



Exploring Social Determinants of Health as Risk Factors for Cancer Treatment-Related Lymphedema

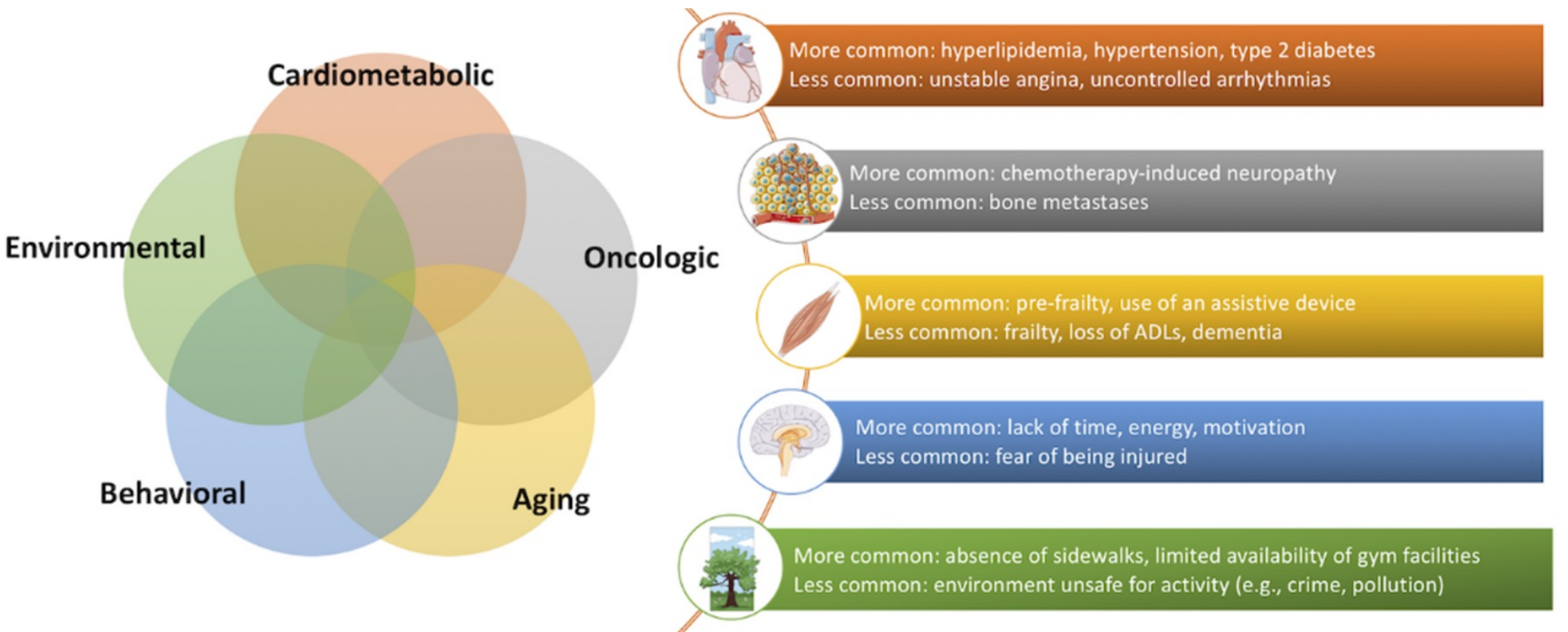
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Background

Risk factors for cancer treatment-related morbidity, such as lymphedema (LE), are commonly attributed to treatment related factors and comorbidity. The influence of social, behavioral, and environmental factors on cancer related LE is less understood.



