

Challenging Your Practice and Heart – The Limits of Viability

Benjamin Mackowiak, MD

Neonatologist, Mednax Inc.

Clinical Assistant Professor of Pediatrics

Mercer University School of Medicine

Memorial Health University Medical Center



Disclosures

- I have no financial disclosures
- I will not be discussing use of off-label therapies

Polling instructions

- Go to pollev.com/benjaminmack277
- Click on answers as slides come up
- Your answers are anonymous

Objectives

1. Understand and define limits of perinatal viability
2. Understand change in outcomes over last 40 years
3. Identify ethical arguments for- and against-intervention at the limits of viability

Outline

- Review most recent outcomes for infants born at the limits of viability
- Summarize most recent statements by AAP, ACOG, and SMFM
- Discuss ethics surrounding resuscitation of the periviable infant

Keep in Mind

- Arguments against treatment of extremely premature infants
 - Futility
 - Cost
 - Adverse outcomes

Review of Outcomes

Periviability

- Infants born at 20 0/7 wks EGA to 24 6/7 wks EGA



Factors that affect Data - Source

- Variations in regional and local practices
 - International
 - National
 - Regional
 - Single institution

Factors that affect Data – Cohort Selection

- Exclusion
 - Newborns that did not survive to NICU admission (results in overestimated survival)
 - $10/50 = 20\%$ OR $10/100 = 10\%$

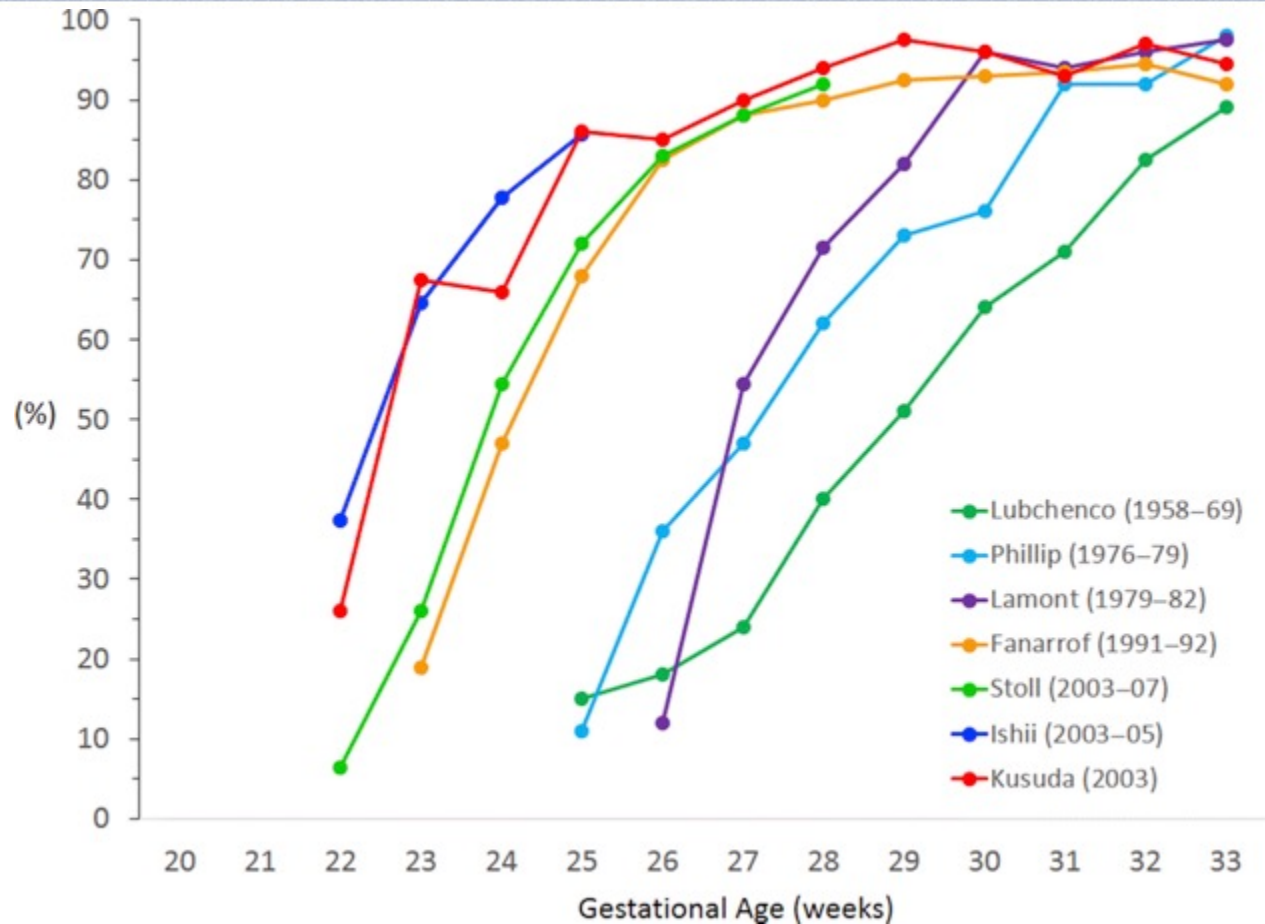
Factors that affect Data – Cohort Selection

- Inclusion
 - Non-resuscitated infants (results in underestimated survival)
 - $20/100 = 20\%$ OR $20/50 = 40\%$
 - Anomalous infants (results in underestimated survival)

