National Birth Defect Registry

- Based on concept of “alert practitioner”
- Identifies patterns of birth defects with the same or similar exposures
- Collects data on maternal/paternal pre-conceptual and prenatal exposures
- Cases dually identified by individual symptoms and overall syndrome or category name
- Designed to raise hypotheses
Teratogens Identified by Alert Practitioners

- Thalidomide
- Rubella
- Dilantin
- DES
- Alcohol
- Methyl Mercury
- Radiation
Scientific Advisory Board

- Peter Kahn, Ph.D.  
  Rutgers University
- James Murphy, Ph.D.  
  University of Colorado
- Theo Colborn, Ph.D.  
  World Wildlife Fund
- Stuart Newman, Ph.D.  
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- Shanna Swan, Ph.D.  
  California Department of Health Services
- Maureen Paul, M.D.  
  University of Massachusetts
- Wayland Swain, Ph.D.  
  Eco Logic Company
- Janette Sherman, M.D.  
  Wayne State University
Registry Projects

- Bendectin
- Agent Orange
- Gulf War
- Community based
  - Dickson, TN - oral cleft cluster
Gulf War Exposures

- DEET
- Permethrin
- Pyridostigmine
- Pentachlorophenol
- Benzocaine sulfur
- Aluminum phosphide
- Baygon
- Boric Acid
- Sevin
- Amidinoxydrazone
- Diazinon
- Dursban
- Dichlorvos
- Ficam
- Carbaryl
- Lindane
- Malathion
- Oil Well Fires
- Leaded fuels
- Depleted Uranium
- Solvents
- Decontam agent
- Malaria Pills
- Campfires
- Leishmaniasis
- Chemical warfare agents
- CARC
- Vaccinations
- D-phenothrin
- Allethrin
- Paint
- Others
## Disability Frequency

<table>
<thead>
<tr>
<th>Condition</th>
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<td>Resp. Infect.</td>
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<td>Ear Infect.</td>
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<tr>
<td>Motor Delay</td>
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<td>Colic as Baby</td>
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<td>Speech</td>
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<td>Allergies</td>
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<td>Jaundice</td>
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<td>Reflux</td>
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<td>Heart Murmur</td>
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<td>High Fevers</td>
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<td>Ext. Ears</td>
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<td>Asthma</td>
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<td>Food Sens.</td>
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<td>Eczema</td>
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<td>VSD</td>
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<td>Drug Reaction</td>
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<td>Seizures</td>
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<td>Acne-like Rash</td>
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<td>Thrush</td>
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<tr>
<td>Mood Swings</td>
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<td>Pneumonia</td>
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<td>Birth Mark</td>
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<td>Stomach problems</td>
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<tr>
<td>Sleep disorder</td>
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<tr>
<td>Walks on tiptoes</td>
<td>26</td>
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<tr>
<td>Goldenhar</td>
<td>26</td>
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<tr>
<td>Up. Limb Reduction</td>
<td>25</td>
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</tbody>
</table>
Male-Mediated Birth Defects

Evidence from Experimental and Epidemiological Studies

- Toluene
- Benzene
- Lead/mercury
- Trichloroethane
- Solvents
- Dyes
- Cigarette smoke/alcohol
- Drugs

Possible Outcomes

- Congenital malformations
- Spontaneous abortions
- Low birth weight
- Childhood cancers
- Developmental, neurobehavioral, neuroendocrine, neurochemical abnormalities
Birth Defect Research for Children, Inc.

National Birth Defect Registry – Children of GW Vets/ Non-GW Vets

N=3137 GW VETERAN: 410 NON-GW VET: 2727 – CNS Comp Cases per 100

- Anencephaly: 2.44 for Gulf War Veteran, 1.21 for Non-GW Veteran
- Cortical Blindness: 1.46 for Gulf War Veteran, 0.99 for Non-GW Veteran
Birth Defect Research for Children, Inc.

