The National Birth Defect Registry collects data on both structural (i.e. cleft palate, spina bifida) and functional (i.e. attention disorders, autism) birth defects and health, exposure and genetic histories in both parents.

Exposures in cases of a particular birth defect are compared to all the non-exposed cases in the registry.

The registry is used to detect patterns of birth defects with similar exposures. The use of malformed controls is well-established in the literature and offers the advantage of comparable levels of maternal recall bias in both study cases and controls.
Studies Using Malformed Controls

  Methodological approaches to evaluate teratogenic risk using birth defect registries: advantages and disadvantages.

  Maternal severe migraine and risk of congenital limb deficiencies

• **Eur J Epidemiol.** 2006;21(1):65-75.
  Population-based case-control study of the common cold during pregnancy and congenital abnormalities.

  Population-based case-control study of isolated congenital cataract.

  Gastroschisis in Europe - A Case-malformed-Control Study of Medication and Maternal Illness during Pregnancy as Risk Factors.

5/8/20
Sudafed (pseudoephedrine) is an over-the-counter medication used for temporary relief of stuffy nose and sinus pain/pressure caused by colds, flu or allergic illnesses such as hay fever and allergies. It works by narrowing the blood vessels to decrease swelling and congestion.

In 2006, the Combat Methamphetamine Epidemic Act banned the over-the-counter sales of medicines containing pseudoephedrine, because it is commonly used to make methamphetamine. The sale of cold medicines containing pseudoephedrine is now limited to behind the counter.

Studies have found associations between pseudoephedrine and increases in certain birth defects including ventricular septal defects, gastroschisis, intestinal atresia and Goldenhar Syndrome (hemifacial macrosomia). Animal studies have found abnormal sperm and lower sperm rates.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6) Gastrochisis... Sudafed and acetaminophin</td>
<td><a href="https://www.ncbi.nlm.nih.gov/pubmed/1533958">https://www.ncbi.nlm.nih.gov/pubmed/1533958</a></td>
</tr>
</tbody>
</table>
In the National Birth Defect Registry, data on 442 Sudafed-exposed cases compared to 5527 non-exposed cases have shown increases of a doubling or more for ventricular septal defects, gastroschisis, rectal/anal atresia, Goldenhar Syndrome (hemifacial macrosomia) and other categories of structural birth defects that have not been the subject of published studies.
Sudafed

Heart

- Ventricular Septal Def: 9.65
- Patent Ductus Arteriosus: 3.47
- Bicuspid Aortic Valve: 1.93

442 Exposed 5527 Not Exposed

5/8/20
Imperforate Anus
Gastroschisis
Rectal/anal Atresia
Biliary Atresia

Sudafed
GI & Liver

442 Exposed
5527 Not Exposed

5/8/20
Sacral Agenesis
Hydrocephalus
Craniosynostosis
Dysmorphic Features

Sudafed
CNS & Cranial-facial

Exposed 442  Not Exposed

Sacral Agenesis: 1.16  0.47
Hydrocephalus: 6.18  3.77
Craniosynostosis: 3.09  1.58
Dysmorphic Features: 3.47  1.98

5/8/20
Sudafed
Eye, Ears & Teeth

Cortical Blindness
Hypertelorism
Ext ear absent or malf
Ear Tag
Early tooth eruption

442 Exposed
5527 Not Exposed

5/8/20
Clomid (clomiphene citrate) is a medication used to treat infertility in women. It works by stimulating hormones so that ovaries release mature eggs.

Clomid is not available in Canada and there are some reports that the manufacturer may no longer make Clomid in the U.S.

