**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcome**

| Author, Year<br>UI# | Demographics | Inclusion Criteria | Exclusion Criteria | Disease/Condition Type (N) | Study Design (Duration) |
|---|---|---|---|---|---|
| Als<br>1994<br>94358983<br><br>(CNS+ Pulmonary) | Location: US<br>Years of Birth: ND<br>Median GA (range), wk:<br>Experiment: 27.1±1.6<br>Control: 26.5±1.4<br>Median BW (range), g:<br>Experiment: 827±173<br>Control: : 862±145<br>Male:<br>Experiment: 45%<br>Control: 61%<br>Race: Black<br>Experiment: 40%<br>Control: 17%<br>SES I, II/III/IV, and V:<br>Experiment: 45%, 20%, 35%<br>Control: 56%, 17%, 27%<br>Enrolled: 43<br>Evaluated: 38<br>Number of sites: 1 | BW < 1250 g<br>GA < 30 weeks and more than 24 weeks of estimated GA at birth<br>Mechanical ventilation starting within the first 3 hrs after birth and lasting longer than 24 hrs in the first 48 hrs<br>Alive at 48 hrs<br>Absence of chromosomal or other major genetic anomalies, congenital infections, and known fetal exposure to drugs of addiction<br>Singleton<br>At least one family member with some English-language facility<br>Telephone access<br>Living within the greater Boston area | ND | Experiment: VLBW infants participated in individualized developmental care (20)<br>Controls: VLBW infants received standard care (18) | Randomized controlled trial<br>(2 weeks and 9 months) |
| Chye<br>1995<br>95314864 | Location: Australia<br>Years of Birth: 1989 to 1990<br>Mean GA (range), wk:<br>Cases: 28±1.58<br>Controls: 28.63±1.26<br>Mean BW (range), g:<br>Cases: 1055± 234<br>Controls: 1077±215<br>Male: 56%<br>Race: ND<br>Enrolled: 80<br>Evaluated: 78 (78 controls)<br>Number of sites: 1 | Cases: 26-33 week GA infants with BPD and discharged home<br><br>Controls: 26-32 week GA infants without BPD admitted to the hospital within 1 year of the cases, matched for BW with the cases in broad categories (<1000 g, 1000-1499 g and =1500 g) | Cases: Trisomy 21 (2) | Cases: Preterm infants with BDP (78)<br>Sample 2: Preterm infants without BPD (78)<br><br>Subgroups of cases at 12 months corrected age follow-up:<br>Sample 1: BPD no Home $O_2$ (58)<br>Sample 2: BPD with Home $O_2$ (20) | Case-control study |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcome**

| Author, Year<br>UI# | Demographics | Inclusion Criteria | Exclusion Criteria | Disease/Condition<br>Type (N) | Study Design<br>(Duration) |
|---|---|---|---|---|---|
| Kraybill<br>1995<br>95264242 | Location: USA<br>Years of Birth: 1986-1989<br>Mean GA: (F/up at 1 year)<br>Sample 1: 28.2 ±1.9<br>Sample 2: 28.1 ±2.0<br>Mean BW:<br>Sample 1: 1022 ±177<br>Sample 2: 1028 ±184<br>Male:<br>Sample 1: 51%<br>Sample 2: 52%<br>Race:<br>Sample 1: White: 21%, Black: 53%, Hispanic: 23%, Other; 4%<br>Sample 2: White: 34%, Black: 42%, Hispanic: 22%, Other: 2%<br>Enrolled: 323 (survivors at 1 yr)<br>Evaluated: 258 (at 1 yr f/up)<br>Mean GA (F/up at 2 years of age)<br>Sample 1: 28.3 ±1.8<br>Sample 2: 28.1 ±1.8<br>Mean BW:<br>Sample 1: 1043 ±165<br>Sample 2: 1005 ±184<br>Male:<br>Sample 1: 49%<br>Sample 2: 43%<br>Race:<br>Sample 1: White: 35%, Black: 60%, Other:5%<br>Sample 2: White: 43%, Black: 54%, Other: 3%<br>Enrolled: 136 (survivors at 2 yrs)<br>Evaluated: 118<br>Number of sites: 2 | Premature VLBW: 700-1350 g<br>(Detailed description available in another article) | ND | At 1 yr f/up<br>Sample 1:<br>Synthetic Surfactant at Birth via ET tube: 5 ml/kg (136)<br>Sample 2:<br>Air placebo via ET tube at birth (122)<br><br>At 2 yr F/up:<br>Sample 1:<br>Synthetic surfactant at birth (57)<br><br>Sample 2:<br>Air placbo (61) | Randomized placebo-controlled double blind trial<br>(at 1 year and at 2 years CA) |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcome**

| Author, Year<br>UI# | Demographics | Inclusion Criteria | Exclusion Criteria | Disease/Condition Type (N) | Study Design (Duration) |
|---|---|---|---|---|---|
