for Parallelism and Coincidence

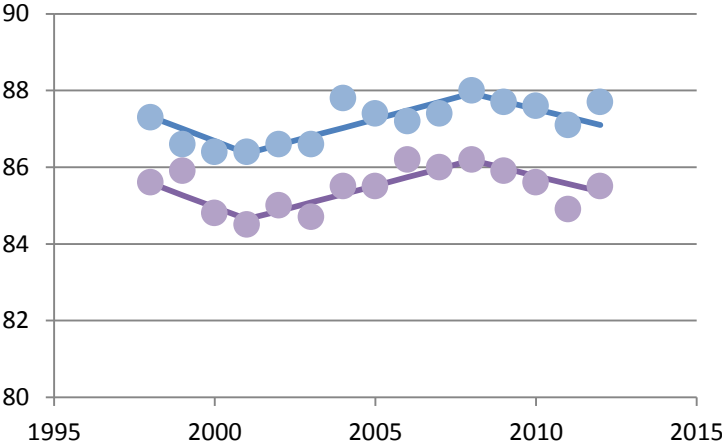
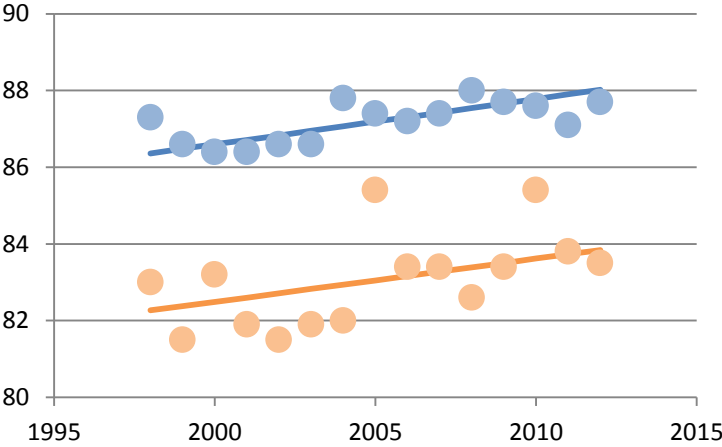
Test (Failed to Reject)	Mathematical Description	Interpretation
Parallelism	$y = \underline{m}x + b$	Persistent Disparities during Time Period
Coincidence	$y = \underline{m}x + \underline{b}$	No Disparities during Time Period