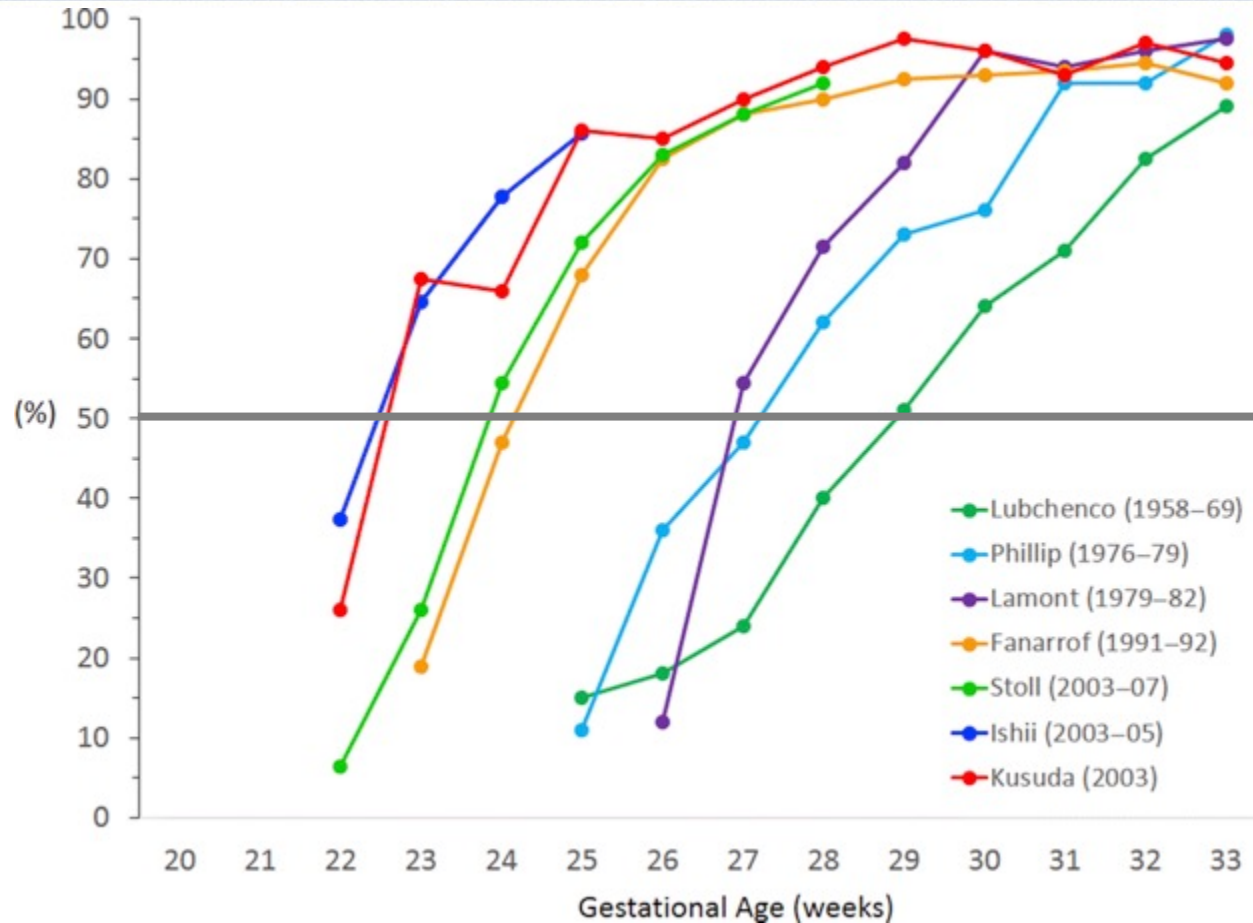
Births and Deaths in the US

- ~3 million people die each year in the US
- ~4 million babies born each year
 - 1% of births are < 1000g (~ 40,000)
 - 0.6 % of all births will die (~ 24,000)
 - Half of neonatal deaths are due to prematurity (~ 12,000)