Clomid has been associated with anencephaly, Dandy Walker, heart defects, cloacal extrophy, omphalocele, tracheoesophageal fistula, craniosynostosis, autism and hypospadias.
<table>
<thead>
<tr>
<th>Clomid</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5) NTDs and hypospadias</td>
<td><a href="https://www.ncbi.nlm.nih.gov/pubmed/28547654">https://www.ncbi.nlm.nih.gov/pubmed/28547654</a></td>
</tr>
</tbody>
</table>
Results from the National Birth Defect Registry

Data from the National Birth Defect Registry on 60 Clomid-exposed case compared to 5907 non-exposed cases found increases in traceoephageal fistula, omphalocele, hypospadias, craniosynostosis, anencephaly and autism. Certain heart defects, cloacal anomaly and Dandy Walker were also increased, but not included because they were based on less than 2 Clomid exposures.
Clomid

CNS/Neurodevelopmental

<table>
<thead>
<tr>
<th>Condition</th>
<th>60 Exposed</th>
<th>5907 Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anencephaly</td>
<td>5.00</td>
<td>0.02</td>
</tr>
<tr>
<td>Microcephaly</td>
<td>6.67</td>
<td>2.67</td>
</tr>
<tr>
<td>Spina Bifida Occulta</td>
<td>3.33</td>
<td>1.57</td>
</tr>
<tr>
<td>Syringomyelia</td>
<td>3.33</td>
<td>0.52</td>
</tr>
<tr>
<td>Asperger</td>
<td>5</td>
<td>2.32</td>
</tr>
<tr>
<td>Autism</td>
<td>6.67</td>
<td>3.54</td>
</tr>
</tbody>
</table>

5/8/20
Clomid

Cranial-facial

- High arched palate: 11.67 (60 Exposed), 4.1 (5907 Not Exposed)
- Craniosynostosis: 6.67 (60 Exposed), 1.59 (5907 Not Exposed)
- Facial Asymmetry: 6.67 (60 Exposed), 3.32 (5907 Not Exposed)

5/8/20
Clomid

Gastrointestinal

<table>
<thead>
<tr>
<th>Condition</th>
<th>60 Exposed</th>
<th>5907 Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traceoeophageal Fistula</td>
<td>2.39</td>
<td>1</td>
</tr>
<tr>
<td>Imperforate Anus</td>
<td>2.1</td>
<td>1</td>
</tr>
<tr>
<td>Omphalocele</td>
<td>3.3</td>
<td>0.52</td>
</tr>
<tr>
<td>Neurogenic Bowel</td>
<td>0.73</td>
<td>1.1</td>
</tr>
<tr>
<td>Single Umbilical Artery</td>
<td>8.33</td>
<td>0.73</td>
</tr>
</tbody>
</table>
Clomid

Genitourinary

<table>
<thead>
<tr>
<th>Condition</th>
<th>60 Exposed</th>
<th>5907 Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypospadias</td>
<td>5</td>
<td>1.68</td>
</tr>
<tr>
<td>Malformed Kidney</td>
<td>5</td>
<td>1.69</td>
</tr>
<tr>
<td>Neurogenic Bladder</td>
<td>5</td>
<td>2.27</td>
</tr>
<tr>
<td>Malformed Ureter</td>
<td>5</td>
<td>1.9</td>
</tr>
<tr>
<td>Hydrocele</td>
<td>3.33</td>
<td>0.76</td>
</tr>
<tr>
<td>Horseshoe Kidney</td>
<td>3.33</td>
<td>0.59</td>
</tr>
</tbody>
</table>
Clomid

Limb Malformations

Upper limb reduction: 8.33
Lower limb reduction: 5
Clubfoot/bone deformity: 3.33
Malf fingers, hands, arms: 11.67
Clubbed hands: 3.33

5/8/20

60 Exposed
5907 Not Exposed
Clomid

Muscle/Ribs

- Pectoralis absent: 8.33 (60 Exposed), 1.32 (5907 Not Exposed)
- Muscle absent/undev: 10 (60 Exposed), 4.66 (5907 Not Exposed)
- Diaphragmatic hernia: 5 (60 Exposed), 2.47 (5907 Not Exposed)
- Rib abnormality: 16.67 (60 Exposed), 2.35 (5907 Not Exposed)

