



# Thoughts on Prematurity and Low Birth Weight In Colorado

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**I HAVE NO \$ DISCLOSURES, DESPITE...  
TRYING. I HAVE WORKED WITH MOD AND CDPHE.**

# Objectives

- Define current state of low birth weight and premature deliveries in the US and Colorado and how it impacts outcomes
- Describe outcomes related to prematurity over the past two decades
- Identify practical steps to decrease preterm and low birth weight delivery rates in Colorado

# Colorado Annual Birth Number= 65,000



**Table 10. Births, by race of mother: United States, each state and territory, 2014**

[By place of residence]

Area	Number				
	All races	White	Black	American Indian or Alaska Native	Asian or Pacific Islander
United States <sup>1</sup> . . . . .	3,988,076	3,019,863	640,562	44,928	282,723
Alabama . . . . .	59,422	39,578	18,417	200	1,227
Alaska . . . . .	11,392	7,288	548	2,450	1,106
Arizona . . . . .	86,887	72,687	5,208	5,473	3,519
Arkansas . . . . .	38,511	29,632	7,376	301	1,202
California . . . . .	502,879	383,492	31,654	3,509	84,224
Colorado . . . . .	65,830	58,117	3,926	777	3,010
Connecticut . . . . .	36,285	28,543	5,154	308	2,280
Delaware . . . . .	10,972	7,314	2,988	26	644
District of Columbia . . . . .	9,509	3,985	5,026	16	482
Florida . . . . .	219,991	159,035	53,148	406	7,402

# There is a Problem

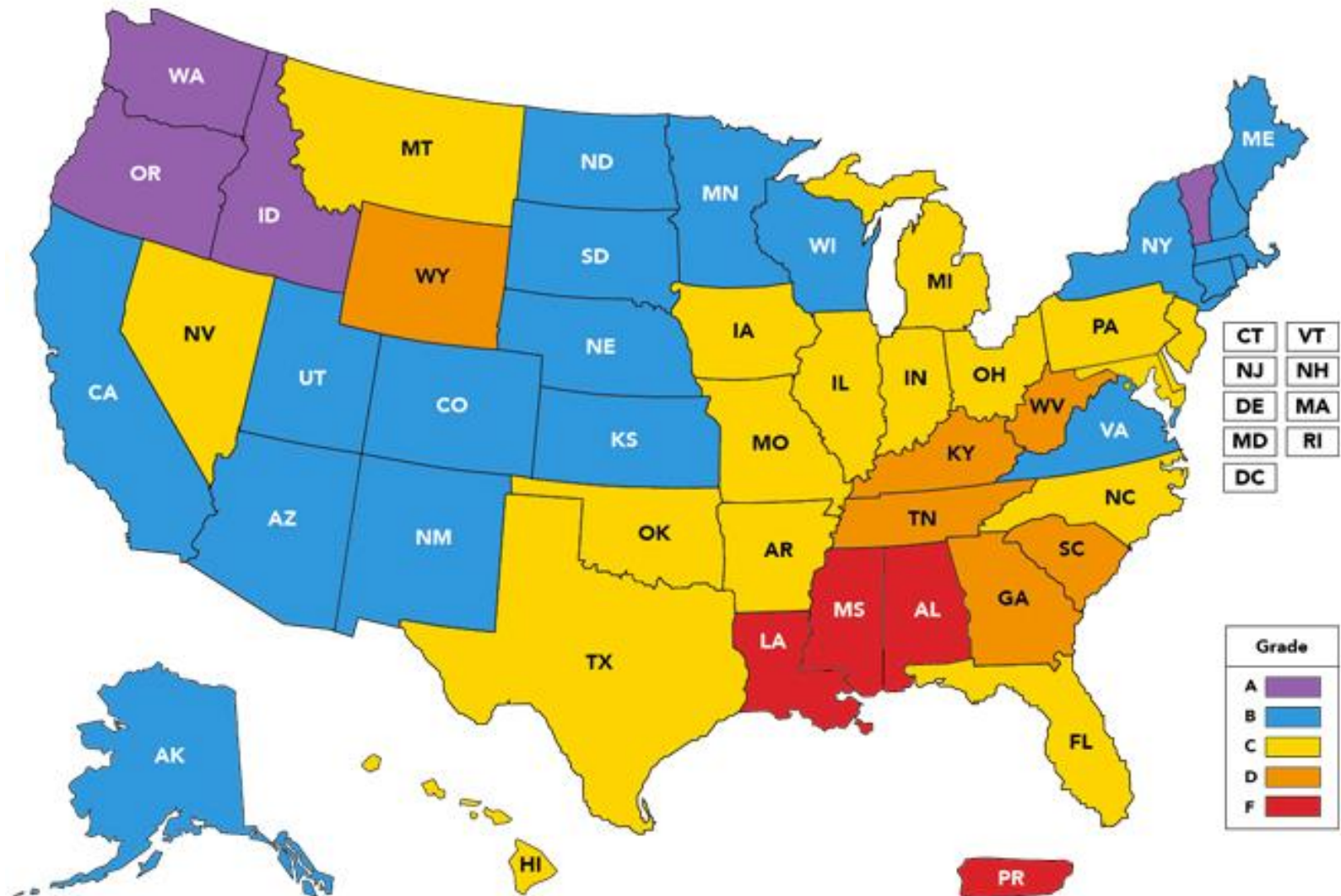
- Too many of these births are:
  - Premature (born before 37 weeks)
  - Of low birth weight (<2500g)
  - Born Late preterm (34-37 weeks).



= >5000

MANY HAVE SIGNIFICANT ISSUES, EARLY AND LATE.

# National Premature Delivery Rates



Grade	Preterm birth rate range Scoring criteria
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A	Preterm birth rate less than or equal to 8.1% Score less than or equal to 0.0
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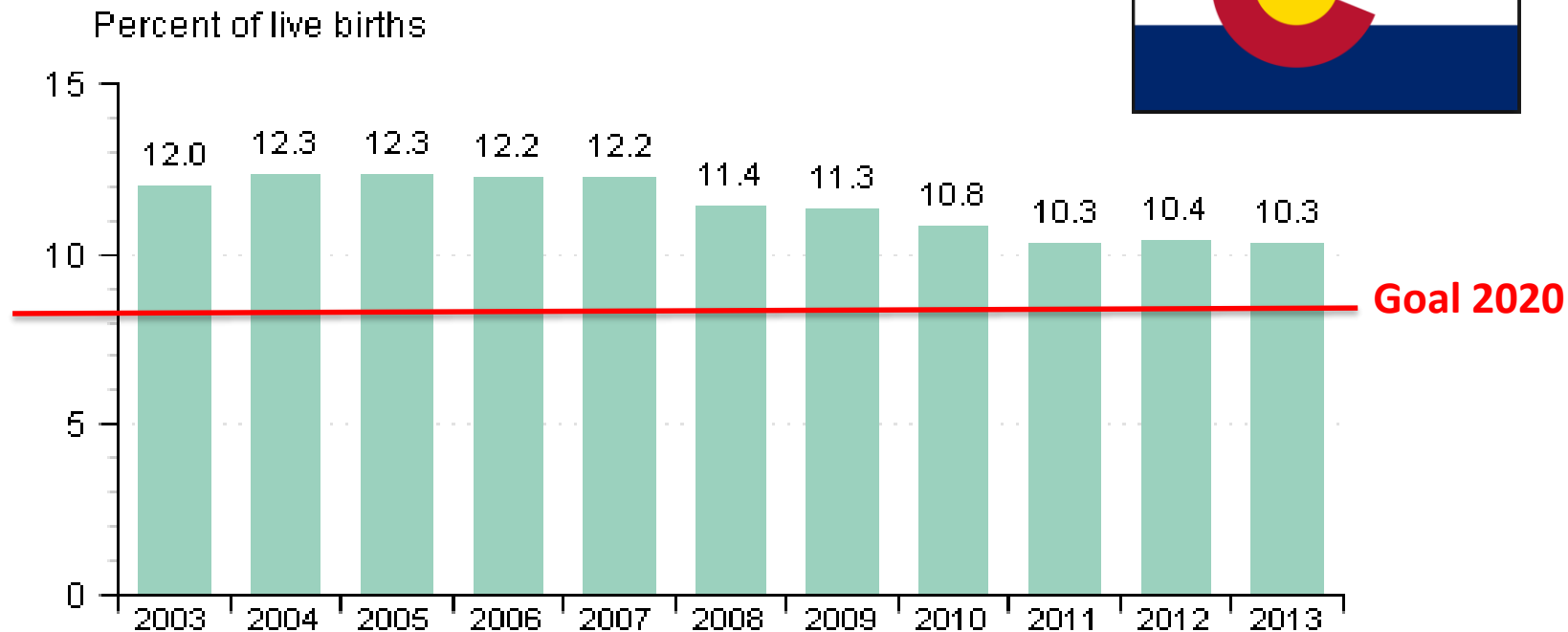
B	Preterm birth rate of 8.2% to 9.2% Score greater than 0.0, but less than or equal to 1.0
---	---

C	Preterm birth rate of 9.3% to 10.3% Score greater than 1.0, but less than or equal to 2.0
---	--

D	Preterm birth rate of 10.4% to 11.4% Score greater than 2.0, but less than or equal to 3.0
---	---

F	Preterm birth rate greater than or equal to 11.5% Score greater than 3.0
---	---

# Colorado Annual Premature Delivery Rates



**1200 less premature deliveries  
in Co 2013 compared to 2003**

Preterm is less than 37 completed weeks gestation.