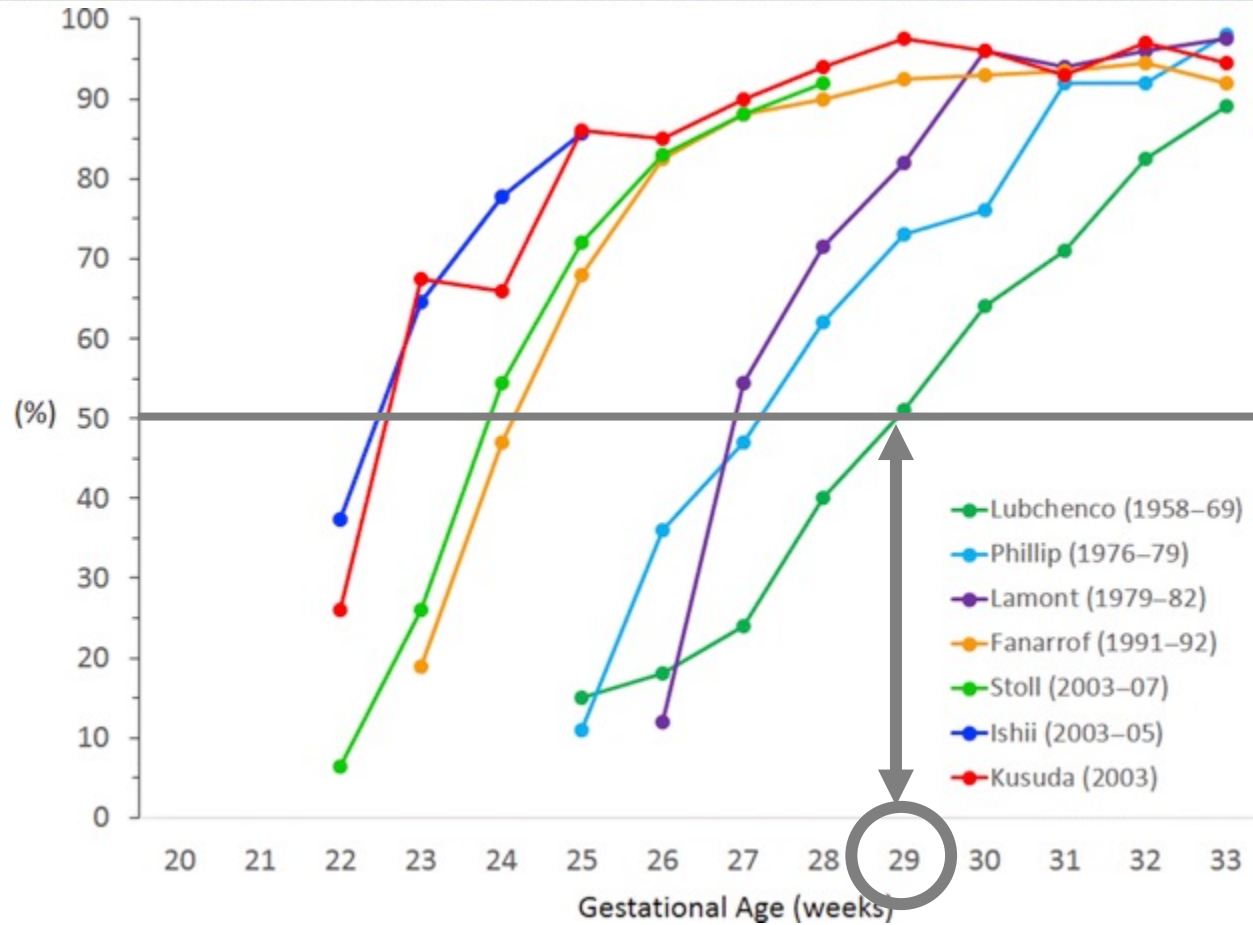
Survival Over The Decades



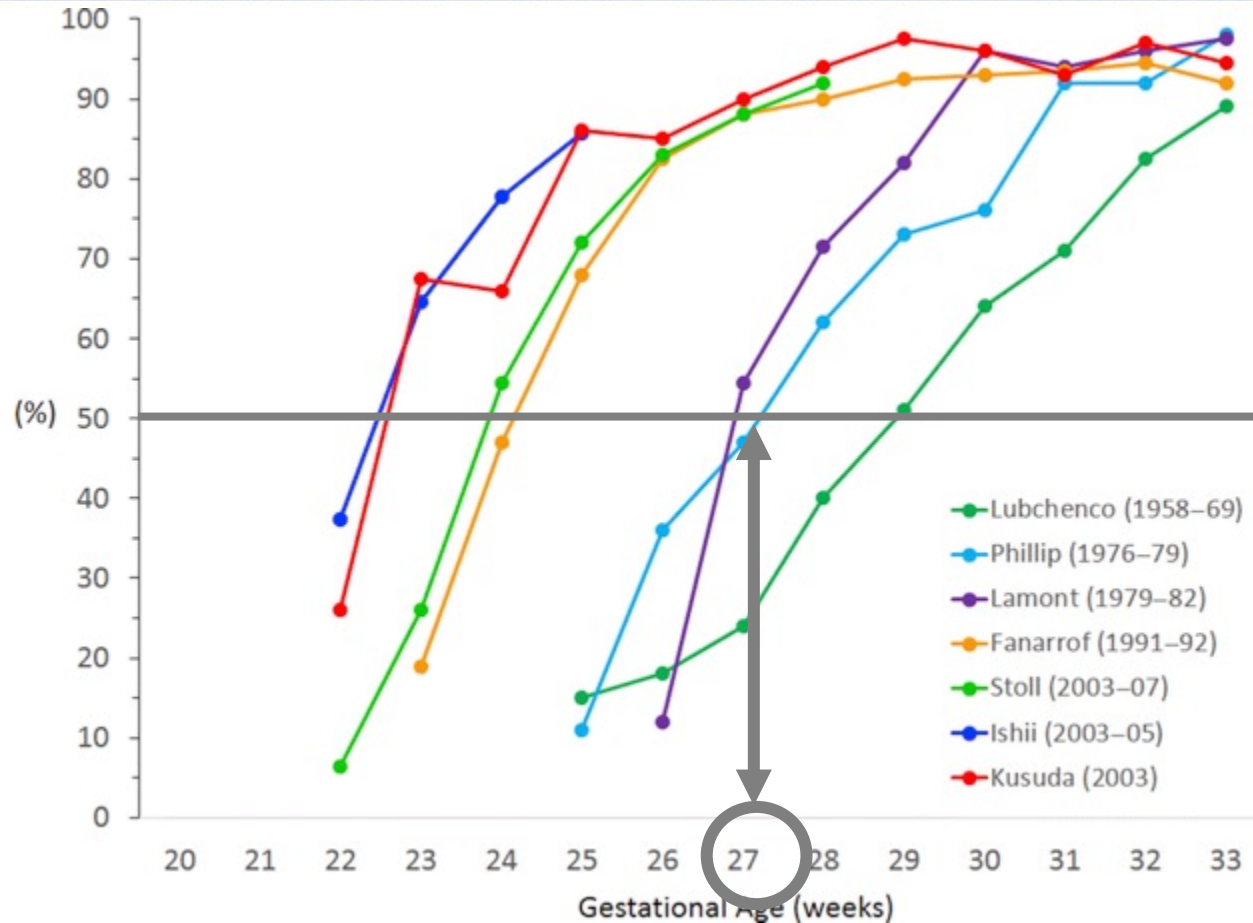
Survival Over Time



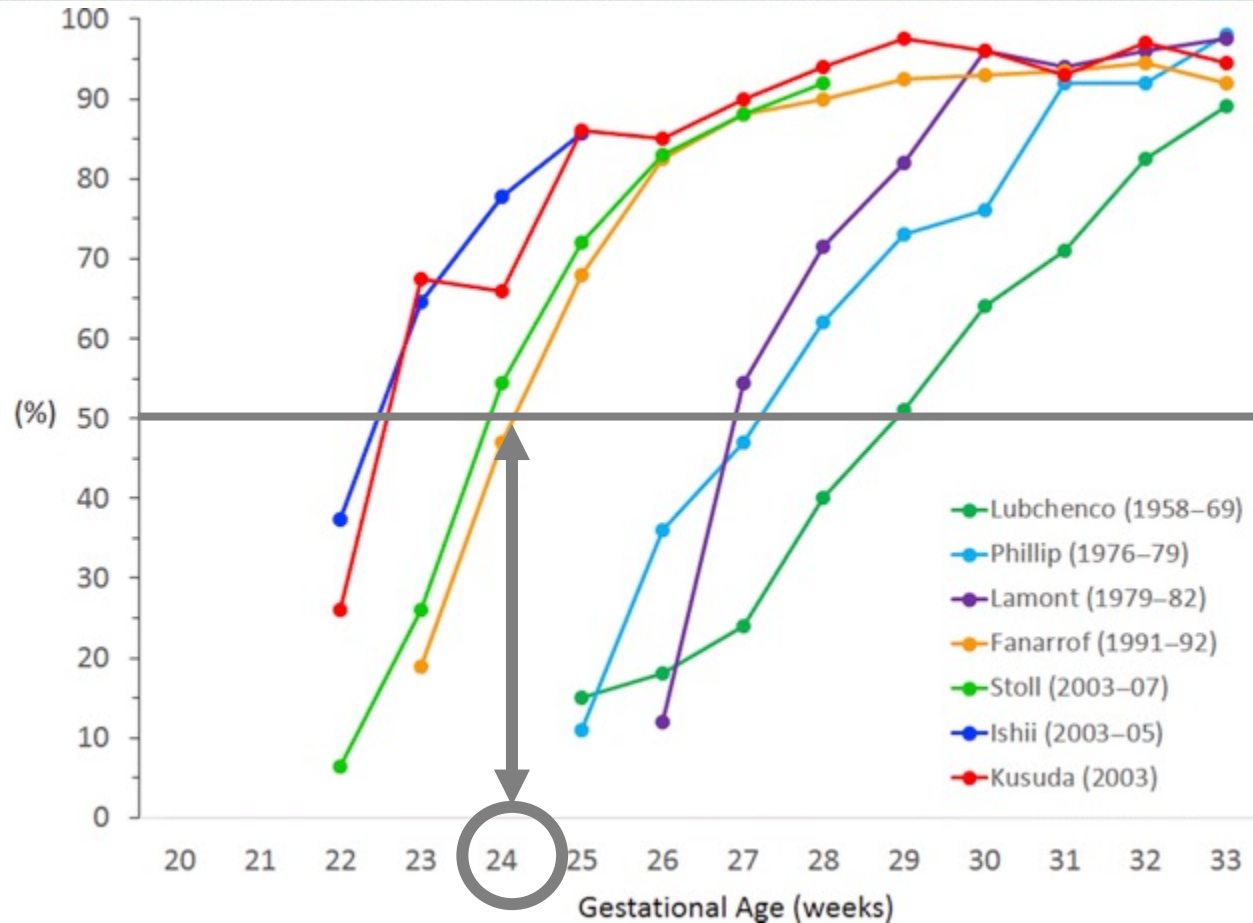
Survival Over Time



