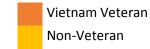
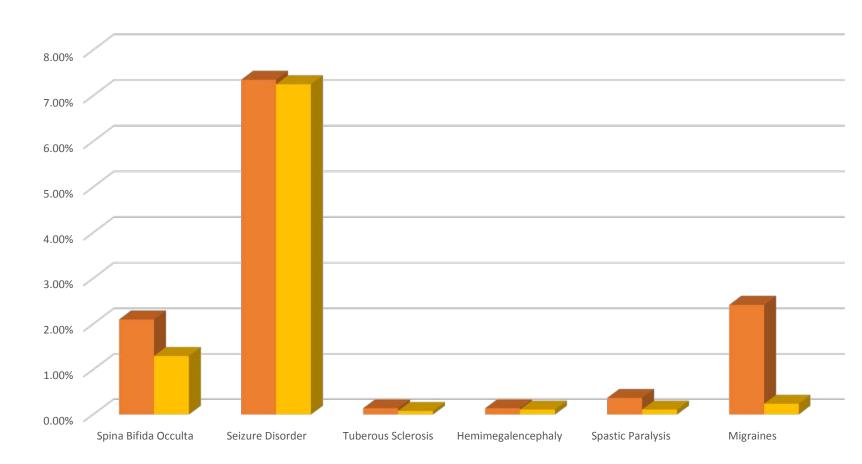


National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Agent Orange was a combination of two defoliants, 2-45T and 2-4D, contaminated by dioxin (TCDD), a toxic byproduct of the chemical production process. Over 19 million gallons of herbicides were sprayed in Vietnam between 1962-1971 to destroy crops and ground cover. The current scientific evidence argues not only that dioxin is a potent carcinogen, but that it appears to have even more profound non-cancer health and environmental hazard effects that include reproductive, developmental and immunological defects. Dioxin appears to act like a persistent synthetic hormone interfering with important physiological signaling systems that can lead to altered cell development, differentiation and regulation. This National Birth Defect Registry report shows the differences in structural and functional birth defects in 2189 children of Vietnam veterans compared to 3778 children of nonveterans in the registry.

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans





Total Participants: 5967

Vietnam Veteran Fathers: 2189

Non-Veteran Fathers: 3778

Query: 02/14/2019

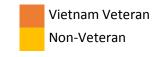
Central Nervous System Defects

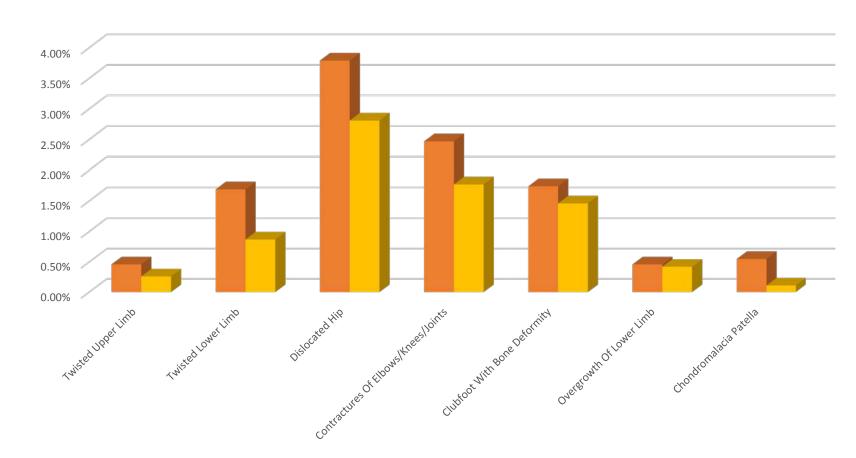
National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Central Nervous System Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Spina Bifida Occulta	2.10%	1.30%
Seizure Disorder	7.35%	7.25%
Tuberous Sclerosis	0.14%	0.08%
Hemimegalencephaly	0.14%	0.11%
Spastic Paralysis	0.37%	0.11%
Migraines	2.42%	0.24%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans





Total Participants: 5967

Vietnam Veteran Fathers: 2189

Non-Veteran Fathers: 3778

Query: 02/14/2019

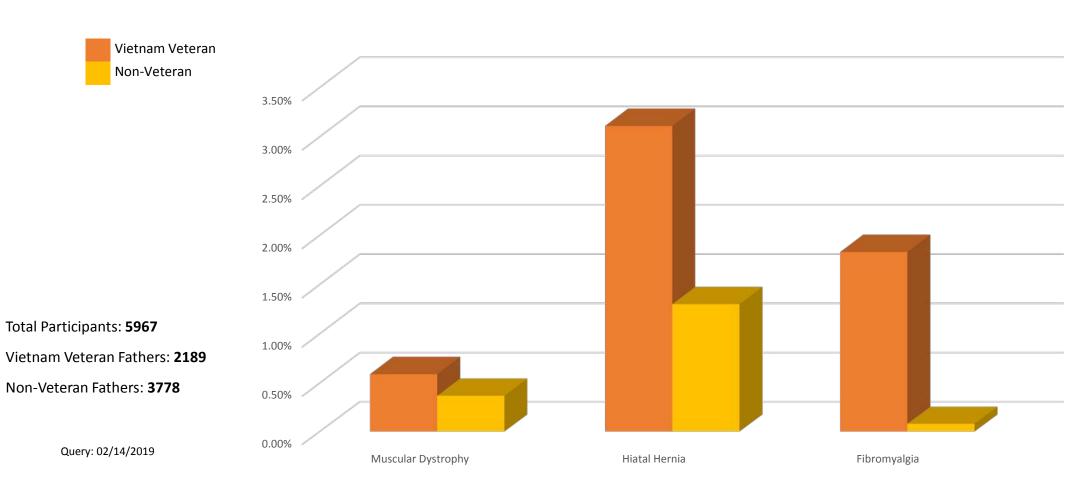
Limb Defects
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Limb Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Twisted Upper Limb	0.46%	0.26%
Twisted Lower Limb	1.69%	0.87%
Dislocated Hip	3.79%	2.81%
Contractures Of Elbows/Knees/Joints	2.47%	1.77%
Clubfoot With Bone Deformity	1.74%	1.46%
Overgrowth Of Lower Limb	0.46%	0.42%
Chondromalacia Patella	0.55%	0.11%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