Comparison of One Year Survival Trends Between Poverty Thresholds

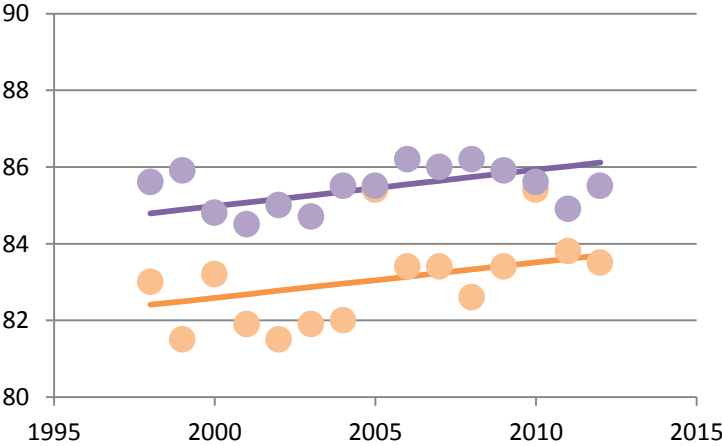
High

Mid

Low



Mid



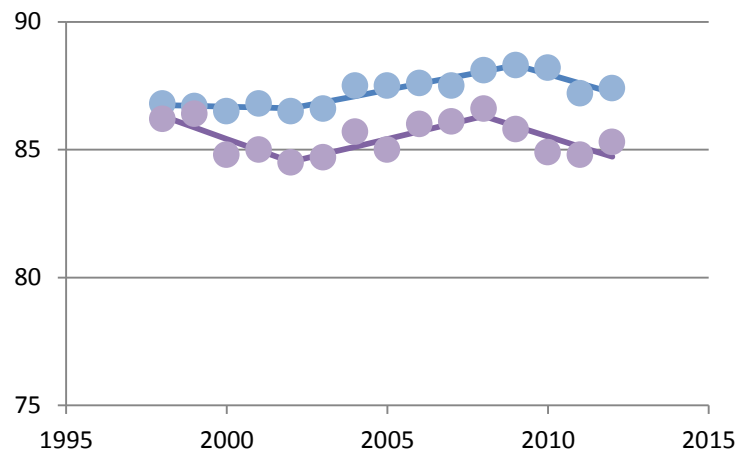
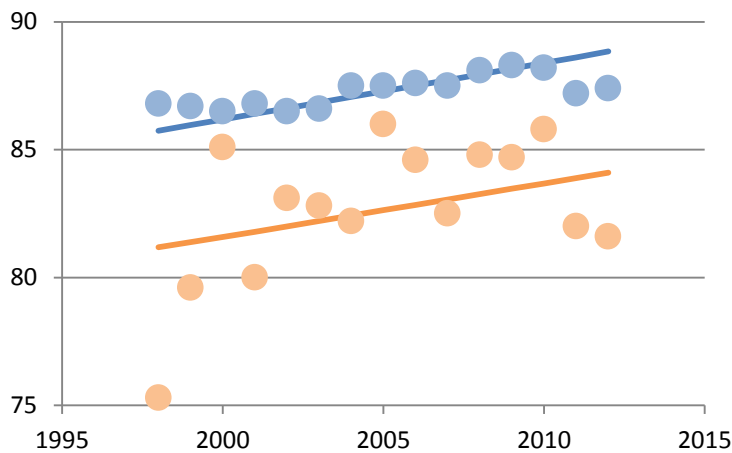
Disparities have persisted between 1998 & 2012 between each Poverty Threshold.

Comparison of One Year Survival Trends Between Poverty Thresholds - Males

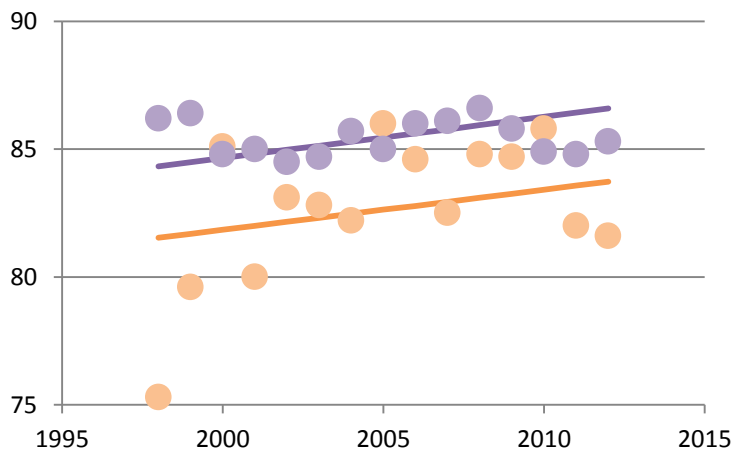
High

Mid

Low



Mid



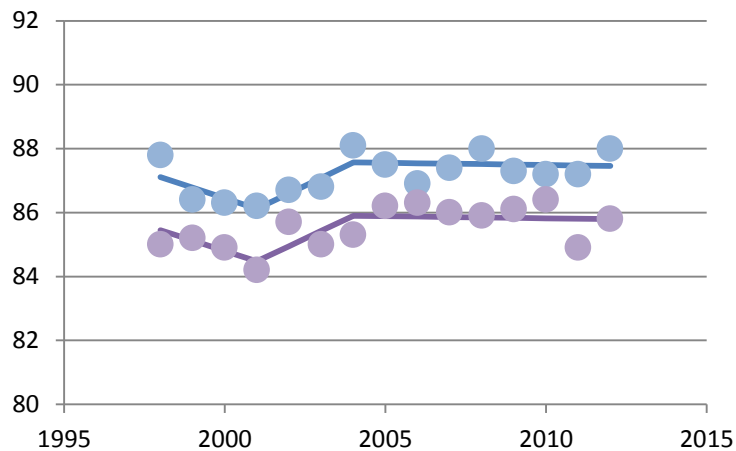
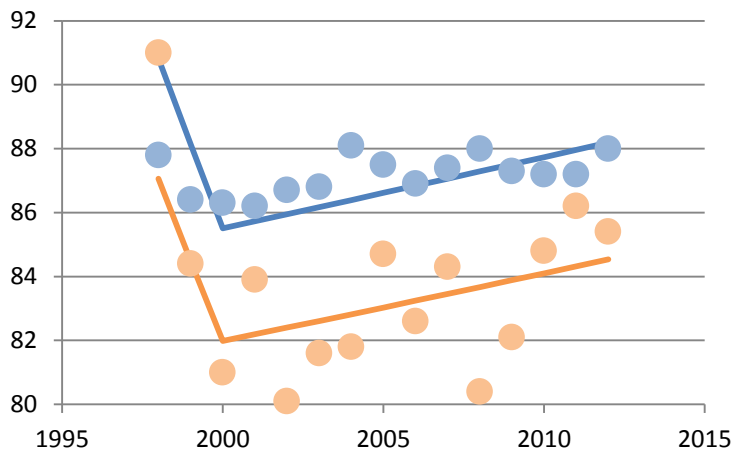
Disparities have persisted between 1998 & 2012 between High Poverty & Other Thresholds