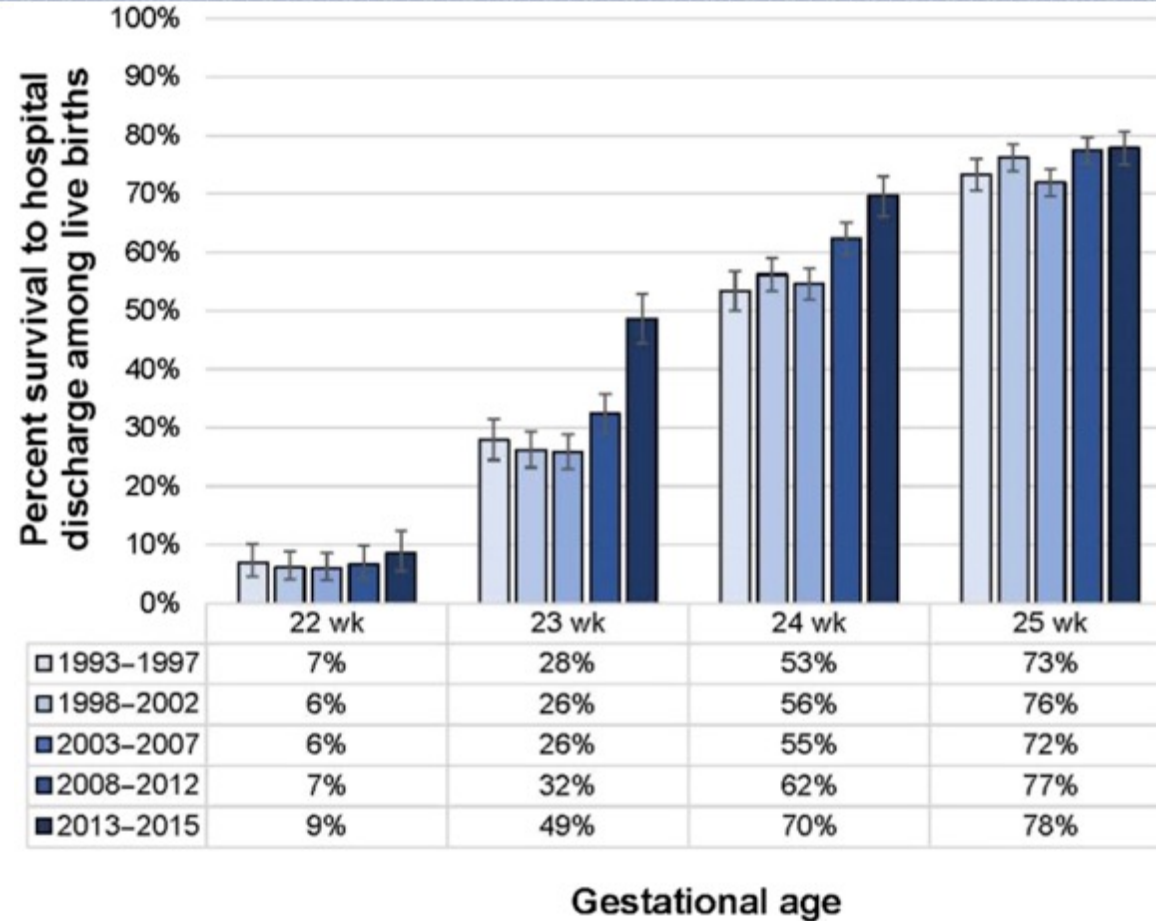
Survival Over Time



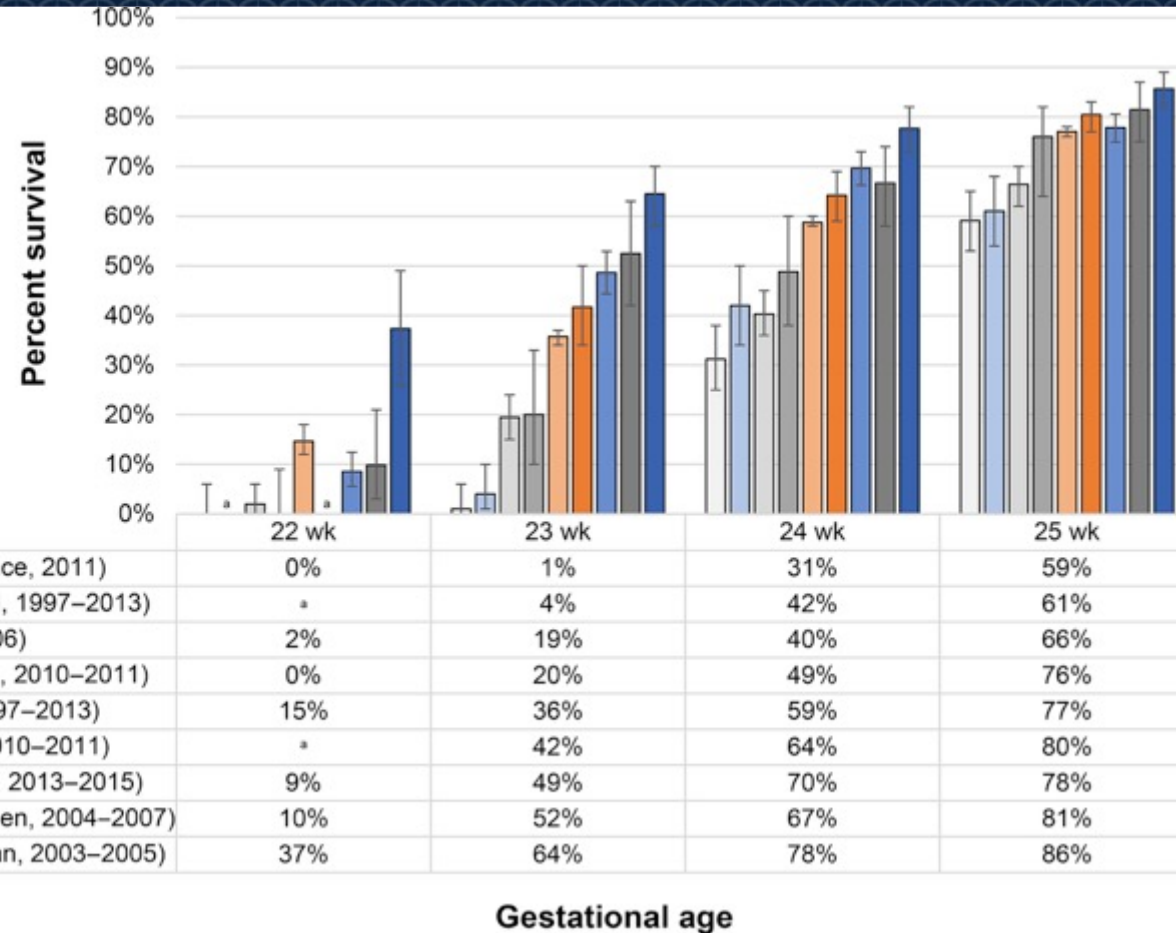
Survival Over Time



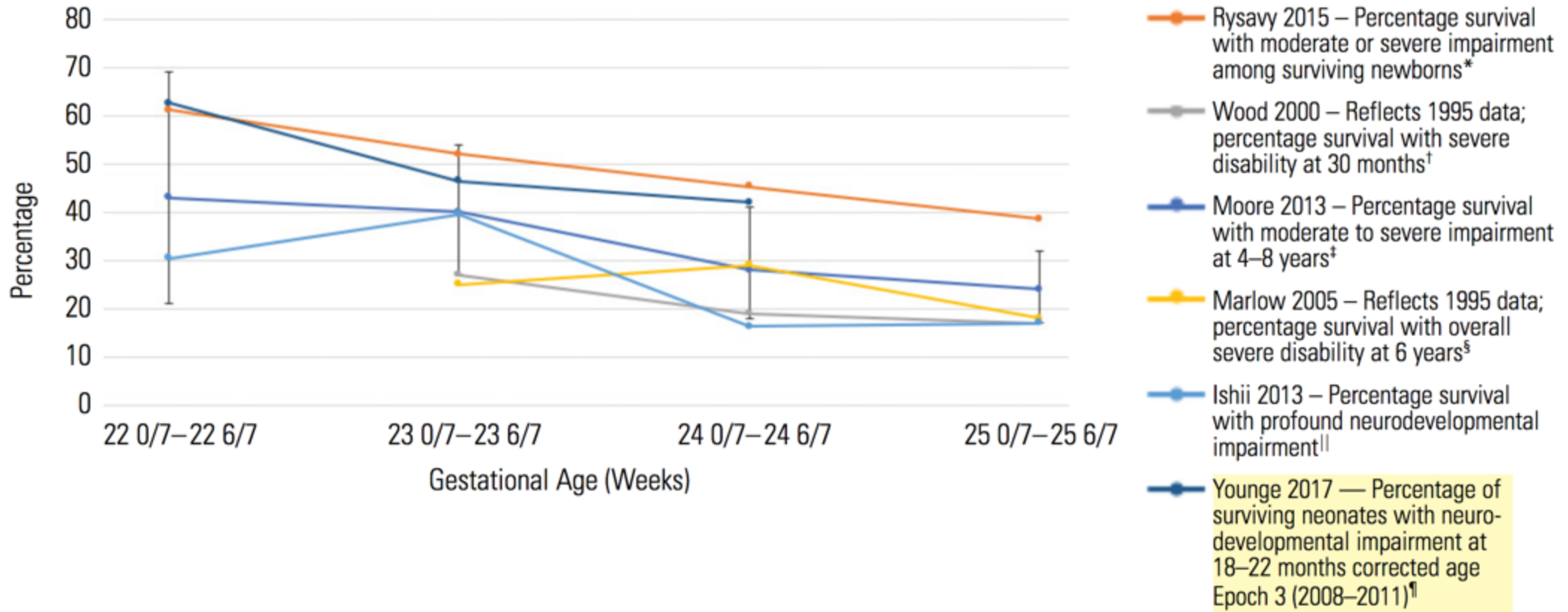
Survival Over Time