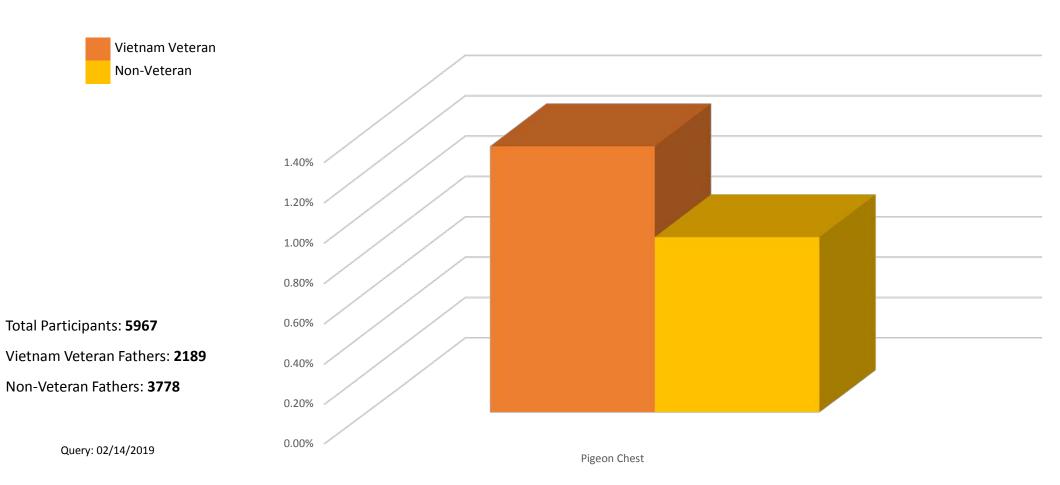
Muscle Defects
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Muscle Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Muscular Dystrophy	0.59%	0.37%
Hiatal Hernia	3.11%	1.30%
Fibromyalgia	1.83%	0.08%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



Chest Defects
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

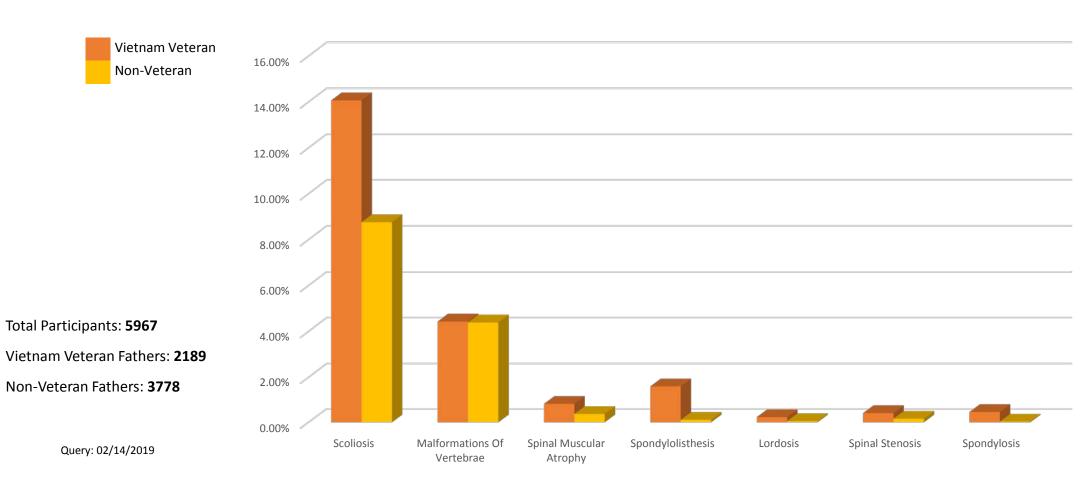
Chest Defects

Cases percentage

Vietnam Veteran Non Veteran Fathers Fathers

Pigeon Chest 1.32% 0.87%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



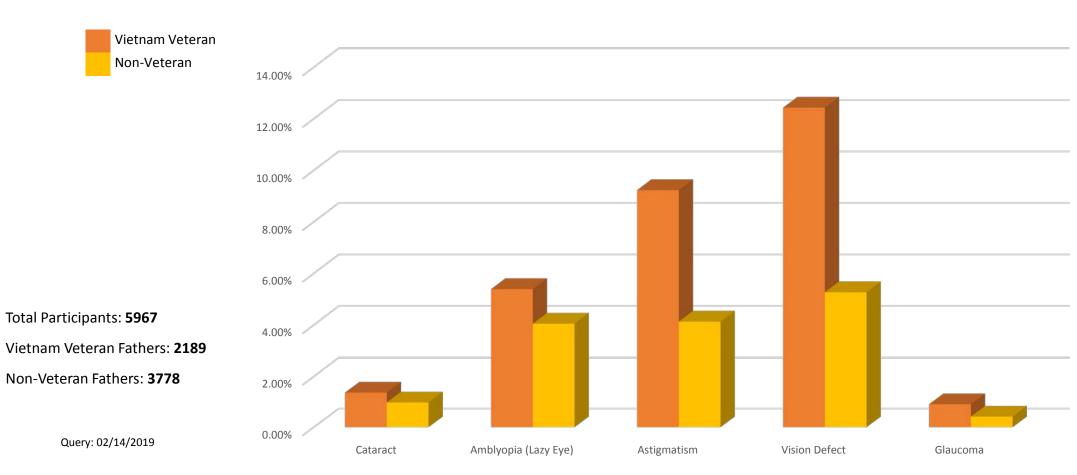
Spine Defects

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Spine Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Scoliosis	14.07%	8.76%
Malformations Of Vertebrae	4.43%	4.39%
Spinal Muscular Atrophy	0.82%	0.37%
Spondylolisthesis	1.60%	0.11%
Lordosis	0.23%	0.05%
Spinal Stenosis	0.41%	0.16%
Spondylosis	0.46%	0.03%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



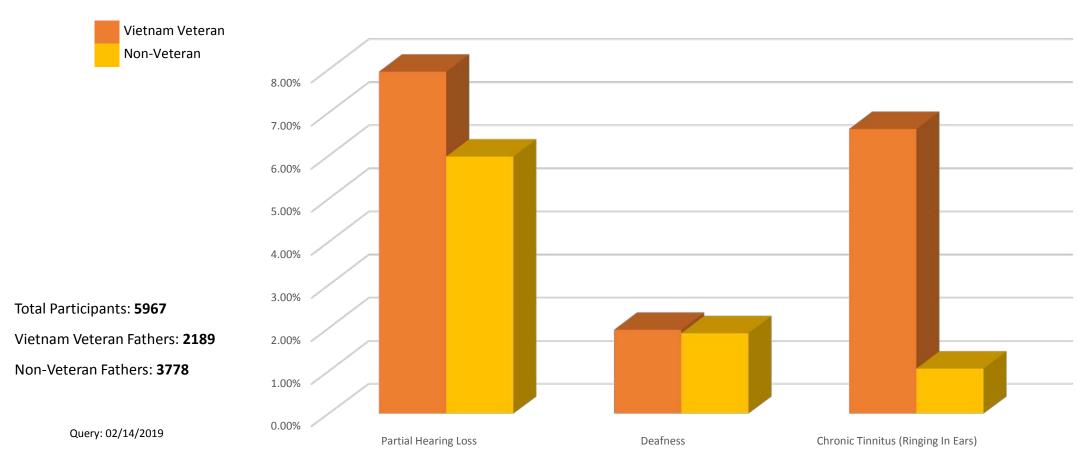
Eye Defects
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Eye Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Cataract	1.37%	0.98%
Amblyopia (Lazy Eye)	5.39%	4.05%
Astigmatism	9.23%	4.13%
Vision Defect	12.43%	5.27%
Glaucoma	0.91%	0.42%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