Comparison of One Year Survival Trends Between Poverty Thresholds - Females

High

Mid

Low



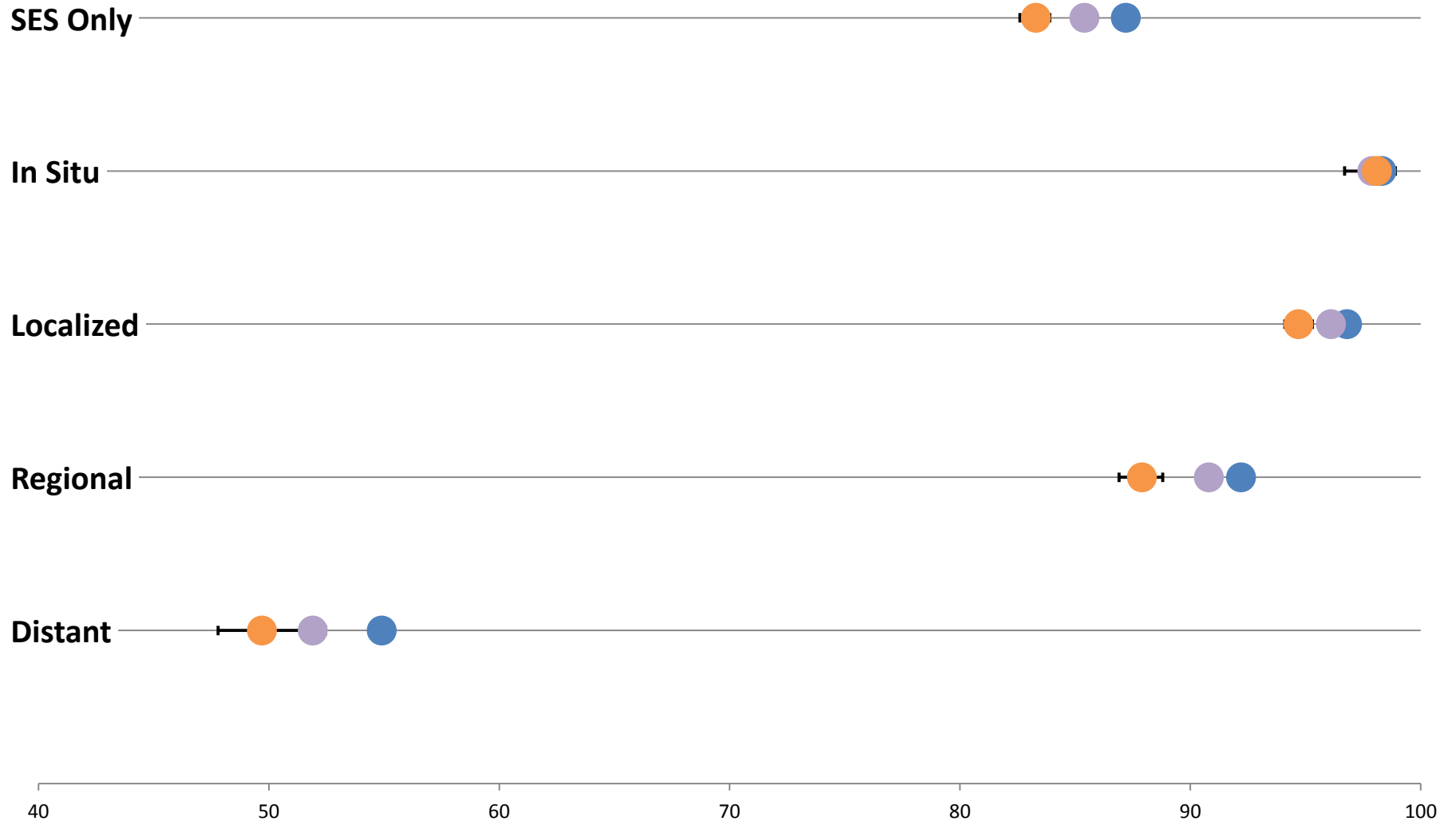
Mid



Disparities have persisted between 1998 & 2012 between each Poverty Threshold.

