

Periviable Pregnancies: Decision Making Under Uncertainty

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Disclosures

- No financial disclosures related to this talk

Overview

- What is periviable?
 - What is viability?
- What are the outcomes?
- Decision making under uncertainty
- What are the potential interventions?
- How do we counsel in this setting?

Case Presentation

- 27 yo G1P0 at 23 2/7 wks GA presents with PTL – ctxns Q3' / cvx- 3/80/0
 - Who counsels her and about what?
 - Outcomes
 - Mgmt
 - MgSo4
 - Tocolysis
 - BMZ
 - MOD
 - Fetal monitoring
 - Resuscitation
 - Expt mgmt

Case Presentation – 23 wks PTL



What are reasonable options?

- A) Expt Mgmt
- B) Interventions (BMZ, MgSO₄, Abx, etc)
- C) No Resuscitation
- D) Induction termination
- D) A&B
- E) A, B, & C
- F) A, B, C, & D

Case Presentation – 22 wks PTL



What are reasonable options?

- A) Expt Mgmt
- B) Interventions (BMZ, MgSO₄, Abx, etc)
- C) No Resuscitation
- D) Induction termination
- D) A&B
- E) A, B, & C
- F) A, B, C, & D

Case Presentation – 24 wks PTL



What are reasonable options?

- A) Expt Mgmt
- B) Interventions (BMZ, MgSO₄, Abx, etc)
- C) No Resuscitation
- D) Induction termination
- D) A&B
- E) A, B, & C
- F) A, B, C, & D

Case Presentation – 25 wks PTL



What are reasonable options?

- A) Expt Mgmt
- B) Interventions (BMZ, MgSO₄, Abx, etc)
- C) No Resuscitation
- D) Induction termination
- D) A&B
- E) A, B, & C
- F) A, B, C, & D

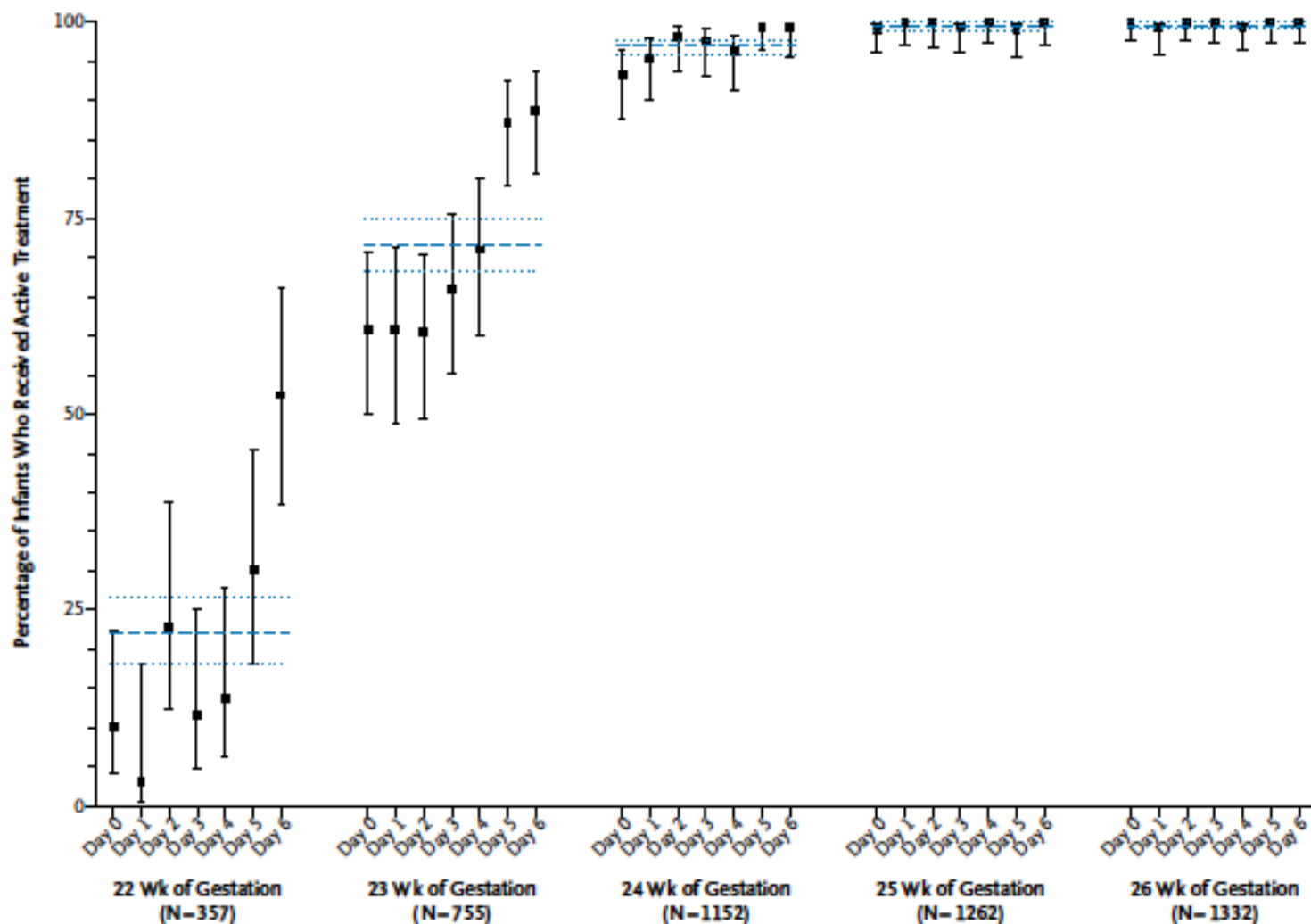


Figure 1. Rates of Active Treatment by Gestational Age at Birth.

Point values represent the mean percentage, across all hospitals, of infants born at a given gestational age (in weeks and days) who received active treatment. Vertical bars represent 95% confidence intervals. Blue dashed lines indicate the mean rate of active treatment among infants born during a given week of gestation, and blue dotted lines indicate 95% confidence intervals.

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Perivable - Definitions

- **Perivable**

- Around the time of viability
- 23 6/7 – 24 1/7? 20-28 wks?

