Online-only supplemental material

Association of type 2 diabetes with cancer: A meta-analysis with bias analysis for unmeasured confounding in 151 cohorts comprising 32 million people

Contents

Table S1. Reasons for exclusion after full-text review

PMID/DOI	Exclusion reason
24220915	Not original studies (commentary/review)
25104789	Not original studies (commentary/review)
25555822	Not original studies (commentary/review)
26338721	Not original studies (commentary/review)
28290049	Not original studies (commentary/review)
9182981	Not original studies (commentary/review)
11509114	Irrelevant study design
11714111	Irrelevant study design
12588087	Irrelevant study design
15233314	Irrelevant study design
20603278	Irrelevant study design
20956995	Irrelevant study design
21505205	Irrelevant study design
21709690	Irrelevant study design
22126502	Irrelevant study design
23112111	Irrelevant study design
25104332	Irrelevant study design
25301194	Irrelevant study design
26455587	Irrelevant study design
3998058	Irrelevant study design
16284945	Irrelevant study design
17109384	Irrelevant study design
17168202	Irrelevant study design
17220709	Irrelevant study design
17689296	Irrelevant study design
19676082	Irrelevant study design
21982487	Irrelevant study design
22161620	Irrelevant study design
28036262	Irrelevant study design
29049401	Irrelevant study design
7947103	Irrelevant study design
11991597	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
12784339	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
12960507	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
15350367	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
16844421	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
17230509	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
17509946	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
17539994	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
18387499	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
18506898	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
18679071	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
18854000	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
19085911	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
19422477	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
19549812	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
19879061	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
20354525	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
20399781	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
20669224	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
20920698	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
21221244	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
21800292	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
21935276	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
22120574	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
22266734	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
22281433	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
22297866	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)

PMID/DOI	Exclusion reason
22526616	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
22991257	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
23633003	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
27527741	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
29054569	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
9010910	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
27294746	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
29790667	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
12640672	Specific population (e.g. cancer patients, or HBV/HCV infected patients etc.)
9308706	Compared to the general population (not people without diabetes)
7068798	Compared to the general population (not people without diabetes)
29370205	Compared to the general population (not people without diabetes)
27271648	Compared to the general population (not people without diabetes)
26541196	Compared to the general population (not people without diabetes)
26201803	Compared to the general population (not people without diabetes)
26082067	Compared to the general population (not people without diabetes)
25488912	Compared to the general population (not people without diabetes)
25451896	Compared to the general population (not people without diabetes)
25300498	Compared to the general population (not people without diabetes)
23722623	Compared to the general population (not people without diabetes)
22839452	Compared to the general population (not people without diabetes)
21752291	Compared to the general population (not people without diabetes)
21193459	Compared to the general population (not people without diabetes)
19918015	Compared to the general population (not people without diabetes)
1951827	Compared to the general population (not people without diabetes)
1932543	Compared to the general population (not people without diabetes)
19191082	Compared to the general population (not people without diabetes)
1827398	Compared to the general population (not people without diabetes)
16790032	Compared to the general population (not people without diabetes)
15886700	Compared to the general population (not people without diabetes)
12663571	Compared to the general population (not people without diabetes)
11515436	Compared to the general population (not people without diabetes)
10497622	Compared to the general population (not people without diabetes)
10096781	Compared to the general population (not people without diabetes)
14652242	Irrelevant exposures
15466982	Irrelevant exposures
19226331	Irrelevant exposures
20636960	Irrelevant exposures
20647401	Irrelevant exposures
23929218	Irrelevant exposures
26212724	Irrelevant exposures
8718428	Irrelevant exposures
9367058	Irrelevant exposures
22619079	Irrelevant exposures
26960926	Irrelevant exposures
30603260	Irrelevant exposures
12730869	Irrelevant outcomes
16790036	Irrelevant outcomes
19908334	Irrelevant outcomes
21325950	Irrelevant outcomes
21894459	Irrelevant outcomes
23560242	Irrelevant outcomes
23755906	Irrelevant outcomes
24091887	Irrelevant outcomes
24944487	Irrelevant outcomes
27208325	Irrelevant outcomes
6370768	Irrelevant outcomes
9794177	Irrelevant outcomes
22527209	Irrelevant outcomes

PMID/DOI	Exclusion reason
26011105	Irrelevant outcomes
10929764	No estimates (CIs, SEs or exact p-values)
17086880	No estimates (CIs, SEs or exact p-values)
24756959	No estimates (CIs, SEs or exact p-values)
4378317	No estimates (CIs, SEs or exact p-values)
6826689	No estimates (CIs, SEs or exact p-values)
8056126	No estimates (CIs, SEs or exact p-values)
9653609	No estimates (CIs, SEs or exact p-values)
10.1016/j.urology.2009.07.1106*	No estimates (CIs, SEs or exact p-values)
20880183	No estimates (CIs, SEs or exact p-values)
28237628	No estimates (CIs, SEs or exact p-values)
29784146	No estimates (CIs, SEs or exact p-values)
29804063	No estimates (CIs, SEs or exact p-values)
11600471	Duplicate cohorts (larger person-years was included)
12181105	Duplicate cohorts (larger person-years was included)
12397646	Duplicate cohorts (larger person-years was included)
12420955	Duplicate cohorts (larger person-years was included)
15191933	Duplicate cohorts (larger person-years was included)
16541321	Duplicate cohorts (larger person-years was included)
16721800	Duplicate cohorts (larger person-years was included)
16968859	Duplicate cohorts (larger person-years was included)
19664792	Duplicate cohorts (larger person-years was included)
19723915	Duplicate cohorts (larger person-years was included)
20479278	Duplicate cohorts (larger person-years was included)
21398527	Duplicate cohorts (larger person-years was included)
21544514	Duplicate cohorts (larger person-years was included)
21820134	Duplicate cohorts (larger person-years was included)
22124092	Duplicate cohorts (larger person-years was included)
22158673	Duplicate cohorts (larger person-years was included)
22525339	Duplicate cohorts (larger person-years was included)
23110810	Duplicate cohorts (larger person-years was included)
23658071	Duplicate cohorts (larger person-years was included)
24069323	Duplicate cohorts (larger person-years was included)
24884617	Duplicate cohorts (larger person-years was included)
25014539	Duplicate cohorts (larger person-years was included)
25978841	Duplicate cohorts (larger person-years was included)
26559055	Duplicate cohorts (larger person-years was included)
27189066	Duplicate cohorts (larger person-years was included)
3372055	Duplicate cohorts (larger person-years was included)
7666483	Duplicate cohorts (larger person-years was included)
8841022	Duplicate cohorts (larger person-years was included)
9139868	Duplicate cohorts (larger person-years was included)
9150194	Duplicate cohorts (larger person-years was included)
9486458	Duplicate cohorts (larger person-years was included)
10088625	Duplicate cohorts (larger person-years was included)
14762783	Duplicate cohorts (larger person-years was included)
17401636	Duplicate cohorts (larger person-years was included)
17450441	Duplicate cohorts (larger person-years was included)
18618278	Duplicate cohorts (larger person-years was included)
20578004	Duplicate cohorts (larger person-years was included)
21273499	Duplicate cohorts (larger person-years was included)
21415356	Duplicate cohorts (larger person-years was included)
21602426	Duplicate cohorts (larger person-years was included)
22719752	Duplicate cohorts (larger person-years was included)
22895832	Duplicate cohorts (larger person-years was included)
23053824	Duplicate cohorts (larger person-years was included)
23648711	Duplicate cohorts (larger person-years was included)
23826297	Duplicate cohorts (larger person-years was included)
23943977	Duplicate cohorts (larger person-years was included)

PMID/DOI	Exclusion reason
24991802	Duplicate cohorts (larger person-years was included)
25058016	Duplicate cohorts (larger person-years was included)
25275365	Duplicate cohorts (larger person-years was included)
25552419	Duplicate cohorts (larger person-years was included)
26185535	Duplicate cohorts (larger person-years was included)
27368048	Duplicate cohorts (larger person-years was included)
28348740	Duplicate cohorts (larger person-years was included)
29518753	Duplicate cohorts (larger person-years was included)
17164367	Combination of several cohorts: no CI in each cohort
17696730	Combination of several cohorts: no CI in each cohort
20027213	Combination of several cohorts: no CI in each cohort
20490448	Combination of several cohorts: no CI in each cohort
20705912	Combination of several cohorts: no CI in each cohort
21366474	Combination of several cohorts: no CI in each cohort
21984693	Combination of several cohorts: no CI in each cohort
22294499	Combination of several cohorts: no CI in each cohort
23889822	Combination of several cohorts: no CI in each cohort
27493134	Combination of several cohorts: no CI in each cohort
27742674	Combination of several cohorts: no CI in each cohort
28265721	Combination of several cohorts: no CI in each cohort
28352981	Combination of several cohorts: no CI in each cohort
Eligible but not included in the meta-analysis	
29483953	Less than 10 cohorts reported for the outcome
27892965	Less than 10 cohorts reported for the outcome
27646740	Less than 10 cohorts reported for the outcome
24425422	Less than 10 cohorts reported for the outcome
23550697	Less than 10 cohorts reported for the outcome
21389009	Less than 10 cohorts reported for the outcome
2037851	Less than 10 cohorts reported for the outcome
16839220	Less than 10 cohorts reported for the outcome
15298731	Less than 10 cohorts reported for the outcome
1462971	Less than 10 cohorts reported for the outcome

PMID: PubMed ID, a unique record assigned by the NIH National Library of Medicine to papers progressively indexed in PubMed. ***DOI**: digital object identifier, a unique alphanumeric string assigned to an online document such as a journal article or ebook. **CI**: confidence interval; **SE**: standard error; **HBV/HCV**: Hepatitis B and hepatitis C virus

Table S2. Characteristics of 151 included cohorts

PMID/DOI	First Author, year (continent) [Ref]	Cohort name	N	I	M	Age	Sex	B	A	S	O
2296978	Levine W, 1990 (NA)[1]	Chicago Heart Association Detection Project in Industry	20,755	X	✓	✓	-	✓	X	✓	✓
2916544	Thompson MM, 1989 (NA)[2]	Lipid Research Clinics Prevalence Study	1,701	✓	X	✓	-	✓	X	✓	✓
3365678	Mills PK, 1988 (NA)[3]	The Adventist Health Study (AHS)	34,198	X	✓	✓	✓	X	X	X	X
8014014	Shibata A, 1994 (NA)[4]	Leisure World, Laguna Hills, LA	13,976	✓	X	✓	✓	X	X	✓	X
8117767	Sellers TA, 1994 (NA)[5]	Iowa Women Health Study	36,603	✓	X	✓	-	X	X	X	X
8449644	Friedman GD, 1993 (NA)[6]	Kasier permanente medical care programme	3,137	✓	X	✓	✓	X	X	✓	✓
8629606	Coughlin SS, 1996 (NA)[7]	Multiple Risk Factor Intervention Trial (MRFIT)	348,874	X	✓	✓	-	X	X	✓	✓
8634649	Steenland K, 1995 (NA)[8]	National Health and Nutrition Survey I	14,407	✓	X	✓	-	✓	✓	✓	✓
9048836	Cerhan JR, 1997 (NA)[9]	Iowa Women Health Study	37,934	✓	X	✓	-	X	X	X	X
9571339	Adlerberth AM, 1997 (EU)[10]	Multifactorial Primary Prevention Trial	7,100	X	✓	✓	-	✓	X	✓	✓
9583711	Will JC, 1998 (NA)[11]	Cancer Prevention Study I (CPS I)	863,699	✓	X	✓	✓	X	X	X	X
9585742	Koskinen SV, 1998 (EU)[12]	1980 census of Finland	58,000	X	✓	✓	X	X	X	X	X
10230844	Will JC, 1999 (NA)[13]	Cancer Prevention Study I (CPS I)	15,065	✓	X	✓	-	X	X	X	X
10360818	Terry P, 1999 (EU)[14]	Swedish Twin Registry	10,154	✓	X	✓	-	✓	X	X	✓
10393723	Schoen RE, 1999 (NA)[15]	Cardiovascular Health Study	5,162	✓	X	✓	✓	X	X	X	✓
10815119	Gapstur SM, 2000 (NA)[16]	Chicago Heart Association Detection Project in Industry	35,658	X	✓	✓	-	✓	X	✓	✓
11161410	Nilsen TI, 2001 (EU)[17]	Nord-Trondelag Health Survey	75,219	✓	X	✓	-	X	X	X	X
11401910	Anderson KE, 2001 (NA)[18]	Iowa Women Health Study	24,664	✓	X	✓	-	✓	X	X	✓
11747142	Fujino Y, 2001 (Asia)[19]	Fukuoka general population	7,018	X	✓	✓	✓	X	✓	✓	X
12115510	Lin Y, 2002 (Asia)[20]	Japan Collaborative Cohort Study for Evaluation of Cancer Risk	99,527	X	✓	✓	-	X	X	✓	X
12146846	Stolzenberg-Solomon RZ, 2002 (EU)[21]	Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study	29,133	✓	X	✓	-	X	X	✓	✓
12436437	Tripthi A, 2002 (NA)[22]	Iowa Women Health Study	37,459	✓	X	✓	-	✓	✓	✓	✓
12714546	Inoue M, 2003 (Asia)[23]	Hospital-based Epidemiologic Research at Aichi Cancer Center	2,200	✓	X	✓	✓	X	✓	X	✓
12766105	Michels KB, 2003 (NA)[24]	Nurses' Health Study	116,488	✓	X	✓	-	✓	✓	X	✓
12796045	SaydahSH, 2002 (NA)[25]	National Health and Nutrition Examination Survey II (NHANES II)	3,054	X	✓	✓	✓	✓	X	✓	✓
14618625	Nicodemus KK, 2005 (NA)[26]	Iowa Women Health Study	34,637	✓	X	✓	✓	X	X	X	X
15184246	Khaw KT, 2005 (EU)[27]	EPIC-Northfolk, UK	9,605	✓	✓	✓	✓	X	X	✓	X
15577289	Batty GD, 2004 (EU)[28]	Whitehall Study	17,031	X	✓	✓	-	✓	X	✓	✓
15632264	Rodriguez C, 2005 (NA)[29]	Cancer Prevention Study II Nutrition Cohort (CPS II Nutrition)	72,670	✓	X	✓	-	✓	X	X	✓
15644546	Jee SH, 2005 (Asia)[30]	Korean Cancer Prevention Study (KCPS)	1,298,385	✓	✓	✓	-	X	✓	✓	X
15668486	Limburg PJ, 2005 (NA)[31]	Iowa Women Health Study	34,972	✓	X	✓	-	✓	X	X	✓
15735193	Hall GC, 2005 (EU)[32]	GP data in the UK(GPRD)	334,120	✓	X	✓	✓	X	X	✓	X
15983343	Larsson SC, 2005 (EU)[33]	Cohort of Swedish Men (COSM)	45,550	✓	X	✓	-	✓	X	✓	✓
16288300	Larsson SC, 2005 (EU)[34]	SMC & COSM	83,053	✓	X	✓	✓	✓	✓	✓	✓
16418516	Seow A, 2006 (Asia)[35]	Singapore Chinese Health Study	61,321	✓	X	✓	-	✓	X	X	X
16557372	Rapp K, 2006 (EU)[36]	Vorarlberg Health Monitoring and Promotion Programme (VHM&PP)	140,813	✓	X	✓	-	✓	X	✓	✓
16729295	Lai MS, 2006 (Asia)[37]	Keelung Community-Based Integrated Screening (KCIS)	54,474	✓	X	X	X	X	X	X	X
16839219	Khan M, 2006 (Asia)[38]	Japan Collaborative Cohort Study for Evaluation of Cancer Risk	56,881	✓	X	✓	-	✓	✓	✓	X
16877536	Bowers K, 2006 (EU)[39]	Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study	29,133	✓	X	✓	-	X	X	✓	X
16945591	Gupta S, 2006 (NA)[40]	Veterans Affairs (VA)	1,421,794	✓	X	✓	✓	X	X	X	✓

PMID/DOI	First Author, year (continent) [Ref]	Cohort name	N	I	M	Age	Sex	B	A	S	O
17000944	Inoue M, 2006 (Asia)[41]	Japan Public Health Center-Based Prospective Study (JPHC)	97,771	✓	X	✓	-	✓	✓	✓	✓
17033617	Velicer CM, 2007 (NA)[42]	Vitamines and Lifestyle study (VITAL)	35,239	✓	X	✓	-	X	X	X	✓
17164361	Sturmer T, 2006 (NA)[43]	Physicians Health Study	22,071	✓	X	✓	-	X	✓	✓	✓
17301260	Friberg E, 2006 (EU)[44]	Women living in Uppsala County of central Sweden	36,773	✓	X	✓	-	✓	X	X	✓
17327321	Stattin P, 2007 (EU)[45]	Northern Sweden Health and Disease Cohort	68,786	✓	X	✓	-	X	X	✓	X
17656615	Setiawan VW, 2007 (NA)[46]	The Multiethnic Cohort	161,126	✓	X	✓	-	✓	✓	✓	✓
17693655	Travier N, 2007 (AU)[47]	New Zealand free HB screening	46,575	✓	X	✓	✓	X	X	X	X
18268068	Folsom AR, 2008 (NA)[48]	Atherosclerosis Risk in Communities (ARIC)	13,117	✓	X	✓	✓	✓	X	✓	✓
18349280	Darbinian JA, 2008 (NA)[49]	Kasier permanente medical care programme	47,209	✓	X	X	-	✓	X	X	✓
18362938	Lindemann K, 2008 (EU))[50]	HUNT, Norway	36,761	✓	X	✓	-	X	✓	X	✓
18443270	Khan AE, 2008 (EU)[51]	European Prospective Investigation into Cancer and Nutrition	393,477	✓	X	✓	-	✓	X	✓	X
18505690	Chen CL, 2008 (Asia)[52]	A cancer screening program in Taiwan	23,218	✓	X	✓	✓	X	X	X	X
18707871	Larsson SC, 2008 (EU)[53]	Cohort of Swedish Men (COSM)	45,906	✓	X	✓	-	X	X	✓	✓
18753735	Oba S, 2008 (Asia)[54]	Takayama Study Cohort	29,079	X	✓	✓	-	✓	✓	✓	✓
19058180	Kasper JS, 2009 (NA)[55]	Health Professional Follow-up Study	47,781	✓	X	✓	-	✓	X	✓	✓
19165860	Stevens RJ, 2009 (EU)[56]	Million women study	1,287,963	✓	X	✓	-	✓	X	X	✓
19236964	Ikeda F, 2009 (Asia)[57]	Hisayama, Kyushu Island, Fukuoka, Japan	2,603	✓	X	✓	✓	✓	✓	✓	✓
19240222	Waters KM, 2009 (NA)[58]	The Multiethnic Cohort	86,013	✓	X	✓	-	✓	X	X	✓
19277881	Martin RM, 2009 (EU)[59]	HUNT 2, Norway	29,364	✓	X	✓	-	X	X	✓	✓
19436298	Wallstrom P, 2009 (EU)[60]	Malmo Diet and Cancer Cohort	10,564	✓	X	✓	-	✓	✓	✓	✓
19444913	Erber E, 2009 (NA)[61]	The Multiethnic Cohort	193,050	✓	X	✓	-	✓	✓	X	✓
19690547	Ogunleye AA, 2009 (EU)[62]	Datasets of the Health Informatics Centre, University of Dundee	28,731	✓	X	✓	✓	X	X	X	✓
10.1016/j.dsx.2008.10.003*	Yood MU, 2009 (NA)[63]	Claims paid by health plan and elements	442,712	✓	X	✓	✓	X	X	X	✓
19808918	Ehrlich SF, 2010 (NA)[64]	Kasier permanente medical care programme	121,887	✓	X	✓	✓	✓	✓	✓	✓
19951937	Meinhold CL, 2009 (NA)[65]	US Radiologic Technologists Study	69,506	✓	X	✓	-	X	X	X	✓
20148361	Chodick G, 2010 (ME)[66]	Maccabi Healthcare Services registry	100,595	✓	X	✓	-	✓	X	X	✓
20228997	Li Q, 2010 (Asia)[67]	The Ohsaki National Health Insurance (NHI) cohort	22,485	✓	X	✓	-	✓	X	✓	✓
20383575	Flood A, 2010 (NA)[68]	Breast Cancer Detection Demonstration project	45,516	✓	X	✓	-	X	✓	✓	✓
20473855	Atchison EA, 2010 (NA)[69]	Veterans Affairs (VA)	4,501,578	✓	X	✓	-	✓	X	X	✓
20531412	He J, 2010 (NA)[70]	The Multiethnic Cohort	215,251	✓	X	✓	✓	✓	X	✓	✓
20633560	Campbell PT, 2010 (NA)[71]	Cancer Prevention Study II Nutrition Cohort (CPS II Nutrition)	154,975	✓	X	✓	-	✓	✓	X	✓
21116605-1	Wotton CJ, 2011 (EU)[72]	Oxford Linkage Study 1	291,462	✓	X	✓	-	X	X	X	✓
21116605-2	Wotton CJ, 2011 (EU)[72]	Oxford Linkage Study 2	192,894	✓	X	✓	-	X	X	X	✓
21470936	Woolcott CG, 2011 (NA)[73]	The Multiethnic Cohort	185,816	✓	X	X	-	X	✓	X	✓
21688131	Lambe M, 2011 (EU)[74]	Apolipoprotein Mortality Related Risk (AMORIS)	201,737	✓	X	✓	-	✓	X	X	✓
21748485	Johnson JA, 2010 (NA)[75]	British Columbia Linked Health Databases (BCLHD)	370,200	✓	X	✓	✓	X	X	X	✓
21767143	Aschebrook- Kilfoy B, 2011 (NA)[76]	NIH-AARP diet and health study	496,548	✓	X	✓	✓	✓	X	✓	✓
21953276	Grote VA, 2011 (EU)[77]	European Prospective Investigation into Cancer and Nutrition	932	✓	X	X	X	✓	X	✓	X
22100961	Yeh HC, 2012 (NA)[78]	Give Us a Clue to Cancer and Heart Disease (CLUE II)	18,240	✓	✓	✓	✓	✓	X	✓	✓
22467266	Attner B, 2012 (EU)[79]	Population of Scania (Southern Sweden)	167,080	✓	X	✓	✓	✓	X	X	✓