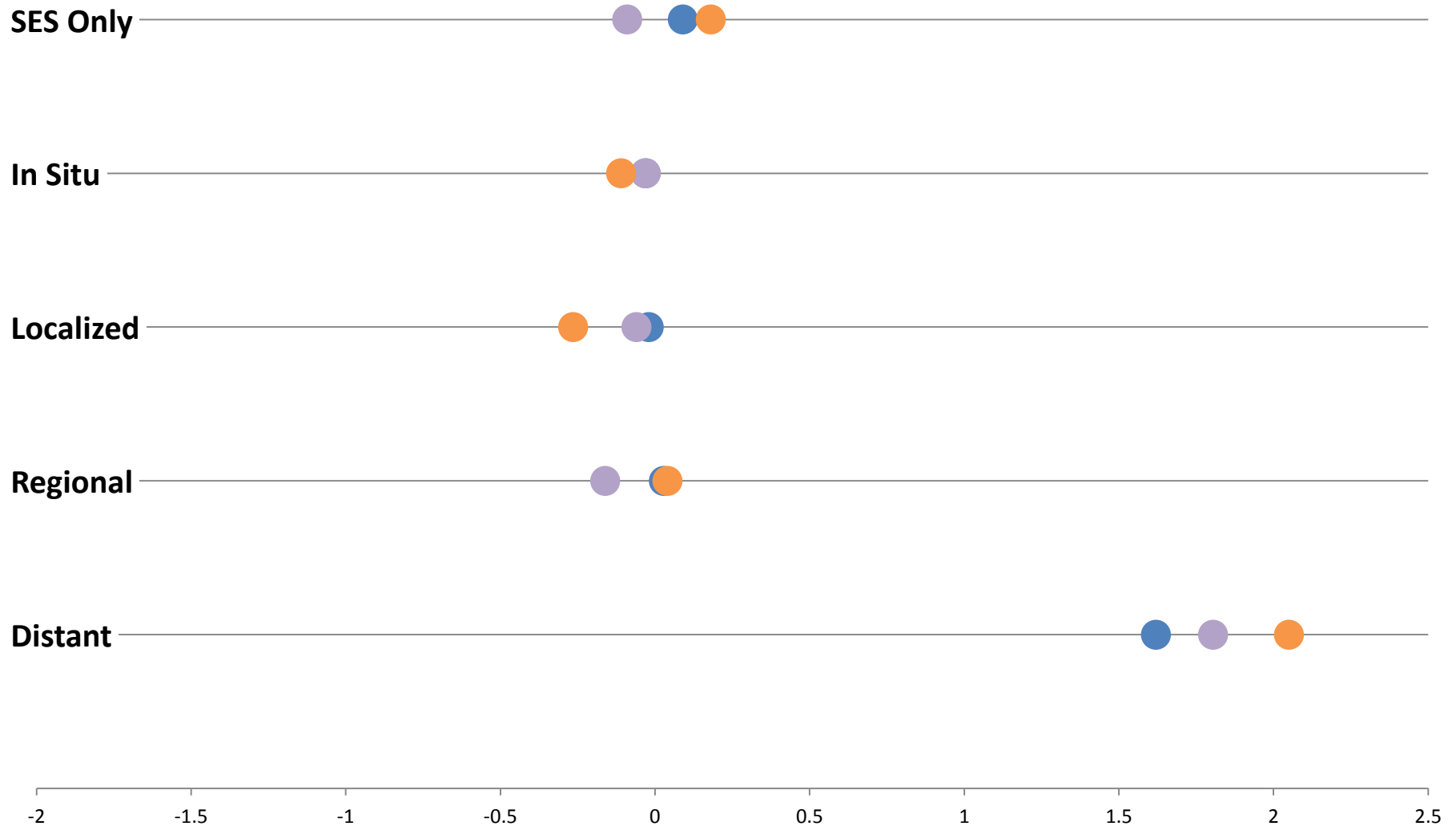
One-Year Survival, Combined 1998 – 2012

By **Low**, **Mid**, and **High** Poverty Counties



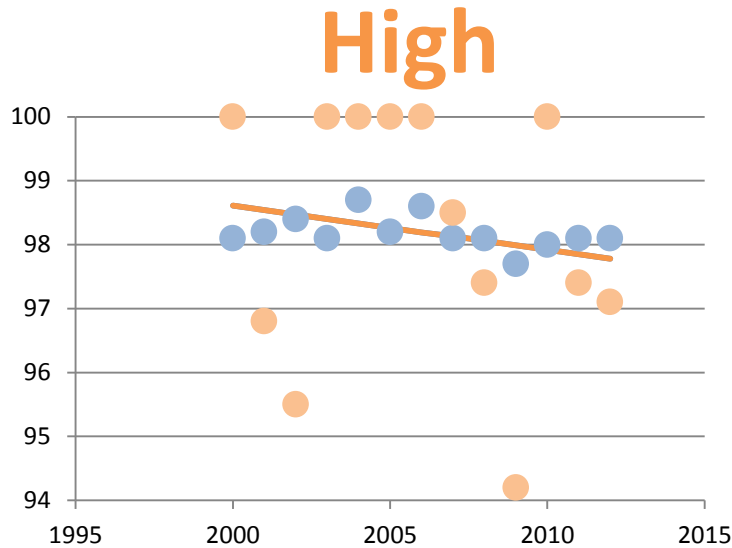
AAPC in One Year Survival during 1998 – 2012

By **Low**, **Mid**, and **High** Poverty Counties



