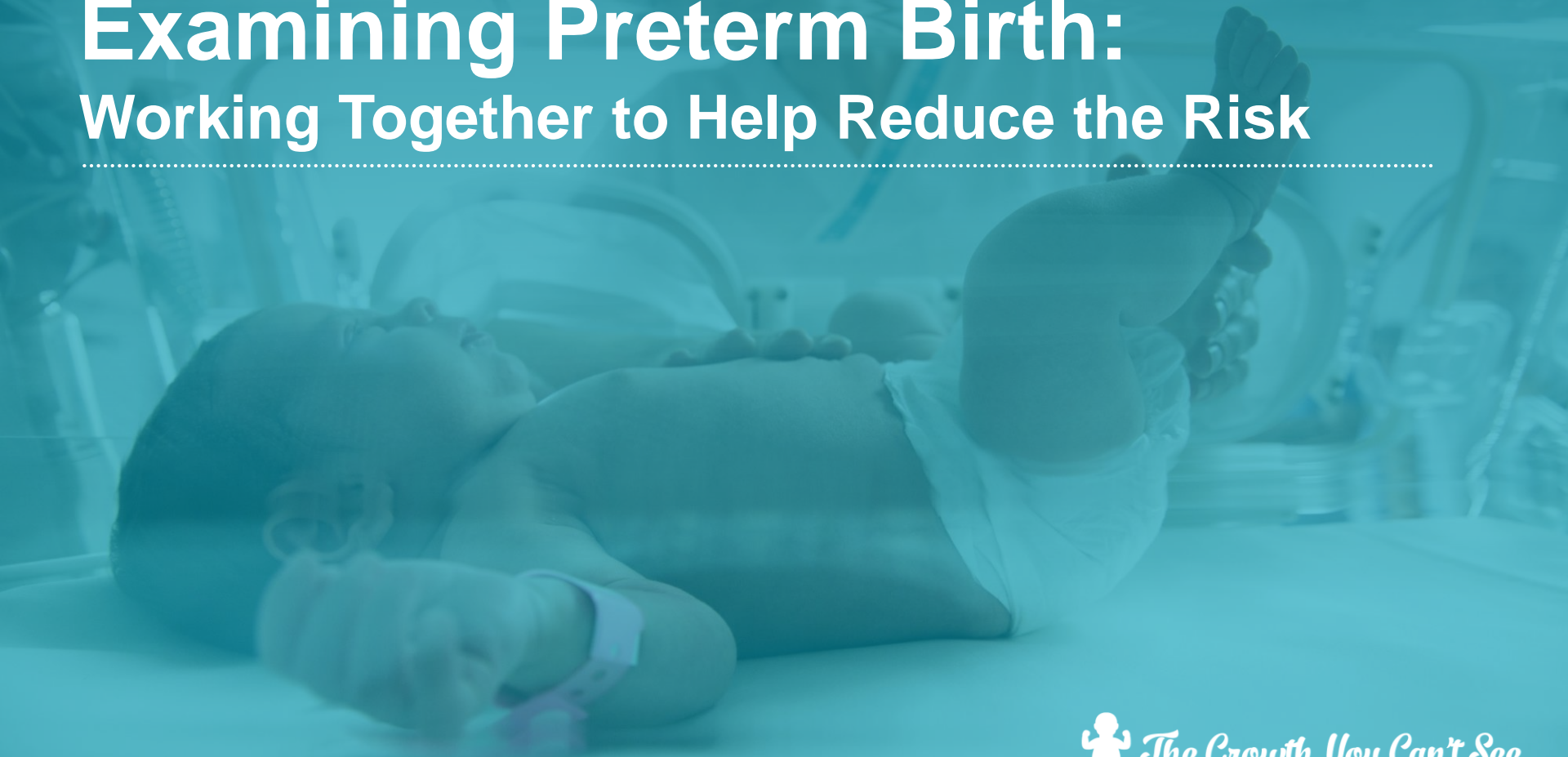


Examining Preterm Birth: Working Together to Help Reduce the Risk



The Growth You Can't See

Courtesy of AMAG Pharmaceuticals, Inc.

