Meeting 3

Cancer - Primary Prevention

Chair: Anne McTiernan

Members: Peter Katzmarzyk, Ken Powell

Experts and Consultants

- Invited experts:
  - None

- Consultants:
  - Christine Friedenreich, PhD

    Alberta Health Services

Subcommittee Questions

1. What is the relationship between physical activity and cancer incidence?
   - What is the dose-response?
   - Does the relationship differ by gender, race, or ethnicity?
   - Does the relationship differ by specific cancer subtypes?
   - Is the relationship present in persons at high risk, such as those with familial predisposition to cancer?
2. What is the relationship between sedentary behavior and cancer incidence?

Question 1 – Breast & Colorectal Cancers

- What is the relationship between physical activity & cancer incidence?
- Source of evidence to answer question:
  - Systematic reviews
  - Meta-analyses
  - Pooled analyses

Analytical Framework

Systematic Review Question

What is the relationship between physical activity and cancer incidence?

Target Population

Adults, 18 years and older

Exposure

All types and intensities of physical activity, including lifestyle activities/leisure activities

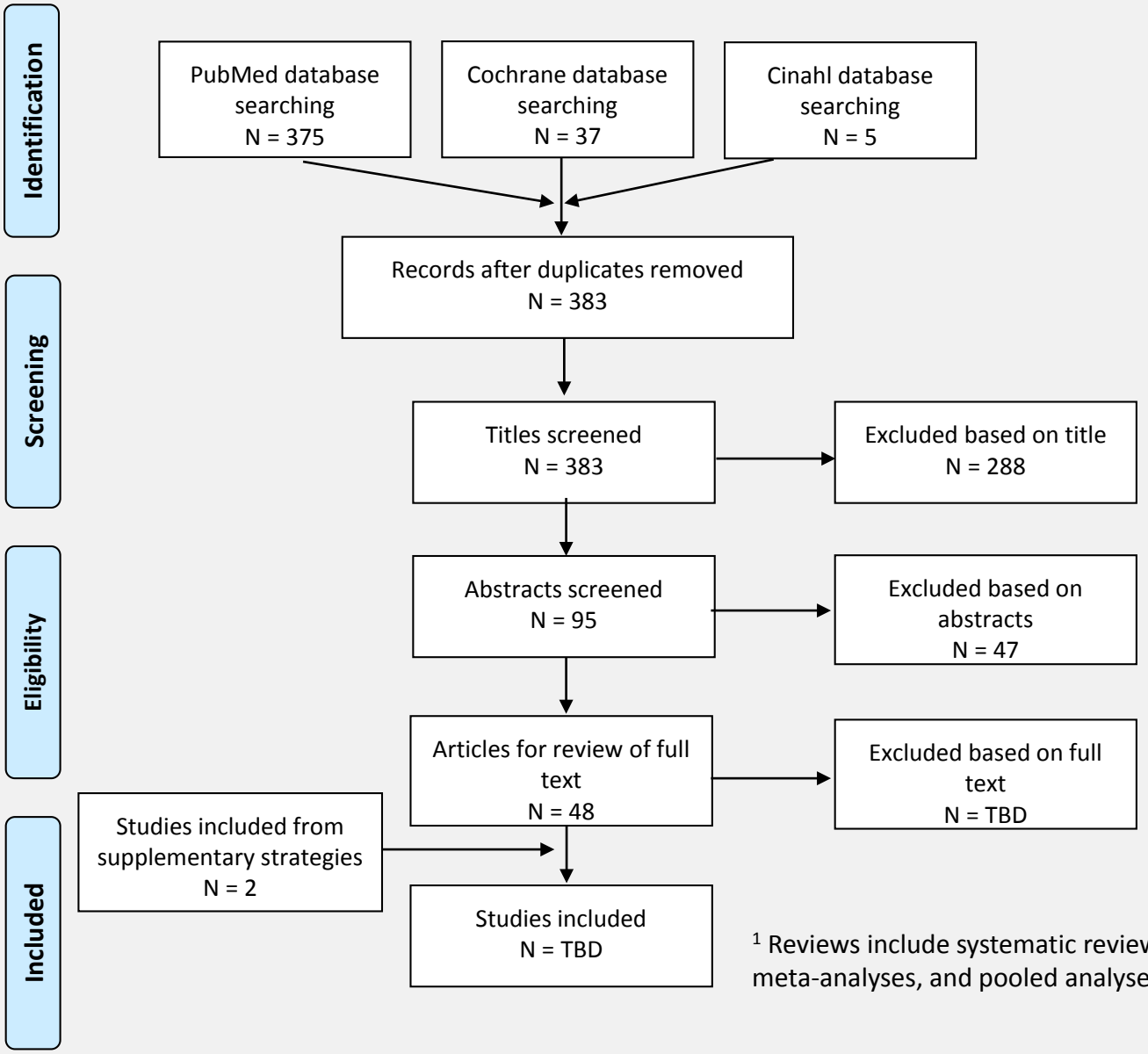
Comparison

Adults who participate in varying levels of physical activity

Endpoint Health Outcome

Incidence of cancer

Search Results (All Cancers): High-Quality Reviews[1] and Reports



[1] Reviews include systematic reviews, meta-analyses, and pooled analyses.

