

Illinois Colorectal Cancer Incidence in Adults, 2000-2021

Stephen Roy and Lori Koch

In the United States, rates of new cancers (incidence) and deaths (mortality) from colorectal cancer (CRC) have fallen among people aged 50 years of age and older, while those among people less than 50 years of age have been steadily increasing (1). Nationally, CRC has increased from the fifth-leading cause in the 1990's to the second-leading cause of cancer-related death in males and females aged less than 50 years of age in 2021 (2,3). Increases in CRC among younger patients are offsetting decreases in incidence and mortality among the older population, primarily accomplished through increased screening (4). Trends in CRC among younger patients have prompted new recommendations from the American Cancer Society (ACS) and the U.S. Preventative Services Task Force (USPSTF) to begin screening starting at 45 years of age, rather than 50 years of age (5,6). Illinois currently ranks 33rd in the nation for CRC incidence and 34th for CRC mortality. In Illinois in 2021, CRC was the third leading diagnosed cancer and the third leading cause of cancer death among males and females (2,7). Because CRC is preventable, and Illinois has a higher rate when compared to the U.S. (5), Gov. JB Pritzker declared March 2024 as CRC Awareness Month mirroring the national presidential proclamation (9). The hope was to increase screening and lower incidence and mortality rates associated with the disease (10). Because guidelines to begin screening at age 45 are relatively new, there is little data to show how well it is working to decrease cancer incidence in this population. Yet, early and regular screening remains an important prevention tool. This report shows Illinois' incidence rates stratified by age, sex, race/ethnicity, and stage.

The overall age trends as depicted in Figure 1 demonstrate a statistically significant increase in new cases of CRC in the younger population whereas the older populations show a significant decrease in new cases. While the number of new cases was small, the percent change from 2000 to 2021 represents a 44% increase in the 20–49 age group, an 18% decrease within the 50–64 age group, and a 53% decrease within the 65 and older age group. Similar patterns of increases and decreases in new cancer cases can be seen among males (+38%) and females (+45%) from 2000 to 2021 in the 20–49-year age grouping (see Figure 2).

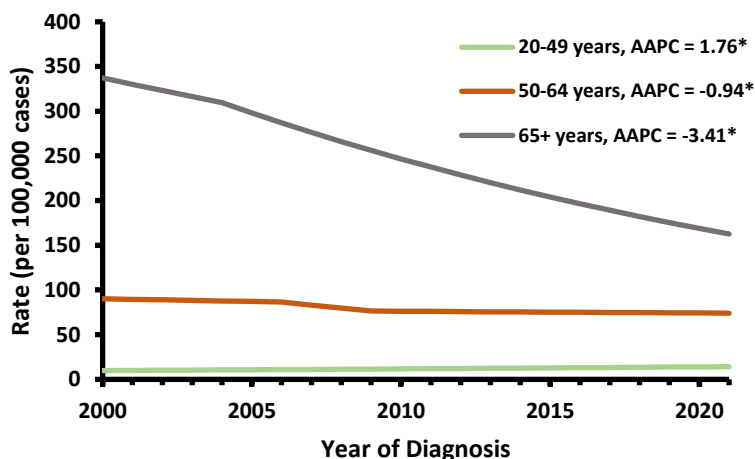


Figure 1 – Trends in colorectal cancer incidence by age, Illinois, 2000-2021. AAPC – Average Annual Percent Change.

* Statistically significant from zero ($p < 0.05$).