PMID/DOI	First Author, year (continent) [Ref]	Cohort name	N	I	M	Age	Sex	B	A	S	O
22510866	Lo SF, 2012 (Asia)[80]	Taiwan NHI program	1,790,868	✓	X	✓	✓	X	X	X	✓
22619084	Luo J, 2012 (NA)[81]	Women's Health Initiative	145,765	✓	X	✓	-	✓	✓	✓	✓
22622863	Luo J, 2013 (NA)[82]	Women's Health Initiative	145,765	✓	X	✓	-	✓	✓	✓	✓
22699290	Campell PT, 2012 (NA)[83]	Cancer Prevention Study II (CPS II)	1,053,831	X	✓	✓	-	✓	✓	✓	✓
22941335	Gapstur SM, 2012 (NA)[84]	Cancer Prevention Study II Nutrition Cohort (CPS II Nutrition)	63,440	✓	X	✓	-	✓	X	X	✓
23024033	Newton CC, 2013 (NA)[85]	Cancer Prevention Study II Nutrition Cohort (CPS II Nutrition)	172,791	✓	X	✓	✓	✓	✓	✓	✓
23296458	Prizment AE, 2013 (NA)[86]	Iowa Women Health Study	37,327	✓	X	✓	-	✓	✓	✓	✓
23370206	Koh WP, 2013 (Asia)[87]	Singapore Chinese Health Study	61,321	✓	X	✓	✓	✓	✓	✓	✓
23406734-1	Yang WS, 2013 (Asia)[88]	Shanghai Women's Health study	73,105	✓	X	✓	-	✓	✓	✓	✓
23406734-2	Yang WS, 2013 (Asia)[88]	Shanghai Men's Health study	60,183	✓	X	✓	-	✓	✓	✓	✓
23408570	Lai GY, 2013 (NA)[89]	NIH-AARP diet and health study	494,867	✓	X	✓	✓	✓	✓	✓	✓
23571511	Onitilo AA, 2014 (NA)[90]	Marshfield Clinic	31,769	✓	X	✓	✓	✓	X	✓	✓
23618197	Sikdar KC, 2013 (NA)[91]	Cancer and Chronic Disease Research Database (CCDRD) in NL	122,228	✓	X	✓	-	X	X	X	✓
23661106	Walker JJ, 2013 (EU)[92]	Scottish Care Information –Diabetes Collaboration	80,838	✓	X	✓	-	X	X	X	✓
23669472	Henry SA, 2014 (NA)[93]	Iowa Women Health Study	36,084	✓	X	✓	-	✓	X	✓	X
23720454	Schlesinger S, 2013 (EU)[94]	European Prospective Investigation into Cancer and Nutrition	363,426	✓	X	✓	✓	✓	✓	✓	✓
23859808	Nakamura K, 2013 (Asia)[95]	Takayama Study Cohort	30,720	✓	X	✓	-	✓	✓	✓	✓
23990517	Colmers IN, 2013 (NA)[96]	British Columbia Linked Health Databases (BCLHD)	370,200	✓	X	✓	✓	X	X	X	✓
24045960	Ma Y, 2013 (NA)[97]	Women's Health Initiative	158,833	X	✓	✓	-	✓	X	✓	✓
24149173	Eijgenraam P, 2013 (EU)[98]	NLCS, the Netherlands Cohort Study	4,438	✓	X	✓	✓	✓	✓	✓	✓
24704132	Shen C, 2014 (Asia)[99]	Elderly health centres in Hong Kong	66,813	X	✓	✓	✓	✓	✓	✓	✓
24862312	Tsilidis KK, 2015 (EU)[100]	European Prospective Investigation into Cancer and Nutrition	139,131	✓	X	✓	-	✓	X	✓	✓
24934410	Sekikawa A, 2014 (Asia)[101]	Osaka Red Cross Hospital	1,449	✓	X	✓	✓	X	X	X	✓
24993754-1	Yang WS, 2014 (Asia)[102]	Shanghai Men's Health Study	59,910	✓	X	✓	-	✓	✓	✓	✓
24993754-2	Yang WS, 2014 (Asia)[102]	Shanghai Women's Health study	73,114	✓	X	✓	-	✓	✓	✓	✓
25047425	De Bruijin KMJ, 2014 (EU)[103]	Rotterdam Study	10,181	✓	X	✓	✓	✓	✓	✓	✓
25051408	Luo J, 2014 (NA)[104]	Women's Health Initiative	88,107	✓	X	✓	-	✓	✓	✓	✓
25104237	Gordon_Dseagu VLZ, 2014 (EU)[105]	HSE and SHeS	204,533	X	✓	✓	✓	✓	X	✓	✓
25326644	Setiawan VW , 2014 (NA)[106]	The Multiethnic Cohort	168,679	✓	X	X	✓	✓	✓	✓	✓
25557005-1	Xu HL, 2015 (Asia)[107]	Shanghai Men's Health Study	61,283	✓	X	✓	✓	✓	✓	✓	✓
25557005-2	Xu HL, 2015 (Asia)[107]	Shanghai Women's Health Study	73,042	✓	X	✓	✓	✓	✓	✓	✓
25604005	Liu X, 2015 (EU)[108]	Swedish Register database	380,196	✓	X	✓	✓	X	X	X	✓
26033947	Goossens ME, 2015 (EU)[109]	GP data in the UK(CPRD)	408,588	✓	X	✓	✓	✓	X	✓	X
26250516	Best LG, 2015 (NA)[110]	Strong Heart Study	4,419	X	✓	✓	✓	✓	✓	✓	✓
26275864	Valent F, 2015 (EU)[111]	Friuli Venezia Giulia region	1,196,243	✓	X	✓	-	X	X	X	X
26575601	Lu Y, 2015 (EU)[112]	GP data in the UK(THIN)	5,529	✓	X	✓	✓	✓	✓	✓	✓
26760177	Luo J, 2016 (NA)[113]	Women's Health Initiative	147,934	✓	X	✓	-	✓	✓	✓	✓
26851751	Gini A, 2016 (EU)[114]	Friuli Venezia Giulia region	1,050,765	✓	X	✓	-	X	X	X	X
27097356	De Kort S, 2016 (EU)[115]	NLCS, the Netherlands Cohort Study	3,919	✓	X	✓	-	✓	✓	✓	✓
27148890	Petrick JL, 2016 (NA)[116]	Kasier permanente medical care programme	4,935	✓	X	✓	✓	X	✓	✓	✓
27257115	Dankner R, 2016 (ME)[117]	Clalit Health Service health records	1,152,122	✓	X	✓	-	X	X	✓	✓

PMID/DOI	First Author, year (continent) Ref	Cohort name	N	I	M	Adjustment					
						Age	Sex	B	A	S	O
27400035	Lega IC, 2016 (NA)[118]	Ontario healthcare database	1,032,438	✓	X	X	X	X	X	X	✓
27770555	Haagstrom C, 2005 (EU)[119]	Prostate Cancer data Base Sweden (PCBaSe)	612,846	✓	X	X	-	X	X	X	✓
27877221	Choi JB, 2016 (Asia)[120]	Korean National Insurance database	139,519	✓	X	✓	-	X	✓	✓	✓
28063165	Pang Y, 2017 (Asia)[121]	China Kadoorie Biobank	510,314	✓	✓	✓	✓	X	✓	✓	✓
28087607	Maskarinec G, 2017 (NA)[122]	The Multiethnic Cohort	103,721	✓	X	✓	-	✓	✓	X	✓
28109969	Kasmari AJ, 2017 (NA)[123]	MarketScan Commercial Claims and Encounters Database	29,583	✓	X	X	X	X	X	X	✓
28114552	Bragg F, 2017 (Asia)[124]	China Kadoorie Biobank	512,797	X	✓	✓	✓	✓	✓	✓	✓
28190111	Yang WS, 2017 (Asia)[125]	Taiwan Chin-Shan township	3,561	✓	X	✓	✓	✓	✓	✓	✓
28436468	De Kort S, 2017 (EU)[126]	PHARMO Database Network	325,054	✓	X	✓	✓	X	X	X	✓
28463757	De Jong RGPJ, 2017 (EU)[127]	PHARMO Database Network	68,076	✓	X	✓	✓	X	X	X	✓
28593629	Drake I, 2017 (EU)[128]	Malmo Diet and Cancer Cohort	26,953	✓	✓	✓	✓	X	✓	✓	✓
28640432	Tsujimoto T, 2017 (NA)[129]	National Health and Nutrition Examination Survey (NHANES)	13,000	X	✓	✓	✓	✓	X	✓	✓
29070034	Ballotari P, 2017 (EU)[130]	Diabetes registry Reggio Emilia province (Northern Italy)	407,157	✓	X	✓	✓	X	X	X	X
29078006	Chen CB, 2018 (NA)[131]	British Columbia Linked Health Databases (BCLHD)	160,566	✓	X	X	-	X	X	X	✓
29141994	Palmer JR, 2017 (NA)[132]	Black Women's Health Study (BWHS)	54,337	✓	X	✓	-	✓	X	X	✓
29152763-1	Simon TG, 2018 (NA)[133]	Nurses' Health study	120,826	✓	X	✓	-	✓	✓	✓	✓
29152763-2	Simon TG, 2018 (NA)[133]	Health Professional Follow-up Study	50,284	✓	X	✓	-	✓	✓	✓	✓
29278016	He X, 2018 (Asia)[134]	Tianjin Urban Employee Basic Medical Insurance database	793,795	✓	X	✓	✓	X	X	X	✓
29304221	Pan XF, 2018 (Asia)[135]	China Kadoorie Biobank	508,892	✓	X	✓	✓	✓	✓	✓	✓
29566433	Bao C, 2018 (EU)[136]	Swedish Twin Registry	25,154	✓	X	✓	-	✓	✓	✓	✓
29582412	Li M, 2018 (AU)[137]	Well Person's Health Check in North Queensland	2,273	✓	X	✓	✓	X	X	X	✓
29678810-1	Graff RE, 2018 (NA)[138]	Health Professional Follow-up Study	46,380	✓	X	✓	-	✓	✓	✓	✓
29678810-2	Graff RE, 2018 (NA)[138]	Nurses' Health Study	111,244	✓	X	✓	-	✓	✓	✓	✓
29705628	De Jong RGPJ, 2018 (EU)[139]	GP data in the UK (CPRD)	666,879	✓	X	✓	-	X	X	X	✓
29734463	Pang Y, 2018 (Asia)[140]	China Kadoorie Biobank	503,993	✓	X	✓	✓	✓	✓	✓	✓
29946194	Lee DY, 2018 (Asia)[141]	Korean National Insurance database	5,027,045	✓	X	✓	✓	X	✓	X	✓
29970599	Pang Y, 2018 (Asia)[142]	China Kadoorie Biobank	510,136	✓	X	✓	✓	✓	✓	✓	✓
30094676	Miller EA, 2018 (NA)[143]	PLCO Screening Trial	73,349	✓	X	✓	-	X	X	X	X
30401889-1	Ma Y, 2018 (NA)[144]	Health Professional Follow-up Study	47,240	✓	X	✓	✓	✓	✓	✓	✓
30401889-2	Ma Y, 2018 (NA)[144]	Nurses' Health study	87,523	✓	X	✓	✓	✓	✓	✓	✓

Studies are sorted by **PMID** (PubMed ID – unique record assigned by the NIH National Library of Medicine to papers progressively indexed in PubMed). ***DOI**: digital object identifier, a unique alphanumeric string assigned to an online document such as a journal article or ebook.

I: Incidence; **M**: Mortality; **A**: Alcohol; **B**: Body Mass Index; **S**: Smoking; **O**: Others

Continent: **NA**: North America; **EU**: Europe; **ME**: Middle East.

✓: Yes; X: No; -: Not Applicable

Table S3. Meta-analyses of all-site and site-specific cancer incidence and mortality: main analysis vs. restricted analysis

Outcome	Cancer	Analysis	No. of cohorts	Total events	Total participants	Pooled RR	I^2	I^2 p-value
Incidence	All	Main	30	816,630	15,498,790	1.15 (1.10, 1.21)	98.8%	<0.001
Incidence	All	Restricted	21	385,887	8,237,333	1.14 (1.08, 1.20)	96.9%	<0.001
Incidence	Bladder	Main	30	43,092	15,869,950	1.19 (1.09, 1.29)	87.0%	<0.001
Incidence	Bladder	Restricted	20	19,370	7,798,242	1.15 (1.05, 1.25)	70.3%	<0.001
Incidence	Breast	Main	32	55,858	8,361,221	1.10 (1.05, 1.15)	66.5%	<0.001
Incidence	Breast	Restricted	23	48,184	5,752,299	1.10 (1.03, 1.17)	68.4%	<0.001
Incidence	Colon	Main	24	48,923	9,128,887	1.30 (1.22, 1.39)	83.7%	<0.001
Incidence	Colon	Restricted	20	22,006	3,851,612	1.29 (1.19, 1.40)	74.4%	<0.001
Incidence	Colorectal	Main	47	104,351	18,416,872	1.29 (1.23, 1.36)	88.6%	<0.001
Incidence	Colorectal	Restricted	36	64,580	1,1025,422	1.27 (1.21, 1.34)	83.4%	<0.001
Incidence	Endometrium	Main	15	6,260	3,147,440	1.63 (1.41, 1.88)	76.2%	<0.001
Incidence	Endometrium	Restricted	8	4,985	1,647,205	1.50 (1.17, 1.94)	76.4%	0.001
Incidence	Esophagus	Main	19	18,497	12,140,419	1.01 (0.89, 1.15)	82.8%	<0.001
Incidence	Esophagus	Restricted	13	7,502	6,315,453	0.96 (0.84, 1.10)	63.8%	0.004
Incidence	Gallbladder	Main	17	4,404	12,738,195	1.61 (1.34, 1.93)	73.4%	<0.001
Incidence	Gallbladder	Restricted	12	2,489	6,632,411	1.57 (1.23, 2.01)	77.9%	<0.001
Incidence	Kidney	Main	23	18,722	13,169,811	1.32 (1.21, 1.44)	74.7%	<0.001
Incidence	Kidney	Restricted	16	8,503	5,954,999	1.30 (1.17, 1.43)	55.5%	0.003
Incidence	Leukemia	Main	12	15,774	11,441,697	1.19 (1.07, 1.31)	69.4%	0.001
Incidence	Leukemia	Restricted	9	5,066	5,509,158	1.21 (1.03, 1.42)	66.3%	<0.001
Incidence	Liver	Main	36	41,464	16,760,921	2.23 (1.99, 2.49)	94.8%	<0.001
Incidence	Liver	Restricted	25	25,539	9,664,922	2.27 (1.97, 2.62)	92.8%	<0.001
Incidence	Lung	Main	32	154,787	16,149,760	1.05 (0.99, 1.12)	92.0%	<0.001
Incidence	Lung	Restricted	23	45,792	8,520,764	1.04 (0.97, 1.11)	81.2%	<0.001
Incidence	Melanoma	Main	11	7,994	8,816,261	1.06 (0.95, 1.19)	43.0%	0.083
Incidence	Melanoma	Restricted	5	2,856	2,316,188	0.95 (0.84, 1.09)	0%	0.769
Incidence	NHL	Main	19	19,637	12,554,832	1.12 (1.02, 1.24)	74.8%	<0.001
Incidence	NHL	Restricted	12	8,571	5,340,020	1.19 (1.01, 1.41)	72.7%	<0.001
Incidence	Ovary	Main	20	4,768	7,037,739	1.14 (1.03, 1.26)	51.3%	0.011
Incidence	Ovary	Restricted	14	3,902	4,629,317	1.14 (0.98, 1.33)	63.3%	0.003
Incidence	Pancreas	Main	38	32,713	23,595,620	2.09 (1.88, 2.33)	93.8%	<0.001
Incidence	Pancreas	Restricted	25	10,048	10,545,118	1.93 (1.70, 2.19)	87.2%	<0.001
Incidence	Prostate	Main	39	187,279	13,982,425	0.83 (0.79, 0.88)	91.3%	<0.001
Incidence	Prostate	Restricted	28	113,930	6,912,226	0.81 (0.75, 0.87)	91.4%	<0.001
Incidence	Rectum	Main	24	25,448	9,106,528	1.23 (1.13, 1.35)	70.8%	<0.001
Incidence	Rectum	Restricted	20	10,837	3,829,253	1.29 (1.17, 1.42)	48.8%	0.004
Incidence	Stomach	Main	28	22,172	14,443,780	1.19 (1.05, 1.35)	92.9%	<0.001
Incidence	Stomach	Restricted	20	12,410	8,167,673	1.24 (1.05, 1.45)	92.5%	<0.001
Incidence	Thyroid	Main	14	5,316	12,942,538	1.20 (1.12, 1.29)	28.3%	0.336
Incidence	Thyroid	Restricted	8	2,618	5,467,095	1.16 (1.07, 1.26)	27.0%	0.498
Mortality	All	Main	17	147,480	3,500,363	1.25 (1.18, 1.33)	80.4%	<0.001
Mortality	All	Restricted	14	145,643	3,426,686	1.26 (1.17, 1.35)	82.6%	<0.001
Mortality	Pancreas	Main	11	5,082	3,487,609	1.67 (1.30, 2.14)	65.3%	0.002
Mortality	Pancreas	Restricted	10	4,256	3,138,735	1.72 (1.39, 2.12)	55.0%	0.008

NHL: Non-Hodgkin Lymphoma.
Restricted: Meta-analyses restricted to the 120 cohorts with adequate outcome assessment and follow-up

Table S4. Meta-analyses of all-site and site-specific cancer incidence and mortality in females and males: main analysis vs. restricted analysis

Outcome	Cancer	Sex	Analysis	No. of Cohorts	Total events	Total participants	Pooled RR	I^2	I^2 p-value
Incidence	All	F	Main	17	47,449	3,478,491	1.20 (1.11, 1.29)	89.8%	<0.001
Incidence	All	F	Restricted	14	39,432	2,184,935	1.17 (1.07, 1.29)	90.7%	<0.001
Incidence	All	M	Main	18	454,124	8,187,414	1.11 (1.04, 1.19)	97.1%	<0.001
Incidence	All	M	Restricted	14	72,655	2,389,867	1.11 (1.03, 1.21)	93.9%	<0.001
Incidence	Bladder	F	Main	13	1,698	3,145,115	1.28 (1.11, 1.48)	32.9%	0.146
Incidence	Bladder	F	Restricted	10	1,532	1,851,559	1.26 (1.05, 1.50)	35.7%	0.159
Incidence	Bladder	M	Main	16	25,797	8,453,856	1.18 (1.10, 1.26)	64.9%	<0.001
Incidence	Bladder	M	Restricted	12	5,791	2,656,309	1.18 (1.12, 1.25)	20.8%	0.584
Incidence	Colon	F	Main	14	7,218	1,484,209	1.30 (1.16, 1.46)	51.0%	0.023
Incidence	Colon	F	Restricted	13	6,513	1,288,032	1.28 (1.13, 1.44)	47.5%	0.044
Incidence	Colon	M	Main	13	30,143	5,724,648	1.21 (1.16, 1.25)	0%	0.272
Incidence	Colon	M	Restricted	11	7,010	1,052,477	1.22 (1.13, 1.32)	20.2%	0.324
Incidence	Colorectal	F	Main	28	20,214	4,848,935	1.30 (1.23, 1.36)	39.5%	0.035
Incidence	Colorectal	F	Restricted	23	18,277	3,357,081	1.29 (1.22, 1.38)	44.5%	0.017
Incidence	Colorectal	M	Main	29	51,025	8,913,761	1.26 (1.20, 1.32)	53.9%	<0.001
Incidence	Colorectal	M	Restricted	23	14,040	2,944,005	1.25 (1.18, 1.33)	45.2%	0.001
Incidence	Gallbladder	F	Main	11	499	2,746,132	1.68 (1.18, 2.39)	35.0%	0.090
Incidence	Gallbladder	F	Restricted	8	438	1,455,778	1.53 (0.91, 2.57)	53.3%	0.051
Incidence	Gallbladder	M	Main	12	1,979	7,906,859	1.49 (1.24, 1.80)	43.3%	0.121
Incidence	Gallbladder	M	Restricted	8	371	2,118,872	1.47 (1.09, 1.99)	50.0%	0.037
Incidence	Kidney	F	Main	12	1,431	2,777,233	1.56 (1.40, 1.75)	25.7%	0.523
Incidence	Kidney	F	Restricted	9	1,275	1,483,677	1.50 (1.29, 1.75)	35.6%	0.311
Incidence	Kidney	M	Main	14	10,860	7,984,350	1.23 (1.11, 1.36)	53.8%	0.002
Incidence	Kidney	M	Restricted	10	2,290	2,186,803	1.25 (1.07, 1.46)	40.3%	0.079
Incidence	Liver	F	Main	16	781	3,705,321	2.17 (1.71, 2.75)	76.0%	<0.001
Incidence	Liver	F	Restricted	13	675	2,411,765	2.08 (1.55, 2.80)	79.1%	<0.001
Incidence	Liver	M	Main	17	6,732	8,261,415	2.26 (1.94, 2.62)	84.0%	<0.001
Incidence	Liver	M	Restricted	13	1,260	2,463,868	2.13 (1.79, 2.53)	72.0%	<0.001
Incidence	Lung	F	Main	13	7,803	2,259,380	1.09 (0.97, 1.21)	41.8%	0.017
Incidence	Lung	F	Restricted	11	7,095	2,016,589	1.10 (0.95, 1.27)	44.5%	0.010
Incidence	Lung	M	Main	14	111,859	6,939,273	1.03 (0.90, 1.17)	90.6%	<0.001
Incidence	Lung	M	Restricted	11	8,573	2,192,491	1.10 (0.96, 1.26)	71.4%	<0.001
Incidence	Pancreas	F	Main	17	6,743	6,856,264	2.06 (1.68, 2.53)	87.7%	<0.001
Incidence	Pancreas	F	Restricted	12	2,938	3,331,493	1.70 (1.41, 2.06)	69.8%	<0.001
Incidence	Pancreas	M	Main	17	17,355	12,233,146	2.04 (1.70, 2.43)	91.2%	<0.001
Incidence	Pancreas	M	Restricted	10	1,594	2,231,058	1.87 (1.45, 2.41)	77.9%	<0.001
Incidence	Rectum	F	Main	15	2,427	1,486,238	1.27 (1.10, 1.47)	25.0%	0.230
Incidence	Rectum	F	Restricted	14	2,187	1,290,061	1.31 (1.15, 1.49)	15.5%	0.438
Incidence	Rectum	M	Main	14	16,331	5,726,538	1.15 (1.08, 1.23)	4.9%	0.301
Incidence	Rectum	M	Restricted	12	3,432	1,054,367	1.20 (1.08, 1.34)	0%	0.281
Incidence	Stomach	F	Main	13	1,600	2,273,616	1.29 (1.03, 1.61)	71.5%	<0.001
Incidence	Stomach	F	Restricted	10	1,418	1,997,435	1.28 (0.94, 1.75)	81.1%	<0.001
Incidence	Stomach	M	Main	14	10,659	6,965,600	1.07 (0.92, 1.24)	85.1%	<0.001
Incidence	Stomach	M	Restricted	10	2,776	2,184,132	1.12 (0.91, 1.38)	83.5%	<0.001
Mortality	All	F	Main	11	63,260	2,063,006	1.28 (1.18, 1.40)	77.0%	<0.001
Mortality	All	F	Restricted	10	62,527	2,029,006	1.26 (1.15, 1.39)	73.6%	<0.001
Mortality	All	M	Main	12	74,943	2,129,614	1.21 (1.13, 1.30)	74.6%	<0.001
Mortality	All	M	Restricted	11	74,255	2,105,614	1.21 (1.12, 1.31)	76.7%	<0.001

