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# Elevated Cancer Risk Among Individuals with Combinations of Cancer-related Risk Factors: A Large Claims Database Analysis

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## INTRODUCTION

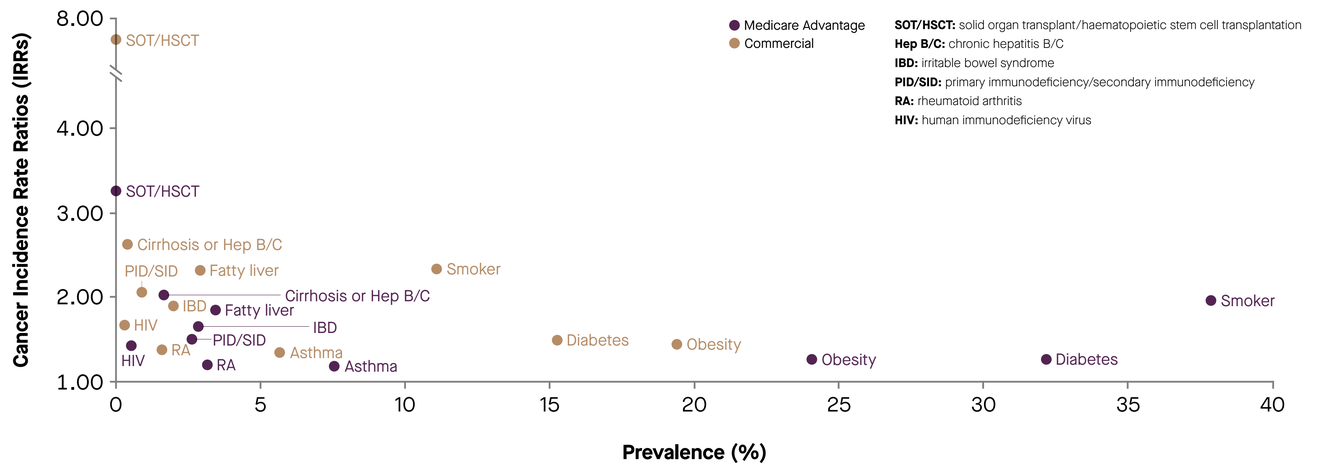
- Besides age, many factors have been demonstrated to be associated with elevated cancer risk. Roughly 40% of cancer cases are linked to potentially modifiable factors,[1] such as smoking,[2] obesity,[3] and diabetes,[4] etc.
- Limited literature has been focused on the magnitude of elevated multi-cancer risks among individuals with risk factors for cancer using the same dataset with consistent methodology.
- Understanding real world multi-cancer incidence rates among patients with single or multiple risk factors can help inform cancer prevention and detection efforts.

## OBJECTIVES

- This study sought to quantify the prevalence and the cancer incidence rate ratios (IRRs) among individuals with risk factors for cancer versus the general population in the US.

## KEY RESULTS: BASED ON A RECENT LARGE SCALE CLAIMS DATASET, INDIVIDUALS AGED 50 YEARS OR OLDER INSURED THROUGH COMMERCIAL OR MEDICARE ADVANTAGE PLANS WITH ANY RISK FACTOR EXPERIENCED STATISTICALLY SIGNIFICANT ELEVATED CANCER RISK

**Figure 1. Prevalence and Cancer Incidence Rate Ratios Among Individuals Aged 50-79 with Risk Factor(s), by Insurance Type**




- Individuals aged 50-79 with any risk factors assessed had statistically significant elevated risk of cancer, regardless of insurance type (IRRs>1.0, p-values<0.05) (**Figure 1**).
- Patients who went through transplants had the highest relative incidence rate of cancer (IRR=7.68 for commercial plan and 3.24 for Medicare Advantage).
- Prevalence rates of enrollees with the same risk factors were higher in Medicare Advantage than in the commercial plans.

## CONCLUSIONS

- Based on recent large-scale claims data, patients aged 50-79 in both commercial and Medicare Advantage plans with any risk factor experienced significantly elevated cancer risk compared to the general population (33%~668% for commercial plan; 17%~224% for Medicare Advantage).
- Risk of cancer was further elevated among patients with multiple risk factors.
- When facing resource constraints, cancer prevention and screening strategies can be informed by risk levels among different patient subgroups to optimize resource allocation.

### References

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4. Giovannucci E, et al. *Diabetes Care*. 2010 Jul;33(7):1674-85. doi: 10.2337/dc10-0666. PMID: 20587728; PMCID: PMC2890380.

### Disclosures

All financial relationships disclosed at abstract submission.