Comparison of One Year Survival Trends Between Poverty Thresholds - In Situ*

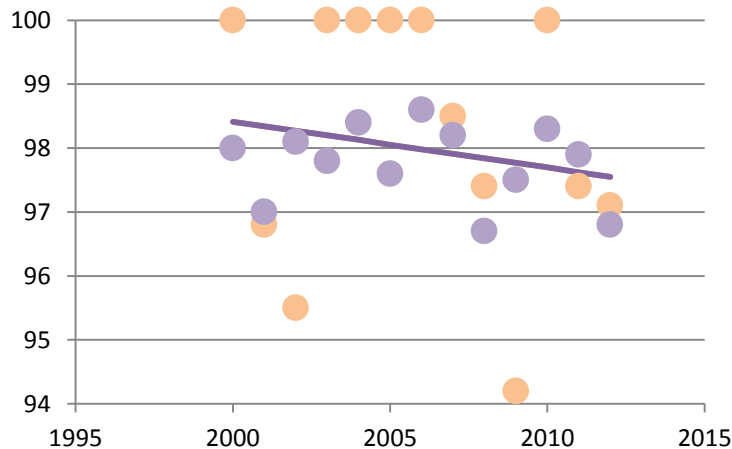
Low



Mid



Mid



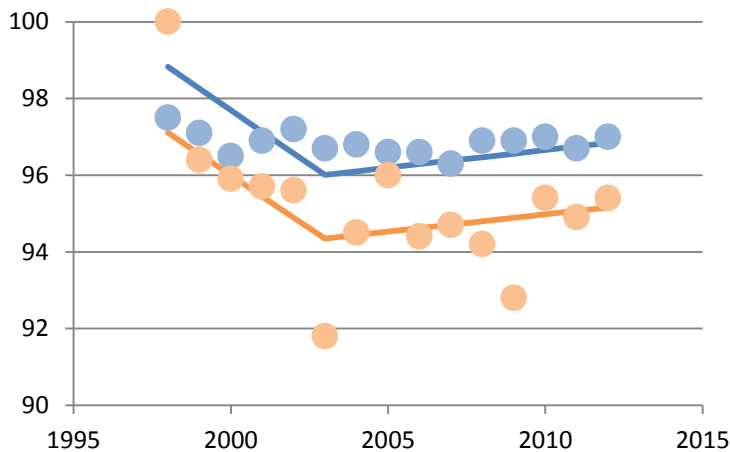
No Disparities were seen
between 2000 & 2012
between High Poverty &
Other Thresholds