The Importance of Addressing Preterm Birth in the Payer Community

- Combined maternal and newborn care is the **most common and costly** type of hospital care for all payers in the United States¹
 - Despite large costs, babies and parents are not experiencing better health outcomes²
- Length of pregnancy is one of the most important factors in a newborn's overall health^{3,4}
 - Preterm birth is the leading cause of neonatal morbidity and mortality
- Hospitalizations associated with pregnancy and childbirth accounted for 7 of the top 20 **most expensive conditions** for hospital stays covered by Medicaid⁵

1. Truven Health Analytics. The Costs of Having a Baby in the United States. January 2013. <http://transform.childbirthconnection.org/wp-content/uploads/2013/01/Cost-of-Having-a-Baby1.pdf>. Accessed August 30, 2017. 2. Childbirth Connection, National Partnership for Women and Families. What's wrong with the status quo? <http://transform.childbirthconnection.org/vision/status-quo>. Accessed August 30, 2017. 3. March of Dimes. Preterm labor and premature birth: Are you at risk? August 2017. <http://www.marchofdimes.org/complications/preterm-labor-and-premature-birth-are-you-at-risk.aspx>. Accessed August 14, 2017. 4. American Congress of Obstetrics and Gynecology. Preterm labor. <http://www.acog.org/-/media/For%20Patients/faq087.pdf?dmc=1&ts=20130207T1252359850>. May 2013. Accessed August 14, 2017. 5. Torio CM (AHRQ), Andrews RM (AHRQ). National Inpatient Hospital Costs: The Most Expensive Conditions by Payer, 2011. HCUP Statistical Brief #160. August 2013. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb160.pdf>. Accessed June 16, 2016.

COVERED TOPICS

- + Facts About Term and Preterm Birth
- + Risk Factors for Preterm Birth
- + Burdens of Preterm Birth
- + Takeaways

Facts About Term Birth⁶

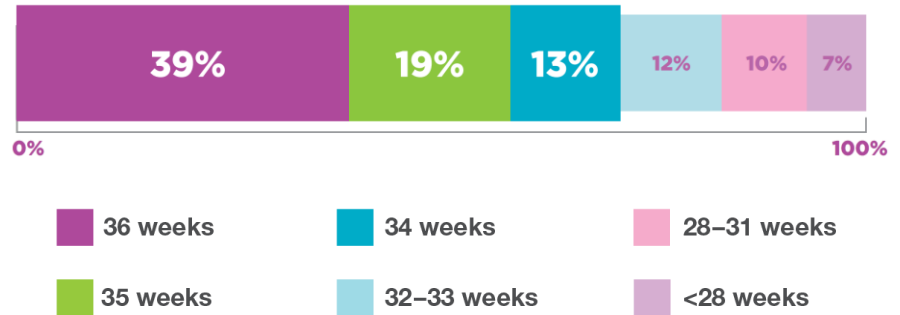
Classification	Gestational Age at Delivery
Early Term	37 ⁰ to 38 ⁶ weeks of gestation
Full Term	39 ⁰ to 40 ⁶ weeks of gestation
Late Term	41 ⁰ -41 ⁶ weeks of gestation
Post Term	>42 weeks of gestation

- The goal of a healthy pregnancy is to **deliver full term**, as this is associated with the lowest frequency of adverse neonatal outcomes

Facts About Preterm Birth and Terminology

Classification	Gestational Age at Delivery
Extremely Preterm	<28 weeks gestation
Very Preterm	28 ⁰ -31 ⁶ weeks gestation
Moderately Preterm	32 ⁰ -33 ⁶ weeks gestation
Late Preterm	34 ⁰ -36 ⁶ weeks gestation

Preterm Birth by Type⁷



Terminology Matters: Here's Why

Noting the impact on perceptions that existing terminology may have had, expert panels redefined and reclassified the category to better inform risk estimation

Preterm terminology

2005 NIH-hosted panel: “near term” to “late preterm”^{8,9}

- Determined “near term” can be misleading and may result in an underestimation of risk and less diligent evaluation, monitoring, and follow-up
- Encouraged further awareness that late preterm infants are less physiologically and metabolically mature than term infants