F: female; **M**: male
Restricted: Meta-analyses restricted to the 120 cohorts with adequate outcome assessment and follow-up

Table S5. Proportions of studies with an unconfounded association of type 2 diabetes with cancer: main analysis vs. restricted analysis

Outcome	Cancer	Analysis	Proportion (95% CI) [%]	
			Pre-specified relative risk 10%	Pre-specified relative risk 30%
Incidence	Bladder	Main	39.2 (19.8, 58.5)	9.9 (0, 22.1)
Incidence	Bladder	Restricted	25.1 (0, 51.1)	1.6 (0, 7.6)
Incidence	Breast	Main	7.5 (0, 20.3)	0 (0, 0.3)
Incidence	Breast	Restricted	11.6 (0, 29.2)	0.2 (0, 1.5)
Incidence	Colon	Main	64.3 (45.0, 83.5)	18.4 (1.4, 35.4)
Incidence	Colon	Restricted	60.5 (39.5, 81.5)	19.2 (0.3, 38.1)
Incidence	Colorectal	Main	62.4 (47.9, 76.8)	16.8 (4.8, 28.8)
Incidence	Colorectal	Restricted	58.0 (42.2, 73.8)	12.6 (0.4, 24.8)
Incidence	Endometrium	Main	93.6 (78.2, 100)	72.0 (44.2, 99.8)
Incidence	Endometrium	Restricted	80.4 (48.3, 100)	54.6 (17.6, 91.6)
Incidence	Esophagus	Main	16.1 (0, 35.1)	3.5 (0, 12.3)
Incidence	Esophagus	Restricted	11.5 (0, 35.4)	0.2 (0, 2.0)
Incidence	Gallbladder	Main	85.6 (63.5, 100)	64.7 (37.2, 92.2)
Incidence	Gallbladder	Restricted	80.4 (53.1, 100)	60.0 (29.0, 91.0)
Incidence	Kidney	Main	67.3 (43.3, 91.4)	22.2 (0, 44.7)
Incidence	Kidney	Restricted	64.5 (34.2, 94.8)	15.8 (0, 43.1)
Incidence	Leukemia	Main	33.1 (0, 66.2)	2.0 (0, 10.4)
Incidence	Leukemia	Restricted	43.3 (4.6, 82.0)	8.7 (0, 33.1)
Incidence	Liver	Main	97.8 (93.9, 100)	92.6 (84.1, 100)
Incidence	Liver	Restricted	98.0 (93.5, 100)	93.2 (83.4, 100)
Incidence	Lung	Main	12.2 (0, 24.3)	1.0 (0, 3.4)
Incidence	Lung	Restricted	5.5 (0, 16.3)	0.1 (0, 0.7)
Incidence	Melanoma	Main	3.4 (0, 21.5)	0 (0, 0.1)
Incidence	NHL	Main	23.5 (0, 48.8)	2.5 (0, 10.7)
Incidence	NHL	Restricted	40.8 (5.2, 76.4)	11.0 (0, 36.1)
Incidence	Ovary	Main	24.4 (0, 52.7)	2.1 (0, 10.7)
Incidence	Ovary	Restricted	31.4 (0, 63.0)	7.4 (0, 26.6)
Incidence	Pancreas	Main	96.9 (92.2, 100)	89.9 (80.3, 99.4)
Incidence	Pancreas	Restricted	95.2 (87.2, 100)	85.0 (70.6, 99.4)
Incidence	Prostate*	Main	36.9 (20.3, 53.5)	1.0 (0, 3.5)
Incidence	Prostate*	Restricted	47.4 (28.4, 66.3)	4.3 (0, 11.7)
Incidence	Rectum	Main	48.7 (22.6, 74.7)	9.5 (0, 26.4)
Incidence	Rectum	Restricted	61.9 (34.0, 89.7)	16.0 (0, 40.5)
Incidence	Stomach	Main	43.6 (24.9, 62.2)	20.9 (5.0, 36.9)
Incidence	Stomach	Restricted	49.5 (27.7, 71.3)	26.9 (6.8, 46.9)
Incidence	Thyroid	Main	32.1 (0, 71.6)	0.2 (0, 2.6)
Incidence	Thyroid	Restricted	14.8 (0, 64.9)	0 (0, 0.3)
Mortality	Pancreas	Main	92.1 (68.1, 100)	73.0 (33.9, 100)
Mortality	Pancreas	Restricted	97.7 (84.6, 100)	83.3 (45.7, 100)

NHL: Non-Hodgkin's lymphoma.

Restricted: Bias analyses restricted to the 120 cohorts with adequate outcome assessment and follow-up.

Pre-specified relative risk 10% (30%) indicates 10% (30%) increased risk among individuals with type 2 diabetes, i.e. a pre-specified relative risk of 1.1 (1.3) for all outcomes except prostate cancer incidence.

*For prostate cancer incidence, 10% (30%) risk indicates 10% (30%) decreased risk among individuals with type 2 diabetes, i.e. a pre-specified relative risk of 0.9 (0.7).

In restricted analysis, the heterogeneity for melanoma incidence derived from meta-analysis was 0%. Therefore, bias analysis for unmeasured confounding was not possible.

Table S6. Proportions of studies with an unconfounded association of type 2 diabetes with cancer in females and males: main analysis vs. restricted analysis

Outcome	Cancer	Sex	Analysis	Proportion (95% CI) [%]	
				Pre-specified relative risk 10%	Pre-specified relative risk 30%
Incidence	Bladder	F	Main	59.7 (18.8, 100)	15.0 (0, 52.7)
Incidence	Bladder	F	Restricted	54.2 (9.5, 99.0)	13.2 (0, 52.4)
Incidence	Bladder	M	Main	30.2 (5.5, 54.8)	1.6 (0, 8.2)
Incidence	Bladder	M	Restricted	16.0 (0, 65.1)	0 (0, 0)
Incidence	Colon	F	Main	64.9 (32.6, 97.3)	18.1 (0, 47.0)
Incidence	Colon	F	Restricted	59.2 (24.1, 94.3)	12.9 (0, 41.1)
Incidence	Colon	M	Restricted	38.9 (0, 92.8)	0 (0, 0.9)
Incidence	Colorectal	F	Main	70.9 (46.5, 95.2)	6.7 (0, 22.9)
Incidence	Colorectal	F	Restricted	67.9 (42.6, 93.3)	8.9 (0, 28.0)
Incidence	Colorectal	M	Main	57.7 (33.1, 82.4)	2.1 (0, 9.3)
Incidence	Colorectal	M	Restricted	54.3 (25.7, 82.8)	2.7 (0, 12.7)
Incidence	Gallbladder	F	Main	86.9 (46.9, 100)	69.2 (22.2, 100)
Incidence	Gallbladder	F	Restricted	69.6 (27.6, 100)	54.1 (12.1, 96.2)
Incidence	Gallbladder	M	Main	84.5 (49.7, 100)	53.9 (17.0, 90.8)
Incidence	Gallbladder	M	Restricted	76.0 (34.9, 100)	50.8 (10.2, 91.4)
Incidence	Kidney	F	Main	97.6 (80.0, 100)	70.8 (29.6, 100)
Incidence	Kidney	F	Restricted	89.3 (53.1, 100)	56.7 (22.6, 90.8)
Incidence	Kidney	M	Main	46.2 (13.2, 79.3)	5.9 (0, 24.8)
Incidence	Kidney	M	Restricted	52.5 (9.3, 95.8)	10.0 (0, 44.4)
Incidence	Liver	F	Main	93.6 (80.8, 100)	85.7 (66.9, 100)
Incidence	Liver	F	Restricted	90.0 (72.4, 100)	80.8 (58.0, 100)
Incidence	Liver	M	Main	99.4 (97.1, 100)	96.6 (88.1, 100)
Incidence	Liver	M	Restricted	99.4 (96.1, 100)	95.8 (83.3, 100)
Incidence	Lung	F	Main	9.0 (0, 36.9)	0.1 (0, 1.4)
Incidence	Lung	F	Restricted	14.7 (0, 51.8)	0.6 (0, 5.7)
Incidence	Lung	M	Main	14.4 (0, 35.0)	2.2 (0, 9.5)
Incidence	Lung	M	Restricted	18.2 (0, 49.8)	1.5 (0, 9.3)
Incidence	Pancreas	F	Main	93.2 (81.2, 100)	84.2 (66.4, 100)
Incidence	Pancreas	F	Restricted	87.2 (65.9, 100)	70.4 (45.4, 95.4)
Incidence	Pancreas	M	Main	96.6 (88.2, 100)	88.6 (72.1, 100)
Incidence	Pancreas	M	Restricted	92.8 (74.0, 100)	80.7 (52.7, 100)
Incidence	Rectum	F	Main	57.3 (16.0, 98.6)	13.2 (0, 53.4)
Incidence	Rectum	F	Restricted	71.8 (12.3, 100)	12.1 (0, 69.1)
Incidence	Rectum	M	Main	0.3 (0, 11.7)	0 (0, 0)
Incidence	Rectum	M	Restricted	0 (0, 0)	0 (0, 0)
Incidence	Stomach	F	Main	55.7 (25.7, 85.6)	31.6 (2.4, 60.8)
Incidence	Stomach	F	Restricted	53.7 (21.6, 85.8)	34.3 (3.0, 65.7)
Incidence	Stomach	M	Main	23.9 (0.2, 47.6)	6.8 (0, 21.0)
Incidence	Stomach	M	Restricted	33.4 (4.0, 62.8)	13.0 (0, 35.7)

F: female; **M**: male.

Restricted: Bias analyses restricted to the 120 cohorts with adequate outcome assessment and follow-up.

Pre-specified relative risk 10% (30%) indicates 10% (30%) increased risk among individuals with type 2 diabetes, i.e. a pre-specified relative risk of 1.1 (1.3) for all outcomes. In the main analysis, the heterogeneity for colon cancer incidence in males derived from meta-analysis was 0%. Therefore, bias analysis for unmeasured confounding was not possible.

Figure S1. Study selection diagram

1. **PubMed search**: *diabetes[title] AND (cancer[title/abstract] OR carcinoma[title/abstract] OR neoplasia[title/abstract] OR tumor[title/abstract] OR neoplasm[title/abstract] OR maligna*[title/abstract]) in Humans* between 01/12/2013 and 10/01/2019

2. **Web of Science search [Science Citation Index Expanded (SCI-EXPANDED), Conference Proceedings Citation Index- Science (CPCI-S), Emerging Sources Citation Index (ESCI)]:** *diabetes[title] AND (cancer[title] OR carcinoma[title] OR neoplasia[title] OR tumor[title] OR neoplasm[title] OR maligna*[title])* between 2013 and 2019

3. **Cochrane Library of Systematic Reviews search**: *diabetes[title/abstract/keywords] AND (cancer[title/abstract/keywords] OR carcinoma[title/abstract/keywords] OR neoplasia[title/abstract/keywords] OR tumorr[title/abstract/keywords] OR neoplasm[title/abstract/keywords] OR maligna*[title/abstract/keywords])* between 01/12/2013 and 10/01/2019

Figure S2. Statistical analysis methodology diagram

Step 1. Random-effects meta-analysis to estimate pooled **relative risk A** and **heterogeneity**

relative risk A

Step 2: Estimate proportions of studies with a scientifically meaningful effect size (i.e., a true effect size above a pre-specified **relative risk C, if C > 1.0**; or below a pre-specific **relative risk C, if C < 1.0**) for a range of unmeasured confounding with **relative risk B**, using meta-analysed **relative risk A** and **heterogeneity** parameters.

Strength of unmeasured confounding with **relative risk B**

Confounders

Diabetes → Cancer

Proportions of studies with meaningful effect size – i.e., a true effect size stronger than pre-specific **relative risk C**

Step 3: Plot the **proportions** of studies with an true effect size stronger than a pre-specified **relative risk C** for a range of unmeasured confounding with **relative risk B**.

Proportion (true effect > **relative risk C**)

Relative risk B=1.5

relative risk C 1
relative risk C 2

Confounding strength (**relative risk B**)

relative risk C 1=1.1
relative risk C 2=1.3

Cancer C
Cancer B
Cancer A

Proportions of studies (95% CI)

Proportion (true effect > **relative risk C**)

relative risk C 1
relative risk C 2

90%
70%

Confounding strength (**relative risk B**)

70% of studies with a true effect size
Relative risk C 1
Relative risk C 2
Relative risk C 3

90% of studies with a true effect size
Relative risk C 1
Relative risk C 2
Relative risk C 3

Cancer C
Cancer B
Cancer A

70%
90%

Confounding strength (**relative risk B**)

Relative risk A: pooled from random-effects meta-analysis (fixed); **Relative risk B**: ranged from 1.0 to 4.0; **Relative risk C**: ranged from 0.5 to 2.0
In bias analysis, we used the method proposed by Mathur and VanderWeele to analytically bound the effect of unmeasured confounding on the results of a meta-analysis. Specifically, we used the pooled relative risk and heterogeneity (variance between studies) and their standard errors derived from random-effects meta-analysis (step 1), to make inference to the population distribution of true causal effects, then in turn to estimate the proportions of studies with scientifically meaningful effect size (a pre-specific relative risk) and its 95% confidence intervals, under different levels of unmeasured confounding (step 2). The proportion of studies with scientifically meaningful effect sizes in the meta-analysis is a useful tool to characterize the evidence strength when the effects are heterogeneous.

Figure S3. Distribution of Newcastle-Ottawa Scale score of included 151 cohorts

Newcastle-Ottawa Scale score: quality assessment of included studies.

The score is obtained as the sum of the questionnaire in 3 domains: maximum 4 scores in selection (representative of the exposed cohort, representative of the non-exposed cohort, ascertainment of exposure, and the outcome of interest was not present at start of study), maximum 2 score in comparability (the study controls for age and sex, the study controls for body mass index); and maximum 3 scores in outcome (assessment of outcome, follow-up long enough, and adequacy of follow-up cohorts).

Figure S4a. Individual and overall estimates, by cancer

Incidence : All

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Atchison EA, 2010 (NA)	371,810	4,501,578	0.93 (0.93, 0.93)
Bao C, 2018 (EU)	NR	25,154	0.93 (0.80, 1.08)
Khan M, 2006 (Asia)	3,308	56,881	0.94 (0.81, 1.10)
Lai GY, 2013 (NA)	82,251	497,767	0.99 (0.97, 1.02)
Ogunleye AA, 2009 (EU)	2,025	28,731	0.99 (0.90, 1.09)
Lega IC, 2016 (NA)	69,298	1,32,438	1.00 (0.99, 1.02)
Wotton CJ, 2011 (EU).1	25,134	291,462	1.01 (0.96, 1.07)
Drake I, 2017 (EU)	NR	27,243	1.07 (0.99, 1.16)
Chodick G, 2010 (ME)	8,977	100,595	1.09 (1.03, 1.15)
Travier N, 2007 (AU)	NR	43,984	1.09 (0.80, 1.48)
Wotton CJ, 2011 (EU).2	10,330	192,894	1.09 (1.01, 1.19)
Attner B, 2012 (EU)	38,814	327,471	1.11 (1.04, 1.19)
Pan XF, 2018 (Asia)	17,463	508,892	1.13 (1.07, 1.19)
Yang WS, 2017 (Asia)	275	3,561	1.13 (0.69, 1.85)
Nakamura K, 2013 (Asia)	3,488	30,720	1.16 (1.02, 1.32)
Lo SF, 2012 (Asia)	110,382	1,790,868	1.19 (1.18, 1.21)
Walker JJ, 2013 (EU)	NR	80,838	1.20 (1.16, 1.25)
Ballotari P, 2017 (EU)	11,297	406,257	1.22 (1.15, 1.29)
Yeh HC, 2012 (NA)	2,481	18,240	1.22 (0.98, 1.52)
Liu X, 2015 (EU)	32,084	380,196	1.23 (1.22, 1.25)
Rapp K, 2006 (EU)	2,762	74,478	1.23 (1.10, 1.38)
Jee SH, 2005 (Asia)	NR	1,298,385	1.26 (1.22, 1.30)
Steendam K, 1995 (NA)	NR	14,407	1.26 (1.00, 1.59)
Inoue M, 2006 (Asia)	6,462	97,771	1.26 (1.15, 1.39)
Gini A, 2016 (EU)	2,069	1,50,765	1.28 (1.23, 1.34)
Stattin P, 2007 (EU)	2,358	61,159	1.29 (1.06, 1.56)
De Bruijn KMJ, 2014 (EU)	2,238	10,181	1.29 (1.09, 1.53)
Dankner R, 2016 (ME)	NR	1,777,953	1.34 (1.32, 1.36)
He X, 2018 (Asia)	11,183	765,547	1.59 (1.44, 1.76)
Li M, 2018 (AU)	141	2,374	1.80 (1.27, 2.55)
Overall effect(df =29, p =0.00;I²=98.8%)			1.15 (1.10, 1.21)

Incidence : Bladder

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Wotton CJ, 2011 (EU).1	1,731	291,462	0.67 (0.51, 0.88)
Ogunleye AA, 2009 (EU)	NR	28,731	0.70 (0.40, 1.22)
Nakamura K, 2013 (Asia)	158	30,720	0.89 (0.45, 1.76)
Travier N, 2007 (AU)	NR	43,984	0.94 (0.22, 4.05)
Atchison EA, 2010 (NA)	19,300	4,501,578	0.96 (0.92, 1.01)
Lega IC, 2016 (NA)	NR	1,32,438	1.02 (0.94, 1.10)
Khan M, 2006 (Asia)	NR	23,378	1.03 (0.41, 2.59)
Wotton CJ, 2011 (EU).2	654	192,894	1.04 (0.73, 1.48)
Goossens ME, 2015 (EU)	2,322	605,660	1.04 (0.95, 1.13)
Lai GY, 2013 (NA)	4,331	497,767	1.10 (1.01, 1.21)
Rapp K, 2006 (EU)	NR	3,977	1.11 (0.58, 2.13)
Newton CC, 2013 (NA)	812	172,791	1.13 (0.91, 1.40)
Colmers IN, 2013 (NA)	1,171	370,200	1.13 (1.01, 1.26)
Chodick G, 2010 (ME)	905	100,595	1.14 (0.95, 1.37)
Bao C, 2018 (EU)	NR	25,154	1.15 (0.69, 1.92)
Larsson SC, 2008 (EU)	414	45,906	1.16 (0.82, 1.65)
Liu X, 2015 (EU)	1,705	380,196	1.20 (1.14, 1.26)
Lo SF, 2012 (Asia)	4,311	1,790,868	1.20 (1.13, 1.27)
Attner B, 2012 (EU)	2,217	18,537	1.25 (0.98, 1.59)
Dankner R, 2016 (ME)	NR	1,777,953	1.25 (1.16, 1.34)
Wookoot CG, 2011 (NA)	918	185,816	1.25 (1.04, 1.50)
Walker JJ, 2013 (EU)	NR	80,838	1.26 (1.07, 1.49)
Jee SH, 2005 (Asia)	NR	829,770	1.32 (1.10, 1.58)
He X, 2018 (Asia)	363	765,547	1.36 (0.81, 2.29)
Gini A, 2016 (EU)	107	1,50,765	1.36 (1.12, 1.65)
Ballotari P, 2017 (EU)	765	407,157	1.39 (1.16, 1.67)
Inoue M, 2006 (Asia)	135	97,771	1.50 (0.84, 2.68)
Prizment AE, 2013 (NA)	277	37,327	1.69 (1.19, 2.41)
Yood MU, 2009 (NA)	243	442,712	2.35 (1.76, 3.14)
Tripthi A, 2002 (NA)	112	37,458	2.46 (1.32, 4.59)
Overall effect(df =29, p =0.00;I²=87.0%)			1.19 (1.09, 1.29)

Incidence : Breast

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	13,254	0.63 (0.36, 1.10)
Sellers TA, 1994 (NA)	488	147,385	0.82 (0.54, 1.24)
Travier N, 2007 (AU)	NR	24,384	0.82 (0.36, 1.88)
Inoue M, 2006 (Asia)	451	51,223	0.83 (0.44, 1.57)
Maskarinec G, 2017 (NA)	6,599	103,721	0.88 (0.79, 0.98)
Wotton CJ, 2011 (EU).2	1,260	84,873	0.96 (0.72, 1.28)
Lai GY, 2013 (NA)	9,581	199,591	0.97 (0.89, 1.06)
Chodick G, 2010 (ME)	1,167	47,682	1.00 (0.85, 1.18)
Johnson JA, 2010 (NA)	NR	169,012	1.00 (0.91, 1.09)
Ogunleye AA, 2009 (EU)	155	28,731	1.05 (0.75, 1.47)
Lega IC, 2016 (NA)	NR	1,32,438	1.05 (0.92, 1.20)
Wotton CJ, 2011 (EU).1	2,561	151,560	1.05 (0.85, 1.28)
Ballotari P, 2017 (EU)	1,780	206,199	1.06 (0.89, 1.26)
Onitilo AA, 2014 (NA)	852	26,892	1.07 (0.90, 1.28)
Lambe M, 2011 (EU)	1,019	201,737	1.07 (0.69, 1.67)
Folsom AR, 2008 (NA)	NR	13,117	1.08 (0.75, 1.55)
Attner B, 2012 (EU)	5,337	46,077	1.09 (0.87, 1.37)
Dankner R, 2016 (ME)	NR	937,714	1.11 (1.05, 1.17)
Gini A, 2016 (EU)	206	1,50,765	1.14 (0.99, 1.31)
Nakamura K, 2013 (Asia)	182	16,547	1.15 (0.47, 2.82)
Liu X, 2015 (EU)	2,895	180,307	1.15 (1.11, 1.19)
Michels KB, 2003 (EU)	5,605	116,488	1.17 (1.01, 1.35)
Lo SF, 2012 (Asia)	7,424	1,790,868	1.17 (1.12, 1.22)
Palmer JR, 2017 (NA)	1,851	54,337	1.18 (1.00, 1.40)
He X, 2018 (Asia)	1,704	765,547	1.21 (0.88, 1.67)
Walker JJ, 2013 (EU)	446	36,592	1.21 (1.08, 1.36)
Pan XF, 2018 (Asia)	1,472	300,060	1.21 (1.00, 1.46)
Khan M, 2006 (Asia)	NR	33,503	1.27 (0.51, 3.15)
Rapp K, 2006 (EU)	480	41,501	1.38 (1.02, 1.86)
Steenland K, 1995 (NA)	NR	14,407	1.40 (0.70, 2.79)
Jee SH, 2005 (Asia)	NR	468,615	1.51 (1.26, 1.80)
De Bruijn KMJ, 2014 (EU)	2,292	6,094	1.54 (0.97, 2.44)
Overall effect(df =31, p =0.00;I²=66.5%)			1.10 (1.05, 1.15)