National Birth Defect Registry – Children of GW Vets/ Non-GW Vets

N=3137 GW VETERAN: 410 NON-GW VET: 2727 – Lung/Ear Comp Cases per 100

- AB/Undeveloped Lung
  - Gulf War Veteran: 6.1
  - Non-GW Veteran: 3.7

- Intern Ears
  - Gulf War Veteran: 5.12
  - Non-GW Veteran: 2.97

- Ex Ear Defects
  - Gulf War Veteran: 9.76
  - Non-GW Veteran: 5.02
N=3137 GW VETERAN: 410 NON-GW VET: 2727 – Heart Defects Comp Cases per 100
N=3137 GW VETERAN: 410 NON-GW VET: 2727 – Heart Defects Comp Cases per 100
Birth Defect Research for Children, Inc.

National Birth Defect Registry – Children of GW Vets/ Non-GW Vets

N=3137 GW VETERAN: 410 NON-GW VET: 2727 – Heart Defects Comp Cases per 100
Birth Defect Research for Children, Inc.

National Birth Defect Registry – Children of GW Vets/ Non-GW Vets

N=3137 GW VETERAN: 410 NON-GW VET: 2727 – Syndromes Comp Cases per 100
Birth Defect Research for Children, Inc.

National Birth Defect Registry – Children of GW Vets/ Non-GW Vets

N=3137 GW VETERAN: 410 NON-GW VET: 2727 – Syndromes Comp Cases per 100
Birth Defect Research for Children, Inc.

National Birth Defect Registry – Children of GW Vets/ Non-GW Vets

N=3137 GW VETERAN: 410 NON-GW VET: 2727 – Immune Comp Cases per 100
Goldenhar Syndrome

- Incidence ranges from 1/14,699 to 1/45,000 births
- Associated with teratogens
  - Thalidomide
  - Primidone
  - Accutane
- Some cases familial
- Others “phenocopies”
- Aranetta study found tripling of Goldenhar in GW children born in military hospitals
Goldenhar Case Study

- 24 Goldenhar – fathers deployed
- 7 Goldenhar criteria fathers deployed
- 2 Goldenhar fathers in Gulf after war
- 33 Goldenhar associated with Gulf service
# Goldenhar Case Study

7 Goldenhar fathers non-deployed

<table>
<thead>
<tr>
<th>ID</th>
<th>Occupation</th>
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<tr>
<td>23344</td>
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<tr>
<td>22970</td>
<td>Shots/solvents</td>
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<tr>
<td>26815</td>
<td>Cont gear</td>
</tr>
<tr>
<td>26896</td>
<td>Shots/Naptha</td>
</tr>
<tr>
<td>30868</td>
<td>Shots/lead fuel</td>
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<tr>
<td>45947</td>
<td>mechanic</td>
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<tr>
<td>48695</td>
<td>Cont gear</td>
</tr>
</tbody>
</table>
Goldenhar Case Rates

- 16 D Goldenhar DOB prior 10/1/93
- 3 ND Goldenhar DOB prior 10/1/93
- 56,782 births to deployed vets*
- 68,908 births to non-deployed vets*

Crude rates for Goldenhar:
Deployed – 28 per 100,000
Non-deployed – 4 per 100,000

Goldenhar Details

• Medical records confirmation 14/19
• 9/16 healthy children before GW
• 2/16 healthy children after birth of child with Goldenhar Syndrome
• 16/16 Goldenhar first born after GW
Published Studies

- 1997 *Teratology* – Aranetta - tripling of Goldenhar Syndrome in GWV infants born in military hospitals

- 2001 *Ann of Epidemiology* – Kang – increased reporting of birth defects significantly associated with military service in the Gulf War

- 2003 *Birth Defects Research* – Aranetta – higher prevalence of tricuspid valve insufficiency, aortic valve stenosis and renal agenesis in infants conceived postwar by GWV fathers; hypospadias in boys born to GWV mothers

- 2004 *Internat. J. of Epidemiology* – Doyle – increased risk of miscarriage, malformations of genital system, urinary system, digestive system, musculo-skeletal system and non-chromosome anomalies in children of GWV fathers
National Birth Defect Registry

Now available on-line 24 hours a day.....

www.birthdefects.org

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