Term terminology

2013 ACOG/SMFM working group: re-classified “term” to include two subgroups⁶

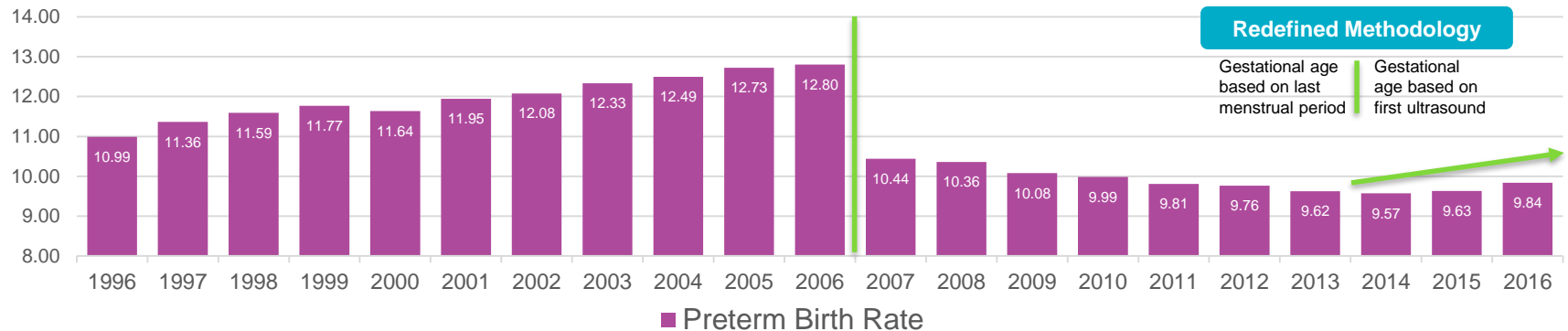
- Recognized that not all “term” deliveries had similar outcomes
- Deemed infants born 37⁰-38⁶ weeks gestation to be “early term” to help inform risk estimation for each week of gestation up to 39 weeks
- Discouraged non-medically indicated deliveries <39 weeks gestation

6. Committee Opinion no.579: definition of term pregnancy. *Obstet Gynecol.* 2013; 122:1139-1140. Reaffirmed 2015. 8. Raju TN, Higgins RD, Stark AR, Leveno KJ. Optimizing care and outcome for late-preterm (near-term) infants: a summary of the workshop sponsored by the National Institute of Child Health and Human Development. *Pediatrics.* 2006;118(3):1207-14. 9. Engle WA, Tomashek KM, Wallman C. "Late-preterm" infants: a population at risk. *Pediatrics.* 2007;120(6):1390-401. doi: 10.1542/peds.2007-2952

Every Year, 1 in 10 Babies is Born Preterm in the United States¹⁰

- In the United States, the annual preterm birth rate is 9.84% (~380,000 births per year)¹¹
- In 2017, the March of Dimes reported an increase in the rate of preterm birth, for the **second year in a row**¹¹

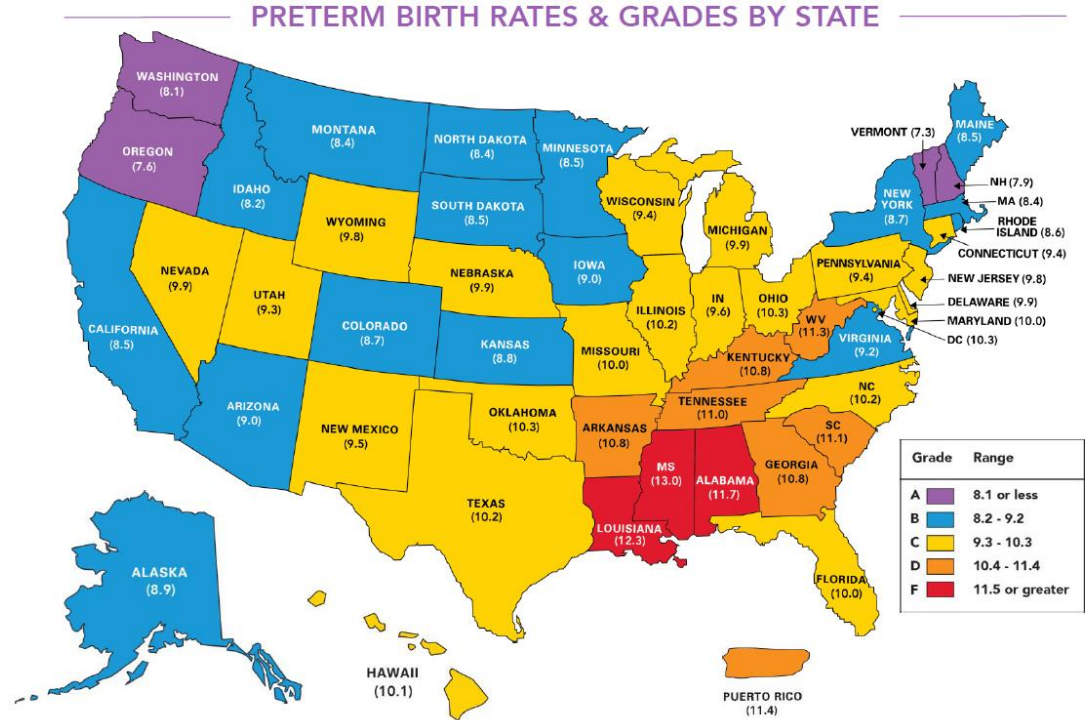
Preterm Birth Rate in the United States¹²⁻¹⁴