Source: National Center for Health Statistics, final natality data. Retrieved

© 2005 March of Dimes. All rights reserved.  
October 15, 2015, from [www.marchofdimes.org/peristats](http://www.marchofdimes.org/peristats).



# March of Dimes Goal, 8.1% by 2020

## 2015 PREMATURE BIRTH REPORT CARD

Colorado	Preterm Birth Rate 8.4%	Grade <i>B</i>
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Getting Closer, over 2500 less premature births annually compared to 2003, but not quite

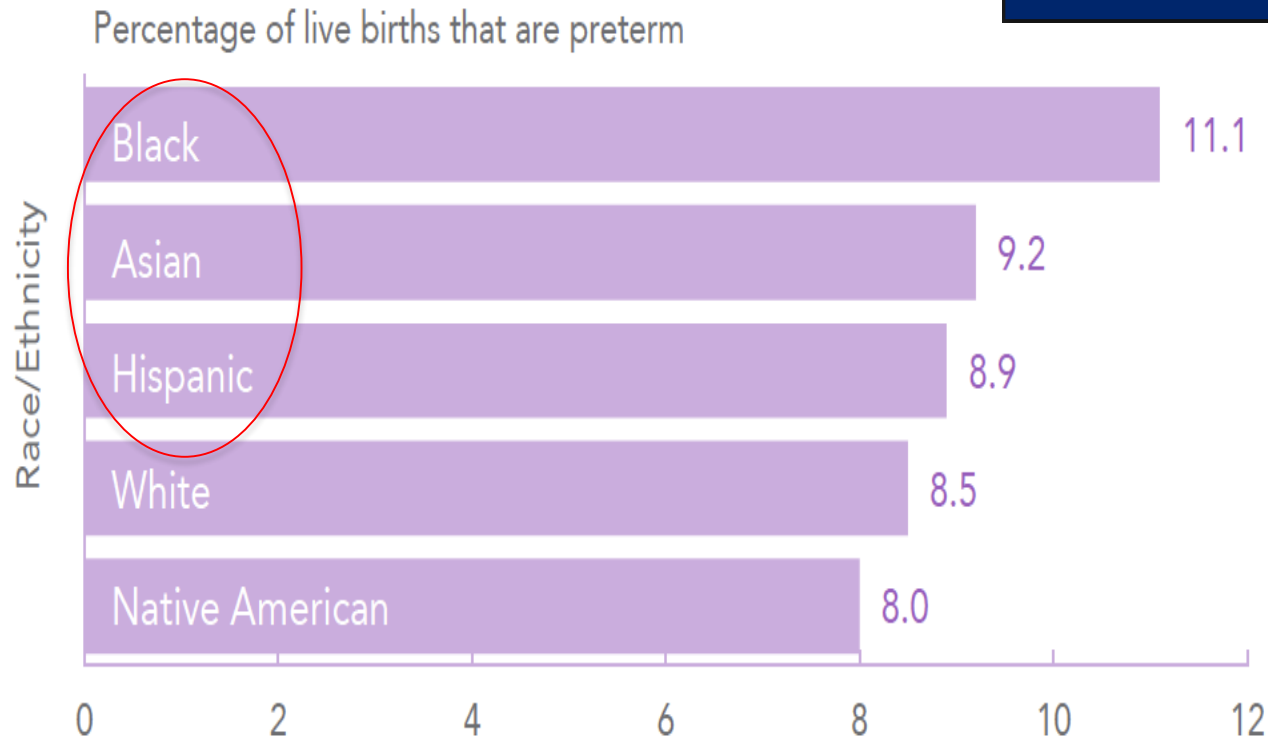
The enemy of better is good.



# MOD 2015 Colorado report



## Preterm birth % by ethnicity



Disparity index

18

State rank

#10

Disparity index- preterm live birth for an ethnic group with the lowest rate in a region

# Preterm Birth Rate, MOD Goal is 8.1% by 2020



## CITIES

Cities with the greatest number of births are graded based on their 2013 preterm birth rates. The status indicator shows whether the 2013 city rate is higher (●), lower (●), or the same (●) as the 2013 state rate (8.6%).

City	Preterm birth rate	Grade	Status
Denver	8.4%	B	●
Colorado Springs	10.0%	C	●
Aurora	9.1%	B	●
Fort Collins	6.8%	A	●
Lakewood	8.2%	B	●
Pueblo	10.3%	C	●

# Preterm Birth Rates



- There are regions and ethnic groups identified in which we could and should focused on to decrease preterm delivery rates.



X 650

# Low Birth Weight

- <2500g at birth



# Colorado Low Birth Weight Delivery Rates



**COLORADO**  
Department of Public  
Health & Environment

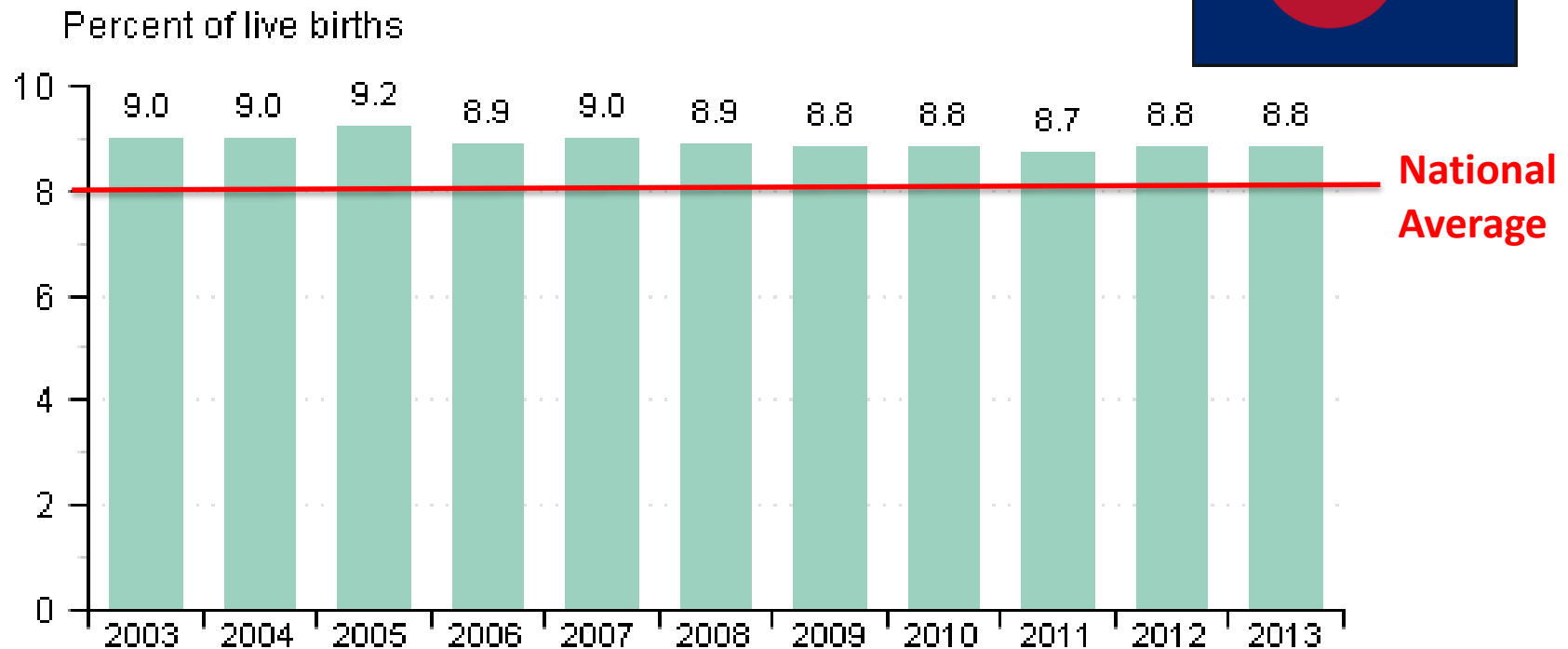
- Colorado has one of the highest low birth weight rates in the nation.
  - In 2012, 8.8 percent of Colorado babies were born at a low birth weight.
  - The Healthy People 2020 goal for the nation is 7.8 percent.

