SYSTEMATIC REVIEW OF THE LINK BETWEEN TOBACCO AND POVERTY

World Health Organization

Systematic Review of the Link Between Tobacco and Poverty

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Systematic Review of the Link Between Tobacco and Poverty

Contents

Summary

BACKGROUND

This study explores the link between tobacco use and poverty, as well as the broader relationship between income, tobacco use, and tobacco-related health consequences, using a meta-analysis of existing research literature. An estimated 5 million deaths are caused by tobacco each year, with this figure expected to reach more than 8 million per year by 2030 given current trends in tobacco use. The proportion of this burden borne by people living in low- and middle-income countries at that time is expected to be above 80%.

Many of the risks to health and life caused by tobacco consumption develop over a long period of time. However, tobacco use can also inflict immediate harm on users and their families – for example, when scarce family resources are spent on tobacco products instead of other essential needs. Even a small diversion of the resources of poor families who live at or below the edge of poverty can have a significant impact on their health and nutrition, and in many countries the percentage of total expenditures allocated for tobacco products was highest for the lowest-income households.

The association between socioeconomic position and health risk factors varies over time and between regions of the world. Smoking is acknowledged to be a contributor to differences in mortality and morbidity between socioeconomic groups, especially in key diseases. A significant variation in the prevalence of use of tobacco is based on income level, in addition to other variables including ethnicity, altitude of residence, occupation, and religion. The aim of this study is to assess the association between income level and tobacco consumption, tobacco expenditures, and morbidity and mortality attributed to tobacco.

SELECTION CRITERIA

Type of exposure

Income level categories (low, middle and high), determined only by validated methods of direct assessment; papers where indirect assessment was performed were not included. As definitions varied between authors, strata of income level were interpreted as an income gradient.

Type of outcome measures
Prevalence of current smokers; intensity of tobacco consumption; incidence of death attributed to tobacco; disease attributed to tobacco; household expenditure on tobacco.

Types of study designs
Observational studies and baseline or control arms of intervention studies published in the last 20 years.

Types of participants
General populations of different income levels around the world.

SEARCH STRATEGY
Multiple electronic databases were searched systematically, including MEDLINE, EMBASE, CENTRAL, SOCINDEX, AFRICAN IDEX MEDICUS and LILACS. We have also reviewed the International Tobacco or Health Conference Paper Index from 2006. The authors personally contacted key referents in tobacco control to obtain unpublished information and referrals to other key researchers. They also consulted the web pages of numerous tobacco control agencies, as well as contacting known Tobacco Control international networks in search of grey literature and contact information for key researchers.

METHODS
Two independent researchers per citation pre-screened titles and abstracts of all studies retrieved to identify those that could be included. Disagreements were solved by consensus, and final decisions were made by the review team in the case of continued discrepancies. After 20% of the citations were screened, only one researcher per citation performed the screening because there was more than 90% agreement between cases with two researchers.

The authors obtained the full text of all articles that were not excluded, and two independent researchers assessed the full text of selected articles to confirm their classification and evaluate whether they met the inclusion criteria or not. Any discrepancies were solved by consensus, with the review team making the final decision. If data from included studies were unclear or insufficient, the author(s) were contacted, and if it was not possible to obtain necessary information the article was excluded.

Data Collection
An electronic chart, previously tested in a pilot study, was used to collect data. One reviewer extracted data from the included studies, and a second one checked this data.

Methodological Quality Assessment

A tool for assessing susceptibility to bias in observational studies was developed. With a modified STROBE (Strengthening the Reporting of Observational studies in Epidemiology) checklist for cross-sectional studies, together with key methodological papers, an algorithm was programmed in an Excel spreadsheet to assess the quality of the studies, and another algorithm was used for identification of the study design. Pairs of reviewers independently assessed the risk of bias, and discrepancies were solved by consensus of the full work team.

ANALYSIS

A random effects meta-analysis was performed using Stata 8.0 to calculate summary odds ratios (OR) based on adjusted OR and confidence intervals, or equivalent data as coefficients (β) and standard errors (SE), presented in the included studies. The random effect model was used, considering important possible sources of heterogeneity. Statistical heterogeneity was evaluated using the $I^{(2)}$ statistic and subgroup and sensitivity analyses were performed to evaluate potential heterogeneity. When there was evidence of substantial statistical heterogeneity, the following preplanned subgroup analysis could be performed: decade of dataset, continent, WHO region, mortality rate stratum, risk of bias, gender and age group. We also performed a sensitivity analysis considering only prospective studies, and excluding studies with methodological flaws. We presented summary and descriptive statistics when meta-analysis was not possible (that is, the case of unadjusted smoking prevalence and household expenditure on tobacco).

RESULTS

A total of 9575 references were initially retrieved. After eliminating duplicates and screening the full text of these references, 765 studies were retrieved for detailed evaluation. From the selected articles assessed by full text, 137 that met the inclusion criteria were selected, together with 17 narrative reviews. Out of these 137 studies, 118 were cross-sectional (86.13%), 13 (9.49%) were prospective studies, and four (2.92%) were case-control studies. From the 137 included studies, 94 were subject to a meta-analysis of current smoking by income level and 17 to a meta-analysis of death or diseases attributable to tobacco by income level. Five studies were not included in the meta-analysis because their quality scores were evaluated as a "high risk of bias," while the others were excluded because of the absence of adjusted data.

A total of 125 papers reported smoking prevalence data. A total of 31,146,096 people were included in the analysis. The median of the mean age in all the studies reporting them was age 41, from those who were 15 or more years old. The median current smoker rate was 27%, ranging from 2.5% to 73.7%.

In the analyzed population, low-income people smoke more than higher-income people (OR 1.48, 95%CI 1.38-1.59). This result is seen in each of the evaluated world regions except the Eastern Mediterranean Region (EMRO), and especially in those reports performed beyond the year 1990. Considering only studies that reported results in three income categories, a gradient is shown, with the highest tobacco use prevalence in the lowest income level versus the high income level (OR 1.54, 95%CI 1.39-1.72), and a less marked increase prevalence in the middle income level people versus the high income level (OR 1.25, 95%CI 1.16-1.33). This trend was observed both in female and in male populations.

A total of 20 studies (N=987,885) reporting data for tobacco-attributable diseases by income were analyzed. The most common tobacco-attributable diseases evaluated were: low birth weight for gestational age (LBWGA) (5 studies); coronary heart disease (4); cardiovascular death (3); periodontitis/ tooth loss (3); chronic obstructive pulmonary disease (COPD) (2); all causes of death (2); lung cancer (2); and stroke (1). Only one study used as independent variables the current smoking status and the income level category, showing the independent effect of smoking on LBWGA by income category. The other studies only evaluated the independent effect of income category on different outcomes of known relationship with tobacco exposure, adjusted by current smoking status and other variables. No study showed statistically significant higher odds of tobacco-attributable diseases at increasing income strata. Three studies showed no statistically significant differences between strata. All the other studies exhibited statistically significant higher odds ratios at decreasing income strata. The median proportion of tobacco spending related to total expenditures was 10.7%, 3.7%, and 1.8% in low, medium and high income levels respectively.

DISCUSSION

This review demonstrated an inverse relationship between income level and tobacco use prevalence, particularly in the last two decades. This coincides with the social gradient of cigarette diffusion taken into account by different authors. In the 1990s, the tendency to smoke by the poorest was well established by the literature, and this has been further confirmed in the latest studies, despite a heterogeneous representation of continents and countries.

This trend was consistent in all continents, with Oceania having the highest association. EMRO was the only region not showing this trend, although it was represented by just two countries, Pakistan and Saudi Arabia. There is clear evidence in America as well as the Western Pacific Region that smoking prevalence in low-income groups is approximately 50% higher than in higher income ones. This social gradient is confirmed when middle and wealthy strata are compared, resulting in intermediate prevalence in the middle category of income. The results also show a consistently higher prevalence in

the poorest smokers for both genders, even though some other analyses state that the influence of economic strata on women should be less due to later incorporation of tobacco consumption. Those studies evaluating age categories showed a greater impact for this in people under age 44.

An increased susceptibility to tobacco related illnesses was also found in low income groups, especially in all cause mortality, lung diseases and low birth weight. This effect was not as evident for cardiovascular disease and coronary disease, but became statistically significant after performing sensitivity analyses.

CONCLUSIONS

This was an exhaustive and methodological rigorous systematic review examining the real magnitude of the impact of tobacco use by income level, which was previously unknown. This complex issue deals with a great heterogeneity of exposure and outcome variables, as well as populations and settings. Nevertheless, this study presented a solid base from which to support its conclusions of an inverse relationship between income level and tobacco use prevalence, and its related consequences. Greater efforts to reduce tobacco use among poor people are clearly needed. This research may be useful for policy makers as well, to improve strategies in tobacco control and inequity.

Background

Concern about the harm that tobacco use causes is usually focused on the risks of serious illness and premature death that smokers and their families face. Ten years ago, four million deaths were estimated to be caused by tobacco each year[1]. Recent estimates report more than five million[2]. The proportion of that burden borne by people living in low- and middle-income countries is also rapidly increasing from 50% to more than 80%. Countries still grappling with infectious diseases traditionally associated with low incomes now increasingly face a rising epidemic of cancers, respiratory and circulatory diseases caused by tobacco.

Cigarettes account for the largest share of manufactured tobacco products in the world, with 96% of total sales. With regional exceptions such as tobacco chewing and bidi smoking in India and the smoking of kreteks in Indonesia, cigarettes are the most common method for tobacco consumption throughout the world.

The health consequences of tobacco use are entirely preventable. Even environmental exposure to tobacco is harmful, and quitting tobacco simultaneously reduces health risks and produces long-term health benefits. Tobacco also creates economic costs that extend beyond the direct cost of related illness and productivity losses, including health care expenditures from active and passive smokers, employee absenteeism, reduced labour productivity, fire damage due to careless smokers, increased cleaning costs, and widespread environmental damage. In the same way, home expenditures for cigarettes reduce national wealth in terms of gross domestic product (GDP) by as much as 3.6%.[3] Moreover, the global tobacco pandemic is moving to developing nations. Women are now smoking more than before, and even if smoking prevalence rates begin to decline, the total number of smokers will rise due to population growth[3].

Many of the risks to health and life caused by tobacco consumption develop over a long period, and take decades to become fully evident. However, tobacco use can also inflict immediate harm on users and their families, damage that is wreaked little by little each day. This is the damage that is done when scarce family resources are spent on tobacco products instead

of on food or other essential needs. Even a small diversion of resources of poor families who live at or below the edge of poverty can have a significant impact on their health and nutrition.

Communities, governments, donors, health professionals, and others who care about reducing poverty and improving lives should work to reduce tobacco use[4]. Efroymson and colleagues show that "If poor people did not smoke, potentially 10.5 million fewer people would be malnourished in Bangladesh," noting that, "Each tobacco user represents one or more people—whether the smoker or his or her spouse or child—who is needlessly going hungry." Of course, reducing malnutrition is a complex challenge, and additional income does not translate in any simple way into nutritional improvements. Clean water, the intra-household distribution of food, feeding and child care practices, and many other factors are relevant as well. However, these complexities should not obscure the key point—an additional 800 calories a day could potentially make an enormous difference to the nutritional status and health of children (or others) in households that suffer from severe malnutrition, in Bangladesh and elsewhere. Furthermore, in many countries the percentage total expenditures allocated for tobacco products was highest for the lowest income households[5,6].

The association between socioeconomic position and health risk factors varies over time and between regions of the world[7]-[9]. However, these remarks must be interpreted cautiously, as the data were sparse and based on household consumption data[9]. Smoking is acknowledged to be a contributor to differences in mortality and morbidity between socioeconomic groups, especially in key diseases. Jha and colleagues report in a four-country study that most social inequalities in adult male mortality during the 1990s were due to smoking[10].