- **Viability**

- Can survive?
- Will survive?
- More likely than not will survive?
- NICHD document – 20 0/7 – 25 6/7
 - “Broadly defined”
- Or should 20 and 21 weeks be removed?

Periviable - Definitions

- Should morbidity figure into this?
- Morbidities
 - Short term – RDS, NICU, NEC, IVH
 - Long-term
 - CP
 - MR (MR/CP)
 - Would a morbidity rate above a threshold be a potential benchmark?

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Periviable – Long-term outcomes

Infants born at 22 wk

Survival without neurodevelopmental impairment§	2/241	1 (0–3)	3/234	1 (0–4)
Survival with neurodevelopmental impairment§	4/241	2 (1–4)	5/234	2 (1–5)
Death	235/241	98 (95–99)	226/234	97 (93–98)

Infants born at 23 wk

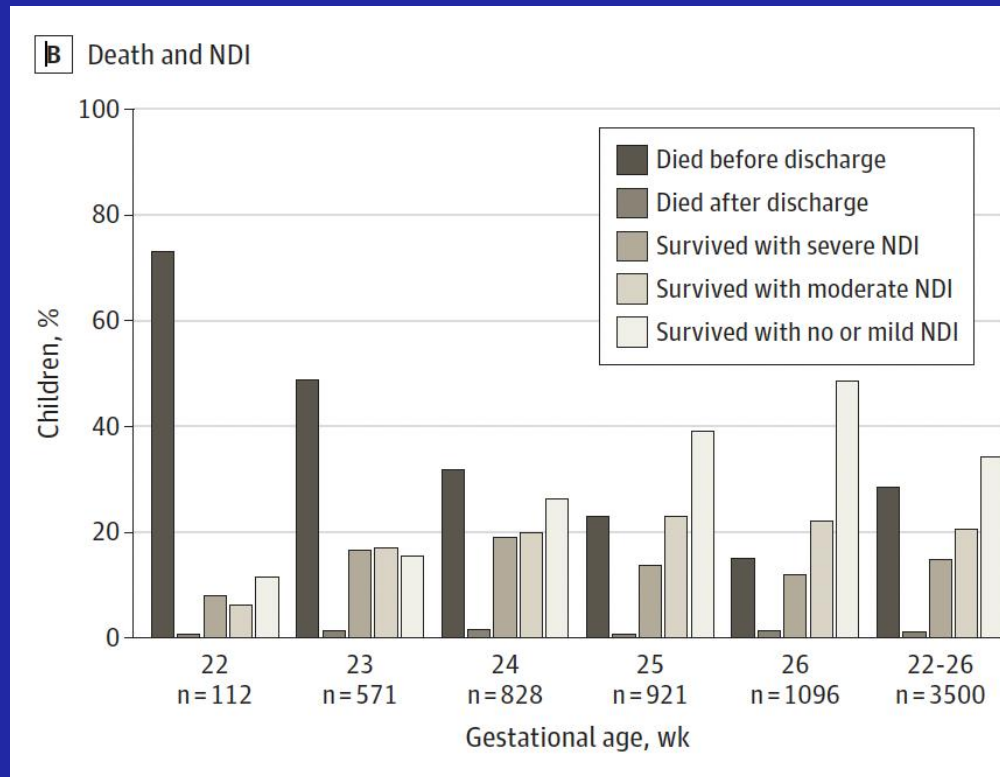
Survival without neurodevelopmental impairment	34/496	7 (5–9)	59/450	13 (10–17)
Survival with neurodevelopmental impairment	63/496	13 (10–16)	51/450	11 (9–15)
Death	399/496	80 (77–84)	340/450	76 (71–79)

Infants born at 24 wk

Survival without neurodevelopmental impairment	181/654	28 (24–31)	214/664	32 (29–36)
Survival with neurodevelopmental impairment	140/654	21 (18–25)	155/664	23 (20–27)
Death	333/654	51 (47–55)	295/664	44 (41–48)

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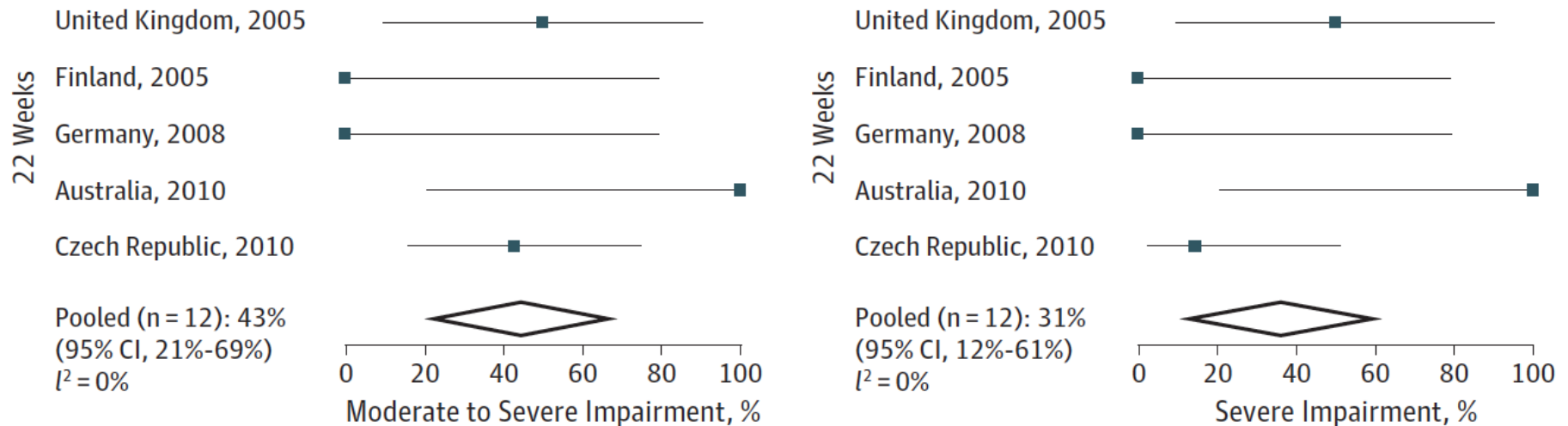
Periviable – Long-term outcomes