# National Low Birth Weight Delivery Rates (<2.5kg)

From the CDC website, [www.cdc.gov](http://www.cdc.gov). Data for 2014

- Number of babies born low birthweight (less than 2500 grams): 318,847
- Percent born low birthweight: 8.00%
- Percent born very low birthweight: 1.40% <1500 g
- Number of preterm births: 381,321
- Percent born preterm: 9.57%

# Colorado Annual Low Birth Weight Delivery Rates



Low birthweight is less than 2500 grams (5 1/2 pounds).

© 2007 Source: National Center for Health Statistics, final natality data. Retrieved October 15, 2015, from [www.marchofdimess.org/peristats](http://www.marchofdimess.org/peristats).



# Low Birth Weight



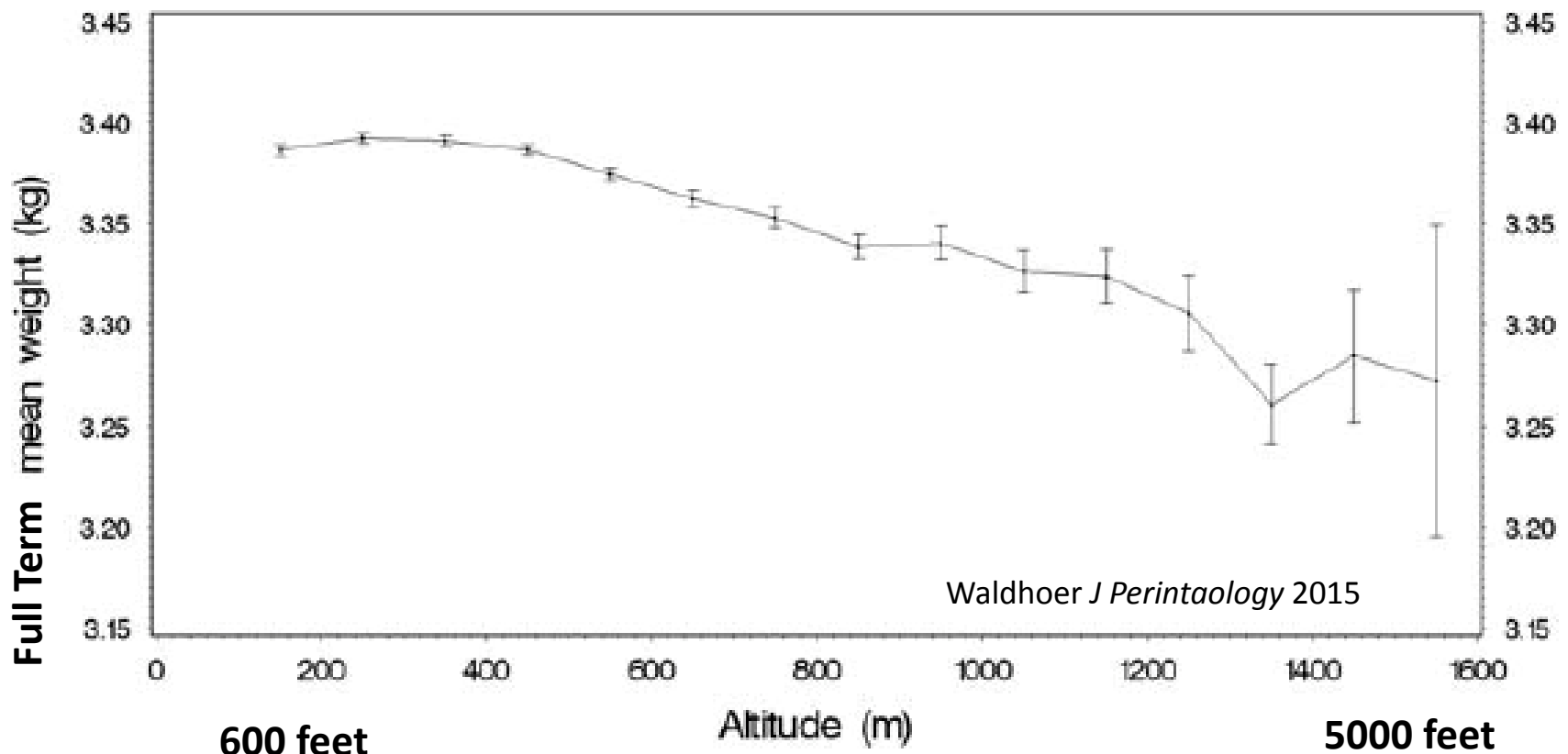
- Associated factors:
  - Pregnancy Factors:
    - Low and advanced maternal age
    - Multiples in gestation- Co, 2400
    - Prenatal care (PRAMS data show 20% get late PNC in Co)
  - Social Determinants:
    - Nutrition
    - Stress
    - Racial-Ethnic Disparities
    - Socioeconomic
  - Maternal Factors:
    - Smoking- Over Co, 1000 women smoking while pregnant
    - Diabetes/Hypertension-Co, 500+
    - ETOH- ? (PRAMS data, only 70% of clinicians spoke with a pregnant mother about the evils of ETOH during pregnancy)

# Low Birth Weight



- Associated factors:

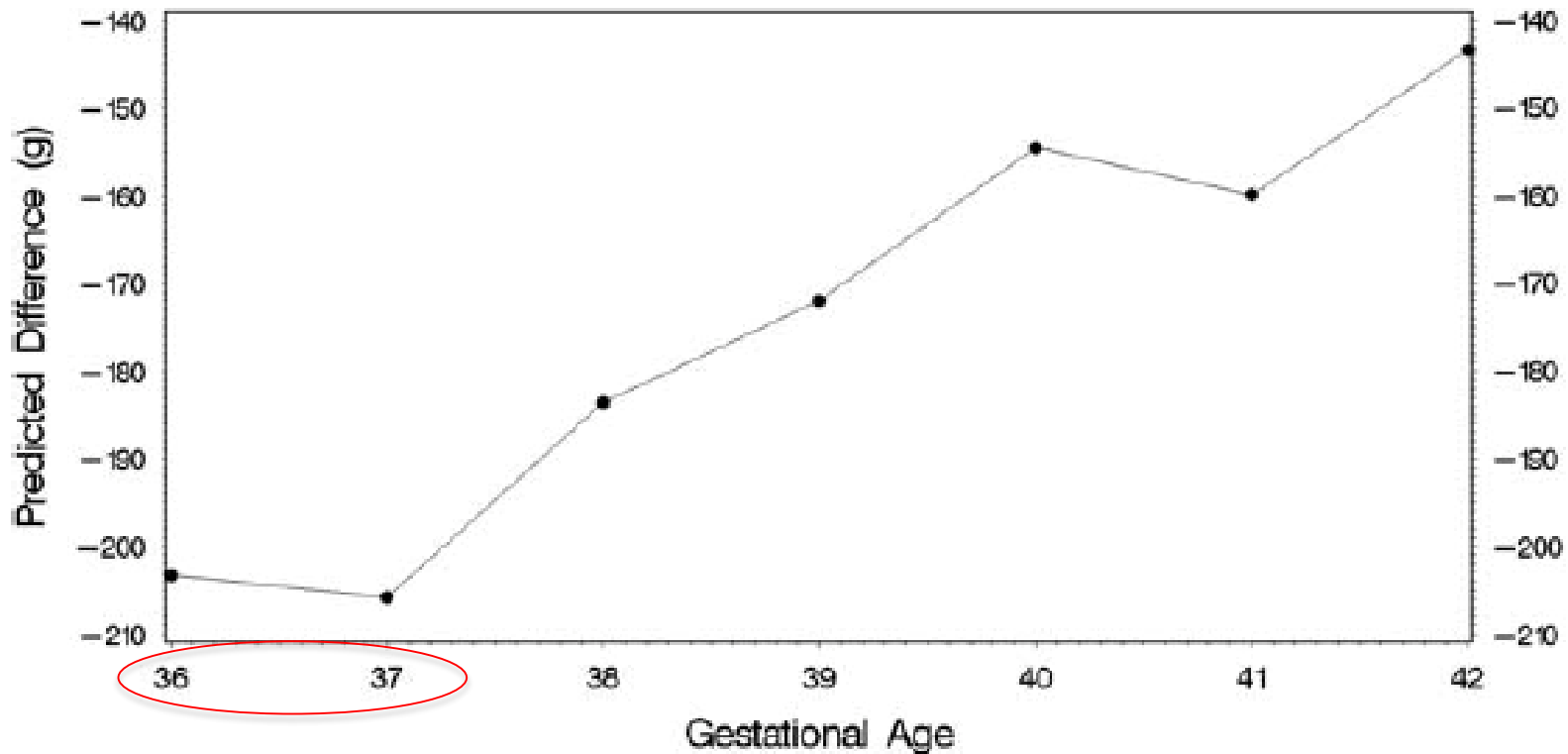
- Altitude: May be one of the most important factors. Birth weight ↓ 150g for every 3280 ft ↑