Date: 5/8/20
Clomid

Eye

- Nystagmus: 5 (Exposed), 1.51 (Not Exposed)
- Strabismus: 8.33 (Exposed), 3.01 (Not Exposed)
- Exotropia: 3.33 (Exposed), 0.59 (Not Exposed)

5/8/20
Clomid

Syndromes

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Exposed</th>
<th>Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland's</td>
<td>5</td>
<td>0.93</td>
</tr>
<tr>
<td>Vater/Vacterl</td>
<td>10</td>
<td>1.44</td>
</tr>
<tr>
<td>Chromosome Disorder</td>
<td>5</td>
<td>1.85</td>
</tr>
<tr>
<td>Prune Belly</td>
<td>3.33</td>
<td>1.07</td>
</tr>
</tbody>
</table>
Clomid

Growth and Benign Tumors

<table>
<thead>
<tr>
<th>Condition</th>
<th>60 Exposed</th>
<th>5907 Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Hormone Def</td>
<td>3.33</td>
<td>1.35</td>
</tr>
<tr>
<td>In Utero Growth Def</td>
<td>5.00</td>
<td>1.73</td>
</tr>
<tr>
<td>Lipoma</td>
<td>3.33</td>
<td>1.15</td>
</tr>
<tr>
<td>Hemangioma</td>
<td>5.00</td>
<td>1.57</td>
</tr>
</tbody>
</table>

5/8/20
Frequent Pneumonia
Chronic Virus
Immune Deficiency

Immune Defects

60 Exposed
5907 Not Exposed
Zoloft (sertraline) is a medication prescribed to treat depression as well as other disorders like OCD, panic and social anxiety and PTSD. Zoloft is classified as a selective serotonin reuptake inhibitor (SSRI). SSRIs affect serotonin in the brain and have been associated with birth defects.

The FDA categorizes Zoloft in Pregnancy Category C which means that reproductive studies in animals have shown evidence of fetal harm.

Published studies have found links between Zoloft and septal heart defects, clubfoot, oral clefts, autism, omphalocele and craniosynostosis.
<table>
<thead>
<tr>
<th>Zoloft</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Heart defects, VSDs, ASDS</td>
<td><a href="https://www.ncbi.nlm.nih.gov/pubmed/27770542">https://www.ncbi.nlm.nih.gov/pubmed/27770542</a></td>
</tr>
<tr>
<td>2) ASDs/VSDs Craniosynostosis</td>
<td><a href="https://www.ncbi.nlm.nih.gov/pubmed/25637841">https://www.ncbi.nlm.nih.gov/pubmed/25637841</a></td>
</tr>
<tr>
<td>6) Autism</td>
<td><a href="https://www.bmj.com/content/346/bmj.f2059">https://www.bmj.com/content/346/bmj.f2059</a></td>
</tr>
</tbody>
</table>
Results from the National Birth Defect Registry

Data from the National Birth Defect Registry compared birth defects in 105 Zoloft-exposed cases to 5863 non-exposed cases.

Increases were found for septal heart defects, clubfoot and autism also found in published studies. Omphalocele was increased, but not included since less than 2 cases were exposed to Zoloft.
<table>
<thead>
<tr>
<th>Condition</th>
<th>105 Exposed</th>
<th>5863 Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transposition of Great Arteries</td>
<td>2.53</td>
<td>0.95</td>
</tr>
<tr>
<td>Ventricular Septal Defect</td>
<td>8.86</td>
<td></td>
</tr>
<tr>
<td>Atrial Septal Defect</td>
<td>3.96</td>
<td></td>
</tr>
<tr>
<td>Bicuspid Aortic Valve</td>
<td>5.06</td>
<td>3.55</td>
</tr>
<tr>
<td>Lung (Absent or Underdeveloped)</td>
<td>8.86</td>
<td>3.53</td>
</tr>
<tr>
<td>Rib Abnormality</td>
<td></td>
<td>2.43</td>
</tr>
</tbody>
</table>