| Santuz<br>1995<br>96023205 | Location: Italy<br>Years of Birth: 1981-1987<br>Mean GA (range), wk:<br>Cases: 30±2 (27-32)<br>Controls: 39±1 (37-40)<br>Mean BW (range), g:<br>Cases: 1400±335 (890-1900)<br>Controls: 3335±418 (2800-4100)<br>Male:<br>Cases: 75%<br>Controls: 69%<br>Race: ND<br>Enrolled: 12 (16 controls)<br>Evaluated: 12 (16)<br>Number of sites: 1 | Cases: Premature, RDS with mechanical vent > 7 days; met criteria for BPD; agreed to cooperate<br><br>Control: healthy term school children matched for age, height, weight, habitual level of physical activity | Cerebral palsy; too young to cooperate | Cases: Preterm infants with BPD (12)<br>Controls: Healthy term infants (16) | Case-control study (6-12 years) |
| Iles<br>1997<br>97280982 | Location: UK<br>Years of Birth: ND<br>Mean GA (range), wk: ND<br>Median BW (range), g: 900 (589-1891)<br>Male: ND<br>Race: ND<br>Enrolled: 40<br>Evaluated: 33<br>Number of sites: 1 | Premature birth<br>Continuous supplemental O2 for 28 days after birth | Refused consent<br>Returned to referring hospital | Premature infants with CLD (33) | Prospective cohort |
| Cheung<br>1998<br>99059896 | Location: Canada<br>Years of Birth: 12/93-10/97<br>Mean GA (range), wk: 25 (24-30)<br>Median BW (range), g: 860 (340-1460)<br>Male: 67%<br>Race: ND<br>Enrolled: 24<br>Evaluated: 10<br>Number of sites: 1 | VLBW survivors, BW < 1500 g, requiring inhaled nitrous oxide (INO) (continues to be hypoxenic at >90% $O_2$ and MAP 15 ± 2) | Mosaic trisomy 18<br>Potter's syndrome<br>survived to 1 year of chronological age | VLBW infants treated with INO (10) | Prospective cohort |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcome**

| Author, Year<br>UI# | Demographics | Inclusion Criteria | Exclusion Criteria | Disease/Condition<br>Type (N) | Study Design<br>(Duration) |
|---|---|---|---|---|---|
| Gross<br>1998<br>98375435 | Location: US<br>Years of Birth: 1985-1986<br>Mean GA (range), wk:<br>Sample 1: 28.2±2.1<br>Sample 2: 28.4±2.0<br>Controls: 40±1.1<br>Mean BW (range), g:<br>Sample 1: 1173±345<br>Sample 2: 1179±354<br>Controls: 3565±427<br>Male:<br>Sample 1: 53%<br>Sample 2: 51%<br>Controls: 57%<br>Race: White<br>Sample 1: 86%<br>Sample 2: 85%<br>Controls: 89%<br>Enrolled: 133 (125 controls)<br>Evaluated: 96 (108)<br>Number of sites: 1 | All live-born babies 24-31 wk gestation cared for at Crouse Memorial Hospital, survived to discharge<br>Controls: FT AGA, 38-42 wk GA.<br><br>PT matched to FT for sex, mat. Race, mat. Educa. and marital status (sociodemographic factors). | ND | (Sample 1&2): Preterm infants (96)<br>Sample 1: Preterm infants with BPD (43)<br>Sample 2: Preterm infants without BPD (53)<br>Controls: Full term infants (108) | Prospective cohort (7 years)<br><br>Cases: 8 died after discharge because of complications of chronic lung disease (2), pneumonia (2), nonrespiratory conditions (4), lost to follow-up (6), and neurodevelopmental delays (23)<br>Controls: lost to follow-up (12), neurodevelopmental delays (5) |
| Kurkinen-Raty<br>1998<br>98387235<br><br>(All+Lung)<br><br>***sample from the same big population as 20284814** | Location: Finland<br>Years of Birth: 1990-1996<br>Mean GA (range), wk:<br>Cases: 28.2 (23.8- 37.2)<br>Controls: 28.4 (22.9-36.9)<br>Mean BW (range), g:<br>Cases: 1138.3±434<br>Controls: 1272.4±547.2<br>Male: ND<br>Race: ND<br>Enrolled: 78 (78 controls)<br>Evaluated: 78 (78)<br>Number of sites: 1 | Preterm PROM between 17-30 weeks gestation; singleton; delivered > 2 hr after rupture<br>Controls: preterm no PROM; spontaneous preterm delivery matched for GA and year of delivery. | Rupture unconfirmed or transient | Sample 2: Preterm rupture (78)<br>Sample 2: Preterm delivery no rupture (78) | Retrospective cohort |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcome**

| Author, Year<br>UI# | Demographics | Inclusion Criteria | Exclusion Criteria | Disease/Condition Type (N) | Study Design (Duration) |
|---|---|---|---|---|---|
