Effect of bariatric surgery on cancer risk: identifying appropriate non-exposed controls for a cohort study

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Background

- We study whether the risk of cancer is reduced after bariatric surgery (BS) using Real-World Data (RWD).
- Target trial emulation using RWD can help produce unbiased estimates of observational analyses.

- Idea: use OHDSI tools to implement target trials.
- Problem: Non-BS patients (control group) do not have an index date needed for the analysis.
- Solution: We describe a protocol to study specific site cancer risk after BS in the OHDSI network. We address the issue of identifying appropriate non-exposed controls.

Methods

- Matched cohort study from 2000 to 2019 using databases mapped to the OMOP-CDM.
- Participants: BS or non-BS patients with a body mass index (BMI)≥ 35 kg/m² or an obesity diagnosis.
- Main exposure: BS.
- Main outcomes: incident diagnoses of specific site cancers.
- Covariates: sociodemographic characteristics of patients, diagnoses, procedures, measurements and devices.

A randomized matching process to emulate a target trial

1. We split the study period in 1-year windows.
2. At each window, we assign patients into the BS and non-BS cohorts.
3. BS cohort: index date = surgery date.
   - Non-BS cohort: index date = random date (in the 1-year window).
4. We identify the covariates from 365 days previous to their index date.
5. We estimate propensity scores (PS).
6. We match 1 BS patient with up to 5 non-BS patients (without replacement) using the PS.
   - We fit Cox proportional hazard models to estimate the risk of developing each cancer type.

Final remarks

- It is possible to emulate a target trial even without a clearly defined index date for non-exposed controls.
- Analogous to in a target trial, patients in the non-BS cohort at period X, could still undergo a BS in the future.
- A network study will soon be proposed to the OHDSI Community using this protocol.