Survival by country

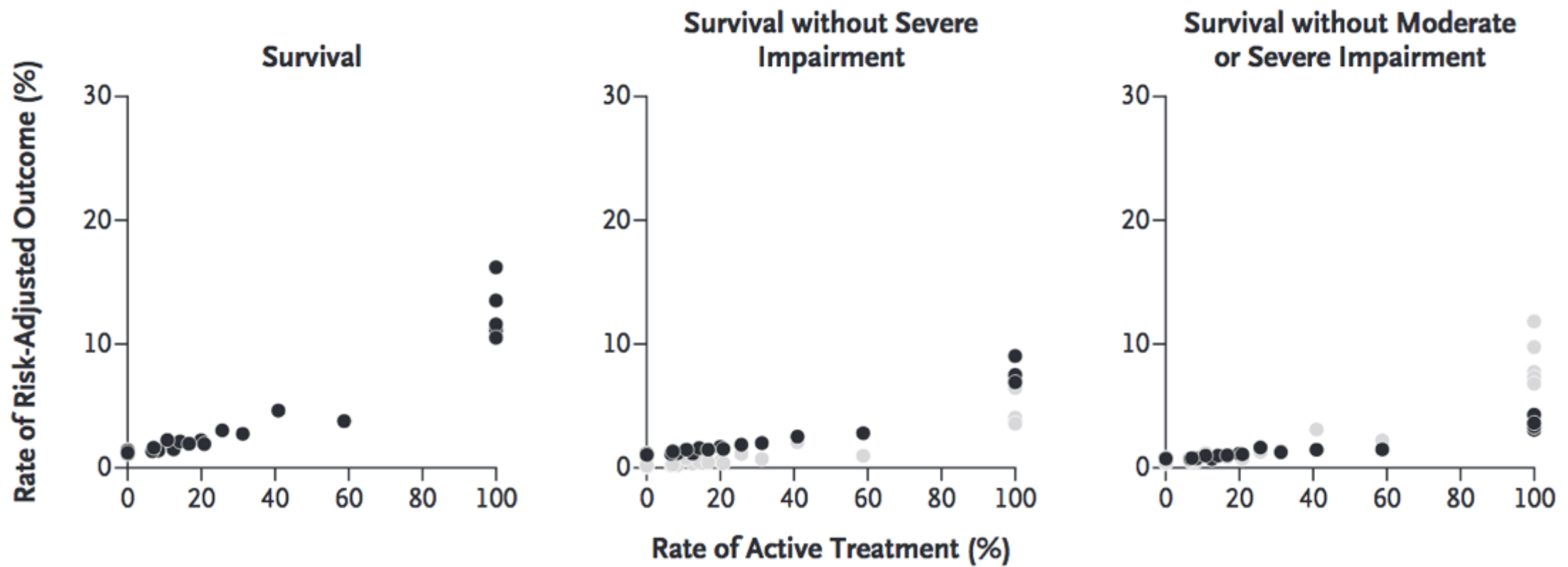


Survival and Neurodevelopmental Outcomes



Hospital Variation

A 22 Wk of Gestation



What about babies <400g?