| Subhedar<br>1999<br>20257096 | Location: UK<br>Years of Birth: 6/1995-5/1999<br>Mean GA (range), wk:<br>Sample 1: 28 (24-34)<br>Sample 2: 30 (26-34)<br>Mean BW (range), g:<br>Sample 1: 1055 (510-2310)<br>Sample 2: 1420 (840-2150)<br>Male:<br>Sample 1: 52%<br>Sample 2: 52%<br>Race: ND<br>Enrolled: 98<br>Evaluated: 98<br>Number of sites: 1 | Sample 1: Preterm infants with CLD<br>Sample 2: Preterm infants without CLD received mechanical ventilation <24 hours + 02< 72 hours | ND | Sample 1: Preterm infants with CLD (54)<br>Sample 2: Healthy preterm infants (44) | Prospective cohort |
| Kurkinen-Raty<br>2000<br>20284814<br><br>***sample from the same big population as 98197235** | Location: Finland<br>Years of Birth: 1990-1997<br>Mean GA (range), wk:<br>Cases: 30.5±2.1<br>Controls: 30.4±2.1<br>Mean BW (range), g:<br>Cases: 1294±469<br>Controls: 1605±427<br>Male: ND<br>Race: ND<br>Enrolled: 103 (103 controls)<br>Evaluated: 103 (103)<br>Number of sites: 1 | Cesarean delivered singleton, GA 24-33 weeks<br>Controls: spontaneously delivered singleton after regular contractions and/or preterm rupture of the membranes no more than 24 hrs before. The mothers were matched one-to-one by gestational age at delivery plu7s or mines 1 week. | ND | Sample 1: Indicated preterm I.e. preterm birth 'indicated' for maternal/fetal reasons (103)<br>Sample 2: Spontaneous preterm delivery due to preterm labor (103) | Retrospective cohort |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcome**

| Author, Year<br>UI# | Demographics | Inclusion Criteria | Exclusion Criteria | Disease/Condition<br>Type (N) | Study Design<br>(Duration) |
|---|---|---|---|---|---|
| Brooks<br>2001<br>21153125 | Location: US<br>Years of Birth: 1988<br>Mean GA (range), wk: ND<br>Mean BW (range), g: ND<br>Male: ND<br>Race: ND<br>Enrolled: 8071<br>Evaluated: 8071<br>Number of sites: 1 | < 4 year old selected from randomized, systematic population based sample, weighted to be nationally representative of sampling of African-American and LBW infants who had initial (1988) and follow-up (1991) surveys and asthma reports | ND | VLBW infants (<1500g), MLBW (1500-2499g); NBW (=2500) infants from NMIHS population (8071) | Prospective cohort<br>Follow-up 3 years<br><br>1988-1991 |
| Doyle<br>2001<br>21064379<br><br>***overlapped sample with Ford, 2000 20380862 in growth table** | Location: Australia<br>Years of Birth: 1/1977 to 3/1982<br>Mean GA (range), wk:<br>Sample 1: 27.5 ±2.3<br>Sample 2: 29.6 ±1.5<br>Controls: 39.9 ±1.0<br>Mean BW (range), g:<br>Sample 1: 859±100<br>Sample 2: 1248±145<br>Controls: 3420±427<br>Male:<br>Sample 1: 45%<br>Sample 2: 54%<br>Controls: 62%<br>Race: ND<br>Enrolled: 210 (60 controls)<br>Evaluated: 180 (42 controls)<br>Number of sites: 1 | Sample 1: 86 consecutive ELBW survivors (BW 500-999g) born during the 63 months from 1/1/1977<br>Sample 2: 124 consecutive ELBW survivors (BW 1000-1500g) born during the 18 months from 1/10/1980<br>Control: 60 randomly selected term infants with BW>2499g born within the Royal Women's Hospital during the last 6 months of the recruitment phase | ND | Sample 1: Preterm ELBW infants, BW 500-999g (78)<br>Sample 2: Preterm ELBW infants, BW 1000-1500g (102)<br>Control: Term infants, BW >2499g (42) | Prospective cohort<br>(14 years) |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part II

| Author, Year | Predictors | Predictor Measures | Outcomes | Outcome Measures |
|---|---|---|---|---|
| Als<br>1994<br>94358983 | Other:<br>Participation in individualized developmental care staffing by specially educated nurses | The psychologist and clinical nurse specialist provided ongoing support for the care teams and parents of the infants in the experimental group in jointly planning and implementing individually supportive care and environments. | **CNS:**<br>Neurodevelopmental:<br>Cognitive delay<br><br>**Pulmonary:**<br>BPD severity | Baley Scale of Infant Development at 9 months of age<br><br>Assessed by double-blind review of cranial US scans by a consultant senior radiologist |