Search Results: High-Quality Reviews[1] & Reports for

- Bladder
- Brain
- Breast
- Colorectal/colon/rectal
- Endometrial
- Esophageal
- Gastric
- Gastroesophageal
- Head and Neck
- Hematologic
- Lung
- Lymphoma
- Non-Hodgkin Lymphoma
- Ovarian
- Pancreatic
- Prostate
- Renal
- Thyroid

[1] Reviews include systematic reviews, meta-analyses, and pooled analyses.

Search Results (Breast & Colorectal Cancers): High-Quality Reviews[1] & Reports

- Breast cancer
  - Among the articles for full text review 9 reported risk of breast cancer
    - 3 were excluded during full text review
    - 6 were included
- Colorectal cancer
  - Among the articles for full text review 6 reported risk of colorectal cancer
    - No articles were excluded during full text review
    - 2 reviews from supplementary strategies were included
    - 8 were included

[1] Reviews include systematic reviews, meta-analyses, and pooled analyses.

Description of the Evidence – Breast Cancer

- Breast Cancer
  - All included reviews were published between 2014-2016
  - N=4 to 80 individual studies
  - 4 of 6 reviews included cohort studies only
  - Mainly considered leisure time PA
  - All examined dose-response effects
  - Several examined sub-group effects

Draft Key Findings – Breast Cancer

- Breast cancer
  - 10-20% reduced risk of breast cancer in “highest” vs “lowest” category of PA
  - Evidence for a dose-response effect found in 4 of 6 reviews
  - Sub-groups considered by: age, race/ethnicity, tumor sub-type, and several breast cancer risk factors
  - Increased lifetime PA most beneficial
  - Effect seen in both pre- and post-menopausal women
  - Statistically significant risk reductions in White, White-Hispanic, and Asian groups (non-significant reductions in Blacks and Hispanics)
  - Greater reductions in: BMI<25; no family history of breast cancer; never used menopausal hormone therapy
  - No clear pattern of risk reduction by tumor sub-type, grade, geographic region, other parameters of activity or other lifestyle factors

Draft Conclusion Statement – Breast Cancer

- Conclusion Statement: Breast Cancer
  - There is strong and consistent evidence from over 65 studies conducted worldwide that physical activity reduces breast cancer risk by 10-20% when comparing the most to least physically active
  - There is also evidence for a clear dose-response effect that is linear to about 20-30 MET-hours/week of moderate-vigorous physical activity particularly among post-menopausal women

- Grade: Strong

Draft Implications – Breast Cancer

- Breast cancer
  - Moderate-vigorous physical activity can be recommended as a means of reducing breast cancer risk to women of all ages, races, ethnic backgrounds
  - There is a particular benefit observed with sustained activity over lifetime, higher intensity and duration of activity

Description of the Evidence – Colorectal Cancer

- Colorectal Cancer
  - 1 included review was published between 2014-2016
  - N=4 to 80 individual studies
  - 2 of 6 reviews included cohort studies only
  - Mainly considered leisure time PA
  - Some examined dose-response effects
  - Several examined sub-group effects

Draft Key Findings – Colorectal Cancer

- ~ 25% reduced risk of colon cancer in “highest” vs. “lowest” category of leisure-time PA
- Similar effects proximal & distal colon
- No effect on rectal cancer
- Effect lower in women than men
- Dose-response analysis (10 studies) vs. 0 leisure-time PA*:
  - 10 MET-hours/week RR = 0.92
  - 20 MET-hours/week RR = 0.85
  - 30 MET-hours/week RR = 0.86
  - P non-linearity = 0.002

*Liu et al. Leisure time physical activity and cancer risk: evaluation of the WHO’s recommendation based on 126 high-quality epidemiological studies. Br J Sports Med 2016;50:372–378.

Draft Conclusion Statement – Colorectal Cancer

- Conclusion Statement: Colorectal Cancer
  - Physical activity is associated with reduced risk for colon, but not rectal, cancer
  - Dose-response analysis (10 studies) indicates that a dose of 20 MET-hours/week in leisure-time PA provides maximal risk reduction

- Grade: Strong

Draft Implications – Colorectal Cancer

- Colorectal cancer
  - Physical activity equivalent to at least 10 MET-hours/week can be recommended as a means of reducing colon cancer risk in men and women
  - 20 MET-hours/week provides maximal benefit

Draft Research Recommendations – Breast & Colorectal Cancers

- Dose-response relations should be investigated further to clarify the effect of very high levels of moderate-vigorous activity
- Direct measurement of activity, rather than self-report, would reduce measurement error
- No randomized controlled exercise intervention trials have been conducted of physical activity and breast or colon cancer incidence, hence evidence is based on observational data only

Committee Discussion

What is the relationship between physical activity and cancer incidence?

Additional Prioritized Questions

2. What is the relationship between sedentary behavior and cancer incidence?
   – Note: Question 2 will be answered by the Sedentary Subcommittee's Question 4