2/14/2019
Zoloft

Limb and Muscle

- Reduction Deformity Upper Limb: 7.59
- Reduction Deformity Lower Limb: 5.06
- Clubfoot: 8.86
- Syndactyly: 8.86
- Diaphragmatic Hernia: 5.06
- Hiatal Hernia: 3.8
- Hypotonia (Floppy Muscles): 16.46
- Pectoralis (Absent or Underdeveloped): 5.26

105 Exposed, 5863 Not Exposed
Other birth defects

- Autism: 8.86
- Lipoma: 3.80
- Hemangioma: 3.80
- Leukemia: 2.53
- Aphasia: 2.53
- Apraxia: 0.78
- Immune Deficiency: 6.33
- Diabetes Insipidus: 1.46
- Pituitary Defect: 2.8
- Walks on Tiptoes: 2.53
- Frequent Nose Bleeds: 0.48
- Other birth defects: 10.13

Exposed: 3.50
Not Exposed: 1.14

2/14/2019

Zoloft
Microcephaly
Ataxia
Intrauterine Stroke
Lipomyelomeningocele
Cleft Lip
Micrognathia (small jaw)
Facial Asymmetry
Goldenhar Syndrome

Zoloft

CNS and Craniofacial

2/14/2019
Zoloft

Gastrointestinal and Genitourinary

- Imperforate Anus: 5.06
- Neurogenic Bowel: 2.09
- Single Umbilical Artery: 2.53
- Malformed Kidney: 3.80
- Bladder Exstrophy: 2.53
- Neurogenic Bowel: 5.06

2/14/2019

105 Exposed vs. 5863 Not Exposed
Growth Disorders and Syndromes

<table>
<thead>
<tr>
<th>Condition</th>
<th>105 Exposed</th>
<th>5863 Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trisomy</td>
<td>2.53</td>
<td>0.59</td>
</tr>
<tr>
<td>DiGeorge</td>
<td>2.53</td>
<td>0.27</td>
</tr>
<tr>
<td>Chromosome Disorder</td>
<td>6.33</td>
<td>1.82</td>
</tr>
<tr>
<td>Prune Belly</td>
<td>3.80</td>
<td>1.05</td>
</tr>
<tr>
<td>Short Bowel</td>
<td>2.53</td>
<td>0.46</td>
</tr>
<tr>
<td>Constitutional Short Stature</td>
<td>3.80</td>
<td>1.68</td>
</tr>
<tr>
<td>In Utero Growth Retardation</td>
<td>5.06</td>
<td>1.72</td>
</tr>
</tbody>
</table>

2/14/2019
Zofran (ondansetron) is an anti-nausea drug and selective 5-HT3 receptor antagonist prescribed for the treatment of nausea and vomiting due to cancer chemotherapy and also used to prevent and treat nausea and vomiting after surgery.

Zofran is not an FDA approved medication for pregnant women experiencing morning sickness and should not be taken during pregnancy.

Published studies have found significant associations between Zofran and heart defects, clefts and renal agenesis.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Reference Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart defects/clefts</td>
<td><a href="https://www.ncbi.nlm.nih.gov/pubmed/30385129">https://www.ncbi.nlm.nih.gov/pubmed/30385129</a></td>
</tr>
<tr>
<td>Cleft palate</td>
<td><a href="http://www.motherisk.org/prof/updatesDetail.jsp?content_id=982">http://www.motherisk.org/prof/updatesDetail.jsp?content_id=982</a></td>
</tr>
</tbody>
</table>
Results from the National Birth Defect Registry

Data from the National Birth Defect Registry compared birth defects in 177 Zofran-exposed cases to 5973 non-exposed cases.