10. March of Dimes. 2016 Premature Birth Report Card – United States. <http://www.marchofdimes.org/materials/premature-birth-report-card-united-states.pdf>. Accessed March 23, 2017. 11. March of Dimes. More babies being born too soon, report shows; March of Dimes says now is not the time to cut maternity benefits. July 2017 Newsletter. June 30, 2017. <http://www.marchofdimes.org/news/more-babies-being-born-too-soon-report-shows-march-of-dimes-says-now-is-not-the-time-to-cut-maternity-benefits.aspx>. Accessed August 14, 2017. 12. Centers for Disease Control and Prevention. Natality public-use data 1995-2002, on CDC WONDER Online Database. November 2005. <http://wonder.cdc.gov/natality-v2002.html>. Accessed August 14, 2017. 13. Centers for Disease Control and Prevention. Natality public-use data 2003-2006, on CDC WONDER Online Database. March 2009. <http://wonder.cdc.gov/natality-v2006.html>. Accessed August 14, 2017. 14. Centers for Disease Control and Prevention. Natality public-use data 2007-2015, on CDC WONDER Online Database. February 2017. <http://wonder.cdc.gov/natality-current.html>. Accessed August 14, 2017.

The Rates of Preterm Birth Vary Significantly Based on Geographical Areas¹⁰

- The March of Dimes “grades” states each year in regard to their preterm birth rate
- In 2015, the preterm birth rate ranged from a state low of 7.3% (Vermont) to a **new state high of 13%** (Mississippi)¹⁰



SOME WOMEN ARE AT HIGHER RISK OF DELIVERING PRETERM THAN OTHERS

There are numerous risk factors for preterm birth, including but not limited to:

Leading Risk Factors^{10,15}

- History of spontaneous preterm birth
- Short cervical length
- Pregnancy with twins, triplets, or other multiples
- African American ethnicity

Other Risk Factors¹⁶

- Short intervals between pregnancies (<18 months)
- Smoking, drinking alcohol, and/or drug use
- Underlying medical conditions such as hypertension or diabetes
- Stress
- Being under or overweight
- Certain infections during pregnancy
- Vaginal bleeding in the second or third trimester
- Late to or no prenatal care

10. March of Dimes. 2016 Premature Birth Report Card – United States. <http://www.marchofdimes.org/materials/premature-birth-report-card-united-states.pdf>. Accessed March 23, 2017. **15.** Practice bulletin no. 130: prediction and prevention of preterm birth. *Obstet Gynecol.* 2012;120 (4):964-73. doi: 10.1097/AOG.0b013e3182723b1b **16.** March of Dimes. Preterm labor and premature birth. <http://www.marchofdimes.org/complications/preterm-labor-and-premature-birth.aspx>. Accessed June 23, 2017.

Preterm Birth, Including Late Preterm Birth, Was Associated With Increased Diagnosis of Medical Conditions

Late preterm infants have increased risk of medical conditions⁹

- **4x** more likely to have at least 1 medical condition diagnosed
- **3½x** more likely to have ≥2 conditions diagnosed

A closer look at the late preterm stage^{9,17-20}

Brain develops better balance, coordination, learning and social function



Lung structure and function continues maturing. Babies born early may have trouble breathing



Regulation is still developing. Body fat may be low leading to **temperature instability**



Hearing is still developing and may not be fully functional until full term



Liver is still maturing and may not be able to remove bilirubin and prevent **jaundice**