Tobacco consumption could be related with poverty through different mechanisms. This association, according to some qualitative studies, could be related with the stress in the life of the smokers of lower classes[11-13], a routine life[11], isolation[12], loneliness[13], the lack of opportunities, or because smoking in their working and social environments is a cultural standard.[12] Stressful events can lead to relapses in those that attempt to stop smoking.[11,12] In addition, a significant variation in the prevalence of use of tobacco is based on specific tribe membership, in addition to other variables including ethnicity, altitude of residence, occupation, and religion[14]

On the other hand, current expenditures in tobacco consumption could exacerbate the effect of tobacco on poverty,[4] The current expenditure in tobacco of the poor families represents a bigger proportion of their income than for rich families[15] and it impedes the allocation of their scarce resources for other important ends, as food.[16-18]. Smoking appears to result in increased lifetime

costs, although some studies have found contrary results. In the workplace, smokers incur greater medical costs and more lost productivity than non-smokers. They also impose costs on their nonsmoking co-workers.[19] This study explored associations such as these, while assessing the link between tobacco and poverty through a systematic review and meta-analysis.

Objectives

Overall objective:
To assess the association between income level and tobacco consumption, tobacco expenditures and morbidity and mortality attributed to tobacco.

Specific objectives:
To compare the following factors in high-income groups versus lower income groups:

1- Tobacco prevalence
2- Tobacco consumption in quantity
3- Disease and death incidence attributed to tobacco
4- Household expenditure on tobacco as a percentage of total household expenditure

Methods

Selection Criteria

Studies published in the last 20 years, irrespective of the date of dataset collection, and meeting the following criteria:

Types of Exposure

There is not a "first-best" measure to identify living standards. Income is an inferior measure, not only because of measurement challenges, but also because for most households the fluctuation in income over time does not imply commensurate changes in living standards.[20] On normative grounds, most analysts prefer to assess living standards with reference to some notion of long-term command over resources. This latent variable can be proxied by consumption or an asset index; most economists prefer consumption because it is rooted in economic theory. However, consumption data may be more susceptible to measurement error, while asset and housing data are not.[21] However, it is also true that in practice the correlation between consumption and asset indices is often low. Montgomery et al [22] found little evidence that the use of asset indices to proxy for consumption results in biased coefficient estimates on other variables of interest.

For these reasons, this study concentrates on income as a variable. Income is the most direct and popular measure of living standards. Also, consumption was not considered due to the potential bias to reflect living standards among smokers, taking into account that smoking changes habits and patterns of consumption per se. However, a variable "line of poverty" was included as a way to compensate the exclusion of household consumption. As you may know, this indicator reflects the income needed to buy a basket with those goods and services that are considered essential to leave poverty. Also, to have a better scope in the systematic literature review, other variables were considered, like a proxy that delimited different categories of income from the numbers of minimum salary.

Income level categories (low, middle and high) were determined by methods of direct assessment (i.e. total household income, minimum salary, line of poverty, etc). Indirect assessment measures of SES (socioeconomic status) –

i.e. proxies such as education level, employment – were not accepted for this review because of the great heterogeneity between settings. As definitions varied between authors, the strata of income level needed to be interpreted more as an income gradient than precise delimited categories.

Types of Outcome Measures

- Prevalence of current smokers (as defined by authors).
- Intensity of tobacco consumption (number of cigarettes/day)
- Death incidence attributed to tobacco
- Disease attributed to tobacco
- Household expenditure on tobacco (as a percentage of total household expenditure)

Types of Study Designs

- **Observational studies:** cohort, case-control, cross sectional, interrupted time series, case series, and econometric studies.
- **Baseline and control arm of intervention studies** (intervention assigned by researchers) were also accepted but assessed its observational component: clinical trials, before-after, and interrupted time series studies.

Types of participants (population)
The general population of the world was examined by income level.

Search Strategy

Electronic Search (indexed articles): This study systematically searched multiple electronic databases including MEDLINE, EMBASE, CENTRAL, SOCINDEX, AFRICAN INDEX MEDICUS and LILACS. The reference list of all the full texts retrieved were examined in order to obtain additional references. Because of the wide spectrum of study designs accepted for this review, a highly sensitive search strategy was performed. The search terms, adapted to each database, and search strategies are detailed below:

Search terms
(Poverty[Mesh] OR poverty[tiab] OR Income[ti] OR poor people*[tiab] OR poors[tiab] OR pauper*[tiab] OR Social risk*[tiab] OR Socioeconomic status[tiab] OR Socio economic status[tiab] OR Indigenc*[tiab] OR indigent*[tiab]) AND (**Tobacco Smoke Pollution[Mesh] OR Tobacco Use Disorder[Mesh] OR** tobacco*[tiab] OR cigar*[tiab] **OR Smoking[Mesh:NoExp] OR** smoking[tiab] OR smoker*[tiab] OR nicotin*[tiab])

Search strategies

MEDLINE:

#1 Search (Tobacco Use Disorder[MeSH Terms] OR smoking[Mesh Terms] OR tobacco[Ti]) AND (socioeconomic factors[Mesh Terms]) Limits: Entrez Date from 1988, Humans

#2 Search tobacco[Title/Abstract]

#3 Search (Tobacco Use Disorder[MeSH Terms] OR smoking[Mesh Terms] OR tobacco[Tiab]) AND (socioeconomic factors[Mesh Terms]) Limits: Entrez Date from 1988, Humans

#4 Search ("tobacco use disorder"[MeSH Terms] OR "smoking"[MeSH Terms] OR tobacco[Tiab]) AND "socioeconomic factors"[MeSH Terms]

#5 Search ("tobacco use disorder"[MeSH Terms] OR "smoking"[MeSH Terms] OR tobacco[Tiab]) AND "socioeconomic factors"[MeSH Terms] Limits: Entrez Date from 1988, Humans

#6 Search ("tobacco use disorder"[MeSH Terms] OR "smoking"[MeSH Terms] OR tobacco[Tiab]) AND "socioeconomic factors"[MeSH Terms] AND socioeconomic factors[MeSH Terms]

#7 Search socioeconomic factors[MeSH Terms]

#8 Search poverty[MeSH Terms] OR socioeconomic factor*[Tiab] OR socio economic factor*[Tiab]

EMBASE:

1 exp POVERTY/
2 poverty.mp.
3 exp lowest income group/
4 income$.mp.
5 poor people$.mp.
6 pauper$.mp.
7 psychosocial$.mp.
8 indigenc$.mp.
9 indigent$.mp.
10 exp social class/
11 exp socioeconomics/
12 impover$.mp.
13 socioeconomic$.mp.
14 socio economic$.mp.
15 (rent$ or expen$ or salar$ or wage$).mp.
16 or/1-15
17 (tobacc$ or cigar$ or smoking or nicotin$).ti,ab.
18 (dependen$ or addict$ or consume$ or smoker$).ti,ab.

19 17 and 18
20 exp Cigarette Smoke/
21 exp Tobacco Dependence/
22 or/19-21
23 16 and 22
24 23 not exp tobacco smokeless/

CENTRAL:
#1 (household* OR famil* OR domestic* OR home* OR house*):ti,ab,kw and (expenditure* OR disbursement* OR spending* OR payment* OR expen*):ti,ab,kw

#2 MeSH descriptor Income explode all trees

#3 MeSH descriptor Salaries and Fringe Benefits explode all trees

#4 MeSH descriptor Poverty explode all trees

#5 MeSH descriptor Social Class explode all trees

#6 (income* OR wage* OR salar* OR pover* OR Indigenc* OR Poor* OR indigent* OR impover* OR pauper* OR disadvant* OR rent*):ti,ab,kw

#7 (#1 OR #2 OR #3 OR #4 OR #5 OR #6)

#8 MeSH descriptor Tobacco Use Disorder explode all trees

#9 MeSH descriptor Smoking, this term only

#10 (tobacco OR smoking OR smoker* OR cigar*):ti,ab,kw

#11 (#8 OR #9 OR #10)

#12 (#7 AND #11)

#13 MeSH descriptor Tobacco, Smokeless explode all trees

#14 (#12 AND NOT #13)

LILACS:
(MH Renta OR Renda$ OR Rent$ OR Ingreso$ OR Ingresso$ OR Fringe$ OR Wage$ OR Jornales OR salari$ OR Ordenados OR MH Salarios y Beneficios OR gasto$ OR payment$ OR hogar$ OR MH Pobreza OR pover$ OR pobre$ OR Indigenci$ OR indigent$ OR poor$ OR impover$ OR pauper$ OR MH Clase Social OR Clase Social OR Classe Social OR social class OR Desventa$ OR disadvant$) AND (MH Trastorno por Uso de Tabaco OR Tobacc$ OR Tabaco$ OR smoking OR MH Tabaquismo OR Tabagis$ OR Tabaquis$ OR fuma$ OR cigar$)

SOCINDEX:
(DE “POVERTY” OR DE “SOCIAL classes” or DE “SOCIAL conditioning” OR AB income* OR TI income OR AB socioeconomic* OR TI

socioeconomic* OR AB "socio economic*" OR TI "socio economic*" OR AB indigent* OR TI indigent* OR TI indigenc* OR AB indigenc*) AND (DE "Tobacco use" OR DE "Nicotine addiction" OR AB tobacco OR TI tobacco OR AB cigar* OR TI cigar* OR AB smoking OR TI smoking OR AB Smoker* OR TI Smoker*)

AFRICAN INDEX MEDICUS:
tobacc$ or cigar$or smoking [Key Word] or tobacco use disorder [Descriptor] or smoking [Descriptor]

Grey literature search
This study reviewed international tobacco and health conference paper indexes from 2006, and the authors personally contacted key referents in tobacco control to obtain unpublished information as well as referrals to other key researchers. Numerous tobacco control agency web sites were also consulted, including:

- World Health Organization www.who.int
- Pan-American Health Organization www.paho.org
- Center for Tobacco Control Research and Education (UCSF) tobacco.ucsf.edu
- Campaign for Tobacco-Free Kids www.tobaccofreekids.org
- Americans for Nonsmokers' Rights www.no-smoke.org

Known tobacco control international networks were also contacted, including CLACCTA; VIVIR SIN TABACO, AND GLOBALINK, asking for grey literature and contacts for key researchers. The following WebPages were also searched to capture grey literature from low- and middle-income countries:

Indmed (Indian medical publications) http://indmed.nic.in/

Koreamed (Korean medical publications) http://www.koreamed.org/SearchBasic.php

South East Asia www.hellis.org

Latin America and Caribbean http://bases.bvs.br

Africa http://indexmedicus.afro.who.int/

Australia http://www.quit.org.au/browse.asp?ContainerID=1758

The Living Standards Measurement Study (or LSMS, available from http://www.worldbank.org/lsms) for tobacco use was also examined, however the statistical data processing involved was beyond the scope of this review.

The study selection followed the steps described here:

1. Two independent researchers per citation pre-screened all search strategy results (titles and abstracts) to identify studies that could be included, or that could be useful as background information. They categorized these articles in five different categories: high probability of inclusion (HPI), excluded (E), not sure about inclusion or "doubt" (D); reviews (REV) and related references (REF).
2. Disagreements were solved by consensus, and the review team made the final decision in the case of continued discrepancies. After 20% of citations were screened only one researcher per citation perform the screening, because agreement using two independent researchers was in excess of 90%.
3. The full text was obtained of all articles not excluded.
4. Two independent researchers assessed the full text of selected articles to confirm the classification and to evaluate whether they met the inclusion criteria or not. Any discrepancies were solved by consensus, and the review team made the final decision in the case of continued discrepancies. If data from the included studies was unclear or insufficient, the authors tried to contact the study's author. If it was not possible to obtain this information, then the article was excluded.
5. Studies identified as HPI that finally met the inclusion criteria are detailed in Tables 1 to 6 in Annex 1.