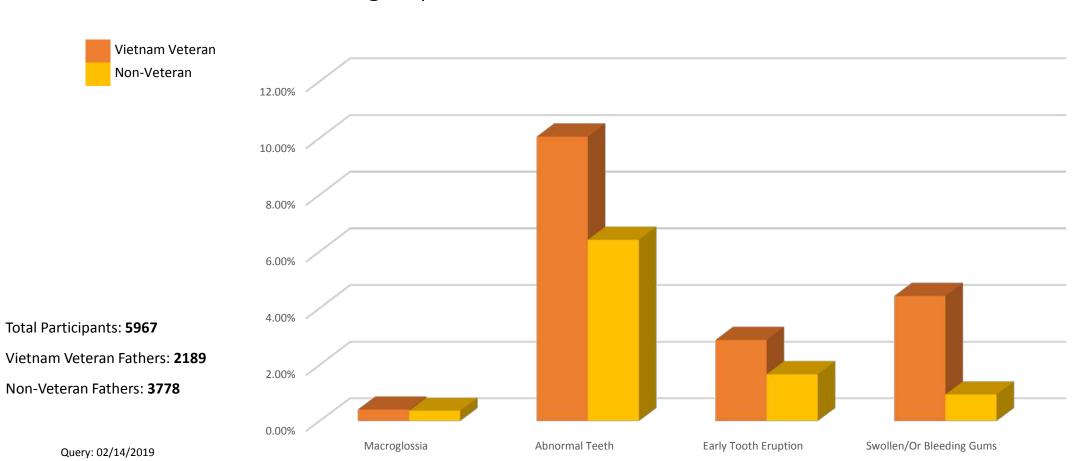
Ear Defects
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Ear Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Partial Hearing Loss	7.95%	5.98%
Deafness	1.96%	1.88%
Chronic Tinnitus (Ringing In Ears)	6.62%	1.06%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



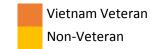
Cranial/Facial Defects
Cases percentage

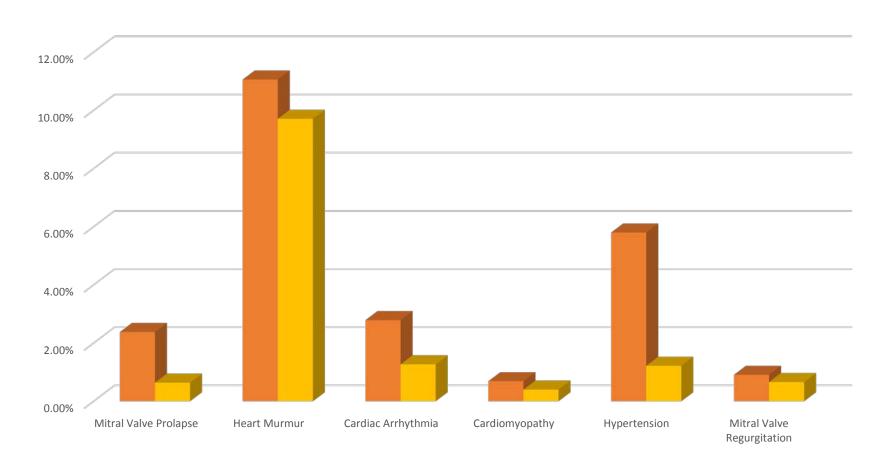
National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Cranial/Facial Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Macroglossia	0.41%	0.37%
Abnormal Teeth	10.05%	6.41%
Early Tooth Eruption	2.88%	1.67%
Swollen/Or Bleeding Gums	4.43%	0.95%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans





Total Participants: **5967**

Vietnam Veteran Fathers: 2189

Non-Veteran Fathers: 3778

Query: 02/14/2019

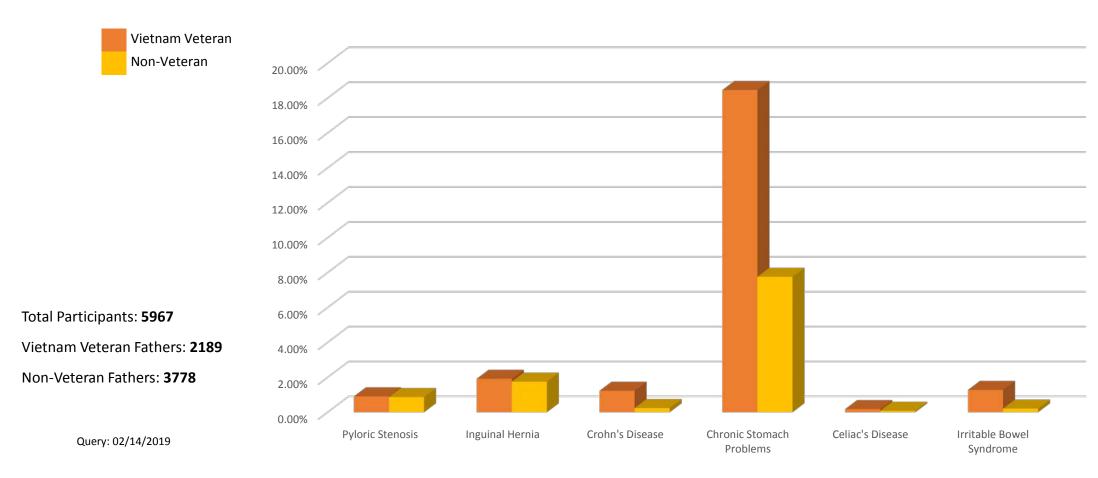
Cardiovascular Defects

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Cardiovascular Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Mitral Valve Prolapse	2.38%	0.64%
Heart Murmur	11.06%	9.71%
Cardiac Arrhythmia	2.79%	1.27%
Cardiomyopathy	0.69%	0.40%
Hypertension	5.80%	1.22%
Mitral Valve Regurgitation	0.91%	0.66%