Sucking and swallowing reflexes continue to develop

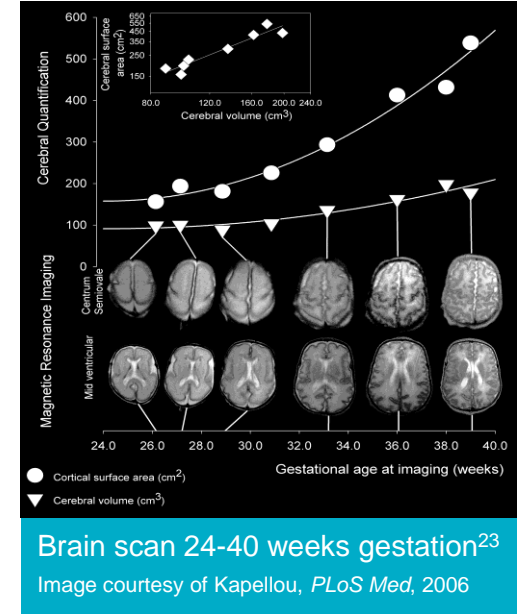


9. Engle WA, Tomashek KM, Wallman C. "Late-preterm" infants: a population at risk. *Pediatrics*. 2007;120(6):1390-401. doi: 10.1542/peds.2007-2952 17. Loftin RW, Habli M, Snyder C, et al. Late preterm birth. *Rev Obstet Gynecol*. 2010;3:10-19. doi:10.3909/riog0098 18. Cleaveland K. Feeding challenges in the late preterm infant. *Neonatal Netw*. 2010;29:37-41. 19. Committee on Environmental Health. Noise: a hazard for the fetus and newborn. *Pediatrics* 1997;100:724-727. doi: 10.1542/peds.100.4.724 20. Hegyi H. The Late Preterm Birth Infant Presentation. New Jersey Hospital Association. http://www.njha.com/media/40836/obe_njhapfp_thomashegyi.pdf. Accessed August 2, 2016.

During the Last 6 Weeks of Gestation (34-40 weeks) Important Brain Development Occurs*

Brain development:

- Brain weight at 34 weeks was **65%** of term brain weight and formation was incomplete, a study showed, as preterm brains are smaller and less mature than full-term babies²¹
- A nearly **10-fold increase** in fetal brain volume occurred between weeks 18 and 34, in one study²²
- Brain development is **not a linear process** in the last 6 weeks²¹
- During the last 6 weeks of gestation:^{17,21}
 - Cortical volume increased by **50%**
 - **25%** of cerebellar development occurred
 - There was an **exponential increase** in relative percentage of gray and myelinated white matter to total brain volume
 - Brain develops **increased** balance, coordination, learning and social functioning



*note: the last 6 weeks of gestation includes late preterm through term stages

17. Loftin RW, Habli M, Snyder C, et al. Late preterm birth. *Rev Obstet Gynecol.* 2010;3:10-19. doi:10.3909/riog0098 21. Kugelmann A, Colin AA. Late preterm infants: near term but still in a critical developmental time period. *Pediatrics.* 2013;132(4):741-51. doi: 10.1542/peds.2013-1131 22. Roelfsema NM, Hop WC, Boito SM, Wladimiroff JW. Three-dimensional sonographic measurement of normal fetal brain volume during the second half of pregnancy. *Am J Obstet Gynecol.* 2004;190(1):275-80. doi: 10.1016/S0002-9378(03)00911-6 23. Kapellou O, Counsell SJ, Kennea N, et al. Abnormal cortical development after premature birth shown by altered allometric scaling of brain growth. *PLoS Med.* 2006;3(8):e265. doi: 10.1371/journal.pmed.0030265

The Growth You Can't See

Preterm Infants Often Required Neonatal Intensive Care

- **Both early and late preterm infants were more likely** to be admitted to neonatal intensive care units (NICUs) or neonatal intermediate care units (NINTs) and to require mechanical ventilation than term infants^{24,25}

Gestational Age	NICU/NINT Admission (%) ²⁴	Mechanical Ventilation (%) ²⁵
<34 weeks (early preterm)	90%	27%
34-36 weeks (late preterm)	48%	3%
37-38 weeks (early term)	10.5%	1%