Cerebral palsy ^c	22 (n = 31)	23 (n = 292)	24 (n = 567)	25 (n = 733)
None	16/31 (51.6)	197/290 (67.9)	432/566 (76.3)	627/730 (85.9)
Mild	8/31 (25.8)	41/290 (14.1)	73/566 (12.9)	56/730 (7.7)
Moderate	4/31 (12.9)	27/290 (9.3)	40/566 (7.1)	24/730 (3.3)
Severe	3/31 (9.7)	25/290 (8.6)	21/566 (3.7)	23/730 (3.2)

Periviable – Long-term outcomes

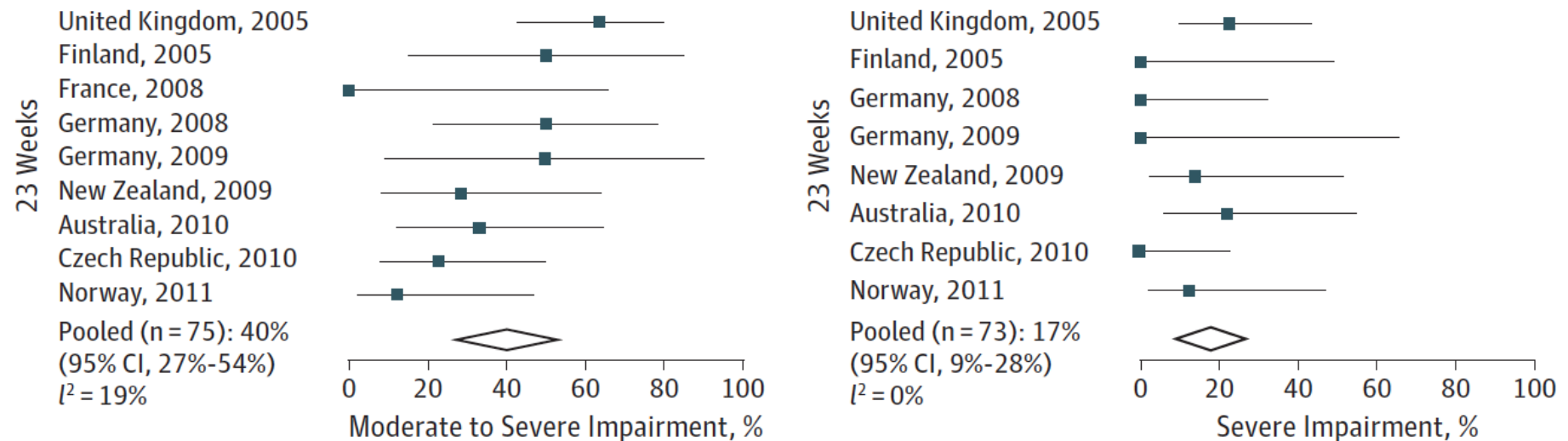
Figure 2. Random-Effects Meta-analysis of Moderate to Severe and Severe Neurodevelopmental Impairment Rates



Moore, et al. JAMA Pediatr. 2013;167(10):967-974.

Periviable – Long-term outcomes

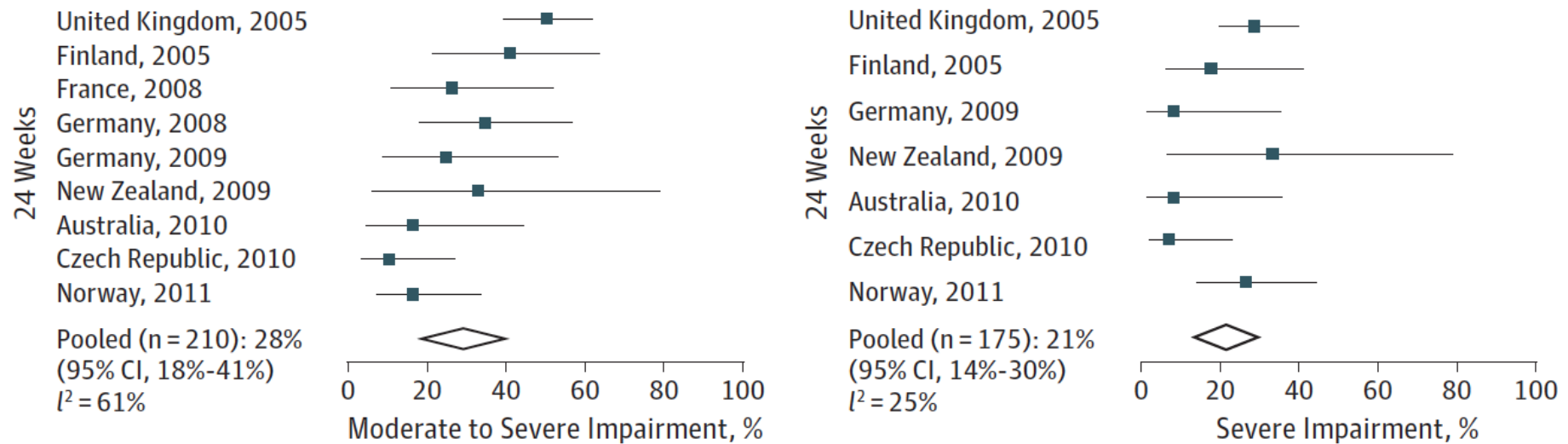
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Periviable – Long-term outcomes