National Birth Defects Registry - Children of Vietnam Veterans and Non-Veterans



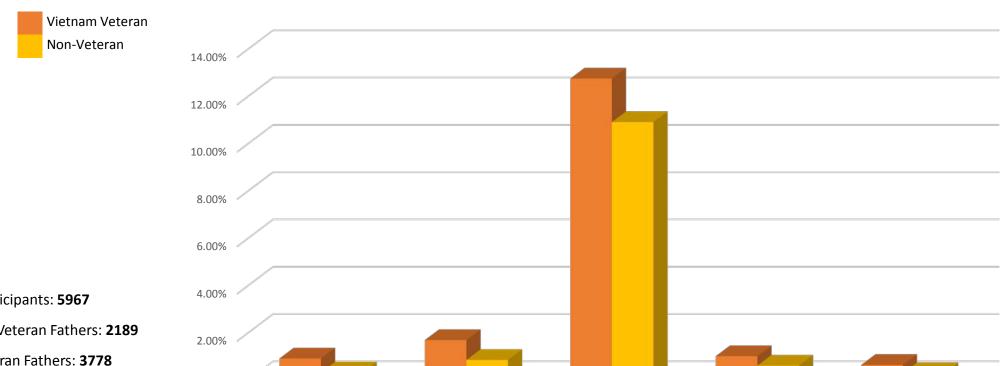
Gastrointestinal Defects

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Gastrointestinal Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Pyloric Stenosis	0.91%	0.87%
Inguinal Hernia	1.92%	1.75%
Crohn's Disease	1.23%	0.24%
Chronic Stomach Problems	18.46%	7.76%
Celiac's Disease	0.18%	0.08%
Irritable Bowel Syndrome	1.28%	0.21%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



Total Participants: 5967

Vietnam Veteran Fathers: 2189

Non-Veteran Fathers: 3778

Query: 02/14/2019

0.00%

Absent Gallbladder

Liver/Bile Duct/Spleen Defects Cases percentage

Jaundice At Birth

Hepatomegaly (Enlarged

Liver)

Splenomegaly (Enlarged

Spleen)

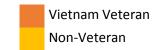
Liver Function Disorder

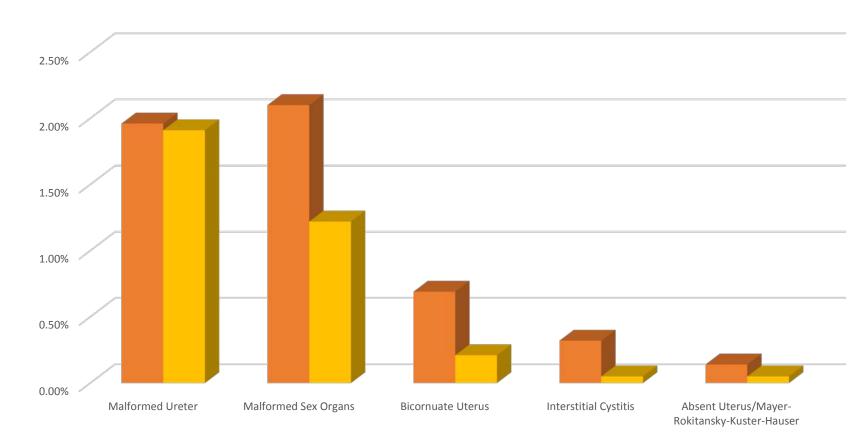
National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Liver/Bile Duct/Spleen Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Absent Gallbladder	0.91%	0.32%
Liver Function Disorder	1.69%	0.85%
Jaundice At Birth	12.75%	10.91%
Hepatomegaly (Enlarged Liver)	1.01%	0.61%
Splenomegaly (Enlarged Spleen)	0.64%	0.29%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans





Total Participants: **5967**

Vietnam Veteran Fathers: 2189

Non-Veteran Fathers: 3778

Query: 02/14/2019

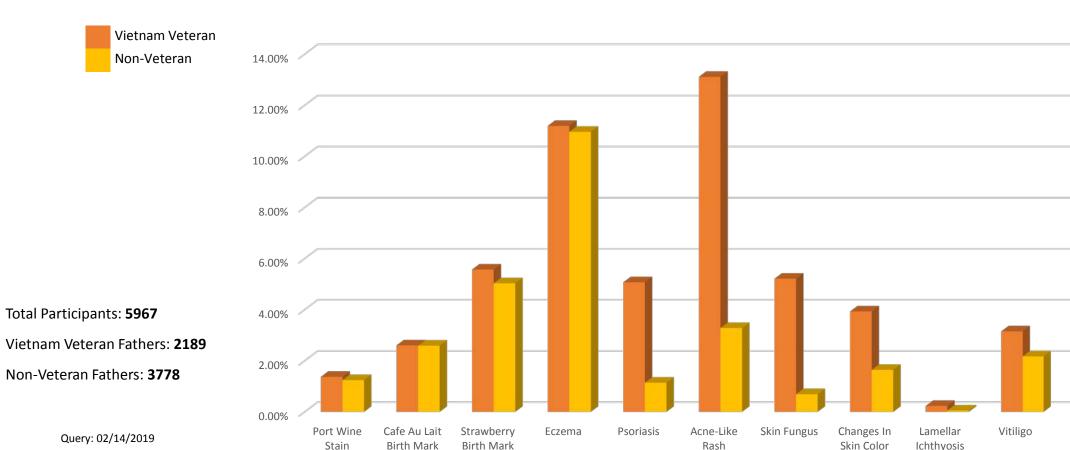
Genitourinary Defects

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Genitourinary Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Malformed Ureter	1.96%	1.91%
Malformed Sex Organs	2.10%	1.22%
Bicornuate Uterus	0.69%	0.21%
Interstitial Cystitis	0.32%	0.05%
Absent Uterus/Mayer- Rokitansky-Kuster-Hauser	0.14%	0.05%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



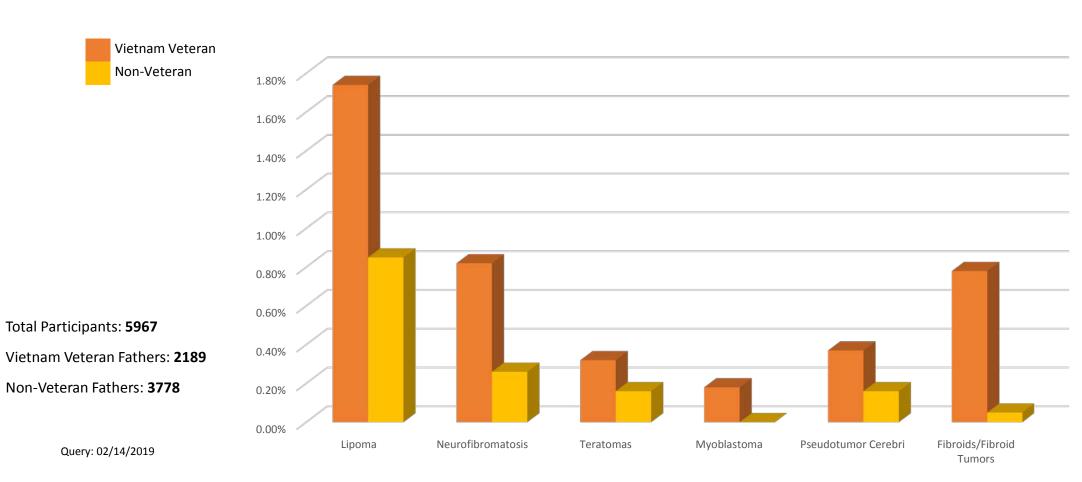
Skin Defects Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Skin Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Port Wine Stain	1.37%	1.24%
Cafe Au Lait Birth Mark	2.60%	2.59%
Strawberry Birth Mark	5.57%	5.03%
Eczema	11.19%	10.96%
Psoriasis	5.07%	1.14%
Acne-Like Rash	13.11%	3.28%
Skin Fungus	5.21%	0.69%
Changes In Skin Color	3.93%	1.64%
Lamellar Ichthyosis	0.23%	0.05%
Vitiligo	3.15%	2.17%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



