Evaluating the impact of major events on colorectal cancer incidence in Puerto Rico: An interrupted time-series analysis

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INTRODUCTION

- Colorectal cancer (CRC) is the third most diagnosed cancer and the second leading cause of cancer deaths worldwide.[1]
- CRC remains one of the most incident and deadliest types of cancer in Puerto Rico (PR).[2]
- Patterns of cancer incidence in PR reflect underlying risk factors, disparities in healthcare access, and overall infrastructure limitations.[3]
- In September 2017, a Category 5 Hurricane Maria hit PR just two weeks after Hurricane Irma, resulting in severe damage to healthcare facilities and infrastructure.
- In March 2020, the COVID-19 pandemic emerged, further interrupting services.

OBJECTIVES

- This study aims to evaluate the impact of Hurricanes Irma and Maria, as well as the lockdown measures imposed during the start of the COVID-19 pandemic on the incidence of CRC in PR.

METHODS

- The source of information for this study was the PR Central Cancer Registry (PRCCR) database.
- CRC incidence data in PR from January 2015 to December 2020 were analyzed.
- An interrupted time-series analysis (ITSA) design was used to compare monthly percent change (MPC) in CRC diagnoses during the following four periods:

Period 1	Period 2	Period 3	Period 4
January 2015 to August 2017	September 2017 to March 2018	April 2018 to March 2020	April 2020 to December 2020
Before Hurricanes	Post-Hurricanes	Before COVID-19 Pandemic	Pandemic restrictions

- Ordinary least squares regression models with Newey-West standard errors were used to adjust for autocorrelation.
- The Cumby-Huizinga general test was used to assess for possible autocorrelation.

RESULTS

Figure. CRC incidence trends in PR, major events: Hurricanes and COVID-19 (2015-2020)

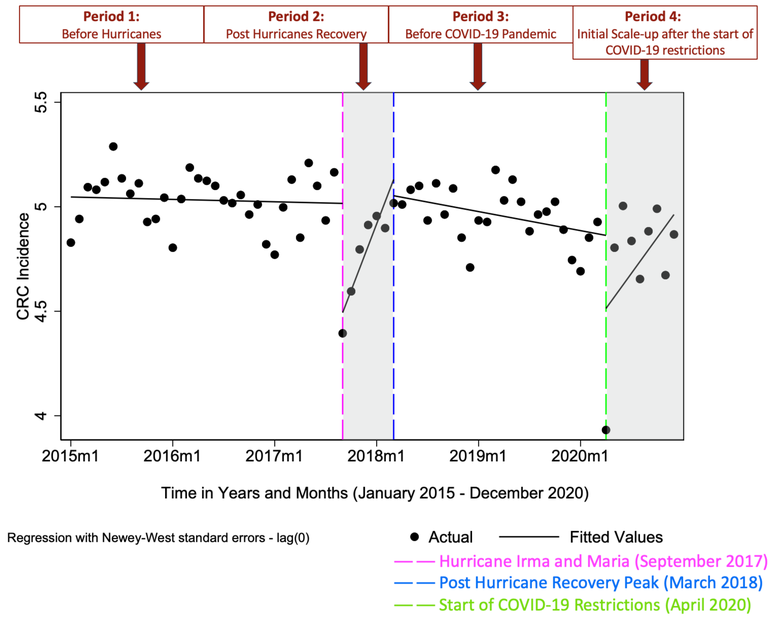

Table 1. Months with immediate change in number of CRC incidence cases in PR (2015-2020)

Distinct Points in Trend	Immediate change in No. CRC cases	95% CI	P-value
Hurricane Irma and Maria (September 2017)	-52.3%	-0.690, -0.356	<0.001
Post Hurricane Recovery Peak (March 2018)	-7.7%	-0.293, 0.139	0.477
Start of COVID-19 Restrictions (April 2020)	-34.9%	-0.891, 0.193	0.202

Table 2. MPC of CRC incidence trends in PR, major events: Hurricanes and COVID-19 (2015-2020)

Period	MPC	95% CI	P-value
1	-0.09%	-0.006, 0.005	0.730
2	10.7%	0.057, 0.157	<0.001
3	-11.4%	-0.164, -0.064	<0.001
4	6.4%	-0.031, 0.159	0.185

DISCUSSION & CONCLUSION

- To our knowledge, this study provides a first-time description of the impact of two major interruptions in the PR health system infrastructure on CRC incidence.
- It sheds light on how unprecedented events disrupt the health system and create challenges for cancer patients.[4]
- Our analyses confirm a change in level and trend caused by the hurricane's aftermath and the COVID-19 restrictions.
- However, due to data limitations at the time of analysis, more research is needed to better understand CRC incidence in the post-pandemic restrictions period.
- More research is needed to better understand the potential factors associated with the decrease of the CRC MPC after post-hurricane recovery (third period), such as migration and changes in health system capacity.
- Public health efforts should prompt research, policy change, increase infrastructure systems, and resilience to provide more support for cancer screening, diagnostics, and treatment during and after natural disasters and major events.[5]

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