Utah Population Database

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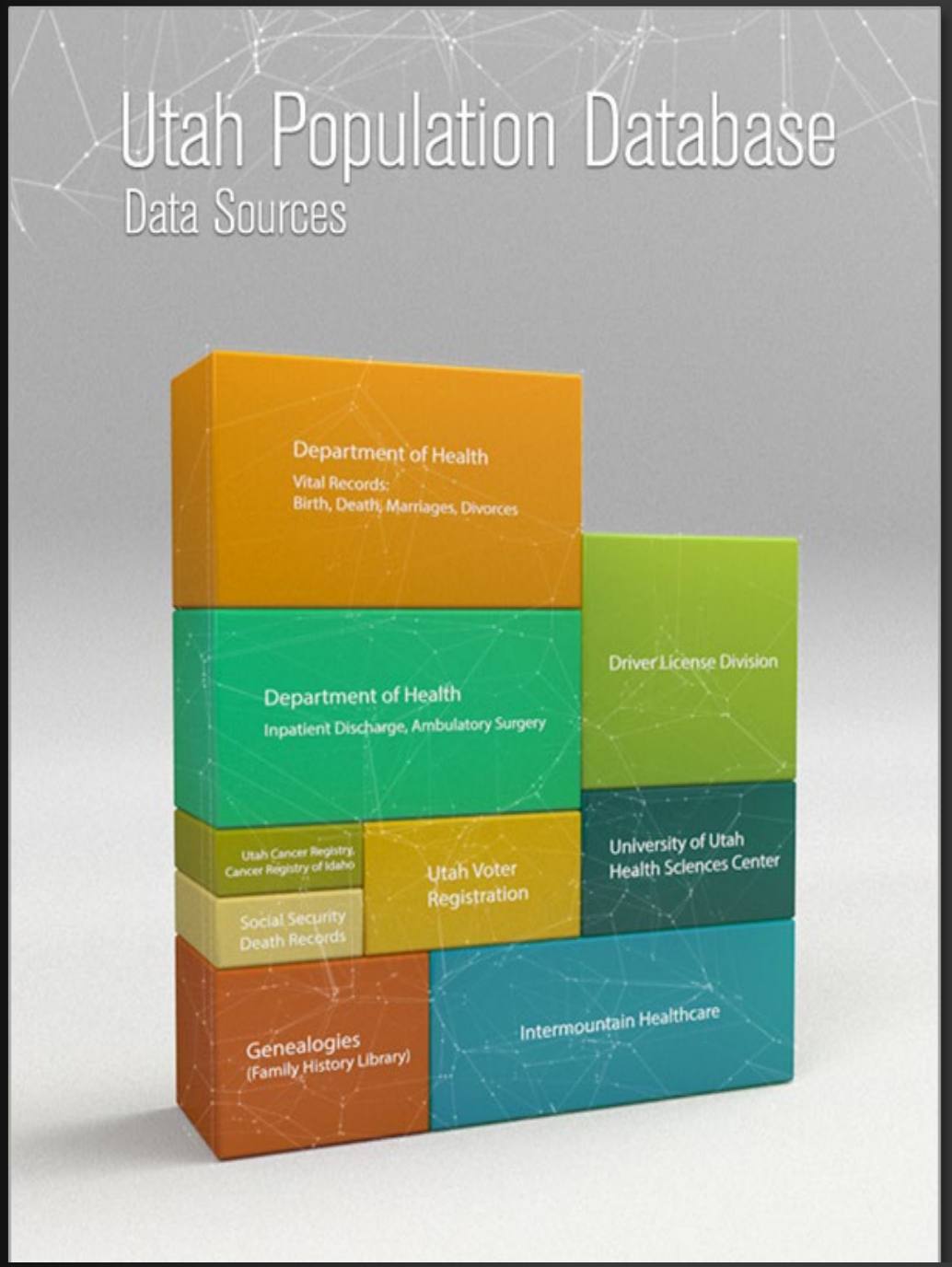
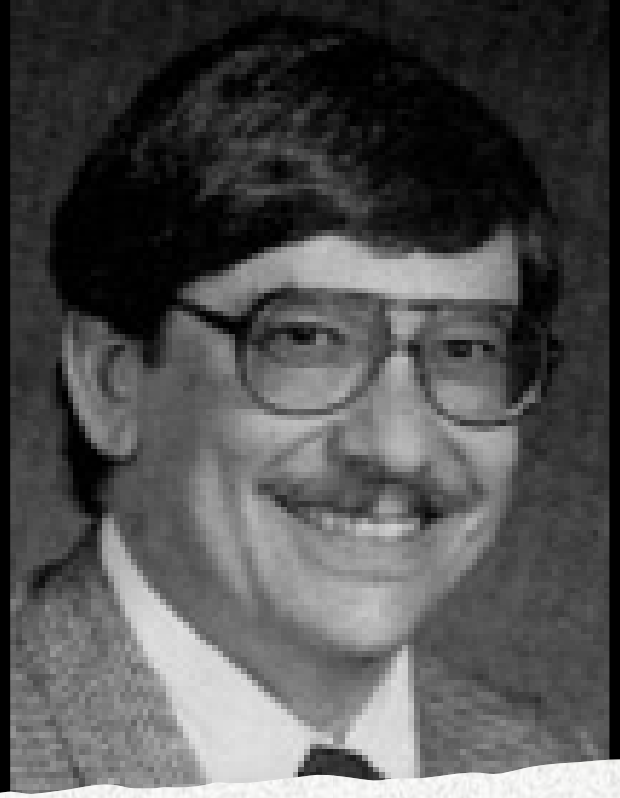
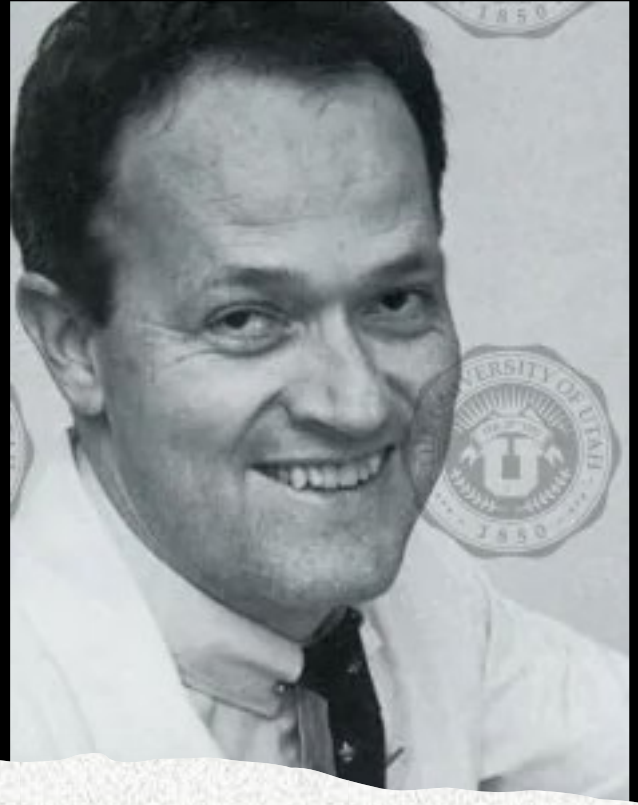
05/25/22
Center on Aging Annual Retreat