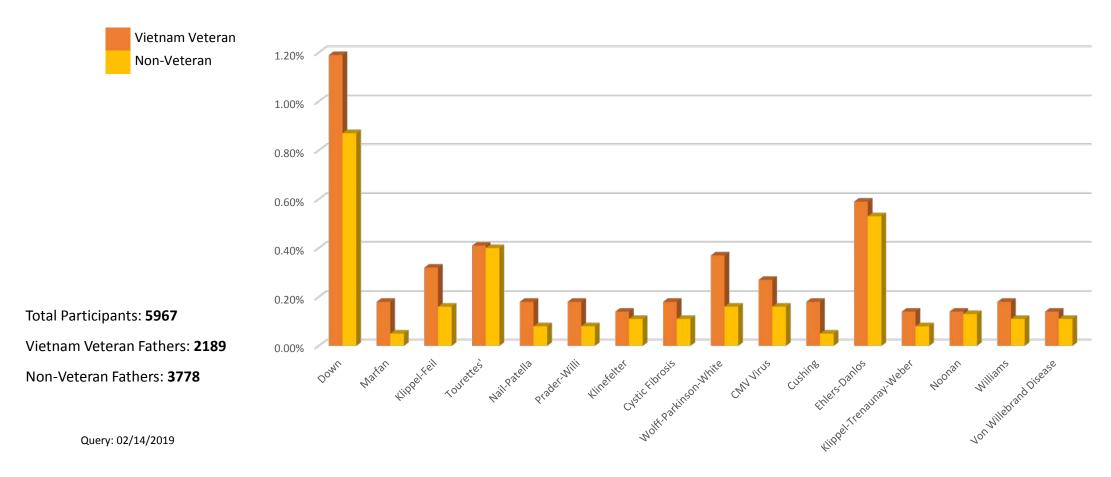
Tumors (Benign)
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Tumors (Benign)

	Vietnam Veteran Fathers	Non Veteran Fathers
Lipoma	1.74%	0.85%
Neurofibromatosis	0.82%	0.26%
Teratomas	0.32%	0.16%
Myoblastoma	0.18%	0.00%
Pseudotumor Cerebri	0.37%	0.16%
Fibroids/Fibroid Tumors	0.78%	0.05%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



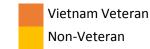
Syndromes
Cases percentage

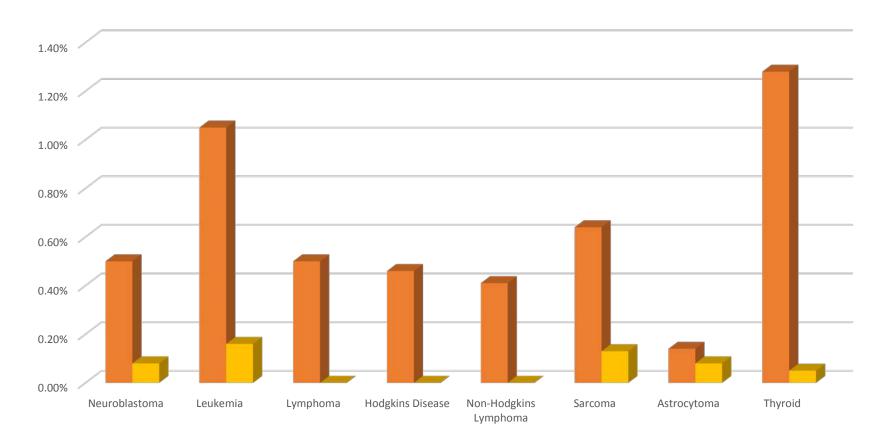
National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Syndromes

	Vietnam Veteran Fathers	Non Veteran Fathers
Down	1.19%	0.87%
Marfan	0.18%	0.05%
Klippel-Feil	0.32%	0.16%
Tourettes'	0.41%	0.40%
Nail-Patella	0.18%	0.08%
Prader-Willi	0.18%	0.08%
Klinefelter	0.14%	0.11%
Cystic Fibrosis	0.18%	0.11%
Wolff-Parkinson-White	0.37%	0.16%
CMV Virus	0.27%	0.16%
Cushing	0.18%	0.05%
Ehlers-Danlos	0.59%	0.53%
Klippel-Trenaunay-Weber	0.14%	0.08%
Noonan	0.14%	0.13%
Williams	0.18%	0.11%
Von Willebrand Disease	0.14%	0.11%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans





Total Participants: 5967

Vietnam Veteran Fathers: 2189

Non-Veteran Fathers: 3778

Query: 02/14/2019

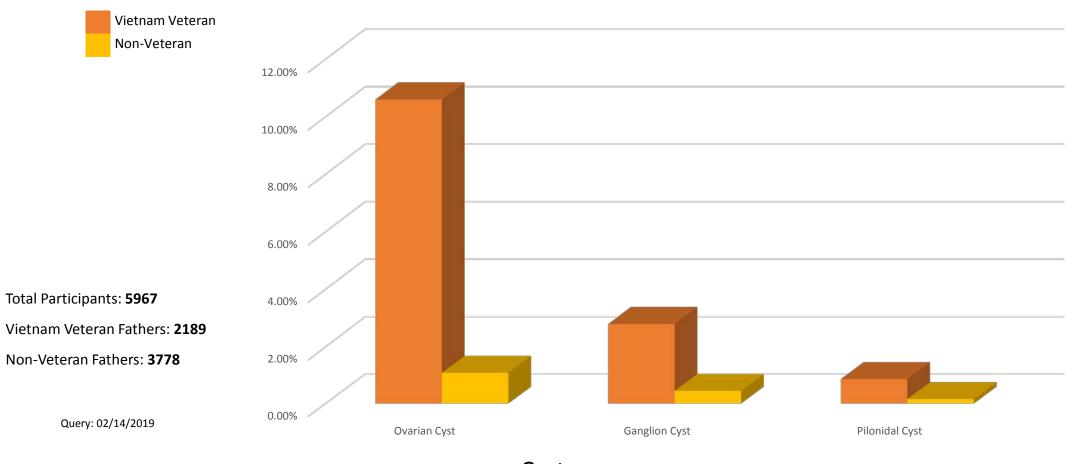
Cancer Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Cancer

	Vietnam Veteran Fathers	Non Veteran Fathers
Neuroblastoma	0.50%	0.08%
Leukemia	1.05%	0.16%
Lymphoma	0.50%	0.00%
Hodgkins Disease	0.46%	0.00%
Non-Hodgkins Lymphoma	0.41%	0.00%
Sarcoma	0.64%	0.13%
Astrocytoma	0.14%	0.08%
Thyroid	1.28%	0.05%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