| Chye<br>1995<br>95314864 | **Bronchopulmonary dysplasia**<br><br>BPD with Home $O_2$<br>BPD without Home $O_2$ | Diagnoses of BPD was based on Bancalari's BPD definition<br><br>Home oxygen therapy program – infants who were well, feeding satisfactorily and gaining weight, but were unable to maintain adequate oxygenation (93-97% saturation) in room air, and were therefore discharged from hospital under the home oxygen therapy | **Growth**<br>Re-hospitalization | Growth was based on sex-specific National Center of Health Statistics growth chart |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part II

| Author, Year | Predictors | Predictor Measures | Outcomes | Outcome Measures |
|---|---|---|---|---|
| Kraybill<br>1995<br>95264242 | **General:**<br>Surfactant (single dose 5 ml/kg given via ET tube at birth) | As soon as after birth, infants were treated either with 5 ml/kg of surfactant or air placebo, via ET tube. | At 1 yr assessment (NCMH and HCHD cohort):<br>**General:**<br>Overall survival<br>**Pulmonary:**<br>Need for O2 via Nasal canula<br>Need for O2 via CPAP<br>CLD<br>At 2 yr assessment (NCMH cohort)<br>**General:**<br>Overall survival<br>Hospitalization for respiratory illness<br>**Pulmonary:**<br>Bronchodilator regular use<br>Tracheostomy<br>At 1 and 2 yr assessment:<br>**Growth:**<br>Height for age<br>Weight for age<br>HC for age<br>Mean MDI score<br>MDI scores < 2 SDs<br>Mean PSI score<br>PDI scores < 2 SDs<br>Severity of impairments<br>Types of Impairments<br>Any surgery (between 28 ds-1 yr or 1yr to 2 yr)<br>Assessment between 28 ds-12mo:<br>**Ophthalmology:**<br>ROP (No ROP, Mild/moderate, Severe)<br>Tx for ROP( surgery or cryotherapy)<br>ROP presence at latest exam<br>Severe ROP | No further specifications given, except for the followings:<br>Oxygen via Nasal canula : providing alveolar O2 concentrations of : 26%-40%, based on NC flow and NC O2 concentration<br>Bayley Scale of Infant Development:<br>• MDI= Mental Development Index Score<br>• PDI: Psychomotor Development Index Score<br>ROP : (not further definitions)<br>• No ROP,<br>• Mild/moderate<br>• Severe<br>CP (no further definitions)<br>• Mild<br>• Moderate/Severe<br>Severity of impairments:<br>• Severe<br>• Mild/Moderate<br>Types of impairments:<br>• MDI<69<br>• MDI: 69-84<br>• Moderate/severe CP<br>• Mild CP<br>• Bilateral sensorineural deafness<br>• Deafness not requiring amplification<br>• Bilateral blindness<br>• Visual defect<br><br>(1 yr and 2 yr CA) |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part II

| Author, Year | Predictors | Predictor Measures | Outcomes | Outcome Measures |
|---|---|---|---|---|
| Santuz<br>1995<br>96023205 | General Predictor: GA<br>Cardiovascular<br>1) Chronic Lung Diseases<br>2) Other: duration of supplemental oxygen | Chronic Lung Disease defined as oxygen dependency for at least 28 days and beyond 36 postmenstrual weeks in association with an abnormal chest radiograph. | Other Outcomes:<br>Cardiovascular: pulmonary hypertension | Measured as AT/RVET ratio = Doppler derived acceleration time to right ventricular ejection time ratio |
| Iles<br>1997<br>97280982 | *Cardiovascular or Pulmonary Predictors:*<br>Bronchopulmonary dysplasia<br>*Other Predictors:*<br>ECG with RVH | $DaAO_2$ in 50% $O_2$<br>$PaCO_2$<br>PFT testing to determining $V_{max}$ FRC | **Pulmonary:**<br>Requirement for supplemental $O_2$ at one year CA; alternately phrased by authors as $SaO_2$ < 90% in RA<br>**Other outcomes**:<br>Hospital readmission | ND |
| Cheung<br>1998<br>99059896 | Cardiovascular or Pulmonary Predictors:<br>Inhaled nitric oxide (INO) | ND | **Pulmonary:**<br>BPD or CLD (with or without meds)<br>Aspiration pneumonia | PDI + MDI of Bayley Scales of Infant Developmental Index were used.<br>"Neurodevelopmental" outcomes:<br>Disability: one of more of:<br>1. CP (all types or severity)<br>2. Legal blindness (corrected visual acuity of the better eye <20/200<br>3. Hearing loss (sensorineural hearing loss of >30 dB in the better ear)<br>4. Severe mental retardation (MDI >3 SD below the mean)<br>Delay: does not have disability and either MDI or PDI was >2 SD below the mean.<br>Normal: free of disability or delay and MDI and PDI were within 2 SD of the mean. |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part II