# Low Birth Weight, Altitude, Gestational Age



Biggest altitude weight difference is with lower gestational ages



# Low Birth Weight Birth Rates



- Desire a 1% reduction in Low Birth Weight annual delivery rates- Goal of Healthy People 2020.



X 650

Pre Term Low Birth Weight

# National Data, Extreme Prematurity



# Survival at Limits of Viability

## Trends in Care Practices, Morbidity, and Mortality of Extremely Preterm Neonates, 1993-2012

*JAMA Sept 8, 2015*

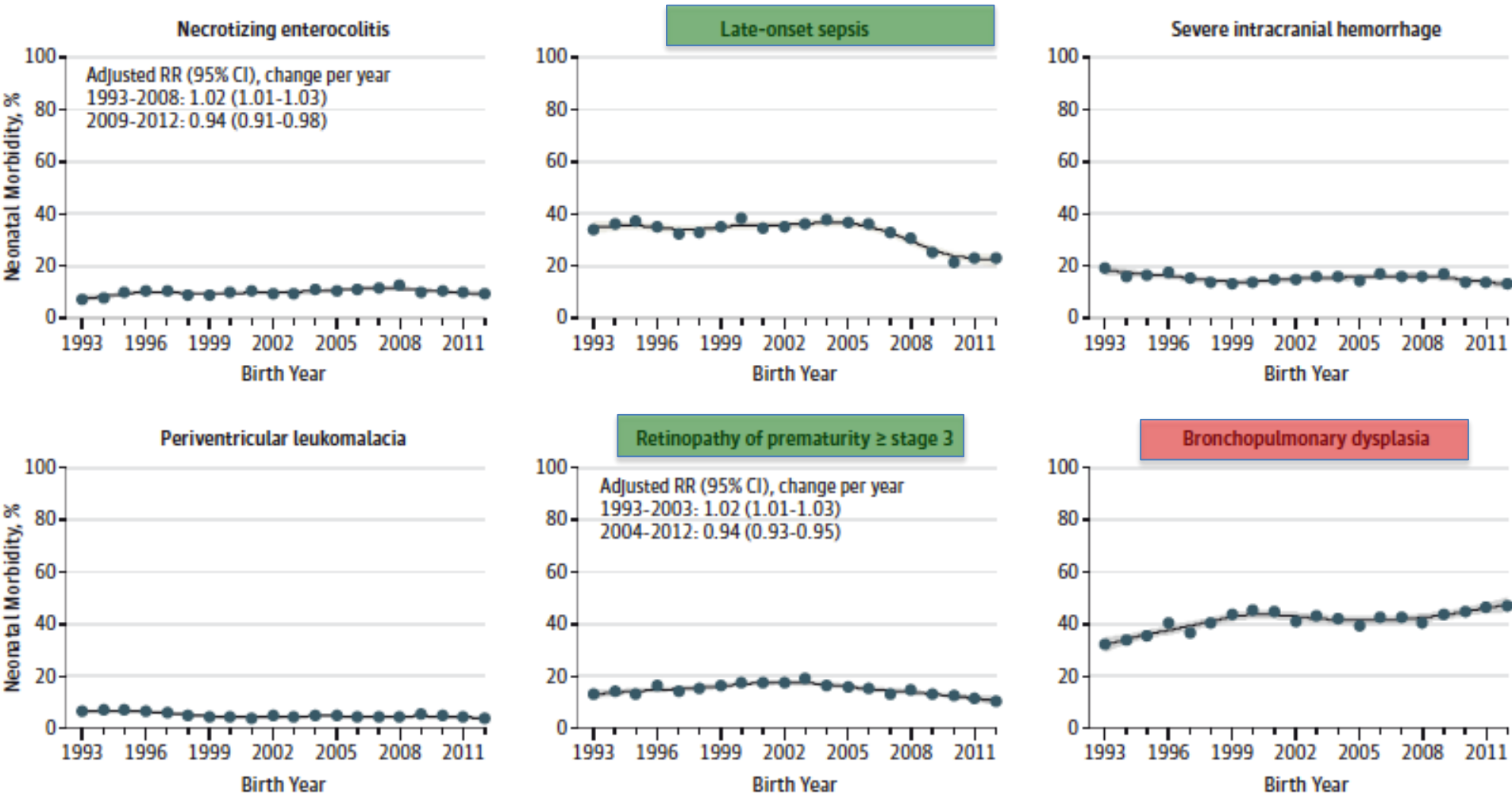
Barbara J. Stoll, MD; Nellie I. Hansen, MPH; Edward F. Bell, MD; Michele C. Walsh, MD, MS; Waldemar A. Carlo, MD; Seetha Shankaran, MD; Abbot R. Laptook, MD; Pablo J. Sánchez, MD; Krisa P. Van Meurs, MD; Myra Wyckoff, MD; Abhik Das, PhD; Ellen C. Hale, RN, BS, CCRC; M. Bethany Ball, BS, CCRC; Nancy S. Newman, BA, RN; Kurt Schibler, MD; Brenda B. Poindexter, MD, MS; Kathleen A. Kennedy, MD, MPH; C. Michael Cotten, MD, MHS; Kristi L. Watterberg, MD; Carl T. D'Angio, MD; Sara B. DeMauro, MD, MSCE; William E. Truog, MD; Uday Devaskar, MD; Rosemary D. Higgins, MD; for the Eunice Kennedy Shriver National Institute of Child Health and Human Development Neonatal Research Network

Prospective registry of 34 636 infants, 22 to 28 weeks' gestation, born at 26 network centers between 1993 and 2012.