Data Collection

To collect the information detailed above, an electronic chart that was previously piloted in 10 papers was used. One reviewer extracted data from the included studies, and a second one checked it. The following information was included:

- ID
- Continent/Country
- Year
- Citation
- Outcome definition: tobacco use and tobacco-attributable diseases.
- Author e-mail address
- Total population (% of smokers)
- Population by income level strata (% of smokers)
- Start and end date (mm/yyyy)
- OR Current smoker (95% CI)
- OR Current smoker converting the high income strata as the reference (OR=1)
- β Coefficient and standard error
- Number of cigarettes per day (mean ± SD)
- Adjusting variables
- Age (limits by protocol, median, mean, range)

- Study design Setting (rural, urban)
- Special population (pregnant, workers)
- Sampling (probabilistic or not)
- Education (high>50% ≥high school, medium 30-50%, low <20%)
- Ethnic and religions
- %Tobacco spending/education spending
- % Tobacco spending/healthcare spending
- % Tobacco spending/food spending
- % Tobacco spending/total expenditure

Study design and quality of study:

- **Study design** (See **Annex 2.1 Algorithm**):

  Observational studies*

  - Prospective comparative cohort studies
  - Retrospective comparative cohort studies
  - Prospective case-control studies
  - Retrospective case-control studies
  - Before-after studies
  - Interrupted time series
  - Case series studies – studies presenting series of patients without a control group
  - Cross-sectional studies

  *Baseline and control arm of intervention studies (intervention assigned by researchers) were also accepted but assessed for its observational component.

  - Randomized trial
  - Quasi-randomized trial - a trial applying a pseudo-random allocation mechanism, such as day of birth
  - Historically controlled trials - pre-planned studies where data on controls are retrieved from archives
  - Trials with concurrent controls - pre-planned studies where data on controls are sampled concurrently, (for example, in patients who refuse to be randomized, or in patients from another department)
  - Controlled before-after studies (quasi-experimental)

Methodological Quality Assessment

A tool for assessing susceptibility to bias in observational studies was developed. The methodological quality of observational studies was assessed by a checklist of essential items derived from the STROBE[8] (Strengthening the Reporting of Observational Studies in Epidemiology) statement and the general guidelines of MOOSE (Meta-analysis of Observational Studies in Epidemiology)[23] (**see Annex 2.2**).

With a modified STROBE checklist for cross-sectional studies, two methodological papers (Sanderson[24] and Fowkes[25]) an algorithm was programmed in the Excel spreadsheet to assess the quality of the studies. Another algorithm was also used for identification of the study design. The observational component of intervention studies was assessed by the same tools.

Criteria category	Domain	Tool item must address
Major*	**1. Methods for selecting study participants**	Appropriate source population (cases, controls and cohorts) and inclusion or exclusion criteria
	2. Methods for measuring exposure† and outcome variables¥	Appropriate measurement methods for both exposure(s) and/or outcome(s)
	3. Methods to control confounding¥	Appropriate design and/or analytical methods
Minor	**4. Design-specific sources of bias (excluding confounding)**	Appropriate methods outlined to deal with any design-specific issues such as recall bias, interviewer bias, biased loss to follow or blinding
	5. Statistical methods (excluding control of confounding)	Appropriate use of statistics for primary analysis of effect

*Around half of the checklists included three areas seen by the authors as fundamental domains of the appropriate selection of participants, appropriate measurement of variables and appropriate control of confounding.

#Risk of bias per domain (See Critical appraisal guidelines for cohort, case-control, cross-sectional studies provided additional in **Annex 2.3** to decide the risk):
H (High Risk of Bias) clearly indicates bias
M (Moderate Risk of Bias) suggests potential bias
L (Low Risk of Bias) clearly excludes bias
? (Doubtful Risk of Bias) suggests doubts about potential bias

NA (Not applicable)

† Exposure

- Low risk of bias: if there was a validated and explicit method to assess income level.
- Moderate risk of bias: if there was an explicit but not validated method to income level.
- High risk of bias: if the method was not clearly stated, with risk of misclassification.

¥ Outcome measures

- Low risk of bias: if there was a clear validated biochemical marker of consumption or a clear anonym and validated questionnaire that evaluated consumption or appropriate methods for tobacco related morbidity and mortality (i.e. confirmation of causality). The outcomes were adjusted by most of the known potential confounders (age, gender, education level, socioeconomic status, religion, ethnicity, etc).

- Moderate risk of bias: a low risk of bias measurement, but only adjusted by age and gender.
- High risk of bias: if the methods to evaluate outcomes were unclear, and/or if the outcome was not adjusted by potential confounders including age and gender.

Summary judgment of the study: High, Moderate, or Low risk of bias

- **High risk of bias**: ≥ 1 of any criteria clearly (H) indicates bias, or ≥2 major criteria* suggest potential bias (M) or doubts (?)
- **Moderate risk of bias**: ≥2 of any criteria suggest potential bias (M) or doubts (?) (if <2 major criteria*)
- **Low risk of bias**: Low (L) risk of bias in all major criteria* and <2 of minor criteria suggest potential bias (M) or doubts (?)

Critical appraisal guidelines for cohort, case-control, cross-sectional studies provided additional

Pairs of reviewers independently assessed the risk of bias. Discrepancies were resolved by consensus of the entire working team.

Statistical Analysis

A random effects meta-analysis was performed using Stata 8.0 to calculate summary odds ratios (OR) based on adjusted OR and confidence intervals, or equivalent data as coefficients (β) and standard errors (SE), presented in the included studies. Econometric studies were not included, because the linear regressions used to obtain these results were not comparable with the other designs.

The DerSimonian-Laird random effect model was used, considering important differences in design, exposure, comparison groups, participants, and outcome measurement as possible sources of heterogeneity.[26] Statistical heterogeneity was evaluated using the $I^{(2)}$ statistic, and subgroup analysis was performed to evaluate potential heterogeneity.

When there was evidence of substantial statistical heterogeneity as assessed by an $I^{(2)}$ statistic more than 50%[27], it was possible to with available explore the following potential sources of heterogeneity by preplanned subgroup analysis:

- **Decade of dataset**: < 1989, between 1989 and 1998, and > 1998.
- **Continent**: Europe, Asia, South America, North America, Oceania, and Africa.
- **WHO region**: African Region (AFRO), Region of the Americas (PAHO), Eastern Mediterranean Region (EMRO), European Region (EURO), South-East Asia Region (SEARO), and Western Pacific Region (WPRO)
- **Mortality astratum**: **A**=very low child mortality and very low adult mortality; **B**=low child mortality and low adult mortality; **C**=low child

mortality and high adult mortality; **D**=high child mortality and high adult mortality; **E**=high child mortality and very high adult mortality.

- **Risk of bias**: low, medium, and high
- **Gender**: male and female.
- **Age group**: between 15 and 44 years, between 45 and 64 years, and higher than 64 years

A sensitivity analysis was also performed considering only prospective studies, and excluding studies with methodological flaws.

The choice between a fixed-effect and a random-effects meta-analysis should never be made on the basis of a statistical test for heterogeneity. [24] The random effect model was the preplanned model to report the outcomes because of the heterogeneous nature of the studies (time, designs, participants, countries, settings, cultures, etc). Considering the wider interval confidence obtained with this method, it is the most conservative approach to deal with both predicted and observed heterogeneity.

Summary and descriptive statistics were presented when meta-analysis was not possible, such as the case of unadjusted smoking prevalence and household expenditure on tobacco.

Description of Studies

Included studies

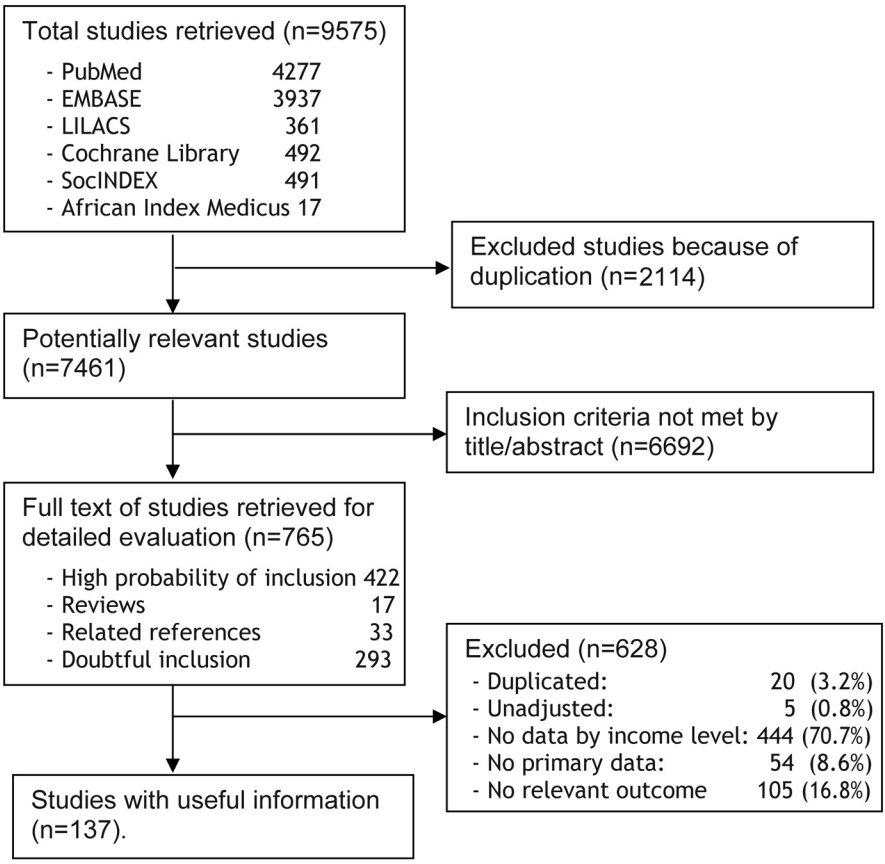
A total of 9575 references were initially retrieved. Figure 1 describes the study flow diagram. After eliminating duplicates and screening, the full text of 765 studies were retrieved for detailed evaluation. From the selected articles assessed by full text, 137 were ultimately included that met the inclusion criteria (Table 1)*, together with 17 narrative reviews. The reviews were classified in two groups: those that responded to the primary goal and those that did not (Table 2). For tobacco-attributable diseases by income, 20 studies were included (Table 2), plus another five for tobacco expenditures by income level (Table 6).

Methodological quality

Table 3 describes the quality assessment of included studies by a summary and individual component risk of bias: selection study participants, measurement of exposure and outcomes, control confounding, design-specific sources of bias, and statistical methods (excluding control of confounding). Out of 137 studies, 118 were cross-sectional (86.13%), 13 (9.49%) were prospective studies, and 4 (2.92%) were case-control studies. The risk of bias was high in 44.2%, moderate in 16.7%, and low in 16.7% of included studies.

* All tables and graphs can be found in Annex 1.