1966, Utah Cancer Registry

- Founded by Charles Smart, MD

1974-1978

- 1974, computerized genealogy initiated (Mark Skolnick, PhD)
- 1975, linked to UCR for cancer genetics (Mark Skolnick, PhD)
- 1977, cardiovascular research (Roger Williams, MD)
- 1978, population studies (Lee Bean, PhD)

1982, creation of the RGE

- Executive Order of the Governor of Utah
- Data governance
- Biomedical and health-related research

Recent History

1990s – now

Institutionalization
Development and Growth

Geri Mineau, PhD

Ken Smith, PhD

Karen Curtin, PhD

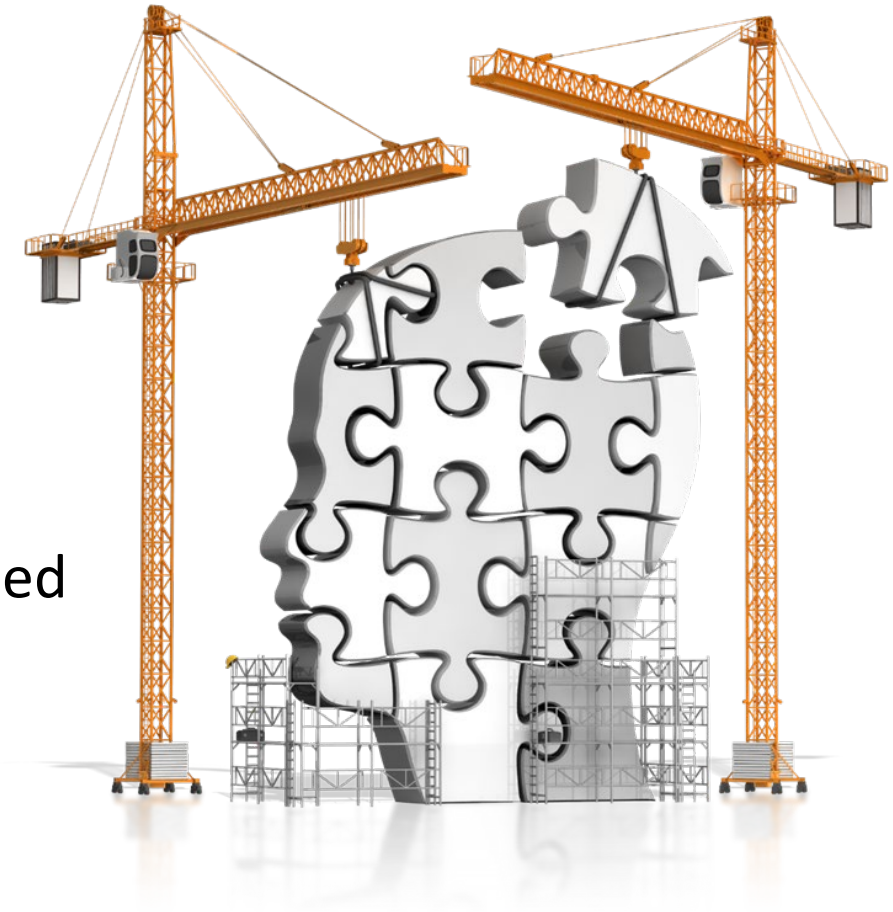
Nicola Camp, PhD

Major Data Contributors

1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 2000 2010 2020
Family History Records*
1700s-1975
Birth Certificates | 1915-1921, 1929
Death Certific
Data Availability
Utah Population Database
Source Records
Original Family History Records
Vital Records
Medical Records
Additional Records
Externally Linked Records
Other Notations
Current
Snapshot
*Data coverage may not
Salt Lake City
Provo
Vernal
Green
UTAH
Ely
PACIFIC TIME ZONE
MOUNTAIN TIME ZONE
15
80
191
6
50
Last updated 2016
1962-2011
versity of Utah Health Sciences EDW* | 1996-C
Intermountain Healthcare EDW* | 1992-C
Centers for Medicare & Medicaid Services | 1992-
Utah Department of Human Services | 199
Air Quality
Common pollutants
Distance to road
Hazardous air pollutants
Oil well
Drinking Water
Water system
Nitrogen application rates
Bedrock geology
Agricultural Chemical Use
Proximity to farmland by crop type
Pesticide application rate (1985+)
Radiation
Gamma radiation from soil
High voltage lines
Radon
Occupational Exposures
Birth certificate and US census data

Person-oriented records

- 11 million unique individuals
- Multiple records for an individual are carefully matched
- Additional dimensions
  - *Geographic mapping, environmental exposures, SDOH*
  - *Longitudinal –many events over an individual's life*
  - *Investigator data*