Incidence : Colon

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Nakamura K, 2013 (Asia)	485	30,720	0.87 (0.57, 1.32)
Bao C, 2018 (EU)	NR	25,154	1.01 (0.61, 1.68)
Wotton CJ, 2011 (EU).1	2,639	291,462	1.06 (0.89, 1.26)
De Bruijn KMJ, 2014 (EU)	166	10,181	1.09 (0.57, 2.10)
Campbell PT, 2010 (NA)	2,096	154,975	1.12 (0.98, 1.28)
Pang Y, 2018 (Asia)	1,745	510,136	1.14 (0.97, 1.34)
Wotton CJ, 2011 (EU).2	645	192,894	1.19 (0.88, 1.61)
Folsom AR, 2008 (NA)	128	13,117	1.19 (0.70, 2.03)
He J, 2010 (NA)	NR	215,251	1.20 (1.09, 1.32)
Lai GY, 2013 (NA)	5,611	497,767	1.20 (1.10, 1.31)
Atchison EA, 2010 (NA)	22,317	4,501,578	1.20 (1.16, 1.25)
Khan M, 2006 (Asia)	NR	56,881	1.22 (0.79, 1.88)
Inoue M, 2006 (Asia)	794	97,771	1.25 (0.94, 1.66)
Chodick G, 2010 (ME)	1,034	100,595	1.30 (1.10, 1.54)
Liu X, 2015 (EU)	2,920	380,196	1.33 (1.28, 1.38)
Attner B, 2012 (EU)	3,160	26,285	1.36 (1.14, 1.63)
Luo J, 2013 (NA)	1,521	160,939	1.38 (1.14, 1.67)
Ogunleye AA, 2009 (EU)	162	28,731	1.46 (1.07, 2.00)
De Kort S, 2017 (EU)	1,518	366,770	1.46 (1.28, 1.67)
Sikdar KC, 2013 (NA)	1,131	122,228	1.48 (1.29, 1.70)
Larsson SC, 2005 (EU)	190	45,550	1.53 (1.02, 2.29)
Nilsen TI, 2001 (EU)	NR	75,219	1.60 (1.02, 2.51)
Limburg PJ, 2005 (NA)	661	34,972	1.63 (1.21, 2.19)
Valent F, 2015 (EU)	NR	1,189,515	1.87 (1.74, 2.01)
Overall effect(df =23, p =0.00;I²=83.7%)			1.30 (1.22, 1.39)

Incidence : Colorectal

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Travier N, 2007 (AU)	NR	43,984	0.63 (0.15, 2.65)
Bowers K, 2006 (EU)	410	29,133	0.92 (0.41, 2.07)
Lega IC, 2016 (NA)	NR	1,32,438	1.02 (0.98, 1.07)
Bao C, 2018 (EU)	NR	25,154	1.03 (0.70, 1.51)
Rapp K, 2006 (EU)	350	74,478	1.06 (0.77, 1.46)
Wotton CJ, 2011 (EU).2	NR	291,462	1.07 (0.93, 1.23)
Nakamura K, 2013 (Asia)	728	30,720	1.07 (0.77, 1.48)
De Kort S, 2016 (EU)	3,056	3,919	1.11 (0.83, 1.49)
Ogunleye AA, 2009 (EU)	223	28,731	1.12 (0.81, 1.55)
Jee SH, 2005 (Asia)	NR	1,298,385	1.13 (1.03, 1.23)
Folsom AR, 2008 (NA)	180	13,117	1.13 (0.70, 1.82)
Pang Y, 2018 (Asia)	3,024	510,136	1.14 (1.01, 1.29)
Campbell PT, 2010 (NA)	2,809	154,975	1.16 (1.03, 1.30)
Wotton CJ, 2011 (EU).1	NR	192,894	1.17 (0.91, 1.51)
Ma Y, 2018 (NA).2	1,790	87,523	1.17 (0.98, 1.39)
Atchison EA, 2010 (NA)	34,814	4,501,578	1.17 (1.14, 1.21)
Inoue M, 2006 (Asia)	1,190	97,771	1.18 (0.93, 1.49)
He J, 2010 (NA)	3,549	199,142	1.19 (1.09, 1.29)
Lo SF, 2012 (Asia)	17,949	1,790,868	1.21 (1.18, 1.25)
Nilsen TI, 2001 (EU)	726	75,219	1.22 (0.87, 1.71)
Lai GY, 2013 (NA)	7,693	497,767	1.24 (1.15, 1.34)
Johnson JA, 2010 (NA)	NR	370,200	1.24 (1.14, 1.35)
Khan M, 2006 (Asia)	NR	56,881	1.24 (0.88, 1.75)
Will JC, 1998 (NA)	7,224	863,699	1.24 (1.04, 1.48)
Chodick G, 2010 (ME)	1,430	100,595	1.25 (1.08, 1.44)
De Bruijn KMJ, 2014 (EU)	334	10,181	1.26 (0.81, 1.97)
Liu X, 2015 (EU)	NR	380,196	1.28 (1.24, 1.32)
De Kort S, 2017 (EU)	2,333	366,770	1.30 (1.16, 1.45)
Walker JJ, 2013 (EU)	NR	80,838	1.31 (1.21, 1.42)
Ballotari P, 2017 (EU)	1,133	407,157	1.32 (1.12, 1.55)
Limburg PJ, 2005 (NA)	870	34,972	1.40 (1.09, 1.79)
Schoen RE, 1999 (NA)	NR	3,737	1.40 (0.81, 2.42)
Yeh HC, 2012 (NA)	266	18,240	1.41 (0.81, 2.45)
Steenland K, 1995 (NA)	NR	14,407	1.42 (1.12, 1.81)
Ma Y, 2018 (NA).1	1,210	47,240	1.42 (1.12, 1.81)
Sikdar KC, 2013 (NA)	1,663	122,228	1.44 (1.28, 1.61)
Luo J, 2013 (NA)	1,786	160,939	1.45 (1.22, 1.72)
Attner B, 2012 (EU)	4,720	39,409	1.45 (1.25, 1.68)
Dankner R, 2016 (ME)	NR	1,777,953	1.47 (1.41, 1.54)
Larsson SC, 2005 (EU)	411	45,550	1.49 (1.14, 1.94)
Flood A, 2010 (NA)	489	45,516	1.49 (1.08, 2.06)
Sturmer T, 2006 (NA)	NR	22,071	1.50 (1.11, 2.02)
Seow A, 2006 (Asia)	636	61,320	1.50 (1.22, 1.84)
Valent F, 2015 (EU)	NR	1,189,515	1.79 (1.68, 1.91)
Yood MU, 2009 (NA)	545	442,712	1.99 (1.65, 2.41)
He X, 2018 (Asia)	662	765,547	2.41 (1.73, 3.35)
Khaw KT, 2005 (EU)	NR	9,805	2.78 (1.10, 7.01)
Overall effect(df =46, p =0.00;I²=88.6%)			1.29 (1.23, 1.36)

Incidence : Endometrium

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Luo J, 2014 (NA)	1,241	107,188	1.16 (0.90, 1.49)
Attner B, 2012 (EU)	931	7,952	1.19 (0.83, 1.70)
Lai GY, 2013 (NA)	1,636	199,591	1.25 (1.06, 1.48)
Anderson KE, 2001 (NA)	341	24,475	1.43 (0.98, 2.09)
Ogunleye AA, 2009 (EU)	NR	28,731	1.47 (0.70, 3.09)
Lambe M, 2011 (EU)	170	201,737	1.48 (0.69, 3.18)
Terry P, 1999 (EU)	113	10,444	1.60 (0.21, 12.03)
Johnson JA, 2010 (NA)	NR	169,012	1.63 (1.33, 1.99)
Lega IC, 2016 (EU)	NR	1,32,438	1.64 (1.50, 1.80)
Liu X, 2015 (EU)	1,090	180,307	1.82 (1.72, 1.93)
Gini A, 2016 (EU)	NR	1,50,765	1.89 (1.38, 2.59)
Friberg E, 2006 (EU)	444	36,773	1.94 (1.23, 3.07)
Walker JJ, 2013 (EU)	NR	36,592	1.94 (1.59, 2.37)
Lindemann K, 2008 (EU)	222	37,051	3.13 (1.92, 5.11)
Travier N, 2007 (AU)	NR	24,384	5.07 (1.20, 21.36)
Overall effect(df =14, p =0.00;I²=76.2%)			1.63 (1.41, 1.88)

Incidence : Esophagus

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Nakamura K, 2013 (Asia)	NR	14,173	0.41 (0.10, 1.68)
Luo J, 2013 (NA)	NR	160,939	0.76 (0.23, 2.53)
Atchison EA, 2010 (NA)	10,343	4,501,578	0.77 (0.72, 0.82)
Lo SF, 2012 (Asia)	1,973	1,790,868	0.78 (0.71, 0.86)
Pan XF, 2018 (Asia)	1,659	508,892	0.86 (0.69, 1.08)
Wotton CJ, 2011 (EU).1	877	291,462	0.86 (0.62, 1.20)
De Jong RGPJ, 2018 (EU)	1,627	666,876	0.87 (0.79, 0.96)
Lai GY, 2013 (NA)	740	497,767	0.90 (0.69, 1.17)
Walker JJ, 2013 (EU)	NR	80,838	0.91 (0.74, 1.11)
Wotton CJ, 2011 (EU).2	309	192,894	1.00 (0.57, 1.75)
Jee SH, 2005 (Asia)	NR	829,770	1.11 (0.90, 1.37)
De Jong RGPJ, 2017 (EU)	NR	68,076	1.30 (0.75, 2.24)
Valent F, 2015 (EU)	NR	1,189,515	1.34 (1.05, 1.72)
Bao C, 2018 (EU)	NR	25,154	1.35 (0.47, 3.88)
Liu X, 2015 (EU)	369	380,196	1.39 (1.26, 1.54)
Inoue M, 2006 (Asia)	176	46,548	1.40 (0.84, 2.33)
He X, 2018 (Asia)	165	765,547	1.43 (0.63, 3.23)
Chodick G, 2010 (ME)	NR	100,595	1.48 (0.70, 3.12)
Ogunleye AA, 2009 (EU)	NR	28,731	1.70 (0.98, 2.95)
Overall effect(df =18, p =0.00;I²=82.8%)			1.01 (0.89, 1.15)

Incidence : Gallbladder

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	25,154	0.47 (0.11, 1.98)
Khan M, 2006 (Asia)	NR	56,881	1.12 (0.34, 3.66)
Lo SF, 2012 (Asia)	1,663	1,790,868	1.17 (1.06, 1.29)
Lai GY, 2013 (NA)	315	497,767	1.18 (0.77, 1.80)
Jee SH, 2005 (Asia)	NR	829,770	1.22 (0.98, 1.52)
Luo J, 2013 (NA)	125	160,939	1.23 (0.54, 2.79)
Inoue M, 2006 (Asia)	180	97,771	1.34 (0.74, 2.44)
Ballotari P, 2017 (EU)	NR	407,157	1.41 (0.81, 2.45)
Atchison EA, 2010 (NA)	1,538	4,501,578	1.41 (1.22, 1.62)
Schlesinger S, 2013 (EU)	204	363,426	1.77 (1.00, 3.13)
Nakamura K, 2013 (Asia)	124	30,720	1.89 (1.10, 3.24)
Valent F, 2015 (EU)	NR	1,189,515	2.10 (1.71, 2.58)
Dankner R, 2016 (ME)	NR	1,777,953	2.16 (1.80, 2.59)
He X, 2018 (Asia)	NR	765,547	2.69 (0.95, 7.62)
Chodick G, 2010 (ME)	NR	100,595	2.79 (1.51, 5.15)
Rapp K, 2006 (EU)	NR	74,478	3.35 (1.16, 9.69)
De Jong RGPJ, 2017 (EU)	NR	68,076	3.50 (1.43, 8.57)
Overall effect(df =16, p =0.00;I²=73.4%)			1.61 (1.34, 1.93)

Figure S4b. Individual and overall estimates, by cancer

Incidence : Kidney

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Oguntleye AA, 2009 (EU)	NR	28,731	0.52 (0.21, 1.28)
Bao C, 2018 (EU)	NR	25,154	0.85 (0.37, 1.96)
Nakamura K, 2013 (Asia)	NR	30,720	0.85 (0.26, 2.77)
Graff RE, 2018 (NA).2	302	46,380	0.89 (0.56, 1.41)
Wotton CJ, 2011 (EU).1	522	291,462	0.92 (0.60, 1.41)
Atchison EA, 2010 (NA)	8,205	4,501,578	1.09 (1.03, 1.16)
Setiawan VW, 2007 (NA)	347	161,126	1.14 (0.85, 1.53)
Lai GY, 2013 (NA)	2,111	497,767	1.18 (1.03, 1.35)
Ballotari P, 2017 (EU)	437	407,157	1.20 (0.67, 2.14)
Jee SH, 2005 (Asia)	NR	829,770	1.21 (0.97, 1.51)
Lo SF, 2012 (Asia)	3,457	1,790,868	1.28 (1.19, 1.37)
Rapp K, 2006 (EU)	NR	3,977	1.29 (0.67, 2.48)
Wotton CJ, 2011 (EU).2	218	192,894	1.34 (0.75, 2.39)
Attner B, 2012 (EU)	741	6,395	1.35 (1.08, 1.69)
Khan M, 2006 (Asia)	NR	56,881	1.42 (0.43, 4.66)
Walker JJ, 2013 (EU)	NR	80,838	1.42 (1.22, 1.65)
Gini A, 2016 (EU)	NR	1,50,765	1.47 (1.18, 1.83)
Graff RE, 2018 (NA).1	418	111,244	1.53 (1.14, 2.05)
Liu X, 2015 (EU)	1,047	380,196	1.59 (1.50, 1.69)
Dankner R, 2016 (ME)	NR	1,777,953	1.64 (1.49, 1.80)
Nicodemus KK, 2005 (NA)	124	34,637	1.68 (0.88, 3.21)
Inoue M, 2006 (Asia)	134	97,771	1.83 (1.06, 3.16)
He X, 2018 (Asia)	416	765,547	2.02 (1.24, 3.29)
Overall effect(df =22, p =0.00; I²=74.7%)			1.32 (1.21, 1.44)

Incidence : Leukemia

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	25,154	0.31 (0.07, 1.32)
Lo SF, 2012 (Asia)	1,557	1,790,868	1.01 (0.91, 1.12)
Wotton CJ, 2011 (EU).2	333	192,894	1.06 (0.62, 1.82)
Lai GY, 2013 (NA)	1,626	497,767	1.11 (0.94, 1.32)
Wotton CJ, 2011 (EU).1	719	291,462	1.12 (0.81, 1.55)
Inoue M, 2006 (Asia)	174	97,771	1.13 (0.59, 2.16)
Gini A, 2016 (EU)	NR	1,50,765	1.13 (0.87, 1.47)
Atchison EA, 2010 (NA)	9,835	4,501,578	1.14 (1.08, 1.21)
Liu X, 2015 (EU)	842	380,196	1.15 (1.07, 1.23)
Attner B, 2012 (EU)	657	5,519	1.35 (1.12, 1.62)
Dankner R, 2016 (ME)	NR	1,777,953	1.39 (1.25, 1.54)
Jee SH, 2005 (Asia)	NR	829,770	1.62 (1.23, 2.13)
Overall effect(df =11, p =0.00; I²=69.4%)			1.19 (1.07, 1.31)

Incidence : Liver

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Kasmari AJ, 2017 (NA)	7,473	29,583	1.35 (1.24, 1.46)
Yood MU, 2009 (NA)	NR	442,712	1.39 (0.81, 2.39)
Yang WS, 2013 (Asia).1	212	60,183	1.40 (0.79, 2.47)
Petrick JL, 2016 (NA)	267	2,779	1.45 (0.69, 3.05)
Pang Y, 2018 (Asia)	2,568	503,993	1.52 (1.35, 1.74)
Jee SH, 2005 (Asia)	NR	1,298,385	1.57 (1.46, 1.69)
Yang WS, 2013 (Asia).2	NR	73,105	1.59 (0.96, 2.64)
Travier N, 2007 (AU)	NR	43,984	1.60 (0.46, 5.56)
Lega IC, 2016 (NA)	NR	1,32,438	1.65 (1.45, 1.88)
Lo SF, 2012 (Asia)	19,207	1,790,868	1.78 (1.73, 1.84)
He X, 2018 (Asia)	838	765,547	1.80 (1.29, 2.52)
Lai MS, 2006 (Asia)	NR	52,247	1.84 (1.10, 3.07)
Nakamura K, 2013 (Asia)	176	30,720	1.87 (1.13, 3.09)
Atchison EA, 2010 (NA)	5,160	4,501,578	1.95 (1.82, 2.09)
Wotton CJ, 2011 (EU).1	NR	291,462	2.02 (1.42, 2.88)
Chodick G, 2010 (ME)	NR	100,595	2.06 (1.16, 3.65)
Lai GY, 2013 (NA)	583	497,767	2.11 (1.71, 2.60)
Koh WP, 2013 (Asia)	499	61,321	2.14 (1.69, 2.71)
Schlesinger S, 2013 (EU)	176	363,426	2.17 (1.36, 3.47)
Inoue M, 2006 (Asia)	432	97,771	2.18 (1.65, 2.89)
Bao C, 2018 (EU)	NR	25,154	2.37 (1.14, 4.92)
Khan M, 2006 (Asia)	NR	56,881	2.39 (1.62, 3.53)
Liu X, 2015 (EU)	1,785	380,196	2.43 (2.32, 2.54)
Wotton CJ, 2011 (EU).2	130	192,894	2.46 (1.35, 4.47)
Setiawan VW, 2014 (NA)	472	168,679	2.64 (2.14, 3.26)
Chen CL, 2008 (Asia)	NR	18,498	2.88 (0.89, 9.30)
Oguntleye AA, 2009 (EU)	NR	28,731	2.93 (1.41, 6.14)
Luo J, 2013 (NA)	NR	160,939	2.97 (1.66, 5.32)
Dankner R, 2016 (ME)	NR	1,777,953	3.17 (2.74, 3.67)
Attner B, 2012 (EU)	553	4,664	3.19 (2.33, 4.36)
Walker JJ, 2013 (EU)	NR	80,838	3.23 (2.68, 3.89)
Simon TG, 2018 (NA).1	NR	44,711	3.34 (1.64, 6.79)
Ballotari P, 2017 (EU)	306	407,157	3.37 (2.63, 4.32)
Rapp K, 2006 (EU)	NR	74,478	3.56 (1.58, 8.02)
Valent F, 2015 (EU)	NR	1,189,515	4.08 (3.71, 4.49)
Simon TG, 2018 (NA).2	NR	109,179	5.49 (3.16, 9.52)
Overall effect(df =35, p =0.00; I²=94.8%)			2.23 (1.99, 2.49)

Incidence : Lung

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Khan M, 2006 (Asia)	NR	56,881	0.65 (0.40, 1.07)
Oguntleye AA, 2009 (EU)	275	28,731	0.77 (0.59, 1.01)
Bao C, 2018 (EU)	NR	25,154	0.77 (0.43, 1.37)
Atchison EA, 2010 (NA)	102,427	4,501,578	0.79 (0.78, 0.81)
Yang WS, 2014 (Asia).2	942	59,910	0.87 (0.62, 1.22)
Hol GC, 2005 (NA)	2,659	334,120	0.88 (0.79, 0.98)
Lo SF, 2012 (Asia)	14,459	1,790,868	0.89 (0.86, 0.92)
Lega IC, 2016 (NA)	NR	1,32,438	0.92 (0.88, 0.96)
Yang WS, 2014 (Asia).1	994	73,114	0.93 (0.69, 1.25)
Folsom AR, 2008 (NA)	238	13,117	0.97 (0.62, 1.51)
Nakamura K, 2013 (Asia)	304	30,720	0.97 (0.61, 1.54)
Lai GY, 2013 (NA)	9,783	497,767	0.99 (0.92, 1.06)
Attner B, 2012 (EU)	3,190	27,333	1.02 (0.84, 1.24)
Walker JJ, 2013 (EU)	NR	80,838	1.02 (0.91, 1.14)
Wotton CJ, 2011 (EU).2	1,120	192,894	1.03 (0.79, 1.34)
Wotton CJ, 2011 (EU).1	4,627	291,462	1.04 (0.91, 1.18)
Inoue M, 2006 (Asia)	745	97,771	1.06 (0.80, 1.41)
Jee SH, 2005 (Asia)	NR	1,298,385	1.08 (0.99, 1.17)
Luo J, 2012 (NA)	1,951	160,939	1.09 (0.89, 1.33)
Ballotari P, 2017 (EU)	1,224	407,157	1.10 (0.93, 1.30)
Ehrlich SF, 2010 (NA)	NR	121,886	1.10 (0.66, 1.26)
Liu X, 2015 (EU)	2,300	380,196	1.11 (1.06, 1.16)
Pan XF, 2018 (Asia)	3,527	508,892	1.11 (0.98, 1.25)
Johnson JA, 2010 (NA)	NR	370,200	1.14 (1.05, 1.23)
Dankner R, 2016 (ME)	NR	1,777,953	1.27 (1.20, 1.35)
De Bruijn KMJ, 2014 (EU)	304	10,181	1.31 (0.82, 2.08)
Gini A, 2016 (EU)	242	1,50,765	1.39 (1.22, 1.58)
Chodick G, 2010 (ME)	673	100,595	1.40 (1.11, 1.73)
Rapp K, 2006 (EU)	186	3,977	1.40 (0.95, 2.06)
He X, 2018 (Asia)	2,527	765,547	1.42 (1.16, 1.74)
Steenland K, 1995 (NA)	NR	14,407	1.47 (0.83, 2.61)
Travier N, 2007 (AU)	NR	43,984	1.58 (0.77, 3.25)
Overall effect(df =31, p =0.00; I²=92.0%)			1.05 (0.99, 1.12)