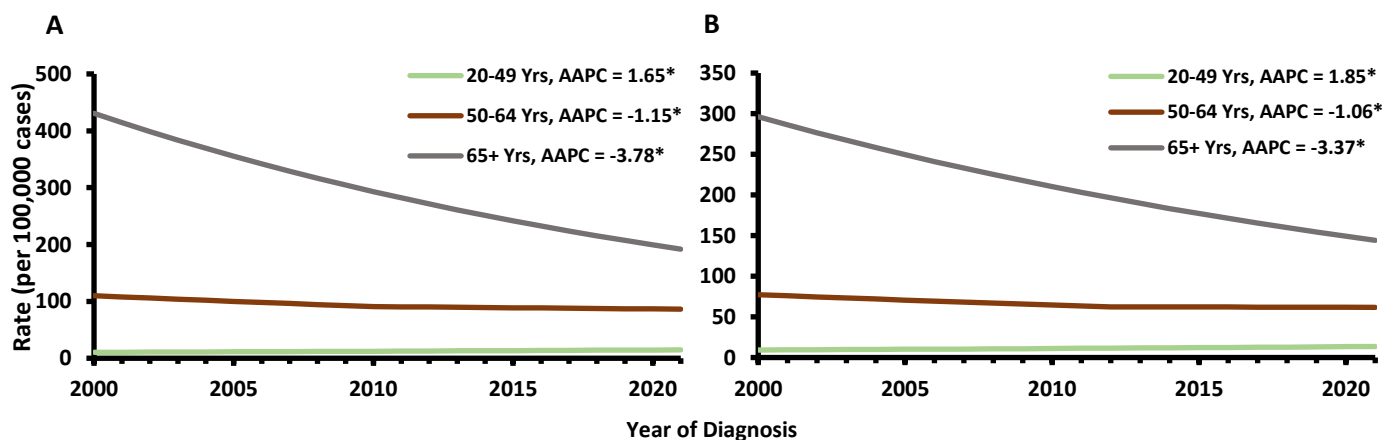


Figure 2 – Incidence trends among (A) males and (B) females stratified by age, Illinois, 2000-2021. AAPC – Average Annual Percent Change.

* Statistically significant from zero ($p < 0.05$).

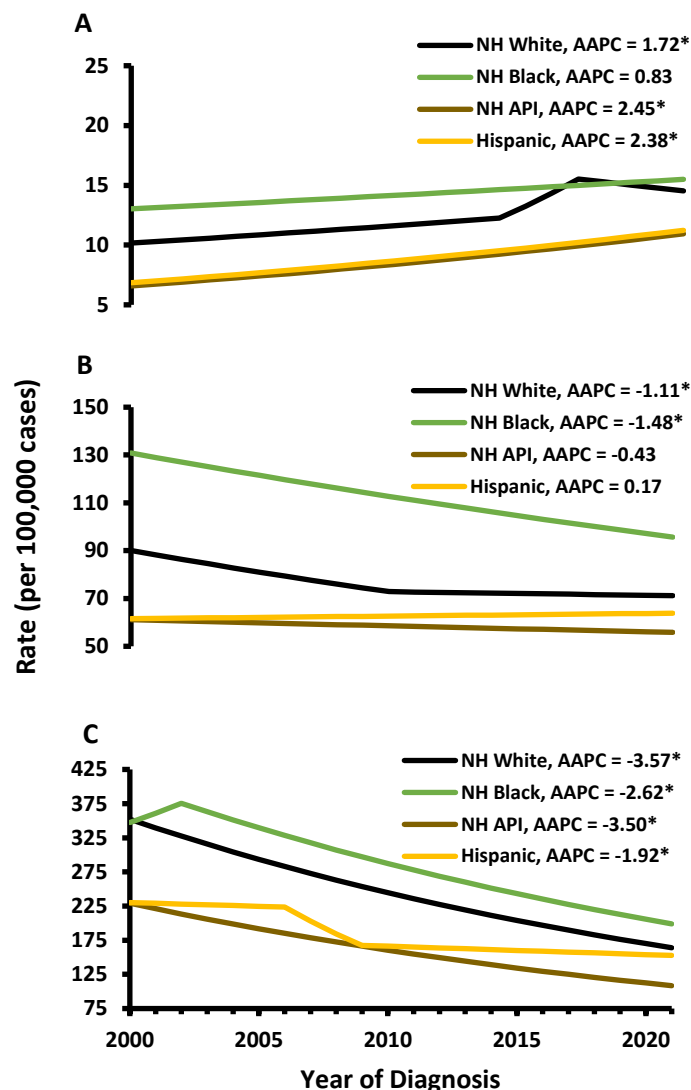


Figure 3 – Incidence trends among (A) 20-49, (B) 50-64, and (C) 65+ year olds stratified by ethnicity, Illinois, 2000-2021. AAPC – Average Annual Percent Change. * Statistically significant from zero ($p < 0.05$).