UDPB Privacy and Confidentiality

Data agreements

RGE review

Utah Health Data Committee review

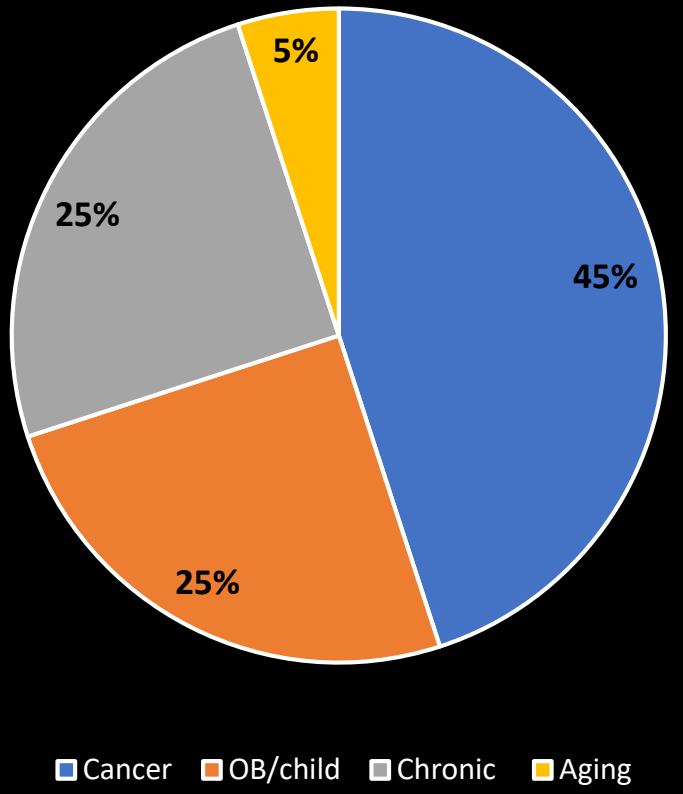
Secure storage locations

Utah Population Database

rare

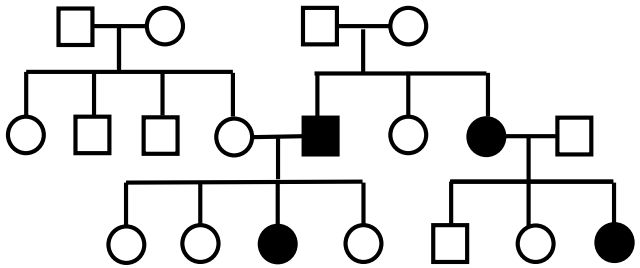
valuable

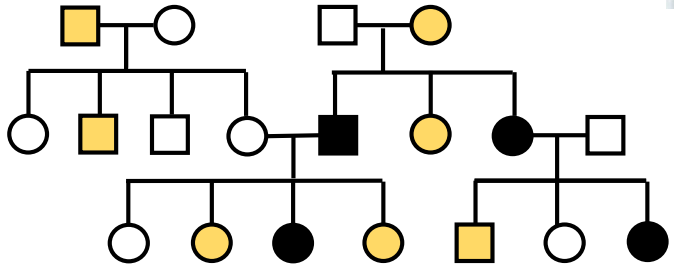
UPDB study portfolio



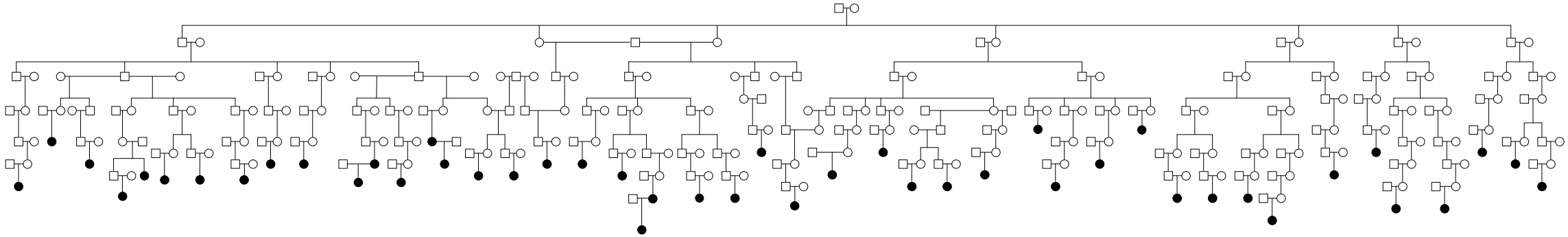
Genetic/Familial Risk

- Understand familial clustering





- Identify high-risk families



Cancer

Heart and lung disease

Immune diseases

Metabolic diseases

Neurological disorders

Reproductive phenotypes

Utah Genome Project

https://uofuhealth.utah.edu/center-genomic-medicine/research/utah-genome-project.php

Feusier *et al. J Transl Genet Genom* 2021;5:189-99
DOI: 10.20517/jtgg.2021.05

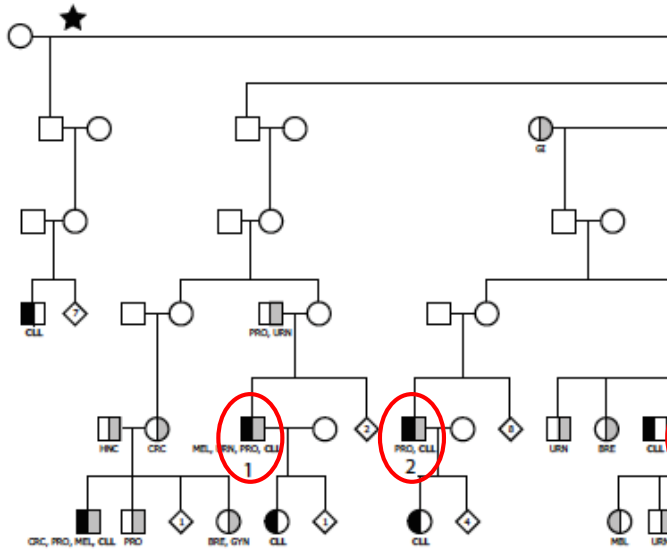
Journal of Translational Genetics and Genomics