| Author, Year | Predictors | Predictor Measures | Outcomes | Outcome Measures |
|---|---|---|---|---|
| Gregoire<br>1998<br>95264241 | Cardiovascular/Pulmonary:<br>1) Chronic Lung Disease<br>2) Bronchopulmonary dysplasia<br>Compared $O_2$ dependence at 28 days with $O_2$ dependence at 36 wk | ND | **CNS:**<br>Cerebral palsy<br>Motor and cognitive delay<br>**Audiology**: Hearing Disorders→<br>Free field audiograms<br>**Pulmonary:**<br>Respiratory readmissions<br>PICU admissions<br>**Growth:** Weight, height, head circumference<br>**Other:** Health Outcomes | Giffith's Mental Development Scales<br>Neurologic examinations |
| Gross<br>1998<br>98375435 | General: GA<br>Cardiovascular:<br>Bronchopulmonary dysplasia @ 30 wk<br>Other: social data, health data | PT 24-31 wk GA<br>BPD if infants were dependent on supplemental oxygen @ 35 wk PMA | **Pulmonary:**<br>Respiratory symptoms (wheeze, chronic cough, chest congestion)<br>Restriction in activity,<br>Use of respiratory medicines,<br>7-year pulmonary function studies<br>Bronchodilator responsivness<br>**Other:**<br>Re-hospitalization<br>Metabolic measures | Lung function testing was performed on SensorMedics 2200 (SensorMedics, Anaheim, Calif) by investigators blinded to children's GA and medical histories |
| Kurkinen-Raty<br>1998<br>98197235 | General : PROM | Diagnose was through clinical assessment or with the use of a PROM-test, which detects insulin growth factor binding protein-1 in the cervico-vaginal secretions, or with the use of a nitrazine test. | **CNS:**<br>Motor delay<br>Cerebral delay<br>**Ophthalmology**: Visual Blindness<br>**Audiology:** Hearing disorders<br>**Pulmonary**: Chronic lung disease<br>**Growth:** weight percent<br>**Other:**<br>Days of re-hospitalization<br>Steroid therapy at follow-up | Neurologic exams<br><br>Diagnosis of CLD was made if infants required oxygen, continuous bronchodilator, or steroid tx because of respiratory signs and symptoms.<br>Diagnoses of RDS were made based on need for respiratory support, radiologic findings, and clinical assessments |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part II

| Author, Year | Predictors | Predictor Measures | Outcomes | Outcome Measures |
|---|---|---|---|---|
| Subhedar<br>1999<br>20257096 | Cardiovascular/Pulmonary:<br>Chronic lung disease | CLD was defined as oxygen dependency for at least 28 days and beyond 36 PMA in association with an abnormal chest radiograph | **Pulmonary:**<br>1) Pulmonary function-forced vital capacity<br>2) Minor ventilation forced expiratory volume, forced expiratory flow<br>Other: Heat rate during exercise | Measures OR aerobic power: a) maximum O2 consumption b) max O2 consumption at anaerobic threshold C) running time |
| Kurkinen-Raty<br>2000<br>20284814 | General predictors:<br>Birth weight<br>GA<br>Antenatal steroids<br>Cord pH<br><br>Bronchopulmonary dysphasia (BPD)<br><br>Other predictors:<br>Indicated preterm delivery<br>Spontaneous preterm delivery | <br><br><br><br><br><br>BPD diagnoses were based on radiologic finding | **CNS:**<br>Motor delay<br>Cerebral palsy<br><br>**Ophthalmology**<br>Visual impairment<br>**Audiology**<br>Hearing disorder<br>**Pulmonary**<br>Chronic lung disease (CLD) at 1 year<br>**Growth:**<br>Wt, Ht, HC | Motor delay = abnormalities of tone or reflexes but functionally normal or borderline<br>CP = spastic diplegia or hemiplegia or spastictetraplegia<br><br><br><br><br>Diagnosis of CLD was made if infants required oxygen, continuous bronchodilator, or steroid tx because of respiratory signs and symptoms. |