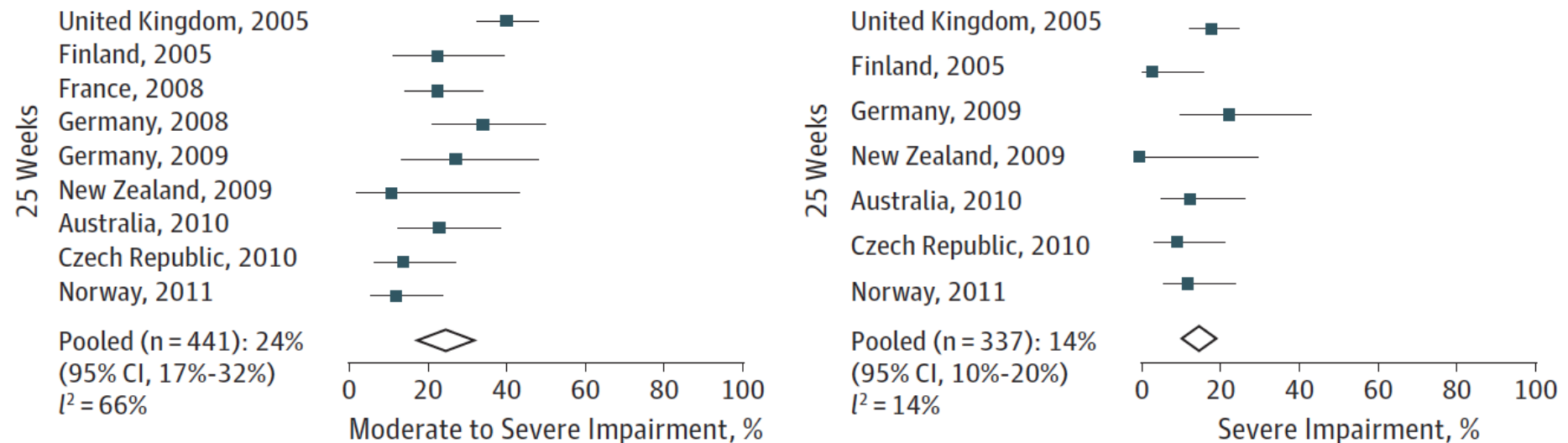
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Periviable – Long-term outcomes

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Periviable – Long-term outcomes

Table 3. Neurodevelopmental Outcomes among Infants Surviving to 18 to 22 Months of Corrected Age.

Outcome	Epoch 1 (2000–2003)	Epoch 2 (2004–2007)	Epoch 3 (2008–2011)
	<i>no./total no. (%)*</i>		
Neurodevelopmental impairment	207/424 (49)	209/459 (46)	211/487 (43)
Neurosensory impairment	73/413 (18)	66/457 (14)	92/487 (19)
Moderate or severe cerebral palsy	62/423 (15)	50/458 (11)	56/487 (11)
Severe cerebral palsy	34/424 (8)	25/459 (5)	26/487 (5)
Profound visual impairment	10/424 (2)	7/457 (2)	2/484 (<1)
Profound hearing loss	17/421 (4)	16/457 (4)	14/487 (3)
Cognitive impairment	194/417 (47)	204/457 (45)	195/480 (41)
Cognitive impairment alone‡	123/417 (29)	141/457 (31)	119/480 (25)

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Impact of Long-term Outcomes

Differences in Preferences for Neonatal Outcomes Among Health Care Professionals, Parents, and Adolescents

Saroj Saigal, MD, FRCP

Context

JAMA, June 2, 1999—Vol 281, No. 21

Sandy

Has a problem seeing, hearing, or talking even with glasses or hearing aid
Needs to use equipment, but not the help of another person, to walk
Sometimes angry, worried, or sad
Learns schoolwork very slowly and needs special help
Needs to use special equipment to eat, bathe, dress, or use the toilet
Sometimes has pain, maybe needs Tylenol, but the pain does not prevent normal activities

Pat

Blind, deaf, or unable to talk
Needs to use equipment, but not the help of another person, to walk
Happy and not worried most of the time
Learns schoolwork very slowly and needs special help
Needs help from another person to eat, bathe, dress, or use the toilet
Sometimes has pain, maybe needs Tylenol, but the pain does not prevent normal activities

Impact of Long-term Outcomes

Table 4. Comparison of Health Care Professionals, Parents, and Adolescents: Descriptive Statistics of Utility Scores for 4 Hypothetical Health States*

Hypothetical Health State	Group	Mean (SD)	Median	Minimum	Maximum	Differences	
						Mean	P Value
Jamie Down Syndrome	HPs	0.80 (0.25)	0.85	−0.95	0.95		
	Parents	0.82 (0.19)	0.90	0.00	1.00	−0.02	.20
	Adolescents	0.72 (0.25)	0.75	0.00	1.00	0.08	.002
Chris CP	HPs	0.62 (0.36)	0.70	−0.85	0.95		
	Parents	0.63 (0.33)	0.75	−0.95	0.95	−0.01	.70
	Adolescents	0.56 (0.31)	0.65	−0.85	0.95	0.06	.04
Pat Severe CI/CP	HPs	−0.05 (0.53)	0.00	−0.95	0.95		
	Parents	0.20 (0.51)	0.30	−0.95	0.95	−0.25	<.001
	Adolescents	0.16 (0.50)	0.15	−0.95	0.95	−0.21	<.001
Sandy CI/CP	HPs	0.05 (0.50)	0.00	−0.95	0.95		
	Parents	0.23 (0.51)	0.25	−0.95	0.95	−0.18	<.001
	Adolescents	0.23 (0.47)	0.25	−0.95	0.95	−0.18	<.001

Overview

- What is periviable?
 - What is viability?
- What are the outcomes?
- **Decision making under uncertainty**
- What are the potential interventions?
- How do we counsel in this setting?

Decision Making Under Certainty

- Many of our day to day decisions
 - What to eat?
 - What to wear?
 - Entertainment (what to watch)?



Decision Making Under Uncertainty

Many decisions with less certainty

- What to eat in a foreign city?
 - (e.g. Shanghai, Kampala)
- What to wear on a trip?



Decision Making Under Uncertainty

- **Examples of uncertainty**
 - **What to eat in a foreign city?**
 - Will you need to eat? Very certain
 - How enjoyable will the food be? Variable
 - How dangerous will the food be? Variable
 - **What to wear on a trip?**
 - Will you need underwear? Very certain
 - Will you need a raincoat? Variable
 - How comfortable will you be (warm/cold)? Variable
 - How dangerous will the clothing be (exposed skin)? V

Decision Making Under Uncertainty

- **Types of uncertainty**
 - **Uncertainty in benefit of treatment / product**
 - **Uncertainty in quality of treatment / product**
 - **Uncertainty in harms of treatment / product**
 - **Uncertainty about the future**
 - **Personal preferences towards product / effects**
 - **Environment / demand**
 - **Uncertainty about the uncertainty (confidence interval)**

Decision Making Under Uncertainty

- **Examples of uncertainty in medicine**
 - **Effect of therapy**
 - Cesarean for delivery of baby – very certain
 - Abx in labor for T of 100.4 degrees – uncertain need
 - Cerclage for a short cervix – uncertain benefit
 - MgSO₄ for CP prophylaxis – uncertain benefit/need
 - Chemotherapy for Ovarian CA – uncertain benefit / harm

Decision Making Under Uncertainty

- One approach – Rational, expected value
- Think of this as lottery
 - Two potential outcomes:
 - 50% chance Win - \$10, 50% chance Lose – Price of lottery
 - A fair price - \$5 – who will pay \$5?
 - 60% chance Win - \$10, 40% chance Lose – Price of lottery
 - A fair price - \$6 – who will pay \$5?

