INFLUENCE OF SOCIO-ECONOMIC STATUS (SES) ON RADIOTHERAPY ADVERSE EVENTS

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RATIONALE

Socio-economic status (SES) is known to influence cancer patient outcomes. The purpose of this study is to evaluate whether SES affected the short-term clinical experience of patients treated with radiotherapy (RT) during the pandemic.

METHODS

- Single institution, retrospective cohort quality improvement study (QI 21-0205)
- Primary endpoint: adverse events (AEs) within 90 days of a radiation course
  - Unplanned radiation-nursing clinic (RNC) visit
  - Emergency department (ED) visit
- Adult patients treated from April 1, 2019 to March 31, 2022 (***Table 1***)
- Two periods: pre-pandemic (pre-COVID) and during pandemic (COVIDera)
- Variables: SES, age, RT intent (curative, palliative, SBRT), regimen (conventional fractionation and hypofractionation), disease site, and sex.
  - SES obtained by matching postal code with provincial data tool with four distinct dimensions: 1) residential instability, 2) material deprivation, 3) ethnic concentration, and 4) dependency.
- For each SES dimension, a score of 1-5 (best-worst) is assigned (***Figure 1 and SES Dimensions definitions***).
- Backward stepwise multivariable logistic regression analysis was performed to identify variables associate with risk of AEs
- Significance defined as p<0.05 with increased risk of AEs.

Table 1 – Patient (N=15715) characteristics of study cohort

Variables		N	Percentage	Variables		N	Percentage
AE	No	9959	63.4%	Instability	1	2638	16.8%
	Yes	5756	36.6%		2	2131	13.6%
Cancer Site	BRE	3186	20.3%		3	2179	13.9%
	CNS	985	6.3%		4	2744	17.5%
	END	234	1.5%		5	6023	38.3%
	ENT	1725	11.0%	Deprivation	1	4318	27.5%
	EYE	416	2.6%		2	3137	20.0%
	GI	1389	8.8%		3	2828	18.0%
	GU	2017	12.8%		4	2738	17.4%
	GYN	1024	6.5%		5	2694	17.1%
	HEM	396	2.5%	Dependency	1	4203	26.7%
	LUN	2135	13.6%		2	3617	23.0%
	LYM	700	4.5%		3	2698	17.2%
	NON-CAN	24	0.2%		4	2325	14.8%
	PAE	7	0.0%		5	2872	18.3%
	SAR	807	5.1%	Ethnic concentration	1	1113	7.1%
	SKI	487	3.1%		2	1452	9.2%
	UNK	183	1.2%		3	3174	20.2%
Sex	Female	8202	52.2%		4	4663	29.7%
	Male	7513	47.8%		5	5313	33.8%
Age	20-40	899	5.7%	Treatment Intent	Curative	9162	58.3%
	40-60	4337	27.6%		Palliative	4657	29.6%
	60-80	8578	54.6%		SBRT	1896	12.1%
	80-100	1901	12.1%	Treatment regimen	Hypofx	10608	67.5%
Time period	COVIDera	10216	65.0%		Conventional	5107	32.5%
	preCOVID	5499	35.0%				

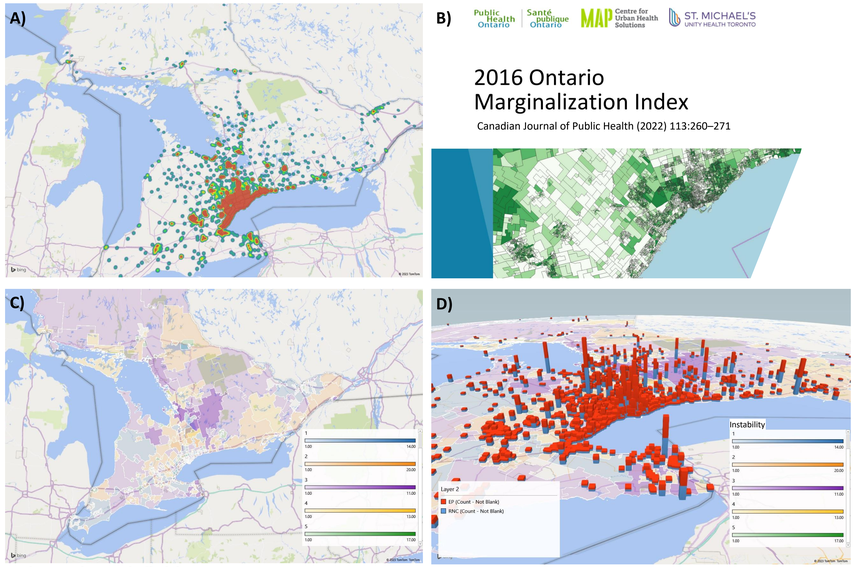
CONCLUSIONS

SES (residential instability and material deprivation) were associated with the increased risk of ED visits within 90 days of RT.