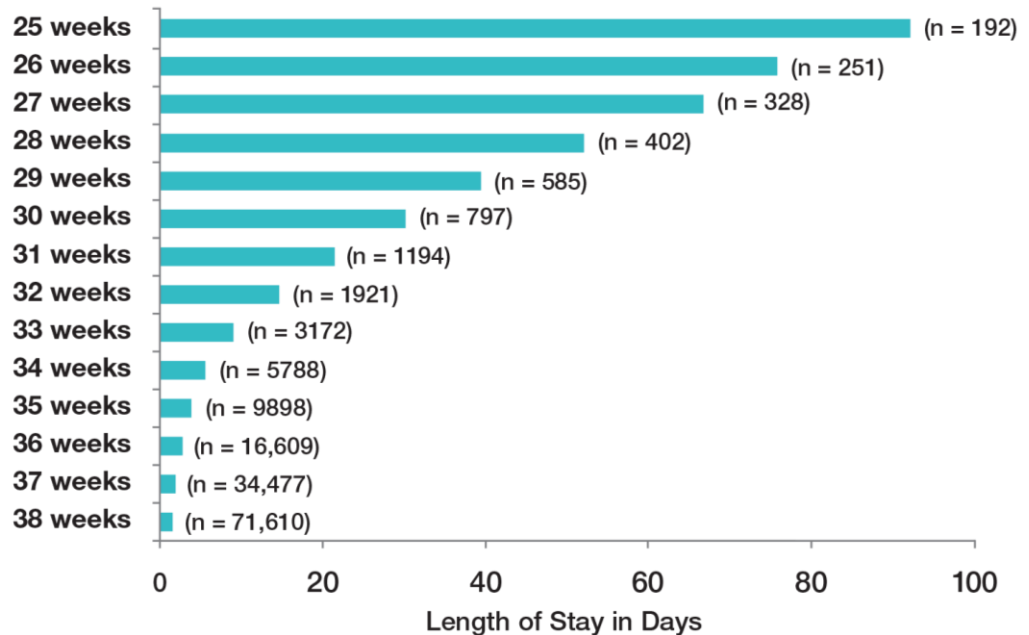
- For all preterm babies, top diagnoses for NICU and NINT admissions included:
 - RDS, extreme immaturity, neonatal jaundice, and newborn septicemia²¹

24. March of Dimes. Special care nursery admissions. https://www.marchofdimes.org/peristats/pdfdocs/nicu_summary_final.pdf. Accessed March 6, 2015. 25. Gilbert WM, Nesbitt TS, Danielsen B. The cost of prematurity: quantification by gestational age and birth weight. *Obstet Gynecol.* 2003;102(3):488-92. doi: 10.1016/S0029-7844(03)00617-3

Preterm Infants Often Required Prolonged Inpatient Stays

- During initial hospitalization, the average length of stay was **substantially longer** for preterm infants vs those born at term²⁵

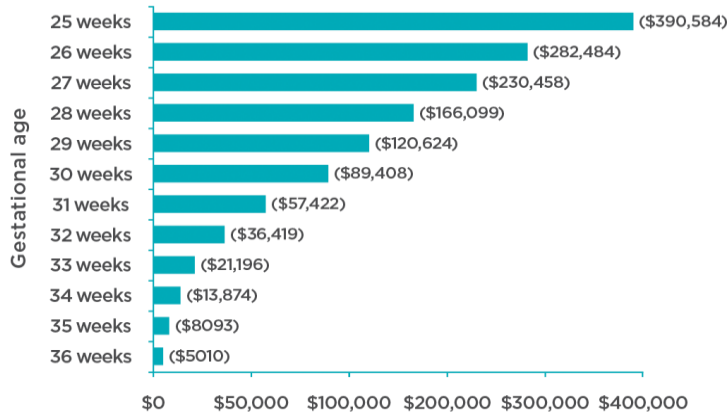
Length of Stay for Neonates by Gestational Age²⁵



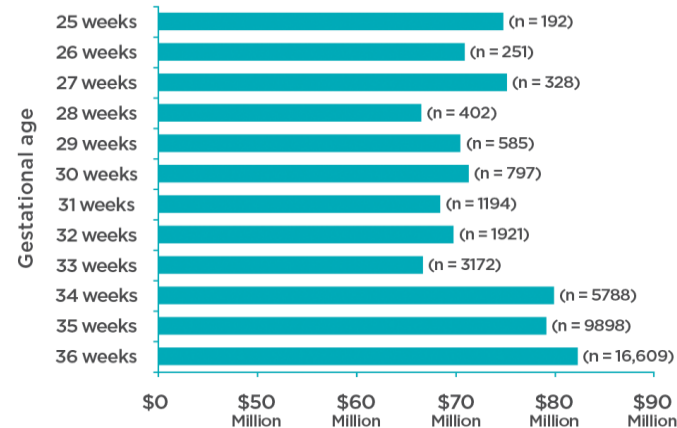
Economic Burden of Preterm Birth

Hospitalization Costs for Preterm Infants by Gestational Age^{25,26}

Per-Case Cost (in thousands)



Aggregate Cost* (in millions)



*Aggregate cost is the total cost for all babies in that delivery category. Data derived from Gilbert et al, 2003 and adjusted for inflation to 2014 dollar values.