Incidence : Melanoma

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	25,154	0.67 (0.34, 1.33)
Walker JJ, 2013 (EU)	NR	80,838	0.91 (0.72, 1.15)
Attner B, 2012 (EU)	1,879	15,810	0.92 (0.74, 1.14)
Wotton CJ, 2011 (EU).2	222	192,894	0.93 (0.45, 1.92)
Lo SF, 2012 (Asia)	372	1,790,868	0.99 (0.80, 1.22)
Liu X, 2015 (EU)	777	380,196	1.04 (0.97, 1.12)
Atchison EA, 2010 (NA)	4,127	4,501,578	1.13 (1.03, 1.24)
Wotton CJ, 2011 (EU).1	383	291,462	1.15 (0.70, 1.88)
Gini A, 2016 (EU)	NR	1,50,765	1.15 (0.85, 1.55)
Yood MU, 2009 (NA)	188	442,712	1.63 (1.21, 2.19)
Travier N, 2007 (AU)	NR	43,984	1.79 (0.40, 8.05)
Overall effect(df =10, p =0.08; I²=43.0%)			1.06 (0.95, 1.19)

Incidence : NHL

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Erber E, 2009 (NA)	198	193,050	0.85 (0.52, 1.38)
Wotton CJ, 2011 (EU).1	832	291,462	0.89 (0.63, 1.25)
Atchison EA, 2010 (NA)	9,496	4,501,578	0.95 (0.89, 1.01)
Gini A, 2016 (EU)	NR	1,50,765	0.95 (0.71, 1.27)
Wotton CJ, 2011 (EU).2	450	192,894	0.96 (0.58, 1.59)
Lo SF, 2012 (Asia)	1,885	1,790,868	1.05 (0.96, 1.15)
Walker JJ, 2013 (EU)	NR	80,838	1.06 (0.87, 1.29)
Khan AE, 2008 (EU)	1,213	392,430	1.07 (0.79, 1.44)
Ballotari P, 2017 (EU)	481	407,157	1.09 (0.82, 1.44)
Lai GY, 2013 (NA)	2,910	497,767	1.10 (0.97, 1.25)
Liu X, 2015 (EU)	912	380,196	1.11 (1.04, 1.18)
Attner B, 2012 (EU)	840	7,033	1.22 (0.85, 1.75)
Oguntleye AA, 2009 (EU)	NR	28,731	1.36 (0.74, 2.50)
He X, 2018 (Asia)	NR	765,547	1.48 (0.42, 5.23)
Dankner R, 2016 (ME)	NR	1,777,953	1.49 (1.38, 1.61)
Inoue M, 2006 (Asia)	NR	97,771	1.52 (0.76, 3.03)
Rapp K, 2006 (EU)	NR	3,977	2.04 (0.82, 5.08)
Cerhan JR, 1997 (NA)	124	37,934	2.18 (1.22, 3.90)
Khan M, 2006 (Asia)	NR	56,881	2.41 (1.00, 5.81)
Overall effect(df =18, p =0.00; I²=74.8%)			1.12 (1.02, 1.24)

Incidence : Ovary

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Nakamura K, 2013 (Asia)	NR	16,547	0.70 (0.10, 5.00)
Lambe M, 2011 (EU)	120	201,737	0.79 (0.19, 3.27)
Lega IC, 2016 (NA)	NR	1,32,438	0.91 (0.80, 1.03)
Wotton CJ, 2011 (EU).1	202	84,873	0.93 (0.43, 2.02)
Lai GY, 2013 (NA)	813	199,591	0.96 (0.72, 1.28)
Walker JJ, 2013 (EU)	NR	36,592	1.00 (0.75, 1.33)
Attner B, 2012 (EU)	569	4,887	1.02 (0.87, 1.19)
Lo SF, 2012 (Asia)	948	1,790,868	1.05 (0.92, 1.19)
Gapstur SM, 2012 (NA)	524	63,440	1.05 (0.75, 1.46)
Liu X, 2015 (EU)	477	180,307	1.13 (1.03, 1.24)
Johnson JA, 2010 (NA)	NR	169,012	1.19 (0.93, 1.53)
Gini A, 2016 (EU)	NR	1,50,765	1.22 (0.75, 2.00)
Wotton CJ, 2011 (EU).2	513	151,560	1.28 (0.91, 1.81)
Bao C, 2018 (EU)	NR	13,254	1.30 (0.46, 3.69)
Dankner R, 2016 (ME)	NR	937,714	1.39 (1.18, 1.64)
He X, 2018 (Asia)	211	765,547	1.54 (0.61, 3.89)
Ballotari P, 2017 (EU)	160	206,199	1.56 (0.97, 2.50)
Khan M, 2006 (Asia)	NR	33,503	1.82 (0.42, 7.88)
Chodick G, 2010 (ME)	NR	47,682	2.39 (1.43, 4.00)
Inoue M, 2006 (Asia)	NR	51,223	2.42 (0.96, 6.10)
Overall effect(df =19, p =0.01; I²=51.3%)			1.14 (1.03, 1.26)

Incidence : Pancreas

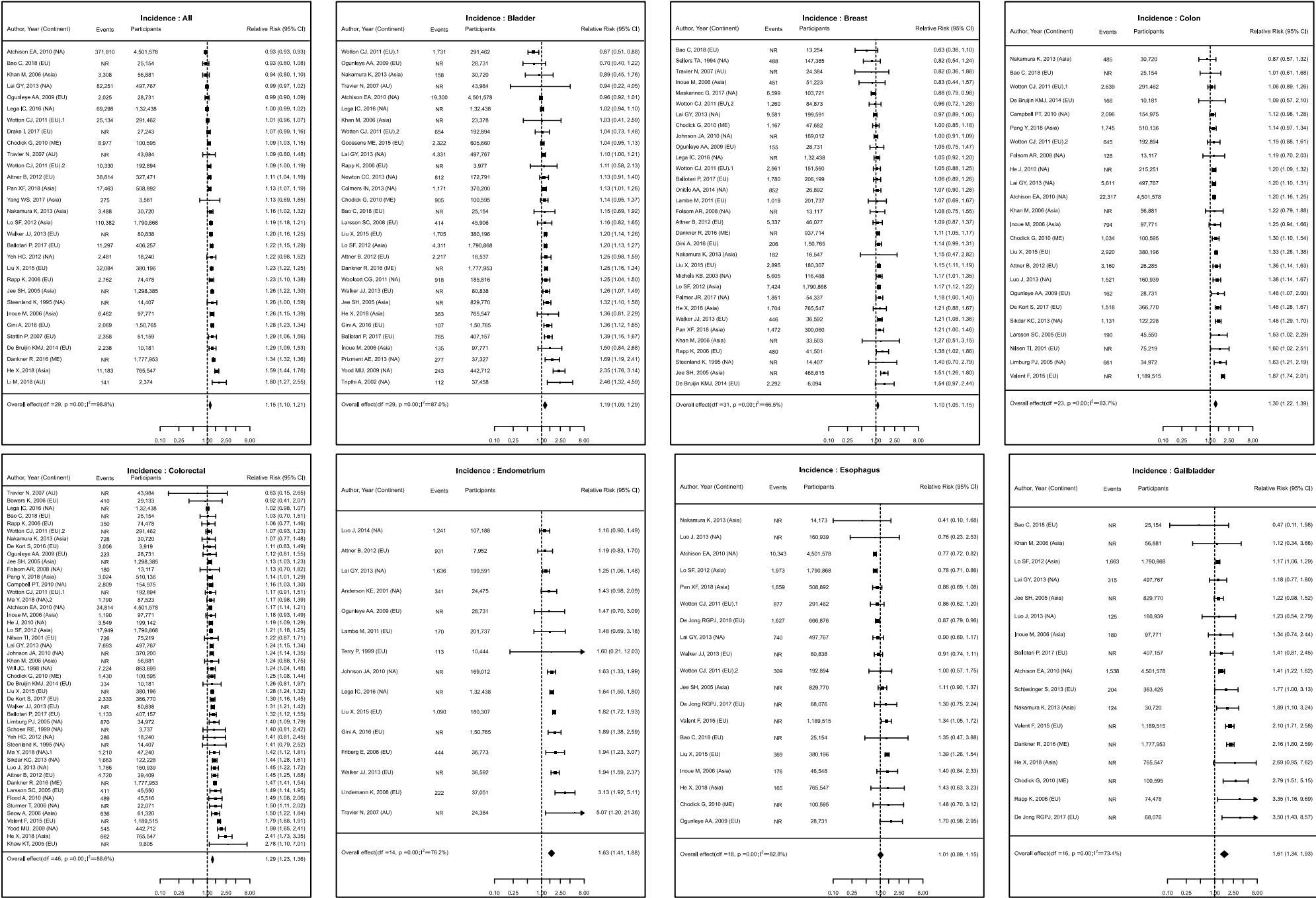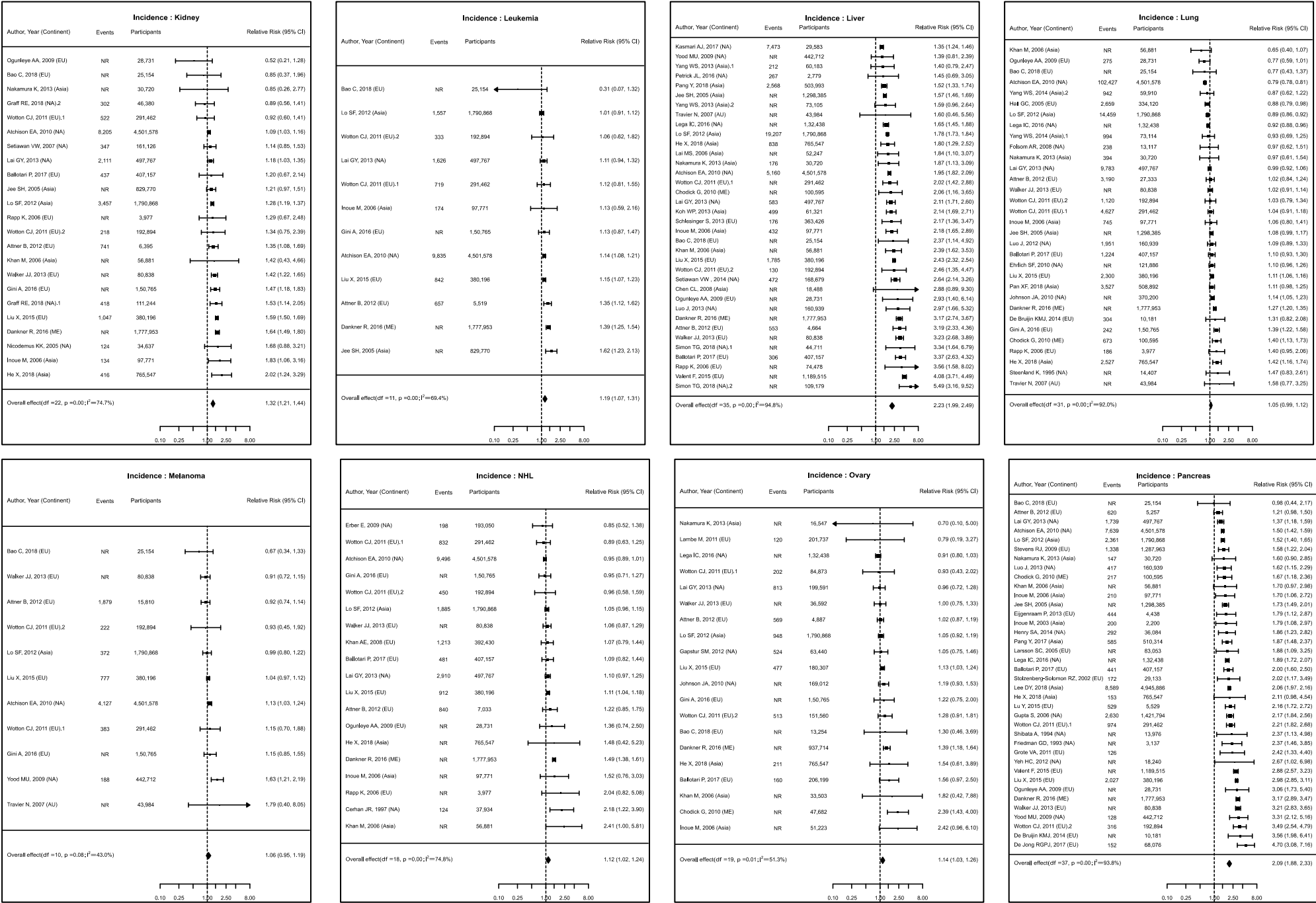| Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	25,154	0.98 (0.44, 2.17)
Attner B, 2012 (EU)	620	5,257	1.21 (0.98, 1.50)
Lai GY, 2013 (NA)	1,739	497,767	1.37 (1.18, 1.59)
Atchison EA, 2010 (NA)	7,639	4,501,578	1.50 (1.42, 1.59)
Lo SF, 2012 (Asia)	2,361	1,790,868	1.52 (1.40, 1.65)
Stevens RJ, 2009 (EU)	1,338	1,287,963	1.58 (1.22, 2.04)
Nakamura K, 2013 (Asia)	147	30,720	1.60 (0.90, 2.85)
Luo J, 2013 (NA)	417	160,939	1.62 (1.15, 2.29)
Chodick G, 2010 (ME)	217	100,595	1.67 (1.18, 2.36)
Khan M, 2006 (Asia)	NR	56,881	1.70 (0.97, 2.98)
Inoue M, 2006 (Asia)	210	97,771	1.73 (1.49, 2.01)
Jee SH, 2005 (Asia)	NR	1,298,385	1.73 (1.45, 2.05)
Eijgenraam P, 2013 (EU)	444	4,438	1.79 (1.12, 2.87)
Inoue M, 2003 (Asia)	200	2,200	1.79 (1.18, 2.72)
Henry SA, 2014 (NA)	292	36,084	1.86 (1.23, 2.82)
Pang Y, 2017 (Asia)	585	510,314	1.87 (1.48, 2.37)
Larsson SC, 2005 (EU)	NR	83,053	1.88 (1.09, 3.25)
Lega IC, 2016 (NA)	NR	1,32,438	1.89 (1.72, 2.07)
Ballotari P, 2017 (EU)	441	407,157	2.00 (1.60, 2.50)
Stolzenberg-Solomon RZ, 2002 (EU)	172	29,133	2.02 (1.17, 3.49)
Lee DY, 2018 (Asia)	8,589	4,945,866	2.06 (1.97, 2.16)
He X, 2018 (Asia)	153	765,547	2.11 (0.98, 4.54)
Lu Y, 2015 (EU)	529	5,529	2.16 (1.72, 2.72)
Gupta S, 2006 (NA)	2,630	1,421,794	2.17 (1.84, 2.56)
Wotton CJ, 2011 (EU).1	974	291,462	2.21 (1.82, 2.68)
Shibata A, 1994 (NA)	NR	13,976	2.37 (1.13, 4.98)
Friedman GD, 1993 (NA)	NR	3,137	2.37 (1.46, 3.85)
Grote VA, 2011 (EU)	126		2.42 (1.33, 4.40)
Yeh HC, 2012 (NA)	NR	18,240	2.67 (1.02, 6.98)
Valent F, 2015 (EU)	NR	1,189,515	2.88 (2.57, 3.23)
Liu X, 2015 (EU)	2,027	380,196	2.98 (2.85, 3.11)
Oguntleye AA, 2009 (EU)	NR	28,731	3.06 (1.73, 5.40)
Dankner R, 2016 (ME)	NR	1,777,953	3.17 (2.89, 3.47)
Walker JJ, 2013 (EU)	NR	80,838	3.21 (2.83, 3.65)
Yood MU, 2009 (NA)	128	442,712	3.31 (2.12, 5.16)
Wotton CJ, 2011 (EU).2	316	192,894	3.49 (2.54, 4.79)
De Bruijn KMJ, 2014 (EU)	NR	10,181	3.56 (1.98, 6.41)
De Jong RGPJ, 2017 (EU)	152	68,076	4.70 (3.08, 7.16)
Overall effect(df =37, p =0.00; I²=93.8%)			2.09 (1.88, 2.33)

Figure S4c. Individual and overall estimates, by cancer

Incidence : Prostate

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	11,900	0.48 (0.35, 0.66)
Thompson MM, 1989 (NA)	NR	1,701	0.50 (0.17, 1.46)
Nakamura K, 2013 (Asia)	179	14,173	0.56 (0.28, 1.13)
Wotton CJ, 2011 (EU).1	2,424	139,902	0.59 (0.47, 0.75)
Martin RM, 2009 (EU)	NR	29,364	0.64 (0.26, 1.58)
Wotton CJ, 2011 (EU).2	1,319	108,021	0.66 (0.49, 0.88)
De Bruijn KMJ, 2014 (EU)	341	4,087	0.66 (0.37, 1.18)
Rodriguez C, 2005 (NA)	5,318	72,670	0.67 (0.60, 0.75)
Folsom AR, 2008 (NA)	335	13,117	0.71 (0.49, 1.03)
Tsilidis KK, 2015 (EU)	4,531	139,131	0.74 (0.63, 0.86)
Lai GY, 2013 (NA)	23,483	295,276	0.74 (0.70, 0.78)
Miller EA, 2018 (NA)	8,184	73,549	0.74 (0.68, 0.81)
Wallstrom P, 2009 (EU)	817	13,464	0.76 (0.52, 1.12)
Lega IC, 2016 (NA)	NR	1,32,438	0.76 (0.73, 0.79)
Ogunleye AA, 2009 (EU)	160	28,731	0.77 (0.54, 1.09)
Jee SH, 2005 (Asia)	NR	829,770	0.80 (0.64, 0.99)
Dankner R, 2016 (ME)	NR	840,239	0.80 (0.76, 0.85)
Attner B, 2012 (EU)	6,969	59,330	0.81 (0.69, 0.95)
Waters KM, 2009 (NA)	5,941	86,303	0.81 (0.75, 0.88)
Chen CB, 2018 (NA)	7,927	160,566	0.82 (0.78, 0.86)
Inoue M, 2006 (Asia)	284	46,548	0.82 (0.51, 1.32)
Kasper JS, 2009 (NA)	4,511	47,781	0.83 (0.74, 0.94)
Velicer CM, 2007 (NA)	827	35,239	0.83 (0.64, 1.07)
Haagstrom C, 2005 (EU)	25,882	612,846	0.86 (0.83, 0.90)
Ballotari P, 2017 (EU)	1,072	200,958	0.86 (0.72, 1.03)
Walker JJ, 2013 (EU)	NR	44,246	0.87 (0.80, 0.94)
Johnson JA, 2010 (NA)	NR	201,188	0.88 (0.82, 0.95)
Darbinian JA, 2008 (NA)	1,531	26,414	0.88 (0.79, 0.98)
Liu X, 2015 (EU)	5,055	199,889	0.88 (0.86, 0.91)
Atchison EA, 2010 (NA)	65,463	4,501,578	0.89 (0.87, 0.91)
Gini A, 2016 (EU)	295	1,50,765	0.96 (0.86, 1.08)
Lo SF, 2012 (Asia)	3,275	1,790,868	1.03 (0.98, 1.09)
Rapp K, 2006 (EU)	534	3,977	1.10 (0.86, 1.41)
Choi JB, 2016 (Asia)	7,622	139,519	1.10 (1.03, 1.18)
Will JC, 1999 (NA)	2,523	305,065	1.13 (0.88, 1.45)
Li Q, 2010 (Asia)	230	22,458	1.18 (0.76, 1.83)
Travier N, 2007 (AU)	NR	19,600	1.19 (0.50, 2.85)
He X, 2018 (Asia)	247	765,547	1.21 (0.63, 2.32)
Steenland K, 1995 (NA)	NR	14,407	1.45 (0.78, 2.70)
Overall effect(df =38, p =0.00; I²=91.3%)			**0.83 (0.79, 0.88)**

Incidence : Rectum

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Ogunleye AA, 2009 (EU)	NR	28,731	0.56 (0.30, 1.04)
De Kort S, 2016 (EU)	678	3,919	0.79 (0.44, 1.41)
Limburg PJ, 2005 (NA)	196	34,972	0.80 (0.40, 1.60)
De Kort S, 2017 (EU)	642	366,770	1.00 (0.73, 1.36)
Inoue M, 2006 (Asia)	396	97,771	1.03 (0.67, 1.58)
Bao C, 2018 (EU)	NR	25,154	1.06 (0.59, 1.90)
Wotton CJ, 2011 (EU).1	1,576	291,462	1.08 (0.86, 1.36)
Chodick G, 2010 (ME)	396	100,595	1.09 (0.81, 1.47)
Pang Y, 2018 (Asia)	1,716	510,136	1.11 (0.94, 1.32)
Atchison EA, 2010 (NA)	12,497	4,501,578	1.12 (1.07, 1.18)
Wotton CJ, 2011 (EU).2	292	192,894	1.14 (0.73, 1.77)
He J, 2010 (NA)	NR	215,251	1.15 (0.97, 1.37)
Liu X, 2015 (EU)	1,411	380,196	1.19 (1.13, 1.25)
Khan M, 2006 (Asia)	NR	56,881	1.27 (0.72, 2.25)
Campbel PT, 2010 (NA)	713	154,975	1.29 (1.03, 1.62)
Sikdar KC, 2013 (NA)	523	122,228	1.30 (1.06, 1.60)
Lai GY, 2013 (NA)	2,082	497,767	1.35 (1.17, 1.55)
Nilsen TI, 2001 (EU)	NR	75,219	1.41 (0.61, 3.26)
Nakamara K, 2013 (Asia)	243	30,720	1.41 (0.86, 2.32)
Valent F, 2015 (EU)	NR	1,189,515	1.62 (1.44, 1.82)
Attner B, 2012 (EU)	1,560	13,124	1.66 (1.28, 2.15)
Larsson SC, 2005 (EU)	127	45,550	1.79 (1.18, 2.72)
Luo J, 2013 (NA)	265	160,939	1.87 (1.22, 2.86)
De Bruijn KMJ, 2014 (EU)	NR	10,181	2.01 (0.90, 4.50)
Overall effect(df =23, p =0.00; I²=70.8%)			**1.23 (1.13, 1.35)**