| Brooks<br>2001<br>21153125 | General:<br>Birth weight<br>Sex<br>Other:<br>SEC factors (mat age, race, education, SEC status, mat wt gain, mat smoking, poverty status variable)<br>Prenatal history<br>Developmental outcomes | Predictors self-explanatory. Poverty variable based on family income and number of household members, categorized by standard national poverty levels. | **Pulmonary:**<br>M.D. diagnosed asthma in 1st 3 years of life | Diagnosis of asthma based on response of parent to question, "Have you been told by a MD/ RN/other health provider that your child has asthma?" |
| Doyle<br>2001<br>21064379<br>***overlapped sample with 20380862** | General: Birth weight<br>Cardiovascular/Pulmonary:<br>Bronchopulmonary | ND | **Pulmonary:**<br>1) Asthma<br>2) Lung function testing<br>3) readmission to hospital for asthma or pneumonia<br>**Growth:** height<br>**Other**: hospital readmission | Lung function testing, Jaeger Bodyscreen II-Bodybox (Jaeger, Germany), with Masterlab (ML3) software |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | | | | Potential Biases | Comments |
|---|---|---|---|---|---|---|
| Als 1994 94358983 | Studied effect of an individualized developmental care plan on Bayley score at 9 months age and occurrence and severity of BPD. | | | | Small number of babies studied<br>Only one NICU<br>Only one neurodevelopmental assessment at 9 months of age<br>Reported timing of IVH different from many other studies<br>High potential for contamination | Study was government funded |
| | | Experimental group | Controls | P value | | |
| | N | 20 | 18 | | | |
| | Bayley MDI | 118.30 (17.35) | 94.38 (23.31) | < 0.001 | | |
| | Bayley PDI | 100.6 (20.19) | 83.56 (17.97) | < 0.01 | | |
| | No BPD | 2/20 | 3/18 | | | |
| | Mild BPD | 13/20 | 7/18 | | | |
| | Moderate BPD | 5/20 | 2/18 | | | |
| | Severe BPD | 0 | 6/18 | 0.03 | | |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | Potential Biases | Comments |
|---|---|---|---|
| Chye<br>1995<br>95314864 | Rehospitalization rate (overall)<br>BPD (78) 58%<br>Control (75) 35% RR 1.7 (1.2-2.4)<br>Rehospitalization for respiratory illness<br>BPD (78) 39%<br>Control (75) 20% RR 1.9 (1.1- 3.2)<br>Rehospitalization for poor growth<br>BPD (78) 14%<br>Control (75) 1% RR=1.4 (1.7-82)<br>Rehospitalization for failure to thrive<br>BPD on home $O_2$ (20) 30%<br>Control no home $O_2$ (58) 9% RR=3.3 (1.2-8.9)<br>**Growth (wt in kg) :** NS diff between BPD and control<br>BPD M 9.08 F 8.4<br>Control M 9.37 F 8.82<br>**Growth (Ht in cm):** NS diff<br>BPD M 73.0 F 72.1<br>Control M 74.4 F 72.6<br>**Growth (HC in cm):** NS diff<br>BPD M 46.7 F 46.0<br>Control M 47.0 F 454.<br>There was a significant increase in **any** rehospitalization in 1st year of life in preterm infants with BPD vs. preterm infants with no BPD.<br>There was a significant increase (2-fold) in rehospitalization for **respiratory illness** in the 1st year of life in preterm infants with BPD vs. preterm infants with no BPD.<br>BPD infants with Home O2 (N=20) had ~3 fold increased re-hospitalization for failure to thrive.<br>Growth failure was common in both preterm groups (i.e. in infants with no BPD and with BPD <10% in weight at 1 yr age). Re-hospitalization was high in both preterm groups (with and without BPD). | (None) | Study was privately funded |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | Potential Biases | Comments |
|---|---|---|---|
| Kraybill<br>1995<br>95264242 | Single dose Surfactant tx at birth was not associated with the physical and neurodevelopmental status of VLBW premature infants at 1 yr of corrected age Placebo group vs Surfactant group, at 1 yr of age:<br>1. Overall survival at 1 yr:<br>2. Oxygen via NC<br>3. Oxygen via CPAP:<br>4. CLD<br>5. Distribution of pts in both groups across different percentiles:<br>Ht/age, Weight/age and HC/age: were not s/s different across the two groups.<br>6. Mean MDI score:<br>7. MDI scores< 2SDs<br>8. Mean PDI score:<br>9. PDI scores < 2 SDs:<br>10. No impairment:<br>11. Impairment present (total )<br>12. Severe impairment:<br>13. Mild/Moderate impairment:<br>14. Types of impairment:<br>MDI<69: MDI: 69-84:<br>Moderate/severe CP: Mild CP:<br>Bilateral sensorineural deafness: Deafness not requiring amplification<br>Bilateral blindness: Visual defect:<br>Assessment from 28ds-12 mo:<br>• No ROP:<br>• Present ROP overall:<br>• Mild/Moderate ROP:<br>• Severe ROP:<br>• Treatment for ROP overall:<br>Surgery:<br>Cryotherapy:<br>In the NCMH cohort there was no difference in impairments, the severity of impairments and the types of impairments at the 1yr of age assessment | | |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | Potential Biases | Comments |