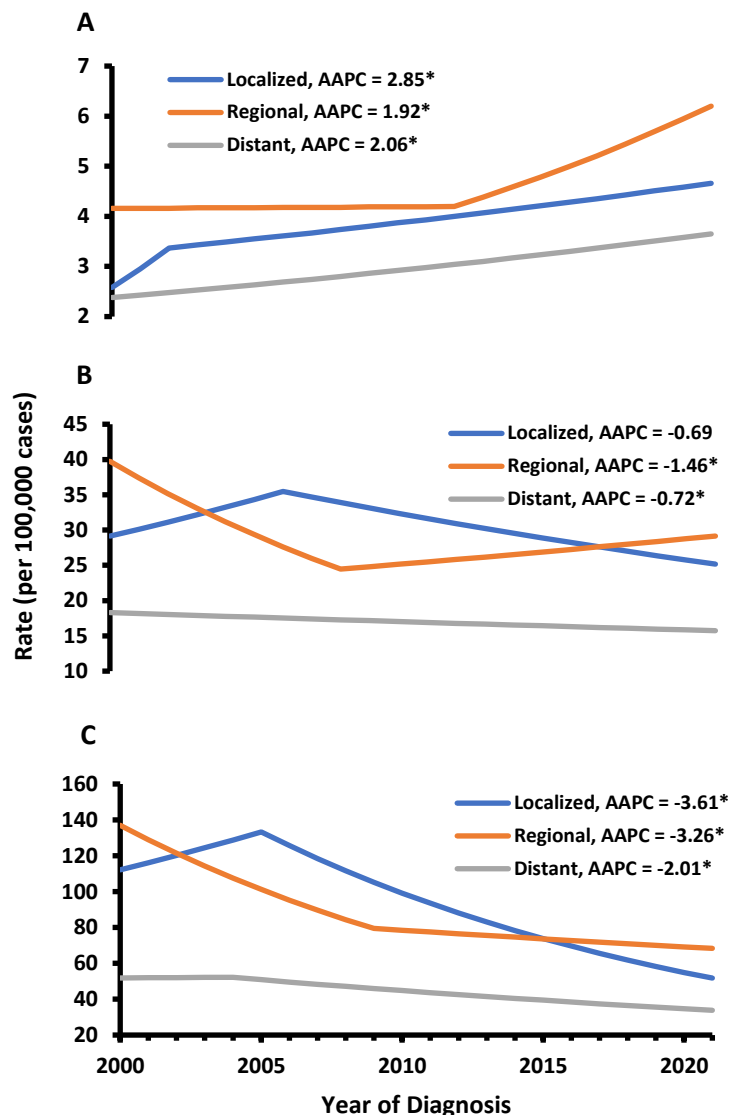


Figure 4 – Incidence trends among (A) 20-49, (B) 50-64, and (C) 65+ year olds stratified by stage at diagnosis, Illinois, 2000-2021. AAPC – Average Annual Percent Change. * Statistically significant from zero ($p < 0.05$).

Throughout 2000 to 2021, non-Hispanic (NH) Blacks have demonstrated the highest incidence in comparison to any other race/ethnicity in all age categories (see Figure 3). In 2021, NH Blacks had a 29% higher percent difference than NH Whites among the 50–64-year age group and were 20% higher within the 65 and older year age group. Additionally, the Hispanic population showed a different trend compared to the other race/ethnicity categories among the 65 year and older age category with an annual percent change (APC) of 0.32 from 2009 to 2021 which demonstrated a plateau in the trend for over a decade. Within the 20-49 age group there was an increasing trend among all stages of disease, while in the two older age groups there was a statistically significant increase in cases diagnosed at the regional stage of disease over recent years. (see Figure 4).

Summary

Together, the data demonstrated increasing trends of new CRC cases among the younger population between 2000-2021 as well as unfavorable shifts in CRC diagnosis at a later stage of disease (regional stage) in all age groups. This shift in stage suggests that additional CRC screening is needed in these populations. Therefore, the call for revised screening age

standards to reduce CRC incidence among younger adults is appropriate but ultimately there remains an additional need to increase CRC screening in all age groups as early detection reduces the number of cases diagnosed at a later stage when the disease has progressed and is more difficult to treat.

Data source and methods

Incidence data collected as new cancer cases for the years 1990-2021 from the Illinois Department of Public Health's Illinois State Cancer Registry (ISCR) is dependent upon reporting by hospitals, free-standing clinics, radiation treatment facilities, laboratories, and physician offices as required by state law. Agreements with other central cancer registries facilitate collecting new cancer cases located in other states, including Arkansas, California, Florida, Indiana, Iowa, Kentucky, Michigan, Mississippi, Missouri, North Carolina, Washington, Wisconsin, Wyoming, and the Mayo Clinic in Minnesota. Data reflects the ISCR case collection as of November 2023. The data were made available in June 2023. The population estimates incorporate intercensal (for 2000-2009 and 2010-2019) and Vintage 2020 (for 2020-2022) bridged single-race estimates are derived from the original multiple race categories in the 2000, 2010, and 2020 censuses (as specified in the 1997 Office of Management and Budget standards for the collection of data on race and ethnicity). The bridged single-race estimates, and a description of the methodology used to develop them, appear on the National Center for Health Statistics website (https://www.cdc.gov/nchs/nvss/bridged_race.htm). Intercensal estimates for 2021 were derived from Woods & Poole Economics Inc. that aligns with the anticipated Census Bureau's 2010-2020 intercensal estimates methodology (<https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/intercensal/2000-2010-intercensal-estimates-methodology.pdf>) (Woods & Poole Economics, Inc. 2010-2020 County Intercensal Estimates ([cancer.gov](https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/intercensal/2000-2010-intercensal-estimates-methodology.pdf))). More in-depth information concerning registry operations and data collection can be found on IDPH's annual incidence Epidemiological Report Series located on ISCR's website (<https://dph.illinois.gov/data-statistics/epidemiology/cancer-registry>) (11). Use of population data and calculation of incidence rates was performed by SEER*stat software (12).