	1993 (n = 1433)	2012 (n = 1922)	Survived to Discharge Among All Infants	1993 (n = 1433)	2012 (n = 1922)
			By gestational age, wk		
≥1 Prenatal visit	1233 (87)	1835 (97)		5/79 (6)	7/75 (9)
Multiple birth	265 (18)	521 (27)		34/122 (28)	50/150 (33)
diabetes	28 (2)	96 (5)		85/163 (52)	174/269 (65)
				153/225 (68)	249/308 (81)
				208/250 (83)	291/333 (87)
Hypertension	172 (12)	508 (27)		238/283 (84)	337/357 (94)
				284/311 (91)	405/430 (94)

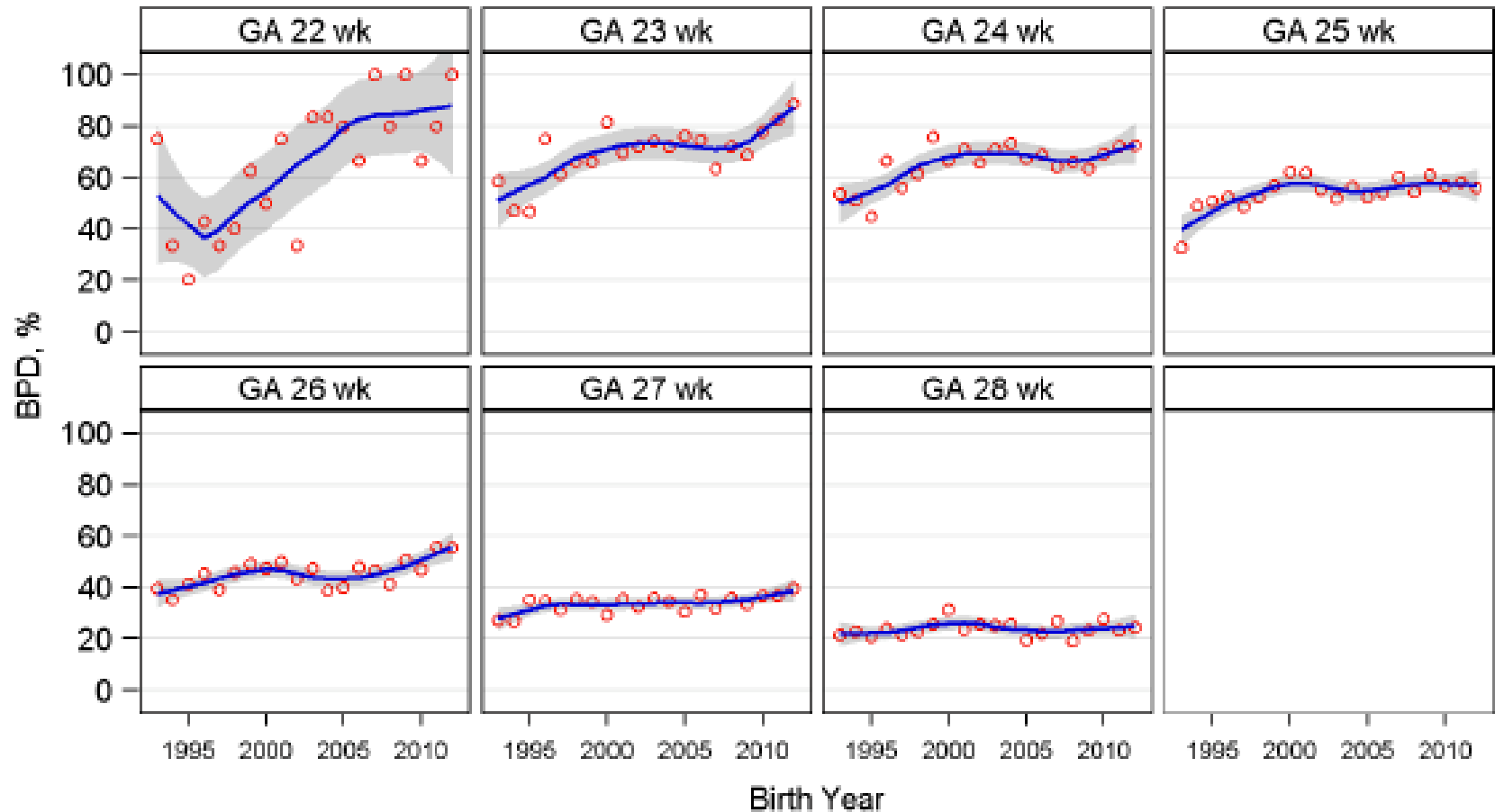
# National Prematurity Data

## Specific Neonatal Morbidity Over Time



# National Prematurity Data

## BPD By Gestational 1993 - 2012





# Colorado Data (Some), Extreme Prematurity



# Vermont Oxford Network (VLBW International Database)

Colorado Collaborative, 10 NICUs in Colorado

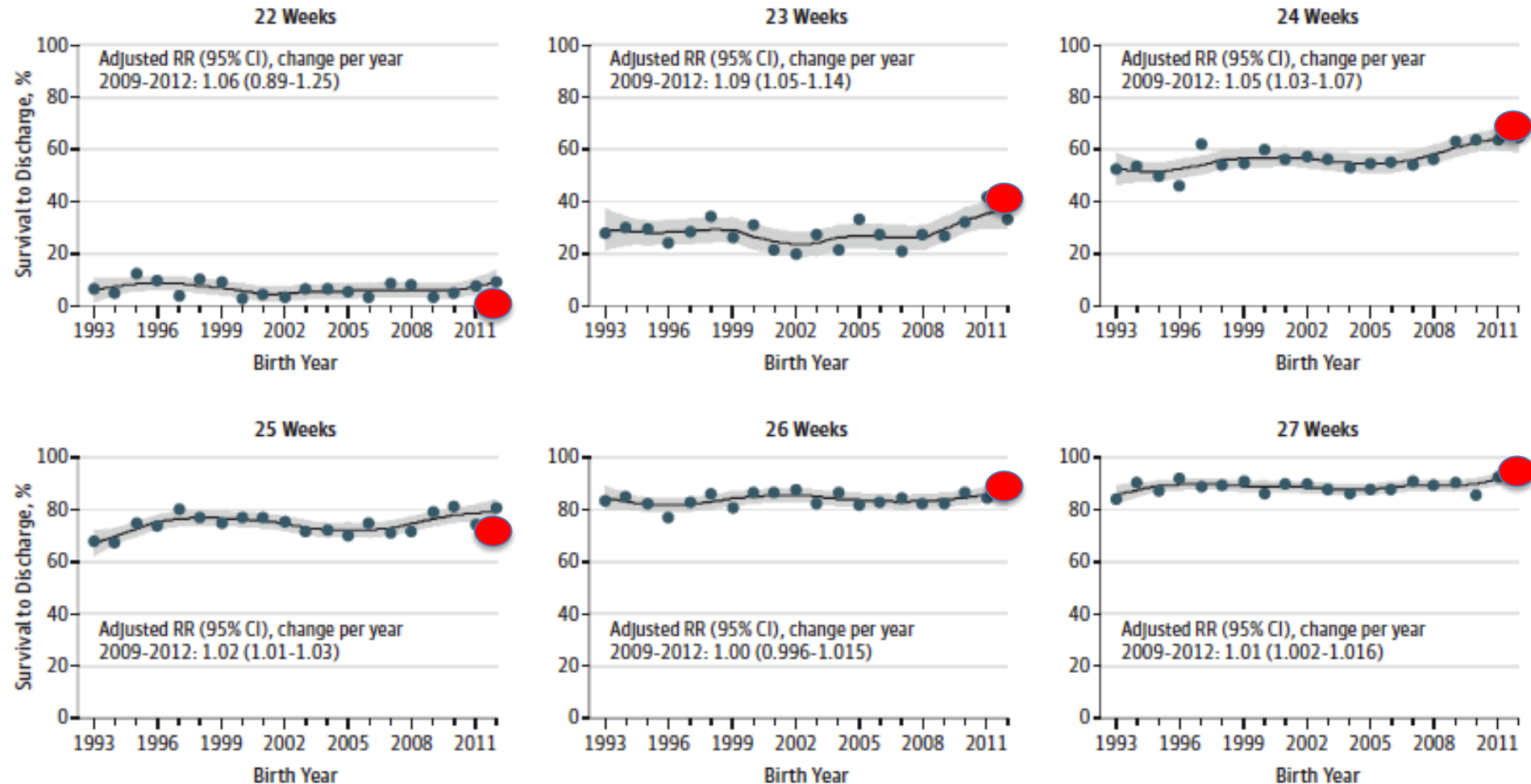


Center	City	State	Country
Children's Hospital, The	Aurora	Colorado	United States
Saint Joseph Hospital	Denver	Colorado	United States
Rocky Mountain Hospital for Children at P/SL	Denver	Colorado	United States
Rose Medical Center	Denver	Colorado	United States
UCHSC	Aurora	Colorado	United States
St. Mary's Hospital and Medical Center	Grand Junction	Colorado	United States
Swedish Medical Center	Englewood	Colorado	United States
Poudre Valley Health System	Fort Collins	Colorado	United States
Good Samaritan Medical Center	Lafayette	Colorado	United States
Denver Health Medical Center	Denver	Colorado	United States




# Prematurity Data ● =



## Survival to DC By Gestational Age Over Time



# Colorado VLBW VON Data 2015, 5 year averages

- Mortality:
  - VON= 10%  -Co= 7.6%
- Severe retinopathy of prematurity:
  - VON=4.9%  -Co=3.7%
- Severe Intraventricular Hemorrhage:
  - VON=5%  -Co=4.9%

In general, survival rates and morbidity rates are similar or better than VON averages.