Incidence : Stomach

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Khan M, 2006 (Asia)	NR	56,881	0.63 (0.45, 0.88)
Travier N, 2007 (AU)	NR	43,984	0.72 (0.09, 5.65)
Ogunleye AA, 2009 (EU)	NR	28,731	0.73 (0.41, 1.29)
Luo J, 2013 (NA)	121	160,939	0.76 (0.34, 1.68)
Xu HL, 2015 (Asia).2	376	61,283	0.83 (0.59, 1.16)
Rapp K, 2006 (EU)	NR	3,977	0.84 (0.38, 1.86)
De Jong RGPJ, 2017 (EU)	NR	68,076	0.88 (0.56, 1.38)
Pan XF, 2018 (Asia)	2,209	508,892	0.91 (0.77, 1.08)
Xu HL, 2015 (Asia).1	379	73,042	0.92 (0.68, 1.25)
Atchison EA, 2010 (NA)	7,515	4,501,578	0.95 (0.89, 1.02)
Ballotari P, 2017 (EU)	454	407,157	0.95 (0.72, 1.26)
Bao C, 2018 (EU)	NR	25,154	1.05 (0.45, 2.45)
Wotton CJ, 2011 (EU).1	1,430	291,462	1.11 (0.89, 1.38)
Walker JJ, 2013 (EU)	NR	80,838	1.12 (0.94, 1.33)
Jee SH, 2005 (Asia)	NR	1,298,385	1.12 (1.05, 1.19)
Lo SF, 2012 (Asia)	3,474	1,790,868	1.15 (1.09, 1.21)
Liu X, 2015 (EU)	1,125	380,196	1.21 (1.14, 1.28)
Lai GY, 2013 (NA)	940	497,767	1.22 (1.00, 1.49)
Chodick G, 2010 (ME)	307	100,595	1.28 (0.92, 1.79)
Inoue M, 2006 (Asia)	1,339	97,771	1.30 (1.06, 1.59)
Nakamura K, 2013 (Asia)	672	30,720	1.45 (1.09, 1.92)
Attner B, 2012 (EU)	767	6,340	1.54 (1.26, 1.88)
Dankner R, 2016 (ME)	NR	1,777,953	1.77 (1.62, 1.94)
Valent F, 2015 (EU)	NR	1,189,515	1.77 (1.59, 1.98)
He X, 2018 (Asia)	510	765,547	2.02 (1.32, 3.09)
Wotton CJ, 2011 (EU).2	255	192,894	2.05 (1.33, 3.17)
Ikeda F, 2009 (Asia)	NR	1,786	2.69 (1.24, 5.84)
Sekikawa A, 2014 (Asia)	NR	1,449	2.76 (1.17, 6.50)
Overall effect(df =27, p =0.00; I²=92.9%)			**1.19 (1.05, 1.35)**

Incidence : Thyroid

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Ballotari P, 2017 (EU)	531	407,157	1.00 (0.67, 1.49)
Dankner R, 2016 (ME)	NR	1,777,953	1.01 (0.88, 1.16)
Inoue M, 2006 (Asia)	103	51,223	1.08 (0.34, 3.43)
Luo J, 2016 (NA)	391	147,934	1.09 (0.79, 1.51)
Atchison EA, 2010 (NA)	1,053	4,501,578	1.12 (0.93, 1.34)
Lo SF, 2012 (Asia)	1,309	1,790,868	1.17 (1.05, 1.31)
Aschebrook- Kilfoy B, 2011 (NA)	585	496,578	1.25 (0.95, 1.64)
Lega IC, 2016 (NA)	NR	1,32,438	1.26 (1.12, 1.41)
Johnson JA, 2010 (NA)	NR	370,200	1.29 (0.87, 1.91)
Chodick G, 2010 (ME)	114	100,595	1.30 (0.79, 2.14)
Liu X, 2015 (EU)	165	380,196	1.35 (1.16, 1.58)
Meinhold CL, 2009 (NA)	116	69,506	1.37 (0.49, 3.80)
He X, 2018 (Asia)	927	765,547	1.39 (0.83, 2.32)
Gini A, 2016 (EU)	NR	1,50,765	1.62 (1.18, 2.22)
Overall effect(df =13, p =0.34; I²=28.3%)			**1.20 (1.12, 1.29)**

Mortality : All

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Batty GD, 2004 (EU)	2,174	17,031	0.74 (0.45, 1.21)
Tsujimoto T, 2017 (NA)	268	13,000	0.98 (0.66, 1.45)
Campell PT, 2012 (NA)	120,221	1,53,831	1.09 (1.07, 1.12)
Shen C, 2014 (Asia)	NR	66,813	1.11 (1.03, 1.20)
Best LG, 2015 (NA)	NR	4,738	1.20 (0.98, 1.47)
SaydahSH, 2002 (NA)	148	2,677	1.20 (0.63, 2.28)
Adlerberth AM, 1997 (EU)	670	7,100	1.21 (0.79, 1.86)
Gordon_Dseagu VLZ, 2014 (EU)	5,571	204,533	1.26 (1.11, 1.43)
Bragg F, 2017 (Asia)	8,579	512,797	1.27 (1.18, 1.37)
Jee SH, 2005 (Asia)	NR	1,298,385	1.28 (1.23, 1.33)
Koskinen SV, 1998 (EU)	1,421	58,000	1.30 (1.23, 1.37)
Drake I, 2017 (EU)	NR	27,243	1.33 (1.19, 1.48)
Yeh HC, 2012 (NA)	907	18,240	1.36 (1.02, 1.81)
Levine W, 1990 (NA)	513	20,755	1.46 (1.00, 2.13)
Ma Y, 2013 (NA)	5,965	158,833	1.47 (1.32, 1.64)
Oba S, 2008 (Asia)	653	29,079	1.49 (1.13, 1.97)
Fujino Y, 2001 (Asia)	390	7,308	1.57 (1.12, 2.20)
Overall effect(df =16, p =0.00; I²=80.4%)			**1.25 (1.18, 1.33)**

Mortality : Pancreas

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Coughlin SS, 1996 (NA)	826	348,874	0.77 (0.43, 1.37)
Campell PT, 2012 (NA)	3,433	1,53,831	1.36 (1.24, 1.49)
Shen C, 2014 (Asia)	NR	66,813	1.36 (0.97, 1.91)
Best LG, 2015 (NA)	NR	4,738	1.44 (0.65, 3.20)
Jee SH, 2005 (Asia)	NR	1,298,385	1.71 (1.45, 2.01)
Pang Y, 2017 (Asia)	420	510,314	1.77 (1.33, 2.35)
Lin Y, 2002 (Asia)	196	99,527	1.86 (1.18, 2.92)
Gapstur SM, 2000 (NA)	NR	35,658	2.15 (1.22, 3.79)
Yeh HC, 2012 (NA)	NR	18,240	3.42 (1.30, 9.01)
Mills PK, 1988 (NA)	NR	34,198	3.76 (1.70, 8.31)
Batty GD, 2004 (EU)	106	17,031	3.99 (1.44, 11.03)
Overall effect(df =10, p =0.00; I²=65.3%)			**1.67 (1.30, 2.14)**

NR: Not Reported in the original study; **NHL**: Non-Hodgkin's Lymphoma. **Black border**: Incidence; **Yellow border**: Mortality
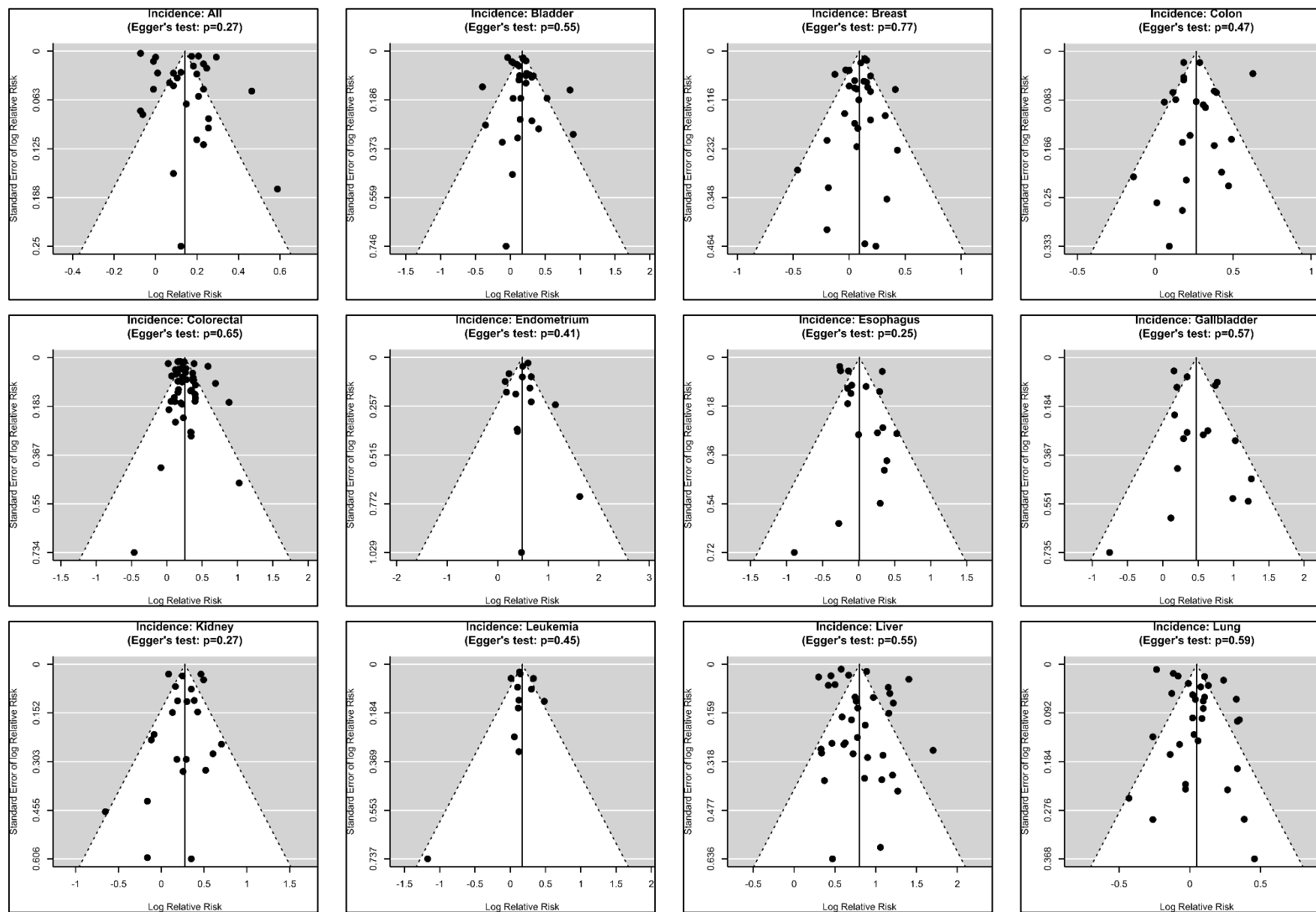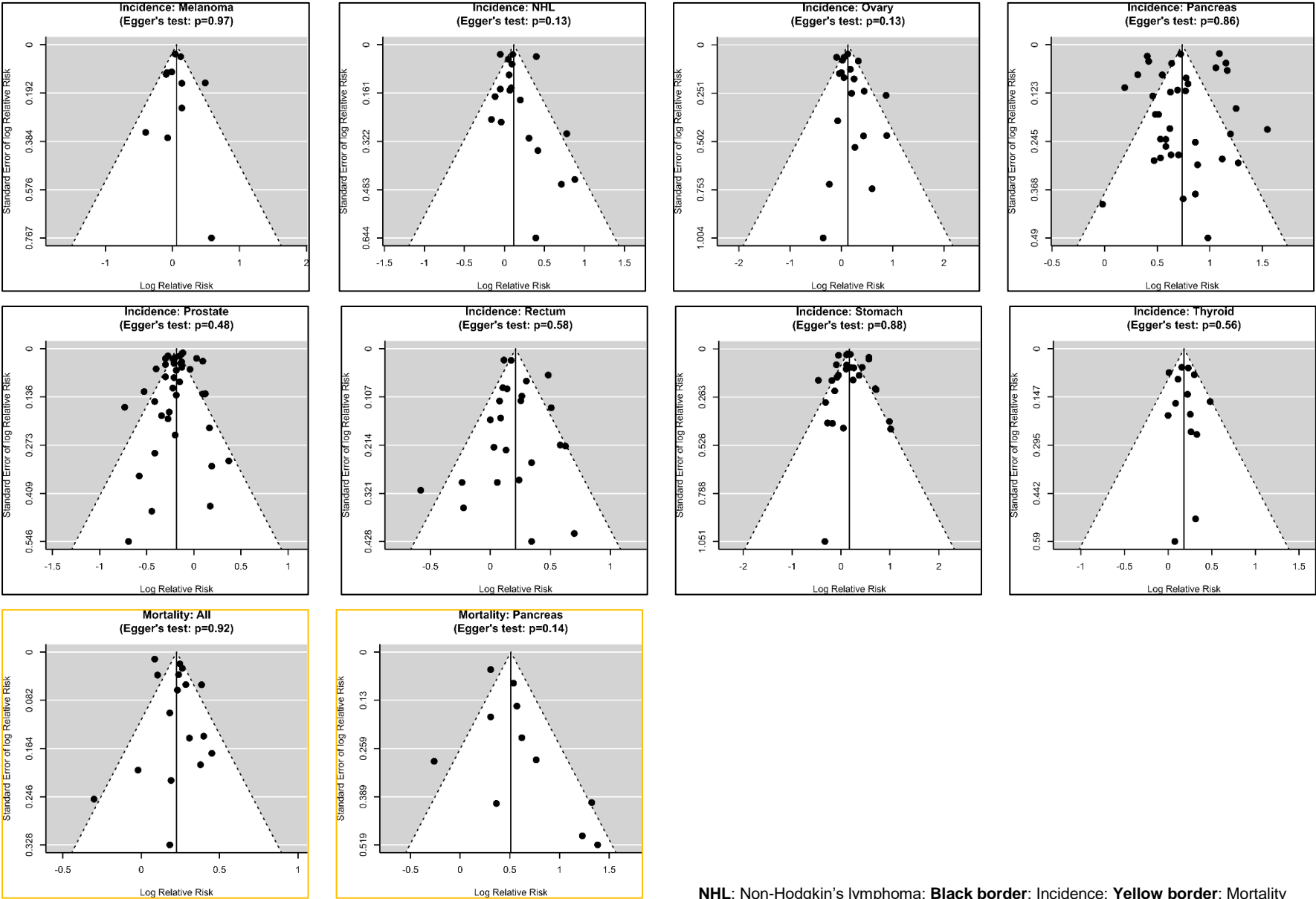
Figure S5a. Publication bias, by cancer

Figure S5b. Publication bias, by cancer

NHL: Non-Hodgkin's lymphoma; **Black border**: Incidence; **Yellow border**: Mortality

21

Figure S6a. Individual and overall estimates, by cancer and sex (Red – Females; Blue – Males)
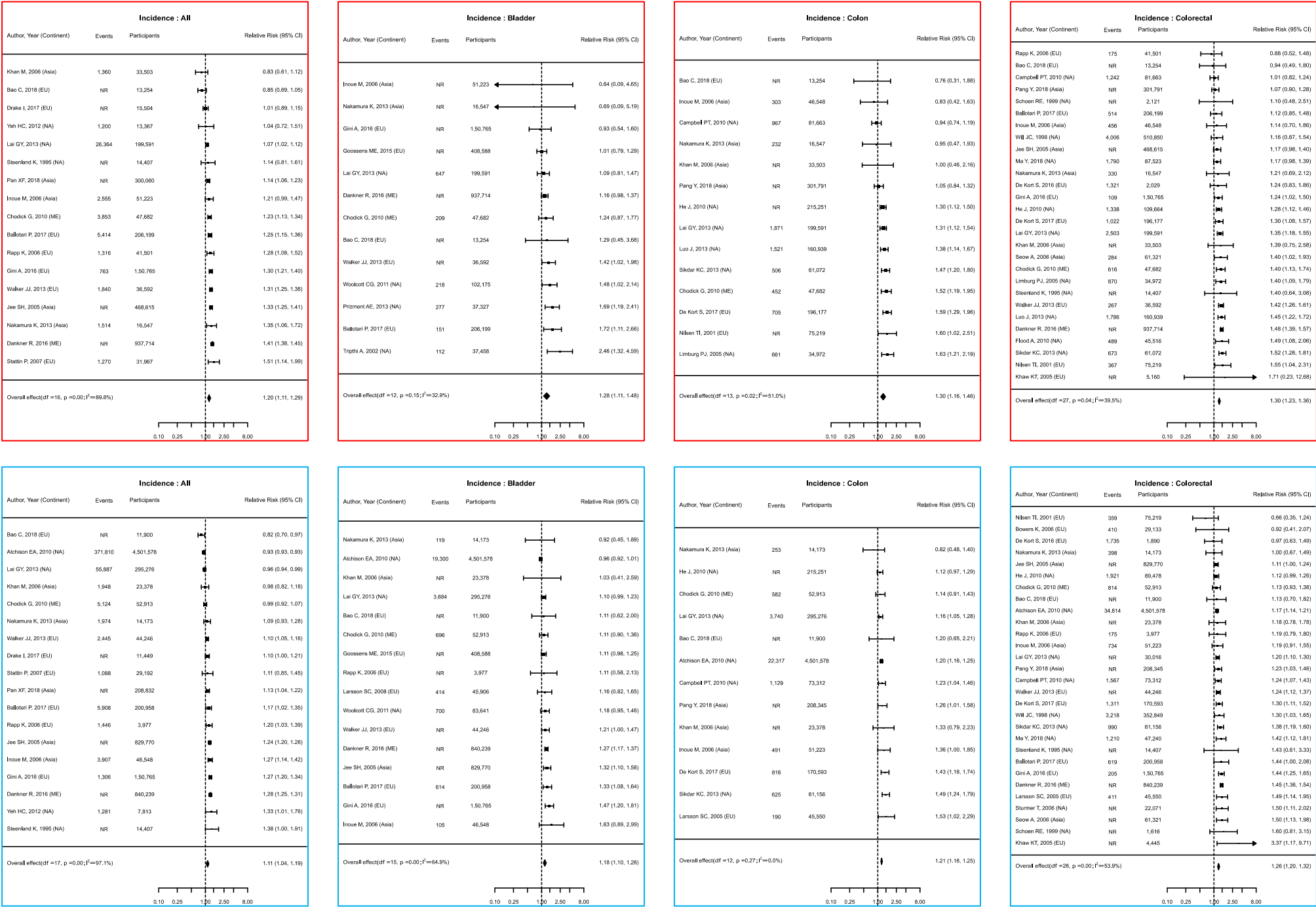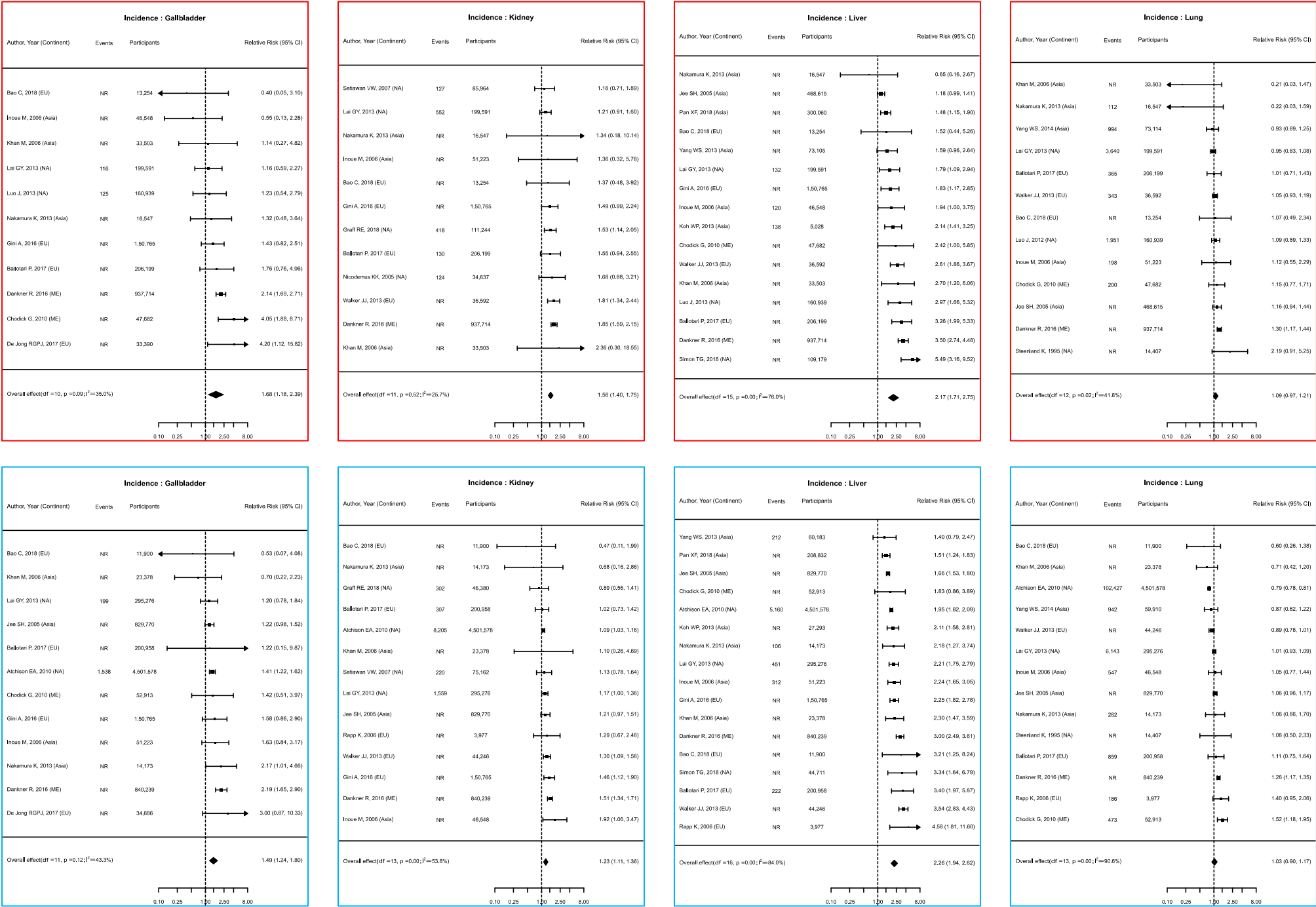
Incidence : All (Females)
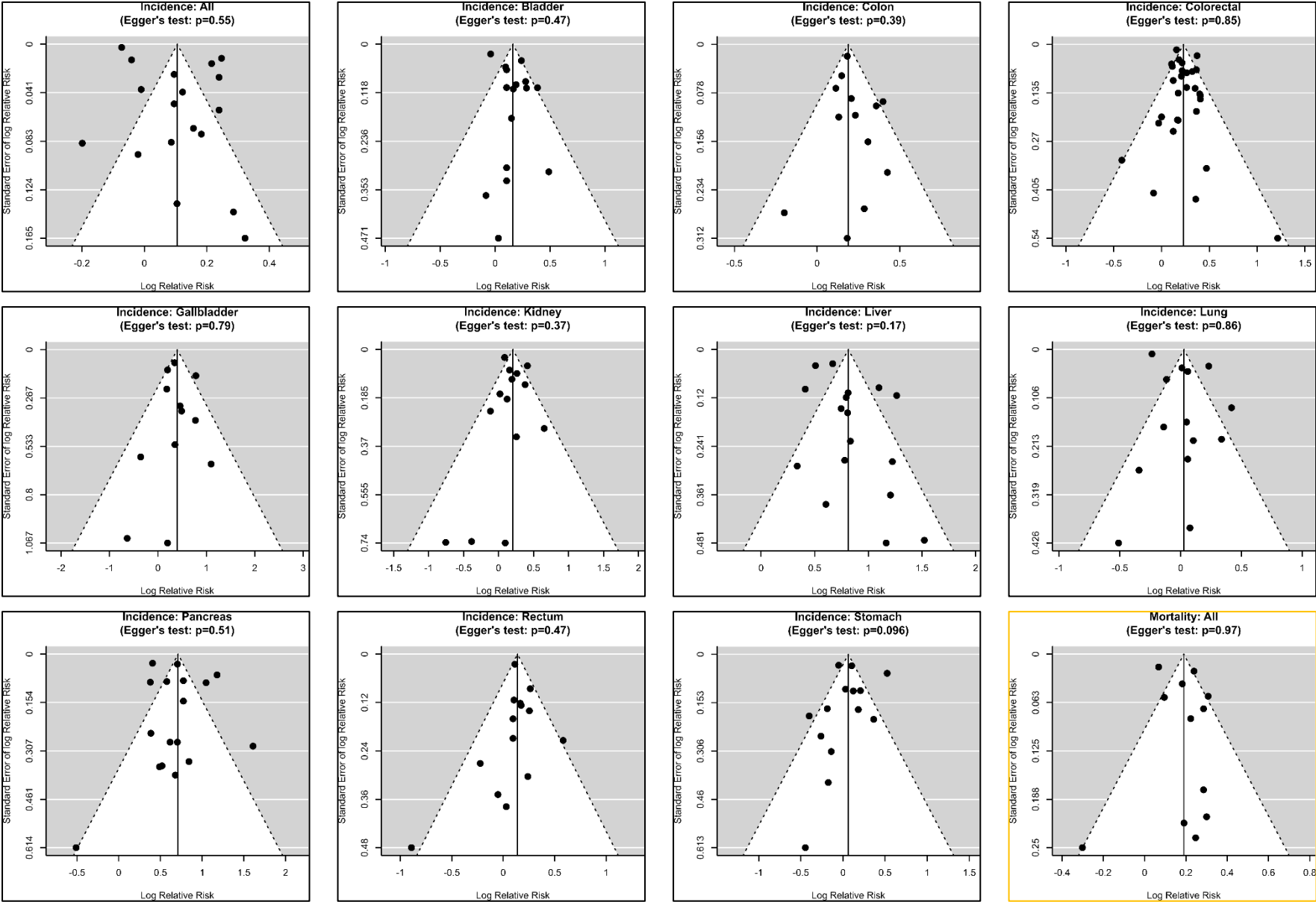
Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Khan M, 2006 (Asia)	1,360	33,503	0.83 (0.61, 1.12)
Bao C, 2018 (EU)	NR	13,254	0.85 (0.69, 1.05)
Drake I, 2017 (EU)	NR	15,504	1.01 (0.89, 1.15)
Yeh HC, 2012 (NA)	1,200	13,367	1.04 (0.72, 1.51)
Lai GY, 2013 (NA)	26,364	199,591	1.07 (1.02, 1.12)
Steenland K, 1995 (NA)	NR	14,407	1.14 (0.81, 1.61)
Pan XF, 2018 (Asia)	NR	300,060	1.14 (1.06, 1.23)
Inoue M, 2006 (Asia)	2,555	51,223	1.21 (0.99, 1.47)
Chodick G, 2010 (ME)	3,853	47,682	1.23 (1.13, 1.34)
Ballotari P, 2017 (EU)	5,414	206,199	1.25 (1.15, 1.36)
Rapp K, 2006 (EU)	1,316	41,501	1.28 (1.08, 1.52)
Gini A, 2016 (EU)	763	1,50,765	1.30 (1.21, 1.40)
Walker JJ, 2013 (EU)	1,840	36,592	1.31 (1.25, 1.38)
Jee SH, 2005 (Asia)	NR	468,615	1.33 (1.25, 1.41)
Nakamura K, 2013 (Asia)	1,514	16,547	1.35 (1.06, 1.72)
Dankner R, 2016 (ME)	NR	937,714	1.41 (1.38, 1.45)
Stattin P, 2007 (EU)	1,270	31,967	1.51 (1.14, 1.99)
Overall effect(df =16, p =0.00; I²=89.8%)			1.20 (1.11, 1.29)