Comparison of One Year Survival Trends Between Poverty Thresholds - Localized

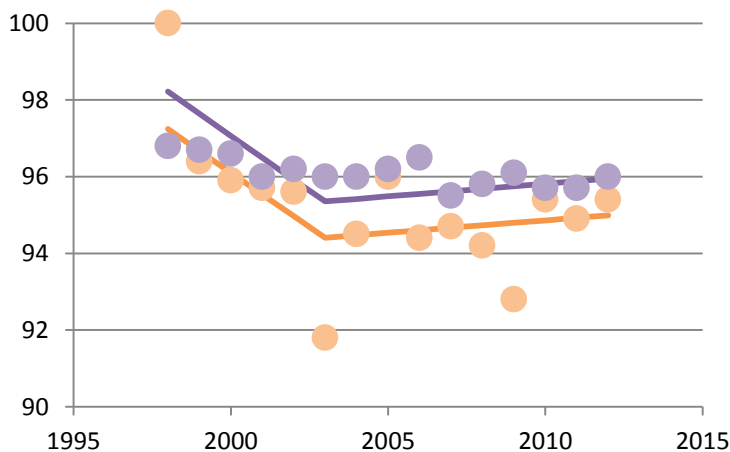
High

Mid

Low



Mid



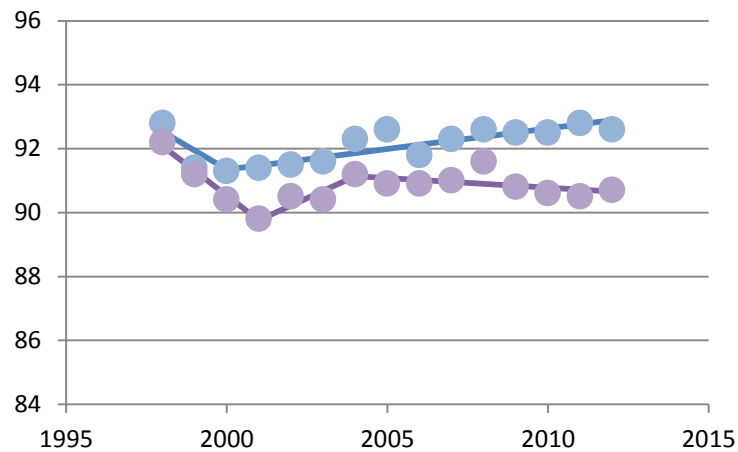
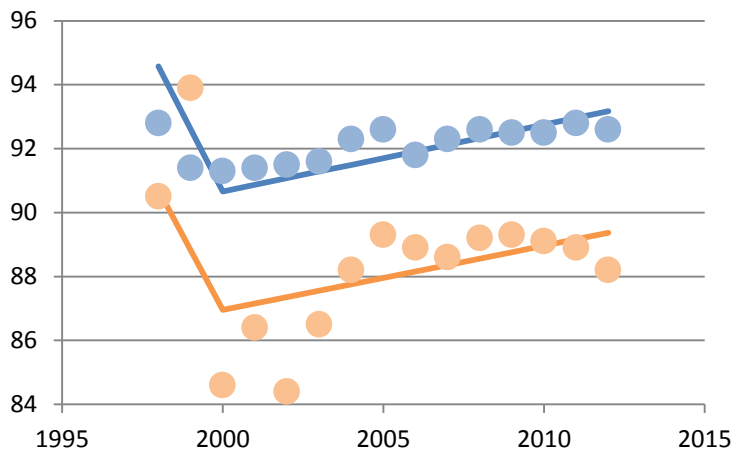
Disparities have persisted
between 1998 & 2012
between High Poverty &
Other Thresholds