Increases were found for heart defects and high arched palate. Significant increases were also found for gastroschisis, NTDs and other birth defects that have not been reported in published studies.
Zofran and Heart Defects

- Aortic Valve Stenosis: 2.88
- Bicuspid Aortic Valve: 0.74
- Bradycardia: 0.55
- Cardiomegaly: 0.34
- Dextrocardia: 0.43
- Hypoplastic Right Heart: 0.43
- Mitral Valve Stenosis: 0.22
- Pulmonary Atresia: 0.5
- Pulmonary Valve Stenosis: 1.17
- Tricuspid Valve Stenosis: 0.33

Legend:
- 177 Exposed
- 5791 Not Exposed

5/8/20
Zofran

CNS, Craniofacial, Eye & Spine

Absence of Septum: 1.44
Anecephaly: 3.6
Encephalocele: 3.6
Holoprosencephaly: 1.44
Hydrocephalus: 7.19
Thin Corpus Callosum: 3.79
Bony Defect Of Skull: 2.16
High Arched Palate: 1.84
Exotropia: 1.44
Sacral Agenesis: 1.44

177 Exposed  5791 Not Exposed

5/8/20
Zofran

Gastrointestinal & Genitourinary

- Gastroschisis
- Neurogenic Bowel
- Omphalocele
- Rectal or Intestinal Atresia
- Short Bowel
- Cloacal Anomaly
- Horseshoe Kidney
- Hydrocele
- Neurogenic Bladder

177 Exposed vs. 5791 Not Exposed

5/8/20
Zofran

Muscle, Limb & Syndrome

<table>
<thead>
<tr>
<th>Condition</th>
<th>Exposed</th>
<th>Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthrogryposis</td>
<td>2.16</td>
<td>0.53</td>
</tr>
<tr>
<td>Hepatomegaly (Enlarged Liver)</td>
<td>1.44</td>
<td>0.74</td>
</tr>
<tr>
<td>Muscle (Absent or Underdeveloped)</td>
<td>9.35</td>
<td>4.60</td>
</tr>
<tr>
<td>Pectoralis (Absent or Underdeveloped)</td>
<td>5.76</td>
<td>1.29</td>
</tr>
<tr>
<td>Ehlers-Danlos</td>
<td>1.44</td>
<td>0.53</td>
</tr>
<tr>
<td>Pierre Robin</td>
<td>2.16</td>
<td>0.82</td>
</tr>
<tr>
<td>Poland's</td>
<td>3.60</td>
<td>0.91</td>
</tr>
<tr>
<td>Prune Belly</td>
<td>5.76</td>
<td>0.98</td>
</tr>
</tbody>
</table>
Bendectin

Bendectin was an anti-nauseant medication, on the market from 1956-1982, recommended solely for morning sickness in pregnancy. The drug was a combination of an antihistamine (doxylamine succinate), an antispasmodic (dicylcomine hydrochloride) and vitamin B-6 (pyridoxine). In epidemiological studies, Bendectin was associated with increases in limb defects, heart defects, oral clefts, pyloric stenosis, amniotic band limb defects, encephalocele, diaphragmatic hernias and musculoskeletal defects. Bendectin was taken off the world-wide market in 1982.
CDC: Statistically significant association with amniotic band limb defects and encephalocele.

Heinonen: Data consistent for association of BDN with musculoskeletal defects.

Jick: Data consistent with modest teratogenic effect on limbs, BDN exposure increases risk of limb defect 120%

Michaelis: 36% increased risk of malformations in BDN exposed babies

Mitchell: 50% increased risk of limb defects in BDN exposed babies

Rothman: Statistically significant association with heart defects

Golding: Statistically significant association with oral clefts

Eskanaiz/Bracken: Statistically significant association with pyloric stenosis

Smithells: 36% increased risk of malformation in BDN exposed babies

Bass: 11-fold increase diaphragmatic hernia in BDN exposed babies

Maynard: Increase in diaphragmatic hernia in BDN exposed babies in analysis of 5 cohort studies
Results from the National Birth Defect Registry

Data from the National Birth Defect Registry compared birth defects in 201 Bendectin exposed cases to 5768 non-exposed cases.