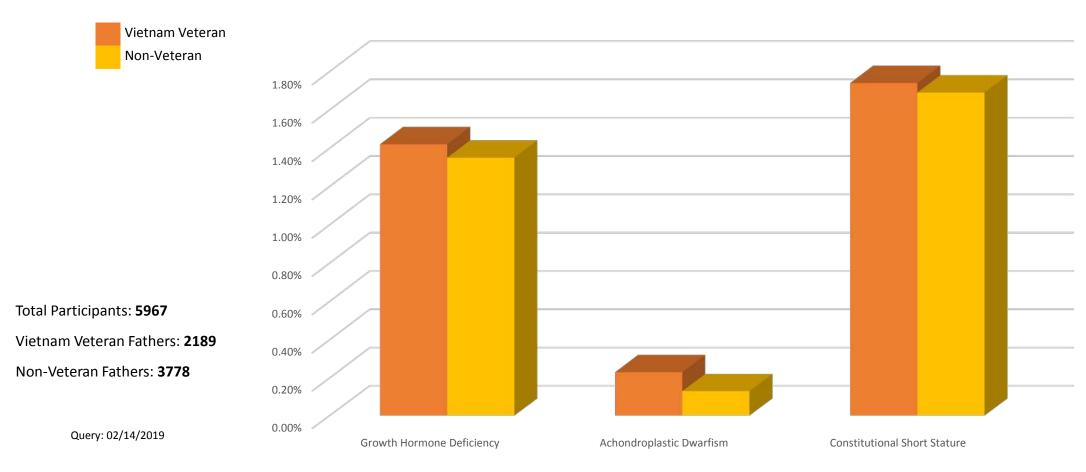
CystsCases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Cysts

	Vietnam Veteran Fathers	Non Veteran Fathers
Ovarian Cyst	10.60%	1.09%
Ganglion Cyst	2.79%	0.45%
Pilonidal Cyst	0.87%	0.16%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



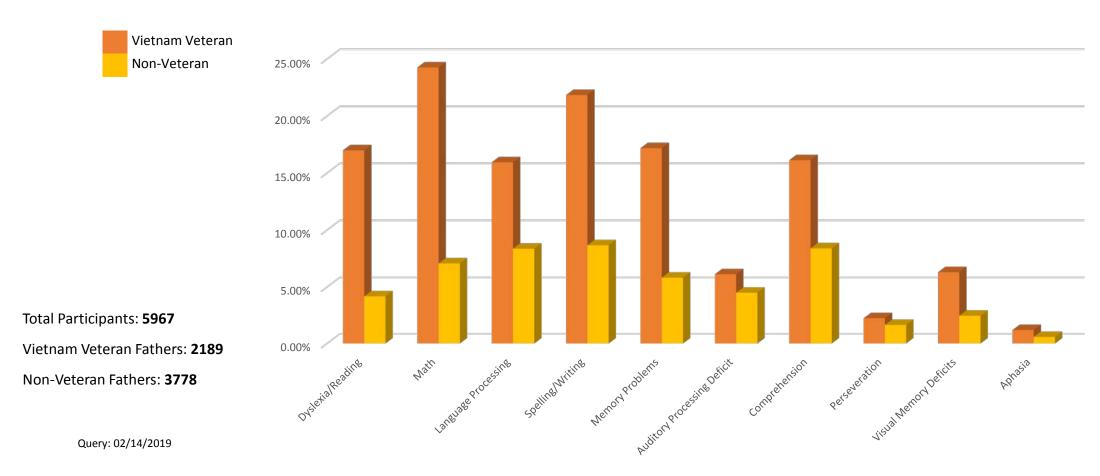
Growth Disorders

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Growth Disorders

	Vietnam Veteran Fathers	Non Veteran Fathers
Growth Hormone Deficiency	1.42%	1.35%
Achondroplastic Dwarfism	0.23%	0.13%
Constitutional Short Stature	1.74%	1.69%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



Learning Disabilities

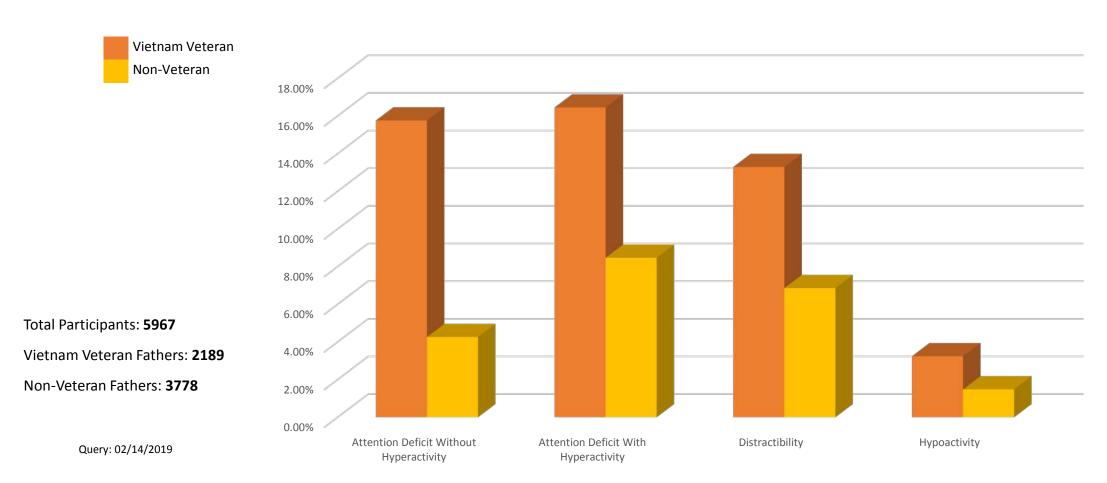
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Learning Disabilities

	Vietnam Veteran Fathers	Non Veteran Fathers
Dyslexia/Reading	16.99%	4.18%
Math	24.26%	7.07%
Language Processing	15.94%	8.36%
Spelling/Writing	21.84%	8.66%
Memory Problems	17.18%	5.82%
Auditory Processing Deficit	6.12%	4.50%
Comprehension	16.13%	8.39%
Perseveration	2.24%	1.64%
Visual Memory Deficits	6.30%	2.46%
Aphasia	1.19%	0.58%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