Comparison of One Year Survival Trends Between Poverty Thresholds - Regional

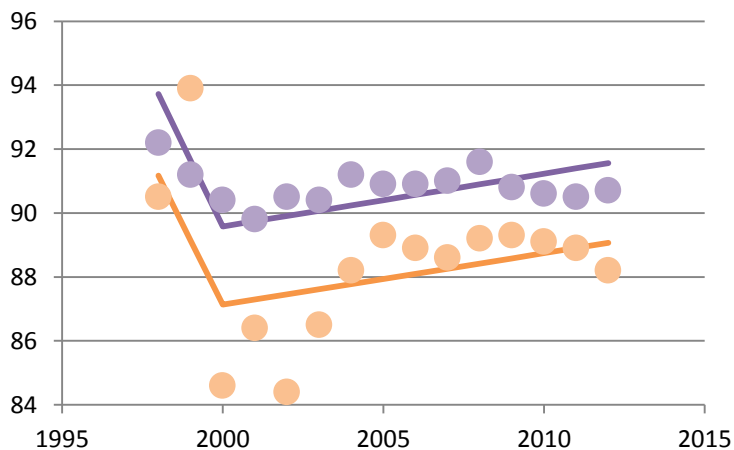
High

Mid

Low



Mid



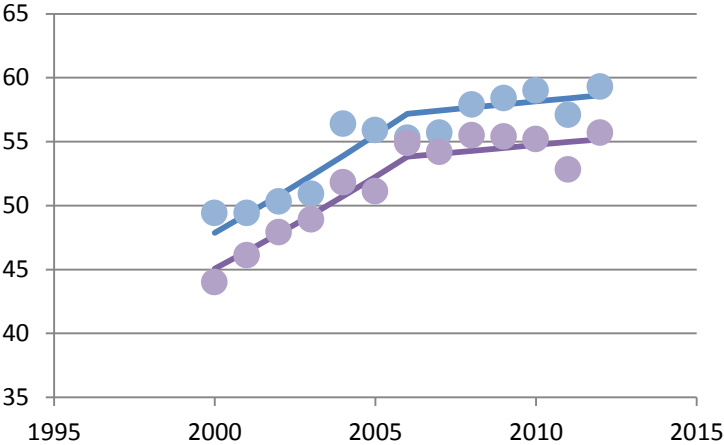
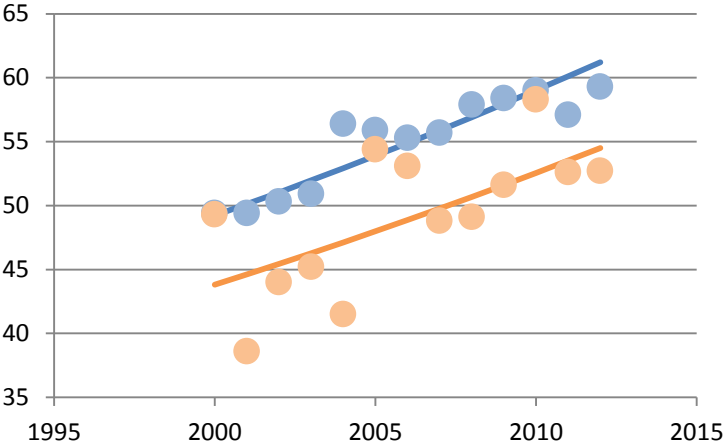
Disparities have persisted between 1998 & 2012 between High Poverty & Other Thresholds

Comparison of One Year Survival Trends Between Poverty Thresholds - Distant*

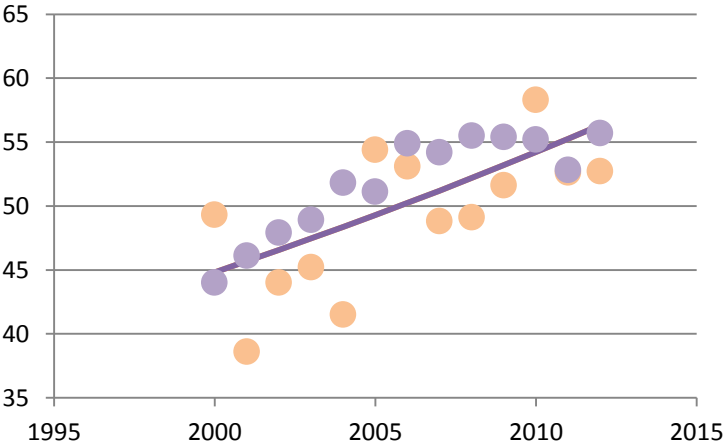
High

Mid

Low



Mid



No Disparities were seen
between 2000 & 2012
between Mid & High
Poverty Thresholds