Decision Making Under Uncertainty

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 - 60% chance Win - \$10, 40% chance Lose – Price of lottery
 - A fair price - \$6 – who will pay \$5?
 - 60% chance Win - \$10, 40% chance Lose – Price of lottery
 - A fair price - \$6 – you can play as many times as you want at \$5!
 - E.g. 1 million times

Decision Making Under Uncertainty

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- Think of this as lottery
 - Two potential outcomes:
 - 50% chance Win - \$10, 50% chance Lose – Price of lottery
 - A fair price - \$5 – who will pay \$5?
 - 60% chance Win - \$10, 40% chance Lose – Price of lottery
 - A fair price - \$6 – who will pay \$5?
 - 60% chance Win - \$1M, 40% chance Lose – Price of lottery
 - A fair price - \$600,000 – who will pay \$500,000?
 - (Isn't this more like periviable resuscitation?)

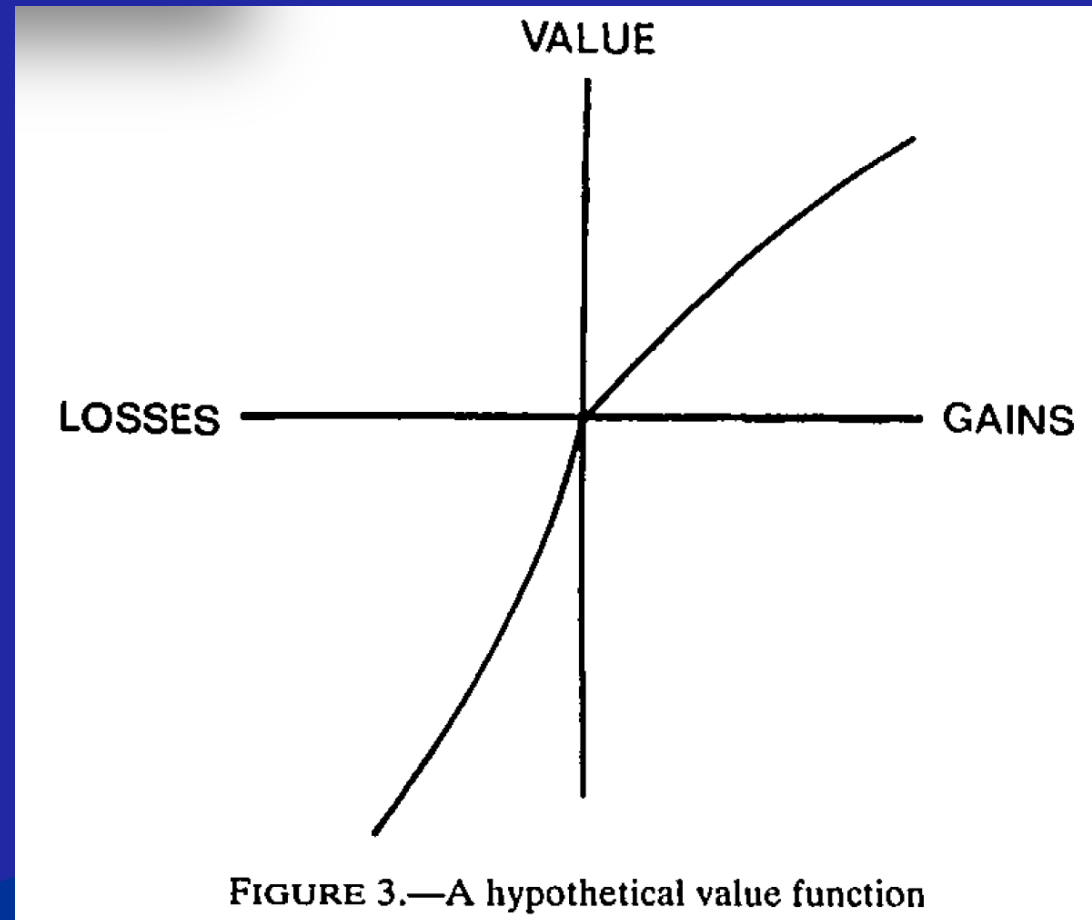
Decision Making Under Uncertainty

- Prospect Theory
- Distortions in:
 - Values
 - Probabilities

Gains domain

Loss domain

Mug experiments



ECONOMETRICA

VOLUME 47

MARCH, 1979

NUMBER 2

PROSPECT THEORY: AN ANALYSIS OF DECISION UNDER RISK

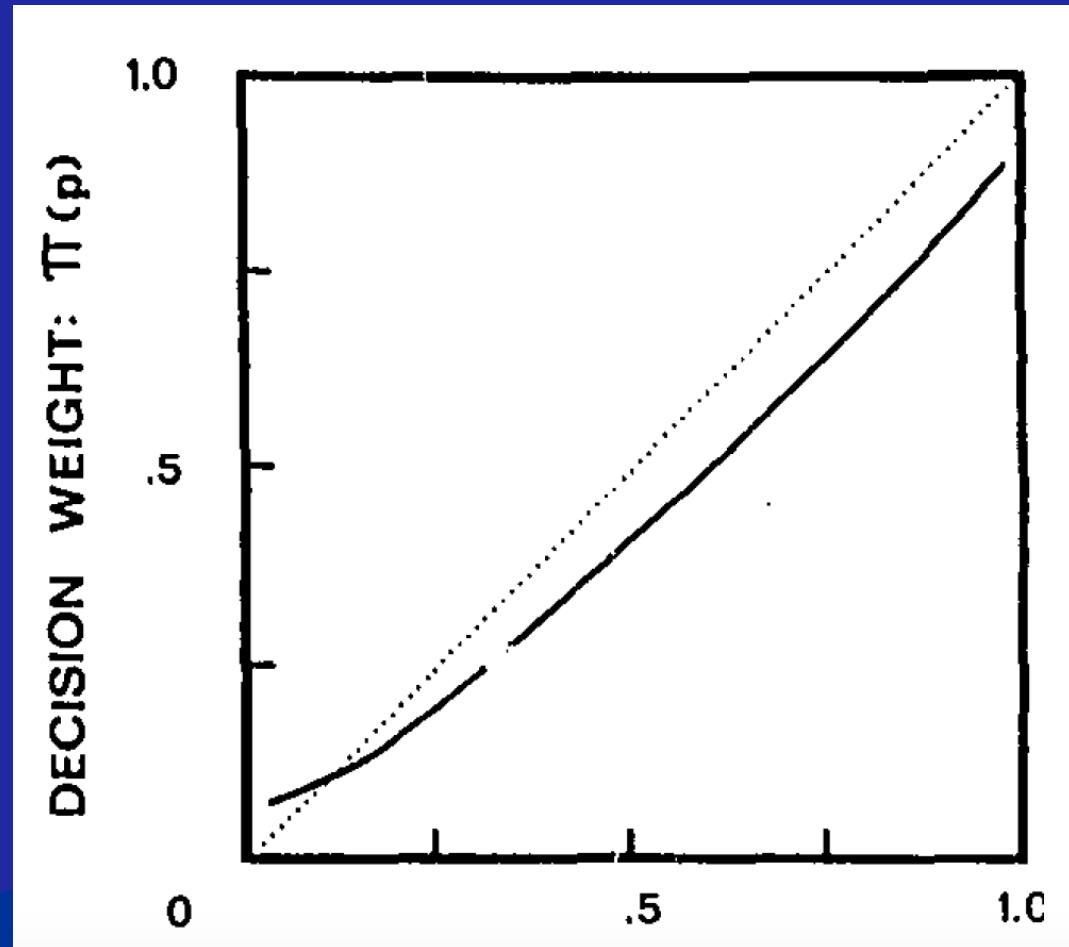
BY DANIEL KAHNEMAN AND AMOS TVERSKY¹

Decision Making Under Uncertainty

- Prospect Theory
- Distortions in:
 - Values
 - Probabilities

Lottery

Airline insurance



Decision Making Under Uncertainty

- Prenatal Dx vs. Periviability Resusc.