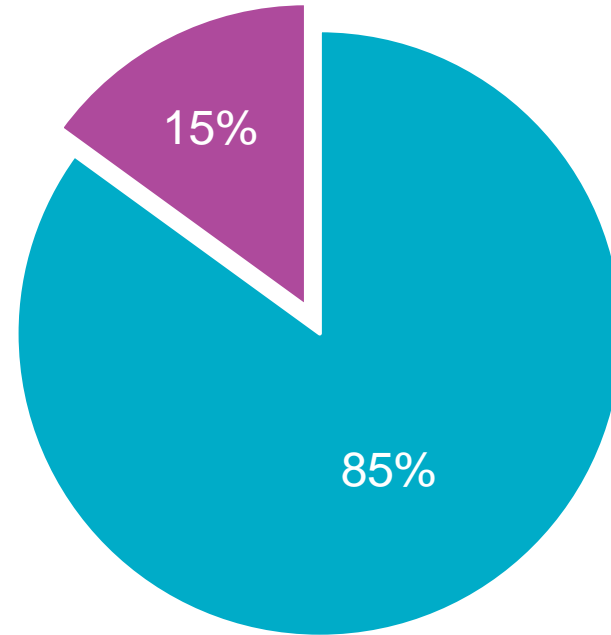
- Delivering a baby preterm results in a significant economic burden to the healthcare system²⁷

25. Gilbert WM, Nesbitt TS, Danielsen B. The cost of prematurity: quantification by gestational age and birth weight. *Obstet Gynecol.* 2003;102(3):488-92. doi: 10.1016/S0029-7844(03)00617-3 26. Bureau of Labor Statistics. Consumer price index-all urban consumers. <http://www.bls.gov/data>.

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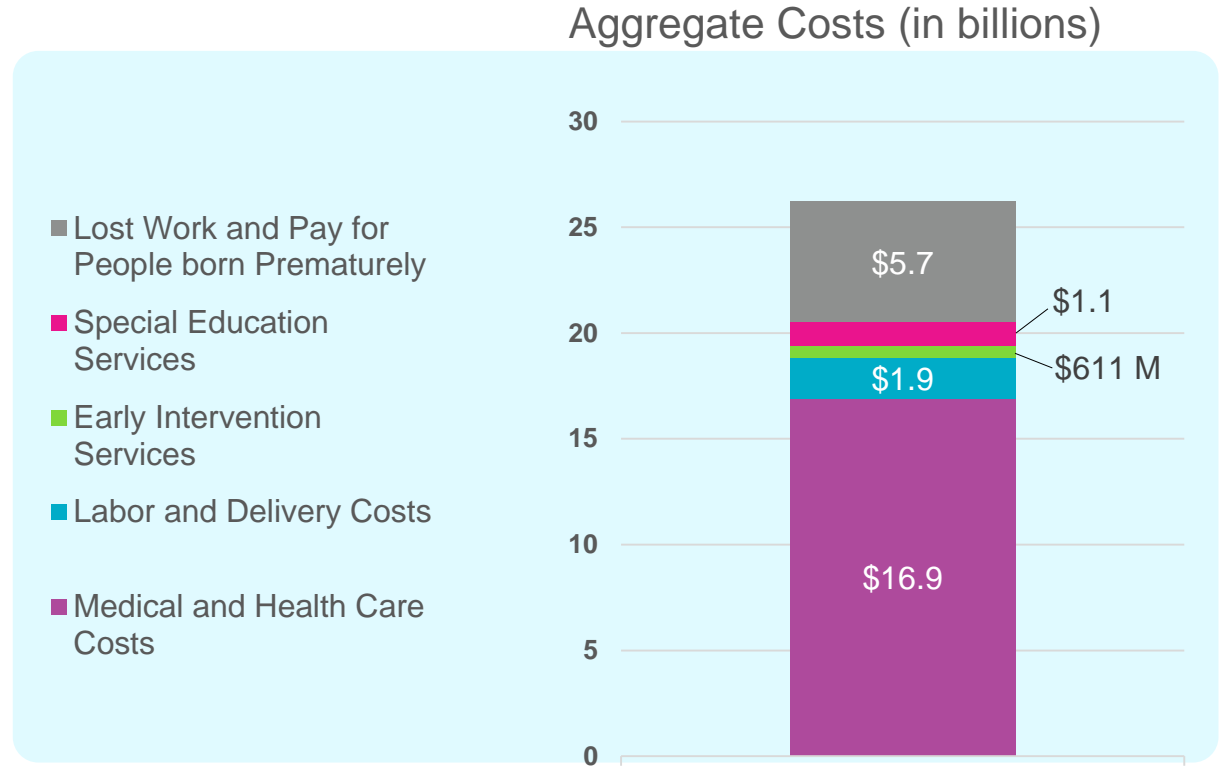
Preterm Infants Were More Likely to Be Rehospitalized in the First Year of Life