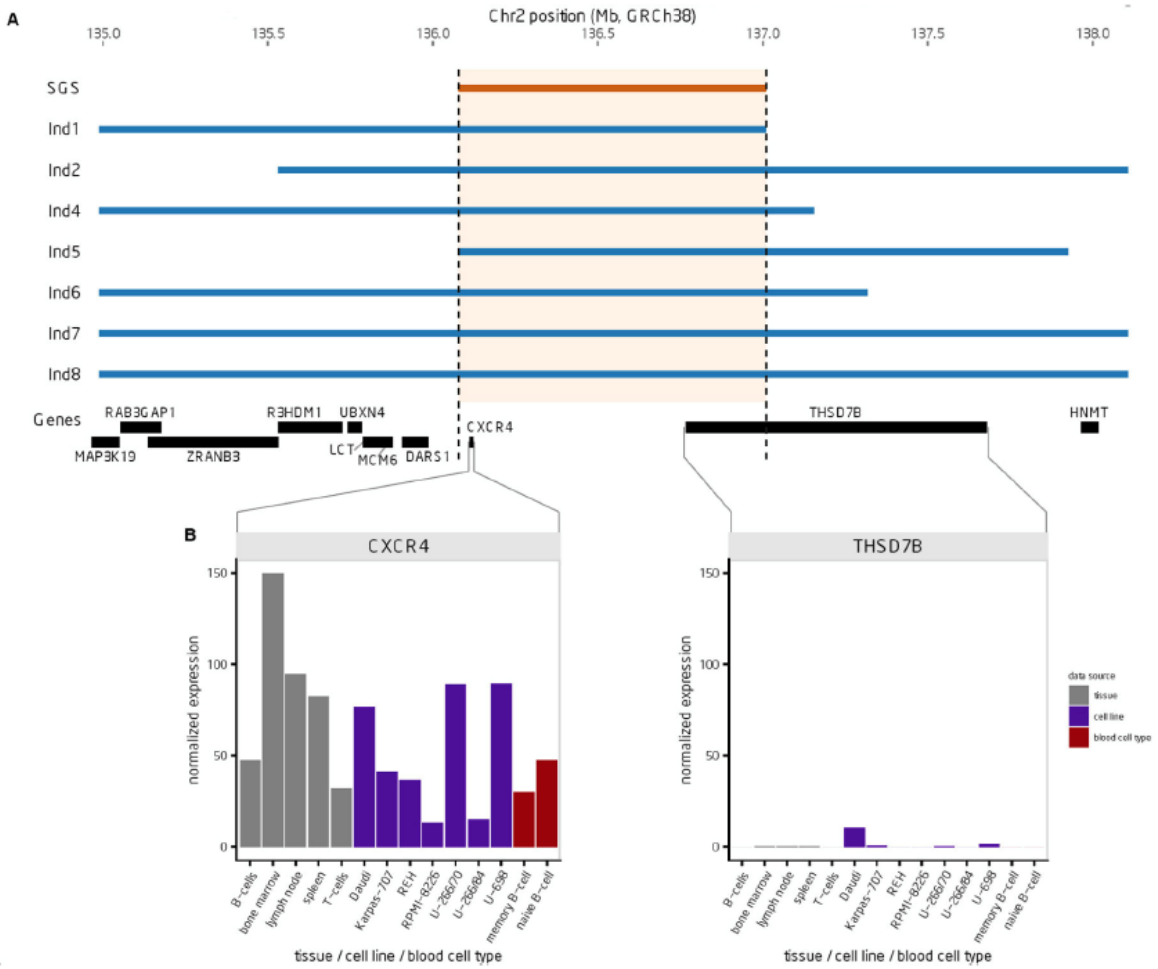
Shared genomic segment analysis in a large high-risk chronic lymphocytic leukemia pedigree implicates *CXCR4* in inherited risk

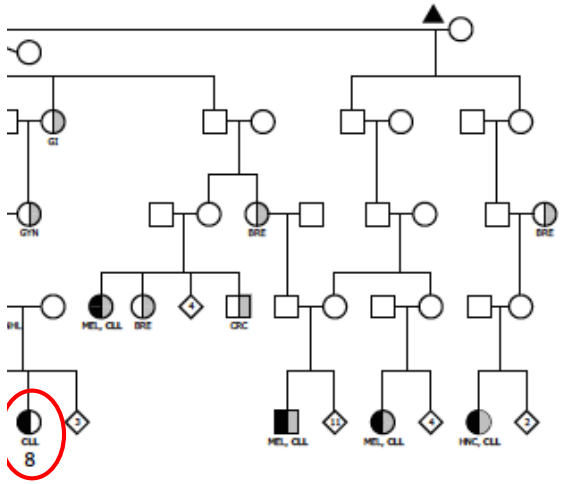
Julie E. Feusier[1,2], Michael J. Madsen[1], Brian J. Av
Hu[1,2], Afaf E. G. Osman[2], Martha J. Glenn[1,2], Nicola

Pedigree symbols:

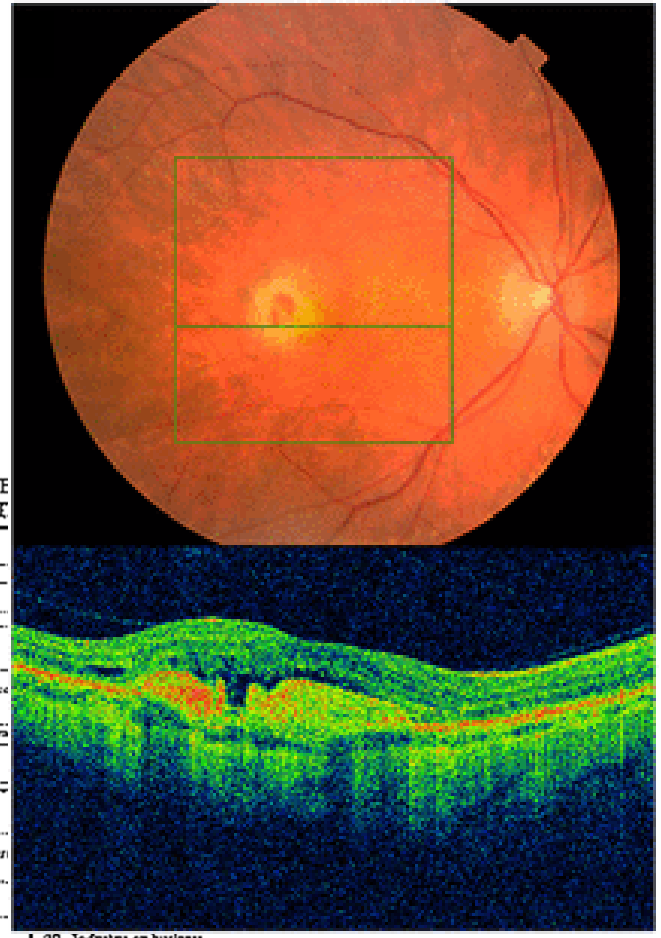
- CLL/SLL
- MBL
- Other heme malignancy
- Solid cancer
- Other heme malignancy and solid cancer