# Late Preterm Birth

## Late Preterm Birth

When is safe...  
safe?



# Not Always Considered a Problem

- Late Preterm Birth (34-37 weeks gestation at birth).
  - Just a smaller version of a term infant
  - The largest portion of pre term deliveries are those in the late preterm category.
- But.....
  - 7X higher risk of neonatal morbidities than FT (respiratory issues, hyperbilirubinemia, hypoglycemia, hypothermia, feeding difficulties).
  - 18% higher rate of behavioral problems at preschool age compared with >37 week controls. Potijk BMJ, 2012

# Late Preterm Births Are Substantial

**Table E. Distribution of births, by selected gestational age categories: United States, 2007–2014**

Year	Births	Preterm					Early term	Full term	Late term	Postterm	Not stated
		Total under 37 weeks	27 weeks and under	28–31 weeks	32–33 weeks	34–36 weeks	37–38 weeks	39–40 weeks	41 weeks	42 weeks or more	
Obstetric estimate											
	Number	Percent									Number
2014 . . . . .	3,988,076	9.57	0.69	0.91	1.15	6.82	24.76	58.72	6.53	0.42	3,246
2013 . . . . .	3,932,181	9.62	0.70	0.92	1.17	6.83	24.81	58.85	6.31	0.41	7,467
2012 . . . . .	3,952,841	9.76	0.71	0.92	1.17	6.96	25.47	58.30	6.06	0.40	8,380
2011 . . . . .	3,953,590	9.81	0.70	0.93	1.18	6.99	26.09	57.51	6.16	0.43	9,290
2010 . . . . .	3,999,386	9.98	0.71	0.94	1.18	7.15	27.29	56.08	6.19	0.46	10,538
2009 . . . . .	4,130,665	10.07	0.71	0.94	1.18	7.24	28.24	54.98	6.23	0.48	11,748
2008 . . . . .	4,247,694	10.36	0.71	0.95	1.22	7.47	29.69	53.26	6.17	0.52	14,194
2007 . . . . .	4,316,233	10.44	0.74	0.97	1.22	7.51	29.46	53.02	6.50	0.58	20,286

# Late Preterm Birth #'s in US Are Substantial

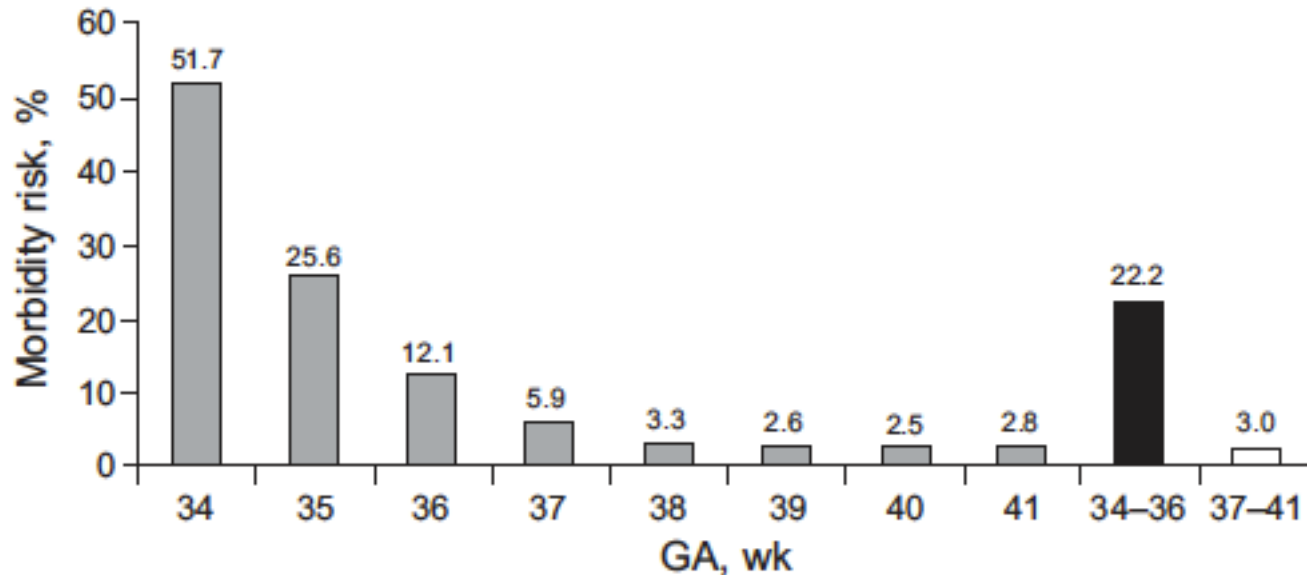
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- **7%= 279,000 neonates annually**
- **6% with Resp Morbidity= 16,740 newborns (1/3<sup>rd</sup> require intubation)** Mcintire D. Ob and Gynecol, 2008
- **Mortality= 1.5/1000 or 418 newborns,** Colin A, Pediatrics 2010.