Figure 1 – Study flow diagram



Results

After reviewing more than 9575 references, 765 papers met the inclusion criteria and were included in this systematic review. From these 137 were included in the meta-analysis because they reported at least one of the studied outcomes:

- Prevalence of current smoking
- Intensity of smoking (number of cigarettes smoked daily).
- Death incidence attributed to tobacco
- Disease attributed to tobacco
- Household expenditure on tobacco (as a percentage of total household expenditure)

Smoking Prevalence

Table 1 describes the characteristics of the 125 included studies about current smoking and income levels. Most of these studies were from the Region of the Americas (PAHO) (n=69), followed by the European Region (EURO) (n=20), Western Pacific Region (WPRO) (n=20), South-East Asia Region (SEARO) (n=7), and the Eastern Mediterranean Region (EMRO) and African Region (AFRO), each of which had only four studies in each of them. In the PAHO region the studies of North America were 57 out of 69 in total (83%). while Europe represented 19 out of 20 studies of the EURO continent. The continents represented were: Africa (5), Asia (16), Central America (4), Europe (19), North America (59), Oceania (15), South America (7). Central America is only represented by Mexico, and South America is represented mostly by Brazil.

A total of 31,146,096 persons (43.4% males and 56.6% females) were included in this analysis, in papers with a minimum of 119 persons and maximum of 2,611,084. The median of the mean age in all the studies that reported it was age 41 (from those who were 15 or more years old). Six studies included only men, 10 studies involved greater than 50% males, and 14 studies included only females. The studies that included the most males showed a higher prevalence of current smokers. Thirty-five of 131 studies (26.7%) were performed before 1989, 45 out of 131 (34.3%) were performed between the years 1990 and 1998, and 51 out of 131(38.9%) were later than 1998.

Most studies reported current cigarette smoking. The heterogeneity in outcome definitions and in populations studied was significantly high among these studies. Eighteen studies reported tobacco habits as "at least one cigarette a day", 22 as 100 cigarettes in their whole life, 75 as being current smoker, and five as there being household smoking. In four studies, the outcome was not available. In 1998 studies the unadjusted prevalence of current smoking was reported. The median current smoker rate was 27% (range 2.5%-73.7%). The lowest prevalence belongs to Gilpin 1999[28] and the highest to Best 2008[29], which deals with parental use of tobacco.

Table 4 shows the effect of income level categories on current smoking at study level. The summary results of the meta-analyses are displayed in the section SUMMARY RESULTS TABLES and each related graphs (forest plots) and input data at the section META-ANALYSIS TABLES AND GRAPHS. Table 7 shows the low versus high income level of all studies by decade, by continent, by WHO region, by country mortality stratum, and by risk of bias.

The low income level group has a statistically significant greater odds ratio of smoking than the high income level group: OR of smoking 1.415 (95% CI 1.276–1.569) (Meta-analysis 1). This trend by year is more marked since 1989 (OR 1.474; 95% CI 1.276–1.702) and even moreso after 1998 (OR 1.498; 95% CI 1.339–1.676) versus before 1989 (OR 1.054; 95% CI 1.008–1.101) (Meta-analysis 2).

The trend is also consistent in all continents (Meta-analysis 3) with the following ranking:

1. Oceania 1.653 (95% CI 1.440–1.897)
2. South America 1.445 (95% CI 1.025–2.038)
3. Asia 1.314 (95% CI 1.083–1.593)
4. North America 1.296 (95% CI 1.759–41.92)
5. Europe 1.296 (95% CI 1.153–1.456)
6. Africa 1.282 (95% CI 1.001–1.641)

The trend is also consistent in all WHO regions (Meta-analysis 4) except the Eastern Mediterranean Region, represented by studies from Pakistan and Saudi Arabia, OR 0.936 (95% CI 0.607 - 1.444).

In countries of low mortality (Stratum A+B) the low versus high income level OR of smoking was greater (1.530; 95% CI 1.414–1.656) than in countries of high mortality (1.220; 95% CI 0.983–1.513) (Meta-analysis 5). The risk of bias did not change the general estimation (Meta-analysis 6). However, including only 3 prospective studies with adjusted data, the trend is much more manifest (OR 2.170; 95% CI 1.440–3.272) (Meta-analysis 33).This gradient by income level can be confirmed by comparing the OR of smoking

of low income level versus high income level (1.545; 95% CI 1.387–1.720; Meta-analysis 7), and medium versus high income level (1.246; 95% CI 1.164–1.334; Meta-analysis 8), considering only studies that reported results in three categories (Table 8).

Comparing low vs. high income level only in studies that included both genders, the OR is virtually the same OR of smoking: female (1.376; 95% CI 1.229–1.542; Meta-analysis 9) and male (1.328; 95% CI 1.223–1.440; Meta-analysis 12) (Table 9). This gradient was also confirmed in both genders analyzing only studies with data for each gender in three categories (Table 10). With respect to the high income strata, females of medium and low income groups have an OR of smoking of 1.172 (95% CI 1.092–1.259; Meta-analysis 11) and 1.509 (95% CI 1.213–1.877; Meta-analysis 10) respectively. The same trend was found among males: 1.207 (95% CI 1.114–1.307; Meta-analysis 14) and 1.430 (95% CI 1.325–1.543; Meta-analysis 13) respectively for medium and low income.

This trend was also confirmed in all the three age categories (Table 11; Meta-analysis 15, 18, and 19). The observed gradient was apparent in the age category between 16 and 44 years (the only one with available data for this analysis): OR 1.313 (95% CI 0.861–2.001; Meta-analysis 17) and 1.727 (95% CI 1.097–2.720; Meta-analysis 16) respectively for medium and low income groups (Table 12).

Table 13 shows the OR of smoking comparing low versus high income level by decade of dataset and mortality level by country. In low mortality countries the trend became more marked in the last two decades, while in high mortality countries this was the case only in the last decade (Meta-analysis 21).

A sensitivity analysis of prospective studies reinforced the association between tobacco use and income (OR: 2.17 CI 95% 1.44–3.27) (Table 14). (Meta-analysis 33). Finally, the intensity of smoking (number of cigarettes smoked daily) was poorly reported, precluding its meta-analysis.

Tobacco-Attributable Deaths and Diseases by Income

Out of 20 studies (N=987,885) with data for tobacco attributable diseases by income (Table 2), the WHO region distribution of studies was: PAHO: 13, EURO: 3, SEARO: 2, and WPRO: 2. With regards to continents, 10 studies were done in North America (Canada 6, USA 4); 4 in South America (Brazil 4); 3 in Europe (Denmark, Finland, Sweden); 2 in Asia (India, South Korea); and 2 in Oceania from the same report (Australia, New Zealand). Five studies included only females, one included only males, and in the rest of the studies the proportion of males ranged between 19% to 84%, with a mean of 51.5%.

The most common tobacco-attributable diseases evaluated were: low birth weight for gestational age (LBWGA) (5 studies, ranging between 5% and 27%); coronary heart disease (4, from 0.6% to 11.6%); cardiovascular death (3, from 9% to 13%); periodontitis/tooth loss (3, ranging between 9% and 51%); chronic obstructionary pulmonary disease (COPD) (2, 12.7%); all causes of death (2, from 1.95% to 2.95%); lung cancer (2, 2.46%); and stroke (1, from 3.3% to 7.4%). Two studies (Khang 2008 and Mo 2006) evaluated two diseases each. Only one study (Simms 2007) used as independent variables the current smoking status and the income level category, showing the independent effect of smoking on LBWGA by income category. The other studies only evaluated the independent effect of income category on different outcomes (of known relationship with tobacco exposure) adjusted by current smoking status and other variables.

No study showed statistically significant higher risk at increasing income strata. Only Prescott 2003 and Singh 1997 (high versus low strata) and Silva 2006 São Luís (medium versus high strata) showed no statistically significant differences between strata. The other studies all exhibited statistically significant higher risk at decreasing income strata (Table 5).

The OR of low versus high income level of all causes of death, lung cancer, and low birth weight was statistically significant, but not for cardiovascular disease and coronary disease (Table 15; Meta-analysis 22, and 30). However the sensitivity analysis, excluding Singh 1997[30] (weak outcome measure) and Stewart 2008[31] (weak outcome measure), showed consistent results (Table 15; Meta-analysis 31, and 32). The gradient of income level is also apparent for coronary diseases (Table 16; Meta-analysis 24 and 25) and for low birth weight (Table 17; Meta-analysis 29 and 30)

Sensitivity analysis by random or fixed effect model was performed for the previous set of outcomes. Both methods were presented in meta-analysis tables. All showed similar point estimates and wider but overlapping confidence intervals using a random-effects model versus a fixed effect one. Only a trend towards grater point estimates (difference > 0.2) using a random-effects model was observed in some meta-analyses or subgroups: Meta-analysis 1, 3 (North America), 4 (PAHO), 5 (low mortality countries), 6 (high and medium bias), 9, 12, 15, 18, and 20 (low mortality countries). The inverse was observed in Meta-analysis 23.

The possibility of publication bias has no sense in prevalence studies studies since there is no test. For tobacco-attributable deaths and diseases by income meta-analyses, the number of included studies ranged mostly from three to five, precluding reliable funnel plots. A funnel plot was only presented for Meta-analysis 23 Low vs. High: Coronary disease) (6 studies), showing slight asymmetry toward smaller OR.

Tobacco Spending Related to Total Expenditures

For tobacco expenditures by income level, five studies were included (Table 6). In all studies, an inverse relationship was observed between income level and the proportion of tobacco spending related to total expenditures. The median proportion of tobacco spending related to total expenditures was 10.7%, 3.7%, and 1.8% in low, medium and high income level respectively (Table 18).

Discussion

Tobacco and Poverty

Eighty two percent of the world's 1.1 billion smokers live in low and middle income level countries[32]. During the last decades a considerable body of evidence has described a puzzling inverse association between social status and smoking[33-37]. In these studies poverty and tobacco consumption have been measured by various means, however income level was frequently signaled as a factor clearly and strongly associated with poverty.

This study set out to analyze the association between smoking prevalence and poverty. It used income variables as a measure of living standard. This variable was considered on level categories (low, middle and high) from different income-related variables (i.e. total household income, minimum salary, etc.). Also considered was a "line of poverty" to directly measure the poverty level. Numerous studies have also shown associations between several socioeconomic status (SES) factors such as level of job, social class, educational level and smoking, but measuring them was beyond the scope of this analysis. For this discussion, income and SES will be used interchangeably.

Definitions of current smoking were grouped into the following categories: at least one cigarette every day; at least 100 cigarettes in their entire life and now smoke either every day or some days; adolescent population; variable authors' definition; pregnant women; and household currently tobacco use and not described.

The present meta-analysis includes 125 papers comprising 31,146,096 subjects (43.4% males) worldwide. The median value of current smoking prevalence was 27% (range 2.5%–73.7%), and the median age reported was 41 years.

The main finding of this study was a robust trend for higher prevalence of any tobacco consumption in the most economically deprived stratum (OR of smoking in low vs. high income level 1.48–CI 95% 1.38–1.59). This association came to attention initially in studies previous to 1989 (OR 1.05 CI 95% 1–1.1) and became clearer in research done between 1989 and 1998

(OR 1.47 CI 95% 1.27–1.7) and afterwards (OR1.49 CI 95% 1.33–1.67 (Table 7) (Meta-analysis 2). The strongest association between tobacco and poverty was found in the younger age group (15 to 44 years old: OR 1.51 CI 95% 1.3–1.75), with slightly lower values for older age groups (Table 11). An analysis of the studies that considered three income level categories also confirmed the existence of a social gradient, with an OR of 1.54 (CI 95% 1.39–1.72) for low income level versus high income level and 1.24 (CI 95%1.16–1.33) for middle income level vs. high income level (Table 8).

Sensitivity analysis of prospective studies reinforces and clarifies this association (OR: 2.17 CI 95% 1.44–3.27) (Table 14). Studies included in this sub-analysis focused on the subsets of younger population (OR: 2.27, mean age: 16.9 years) and women of childbearing age (Meta-analysis 33)[38-40]. When considering geographic variables, this association was also present for all continents. The strongest values were found for Oceania (OR 1.65 CI95% 1.44–1.89) and the weakest for Africa (OR 1.28 CI 95% 1–1.64). Information in this latter case was limited to only one paper[41]. Most of the studies included were conducted in Europe and North America, with ORs in the range of 1.29.