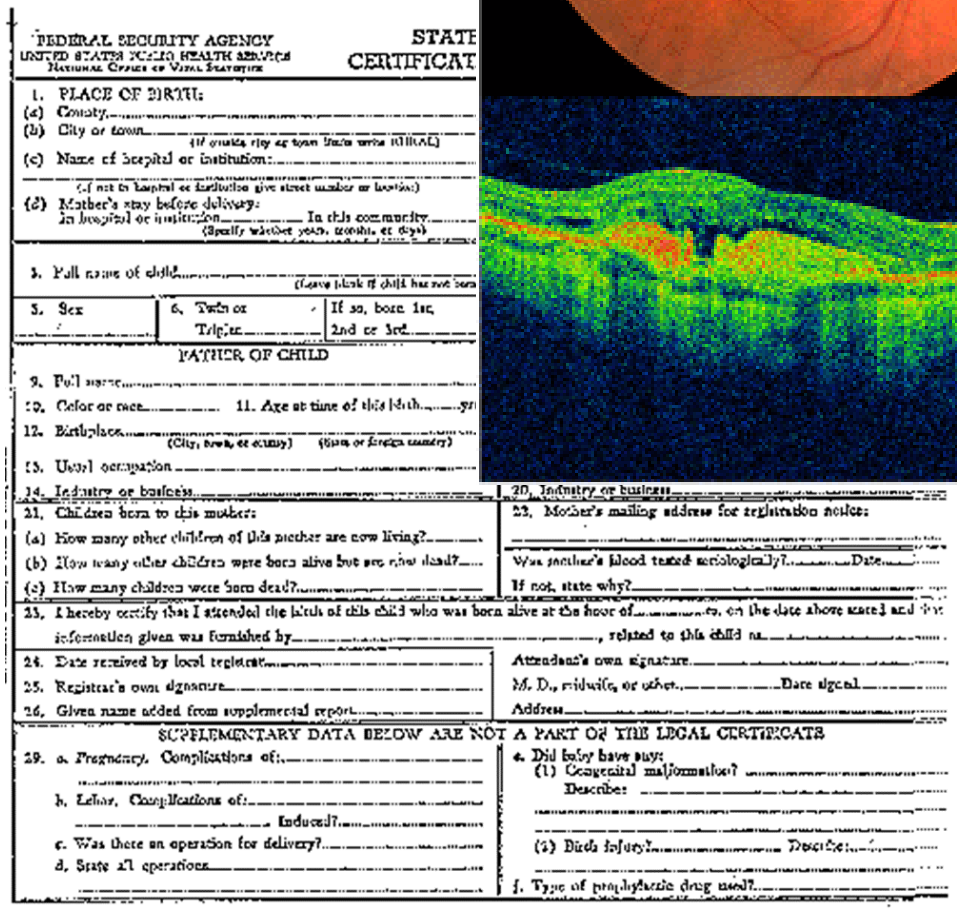






Health outcomes





Hypertens Pregnancy. Author manuscript; available in PMC 2020 Aug 1.

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Published online 2019 Apr 12. doi: 10.1080/10641955.2019.1597107

PMCID: PMC6642000

NIHMSID: NIHMS1524514

PMID: 30977693

Hypertensive Disorders of Pregnancy Increases Risk of Developing Neovascular Age-related Macular Degeneration in Later Life

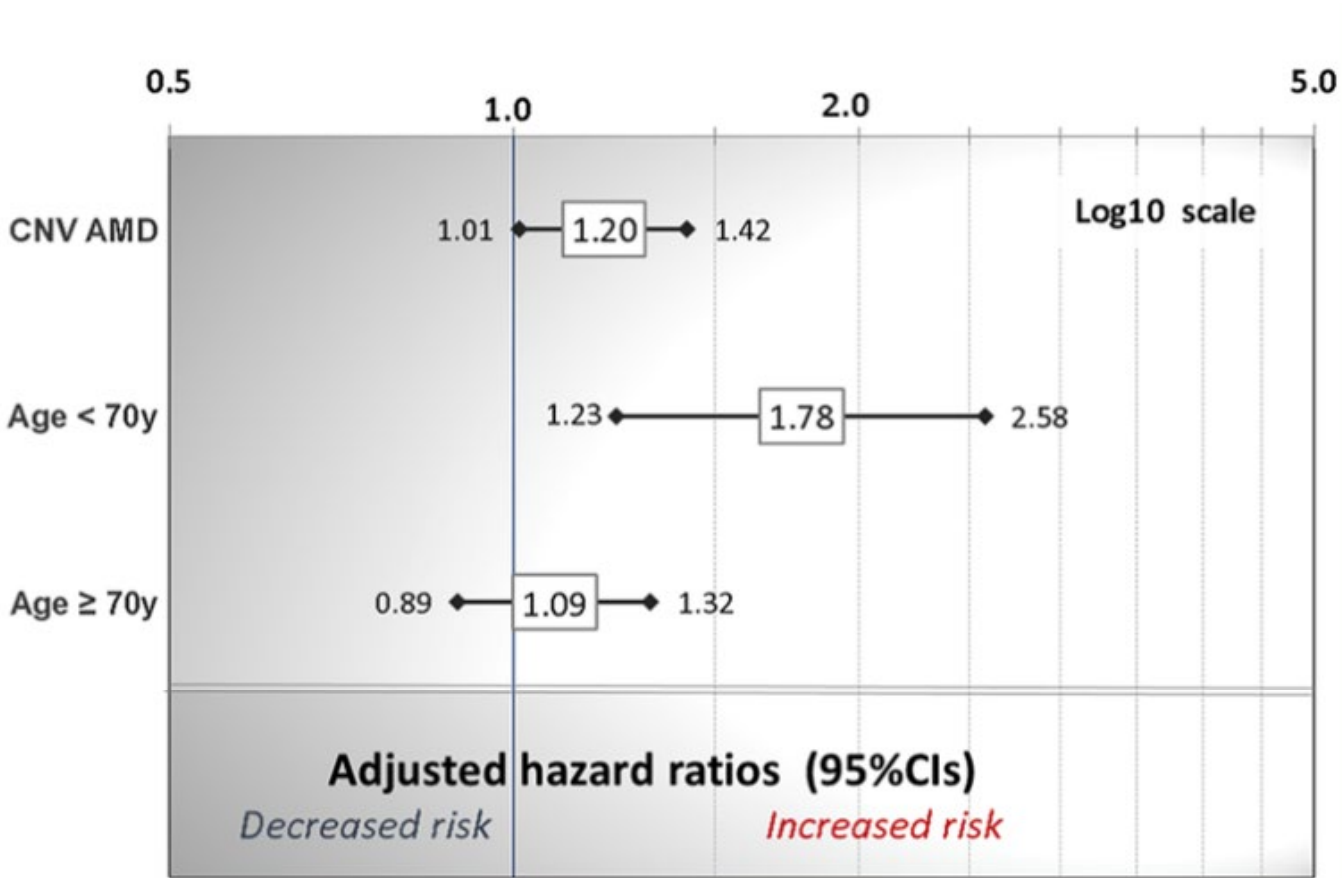
Karen Curtin, PhD,[1,2,5] Lauren H. Theilen, MD,[3] Alison Fraser, MSPH,[2] Ken R. Smith, PhD,[2,4] Michael W. Varner, MD,[3] and Gregory S. Hageman, PhD[5]