Increases were found for limb reduction defects, pyloric stenosis, muscle and skeletal defects, clubfoot with bone deformities and other birth defects.
Bendectin

Limb, Chest and Muscle Deformities

- Upper limb reduction
- Lower limb reduction
- Arthrogryposis
- Clubfoot with bone deformity
- Pectoralis absent
- Pectus Excavatum

201 Exposed
5768 Not Exposed
Bendectin

Heart (1)

Cardiomegaly
Dextrocardia
Tetralogy of fallot
Double outlet rgt. Ventricle
Transposition great arteries
Atrial Septal Defect
Hypertension

201 Exposed
5768 Not Exposed
Bendectin

Heart (2)

- Pulmonary valve stenosis: Exposed 2.79, Not Exposed 1.17
- Pulmonary artery anomaly: Exposed 1.68, Not Exposed 0.41
- Pulmonary atresia: Exposed 1.68, Not Exposed 0.5
Bendectin
GI and Genitourinary

Pyloric stenosis: 2.23
Inguinal hernia: 5.03
Neurogenic bowel: 2.23
Hydrocele: 1.68
Undescended testicles: 7.26

Exposed: 201
Not Exposed: 5768

5/8/20
Bendectin
Cysts and Growth

- **Ovarian cyst**: 8.94
- **Ganglion cyst**: 2.79
- **Short Stature**: 6.7

- **201 Exposed**
- **5768 Not Exposed**
Bendectin

Eye, Ear, Facial

<table>
<thead>
<tr>
<th>Condition</th>
<th>201 Exposed</th>
<th>5768 Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract</td>
<td>1.68</td>
<td>1.1</td>
</tr>
<tr>
<td>Coloboma</td>
<td>1.68</td>
<td>0.88</td>
</tr>
<tr>
<td>Nystagmus</td>
<td>2.79</td>
<td>1.5</td>
</tr>
<tr>
<td>Partial hearing loss</td>
<td>10.06</td>
<td>6.68</td>
</tr>
<tr>
<td>Micrognatia</td>
<td>5.06</td>
<td>3.18</td>
</tr>
<tr>
<td>Facial bone defect</td>
<td>3.35</td>
<td>1.67</td>
</tr>
<tr>
<td>Abnormal teeth</td>
<td>13.97</td>
<td>7.54</td>
</tr>
</tbody>
</table>
Bendectin

Immune Disorders

<table>
<thead>
<tr>
<th>Condition</th>
<th>201 Exposed</th>
<th>5768 Not exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hay Fever</td>
<td>18.44</td>
<td>9.39</td>
</tr>
<tr>
<td>Drug Reaction</td>
<td>21.23</td>
<td>10.86</td>
</tr>
<tr>
<td>MCS</td>
<td>2.23</td>
<td>0.81</td>
</tr>
<tr>
<td>Primary Immune Def</td>
<td>1.68</td>
<td>0.55</td>
</tr>
<tr>
<td>Frequent Pneumonia</td>
<td>6.15</td>
<td>4.06</td>
</tr>
<tr>
<td>Frequent Ear Infection</td>
<td>29.61</td>
<td>15.91</td>
</tr>
<tr>
<td>Rheumatoid Arthritis</td>
<td>2.23</td>
<td>1.47</td>
</tr>
</tbody>
</table>