Causes for this phenomenon are still under discussion. Several complex aspects of smoking should be taken into account in explanation. The widely accepted Four Stages model of the smoking epidemic distinguishes stages from male prevalence and smoking-attributable burden of disease and death[37]. In earlier stages, smoking disseminates among higher income groups who are more open to innovation. During the intermediate stages, smoking diffuses to the rest of the population. Later, smoking declines among the high income level strata, as they are concerned with health, fitness and the harm of smoking. Only after a long history of cigarette consumption, when all SES groups have been similarly exposed to smoking, does the inverse social status gradient emerge. However, this model cannot be applied to all countries[42, 43].

Relative deprivation inside societies may play a stronger role than material deprivation by itself (e.g. inequality)[35]. Inegalitarian societies generate a variety of psychological and health problems. With comparable low income levels, poorer groups in less egalitarian societies feel relatively more deprived than their counterparts in more egalitarian ones, where disadvantaged groups feel that social demands exceed their ability to satisfy them.

Furthermore, tobacco consumption is a complex problem as it behaves simultaneously as an addiction, a pleasure and a marker of social status as presented by advertising. Nicotine can offer some relief replacing the expensive things the poor cannot afford. The social gradient may also be modified by a different likelihood of success in quitting, as high SES people are more

likely to stop smoking[44, 45]. The ability to avoid starting to smoke or to quit among higher SES groups could reflect a sense of self-efficacy and self-care among them. The differential effects of prices are also an issue to be considered: in developed countries, high prices are used more often as a financial disincentive than in poorer countries, while tobacco still remains accessible to all of the world's population[3].

Other factors involved are the growing trend denormalizing smoking, as well as changes in marketing, industrialization, communication and innovation. Policies focusing on tobacco prices have been shown to reduce tobacco consumption and improve the health of the whole population[46]. In line with this, the WHO Framework Convention on Tobacco Control (WHO FCTC) proposes guidelines for policies to reduce tobacco consumption. The WHO FCTC emphasizes important and efficacious regulations on economic aspects such as prices, taxes (Article 6), the packaging and labeling of tobacco products (Article 11), advertising, promotion and sponsorship (Article 13), illicit trade (Article 15), and others.

Regarding gender, 23 studies included information on gender according to income strata (Meta-analysis 9). Results show higher smoking prevalence among the poorest for both genders (pooled OR for females 1.37 CI 95% 1.22–1.54, for males 1.32 CI 95% 1.22–1.44). No gender differences were found even when the middle strata was considered, with ORs between low and medium income for men (OR 1.2 CI 95% 1.11–1.3) and women (OR 1.17 CI 95% 1.09–1.25) (Meta-analysis 11, Meta-analysis 14).

According to the Four Stages model, women could be less sensitive to economic influence as they incorporate tobacco consumption later[37, 47]. However, our analysis shows no difference in the behaviour of men and women in income level strata.

Smoking is marketed as a masculine habit, linked to health, happiness, fitness, wealth, power, and virility. In reality, it leads to sickness, premature death, sexual impotence and infertility. Almost 1 billion men and 250 million women in the world are daily smokers. Male smoking rates have now peaked, and trends in low- and middle-resource countries are declining slowly but surely. Cigarette smoking among women is also declining in most high-resource countries[3].

Globally, 35% of men in developed countries smoke versus 50% in developing countries. Women present an inverse pattern, with a 22% smoking prevalence in high-income countries and 9% in low-and middle-income countries. Although several factors have been described[47] as promoting a high smoking prevalence among women (low-income jobs, lone parent status, low levels of education, lack of social support, work and family obligations, violence, etc) these factors seem to cause a higher prevalence among women in inegalitar-

ian countries more than in the poorest. It has been reported that female smoking prevalence increases linearly with logged gross domestic product[48].

Regions

The World Health Organization divides the world into six regions: Africa (AFRO), the Americas (PAHO), the Eastern Mediterranean (EMRO), Europe (EURO), South-East Asia (SEARO) and the Western Pacific (WPRO). In the analysis by WHO region, we found a clear evidence of a higher smoking prevalence in low income level groups in the PAHO as well as in the WPRO (ORs in the range of 1.5) (Table 7).

EMRO is the only region where this trend was not found (OR 0.93; IC 0.6–1.4), but the data are limited to two studies from Pakistan and Saudi Arabia. Thus, the lack of an association can be explained by insufficient data. More research from this part of this world is needed, as available data presents these countries as having a high poverty rate, with high to intermediate values of male prevalence and tobacco related illnesses[3]. Using World Bank data from the 1990s, Blakely found that tobacco consumption was more common among those living on < US$ 1.00 (RR 1.7) or > US$ 2.00 per day (RR 1.0) in the EMRO (Stratum D)[36].

A subgroup analysis was performed by dividing countries by their child and adult mortality (Meta-analysis 5, Table 7), including 74 studies from countries with low mortality rates (Strata A+B) and 15 with high mortality rates (Strata C+D+E). In countries of low mortality the low versus high income level OR of smoking tended to be greater (1.530; 95% CI 1.414–1.656) than in countries of high mortality (1.220; 95% CI 0.983–1.513). However, confidence intervals overlap, so there is no significant difference.

The association between smoking and low income level is more evident in the most developed countries with increasing ORs by decades, starting from 1.05 in the 1980s, to 1.6 in the 1990s studies, and projecting into the first period of the new millennium with an OR level of 1.59 (Table 13). The association in earlier studies from less developed countries is weaker and increases with time from ORs of 0.8 to 1.4. The hypothesis of the Four Stages provides a possible explanation, where these poorer countries are moving to another stage of smoking dissemination[37].

It is interesting to note that in the aforementioned study no association between tobacco use and poverty was found for some specific countries of developing regions (AFR D, PAHO B, EUR B and C, and in the WPR B). Furthermore, consumption was more common among non-impoverished individuals in the AFR E and in the PAHO D[36]. This shows that any inference should be taken with caution as local realities may vary.

Tobacco, Poverty, and Health

An inverse relationship between SES and illness and mortality has been previously reported. The evidence of this study follows the same trend, with an association between tobacco-related illnesses and low income level, especially for all-cause mortality (OR 1.39 CI 95% 1.31-1.74), lung cancer (OR 1.51 CI 95% 1.31-1.74), coronary disease (OR 1.44 CI 95% 0.94-2.23), and low birth weight for gestational age (LBWGA) (OR 1.52 CI 95% 1.31-1.76). The association was not significant for cardiovascular disease (OR 1.07 CI 95% 0.824-1.4), but became statistically significant when prospective studies of low risk of bias were included in sensitivity analysis (OR 1.48 CI 95% 1.37-1.59) (Meta-analysis 22 to Meta-analysis 32).

Regarding LWBGA, all five studies included were conducted in PAHO (Brazil and USA). Sims et al. found that smoking Afro-American and Latino mothers, living in poor communities, were almost three times more likely to deliver LBWGA children[49]. In another study, the risk of LBWGA among births to poor black and white women was at similarly high levels (after adjustment for tobacco consumption among others)[50]. The data suggests that poverty has a stronger effect than tobacco on this outcome.

In the same trend, cardiovascular disease and lower income was independently associated with heart disease and stroke in diabetics in the study by Mo[51]. In a Korean report, four risk factors (cigarette smoking, blood pressure, fasting serum glucose, and serum total cholesterol) explained 15.2% of excess relative risk for all-cause mortality in low-income men aged 30–44 years old. However, when using a statistical analysis where the risk factors were removed from the whole population, excess absolute risk for all-cause mortality was reduced by 48.3%, showing that individuals with lower SES would reap greater absolute benefits than those with higher SES if all risk factors could be eliminated from the population[52].

Concerning respiratory illnesses, Prescott et al. found an inverse relationship between social position and mortality from respiratory disease and chronic obstructive pulmonary disease[53]. This association remained significant after adjustment for smoking and was stronger in males. Regarding lung cancer, Ekberg-Aronsson et al. found that low SES groups had an increased risk of lung cancer compared with high SES groups, despite accounting for smoking[54]. These results were consistent with the ones by Mao, showing an increased risk among low income level males and females (adjusted OR 1.7 and 1.5 respectively)[55].

In the Brazilian study by Menezes significant relative odds for chronic bronchitis were described for low family income level (OR=2.60) and smoking dependence (OR=6.92) among others. An adjusted analysis identified significant odds for family income (OR=1.99 95% CI 1.04–3.81) and smoking

(OR= 8.10; 95% CI 4.46–14.71) among others[56]. A Canadian study by Chen also found an increased prevalence of COPD among men from low income families (OR: 3.7)[57].

An Indian study by Singh yielded a low value of odds ratio for low social class versus coronary artery disease[30]. This study was excluded from sensitivity analysis as its outcome diagnosis was based on questionnaires, physical examination and electrocardiography, being susceptible to under or misdiagnosis. The author explains these paradoxical results by noting that in India, fatty dietary intake could be limited to high SES while poorer people would frequently engage in physically demanding work such as farming, becoming less likely to develop coronary disease than sedentary people.

The effect of smoking and poverty on health could have a long list of reasons: lack of access to tobacco damage information and adequate health coverage, insufficient personal and social self-care, low nutrition level, poor housing, presence of occupational hazards, etc. Relative deprivation by itself and societal inequality are strongly associated with mortality and health. For example, in a recent United States study with a sample of 300,000 men, mortality declined progressively across 12 categories of household as income increased from less than $7500 to more than $32 499[58].

Alternative theories may explain the combined influences of poverty and smoking on health problems[34]. High SES groups may be the most vulnerable to the harmful effects of smoking, as they have a greater potential for good health. Conversely, SES could ameliorate the harm of tobacco for richer groups and potentiate the harm for poorer groups. Finally, each factor could contribute to health independently. The results of this study provide data in favor of the vulnerability theory: tobacco inflicts a greater harm among disadvantaged groups.

Sensitivity analyses by random or fixed effect model were performed for all meta-analyses. All showed similar point estimates and wider but overlapped confidence intervals using a random-effects model versus a fixed effect one, reinforcing the robustness of the results. Because of the number of studies involved, a funnel plot was only presented for Meta-analysis 23 (Low vs. High: Coronary Disease) (6 studies) showing slight asymmetry toward a smaller association that could underestimate the OR but never overestimate it.

Tobacco and Home Expenditures

In the pooled results of studies addressing the issue, a median of 10.7% of home expenditures was spent in tobacco consumption in low income level households (3.7% for medium and 1.8% for high income level) (Table 18). This level of tobacco expenditures could exacerbate the effects of poverty and cause significant deterioration in living standards among the poor.

Data from the studies included illustrate this point. For example, Bangladesh is one of the poorest countries in the world, having a life expectancy of only 60.5 years in 1998. It is also the seventh ranking country in male smoking prevalence[3]. Efroymson et al. measured the expenditure on tobacco, particularly cigarettes, among impoverished Bangladeshis[4]. The poorest (household income < $24/month) were twice as likely to smoke as the wealthiest (household income > $118/month). Average male cigarette smokers spent more than twice as much on cigarettes as per capita expenditure on clothing, housing, health and education combined. A typical poor smoker could easily add over 500 calories to the diet of one or two children using his or her daily tobacco expenditure, and therefore the lives of 350 children could be saved daily. Bangladeshi households spent an average 2.8% of total expenditures on tobacco products, from 1.5% for the poorest households to 4.5% for the richest ones[16].