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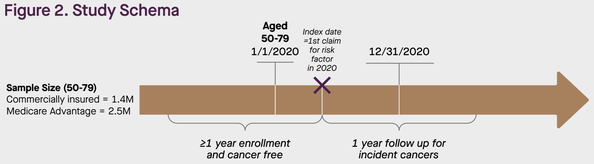
## METHODS

- Study design: A retrospective observational analysis.
- Database: Optum's de-identified Clinformatics® Data Mart which includes Medicare Advantage (vast majority aged 65+) and commercially insured members (mostly below 65 and employed) (**Figure 2**).
- Inclusion/exclusion criteria:
  - Individuals aged 50-79 in 2020
  - No prior cancer diagnosis (continuously enrolled with no cancer claims for one year)
  - With any cancer risk factors in 2020 identified using ICD-10-CM and CPT-4 codes:
    - Autoimmune-related chronic inflammation (diabetes, inflammatory bowel disease, asthma, or rheumatoid arthritis)
    - Non-autoimmune related chronic inflammation (fatty liver disease, obesity, or cirrhosis/chronic hepatitis B/C)
    - Immunodeficiency (primary or secondary immunodeficiency, HIV, or status post organ transplant)
    - Smoking (current or previous smokers)
- Individuals with evidence of any individual risk factor, or risk factor group were assessed.
- Prevalence rates of individuals with risk factors or combination of risk factors were estimated.
- Cancer IRRs were calculated by comparing one-year cancer incidence rate among the groups with risk factors versus the general population by insurance type (IRR>1 means elevated risk of cancer).
- Statistical significance of IRRs was evaluated using logistic regression models adjusting for demographic characteristics.
- All analyses were stratified by payer type (commercial plan vs. Medicare Advantage).

**Figure 2. Study Schema**




**Prevalence** = number of individuals aged 50-79 with risk factors, continuously enrolled but no cancer claim 1 year prior/number of individuals aged 50-79, continuously enrolled but no cancer claim 1 year prior

**Cancer incidence** = number of new cancer cases within one year after index/number of individuals at risk (1 year continuous enrollment after index OR number of individuals died of cancer within 1 year)

**Cancer incidence ratio in commercial plan** = cancer incidence in patients with risk factor on commercial plan/cancer incidence in general population on commercial plan

**Cancer incidence ratio in Medicare Advantage** = cancer incidence in patients with risk factor on Medicare Advantage/cancer incidence in general population on Medicare Advantage

## SUPPORTING DATA

### Participants

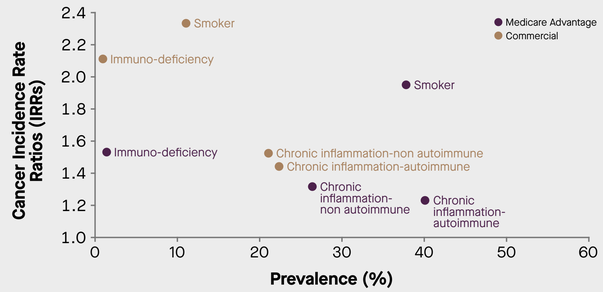
- 1,402,648 individuals aged 50-79 years old on commercial plans and 2,545,472 on Medicare Advantage plans were assessed.
- The one year cancer incidence rates were 1.12% and 2.11% for commercial and Medicare Advantage, respectively (**Table 1**).

**Table 1. Overall Cohort Size and Cancer Incidence Rates by Insurance Type**

| Insurance Type | Cohort (N) | Incident Cancer Cases (N) | 1-Year Cancer Incidence Rate (%) |
|---|---|---|---|
| Commercial | 1,402,648 | 15,715 | 1.12 |
| Medicare Advantage | 2,545,472 | 53,739 | 2.11 |

- All risk groups had statistically significant elevated risk of cancer compared to the general population (IRRs>1.0, p-values<0.05), regardless of insurance type (**Figure 3**).
- Risks of cancer were further elevated among individuals with multiple risk factors.
  - Smokers with immune-deficiency had the highest magnitude of cancer risk elevation (IRR=3.16 commercial and 2.19 Medicare Advantage).
  - Smokers with chronic inflammation-autoimmune conditions had the 2nd highest magnitude of cancer risk elevation (IRR=2.43 commercial and 1.95 Medicare Advantage).
- Prevalence of risk groups are higher in Medicare Advantage vs. commercial plans (**Figure 3**).

**Figure 3. Prevalence and Cancer Incidence Rate Ratios Among Individuals Aged 50-79 with Risk Factor Groups, by Insurance Type**




### Limitations

- This research analyzed data from the Optum dataset, which focused on individuals with health insurance plans. Cautions need to be taken while extrapolating the results from this analysis to the general population in the US.
- The identification of risk factors in this analysis relied on ICD-10 and CPT codes. Under report and misclassification of some of the health conditions in claims dataset are not uncommon, e.g., smoking, obesity.