- 2008-2016 NICHD NRN
- 22-26 wks EGA
- 101/205 actively treated
- 26/101 survived
 - 6/36 22-23 wks EGA survived (17%)
- 19/90 were evaluated at 18-26 mths
 - 14/19 with mod-severe NDI (74%)

Summary of Statements

AAP/ACOG/SMFM Statements

- AAP Committee on Fetus and Newborn
 - 2002 – MacDonald
 - 2009 – Batton
 - 2015 – Cummings

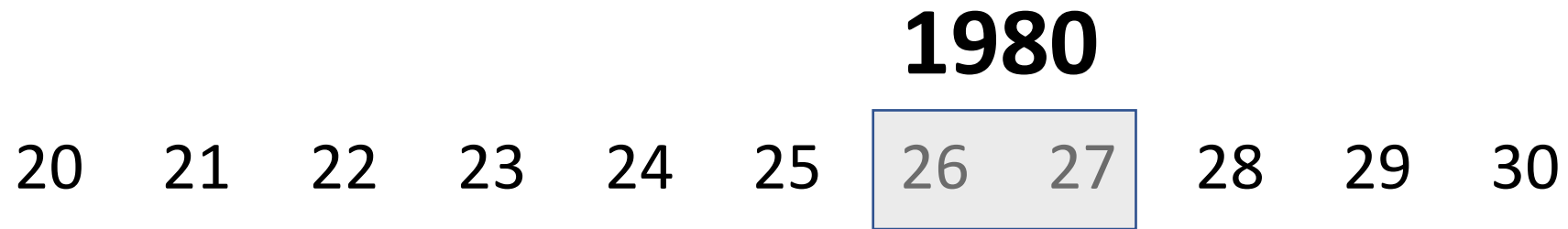
AAP/ACOG/SMFM Statements

- Joint AAP/ACOG/SMFM Workshop 2014
- ACOG/SMFM
 - Obstetric Consensus #3 - 2015
 - Obstetric Consensus #4 - 2016
 - Obstetric Consensus #6 - 2017

Decision-Making Zones

- Beneficial – intervention is indicated because of good outcomes
- Futile – intervention is not recommended because of improbable survival
- “Gray zone” – outcomes could justify either life support or withholding life support

The "Gray Zone"



The "Gray Zone"

1990

20 21 22 23 24 25 26 27 28 29 30

The "Gray Zone"

2000

20 21 22 23 24 25 26 27 28 29 30

The "Gray Zone"

2019

20 21 22 23 24 25 26 27 28 29 30

Gestational Age is a Poor Predictor of Outcome

- Rapid rate of fetal growth and development between 22 wks and 25 wks
- First trimester ultrasound gold standard for dating:
 - Can be wrong by 4-7 days (some data show up to 14 days) at 24 wks EGA
- Most precise measure of GA is with assisted reproductive technology

Gestational Age is a Poor Predictor of Outcome

- Is a 23 6/7 wks fetus very different from a 24 0/7 wk infant?
- Conclusion: GA should NOT be the only factor used in discussing outcomes with parents

Antenatal Factors

- Beyond gestational age at birth and active treatment, factors that increase probability of survival :
 - Higher fetal weight
 - Female sex
 - Singleton gestation
 - Receipt of antenatal steroids
- NICHD outcomes calculator (uses data from 1998-2003)

Physical Exam

- Physical exam at birth to determine level of development and likelihood of survival?
 - We're not very good at it

2014 Joint Workshop – Obstetric Interventions

Variable	Weeks of gestation ^b		
	<22 0/7	22 0/7-22 6/7	≥23 0/7
Antenatal corticosteroids	Not recommended	Consider if delivery at ≥23 0/7 is anticipated	Recommended
Tocolytics to enhance latency for potential steroid benefit	Not recommended	Not recommended unless concurrent with antenatal steroids	Consider
Magnesium sulfate for neuroprotection	Not recommended	Not recommended	Recommended
Antibiotics for preterm premature rupture of membranes to enhance latency	Consider if delivery not imminent	Consider if delivery not imminent	Recommended if delivery not imminent
Intrapartum antibiotics for group B streptococcus prophylaxis ^c	Not recommended	Not recommended	Recommended
Continuous intrapartum electronic fetal monitoring	Not recommended	Not recommended	Recommended
Cesarean delivery for fetal indication ^d	Not recommended	Not recommended	Recommended
Aggressive newborn infant resuscitation	Not recommended, comfort care only	Not recommended unless considered potentially viable based on individual circumstances	Recommended unless considered nonviable based on individual circumstances

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2017 ACOG/SMFM – Obstetric Interventions

	20 0/7 weeks to 21 6/7 weeks	22 0/7 weeks to 22 6/7 weeks	23 0/7 weeks to 23 6/7 weeks	24 0/7 weeks to 24 6/7 weeks	25 0/7 weeks to 25 6/7 weeks
Neonatal assessment for resuscitation*	Not recommended 1A	Consider 2B	Consider 2B	Recommended 1B	Recommended 1B
Antenatal corticosteroids	Not recommended 1A	Not recommended 1A	Consider 2B	Recommended 1B	Recommended 1B
Tocolysis for preterm labor to allow for antenatal corticosteroid administration	Not recommended 1A	Not recommended 1A	Consider 2B	Recommended 1B	Recommended 1B
Magnesium sulfate for neuroprotection	Not recommended 1A	Not recommended 1A	Consider 2B	Recommended 1B	Recommended 1B
Antibiotics to prolong latency during expectant management of preterm PROM if delivery is not considered imminent	Consider 2C	Consider 2C	Consider 2B	Recommended 1B	Recommended 1B
Intrapartum antibiotics for group B streptococci prophylaxis [†]	Not recommended 1A	Not recommended 1A	Consider 2B	Recommended 1B	Recommended 1B
Cesarean delivery for fetal indication [‡]	Not recommended 1A	Not recommended 1A	Consider 2B	Consider 1B	Recommended 1B