 - Termination vs. Nonintervention
 - “losing” aneuploid vs. “losing” normal fetus
 - Uncertainty of specificity of phenotype (DS vs. range)
 - Uncertainty about phenotype (What is NDD?)
 - Uncertainty of severity of phenotype

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23 0/7 – 23 6/7: NICHD - To resuscitate or not - Is 23 weeks the new 24 weeks?

Table 3. General guidance regarding obstetric interventions for threatened and imminent periviable birth, according to whether the fetus is considered potentially viable, and the parents' wishes for aggressive intervention^a

	<i>Weeks of gestation^b</i>		
	<i>< 22 0/7 Weeks</i>	<i>22 0/7 Weeks to 22 6/7 Weeks</i>	<i>23 0/7 Weeks or more</i>
Antenatal corticosteroids	Not recommended	Consider if delivery at or later than 23 0/7 weeks 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 PROM to enhance latency	Consider if delivery is not imminent	Consider if delivery is not imminent	Recommended if delivery is not imminent
Intrapartum antibiotics for GBS 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 resuscitation	Not recommended, comfort care only	Not recommended unless considered potentially viable based on individual circumstances	Recommended unless considered nonviable based on individual circumstances

23 0/7 – 23 6/7: To resuscitate or not?

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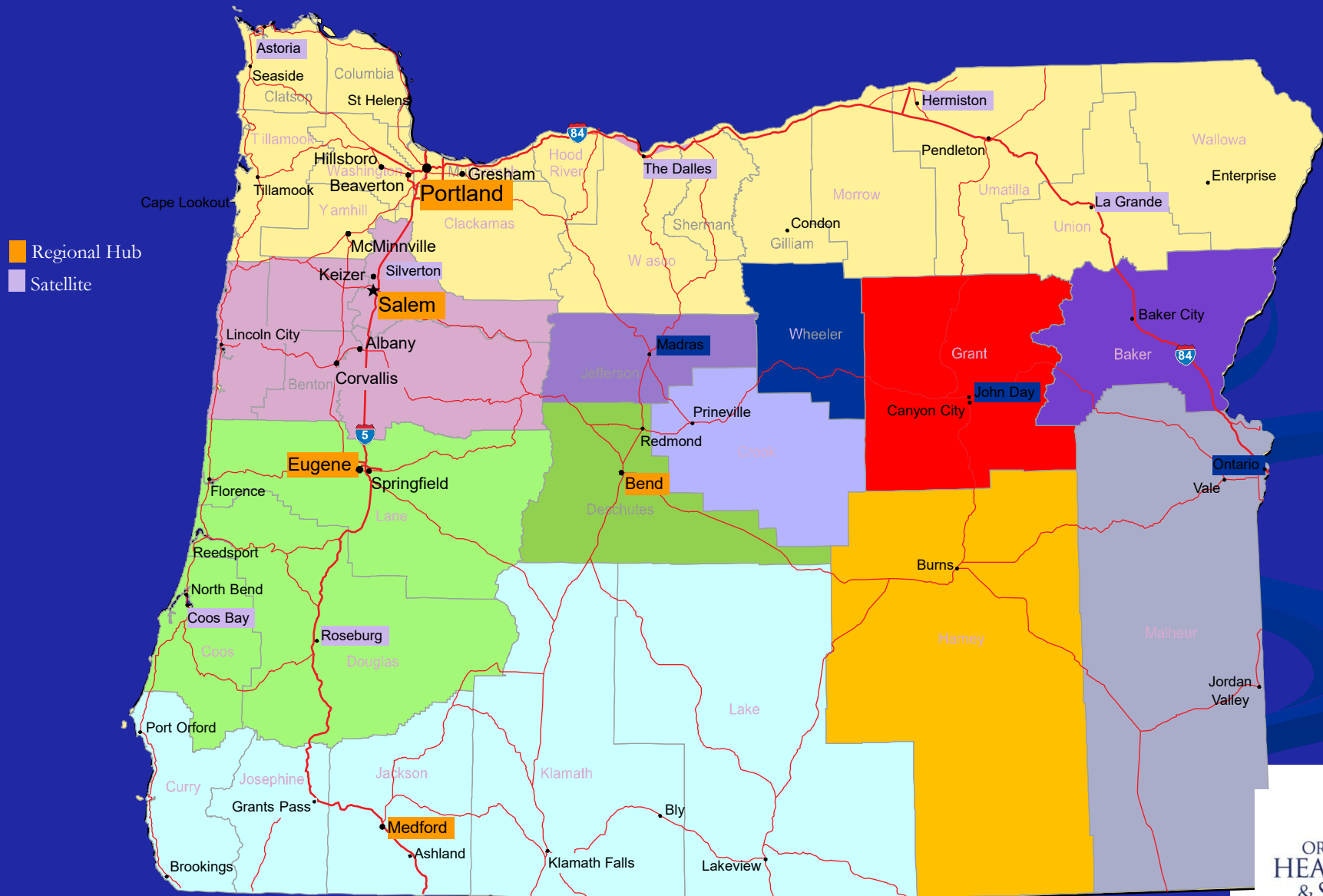
Updated OCC Document