Author Manuscript

Characteristic	HDP exposed N	%	2:1 unexposed N	%	P*
Total births	31,454	100.0	62,908	100.0	–
Characteristics of mother:					
Age at child's birth (mean, ±SD)	27.6	±6.38	27.4	±6.36	<0.001
12 - 21y	6,012	19.1	12,716	20.2	
22 - 26y	9,005	28.6	17,860	28.4	
27 - 33y	10,123	32.2	20,288	32.3	
34 - 55y	6,314	20.1	12,044	19.1	0.22
Birth year of mother					
1900-1949	5,027	16.0	10,030	15.9	
1950-1965	11,452	36.4	22,711	36.1	
1966-1975	14,975	47.6	30,167	48.0	0.45

Implications:
earlier screening
detection of choroidal neovascularization

Hypertensive disorders during pregnancy & risk choroidal neovascular AMD



Fertility and Sterility
Volume 111, Issue 2, February 2019, Pages 341-347

Original article

Acute effects of air pollutants on spontaneous pregnancy loss: a case-crossover study

Claire L. Leiser M.S.P.H. [a], Heidi A. Hanson Ph.D., M.S. [a, b], Kara Sawyer M.D. [c], Jacob Steenblik M.P.H., M.H.A. [c], Ragheed Al-Dulaimi M.D., M.P.H., M.Sc. [d, e], Troy Madsen M.D. [c], Karen Gibbins M.D. [f], James M. Hotaling M.D. [b], Yetunde Oluseye Ibrahim M.D. [g], James A. VanDerslice Ph.D. [h], Matthew Fuller M.D. [c]

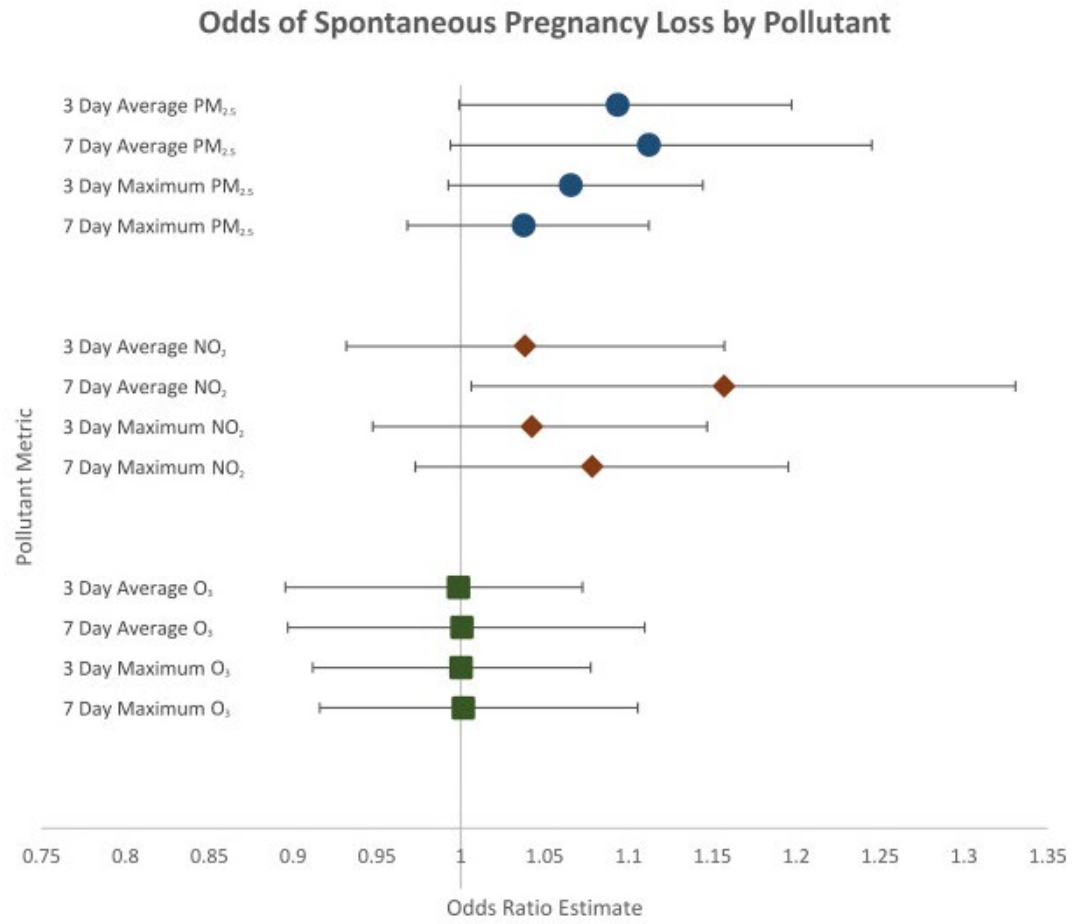
Air pollution 'as bad as smoking in increasing risk of miscarriage'

EPA United States Environmental Protection Agency

Environmental Topics ⌄ Laws & Regulations ⌄ Report a Violation ⌄

Air Quality System (AQS)

AQS User Support is provided through your Regional EPA representative.