Proactive care and virtual monitoring during the 90-day period after RT in high-risk patients may reduce ED visits.

Figure 1 – Mapping of patients Socio-Economic Status with Adverse Events

Patient postal codes over the 3 years (A) were matched to the dissemination areas within the Ontario Marginalization Index (B) that categorizes 4 SES dimensions of people living in each dissemination areas into quintiles based on 2016 Census answers. In (C) the instability quintile score (1-5) is color coded and darker shades represent more patients belonging to a dissemination area with the same score. The number of emergency (EP) and unplanned radiation nursing clinic (RNC) visits for each unique patient during the 90-day period following a course of radiotherapy was layered on the map (D).



SES Dimensions definitions

- **Residential instability** refers to area-level concentrations of people who experience high rates of family or housing instability.
- **Material Deprivation** is closely connected to poverty, and it refers to inability for individuals and communities to access and attain basic material needs.
- **Dependency** refers to area-level concentrations of people who do not have income from employment.
- **Ethnic concentration** refers to high area-level concentrations of people who are recent immigrants and/or people belonging to a 'visible minority' group

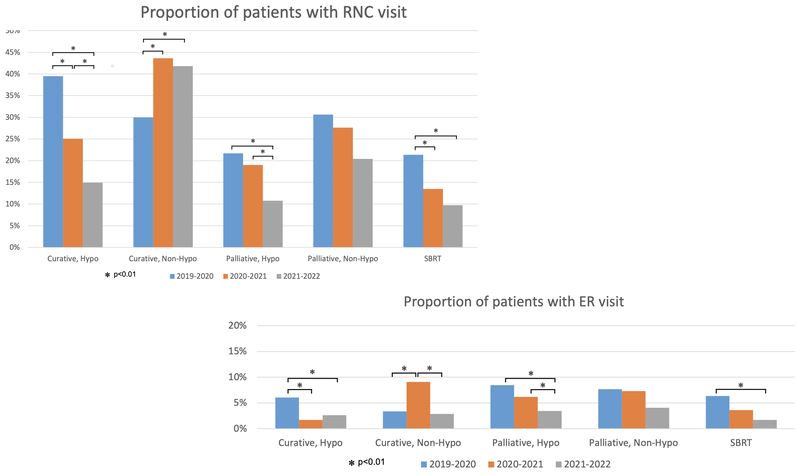
Dimension	Quintiles
Residential Instability	1 = most household/dwelling security 5 = least household/dwelling security
Material deprivation	1 = most material resources 5 = least material resources
Dependency	1 = lowest proportions of seniors, children, and those not in the labour force 5 = highest proportions of seniors, children, and those not in the labour force
Ethnic Concentration	1 = lowest proportions of recent immigrants and visible minorities 5 = highest proportions of recent immigrants and visible minorities

RESULTS

- 15715 patients (5499 pre-COVID and 10216 COVIDera patients)
- 5756 AEs observed (***Figure 2***)
- AE risk was associated with
  - patient age (p<0.001), disease site (p<0.001), treatment intent (p<0.001), treatment regimen (p=0.005), treatment period (pre-COVID vs. COVIDera) (p<0.001) and material deprivation (p=0.027).
- **After adjusting for multiple variables:**
  - **Least materially deprived were at lower risk (Odds Ratio (OR)=0.88, 95%CI [0.78-0.98]) of developing AEs than patients who were most materially deprived.**
  - **Patients with more (5 vs 1-4) residential instability (p<0.001; OR=0.82, 95%CI [0.74-0.90]) were at reduced the risk of ED visits.**
  - **Less (1 vs 2-5) materially deprived patients (p=0.006; OR=0.76, 95%CI [0.66-0.88]) were at reduced the risk of ED visits.**

Figure 2 – AEs by type (Radiation nursing clinic vs. ER), year and treatment regimen used

% Patients reporting to RNC or ER by RT treatment intent per year



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