TABLE 3

General guidance regarding obstetric interventions for threatened and imminent periviable birth by best estimate of gestational age^a

	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 ^a	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 ^b	Not recommended 1A	Not recommended 1A	Consider 2B	Recommended 1B	Recommended 1B
Cesarean delivery for fetal indication ^c	Not recommended 1A	Not recommended 1A	Consider 2B	Consider 1B	Recommended 1B

Consider Regional Approach



Summary

- **Periviability**
- **Outcomes**
 - OHSU
- **Interventions**
 - Should be driven by plans for resuscitation
- **Shared decision making with a focus on the unknown and long-term patient prefs**
 - Team counseling – MFM / Neo / RN
 - 20% severely disabled – is that acceptable?

Figure 2. Random-Effects Meta-analysis of Moderate to Severe and Severe Neurodevelopmental Impairment Rates

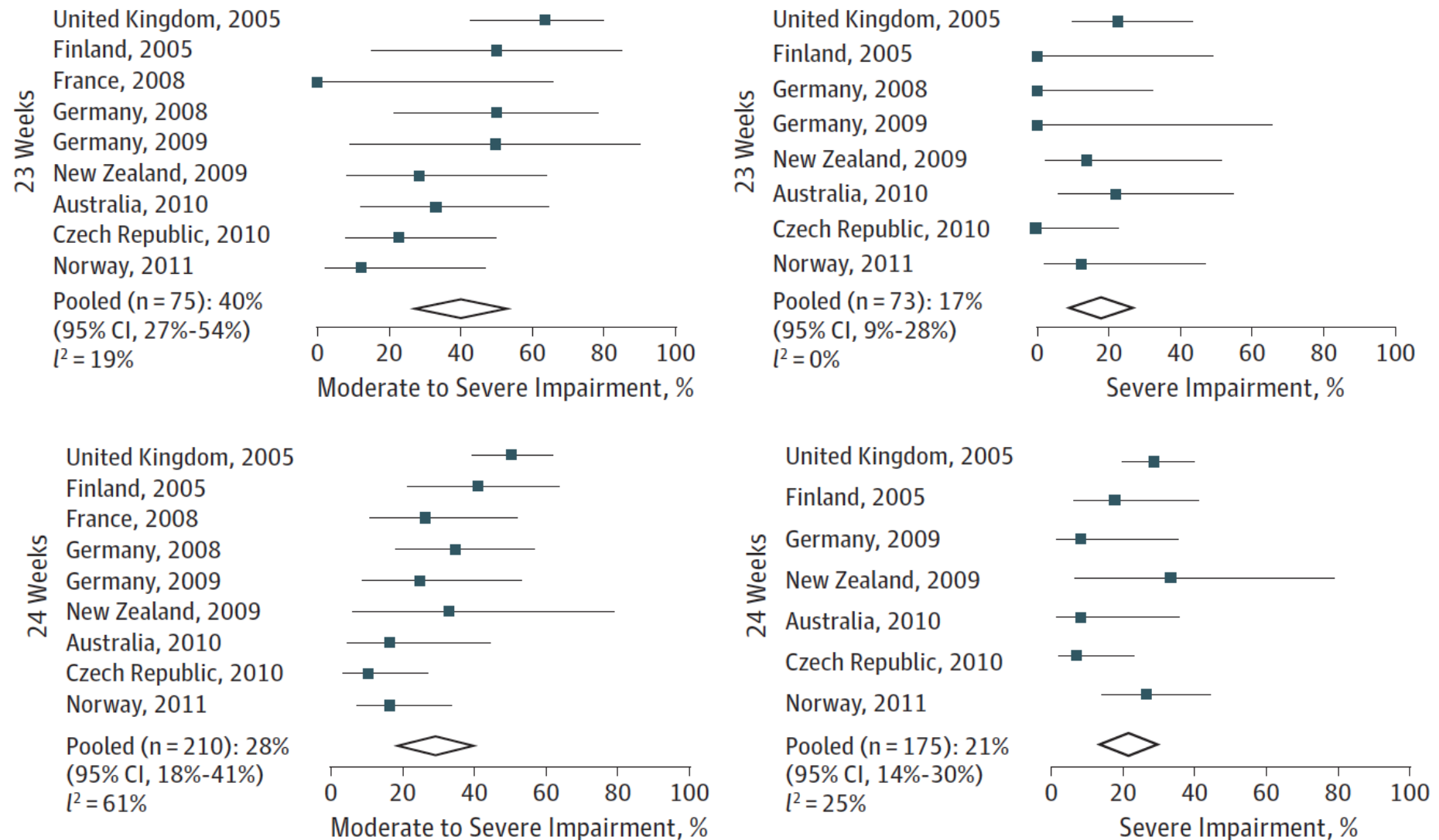
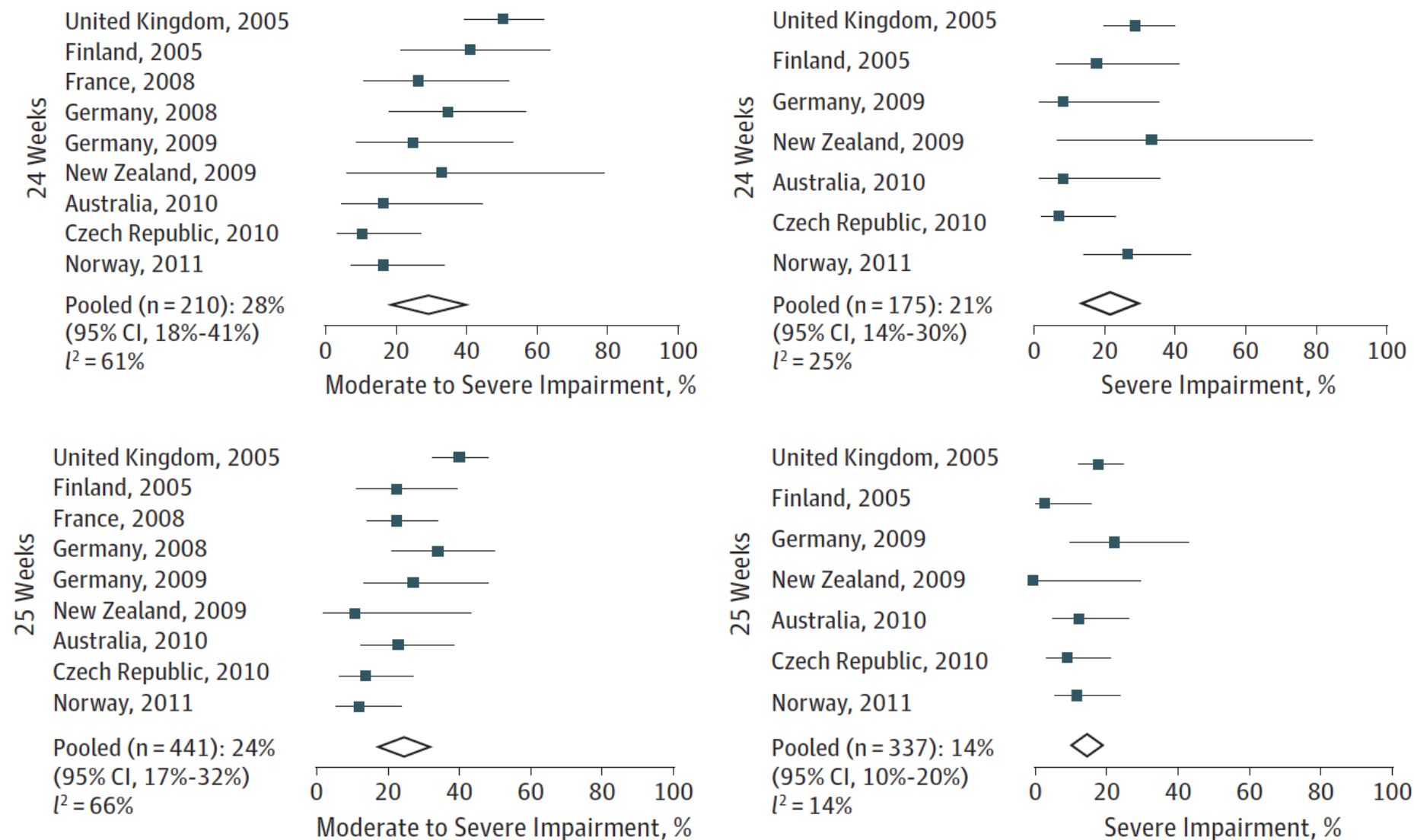


