Associations between transport modes and risks of site-specific cancers: A systematic literature review and meta-analysis

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Background

Choice of transport mode can influence risk of cancers

- Physical activity (bladder, breast, colon, endometrial, oesophageal adenocarcinoma, gastric and renal cancers)[1,2]
- Sedentary behavior (e.g., car driving)[3]
- Environmental factors (air pollution, noises)[4,5]
- WHO/NZ: at least 150–300 minutes of moderate-intensity (e.g., walking for commute) or 75–150 minutes of vigorous-intensity aerobic PA (e.g., cycling for commute) per week[6]

1. Rezende LFM de, Sá TH de, Markozannes G, Rey-Lopez JP, Lee IM, Tsilidis KK, et al. Physical activity and cancer: an umbrella review of the literature including 22 major anatomical sites and 770 000 cancer cases. Br J Sports Med. 2018 Jul;52(13):826–33.
2. Mctiernan A, Friedenreich CM, Katzmarzyk PT, Powell KE, Macko R, Buchner D, et al. Physical Activity in Cancer Prevention and Survival: A Systematic Review. Medicine & Science in Sports & Exercise. 2019 Jun;51(6):1252–61.
3. Hermelink R, Leitzmann MF, Markozannes G, et al. Sedentary behavior and cancer–an umbrella review and meta-analysis. Eur J Epidemiol. 2022;37(5):447-460. doi:10.1007/s10654-022-00873-6
4. World Health Organization, editor. Air quality guidelines for Europe. 2nd ed. Copenhagen: World Health Organization, Regional Office for Europe; 2000. 273 p.
5. Andersen ZJ, Jørgensen JT, Elsborg L, Lophaven SN, Backalarz C, Laursen JE, et al. Long-term exposure to road traffic noise and incidence of breast cancer: a cohort study. Breast Cancer Res. 2018 Dec;20(1):119.
6. WHO PA guideline

Research question

What is the current evidence about the association?

Methodology

Systematic Literature Review

- PubMed, Embase, Scopus
- November 2022 – February 2023

Meta-analysis

- Pooling the risks from the studies to generate a summary/overall effect

Results (Literature Search)