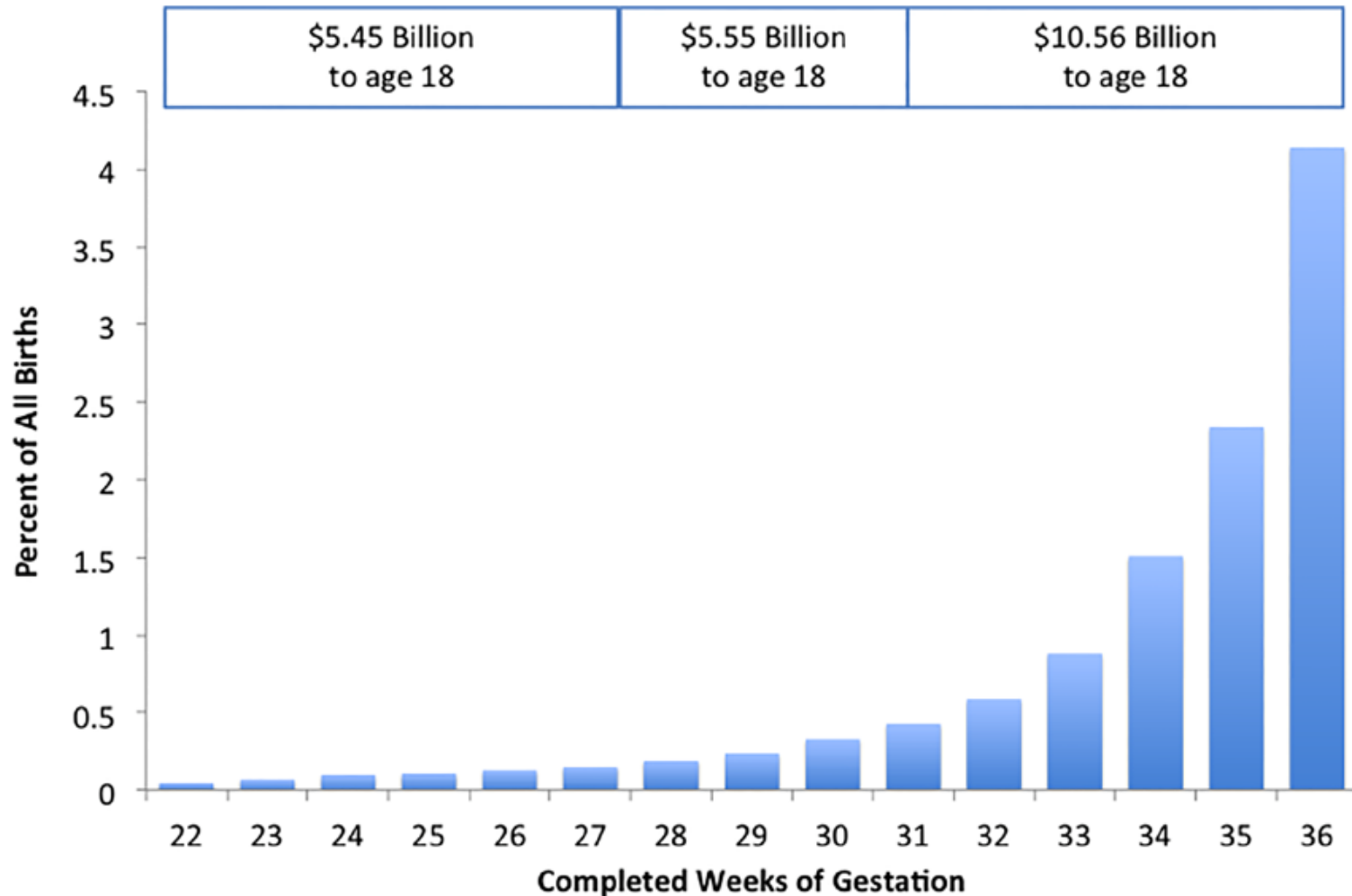


# Late Preterm Morbidities

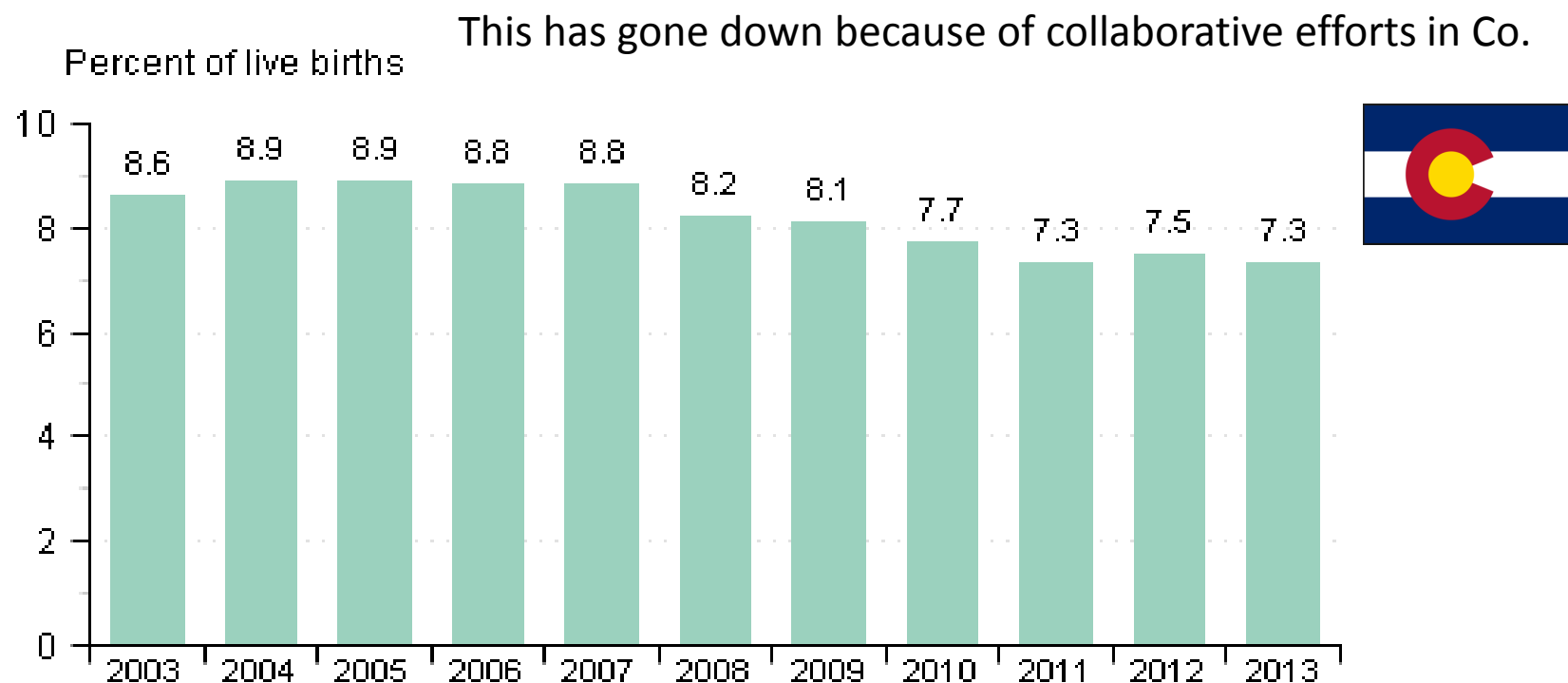


- **22%= US, 61,380 newborns annually with significant morbidities.**
-  **Colorado= roughly 1200 newborns annually.**

# Cost of Late Preterm Births



# Colorado Late Preterm Delivery Rates



Late preterm is between 34 and 36 weeks gestation.

© 2009 March of Dimes Foundation.

Source: National Center for Health Statistics, final natality data. Retrieved October 15, 2015, from [www.marchofdimes.org/peristats](http://www.marchofdimes.org/peristats).

# Data from Co Infant Mortality Dashboard

PT-ETB3: Early Non-medically Indicated Elective Delivery (%)	Quarters 1-3 2015	Target	Performance	2014 Final	Change Since 2014
All Races	26.3%	23.0%	●	24.9%	↑

PT-ETB2: Early Term Birth (%)	Quarters 1-3 2015	Target	Performance	2014 Final	Change Since 2014
All Races	24.1%	21.4%	●	23.8%	↑

*Singleton live births delivered between 37 and 38 weeks.*

**Quarters 1-3 2015 Provisional Data: 4,375 total preterm births. 2014 Final Data: 5,514 total preterm births.**

CW6: Preterm Birth Rate (%)	Quarters 1-3 2015	Target	Performance	2014 Final	Change Since 2014
All Races	8.7%	8.2%	●	8.4%	↑
NH White	8.2%	8.2%	●	7.9%	↑
NH Black	11.7%	8.2%	●	10.7%	↑
Hispanic	9.2%	8.2%	●	8.7%	↑
NH American Indian/Alaska Native	9.7%	8.2%	●	9.4%	↑
NH Asian/Pacific Islander	9.5%	8.2%	●	9.5%	↔

*Infants born prior to 37 weeks gestational age. NH: non-Hispanic.*

*Colorado's Infant Mortality Collaborative Improvement and Innovation Network (CoIIN)*

# Summary

- Rates of preterm deliveries, low birth weight deliveries, and late preterm deliveries are higher than we would like it to be nationally and in Colorado.
- They come with significant health and financial implications.

# We Know.... Can We Do Better?

Do the best you  
can until you  
know better.

Then when you  
know better, do  
better.

- Maya Angelou

The Solutions are Simple

Doing Them Is Complex



We Underestimate the Complexity of  
Our Care and Care Systems

# US Healthcare System Is Fractured

**We Are The Center, Not Patients**

**No New Interventions Are Needed**

We Need to Better Utilize What We  
Already Have

We Need to Get It To Patients in a  
Timely and Effective Manner

# Improving NICU Care

- There have been significant advances in neonatal care over the past several decades
  - Oxygen/Surfactant/iNO
  - TPN/nutrition
  - Neonatal ventilators/isolettes/CPAP

**But these tools/interventions need to be applied/used correctly, on the right patients, at the right time, by the right people.**

# Healthcare Struggles With The Later

In many respects, the U.S. health care system is breathtakingly innovative. It produces new technology, medical procedures, and scientific knowledge at a dazzling speed, enabling patients to recover from diseases and injuries once thought incurable or untreatable. As a consequence, the U.S. has one of the highest survival rates for cancers, excels at acute and trauma care, and has produced half of the world's Nobel laureates.<sup>1,2</sup>

- Delivery of such breathtaking care lags way behind;
  - 55% of adults get recommended care
  - <50% of children get EBM care in outpt setting