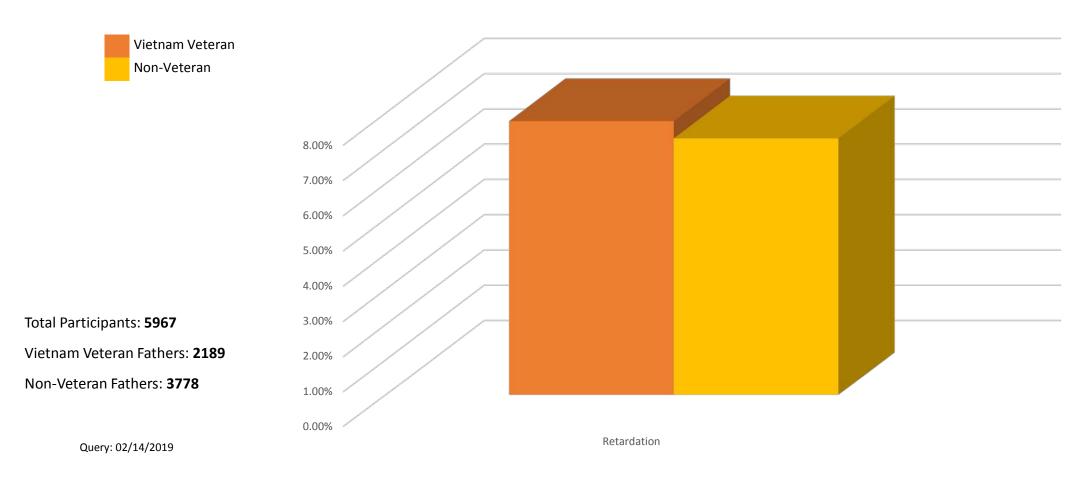
Attention Deficit/Activity Disorders

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Attention Deficit/Activity Disorders

	Vietnam Veteran Fathers	Non Veteran Fathers
Attention Deficit Without Hyperactivity	15.76%	4.26%
Attention Deficit With Hyperactivity	16.45%	8.47%
Distractibility	13.29%	6.86%
Hypoactivity	3.24%	1.48%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



Developmental Delay

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Developmental Delay

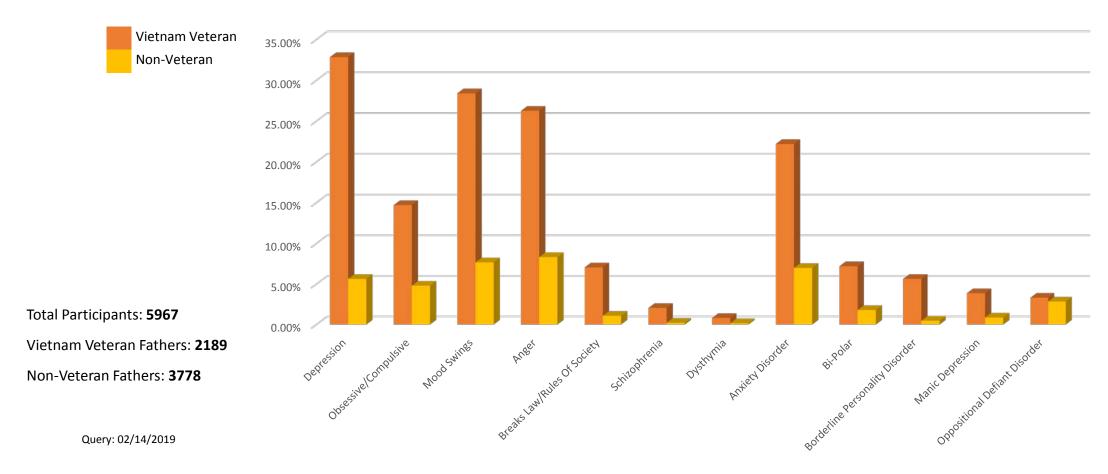
Cases percentage

Vietnam Veteran Non Veteran Fathers Fathers

Fathers 7.28%

Retardation 7.77% 7

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



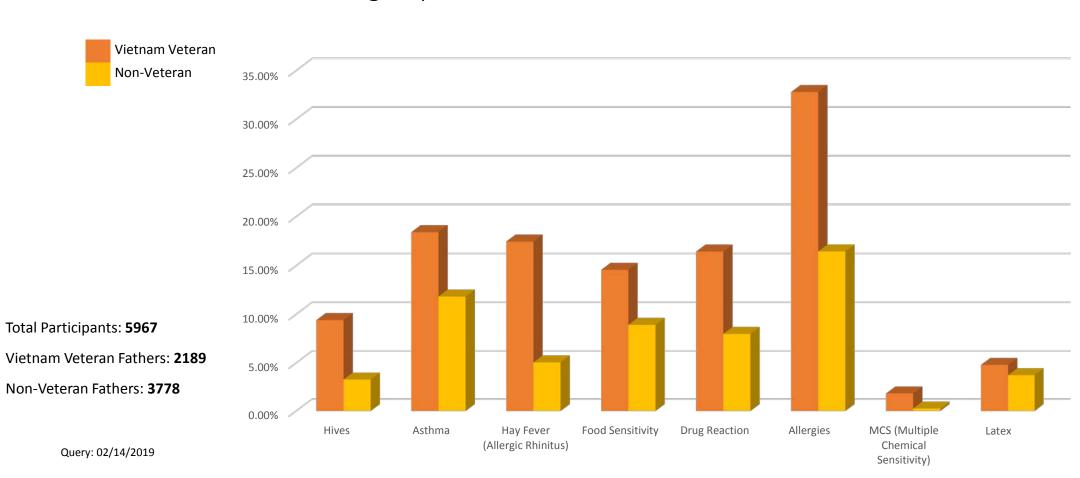
Emotional/Behavioral
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Emotional/Behavioral

	Vietnam Veteran Fathers	Non Veteran Fathers
Depression	32.85%	5.66%
Obsessive/Compulsive	14.71%	4.82%
Mood Swings	28.41%	7.70%
Anger	26.27%	8.34%
Breaks Law/Rules Of Society	7.08%	1.09%
Schizophrenia	2.06%	0.21%
Dysthymia	0.82%	0.16%
Anxiety Disorder	22.20%	7.01%
Bi-Polar	7.22%	1.80%
Borderline Personality Disorder	5.66%	0.48%
Manic Depression	3.88%	0.87%
Oppositional Defiant Disorder	3.33%	2.86%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