Incidence : Bladder (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Inoue M, 2006 (Asia)	NR	51,223	0.64 (0.09, 4.65)
Nakamura K, 2013 (Asia)	NR	16,547	0.69 (0.09, 5.19)
Gini A, 2016 (EU)	NR	1,50,765	0.93 (0.54, 1.60)
Goossens ME, 2015 (EU)	NR	408,588	1.01 (0.79, 1.29)
Lai GY, 2013 (NA)	647	199,591	1.09 (0.81, 1.47)
Dankner R, 2016 (ME)	NR	937,714	1.16 (0.98, 1.37)
Chodick G, 2010 (ME)	209	47,682	1.24 (0.87, 1.77)
Bao C, 2018 (EU)	NR	13,254	1.29 (0.45, 3.68)
Walker JJ, 2013 (EU)	NR	36,592	1.42 (1.02, 1.98)
Woolcott CG, 2011 (NA)	218	102,175	1.48 (1.02, 2.14)
Prizment AE, 2013 (NA)	277	37,327	1.69 (1.19, 2.41)
Ballotari P, 2017 (EU)	151	206,199	1.72 (1.11, 2.66)
Tripthi A, 2002 (NA)	112	37,458	2.46 (1.32, 4.59)
Overall effect(df =12, p =0.15; I²=32.9%)			1.28 (1.11, 1.48)

Incidence : Colon (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	13,254	0.76 (0.31, 1.88)
Inoue M, 2006 (Asia)	303	46,548	0.83 (0.42, 1.63)
Campbell PT, 2010 (NA)	967	81,663	0.94 (0.74, 1.19)
Nakamura K, 2013 (Asia)	232	16,547	0.95 (0.47, 1.93)
Khan M, 2006 (Asia)	NR	33,503	1.00 (0.46, 2.16)
Pang Y, 2018 (Asia)	NR	301,791	1.05 (0.84, 1.32)
He J, 2010 (NA)	NR	215,251	1.30 (1.12, 1.50)
Lai GY, 2013 (NA)	1,871	199,591	1.31 (1.12, 1.54)
Luo J, 2013 (NA)	1,521	160,939	1.38 (1.14, 1.67)
Sikdar KC, 2013 (NA)	506	61,072	1.47 (1.20, 1.80)
Chodick G, 2010 (ME)	452	47,682	1.52 (1.19, 1.95)
De Kort S, 2017 (EU)	705	196,177	1.59 (1.29, 1.96)
Nilsen TI, 2001 (EU)	NR	75,219	1.60 (1.02, 2.51)
Limburg PJ, 2005 (NA)	661	34,972	1.63 (1.21, 2.19)
Overall effect(df =13, p =0.02; I²=51.0%)			1.30 (1.16, 1.46)

Incidence : Colorectal (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Rapp K, 2006 (EU)	175	41,501	0.88 (0.52, 1.48)
Bao C, 2018 (EU)	NR	13,254	0.94 (0.49, 1.80)
Campbell PT, 2010 (NA)	1,242	81,663	1.01 (0.82, 1.24)
Pang Y, 2018 (Asia)	NR	301,791	1.07 (0.90, 1.28)
Schoen RE, 1999 (NA)	NR	2,121	1.10 (0.48, 2.51)
Ballotari P, 2017 (EU)	514	206,199	1.12 (0.85, 1.48)
Inoue M, 2006 (Asia)	456	46,548	1.14 (0.70, 1.86)
Will JC, 1998 (NA)	4,006	510,850	1.16 (0.87, 1.54)
Jee SH, 2005 (Asia)	NR	468,615	1.17 (0.98, 1.40)
Ma Y, 2018 (NA)	1,790	87,523	1.17 (0.98, 1.39)
Nakamura K, 2013 (Asia)	330	16,547	1.21 (0.69, 2.12)
De Kort S, 2016 (EU)	1,321	2,029	1.24 (0.83, 1.86)
Gini A, 2016 (EU)	109	1,50,765	1.24 (1.02, 1.50)
He J, 2010 (NA)	1,338	109,664	1.28 (1.12, 1.46)
De Kort S, 2017 (EU)	1,022	196,177	1.30 (1.08, 1.57)
Lai GY, 2013 (NA)	2,503	199,591	1.35 (1.18, 1.55)
Khan M, 2006 (Asia)	NR	33,503	1.39 (0.75, 2.58)
Seow A, 2006 (Asia)	284	61,321	1.40 (1.02, 1.93)
Chodick G, 2010 (ME)	616	47,682	1.40 (1.13, 1.74)
Limburg PJ, 2005 (NA)	870	34,972	1.40 (1.09, 1.79)
Steenland K, 1995 (NA)	NR	14,407	1.40 (0.64, 3.08)
Walker JJ, 2013 (EU)	267	36,592	1.42 (1.26, 1.61)
Luo J, 2013 (NA)	1,786	160,939	1.45 (1.22, 1.72)
Dankner R, 2016 (ME)	NR	937,714	1.48 (1.39, 1.57)
Flood A, 2010 (NA)	489	45,516	1.49 (1.08, 2.06)
Sikdar KC, 2013 (NA)	673	61,072	1.52 (1.28, 1.81)
Nilsen TI, 2001 (EU)	367	75,219	1.55 (1.04, 2.31)
Khaw KT, 2005 (EU)	NR	5,160	1.71 (0.23, 12.68)
Overall effect(df =27, p =0.04; I²=39.5%)			1.30 (1.23, 1.36)

Incidence : All (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	11,900	0.82 (0.70, 0.97)
Atchison EA, 2010 (NA)	371,810	4,501,578	0.93 (0.93, 0.93)
Lai GY, 2013 (NA)	55,887	295,276	0.96 (0.94, 0.99)
Khan M, 2006 (Asia)	1,948	23,378	0.98 (0.82, 1.18)
Chodick G, 2010 (ME)	5,124	52,913	0.99 (0.92, 1.07)
Nakamura K, 2013 (Asia)	1,974	14,173	1.09 (0.93, 1.28)
Walker JJ, 2013 (EU)	2,445	44,246	1.10 (1.05, 1.16)
Drake I, 2017 (EU)	NR	11,449	1.10 (1.00, 1.21)
Stattin P, 2007 (EU)	1,088	29,192	1.11 (0.85, 1.45)
Pan XF, 2018 (Asia)	NR	208,832	1.13 (1.04, 1.22)
Ballotari P, 2017 (EU)	5,908	200,958	1.17 (1.02, 1.35)
Rapp K, 2006 (EU)	1,446	3,977	1.20 (1.03, 1.39)
Jee SH, 2005 (Asia)	NR	829,770	1.24 (1.20, 1.28)
Inoue M, 2006 (Asia)	3,907	46,548	1.27 (1.14, 1.42)
Gini A, 2016 (EU)	1,306	1,50,765	1.27 (1.20, 1.34)
Dankner R, 2016 (ME)	NR	840,239	1.28 (1.25, 1.31)
Yeh HC, 2012 (NA)	1,281	7,813	1.33 (1.01, 1.76)
Steenland K, 1995 (NA)	NR	14,407	1.38 (1.00, 1.91)
Overall effect(df =17, p =0.00; I²=97.1%)			1.11 (1.04, 1.19)

Incidence : Bladder (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Nakamura K, 2013 (Asia)	119	14,173	0.92 (0.45, 1.89)
Atchison EA, 2010 (NA)	19,300	4,501,578	0.96 (0.92, 1.01)
Khan M, 2006 (Asia)	NR	23,378	1.03 (0.41, 2.59)
Lai GY, 2013 (NA)	3,684	295,276	1.10 (0.99, 1.23)
Bao C, 2018 (EU)	NR	11,900	1.11 (0.62, 2.00)
Chodick G, 2010 (ME)	696	52,913	1.11 (0.90, 1.36)
Goossens ME, 2015 (EU)	NR	408,588	1.11 (0.98, 1.25)
Rapp K, 2006 (EU)	NR	3,977	1.11 (0.58, 2.13)
Larsson SC, 2008 (EU)	414	45,906	1.16 (0.82, 1.65)
Woolcott CG, 2011 (NA)	700	83,641	1.18 (0.95, 1.46)
Walker JJ, 2013 (EU)	NR	44,246	1.21 (1.00, 1.47)
Dankner R, 2016 (ME)	NR	840,239	1.27 (1.17, 1.37)
Jee SH, 2005 (Asia)	NR	829,770	1.32 (1.10, 1.58)
Ballotari P, 2017 (EU)	614	200,958	1.33 (1.08, 1.64)
Gini A, 2016 (EU)	NR	1,50,765	1.47 (1.20, 1.81)
Inoue M, 2006 (Asia)	105	46,548	1.63 (0.89, 2.99)
Overall effect(df =15, p =0.00; I²=64.9%)			1.18 (1.10, 1.26)

Incidence : Colon (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Nakamura K, 2013 (Asia)	253	14,173	0.82 (0.48, 1.40)
He J, 2010 (NA)	NR	215,251	1.12 (0.97, 1.29)
Chodick G, 2010 (ME)	582	52,913	1.14 (0.91, 1.43)
Lai GY, 2013 (NA)	3,740	295,276	1.16 (1.05, 1.28)
Bao C, 2018 (EU)	NR	11,900	1.20 (0.65, 2.21)
Atchison EA, 2010 (NA)	22,317	4,501,578	1.20 (1.16, 1.25)
Campbell PT, 2010 (NA)	1,129	73,312	1.23 (1.04, 1.46)
Pang Y, 2018 (Asia)	NR	208,345	1.26 (1.01, 1.58)
Khan M, 2006 (Asia)	NR	23,378	1.33 (0.79, 2.23)
Inoue M, 2006 (Asia)	491	51,223	1.36 (1.00, 1.85)
De Kort S, 2017 (EU)	816	170,593	1.43 (1.18, 1.74)
Sikdar KC, 2013 (NA)	625	61,156	1.49 (1.24, 1.79)
Larsson SC, 2005 (EU)	190	45,550	1.53 (1.02, 2.29)
Overall effect(df =12, p =0.27; I²=0.0%)			1.21 (1.16, 1.25)

Incidence : Colorectal (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Nilsen TI, 2001 (EU)	359	75,219	0.66 (0.35, 1.24)
Bowers K, 2006 (EU)	410	29,133	0.92 (0.41, 2.07)
De Kort S, 2016 (EU)	1,735	1,890	0.97 (0.63, 1.49)
Nakamura K, 2013 (Asia)	398	14,173	1.00 (0.67, 1.49)
Jee SH, 2005 (Asia)	NR	829,770	1.11 (1.00, 1.24)
He J, 2010 (NA)	1,921	89,478	1.12 (0.99, 1.26)
Chodick G, 2010 (ME)	814	52,913	1.13 (0.93, 1.38)
Bao C, 2018 (EU)	NR	11,900	1.13 (0.70, 1.82)
Atchison EA, 2010 (NA)	34,814	4,501,578	1.17 (1.14, 1.21)
Khan M, 2006 (Asia)	NR	23,378	1.18 (0.78, 1.78)
Rapp K, 2006 (EU)	175	3,977	1.19 (0.79, 1.80)
Inoue M, 2006 (Asia)	734	51,223	1.19 (0.91, 1.55)
Lai GY, 2013 (NA)	NR	30,016	1.20 (1.10, 1.30)
Pang Y, 2018 (Asia)	NR	208,345	1.23 (1.03, 1.46)
Campbell PT, 2010 (NA)	1,567	73,312	1.24 (1.07, 1.43)
Walker JJ, 2013 (EU)	NR	44,246	1.24 (1.12, 1.37)
De Kort S, 2017 (EU)	1,311	170,593	1.30 (1.11, 1.52)
Will JC, 1998 (NA)	3,218	352,849	1.30 (1.03, 1.65)
Sikdar KC, 2013 (NA)	990	61,156	1.38 (1.19, 1.60)
Ma Y, 2018 (NA)	1,210	47,240	1.42 (1.12, 1.81)
Steenland K, 1995 (NA)	NR	14,407	1.43 (0.61, 3.33)
Ballotari P, 2017 (EU)	619	200,958	1.44 (1.00, 2.08)
Gini A, 2016 (EU)	205	1,50,765	1.44 (1.25, 1.65)
Dankner R, 2016 (ME)	NR	840,239	1.45 (1.36, 1.54)
Larsson SC, 2005 (EU)	411	45,550	1.49 (1.14, 1.95)
Sturmer T, 2006 (NA)	NR	22,071	1.50 (1.11, 2.02)
Seow A, 2006 (Asia)	NR	61,321	1.50 (1.13, 1.98)
Schoen RE, 1999 (NA)	NR	1,616	1.60 (0.81, 3.15)
Khaw KT, 2005 (EU)	NR	4,445	3.37 (1.17, 9.71)
Overall effect(df =28, p =0.00; I²=53.9%)			1.26 (1.20, 1.32)

Figure S6b. Individual and overall estimates, by cancer and sex (Red – Females; Blue – Males)

Incidence : Gallbladder (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	13,254	0.40 (0.05, 3.10)
Inoue M, 2006 (Asia)	NR	46,548	0.55 (0.13, 2.28)
Khan M, 2006 (Asia)	NR	33,503	1.14 (0.27, 4.82)
Lai GY, 2013 (NA)	116	199,591	1.16 (0.59, 2.27)
Luo J, 2013 (NA)	125	160,939	1.23 (0.54, 2.79)
Nakamura K, 2013 (Asia)	NR	16,547	1.32 (0.48, 3.64)
Gini A, 2016 (EU)	NR	1,50,765	1.43 (0.82, 2.51)
Ballotari P, 2017 (EU)	NR	206,199	1.76 (0.76, 4.06)
Dankner R, 2016 (ME)	NR	937,714	2.14 (1.69, 2.71)
Chodick G, 2010 (ME)	NR	47,682	4.05 (1.88, 8.71)
De Jong RGPJ, 2017 (EU)	NR	33,390	4.20 (1.12, 15.82)
Overall effect(df =10, p =0.09; I²=35.0%)			1.68 (1.18, 2.39)

Incidence : Kidney (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Setiawan VW, 2007 (NA)	127	85,964	1.16 (0.71, 1.89)
Lai GY, 2013 (NA)	552	199,591	1.21 (0.91, 1.60)
Nakamura K, 2013 (Asia)	NR	16,547	1.34 (0.18, 10.14)
Inoue M, 2006 (Asia)	NR	51,223	1.36 (0.32, 5.78)
Bao C, 2018 (EU)	NR	13,254	1.37 (0.48, 3.92)
Gini A, 2016 (EU)	NR	1,50,765	1.49 (0.99, 2.24)
Graff RE, 2018 (NA)	418	111,244	1.53 (1.14, 2.05)
Ballotari P, 2017 (EU)	130	206,199	1.55 (0.94, 2.55)
Nicodemus KK, 2005 (NA)	124	34,637	1.68 (0.88, 3.21)
Walker JJ, 2013 (EU)	NR	36,592	1.81 (1.34, 2.44)
Dankner R, 2016 (ME)	NR	937,714	1.85 (1.59, 2.15)
Khan M, 2006 (Asia)	NR	33,503	2.36 (0.30, 18.55)
Overall effect(df =11, p =0.52; I²=25.7%)			1.56 (1.40, 1.75)

Incidence : Liver (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Nakamura K, 2013 (Asia)	NR	16,547	0.65 (0.16, 2.67)
Jee SH, 2005 (Asia)	NR	468,615	1.18 (0.99, 1.41)
Pan XF, 2018 (Asia)	NR	300,060	1.48 (1.15, 1.90)
Bao C, 2018 (EU)	NR	13,254	1.52 (0.44, 5.26)
Yang WS, 2013 (Asia)	NR	73,105	1.59 (0.96, 2.64)
Lai GY, 2013 (NA)	132	199,591	1.79 (1.09, 2.94)
Gini A, 2016 (EU)	NR	1,50,765	1.83 (1.17, 2.85)
Inoue M, 2006 (Asia)	120	46,548	1.94 (1.00, 3.75)
Koh WP, 2013 (Asia)	138	5,028	2.14 (1.41, 3.25)
Chodick G, 2010 (ME)	NR	47,682	2.42 (1.00, 5.85)
Walker JJ, 2013 (EU)	NR	36,592	2.61 (1.86, 3.67)
Khan M, 2006 (Asia)	NR	33,503	2.70 (1.20, 6.06)
Luo J, 2013 (NA)	NR	160,939	2.97 (1.66, 5.32)
Ballotari P, 2017 (EU)	NR	206,199	3.26 (1.99, 5.33)
Dankner R, 2016 (ME)	NR	937,714	3.50 (2.74, 4.48)
Simon TG, 2018 (NA)	NR	109,179	5.49 (3.16, 9.52)
Overall effect(df =15, p =0.00; I²=76.0%)			2.17 (1.71, 2.75)