|---|---|---|---|
| Santuz<br>1995<br>96023205 | Forced vital capacity (FVC):<br>BPD: (N=12) 87±10<br>Without BPD: (N=16) 96±8<br><0.05<br>Forced expiratory volume(1 sec)(FEV1):<br>BPD: 83±12<br>Without BPD: 100±8<br><0.01<br>FEF 25-75 (forced expiratory flow between 15-7520 vc):<br>BPD: 77±30<br>Without BPD: 110±14<br><0.01<br>Oxygen consumption (ml/?/?):<br>BPD: 25.2±10.3<br>Without BPD: 37.1±10.4<br><0.01<br>Running time (minutes):<br>BPD: 6.1±1.3<br>Without BPD: 7.9±2.6<br><0.05<br>Minute ventilation:<br>BPD: 20±9.4<br>Without BPD: 30.7±9<br><0.01<br>Max heat rate during exercise:<br>BPD: 192±7.9<br>Without BPD: 194±8<br>Not significant<br>Running time:<br>BPD: 6.1±1.3<br>Without BPD: 7.9±2.6<br>P <0.05 | Small study<br>Far from comprehensive; likely substantial section bias<br><br>Compares prematures with BPD to term infants without BPO; unclear if results are due to BPD or prematurity | No data on funding source |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | Potential Biases | Comments |
|---|---|---|---|
| Iles<br>1997<br>97280982 | Study of chronic lung disease (CLD) leading to a persistent requirement for supplemental oxygen at one year of age.<br><br>N % requiring oxygen at one year age<br>Supplemental O2 at discharge 6 50%<br>RVH on ECG 3 100%<br><br>Alveolar arterial oxygen gradient > 29 kPa in 50% hood oxygen at 35 to 40 weeks PCA predicted need for supplemental oxygen at one year with sensitivity 0.85 and specificity 0.88. PaCO2 greater than 7 kPa at 35 to 40 weeks PCA predicted supplemental oxygen requirement at one year with sensitivity 0.78 and specificity 0.88. | Small number of infants<br>No information regarding early neonatal course<br>No control groups of preterms without CLD | Study was privately funded |
| Cheung<br>1998<br>99059896 | Mean MDI 81 ± 21, PDI 64 ± 22<br>Normal development 31%<br>Neurodevelopmental delay 20%<br>Disabled 50%<br>Severe mental retardation 10%<br>Spastic diplegic CP 30%<br>Hemiplegic CP 10%<br><3rd %ile for weight 20%<br><3rd%ile for height 40%<br><3rd%ile HC 30%<br>BPD 80%<br>Need bronchodilators for CLD 10%<br>Recurrent wheezing but did not need meds 40%<br>Grade 4 IVH 20%<br>Grade 3 IVH 20%<br>VP shunt 30%<br>PVL 10%<br>Sensorineural hearing loss 10% | Very small sample size<br>Descriptive study with no control group for comparison | No data on funding source |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | Potential Biases | Comments |
|---|---|---|---|
| Gross<br>1998<br>98375435 | Rehospitalization during 1st 2 years:<br>PT with BPD 23/43 (53%)<br>PT without BPD 14/53 (26%)<br>FT 3/108 (3%)<br><br>Respiratory symptoms in PT with BPD were greater than symptoms in PT without BPD, and both were greater than FT group<br>Pulmonary function Tests: Multiple tests revealed significantly worse PFTs in PT with BPD at rest and after exercise compared to either PT without BPD or FT group.<br>Exercise results:<br>No difference in baseline HR, VO2, RQ, Max VO2, Max RQ, endurance among groups<br><br>Asthma:<br>PT with BPD 20/43 (47%)<br>PT without BPD 13/53 (25%)<br>FT 23/108 (21%)<br>PT with BPD vs. FT: P<0.001<br><br>School age children who were former preterm infants with BPD demonstrated abnormal pulmonary function at 7 years age in contrast to school age children who were preterm infants without BPD or FT AGA control. The children who were preterm infants without BPD had similar pulmonary function as children who were FT AGA controls. | (None) | No data on funding source |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | Potential Biases | Comments |