NO_2 = nitrogen dioxide; O_3 = ozone; $PM_{2.5}$ = fine particulate matter.

If 7-day average of $N0_2$ raises from 25th to 75th %ile, risk pregnancy loss increase 11%

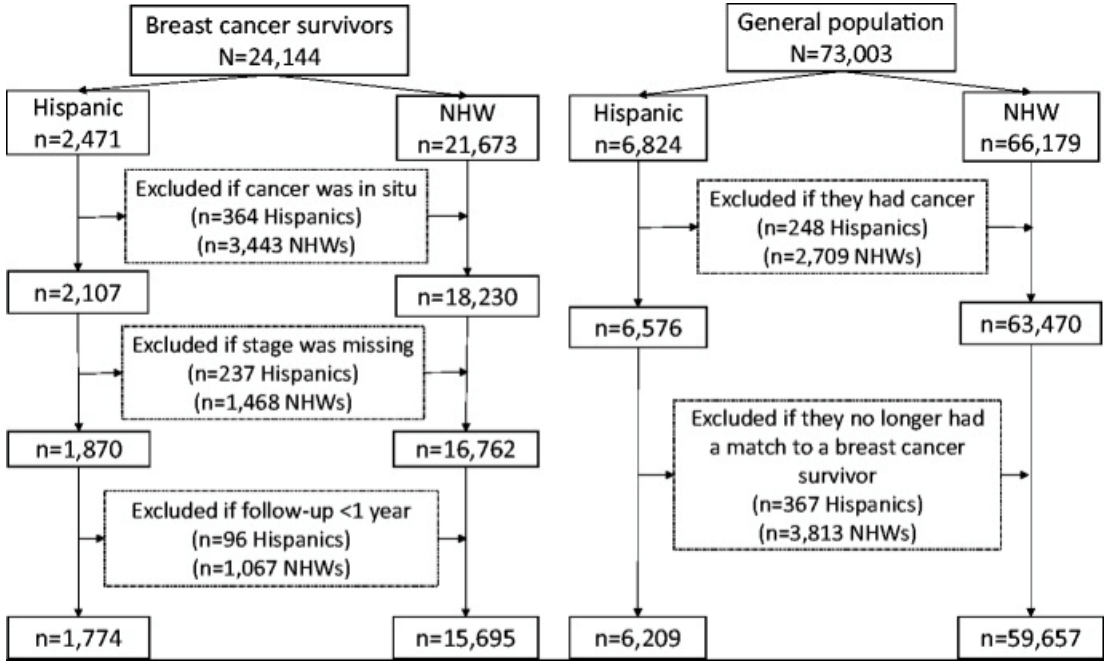
Disparities

JNCI Cancer Spectrum (2021) 5(2): pkab016

doi: 10.1093/jncics/pkab016
First published online 15 February 2021
Article

Disparities in Cardiovascular Disease Risk Among Hispanic Breast Cancer Survivors in a Population-Based Cohort

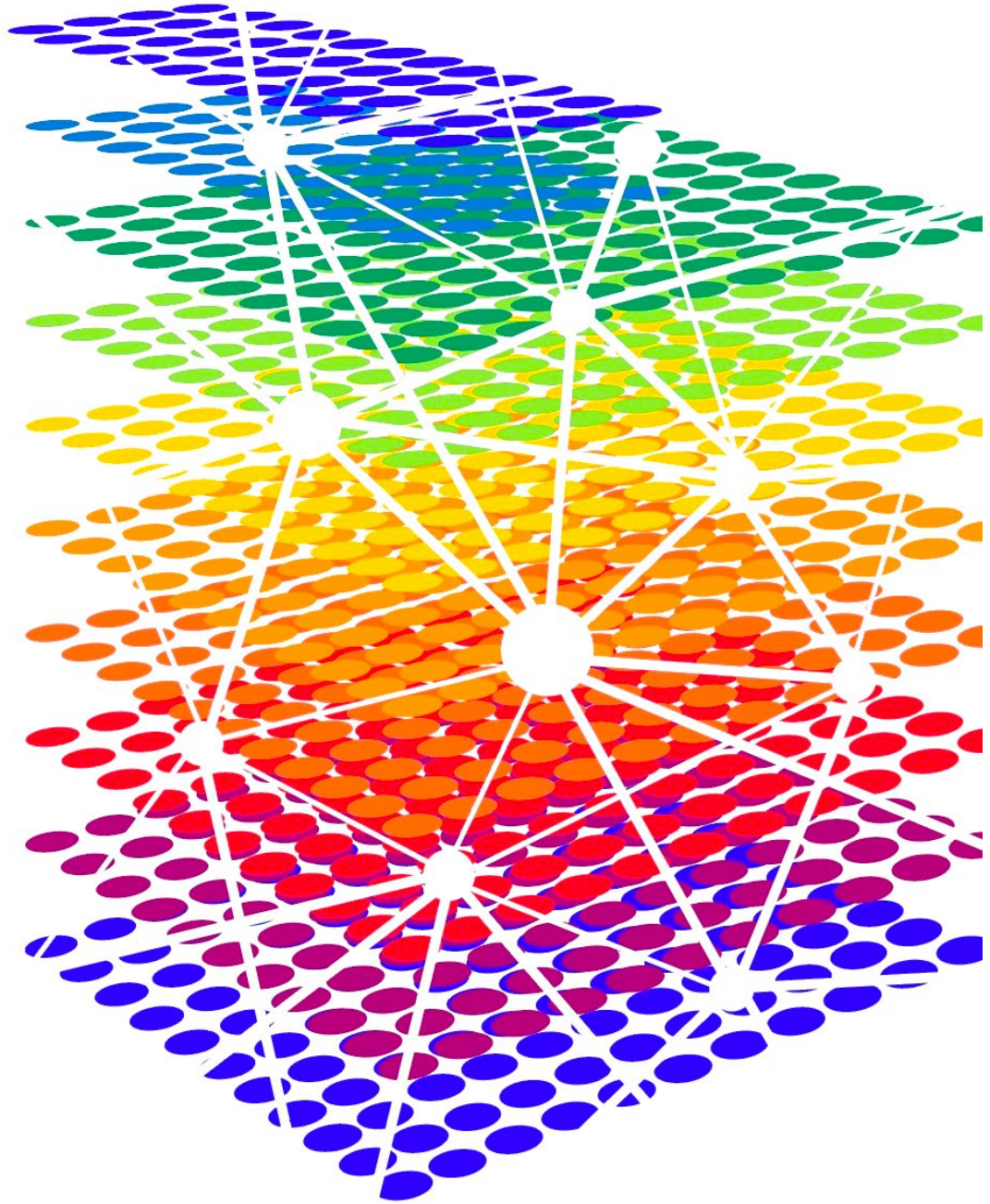
Qingqing Hu, PhD,[1,2] Chun-Pin Chang, PhD,[1,2] Kerry Rowe, PhD,[3] John Snyder, PhD,[3] Vikrant Deshmukh, PhD,[4] Michael Newman, MS,[4] Alison Fraser, MSPH,[5] Ken Smith, PhD,[5] Lisa H. Gren, PhD,[1] Christina Porucznik, PhD,[1] Joseph B. Stanford, MD, MSPH,[1] David Gaffney, MD,[2,6] N. Lynn Henry, MD, PhD,[7] Ivette Lopez, PhD,[1] Mia Hashibe, PhD[1,2,8,*]