In Mexico the adjusted prevalence of household tobacco spending fell from 22.4% to 9.9% between 1992 and 1998[59, 60]. Households allocated more than 4% of their income to tobacco consumption. The poorest population (first quintile) allocated a greater share of their income than higher quintiles. The average daily consumption of cigarettes increased from 7.5 to 9.8 between 1992 and 1998. It was estimated that 90% of "smoker homes" consumed up to one package per day. Households with higher incomes consumed more tobacco; nevertheless, households with the lowest income devoted a greater proportion of their income to tobacco consumption (16%).

In a Vietnamese paper, among 6000 households, low-priced cigarettes accounted for a larger share of total cigarette consumption[61]. Most consumers smoked low-priced cigarettes, were poor, and lived in rural areas or small towns. Low income level households' tobacco spending was equal to 1.5 times their educational spending and was similar to health care spending. In Vietnam, as the poor are likely to smoke low-priced cigarettes, smokers are particularly responsive to policies on prices.

Other data show a wide variety of settings among different countries. Data from the World Bank collected by de Beyer describe different situations around the world.[5] In Egypt in 1997, tobacco products accounted for just less than 2% of total household expenditures for all but the richest quintile of households, where it rose to 2.8%. The national household expenditure survey in India in 1986–87 found that between 2.5–4% of all household expenditures were for tobacco, bread and intoxicants; the percentage was highest for the lowest income urban households. In South Africa in 1995, for all households including at least one smoker, the lowest income level quartile spent 4.7% of their income on cigarettes, with decreasing percentages for higher income level quartiles up to 0.6-1.3% regardless of race. On the other hand, low income level households with at least one smoker

in Bulgaria spent 10.4% of their total income on tobacco products in 1995. Urban households in Tibet spent 5.5% of their monthly disposable income on tobacco products in 1992.

Trends in expenditures on tobacco among the poor in developing countries are also extremely worrying. In Indonesia, tobacco expenditure has grown fastest among the poorest groups. In 1981, the lowest income level group spent 210 rupiah per capita on tobacco, 9% of their total expenditure. This rose to 1278 rubiah, 15% of total expenditure for 1996.

In China, smokers in 2,716 households surveyed in the Minhang district reported spending 17% of their household income on cigarettes[6]. The amount of money spent by a current smoker could reach 60% of his or her personal income, representing 17% of total household income. The proportion of individual and household income consumed in cigarettes increased as income was lower.

Going beyond the immediate effects of smoking on home expenditures, there are long-term effects attributable to the higher risk of illnesses that can be devastating for a family living close to, or below, the poverty line. The poorest are the most likely to be limited to menial jobs with higher physical demands. If they become too ill to work, the family's food supplies and income are endangered. If somebody who lives on $1 a day is ill, he or she is faced with a choice between seeking care or obtaining food for the family. Generally, this group has less access to medical care, requiring many hours of walking and waiting; quality of care is highly variable, and drugs are often unavailable The consequences of this are considerable relative risks for serious diseases and premature death[62].

From this analysis, the picture of a greater impact of tobacco consumption on the home budget for the poorer is clear: people in a low IL strata allocate a significant portion of their total expenditures on a harmful and addictive substance instead of improving their healthcare and lifestyle.

Conclusions

This paper presents results that confirm and quantify an inverse relationship between income level and smoking prevalence and consequences in a wide variety of populations and settings, using a rigorous systematic review including data from varied sources to minimize publication bias.

The analysis performed here presents a solid basis to support an inverse relationship between income level and tobacco use prevalence and its related consequences. It also displays data on the negative impact of tobacco consumption on illnesses and household expenditures. These results contribute to evidence in favor of the vulnerability theory that tobacco inflicts a greater harm among disadvantaged groups. Therefore, policies and interventions focusing on smoking prevention and cessation among the poor are an important component of national and international efforts to improve the health and well being of less affluent populations.

Implications for Practice

Greater efforts to reduce tobacco use among the poor are clearly needed. Tobacco consumption varies due to inequity more than poverty itself, and should be proactively controlled. The presence of vulnerable and disadvantaged groups poses a challenge for policy makers and healthcare workers. The research presented here may be useful to establish priorities in policy and cessation efforts for the future. Efforts to help low-income groups to quit will have an effect as well as on their quality of life and life expectancy in the long term, as well as an immediate effect on their household expenditures, thereby improving their availability of resources.

Implications for Research

Migration of the smoking epidemic is expected to continue in the future, and the association between tobacco and poverty should be repeatedly assessed, as the effects of policies suggested by the WHO FCTC are likely to modify the current situation. Further research with indirect assessment of SES (i.e. proxies as education level, employment, etc.), which represent a great

amount of the evidence, could help to better understand the problem. Standardization of designs and criteria for definitions should also be agreed upon in order to diminish the heterogeneity of studies.

Potential conflict of interests

None.

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Annex 1: Tables and Graphs

DESCRIPTIVE TABLES

Table 1 Characteristics of included studies about current smoking and income levels

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
AFRO	Africa	Nigeria	Obot 1990[64]	1989	4	20-100	26.8	619	89.5	
AFRO	Africa	South Africa	Mfenyana 2006[41]	1999	4	15-45	4.80	12,049		Mostly women
AFRO	Africa	South Africa	vanWalbeek 2002[65]	1993/2000	4		N/A	N/A	51.4	
AFRO	Africa	South Africa	Vorster 2007[66]	1996-1998	4	15+	37.0	1,854		
SEARO	Asia	South Korea	Khang 2008[52]	1995-2003	4		57.2	575,377	100.0	Male public servants 1994-2003
SEARO	Asia	Bangladesh	Best 2007[16]	2005-6	6		69.9	77,678		Parental use of tobacco
WPRO	Asia	China	Chen 2004[67]	2002-3	4	18-30	35.6	2,201	60.7	Rural-to-urban migrants in Beijing

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
WPRO	Asia	China	Gong 1995[6]	1995	2		33.3	7,016	48.8	
WPRO	Asia	China	Hesketh 2007[68]	2004	4	15-52	54.8	7,115	100.0	
EURO	Asia	India	Ramachan-dran 2002[69]	2002	4		28.0	2,383	50.0	
SEARO	Asia	India	Singh 1997[30]	1991	1	25-64	19.8	1,769		
SEARO	Asia	Indonesia	Best 2008[29]	2000-3	6		73.7	438,336		Parental use of tobacco
WPRO	Asia	Japan	Fukuda 2005[70]	2001	4	25-59	33.8	41,109	48.7	
WPRO	Asia	Japan	Fukuda 2007[71]	2007	4	20+		62,363	47.2	
SEARO	Asia	Korea	Cho 2004[72]	1990-8	4	30-49	60.1	322,991	100.0	
SEARO	Asia	Korea	Kim 2006[73]	2001	7		N/A	28,007		
EMRO	Asia	Pakistan	Alam 2008[74]	2004-5	1	18-67	16.5	2,018	42.7	
EMRO	Asia	Pakistan	Khuwaja 2004[75]	2004	4		34	396	100.0	Urban males
EMRO	Asia	Pakistan	Nisar 2007[76]	2005	4		70.0	157		
EMRO	Asia	Saudi Arabia	Merdad 2007[77]	2007	4	18-26	11.0	1,050	0.0	Female students
WPRO	Asia	Vietnam	Van Kinh 2006[61]	1997-8	4	6+	50.8	28,512	100.0	

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
PAHO	Central America	Mexico	Anaya Ocampo 2006[40]	1998-01	1		5.2	2,568		
PAHO	Central America	Mexico	Bird 2007[78]	2000	3	11-13	26.1	506	47.8	Students
PAHO	Central America	Mexico	Smith 2007[79]	2001	4		18.2	9,518		
PAHO	Central America	Mexico	Vázquez-Segovia 2002[80]	1984-2000	6		varies according to year	26,110,841		
EURO	Europe	Albania	Shapo 2003[81]	2001	1		37.6	1,120	47.8	
EURO	Europe	Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine	Pomerleau 2004[82]	2001	1	18-100	N/A	18,428		
EURO	Europe	Belaruse	Gilmore 2001[83]	2000	4	18 y >65	53	1090	47.0	
EURO	Europe	Estonia	Parna 2002[84]	1996	4	30-59	41.2	2,086	48.1	
EURO	Europe	Estonia, Latvia and Lithuania	Pudule 1999[85]	1997	4	19-64	N/A	9,000		

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
EURO	Europe	Europe	Schaap 2008[86]	1998	4	25-60	37.5	45,765	49.2	
EURO	Europe	Finland	Paavola 2004[87]	1978	4		N/A	3,014		
EURO	Europe	Finland	Virtanen 2007[88]	2000-01	4		18.9	23,008	21.0	Government employees in 10 Finnish towns
EURO	Europe	Finlandia	Laaksonen 2005[89]	1993-99	4	40-60	N/A	6,243	20.0	
EURO	Europe	Finlandia	Rahkonen 2005[90]	2002	4	40-60	25.0	6,243		Employees by the citiy in Helsnski
EURO	Europe	France	La Rosa 2004[91]	1998	1	16-59	48.1	1,089	46.0	
EURO	Europe	Germany	Rathmann 2006[92]	2000	4	55-74	14.1	1476		
EURO	Europe	Netherlands	Reijneveld 2002[93]	1991	7		N/A	20,401		
EURO	Europe	Poland	Kaleta 2007[94]	2006	1	25-64	38.8	598	50.0	Working population of the district of Lodz
EURO	Europe	Spain	De Onis 1991[95]	1987	1	16+	22.9	14,445	0.0	

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
EURO	Europe	Spain	Silvestre Garcia 1990[96]	1989	4		N/A	N/A		
EURO	Europe	Sweden	Ekberg-Aronsson 2006[54]	2005	4	17-61	44.2	22,367		
EURO	Europe	Sweden	Pudaric 2000[97]	1988-89	4	55-74	N/A	3,100	95.0	
EURO	Europe	Turkey	Keles 2003[98]	1990-2002	4		38.3	2,704		
PAHO	North America	Canada	Anonimo 2000[99]	1996-7	4		29.0	23,471	100.0	
PAHO	North America	Canada	Birch 2000[100]	1992-3	4	15+	35.4	23,564		
PAHO	North America	Canada	Choiniere 2000[101]	1986-92	4		26.0	23,131		
PAHO	North America	Canada	Mao 2001[55]	1994-1997	2					
PAHO	North America	Canada	Millar 2004[102]	2000-01	4	15-54		7,614	0	Pregnant
PAHO	North America	Canada	Millar 2007[103]	2003	4		24.0	33,777		
PAHO	North America	Canada	Pomerleau 1997[104]	1990	4	19-100	32.9	61,239		
PAHO	North America	Canada	Seguin 2003[105]	1998	7			2,223	0.0	Mothers of 5-month-old children

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
PAHO	North America	Canada	Wister 1996[106]	1990	4		30.6	11,630		
PAHO	North America	Samoa-Hawai-Los Angeles	Mishra 2005[107]	1996	2	18-100	26.6	1,834	46.2	Samoans
PAHO	North America	United States	Fagan 2007[108]	2003	4	18-30	22.0	33,983	50.0	
PAHO	North America	United States	Fagan 2007[109]	1998	2	18-64	35.0	13,840	53.0	Unemployed adults
PAHO	North America	United States	Friis 2006[110]	2004	2	18+	24.3	119	44	Cambodian americans
PAHO	North America	United States	McWhorter 1990[111]	1971-75	4	25-75	36.0	4,779		
PAHO	North America	United States	Scholes 1992[112]	1984	7	18-40	31.2	425	0.0	
PAHO	North America	USA	Abma 1991[113]	1979-88	5	23-31 years	36.7	1,664	0.0	Pregnant women
PAHO	North America	USA	Abraido Lanza 2005[114]	1991	2	18 en adelante	25.7	36,401	42.8	
PAHO	North America	USA	Acevedo-Garcia 2005[115]	1995-6	4		19.0	221,798	46.4	
PAHO	North America	USA	Ahrens 2005[116]	2003	2		20.0	8,000		