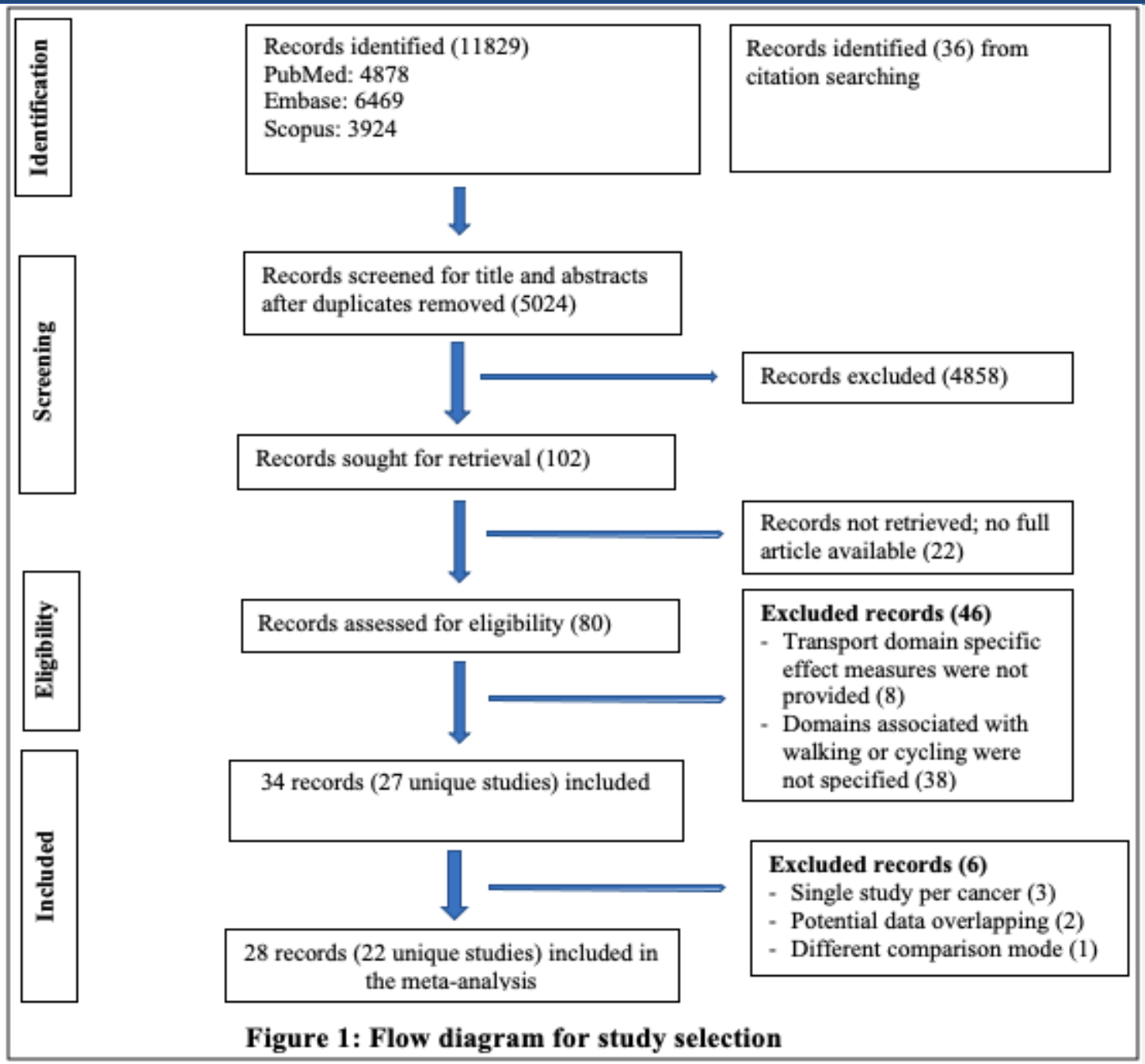


Figure 1: Flow diagram for study selection

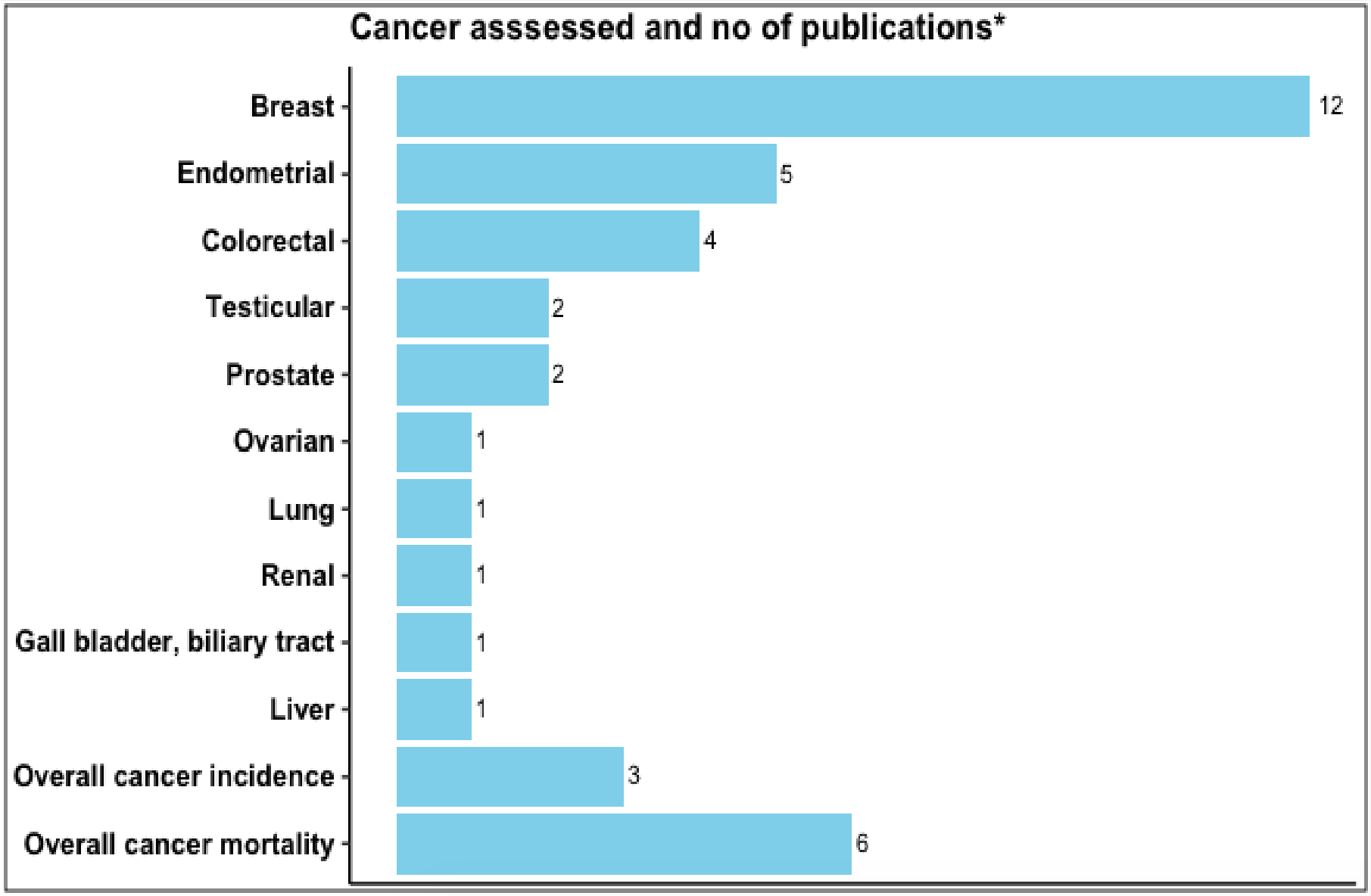
Results (Overview of included studies)