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Case Presentation – 23 wks PTL



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Thank You

Roe V. Wade

“ For the stage subsequent to viability the State, in promoting its interest in the potentiality of human life, may, if it chooses, regulate, and even proscribe, abortion except where necessary, in appropriate medical judgment, for the preservation of the life or health of the mother.”

Translation: After viability, states may restrict or ban abortions except “necessary to preserve the life or health” of the woman.

LATER ABORTION POLICIES

STATE	STATE RESTRICTIONS ON LATER ABORTION		EXCEPTIONS		
	Constitutional Limit on Abortion After Viability	Unconstitutional Limit on Abortion at a Specific Gestational Age	Life and Health	Life and Physical Health	Life
Alabama		20 weeks postfertilization*		X	
Arizona	X	▼	X		
Arkansas		20 weeks postfertilization*		X	
California	X		X		
Connecticut	X		X		
Delaware	X		X		
Florida		24 weeks LMP	X		
Georgia	X	†		X ^ε	
Hawaii	X		X		
Idaho	X	▼			X
Illinois	X		X		
Indiana		20 weeks postfertilization*		X	
Iowa		3rd trimester LMP	X		
Kansas ^{††}		22 weeks LMP*		X	
Kentucky	X		X		
Louisiana		20 weeks postfertilization*		X ^ε	
Maine	X		X		
Maryland	X		X ^ε		
Massachusetts		24 weeks post-implantation	X		
Michigan	X				X
Minnesota	X		X		
Mississippi		20 weeks LMP*		X	
Missouri	X			X	
Montana	X		X ^ψ		
Nebraska		20 weeks postfertilization*		X	
Nevada		24 weeks postfertilization*	X		
New York		24 weeks postfertilization			X
North Carolina		20 weeks LMP	X		
North Dakota		20 weeks postfertilization*		X	
Ohio	X		X		
Oklahoma ^{††}		20 weeks postfertilization*		X	
Pennsylvania		24 weeks LMP	X ^ψ		
Rhode Island		24 weeks LMP			X
South Carolina		3rd trimester postfertilization	X ^Ω		
South Dakota		24 weeks LMP	X		
Tennessee	X		X		
Texas		20 weeks postfertilization*		X ^ε	
Utah	X		X ^{ε,ψ}		
Virginia		3rd trimester LMP	X		
Washington	X		X		
West Virginia		22 weeks LMP*		X ^ε	
Wisconsin	X		X		
Wyoming	X		X		
TOTAL	21	22	26	13	4

No Colorado

No Oregon