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
PAHO	North America	USA	Conwell 2003[117]	1981-4	3	14-14	11.7	5,247		14-yr old Adolescents
PAHO	North America	USA	Coreil 1991[118]	1982-4	4		33.3	3,464		HHANES of Mexicans living in USA
PAHO	North America	USA	Delva 2005[119]	2002-2003	4		42.0	1,021	5.4	
PAHO	North America	USA	Diez-Roux 1999[120]	1992-1994	4	18-65	44.0	695		
PAHO	North America	USA	Fagan 2007[121]	2003	4		22.2	33,983	50.0	
PAHO	North America	USA	Gilpin 1990[28]	1990	2		2.5	24,296		
PAHO	North America	USA	Gilpin 1996[28]	1996	2		4.9	18,616		
PAHO	North America	USA	Green 2007[122]	2003	4	18-34	N/A	47,987	44.1	
PAHO	North America	USA	Kanjilal 2006[123]	1990-1999	2	25-74	N/A	6,997	49.0	
PAHO	North America	USA	Kesteloot 2003[124]	1997	2		28.0	68,556		
PAHO	North America	USA	Kiefe 1998[125]	1985-1992	1		27	4,086		Young adults

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
PAHO	North America	USA	Kiefe 2001[126]	1985-1992	1		25.6	3,948		Young adults
PAHO	North America	USA	Kim 2006[127]	1995	1		11	2,697	0.0	
PAHO	North America	USA	King 1999[128]	1990-94	2	18-64	29.1	16,738	45.3	
PAHO	North America	USA	Lantz 1998[129]	1986-94	4		29.3	3,617	37.5	
PAHO	North America	USA	Lawrence 2007[130]	1998-99	2	18-24	26.0	15,371	48.3	
PAHO	North America	USA	Lowry 1996[131]	1992-93	3	12-17	19.6	6,321		
PAHO	North America	USA	Luepker 1993[132]	1980-82	4	25-74		7,781		
PAHO	North America	USA	Malmstadt 2001[133]	1994	2		23	12,591	43.2	
PAHO	North America	USA	MMRW 1998[134]	1976-80, 1983-5, 1987-93	2		29.3	355,246		
PAHO	North America	USA	Mody 2006[135]	2001	2	18+	22.8	209,031	48.8	
PAHO	North America	USA	Mostashari 2005[136]	2002	2	18+	21.6	1,280,000		
PAHO	North America	USA	Novotny 1988[137]	1985	2	25-64	N/A	21,593		

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
PAHO	North America	USA	Rahman 2005[138]	2001	2		17.7	660	51.3	Vietnamese living in California
PAHO	North America	USA	Resnicow 2001[139]	1998	4		12.0	1,016		
PAHO	North America	USA	Rogers 1995[140]	1990	2	18+	N/A	41,104	40.7	
PAHO	North America	USA	Ross 2000[141]	1995	1	18-92	N/A	2,482		
PAHO	North America	USA	Samet 1992[142]	1984	4	18+	28.1	1,072	41.0	
PAHO	North America	USA	Scarinci 2002[143]	1994	3		N/A	3,815		Adolescents, 7th graders
PAHO	North America	USA	Shavers 2005[144]	1998-99	2		23.8	108,687		
PAHO	North America	USA	Shelley 2006[145]	2002-03	2	18-74	17.7	2,537		Chinese subjects
PAHO	North America	USA	Siegel 1996[146]	1989-90	4		40.0	1,770		
PAHO	North America	USA	Tomar 2000[147]	2000	4		27.9	13,650	47.3	
PAHO	North America	USA	Unger 2007[148]	2002	3	11-16	18.0	1,847	44.0	Adolescents of the 8th grade

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
PAHO	North America	USA	Watson 2003[38]	1994-1997	1		19.4	715	0.0	
PAHO	North America	USA	Webb 2008[149]	1999	1	16–45	70.0	263		
PAHO	North America	USA	Wee 2001[150]	2000	4		25.0	14,952		
PAHO	North America	USA	Winkleby 1992[151]	1979-86	4		27.7	2,380		Predominantly White, non-Hispanic (85%)
PAHO	North America	USA	Kahn 2002[152]	1988	5		29.6	8,285	0.0	Women giving birth in 1988
WPRO	Oceania	Australia	Lawlor 2005[153]	1981-84	4		14.4	3,613		
WPRO	Oceania	Australia	Najman 1998[154]	1981-89	4		45.9	5,147	0.0	Woman in reproductive age before getting pregnant
WPRO	Oceania	Australia	Najman 2006[155]	1989-1990	1		N/A	135,267		
WPRO	Oceania	Australia	Siahpush 2001[156]	1995	1	18+	24.0	39,110	48.4	
WPRO	Oceania	Australia	Siahpush 2002[157]	1995	4		44.5	1,184	0.0	Single mothers with dependent children

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
WPRO	Oceania	Australia	Siahpush 2003[158]	1998-99	6		33.2			
WPRO	Oceania	Australia	Siahpush 2006[159]	2004	4		19.5	2,762		
WPRO	Oceania	Australia	Thomas 2008[160]	2002-03	4		51.2	9,289		Indigenous subjects
WPRO	Oceania	Australia	Turrell 2002[161]	1995	1		28.9	1,428	47.0	
WPRO	Oceania	New Zealand	Butler 2004[162]	2000	5		24.9	1,365	0.0	Pregnant women
WPRO	Oceania	New Zealand	Erick-Peleti 2007[163]	2000	4	20-39	29.8	1219	0.0	Women who gave birth between March and December 2000
WPRO	Oceania	New Zealand	Metcalf 2007[164]	1988-90	4	40-78	N/A	5,677	72.3	
WPRO	Oceania	New Zealand	Metcalf 2008[165]	2001-03	4	35-74	N/A	4,020	47.8	
WPRO	Oceania	New Zealand	Stewart 2008[31]	1990-9	4	62	10.0	2,784	82.0	Patients with history of myocardial infarction or unstable angina

WHO REGION*	Continent	Country	ID	Time of Recruitment	Outcome definition#	Age Range	Current Smoking (%)	N	Males (%)	Special Population
WPRO	Oceania	New Zealand	Whitlock 1997[166]	1992	4	18-65	N/A	10,529	72.0	
PAHO	South America	Argentina	Ferrante 2007[167]	2005	4		29.5	41,392	47.5	
PAHO	South America	Brazil	De Lima 2003[168]	1995	5		21.6	3,219		
PAHO	South America	Brazil	Gonçalves-Silva 2005[169]	2005	6		37.7	2,037	51.0	
PAHO	South America	Brazil	Marinho 2008[170]	2008	4	60+	18.8	6,961	44.0	
PAHO	South America	Brazil	Momino 2003[171]	2000	4		N/A	412	0.0	Pregnant women
PAHO	South America	Brazil	Monteiro 2007[172]	1989	4		33.2	39,808		
PAHO	South America	Brazil	Moreira 1995[173]	1991	1		34.9	1,091		

 # Outcome definitions: 1- At least 1 cigarette every day. 2- At least 100 cigarettes in their entire life and now smoke either every day or some days. 3- Current smoker (adolescent population). 4- Current smoker (variable authors' definition). 5- Current smoker (pregnant women). 6- Household currently using tobacco. 7- N/A.

* WHO regions

AFRO African Region
PAHO Region of the Americas
EMRO Eastern Mediterranean Region
EURO European Region
SEARO South-East Asia Region
WPRO Western Pacific Region

Table 2 Characteristics of tobacco attributable disease included studies

WHO Region	Continent	Country	ID	Recruitment Year	Tobacco Attribu table Disease	Total	(% of current smokers; % with diseases)	Male (%)	Population characteristics	Mean / Median (range)
SEARO	Asia	India	**Singh 1997**[30]	1991	Coronary Heart Disease	1768	CHD 3.27% (males 3.9%, females 2.6%)	50.6	Rural	25-64
SEARO	Asia	South Korea	**Khang 2008**[52]	1995-03	Death	575377	Deaths 2.95%	100	Public servants	30–64
EURO	Europe	Denmark	**Prescott 2003**[53]	1976-92	Death	26391	Smokers from 48.4 to 64.1%; deaths 1.94%	47.0		Mean from 42.7 to 57.9
EURO	Europe	Finland	**Ylostalo 2004**[174]	1997-8	Tooth Loss	8408	Missing teeth 43.05%	47.7		-
EURO	Europe	Sweden	**Ekberg-Aronsson 2006**[54]	2005	Lung Cancer	22387	Smokers from 22 to 55%; lung cancer 2.46%	67		49,7
PAHO	North America	Canada	**Chen 2000**[57]	1994-5	COPD	7209	COPD 27.6%	-		35 to 64
PAHO	North America	Canada	**Anand 2001**[175]	2000	Coronary Heart Disease	626	Smokers from 51 to 76%, CHD from 7% to 19%	44	Aboriginal people and European people in Canada	
PAHO	North America	Canada	**Mo 2006**[51]	2002-3	CHD & Stroke	127610	Smokers 23.73%; CHD 21.7% & Stroke 4.8%	45.8	diabetics	48.5

WHO Region	Continent	Country	ID	Recruitment Year	Tobacco Attribu table Disease	Total	(% of current smokers; % with diseases)	Male (%)	Population characteristics	Mean / Median (range)
PAHO	North America	Canada	**Millar 2007**[103]	2003	Periodontitis	33776	Smokers 24%; edentulism 15% in smokers and 7% in non smokers	45.1	All of the country except reserves and forces	18-100
PAHO	North America	Canada	**Mao 2001**[55]	1994-7	Lung Cancer	8549	3280 cases & 5270 controls	51.0	Rural and urban	20+
PAHO	North America	USA	**Kivimäki 2007**[176]	2000-2	Coronary Heart Disease	48592	CHD 1.1%	19	Public employees (largest group nurses and teachers)	(17-65)
PAHO	North America	USA	**Sims 2007**[49]	1990	Low Birth Weight For Gestational Age	100074	Smokers 19% ; LBW from 5 to 12%	0	Pregnant mothers (African-American 11.3%, Latinos 6.4%)	
PAHO	North America	USA	**Starfield 1991**[50]	1979-88	Low Birth Weight For Gestational Age	3835	Smokers black mothers 14.5 and white ones 8.3%; LBW 10.92%	0	Pregnant mothers	
PAHO	North America	USA	**Dolan 1997**[177]	1995	Periodontitis	760	Smokers 19%; attachment loss 92%		46	45+

WHO Region	Continent	Country	ID	Recruitment Year	Tobacco Attribu table Disease	Total	(% of current smokers; % with diseases)	Male (%)	Popula tion character ristics	Mean / Median (range)
WPRO	Oceania	Australia	**Stewart 2008[31] Australia**	1990-9	Cardiovascular Death	5948	Smokers 9%; CV Death 9 to 11%	84	Urban patients with history of myocardial infarction or unstable angina who participated in the LIPID Study	61
WPRO	Oceania	New Zealand	**Stewart 2008[31] New Zealand**	1990-9	Cardiovascular Death	2783	Smokers 10%; CV Death 13 to 15%	82		61
PAHO	South America	Brasil	**Menezes 1994[56]**	1994	Chronic Bronchitis	1053	Smokers 86.7%; chronic bronchitis 12.7%	40.8	Urban	40+
PAHO	South America	Brazil	**Azenha 2008[178]**	1978-9 /94	Low Birth Weight For Gestational Age	6750	Smokers from 18,5 to 26.9%; insufficient weight from 22.4 to 28.7%	0	Pregnant mothers	-
PAHO	South America	Brazil	**Rondó 1997[179]**	1997	Low Birth Weight For Gestational Age	712	Smoker mothers 41.9%	0	Pregnant mothers	-

