The late preterm infant:
Challenges in practice

Dr. Lizel G. Lloyd
Update 2013

UPdate 2013
The late preterm infant: A wolf in sheep's clothing

Update 2013
Definition

Incidence
Incidence

Distribution of preterm births by gestational age
United States, 2008

- <28 weeks: 6%
- 28-31 weeks: 10%
- 32-33 weeks: 12%
- 34-36 weeks: 72%

Late preterm

Incidence

Figure 1. Birth rates at 34, 35, 36, and total 34 to 36 weeks of gestation:
United States, 1990–2006

Total 34–36 weeks

36 weeks

35 weeks

34 weeks

Year


Percent

0 2 4 6 8 10

1Late preterm. NOTE: Singleton births only.

http://www.cdc.gov/nchs/vitalstats.htm
Incidence

Figure 1. Preterm birth rates: United States, final 1990–2006 and preliminary 2007 and 2008

http://www.cdc.gov/nchs/vitalstats.htm
Incidence

Distribution of births 2011: Steve Biko Academic Hospital vs. Vermont Oxford Network NICU Type B

Update 2013
Aetiology

- Idiopathic
- Improved medical surveillance and intervention
- Increased C-sections and planned induction of labor
- Changing maternal demographics
- Physician practice patterns

Every Week Counts

Update 2013
Morbidity

Morbidity

- IUGR
- Multiple births
- Specific maternal conditions
- Emergency C-section
- Lack of maternal antenatal corticosteroids
- Pregnancy complications
- Infection
- Race
- Smoking

Morbidity

Morbidity

- Temperature instability
- Hypoglycaemia
- Respiratory illness
- Jaundice
- Neurodevelopmental problems
- Feeding related problems
- Readmissions

Morbidity

Table 14.1 Complications of prematurity in late preterm vs term infants

<table>
<thead>
<tr>
<th>Complication</th>
<th>Frequency late preterm</th>
<th>Frequency term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaundice</td>
<td>54%</td>
<td>38%</td>
</tr>
<tr>
<td>Sepsis evaluation</td>
<td>37%</td>
<td>13%</td>
</tr>
<tr>
<td>Feeding difficulties</td>
<td>32%</td>
<td>7%</td>
</tr>
<tr>
<td>Receive IV fluids</td>
<td>27%</td>
<td>5%</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>16%</td>
<td>5%</td>
</tr>
<tr>
<td>Temp. instability</td>
<td>10%</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>Apnea</td>
<td>6%</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>3.4%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Mortality (2002)</td>
<td>7.9/1000 Live births</td>
<td>2.4/1000 Live births</td>
</tr>
</tbody>
</table>

Fanaroff AA. Late Preterm Infants at Risk for Short-Term and Long-Term Morbidity and Mortality; p95 in: Buonocore G, Bracci R, Weindling M. Neonatology: A Practical Approach to Neonatal Diseases
Mortality

Infant death rate:
United States 2007-2008

Mortality

Infant death rate:
United States 2007-2008

http://www.cdc.gov/nchs/vitalstats.htm
Central Nervous System

Central Nervous System

- 65% of brain at 40 weeks
- ↓ sulci and gyri
- ↓ myelinisation
- Active development

↑ vulnerable

Poor neurodevelopmental outcome

Central Nervous System

Respiratory

• Saccules → Alveoli
• Increasing surfactant production
• ↓ Fluid absorption
• Inefficient gas exchange

Redrawn from Jain L: Respiratory morbidity in late-preterm infants: prevention is better than cure! Am J Perinatol 25:75-78, 2008
Respiratory

Raju TNK. Developmental physiology of late and moderate prematurity. Sem Fet Neo Med 2012; 17:126-131
Apnoea and SIDS

Apnoea and SIDS

Jaundice
Watchko JF. Hyperbilirubinaemia and bilirubin toxicity in the late preterm infant. Clin Perinatol 2006; 33:839-852
Jaundice

Watchko JF. Hyperbilirubinaemia and bilirubin toxicity in the late preterm infant. Clin Perinatol 2006; 33:839-852

UPdate 2013
### Jaundice

**Table 14.4** AAP Jaundice Guideline The 10 key elements [33]

1. Promote and support successful breastfeeding  
2. Establish nursery protocols – include circumstances in which nurses can order a bilirubin  
3. Measure TSB or TcB if jaundiced in the first 24 hours  
4. Visual estimation of jaundice can lead to errors, particularly in darkly pigmented infants  
5. Interpret bilirubin levels according to the infant’s age in hours  
6. Infants < 38 weeks particularly if breast fed are at high risk  
7. Perform risk assessment prior to discharge  
8. Give parents written and oral information  
9. Provide appropriate follow-up based on time of discharge and risk assessment  
10. Treat newborns when indicated with phototherapy or exchange transfusion

---

Fanaroff AA. Late Preterm Infants at Risk for Short-Term and Long-Term Morbidity and Mortality; p97 in: Buonocore G, Bracci R, Weindling M. Neonatology: A Practical Approach to Neonatal Diseases
GIT and feeding

UPdate 2013
GIT and feeding

Hypoglycaemia

↓ Glycogen stores

↓ Hepatic gluconeogenesis

↓ Intake

↑ Demand

Hormone dysregulation

Hypothermia

↓ Subcutaneous fat

Thin skin

↓ Brown fat

↑ BSA: body mass

↓ Metabolic response

↑ Heat loss

↓ Peripheral vasoconstriction

Infection and immunity
Infection and immunity

- ↓ IgG via placenta
- ↓ complement
- Antimicrobial proteins increase gestation dependent
- ↓ chemotaxis/neutrophil pool
- ↓ opsonisation
- ↓ function dendritic cells
- ↓ Functional maturity of TLR
- ↓ cytokine producing capacity monocytes

_Darcy AE. Complications of the late preterm infant._
_J Perinat Neonat Nurs 2009; 23:78-86_
Readmissions

- 5% readmitted within 2 weeks
- 1/+ admission by 6m
- 3/+ admissions by 9m
- Discharge < 2 days

UPdate 2013

Raju TNK. Epidemiology of late preterm (near-term) births. Clin Perinatol 2006; 33:751-763
Economic burden

- **< 34 weeks**
  - $202,700 per patient
  - Total: $38.9 million

- **34-37 weeks**
  - $4,200 per patient
  - Total: $41.1 million

*Raju TNK. Epidemiology of late preterm (near-term) births. Clin Perinatol 2006; 33:751-763*
### Infant and childhood outcome

| • ↑ Respiratory infection |
| • ↑ Asthma and wheezing |
| • ↓ Lung function |
| • ↓ Growth |
| • ↓ School performance |
Conclusion

• Stop and think before discharging a late preterm infant
• Good post-discharge follow-up
• More research needed
Questions

Update 2013