Incidence : Lung (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Khan M, 2006 (Asia)	NR	33,503	0.21 (0.03, 1.47)
Nakamura K, 2013 (Asia)	112	16,547	0.22 (0.03, 1.59)
Yang WS, 2014 (Asia)	994	73,114	0.93 (0.69, 1.25)
Lai GY, 2013 (NA)	3,640	199,591	0.95 (0.83, 1.08)
Ballotari P, 2017 (EU)	365	206,199	1.01 (0.71, 1.43)
Walker JJ, 2013 (EU)	343	36,592	1.05 (0.93, 1.19)
Bao C, 2018 (EU)	NR	13,254	1.07 (0.49, 2.34)
Luo J, 2012 (NA)	1,951	160,939	1.09 (0.89, 1.33)
Inoue M, 2006 (Asia)	198	51,223	1.12 (0.55, 2.29)
Chodick G, 2010 (ME)	200	47,682	1.15 (0.77, 1.71)
Jee SH, 2005 (Asia)	NR	468,615	1.16 (0.94, 1.44)
Dankner R, 2016 (ME)	NR	937,714	1.30 (1.17, 1.44)
Steenland K, 1995 (NA)	NR	14,407	2.19 (0.91, 5.25)
Overall effect(df =12, p =0.02; I²=41.8%)			1.09 (0.97, 1.21)

Incidence : Gallbladder (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	11,900	0.53 (0.07, 4.08)
Khan M, 2006 (Asia)	NR	23,378	0.70 (0.22, 2.23)
Lai GY, 2013 (NA)	199	295,276	1.20 (0.78, 1.84)
Jee SH, 2005 (Asia)	NR	829,770	1.22 (0.98, 1.52)
Ballotari P, 2017 (EU)	NR	200,958	1.22 (0.15, 9.87)
Atchison EA, 2010 (NA)	1,538	4,501,578	1.41 (1.22, 1.62)
Chodick G, 2010 (ME)	NR	52,913	1.42 (0.51, 3.97)
Gini A, 2016 (EU)	NR	1,50,765	1.58 (0.86, 2.90)
Inoue M, 2006 (Asia)	NR	51,223	1.63 (0.84, 3.17)
Nakamura K, 2013 (Asia)	NR	14,173	2.17 (1.01, 4.66)
Dankner R, 2016 (ME)	NR	840,239	2.19 (1.65, 2.90)
De Jong RGPJ, 2017 (EU)	NR	34,686	3.00 (0.87, 10.33)
Overall effect(df =11, p =0.12; I²=43.3%)			1.49 (1.24, 1.80)

Incidence : Kidney (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	11,900	0.47 (0.11, 1.99)
Nakamura K, 2013 (Asia)	NR	14,173	0.68 (0.16, 2.86)
Graff RE, 2018 (NA)	302	46,380	0.89 (0.56, 1.41)
Ballotari P, 2017 (EU)	307	200,958	1.02 (0.73, 1.42)
Atchison EA, 2010 (NA)	8,205	4,501,578	1.09 (1.03, 1.16)
Khan M, 2006 (Asia)	NR	23,378	1.10 (0.26, 4.69)
Setiawan VW, 2007 (NA)	220	75,162	1.13 (0.78, 1.64)
Lai GY, 2013 (NA)	1,559	295,276	1.17 (1.00, 1.36)
Jee SH, 2005 (Asia)	NR	829,770	1.21 (0.97, 1.51)
Rapp K, 2006 (EU)	NR	3,977	1.29 (0.67, 2.48)
Walker JJ, 2013 (EU)	NR	44,246	1.30 (1.09, 1.56)
Gini A, 2016 (EU)	NR	1,50,765	1.46 (1.12, 1.90)
Dankner R, 2016 (ME)	NR	840,239	1.51 (1.34, 1.71)
Inoue M, 2006 (Asia)	NR	46,548	1.92 (1.06, 3.47)
Overall effect(df =13, p =0.00; I²=53.8%)			1.23 (1.11, 1.36)

Incidence : Liver (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Yang WS, 2013 (Asia)	212	60,183	1.40 (0.79, 2.47)
Pan XF, 2018 (Asia)	NR	208,832	1.51 (1.24, 1.83)
Jee SH, 2005 (Asia)	NR	829,770	1.66 (1.53, 1.80)
Chodick G, 2010 (ME)	NR	52,913	1.83 (0.86, 3.89)
Atchison EA, 2010 (NA)	5,160	4,501,578	1.95 (1.82, 2.09)
Koh WP, 2013 (Asia)	NR	27,293	2.11 (1.58, 2.81)
Nakamura K, 2013 (Asia)	106	14,173	2.18 (1.27, 3.74)
Lai GY, 2013 (NA)	451	295,276	2.21 (1.75, 2.79)
Inoue M, 2006 (Asia)	312	51,223	2.24 (1.65, 3.05)
Gini A, 2016 (EU)	NR	1,50,765	2.25 (1.82, 2.78)
Khan M, 2006 (Asia)	NR	23,378	2.30 (1.47, 3.59)
Dankner R, 2016 (ME)	NR	840,239	3.00 (2.49, 3.61)
Bao C, 2018 (EU)	NR	11,900	3.21 (1.25, 8.24)
Simon TG, 2018 (NA)	NR	44,711	3.34 (1.64, 6.79)
Ballotari P, 2017 (EU)	222	200,958	3.40 (1.97, 5.87)
Walker JJ, 2013 (EU)	NR	44,246	3.54 (2.83, 4.43)
Rapp K, 2006 (EU)	NR	3,977	4.58 (1.81, 11.60)
Overall effect(df =16, p =0.00; I²=84.0%)			2.26 (1.94, 2.62)

Incidence : Lung (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	11,900	0.60 (0.26, 1.38)
Khan M, 2006 (Asia)	NR	23,378	0.71 (0.42, 1.20)
Atchison EA, 2010 (NA)	102,427	4,501,578	0.79 (0.78, 0.81)
Yang WS, 2014 (Asia)	942	59,910	0.87 (0.62, 1.22)
Walker JJ, 2013 (EU)	NR	44,246	0.89 (0.78, 1.01)
Lai GY, 2013 (NA)	6,143	295,276	1.01 (0.93, 1.09)
Inoue M, 2006 (Asia)	547	46,548	1.05 (0.77, 1.44)
Jee SH, 2005 (Asia)	NR	829,770	1.06 (0.96, 1.17)
Nakamura K, 2013 (Asia)	282	14,173	1.06 (0.66, 1.70)
Steenland K, 1995 (NA)	NR	14,407	1.08 (0.50, 2.33)
Ballotari P, 2017 (EU)	859	200,958	1.11 (0.75, 1.64)
Dankner R, 2016 (ME)	NR	840,239	1.26 (1.17, 1.35)
Rapp K, 2006 (EU)	186	3,977	1.40 (0.95, 2.06)
Chodick G, 2010 (ME)	473	52,913	1.52 (1.18, 1.95)
Overall effect(df =13, p =0.00; I²=90.6%)			1.03 (0.90, 1.17)

Figure S6c. Individual and overall estimates, by cancer and sex (Red – Females; Blue – Males)

Incidence : Pancreas (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Lai GY, 2013 (NA)	627	199,591	1.15 (0.85, 1.55)
Larsson SC, 2005 (EU)	NR	83,053	1.31 (0.49, 3.49)
Inoue M, 2006 (Asia)	NR	46,548	1.33 (0.53, 3.32)
Khan M, 2006 (Asia)	NR	33,503	1.42 (0.61, 3.30)
Bao C, 2018 (EU)	NR	13,254	1.53 (0.53, 4.38)
Nakamura K, 2013 (Asia)	NR	16,547	1.53 (0.55, 4.26)
Jee SH, 2005 (Asia)	NR	468,615	1.56 (1.14, 2.14)
Stevens RJ, 2009 (EU)	1,338	1,287,963	1.58 (1.22, 2.04)
Luo J, 2013 (NA)	417	160,939	1.62 (1.15, 2.29)
Henry SA, 2014 (NA)	292	36,084	1.86 (1.23, 2.82)
Chodick G, 2010 (ME)	103	47,682	1.89 (1.16, 3.07)
Lee DY, 2018 (Asia)	3,467	2,197,825	2.12 (1.97, 2.28)
Ballotari P, 2017 (EU)	203	206,199	2.49 (1.79, 3.46)
Dankner R, 2016 (ME)	NR	937,714	3.10 (2.73, 3.53)
Gini A, 2016 (EU)	NR	1,50,765	3.18 (2.48, 4.08)
Walker JJ, 2013 (EU)	NR	36,592	3.64 (3.03, 4.38)
De Jong RGPJ, 2017 (EU)	NR	33,390	4.50 (2.42, 8.37)
Overall effect(df =16, p =0.00; I²=87.7%)			2.06 (1.68, 2.53)

Incidence : Rectum (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
De Kort S, 2017 (EU)	240	196,177	0.80 (0.52, 1.24)
Limburg PJ, 2005 (NA)	196	34,972	0.80 (0.40, 1.60)
Pang Y, 2018 (Asia)	NR	301,791	1.06 (0.83, 1.35)
Chodick G, 2010 (ME)	164	47,682	1.08 (0.69, 1.69)
Bao C, 2018 (EU)	NR	13,254	1.18 (0.47, 2.98)
De Kort S, 2016 (EU)	241	2,029	1.18 (0.56, 2.48)
He J, 2010 (NA)	NR	215,251	1.19 (0.90, 1.57)
Campbell PT, 2010 (NA)	275	81,663	1.28 (0.85, 1.92)
Nilsen TI, 2001 (EU)	NR	75,219	1.41 (0.61, 3.26)
Lai GY, 2013 (NA)	632	199,591	1.49 (1.13, 1.97)
Sikdar KC, 2013 (NA)	163	61,072	1.56 (1.10, 2.22)
Inoue M, 2006 (Asia)	153	46,548	1.65 (0.80, 3.40)
Nakamura K, 2013 (Asia)	NR	16,547	1.81 (0.73, 4.49)
Luo J, 2013 (NA)	265	160,939	1.87 (1.22, 2.86)
Khan M, 2006 (Asia)	NR	33,503	2.54 (0.89, 7.25)
Overall effect(df =14, p =0.23; I²=25.0%)			1.27 (1.10, 1.47)

Incidence : Stomach (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Khan M, 2006 (Asia)	NR	33,503	0.49 (0.23, 1.04)
Luo J, 2013 (NA)	121	160,939	0.76 (0.34, 1.68)
Xu HL, 2015 (Asia)	379	73,042	0.92 (0.68, 1.25)
Chodick G, 2010 (ME)	106	47,682	0.99 (0.55, 1.79)
Jee SH, 2005 (Asia)	NR	468,615	1.15 (0.99, 1.34)
Ballotari P, 2017 (EU)	159	206,199	1.17 (0.72, 1.89)
Walker JJ, 2013 (EU)	NR	36,592	1.30 (0.97, 1.75)
De Jong RGPJ, 2017 (EU)	NR	33,390	1.40 (0.56, 3.48)
Inoue M, 2006 (Asia)	362	46,548	1.61 (1.02, 2.54)
Lai GY, 2013 (NA)	216	199,591	1.64 (1.07, 2.51)
Dankner R, 2016 (ME)	NR	937,714	1.90 (1.65, 2.19)
Bao C, 2018 (EU)	NR	13,254	2.05 (0.61, 6.85)
Nakamura K, 2013 (Asia)	234	16,547	2.15 (1.30, 3.55)
Overall effect(df =12, p =0.00; I²=71.5%)			1.29 (1.03, 1.61)

Mortality : All (Females)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Campbell PT, 2012 (NA)	55,140	586,688	1.11 (1.07, 1.16)
Shen C, 2014 (Asia)	NR	44,136	1.12 (1.02, 1.23)
Bragg F, 2017 (Asia)	524	512,797	1.19 (1.07, 1.33)
Gordon_Dseagu VLZ, 2014 (EU)	NR	204,533	1.25 (1.03, 1.52)
Jee SH, 2005 (Asia)	NR	468,615	1.31 (1.20, 1.44)
Drake I, 2017 (EU)	NR	15,504	1.33 (1.11, 1.59)
Yeh HC, 2012 (NA)	449	13,367	1.37 (0.93, 2.03)
Koskinen SV, 1998 (EU)	733	34,000	1.40 (1.30, 1.51)
Ma Y, 2013 (NA)	5,965	158,833	1.47 (1.32, 1.64)
Levine W, 1990 (NA)	196	8,809	1.85 (0.98, 3.50)
Oba S, 2008 (Asia)	253	15,724	1.88 (1.16, 3.05)
Overall effect(df =10, p =0.00; I²=77.0%)			1.28 (1.18, 1.40)

Incidence : Pancreas (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	11,900	0.60 (0.18, 2.00)
Lai GY, 2013 (NA)	1,112	295,276	1.46 (1.23, 1.74)
Chodick G, 2010 (ME)	114	52,913	1.47 (0.90, 2.41)
Atchison EA, 2010 (NA)	7,639	4,501,578	1.50 (1.42, 1.59)
Nakamura K, 2013 (Asia)	NR	14,173	1.63 (0.81, 3.29)
Ballotari P, 2017 (EU)	238	200,958	1.68 (0.84, 3.37)
Jee SH, 2005 (Asia)	NR	829,770	1.78 (1.50, 2.11)
Inoue M, 2006 (Asia)	118	51,223	1.85 (1.07, 3.20)
Khan M, 2006 (Asia)	NR	23,378	1.97 (0.93, 4.18)
Stolzenberg-Solomon RZ, 2002 (EU)	172	29,133	2.02 (1.17, 3.49)
Lee DY, 2018 (Asia)	5,122	2,748,061	2.02 (1.90, 2.15)
Gini A, 2016 (EU)	NR	1,50,765	2.17 (1.62, 2.91)
Gupta S, 2006 (NA)	2,630	1,421,794	2.17 (1.84, 2.56)
Larsson SC, 2005 (EU)	NR	83,053	2.32 (1.19, 4.53)
Walker JJ, 2013 (EU)	NR	44,246	2.85 (2.39, 3.40)
Dankner R, 2016 (ME)	NR	840,239	3.25 (2.86, 3.70)
De Jong RGPJ, 2017 (EU)	NR	34,686	5.00 (2.82, 8.86)
Overall effect(df =16, p =0.00; I²=91.2%)			2.04 (1.70, 2.43)

Incidence : Rectum (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
De Kort S, 2016 (EU)	437	1,890	0.41 (0.16, 1.05)
Inoue M, 2006 (Asia)	243	51,223	0.80 (0.47, 1.36)
Khan M, 2006 (Asia)	NR	23,378	0.95 (0.48, 1.88)
Bao C, 2018 (EU)	NR	11,900	1.03 (0.49, 2.16)
Chodick G, 2010 (ME)	232	52,913	1.10 (0.73, 1.66)
De Kort S, 2017 (EU)	402	170,593	1.10 (0.80, 1.51)
He J, 2010 (NA)	NR	215,251	1.11 (0.89, 1.39)
Atchison EA, 2010 (NA)	12,497	4,501,578	1.12 (1.07, 1.18)
Pang Y, 2018 (Asia)	NR	208,345	1.18 (0.93, 1.50)
Sikdar KC, 2013 (NA)	360	61,156	1.19 (0.93, 1.53)
Nakamura K, 2013 (Asia)	145	14,173	1.27 (0.70, 2.30)
Campbell PT, 2010 (NA)	438	73,312	1.29 (0.98, 1.70)
Lai GY, 2013 (NA)	1,450	295,276	1.30 (1.10, 1.54)
Larsson SC, 2005 (EU)	127	45,550	1.79 (1.18, 2.72)
Overall effect(df =13, p =0.30; I²=4.9%)			1.15 (1.08, 1.23)

Incidence : Stomach (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Bao C, 2018 (EU)	NR	11,900	0.64 (0.19, 2.13)
Khan M, 2006 (Asia)	NR	23,378	0.67 (0.46, 0.98)
De Jong RGPJ, 2017 (EU)	NR	34,686	0.77 (0.46, 1.28)
Xu HL, 2015 (Asia)	376	61,283	0.83 (0.59, 1.16)
Rapp K, 2006 (EU)	NR	3,977	0.84 (0.38, 1.86)
Ballotari P, 2017 (EU)	295	200,958	0.87 (0.48, 1.59)
Atchison EA, 2010 (NA)	7,515	4,501,578	0.95 (0.89, 1.02)
Walker JJ, 2013 (EU)	NR	44,246	1.03 (0.83, 1.28)
Jee SH, 2005 (Asia)	NR	829,770	1.11 (1.03, 1.19)
Lai GY, 2013 (NA)	724	295,276	1.13 (0.90, 1.42)
Nakamura K, 2013 (Asia)	438	14,173	1.20 (0.85, 1.69)
Inoue M, 2006 (Asia)	977	51,223	1.23 (0.98, 1.54)
Chodick G, 2010 (ME)	201	52,913	1.44 (0.96, 2.16)
Dankner R, 2016 (ME)	NR	840,239	1.69 (1.50, 1.90)
Overall effect(df =13, p =0.00; I²=85.1%)			1.07 (0.92, 1.24)

Mortality : All (Males)

Author, Year (Continent)	Events	Participants	Relative Risk (95% CI)
Batty GD, 2004 (EU)	2,174	17,031	0.74 (0.45, 1.21)
Campbell PT, 2012 (NA)	65,081	467,143	1.07 (1.04, 1.11)
Shen C, 2014 (Asia)	NR	22,677	1.10 (0.99, 1.23)
Koskinen SV, 1998 (EU)	688	24,000	1.20 (1.11, 1.29)
Adlerberth AM, 1997 (EU)	670	7,100	1.21 (0.79, 1.86)
Gordon_Dseagu VLZ, 2014 (EU)	NR	204,533	1.25 (1.06, 1.47)
Jee SH, 2005 (Asia)	NR	829,770	1.27 (1.22, 1.33)
Levine W, 1990 (NA)	317	11,946	1.28 (0.80, 2.04)
Oba S, 2008 (Asia)	400	13,355	1.33 (0.94, 1.88)
Drake I, 2017 (EU)	NR	11,449	1.33 (1.16, 1.53)
Yeh HC, 2012 (NA)	458	7,813	1.35 (0.89, 2.04)
Bragg F, 2017 (Asia)	5,155	512,797	1.36 (1.22, 1.51)
Overall effect(df =11, p =0.00; I²=74.6%)			1.21 (1.13, 1.30)

NR: not reported in the original study

Figure S7a. Publication bias by cancer, Females

Black border: Incidence; **Yellow border**: Mortality

Figure S7b. Publication bias by cancer, Males

Black border: Incidence; **Yellow border**: Mortality

Figure S8. Proportions of studies with the true effect stronger than pre-specified relative risks in Females and Males

Within each panel is shown the pooled relative risk with 95% confidence interval derived from the random-effects meta-analysis. Bias analysis was not possible for colon cancer incidence in males as the heterogeneity in random-effects meta-analysis was zero; **X-axes:** Unmeasured confounding strength, associated with both diabetes and cancer, with a relative risk ranging from 1.0 to 4.0; **Y-axes:** proportions of studies with the true causal effect size stronger than each pre-specified relative risk for the association between diabetes and cancer: 1.0 to 2.0 for all outcomes (each **Line); Green area:** Association between T2D and cancer likely to be causal if proportion of studies with the true effect size is more than 70% and the unmeasured confounding needed to attenuate the effect is stronger than 1.5; the more are the lines in the right upper quadrant (green area), the more likely the association is causal.

Figure S9a. Unmeasured confounding and proportion of studies with true effect

NHL: Non-Hodgkin's lymphoma; **X-axes**: Unmeasured confounding strength, associated with both diabetes and cancer (green grid line: 1.5); **Bars**: pre-specified relative risk for the associations between diabetes and cancer (blue: 70% of studies with a true effect; red: 90% of studies with a true effect). The longer the bar, the more likely the association is causal; the darker the colour, the stronger the true effect. For example, to reduce the proportion of studies with the true causal effect stronger than the relative risk of 1.8 (i.e., 80% increased risk in people with T2D comparing to those without) to a value lower than 70%, for liver cancer incidence (darkest blue), an unmeasured confounding of 1.32 is needed. Corresponding strengths of the unmeasured confounding to reduce the proportion lower than 70% for a true effect size stronger than the relative risk of 1.5, 1.3, 1.2, 1.1 and 1.0 were 1.9, 2.3, 2.6, 2.9 and 3.3, respectively.

Figure S9b. Unmeasured confounding and proportion of studies with true effect in females and males

Bias analysis was not possible for colon cancer incidence in males as the heterogeneity in random-effects meta-analysis was zero; **X-axes**: Unmeasured confounding strength, associated with both diabetes and cancer; **Bars**: pre-specified threshold of relative risk for associations between diabetes and cancer; **blue**: assuming 70% of studies with a true effect; **red**: assuming 90% of studies with a true effect; (**F**): Females; (**M**): Males. The longer the bar, the more likely the association is causal; the darker the colour, the stronger the true effect. To reduce the proportion of studies lower than 70% for the true causal effect stronger than the relative risk of 1.8 for liver cancer incidence in Males [Liver (M) darkest blue], an unmeasured confounding of 1.45 is needed. Corresponding strengths of the unmeasured confounding for the pre-specified relative risk of 1.5, 1.3, 1.2, 1.1, and 1.0 were 2.0, 2.4, 2.7, 3.0 and 3.4, respectively.

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PRISMA checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3, 4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5, 6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5, Figure S1
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5, 6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6-8
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	6-8
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6-8

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6-8
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6-8
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	9, Figure S1, Table S1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	9, Table S2
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	10, Figure S5, Figure S7
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	10, Figure S4, Figure S6
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	10-13, Figure 1-3
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	10-13, Figure S3-4, Figure S6
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	10-13, Table S3-6, Figure 1, Figure 3, Figure S6-9
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	14
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	18
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	14-19
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	20