- Study designs
  - Case-control (55%)
  - Cohort (45%)

- Two thirds of the studies were conducted in Europe and USA

- **Mode/s assessed**
  - Highest vs lowest level
    - Walking and cycling combined mode (n=13)
    - Walking and cycling modes separately (n=12)
  - Across different modes
    - Walking, Cycling, Public Transport and Car modes (n=2)

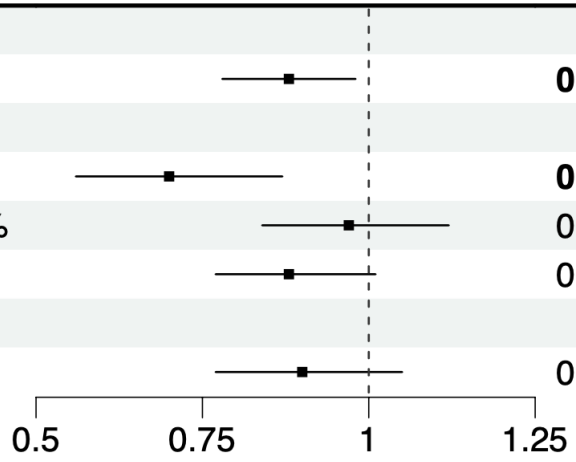
Results (Site-specific cancers assessed)



Results (Meta-analysis)

Highest level vs lowest level

Mode_cancer	Studies	Sample	Cases	I^2	Summary Risk (95% CI)
Walking					
Breast	6	78544	5547	0%	**0.88 (0.78 – 0.98)**
Walking and cycling					
Endometrial	4	206360	1544	0%	**0.70 (0.56 – 0.87)**
Breast	5	131155	5883	31%	0.97 (0.84 – 1.12)
Colorectal	2	144438	3161	9%	0.88 (0.77 – 1.01)
Cycling					
Breast	4	71677	3394	0%	0.90 (0.77 – 1.05)



Results (Meta-analysis)

- **Increment of 150 min of walk or 90 min of cycling per week for transport** (~30 min of walk or ~18 min of cycling per day for commute for 5 working days)

Mode_cancer	Sample	Cases	Studies	I^2	RR (95% CI)
Breast	182529	10012	8	0%	**0.98 (0.97 - 0.996)**
Endometrial	98431	2560	4	71%	**0.93 (0.89 - 0.98)**
Colorectal	270316	4712	3	61%	**0.95 (0.91 - 0.99)**
Prostate	58416	1489	2	20%	0.96 (0.88 - 1.04)
Overall cancer mortality	145949	2573	2	49%	0.97 (0.92 - 1.01)

Strengths and limitations

Strengths

- First attempt to systematically identify and synthesize evidence for site-specific cancers
- Generate mode-specific overall effect

Limitations

- Only include English language studies
- Need to pool risks from studies with different designs

Conclusion

- Active transport modes appear to reduce the risks of some common cancers (breast, colorectal, and endometrial)
- Evidence on association with other cancers is limited.

THANK YOU!!