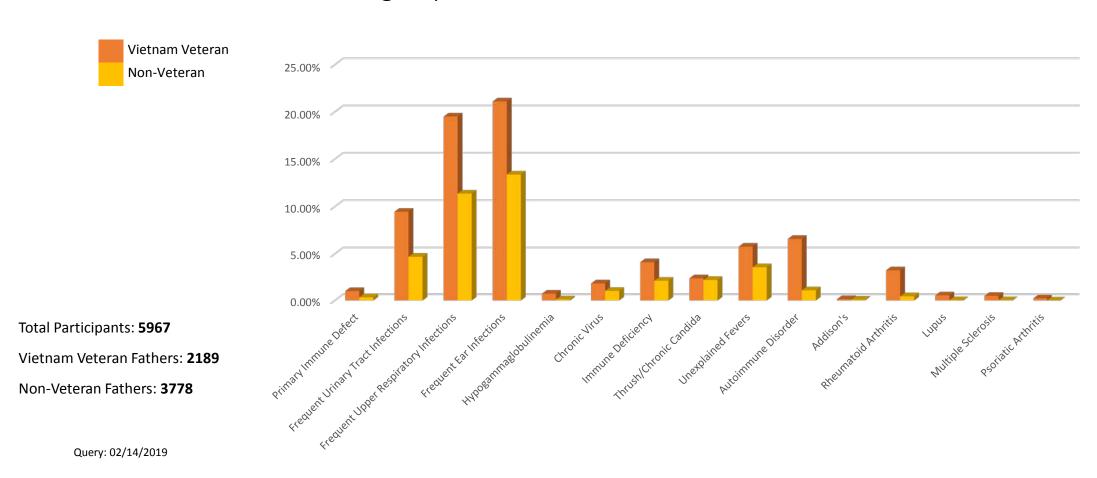
Allergies
Cases percentage

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Allergies

	Vietnam Veteran Fathers	Non Veteran Fathers
Hives	9.41%	3.28%
Asthma	18.41%	11.83%
Hay Fever (Allergic Rhinitus)	17.45%	5.06%
Food Sensitivity	14.57%	8.92%
Drug Reaction	16.45%	7.99%
Allergies	32.80%	16.46%
MCS (Multiple Chemical Sensitivity)	1.83%	0.26%
Latex	4.80%	3.73%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans



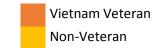
Immune Response Disorders

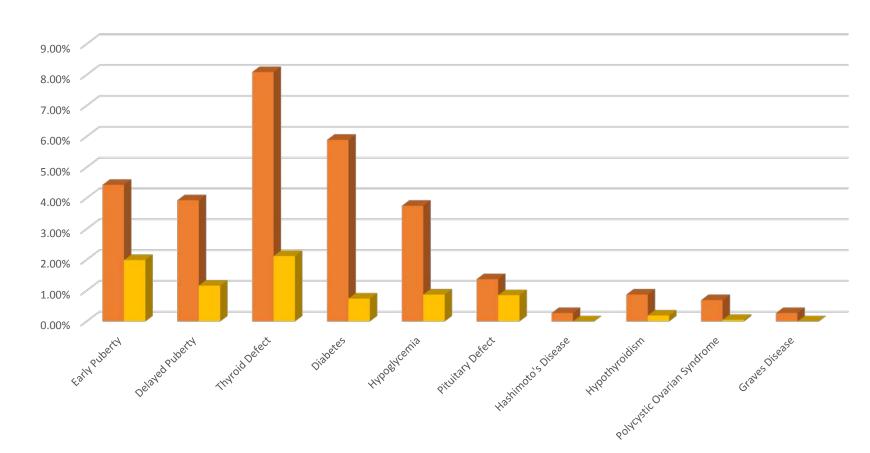
National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Immune Response Disorders

	Vietnam Veteran Fathers	Non Veteran Fathers
Primary Immune Defect	1.01%	0.34%
Frequent Urinary Tract Infections	9.46%	4.69%
Frequent Upper Respiratory Infections	19.51%	11.38%
Frequent Ear Infections	21.11%	13.37%
Hypogammaglobulinemia	0.73%	0.11%
Chronic Virus	1.83%	1.03%
Immune Deficiency	4.11%	2.12%
Thrush/Chronic Candida	2.38%	2.20%
Unexplained Fevers	5.76%	3.57%
Autoimmune Disorder	6.58%	1.09%
Addison's	0.14%	0.08%
Rheumatoid Arthritis	3.24%	0.45%
Lupus	0.55%	0.03%
Multiple Sclerosis	0.50%	0.03%
Psoriatic Arthritis	0.23%	0.00%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans





Total Participants: 5967

Vietnam Veteran Fathers: 2189

Non-Veteran Fathers: 3778

Query: 02/14/2019

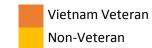
Endocrine Defects

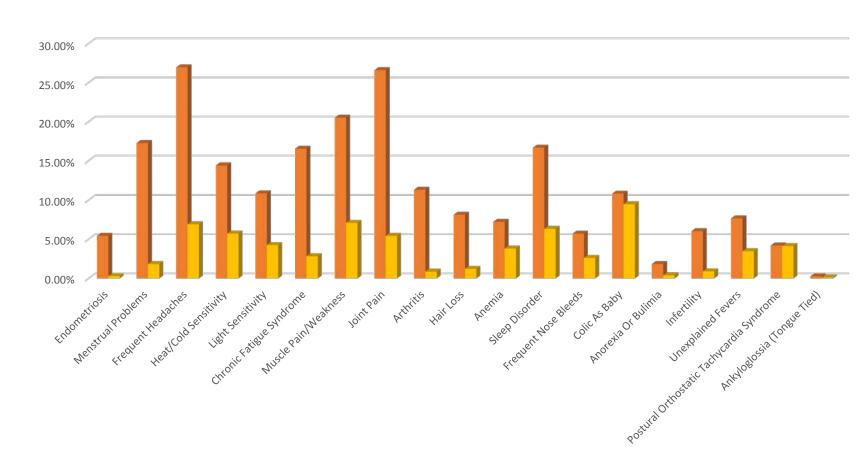
National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Endocrine Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Early Puberty	4.43%	1.99%
Delayed Puberty	3.93%	1.16%
Thyroid Defect	8.09%	2.12%
Diabetes	5.89%	0.74%
Hypoglycemia	3.75%	0.87%
Pituitary Defect	1.37%	0.85%
Hashimoto's Disease	0.27%	0.00%
Hypothyroidism	0.87%	0.19%
Polycystic Ovarian Syndrome	0.69%	0.05%
Graves Disease	0.27%	0.00%

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans





Total Participants: 5967

Vietnam Veteran Fathers: 2189

Non-Veteran Fathers: 3778

Query: 02/14/2019

Miscellaneous Defects

National Birth Defects Registry – Children of Vietnam Veterans and Non-Veterans

Miscellaneous Defects

	Vietnam Veteran Fathers	Non Veteran Fathers
Endometriosis	5.44%	0.29%
Menstrual Problems	17.27%	1.83%
Frequent Headaches	26.95%	6.91%
Heat/Cold Sensitivity	14.44%	5.72%
Light Sensitivity	10.87%	4.26%
Chronic Fatigue Syndrome	16.54%	2.83%
Muscle Pain/Weakness	20.51%	7.09%
Joint Pain	26.59%	5.43%
Arthritis	11.33%	0.87%
Hair Loss	8.13%	1.22%
Anemia	7.22%	3.81%
Sleep Disorder	16.67%	6.33%
Frequent Nose Bleeds	5.71%	2.62%
Colic As Baby	10.83%	9.48%
Anorexia Or Bulimia	1.83%	0.40%
Infertility	6.03%	0.90%
Unexplained Fevers	7.67%	3.47%
Postural Orthostatic Tachycardia Syndrome	4.20%	4.13%
Ankyloglossia (Tongue Tied)	0.27%	0.11%