Comparison of One Year Survival Trends Summary, 1998 – 2012

Cohort	Low – High	Mid – High	Low – Mid
SES Overall	Parallel	Parallel	Parallel
Male	Parallel	Parallel	<u>Not Parallel</u>
Female	Parallel	Parallel	Parallel
In Situ*	<u>Coincident</u>	<u>Coincident</u>	Parallel
Localized	Parallel	Parallel	<u>Not Parallel</u>
Regional	Parallel	Parallel	<u>Not Parallel</u>
Distant*	Parallel	<u>Coincident</u>	Parallel

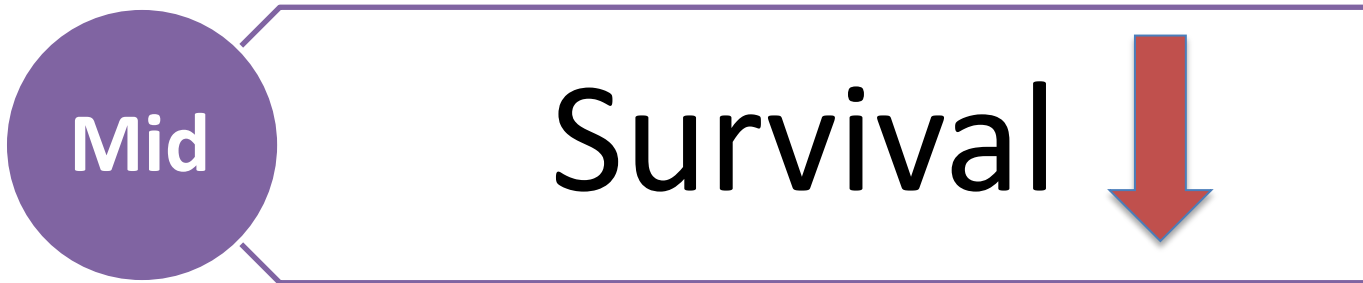
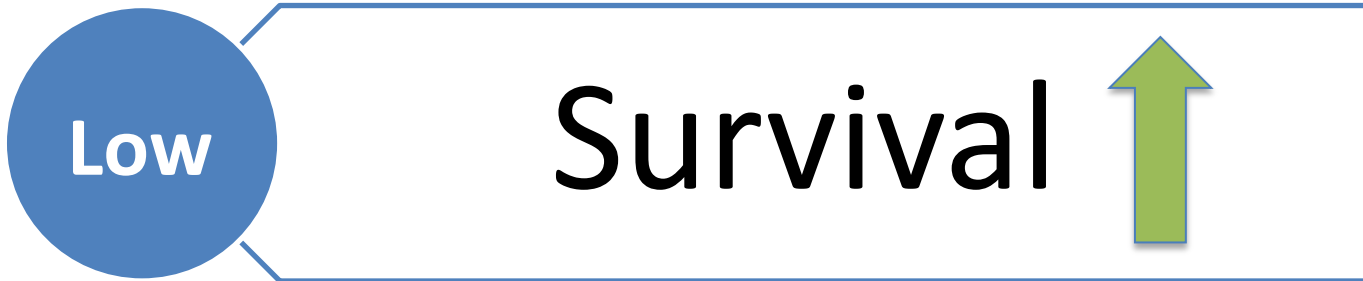
Comparison of One Year Survival Trends Summary, 1998 – 2020 (Preliminary Forecasting)

Cohort	Low – High	Mid – High	Low – Mid
SES Overall	Not Parallel	Not Parallel	Not Parallel
Male	Not Parallel	Not Parallel	<u>Not Parallel</u>
Female	Not Parallel	Parallel	Parallel
In Situ*	<u>Coincident</u>	<u>Coincident</u>	Not Parallel
Localized	Parallel	Parallel	<u>Not Parallel</u>
Regional	Parallel	Parallel	<u>Not Parallel</u>
Distant*	Parallel	<u>Coincident</u>	Parallel

Conclusion

Summary of Results

Persisting Disparities



Conclusion

Future Directions

- Cox Proportional Hazards Modeling
 - Controlling for possible confounding variables associated with SES, Year of Diagnosis, and Survival
- More Formal Forecasting
 - Analyzing possible non-linear trends to predict survival more accurately through 2020

Thank You!