Trend analysis and weighted averages to compute a weighted average of annual percent change (AAPC) were calculated and analyzed with the Joinpoint Regression Program (National Cancer Institute; Version 5.1.0.0) (8,13) incorporating log transformation. Default settings for grid search of joinpoints included two observations on either end of a dataset at minimum, two observations between joinpoints at minimum, and no joinpointing to occur between any observed values. The model selection method incorporated the weighted Bayesian Information Criterion (BIC). Both grid search methodology and model selection were set to the default settings of the Joinpoint program. The Empirical Quantile method was employed to calculate the most accurate confidence intervals for selected models. As recommended by the Surveillance, Epidemiology, and End Results (SEER) data release, 2020 data was excluded from all trend analysis as it served as an outlier due to low screenings and doctor visits with respect to COVID-19 (<https://seer.cancer.gov//data/covid-impact.html>).

References

1. Surveillance, Epidemiology, and End Results (SEER) Program Populations (1969-2020) (www.seer.cancer.gov/popdata), National Cancer Institute, DCCPS, Surveillance Research Program, released February 2022. Retrieved from State Cancer Profiles - Dynamic views of cancer statistics for prioritizing cancer control efforts across the nation: <https://statecancerprofiles.cancer.gov/index.html>
2. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2020) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, released June 2022. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).
3. Siegel, R. L., Giaquinto, A. N., & Jemal, A. (2024). Cancer statistics, 2024. *CA: a cancer journal for clinicians*.
4. Siegel, R. L., Wagle, N. S., Cercek, A., Smith, R. A., & Jemal, A. (2023). Colorectal cancer statistics, 2023. *CA: a cancer journal for clinicians*, 73(3), 233-254.
5. Wolf, A. M., Fontham, E. T., Church, T. R., Flowers, C. R., Guerra, C. E., LaMonte, S. J., ... & Smith, R. A. (2018). Colorectal cancer screening for average-risk adults: 2018 guideline update from the American Cancer Society. *CA: a cancer journal for clinicians*, 68(4), 250-281.
6. Davidson, K. W., Barry, M. J., Mangione, C. M., Cabana, M., Caughey, A. B., Davis, E. M., ... & US Preventive Services Task Force. (2021). Screening for colorectal cancer: US Preventive Services Task Force recommendation statement. *Jama*, 325(19), 1965-1977.
7. National Program of Cancer Registries and Surveillance, Epidemiology and End Results Program SEER*Stat Database: NPCR and SEER Incidence - U.S. Cancer Statistics Public Use Research Database, 2022 Submission (2001-2020). United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2023. Accessed at www.cdc.gov/cancer/uscs/public-use.

8. Joinpoint Regression Program, Version 5.1.0.0. April, 2024; Statistical Research and Applications Branch, National Cancer Institute.
9. Biden, JR (2024, Feb 29). Proclamation on National Colorectal Cancer Awareness Month, 2024. The White House. <https://www.whitehouse.gov/briefing-room/presidential-actions/2024/02/29/proclamation-on-national-colorectal-cancer-awareness-month-2024/>.
10. Illinois Department of Public Health (2024, Feb 28). Colorectal Cancer Awareness Month (March 2024). <https://dph.illinois.gov/content/dam/soi/en/web/idph/publications/idph/topics-and-services/diseases-and-conditions/cancer/colorectal-cancer-awareness-month-03-07-2024.pdf>.
11. Garner K, Fornoff J (2024). Illinois State Cancer Incidence Review and Update, 1986-2021. Epidemiologic Report Series 23:06. Springfield, Ill.: Illinois Department of Public Health.
12. Surveillance, Epidemiology, and End Results Program SEER*Stat Database: IL Inv Cancer Inc by County (1990-2021) IHS & NAPIIA in Race 1 as of November 2023, ExpRace Hispanic, 19ages, 2022 Pops created 3/29/2024. Illinois Department of Public Health, Illinois State Cancer Registry. Released November 2023.
13. Kim, H.J., Fay, M.P., Feuer, E.J., Midthune, D.N. (2000). Permutation tests for joinpoint regression with applications to cancer rates. *Stat Med*, 19, 335-51 (correction: 2001; 20, 655).