2017 ACOG/SMFM – Obstetric Interventions

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Recommended Approach

- Prenatal discussion as a team with parents is best

Prenatal Counseling

- No “cookie-cutter” approach – every family is different
- Avoid framing bias
- Determine if goal is to optimize the chance of survival or minimize the likelihood of suffering
- Comfort care should be offered as an option

Comfort Care

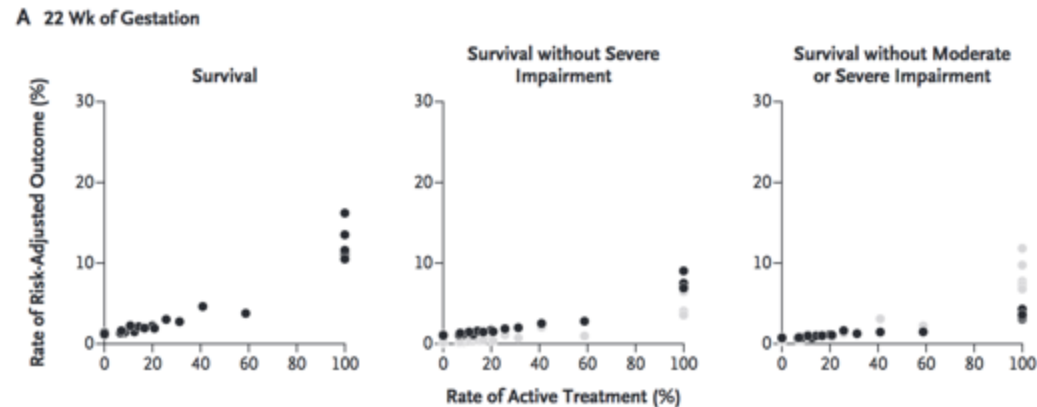
“A decision not to undertake resuscitation of a live born infant should not be seen as a decision to provide no care, but rather a decision to redirect care to comfort measures”

Maternal Health Considerations

- Little/no risk to mother:
 - Fetal monitoring
 - Steroids
 - Magnesium sulfate
- Possible short- and long-term consequences
 - Emergent cerclage
 - Classical c-section

Numbers – Active Treatment

“Policies do not just reflect outcomes, they shape them.” – Janvier and Lantos



Ethics

Ethics

- Premature infants are a vulnerable population

Principles of Biomedical Ethics

Autonomy

Respect for parental decision-making authority

Beneficence

Do what is best for the patient

Non-
Maleficence

“Do no harm”

Justice

Equals ought to be treated equitably

Arguments against treatment of extremely premature infants

- Futile/painful
- Too expensive
- Majority of survivors are disabled

Arguments against treatment of extremely premature infants

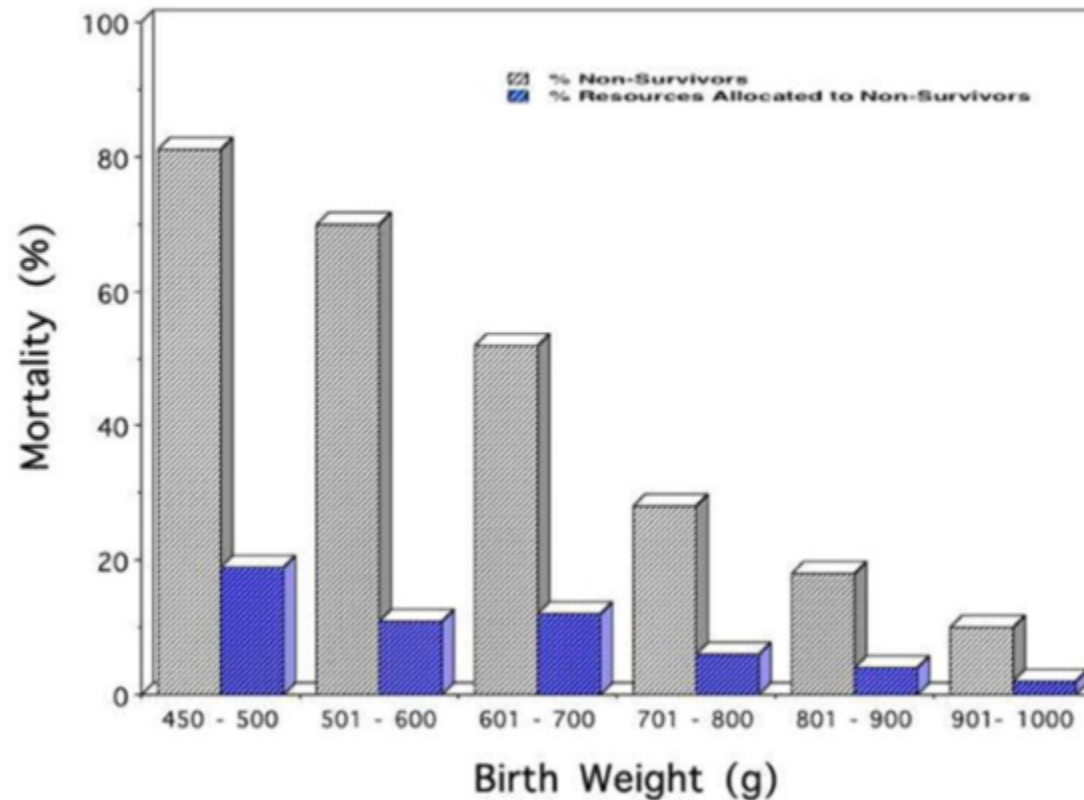
- Futile
 - With treatment 20-70% of patients at 22-23 wks EGA survive
 - Pancreatic cancer survival: 1-yr – 20%, 5-yr – 7% (Hirschberg Foundation)