- After the initial hospital stay, about **15% of preterm infants** required at least 1 rehospitalization within the first year of life²⁸



Associated Costs of Premature Birth Have Reached \$26.2 Billion a Year²⁷

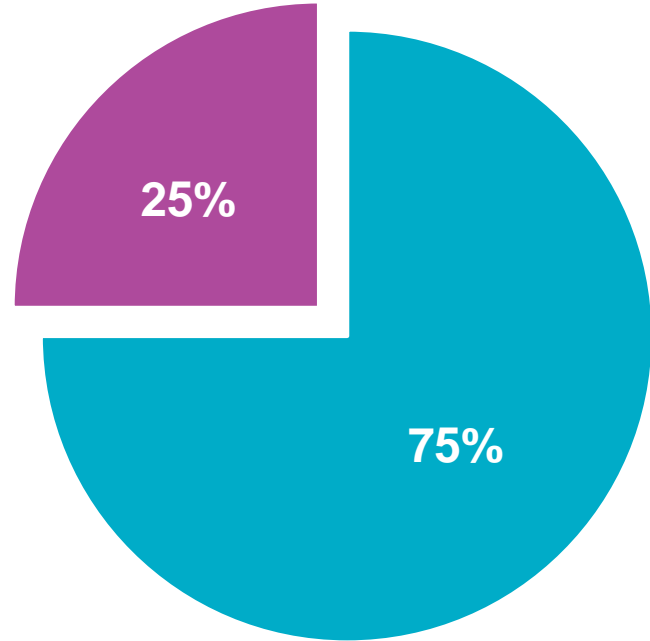
- **\$50,000 average incremental cost** per infant during the first year of life^{27,29}



27. Behrman RE, Butler AS, eds. Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes. Preterm Birth: Causes, Consequences, and Prevention. Washington, DC: National Academies Press; 2007. 29. March of Dimes. Premature birth: the financial impact on business. <http://www.marchofdimes.org/materials/premature-birth-the-financial-impact-on-business.pdf>. Accessed March 6, 2015.

Preterm Infants Are at a Greater Risk of Developing Serious Complications

- During initial hospitalization, **up to 25%** of preterm infants were diagnosed with:³⁰
 - Respiratory distress syndrome (RDS)
 - Bronchopulmonary dysplasia (BPD)
 - Intraventricular hemorrhage (IVH)
 - Necrotizing enterocolitis (NEC)
- Very severe complications are more likely to be found in babies born <34 weeks



Preterm Birth Can Lead to Severe Long-term Complications and Disability

- Children born preterm faced **greater risks of serious disabilities** that can last throughout their lives, including:³¹
 - Cerebral palsy
 - Intellectual impairment
 - Chronic lung disease
 - Vision and hearing impairment or loss
- Preterm birth was also associated with a variety of developmental and behavioral problems³¹

Key Takeaways

- Key Payer Priority
 - Preterm birth poses a key issue for commercial and public payers, and disproportionately affects certain populations
 - This public health concern has seen a uptick over the last two years and is trending in the wrong direction
- Leading Risk Factors
 - There are clearly defined risk factors for preterm birth
- Clinical and Economic Burdens
 - Preterm birth is the leading cause of infant mortality and morbidity
 - Preterm birth contributes to significant medical costs



Discover free patient preterm birth educational resources at
www.growthyoucantsee.com

Full list of references

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