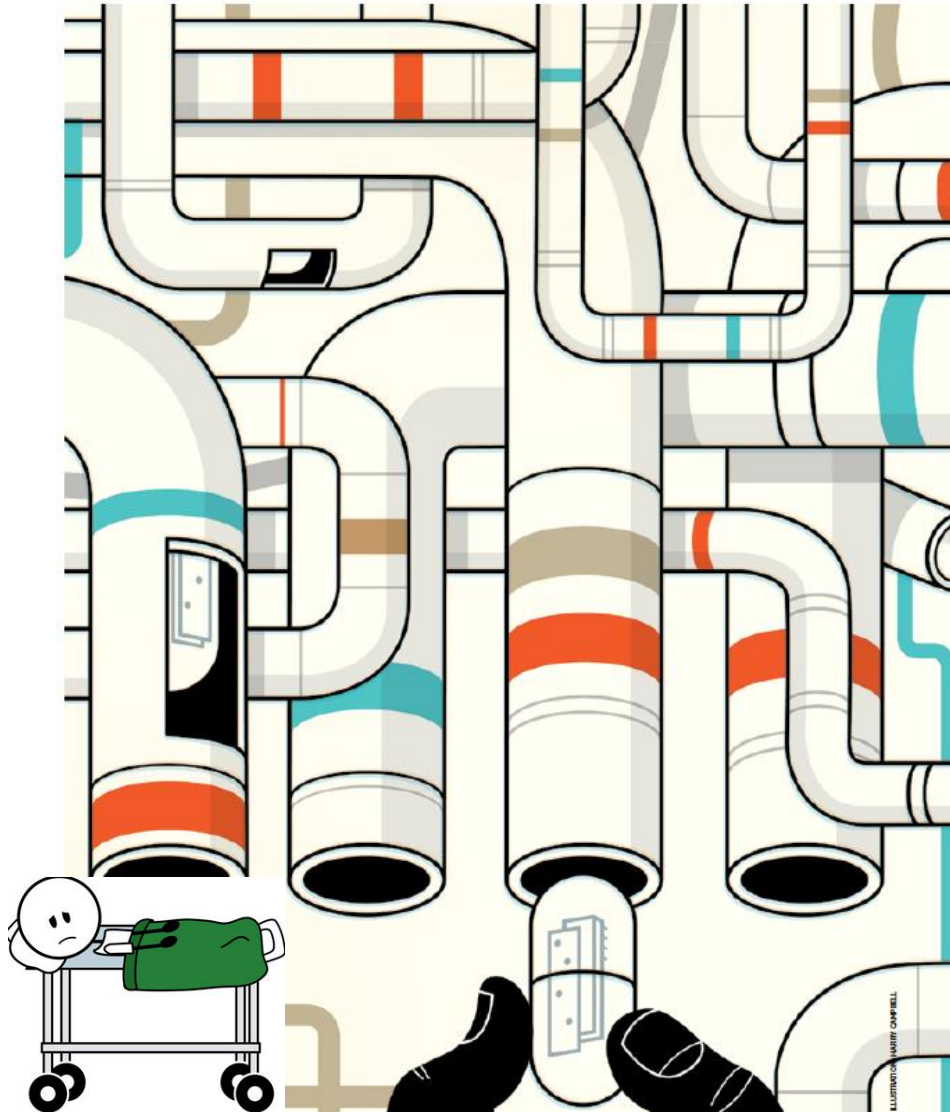
Mangione-smith, *NEJM* 2007

McGlynn, *NEJM* 2003

Aspen Institute, 2014, reinventing healthcare

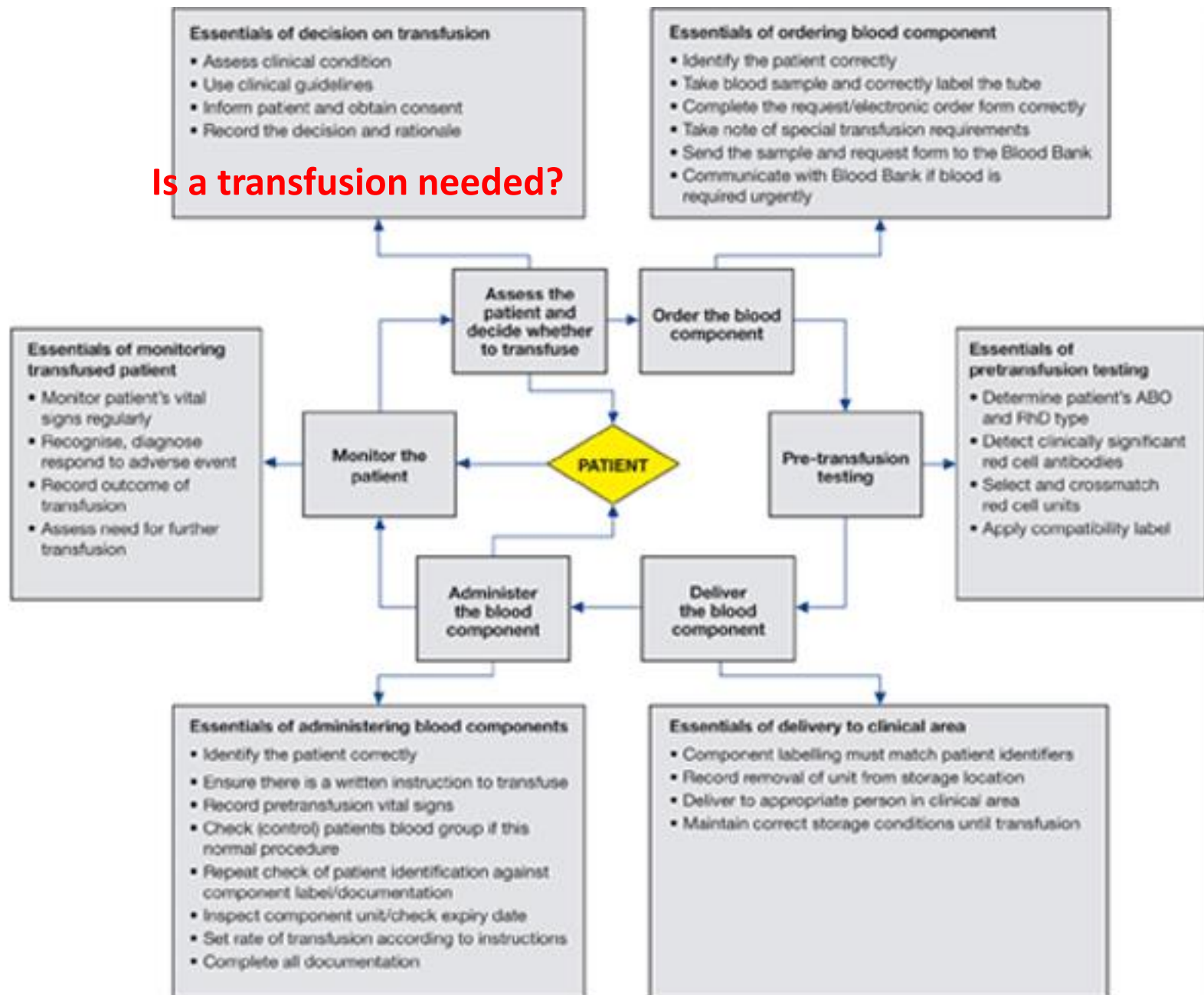


# Got a pill for that?



# A Simple blood cell transfusion for a patient– 31 STEPS

Is a transfusion needed?



# Safer Deliveries Colorado

- <http://www.cha.com/Focus-Areas/Quality-Patient-Safety/Safe-Deliveries-Colorado.aspx>
- Trying to do just that-
  - Have invited all 51 hospitals in Colorado that perform deliveries
  - Right care, To the Right People, At the Right Time
  - Overall Goals:
    - Reduce low-birthweight deliveries to no more than 7.8 percent of live births
    - Reduce preterm births to no more than 9.6 percent of live births

# Goals

- Low birthweight deliveries at 8% or less
- Preterm births at or below 9.6

## Principal Initial Interventions



Administration of  
progesterone to prevent  
repeat early deliveries



Use of premature labor  
assessment toolkit



# Progesterone for Women with Previous Preterm Births

## Access to progesterone

- Medicaid will cover administration of Makena without prior authorization.
- Makena is now available through a Denver pharmacy and shipped to any location.

## Progesterone information sheet

- Available from MOD toolkit
- In English and Spanish
- Considering how to distribute it more widely

# Progesterone Works to Decrease Preterm Deliveries in Some

- Is it being used as it should be?
  - Not very frequently
    - 7% in La, of 3000 eligible only 400 received it.

# Preterm Labor Assessment Toolkit

## Resources from toolkit:

- Preterm labor assessment pre- implementation survey
  - Has self-assessment questions for hospitals
  - Will send survey to participating hospitals
  - Will use this for discussion during site visits
- Algorithm for preterm labor triage assessment
- Preterm labor assessment chart audit tool

# Safer Deliveries Colorado

- **Who should we contact for questions?**
- Please contact Nancy Griffith at Colorado Hospital Association at 720.330.6067 or [nancy.griffith@cha.com](mailto:nancy.griffith@cha.com).



“

If you do  
not change  
direction,  
you may end  
up where  
you are heading.

”

Lao Tzu