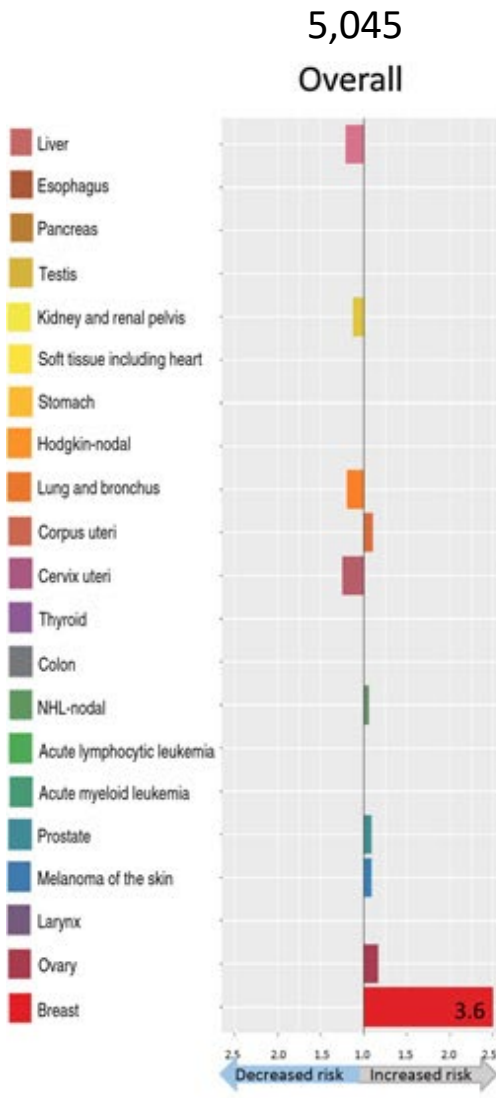
The risks of cardiovascular disease at 1-5 years follow-up among Hispanic and non-Hispanic White breast cancer survivors in comparison with general population cohorts of women[a]

Clinical Classification Software disease level for cardiovascular disease	Hispanic			Non-Hispanic White			*P* heterogeneity
	Breast cancer survivors N (%)	General population N (%)	HR (99% CI)	Breast cancer survivors N (%)	General population N (%)	HR (99% CI)	
7 Diseases of the circulatory system[b]	1079 (60.8)	2793 (47.9)	1.94 (1.49 to 2.53)	10 403 (66.3)	31 782 (53.3)	1.38 (1.33 to 1.43)	.01

data science



Familial Multi-Phenotype Configurations (FMC)

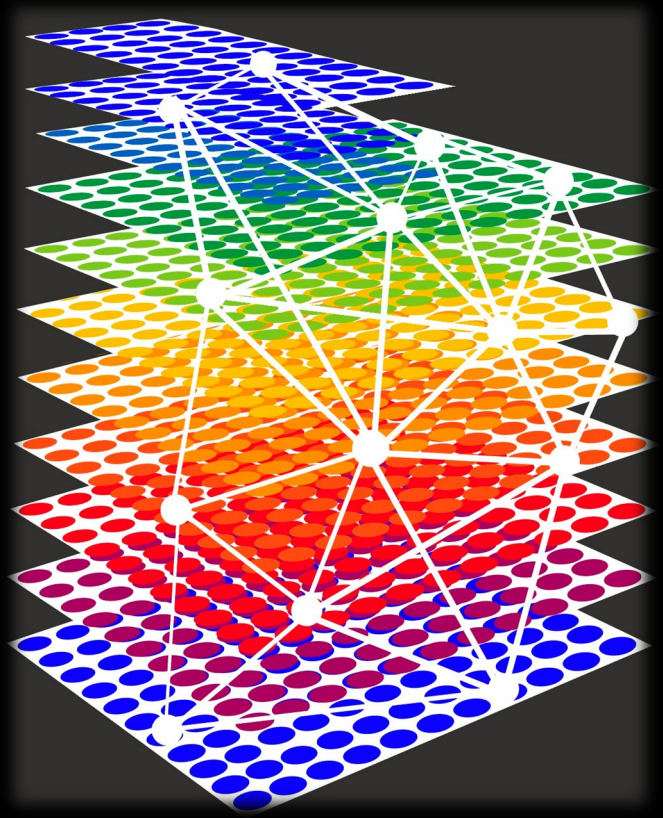


CEBP FOCUS | APRIL 01 2020

Family Study Designs Informed by Tumor Heterogeneity and Multi-Cancer Pleiotropies: The Power of the Utah Population Database FREE

Heidi A. Hanson ✉; Claire L. Leiser; Michael J. Madsen; John Gardner; Stacey Knight ; Melissa Cessna; Carol Sweeney; Jennifer A. Doherty; Ken R. Smith; Philip S. Bernard; Nicola J. Camp

looking to the future



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https://uofuhealth.utah.edu/huntsman/utah-population-database/

Utah Population Database

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