Purpose

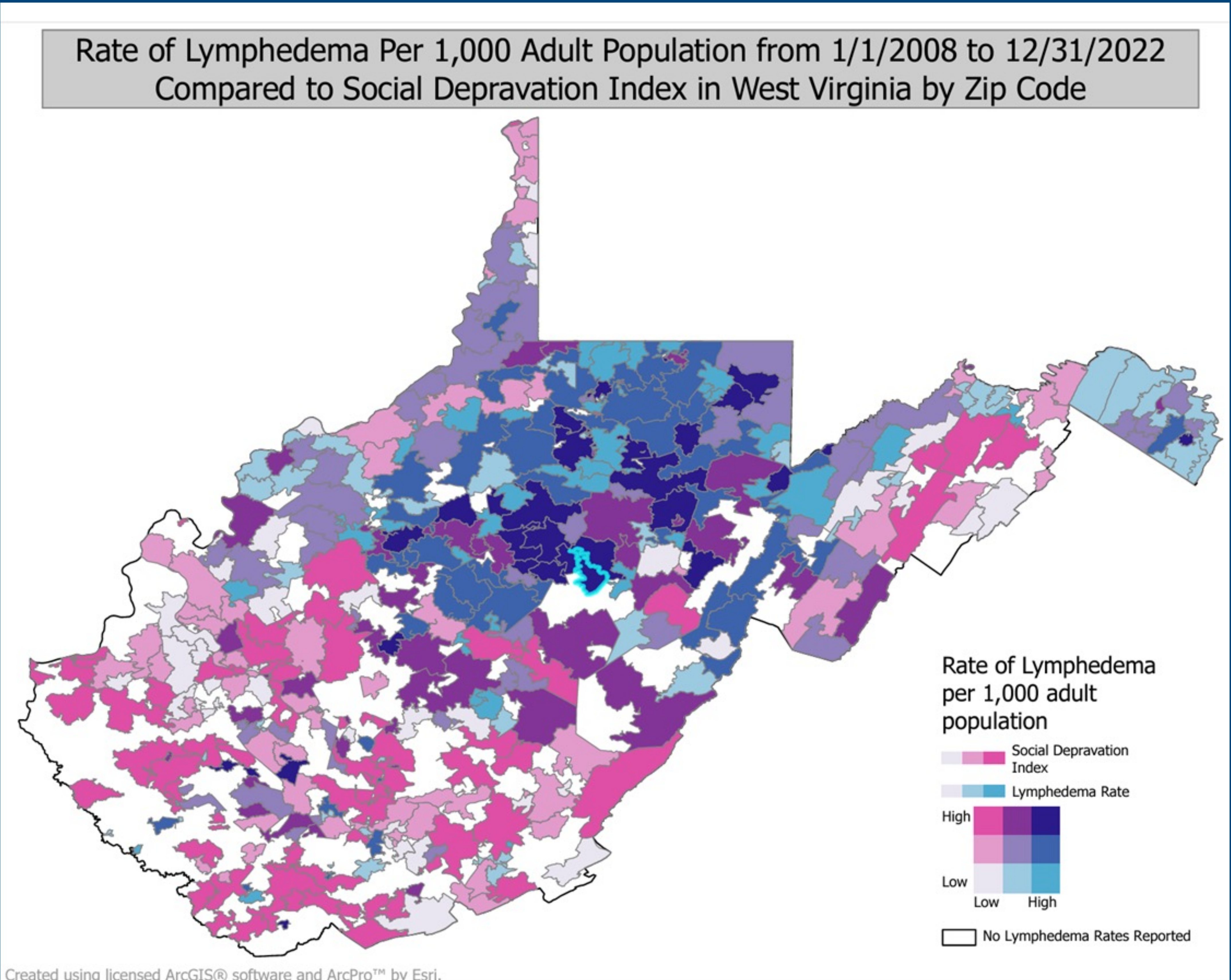
To understand the relationship between social factors and LE, based on EHR data from a single medical institution.

Population

	Control n=5543 n(%)	Lymphedema n=5526 n(%)	Total n(%)	Chi- square p-value
SDI Score				0.02*
<=50	2602(46.9)	2471(44.7)	5073(45.8)	
>50	2941(53.1)	3055(55.3)	5996(54.2)	
SDI Score				<0.001*
<=74	4789(86.4)	4614(83.5)	9403(84.9)	
>74	754(13.6)	912(16.5)	1666(15.1)	
Sex				<0.001*
Female	4137(74.4)	3733(67.2)	7870(70.8)	
Male	1421(25.6)	1825(32.8)	3246(29.2)	
Race				<0.001*
Black/A. American	129(2.3)	163(2.9)	292(2.6)	
Other	177(3.2)	89(1.6)	266(2.4)	
White	5252(94.5)	5306(95.5)	10558(95)	
Marital Status				<0.001*
Divorced	678(12.2)	720(13)	1398(12.6)	
Married	3233(58.2)	2990(53.8)	6223(56)	
Other	171(3.1)	121(2.2)	292(2.6)	
Single	849(15.3)	805(14.5)	1654(14.9)	
Widowed	627(11.3)	922(16.6)	1549(13.9)	
Smoking Status				<0.001*
Daily	838(15.7)	614(11.1)	1452(13.4)	
Former	1706(32)	2126(38.5)	3832(35.4)	
Heavy Smoker	6(0.1)	5(0.1)	11(0.1)	
Light Smoker	20(0.4)	27(0.5)	47(0.4)	
Never	2657(49.9)	2668(48.4)	5325(49.1)	
Some Days	97(1.8)	76(1.4)	173(1.6)	
Comorbidity Count				<0.001*
Total	8923	19888		