Arguments against treatment of extremely premature infants

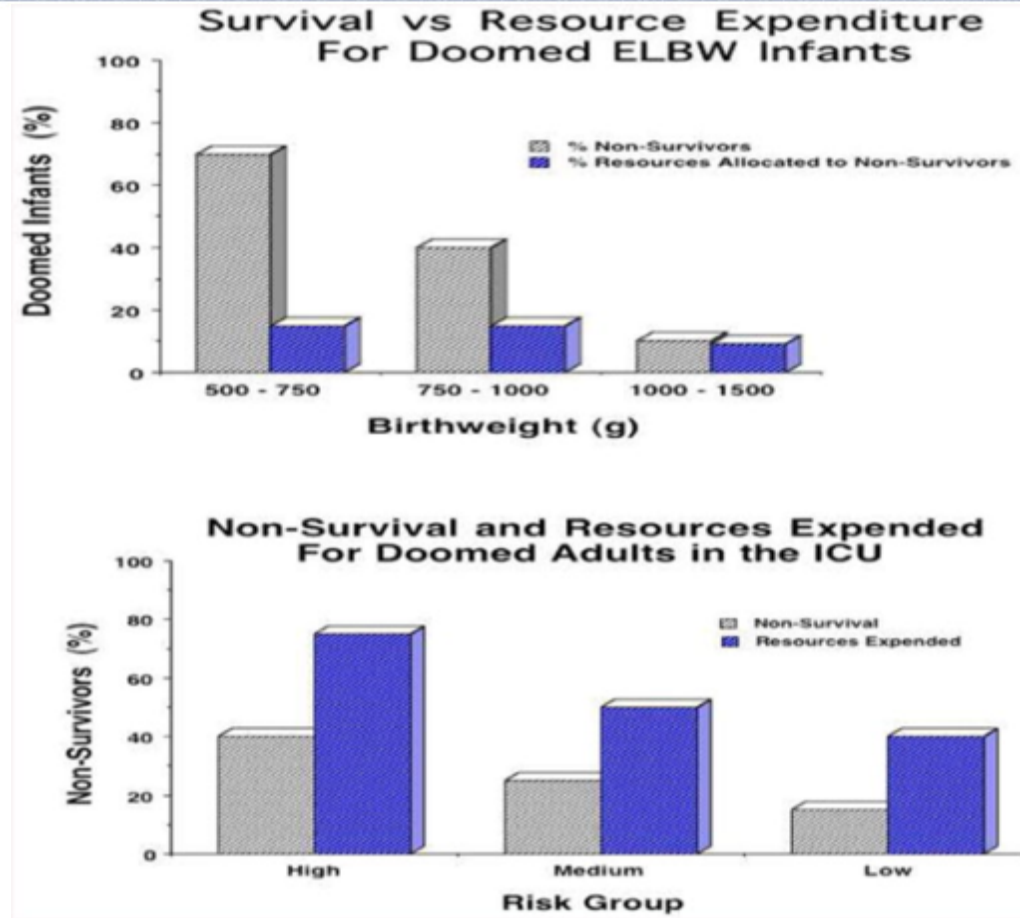
- Too expensive
 - NICU care is expensive but cost-effective
 - <\$10,000 per quality-adjusted life-year (for ELBW)
 - More cost-effective than routine Pap smears, treatment of severe hypertension, coronary artery bypass surgery (5X), and renal dialysis (5X)

Arguments against treatment of extremely premature infants

"Wasted" Resources and Mortality vs Birth Weight



Arguments against treatment of extremely premature infants



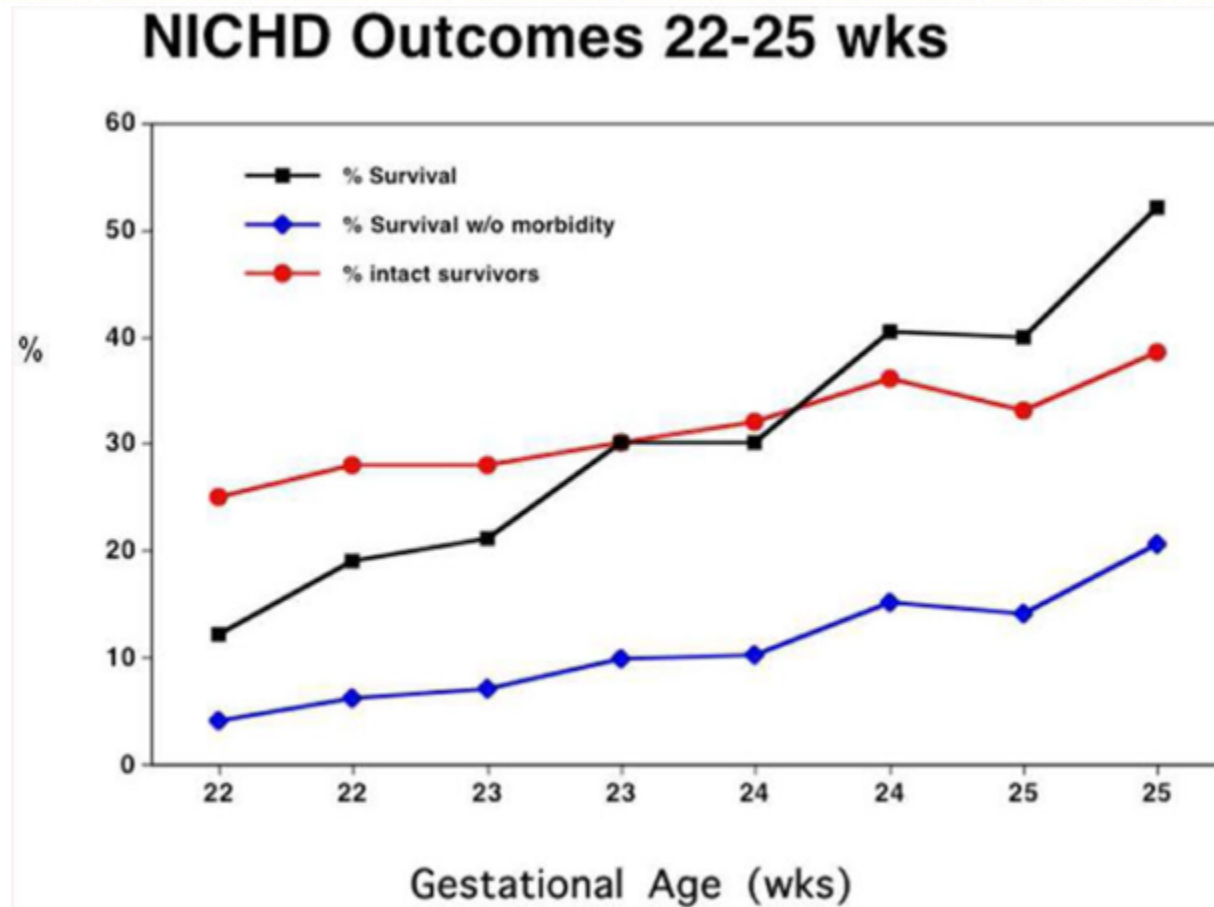
Arguments against treatment of extremely premature infants

- Majority of survivors are disabled - are they?

Arguments against treatment of extremely premature infants

- 4 possible outcomes after birth
 1. Comfort care – death
 2. Resuscitation at birth – death before discharge
 3. Resuscitation at birth – survival with neurodevelopmental impairment (NDI)
 4. Resuscitation – intact survival (no NDI)

Arguments against treatment of extremely premature infants



Arguments against treatment of extremely premature infants

- Majority of survivors are disabled
 - Maybe not

How do we measure quality of life?

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Questions?

References

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