5/8/20
Nail Tech Exposures

Artificial nail technicians are exposed to a number of reproductive toxicants including the solvent toluene, plasticizers like Di-n-butyl phthalate (DBP), acetone and formaldehyde. Toluene has been associated with intrauterine growth retardation, congenital malformations, intellectual disabilities and premature delivery. DBP is believed to cause reproductive toxicity at high exposures over extended periods of time. Formaldehyde is suspected of reproductive toxicity. DBP and formaldehyde have been banned by the European Union.
<table>
<thead>
<tr>
<th>Nail Tech Exposures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth Defects</td>
<td><a href="https://www.scientificamerican.com/article/these-4-chemicals-may-pose-the-most-risk-for-nail-salon-workers/">https://www.scientificamerican.com/article/these-4-chemicals-may-pose-the-most-risk-for-nail-salon-workers/</a></td>
</tr>
<tr>
<td>NTDs</td>
<td><a href="https://www.jstor.org/stable/27797694?seq=1#page_scan_tab_contents/">https://www.jstor.org/stable/27797694?seq=1#page_scan_tab_contents/</a></td>
</tr>
<tr>
<td>Birth Defects</td>
<td><a href="https://www.p65warnings.ca.gov/fact-sheets/di-n-butyl-phthalate-db/">https://www.p65warnings.ca.gov/fact-sheets/di-n-butyl-phthalate-db/</a></td>
</tr>
<tr>
<td>Damage develop fetus</td>
<td><a href="https://www.nj.gov/health/eoh/rtkweb/documents/fs/1866.pdf">https://www.nj.gov/health/eoh/rtkweb/documents/fs/1866.pdf</a></td>
</tr>
</tbody>
</table>
Results from the National Birth Defect Registry

Data from the National Birth Defect Registry compared birth defects in 140 nail-tech cases to 5829 non-exposed cases.

Increases were found for anencephaly (NTD). Significant increases were also found for gastroschisis, Autistic Spectrum Disorders and other birth defects that have not been reported in published studies.
Artificial Nail Tech

Central Nervous System

Anencephaly
Holoprosencephaly
Ataxia
Delayed Myelination

140 Exposed
5829 Not exposed
Artificial Nail Tech

Eye and Ear

- Strabismus: 7.14
- Preauricular Pits: 1.43
- Sensorineural Hearing Loss: 3.57

Legend:
- 140 Exposed
- 5829 Not exposed
Artificial Nail Tech

Cranial/Facial

- Bony Defect Of Skull: 4.29 (Exposed), 1.82 (Not exposed)
- Dysmorphic Features: 5.00 (Exposed), 1.97 (Not exposed)
- Early Tooth Eruption: 4.29 (Exposed), 2.06 (Not exposed)
- Hypertelorism: 4.29 (Exposed), 0.38 (Not exposed)
- Macrocephaly: 2.14 (Exposed), 0.57 (Not exposed)
- Macrostomia: 1.43 (Exposed), 0.15 (Not exposed)
Artificial Nail Tech

Cardiovascular, Gastrointestinal, Genitourinary

<table>
<thead>
<tr>
<th>Condition</th>
<th>Exposed</th>
<th>Not exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoplastic Left Heart Syndrome</td>
<td>2.86</td>
<td>1.17</td>
</tr>
<tr>
<td>Imperforate Anus</td>
<td>4.29</td>
<td>2.08</td>
</tr>
<tr>
<td>Omphalocele</td>
<td>1.43</td>
<td>0.53</td>
</tr>
<tr>
<td>Umbilical Hernia</td>
<td>5.00</td>
<td>2.32</td>
</tr>
<tr>
<td>Gastrochisis</td>
<td>22.86</td>
<td>4.99</td>
</tr>
<tr>
<td>Polycystic Kidney</td>
<td>1.43</td>
<td>0.69</td>
</tr>
</tbody>
</table>
Artificial Nail Tech

Syndromes

- Amniotic Band: 2.14 Exposed, 0.89 Not exposed
- Chromosome Disorder: 4.29 Exposed, 1.82 Not exposed
- Prune Belly: 2.14 Exposed, 1.06 Not exposed
- Short Bowel: 2.14 Exposed, 0.45 Not exposed
Artificial Nail Tech

Immune and Endocrine

- **Primary Immune Defect**
  - Exposed: 1.43
  - Not exposed: 0.57

- **Diabetes Insipidus**
  - Exposed: 1.43
  - Not exposed: 0.48
Artificial Nail Tech

Autism Spectrum Disorders

140 Exposed  5829 Not exposed

Asperger: 3.57  1.42
PDD (Pervasive Development Disorder): 4.29  1.54