There is a need to understand how social determinants of health influence the risk for cancer treatment-related morbidity

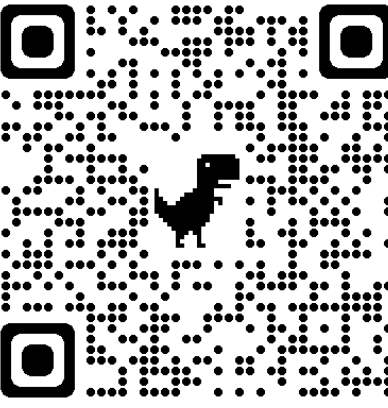
High Rates of Cancer Treatment-Related Lymphedema Co-Occurred with Higher Social Depravation Index Ratings



Social Deprivation

Using the Social Deprivation Index (SDI) we obtained Zip Code Tabulation Area data for all individuals

SDI Component Description	SDI Component Formula
Percent Population Less Than 100% FPL	(Population < 0.99 FPL) / (Total Population)
Percent Population 25 Years or More With Less Than 12 Years of Education	(Population < 12 years of education) / (Total Population)
Percent Non-Employed for Population 16-64 years	(Not in Labor Force + Unemployed Between 16-64 Years) / (Civilian + Not in Labor Force between 16-64 years)
Percent Households Living in Renter-Occupied Housing Units	(Renter Occupied) / (Owner Occupied + Renter Occupied)
Percent Households Living in Crowded Housing Units	(Tenure by Occupants Per Room - (Owner Occupied + Renter Occupied)) / (Total Occupied Housing Units)
Percent Single Parent Families With Dependents < 18 years	(Single Parent Households With Dependent Children < 18 Years) / (Total Families)
Percent Households With No Vehicle	(Households Without a Vehicle) / (Total Occupied Housing Units)



	Control		Lymphedema		Wilcoxon test
	n	mean (± sd)	n	mean (± sd)	p-value
SDI score	5543	49.7 (± 20.69)	5526	50.55 (± 20.83)	0.041*
Poverty	5546	60.8 (± 23.99)	5534	62.06 (± 24.14)	0.002*
Single Parent	5546	43.4 (± 25.38)	5534	43.20 (± 25.33)	0.818
Education	5546	53.1 (± 20.19)	5534	52.56 (± 20.07)	0.158
# Vehicle	5546	57.4 (± 27.25)	5534	57.66 (± 27.61)	0.501
Renter Occupied	5546	33.3 (± 21.80)	5534	34.47 (± 22.86)	0.038*
Crowding	5546	29.8 (± 23.55)	5534	31.36 (± 23.89)	<0.001*
Non-employed	5546	72.5 (± 22.44)	5534	72.55 (± 22.27)	0.868

References

Rochlin, D. H., Barrio, A. V., McLaughlin, S., et al. (2023). Feasibility and Clinical Utility of Prediction Models for Breast Cancer-Related Lymphedema Incorporating Racial Differences in Disease Incidence. *JAMA Surg*, 158(9), 954-964. <https://doi.org/10.1001/jamasurg.2023.2414>

Rockson SG, Zhou X, Zhao L, et al. Exploring disease interrelationships in patients with lymphatic disorders: A single center retrospective experience. *Clinical and translational medicine*. 2022;12(4):e760.

Afshar, N., English, D. R., & Milne, R. L. (2021). Factors Explaining Socio-Economic Inequalities in Cancer Survival: A Systematic Review. *Cancer Control*, 28, 10732748211011956. <https://doi.org/10.1177/10732748211011956>

Social deprivation index (SDI). Robert Graham Center - Policy Studies in Family Medicine & Primary Care. (2018, November 5). Retrieved November 2023 from <https://www.graham-center.org/rgc/maps-data-tools/sdi/social-deprivation-index.html>.

* PCP – Primary care professionals include MD/DO/NP/PA and other primary facing professionals