|---|---|---|---|
| Kurkinen-Raty 1998 98387235 | Retrospective controlled cohort study of early PROM between 17 and 30 weeks of gestation. Assements at one year corrected age. N = 55 for early PROM and 56 for control.<br>Outcome / Early PROM / Control / OR (CI)<br>Cerebral palsy / 18% / 16% / 1.2 (0.4, 3.1)<br>Delayed motor Development / 9% / 16% / 0.5 (0.2, 1.7)<br>Visual disability / 4% / 4% / 1.0 (0.1, 7.5)<br>Hearing loss / 7% / 9% / 0.8 (0.2, 3.2)<br>Good nuerosensory development / 67% / 61% / 1.2 (0.6, 2.2)<br>Early PROM seems to be a major obstetric and neonatal problem with pulmonary ramifications extending beyond the neonatal period. However, most of these infants can be saved. | (None) | No data on funding source |
| Subhedar 1999 20257096 | AT/RVET ratio much lower in CLD group p< 0.01.<br>Pulmonary arterial pressure remains persistently elevated in CLD infants until the end of first year of life. | Does not state whether the Doppler evaluators were blinded to the groups | Study was private funded |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | Potential Biases | Comments |
|---|---|---|---|
| Kurkinen-Raty 2000 20284814 | **CLD at 1 year age:**<br>Indicated PT delivery: (81) 12/81 (15%)<br>Spontaneous PT delivery: (94) 3/94 (3%)<br>RR 4.6 (1.4, 1.6)<br>**Growth:**<br>Indicated PT delivery: (81)<br>Spontaneous PT delivery: (94)<br>Weight RR =0.03 (-5.3, 0.3)<br>L RR = 0.002<br>HC RR = 0.03<br>**CP:**<br>Indicated PT delivery: (81) 5/81 (6%)<br>Spontaneous PT delivery: (94) 10/94 (11%)<br>RR=0.6 (0.25-1.6)<br>**Delayed motor:**<br>Indicated PT delivery: (81) 8/81 (6%)<br>Spontaneous PT delivery: (94) 8/94 (9%)<br>RR 1.2 (0.5-3.0)<br>**Visual disability:**<br>Indicated PT delivery: (81)<br>Spontaneous PT delivery: (94)<br>RR =1.9 (0.5, 7.8)<br>**Hearing loss:**<br>Indicated PT delivery: (81)<br>Spontaneous PT delivery: (94)<br>RR =1.9 (0.5, 7.8)<br>This study demonstrated that premature infants who were born due to 'indicated maternal/fetal reasons' vs. spontaneous preterm delivered infants had worse pulmonary outcome a 1 yr age. More infants in 'indicated' group were SGA and were significantly smaller than control group at 1 yr in Wt, HT, and HC. There was no difference between groups in neurosensory outcomes. | Outcome not well-defined<br>Difficult to know if lack of difference between groups is due to sample size or event rate. | No data on funding source |

**Evidence Table 9. Studies Evaluating Association of LBW and Pulmonary Outcomes**
Part III

| Author, Year | Associations found | Potential Biases | Comments |
|---|---|---|---|
| Brooks<br>2001<br>21153125 | Diagnosis asthma by age 3 years<br>BW ≥ 2500 gm 6.7%<br>BW≥1500-2499gm 10.9% OR=1.4 (1.1-1.8)<br>BW < 1500 (VLBW) 21.9% OR=2.9 (2.3-3.6)<br><br>African-American 12% OR=1.9 (1.6-2.4)<br>VLBW/African-American OR 2.5 (2.0-3.3)<br>VLBW/white OR=3.1 9 ( 2.2-4.3)<br>Chronic lung disease (8058) 20.4% OR 3.4 (2.4-4.8)<br>68% attributable risk for asthma in VLBW children was due to birth weight. | Retrospective classification of BPD may have been limited compared to prospective classification.<br>Potential for selection bias<br>a. identifying asthma children based on parental report of physician-diagnosed asthma. (Evidence of high specificity and PPV)<br>b. defining asthma may vary by physician practice | Study was government funded<br>Objective of study was to estimate the independent contribution of BW to asthma prevalence among children <4 years age. This study found a strong, independent association between low birth weight and asthma. |
| Doyle<br>2001<br>216464379<br><br>***overlapped sample with 20380862** | Respiratory health and lung function in these preterm children <1501g were mostly normal and comparable with normal control term infants at 14 years | (None) | Study was privately funded |