WHO Region	Continent	Country	ID	Recruitment Year	Tobacco Attribu table Disease	Total	(% of current smokers; % with diseases)	Male (%)	Popula tion characteristics	Mean / Median (range)
PAHO	South America	Brazil	**Silva 2006**[180]	1994-8	Low Birth Weight	5277	Ribeirão Preto smokers mothers 5.7%; LBW 10.7%, São Luís smoker mothers 33%, LBW 7.6%)	0	Pregnant mothers	

CHD: Coronary Heart Disease; **COPD**: Chronic Obstructive Pulmonary Disease; **LBW**: Low Birth Weight For Gestational Age, **CV Death**: Cardiovascular Death

Table 3 Risk of Bias of included studies

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Abma 1991	Cross-sectional	Low	Medium	Low	Low	Medium	**Low**
Abraido Lanza 2005	Cross-sectional	Low	Low	Medium	Unknown	Low	**Moderate**
Acevedo-Garcia 2005	Nationwide cross-sectional survey	Low	Low	Low	Low	Low	**Low**
Ahrens 2005	Cross-sectional	High	Low	High	Medium	Unknown	**High**
Alam 2008	Cross-sectional	Low	Low	Medium	Unknown	Low	**Moderate**
Anand 2001	Cross sectional	Low	Medium	Low	Medium	Low	**Moderate**
Anaya Ocampo 2006	Cohort	High	Low	High	High	Medium	**High**
Anonimo 2000	Cross-sectional	Low	Medium	Low	Low	Medium	**Low**
Azenha 2008	Cross sectional	Low	low	low	low	low	**Low**
Best 2007	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Best 2008	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Birch 2000	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Bird 2007	Cross-sectional	Medium	Low	Medium	Medium	Medium	**High**
Butler 2004	Cross-sectional	Medium	Low	Low	Low	Low	**Low**
Chen 2004	Cross-sectional	Low	Low	High	Low	Low	**High**
Chen2000	Cross sectional	Low	Medium	Low	Low	Low	**Low**
Cho 2004	Prospective	Low	Low	Medium	Medium	Medium	**Moderate**

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Choiniere 2000	Nationwide cross-sectional survey	Low	Low	Medium	Medium	Low	**Moderate**
Conwell 2003	Cross-sectional	High	High	High	Medium	Medium	**High**
Coreil 1991	Cross-sectional	High	High	High	High	High	**High**
De Lima 2003	Cross-sectional	High	High	High	High	High	**High**
De Onis 1991	Nationwide cross-sectional survey	Medium	Low	Low	Low	Low	**Low**
Delva 2005	Community-based Randomized Control Trial	Low	Low	Low	Low	Low	**Low**
Diez-Roux 1999	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Dolan 1997	Cross sectional	High	High	High	High	High	**High**
Efroyson 2001	Nationwide cross-sectional survey	High	high	High	medium	medium	**High**
Ekberg-Aronsson 2006	Cohort study	High	low	low	medium	low	**High**
Erick-Peleti 2007	Cross-sectional	Medium	Medium	Low	Medium	Low	**High**
Fagan 2007	Cross-sectional	Medium	Medium	Low	Medium	Low	**High**
Fagan 2007	Cross-sectional	Low	Medium	Low	Medium	Low	**Moderate**
Fagan 2008-NTR	Cross-sectional	Medium	Medium	Low	Medium	Low	**High**
Ferrante 2007	Cross-sectional	Low	Low	Low	Medium	Medium	**Low**

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Friis 2006	Qualitative (focus groups)	High	High	High	High	Medium	**High**
Fukuda 2005	Cross-sectional	Low	Medium	Low	Low	Low	**Low**
Fukuda 2007	Cross-sectional	Low	Low	Low	Medium	Medium	**Low**
Gilmore 2001	Cross-sectional	Low	Medium	Medium	Medium	Medium	**High**
Gilpin 1999	Cross-sectional	Low	Low	Low	Medium	Medium	**Low**
Gonçalves-Silva 2005	Cross-sectional	Low	Low	Medium	Medium	Medium	**Moderate**
Gong 1995	Cross-sectional survey	High	Medium	High	Medium	Medium	**High**
Green 2007	Cross sectional	Low	Low	Low	Low	Low	**Low**
Hesketh 2007	Cross-sectional	Low	Low	Medium	Medium	Medium	**Moderate**
Kahn 2002	Cross-sectional	Low	Medium	Medium	Low	Low	**High**
Kahn 2005	Prospective	Medium	Medium	Medium	Low	Low	**High**
Kaleta 2007	Cross-sectional	Low	Medium	Medium	Medium	Medium	**High**
Kanjilal 2008	Cross-sectional	Medium	Low	Low	Medium	Low	**Moderate**
Keles 2003	Prospective population-based study	Low	Low	Medium	Medium	Medium	**Moderate**
Kesteloot 2003	Cross-sectional	Medium	Low	Medium	Medium	Medium	**High**
Khang 2008	Prospective	Low	Low	Medium	Medium	Medium	**Moderate**
Khuwaja 2004	Cross-sectional	Medium	Low	Low	Medium	Medium	**Moderate**
Kiefe 1998	Prospective-study	Medium	Low	Low	Medium	Medium	**Moderate**

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Kim 2006	Cross-sectional	Low	Low	Medium	Medium	Medium	**Moderate**
Kim 2006-JPMPH	Cross-sectional	Low	Low	Medium	Medium	Medium	**Moderate**
King 1999	Cross-sectional	Low	Medium	Low	Low	Medium	**Low**
Kivimäki 2007	Cross sectional	Medium	Medium	Low	Low	Low	**High**
La Rosa 2004	Cross-sectional	High	Medium	Low	Low	Low	**High**
Laaksonen 2005	Cross-sectional	Medium	Medium	Low	Low	Low	**Moderate**
Lantz 1998	Cross-sectional	Low	Medium	High	High	Medium	**High**
Lawlor 2005	Cross-sectional	Medium	Medium	High	High	Medium	**High**
Lawrence 2007	Cross-sectional	Low	Low	Low	Low	Low	Low
Lowry 1996	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Luepker 1993	Cross-sectional	Low	High	High	Low	Medium	**High**
Malmstadt 2001	Cross-sectional	Medium	Low	Medium	Medium	Medium	**High**
Mao 2001	Case-control	Low	Low	Low	Medium	Medium	**Low**
Marinho 2008	Cross-sectional	Low	Medium	Low	Low	Low	**Low**
McWhorter 1990	Cross-sectional	Low	Medium	High	Medium	Medium	**High**
Menezes 1994	Cross-sectional	Medium	Medium	Low	Medium	Medium	**High**
Merdad 2007	Cross-sectional	High	High	High	High	High	**High**
Metcalf 2008	Cross-sectional	Medium	Medium	Low	Medium	Low	**High**
Mfenyana 2006	Cross-sectional	Medium	Medium	Low	Low	Low	**High**

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Millar 2004	Cross-sectional	Unknown	Unknown	Low	Unknown	Low	**High**
Millar 2007	Cross-sectional	Low	Medium	Low	Medium	Low	**Moderate**
Mishra 2005	Cross-sectional	Low	Low	Low	Low	Low	**Low**
MMRW 1998	Cross-sectional survey	Medium	Unknown	Unknown	Unknown	Unknown	**High**
Mo 2006	Cross sectional	Low	Low	Medium	Low	Low	**Low**
Mody 2006	Nationwide cross-sectional survey	Low	Low	Low	Low	Low	**Low**
Momino 2003	Cross-sectional	High	Low	Low	Low	Low	**High**
Monteiro 2007	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Moreira 1995	Cross-sectional	Low	Medium	Medium	Low	Low	**High**
Mostashari 2005	Cross-sectional	low	low	Low	low	low	**Low**
Najman 1998	Cross-sectional	High	Medium	Low	Medium	Low	**High**
Najman 2006	Cross-sectional	Low	Low	Low	Medium	Medium	**Low**
Nisar 2007	Cross-sectional	Medium	Medium	Low	Low	Low	**High**
Novotny 1988	Nationwide cross-sectional survey	Low	Low	Low	Low	Low	**Low**
Obot 1990	Cross-sectional	Low	Medium	Medium	Low	Low	**High**
Paavola Meri 2004	Case-control	Medium	Medium	Medium	Low	Low	**High**

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Parna 2002	Nationwide cross-sectional survey	Low	Medium	Low	Low	Low	**Low**
Pomerleau 1997	Nationwide cross-sectional survey	Low	Low	Low	Low	Low	**Low**
Pomerleau 2004	Multinational cross-sectional survey	Low	Medium	Low	Low	Low	**Low**
Prescott 2003	Pool of 2 Pop. based cohort	Low	Low	Medium	Low	Low	**Low**
Pudaric 2000	Cross-sectional	Low	Low	High	Low	Low	**High**
Pudule 1999	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Rahkonen 2004	Cross-sectional	Medium	Low	High	Medium	High	**High**
Rahman 2005	Cross-sectional	Medium	Low	Medium	Medium	Medium	**Moderate**
Ramachandran 2002	Cross-sectional	High	Medium	Medium	Medium	Medium	**High**
Rathman 2006	Cross-sectional	low	high	High	high	low	**High**
Reijneveld 2002	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Resnicow 2001	Cross-sectional	High	Middle	High	High	High	**High**
Rogers 1997	Nationwide cross-sectional survey	Low	Low	Low	Low	Low	**Low**
Rondó 1997	Case control	Medium	Low	Low	Low	Low	**Low**
Ross 2000	Cross-sectional	Medium	High	Unknown	High	High	**High**

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Samet 1992	Cross-sectional	Low	Low	Medium	Medium	Low	**Moderate**
Scarinci 2002	Cross-sectional	High	Middle	High	Medium	Low	**High**
Schaap 2008	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Scholes 1992	Case-control	Medium	Medium	Low	Low	Low	**High**
Seguin 2003	Cross-sectional	High	High	High	High	High	**High**
Sesma-Vázquez 2002	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Shapo 2003	Cross-sectional	Low	Low	Low	Medium	Medium	**Moderate**
Shavers 2005	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Shelley 2006	Cross-sectional	Low	Medium	Low	Medium	Medium	**Moderate**
Siahpush 2001	Cross-sectional	Low	High	High	High	High	**High**
Siahpush 2002-ANZ	Cross-sectional	Low	Low	Low	Low	Low	**Low**
Siahpush 2003-JECH	Cross-sectional	Low	High	High	High	High	**High**
Siahpush 2006-SCM	Cross-sectional	Medium	High	High	High	High	**High**
Siegel 1996	Cross-sectional and longitudinal comm-based random household sample.	Low	Low	Low	Low	Low	**Low**
Silva 2006	Population cohort studies	Low	Low	Low	Low	Low	**Low**
Silvestre Garcia 1990	Cross-sectional	Low	Medium	Medium	Medium	Medium	**High**

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Simms 2007	Ecological study and census.	Low	Medium	Low	medium	Low	**Moderate**
Singh 1997	Cross-sectional	Low	Medium	Low	Low	Low	**Low**
Smith 2007	Cross-sectional	Low	Medium	High	High	Low	**High**
Starfield 1991	Cross-sectional	Low	Medium	Low	Low	Low	**Low**
Stewart 2008	Randomized Control Trial	High	Low	Low	Low	Low	**High**
Thomas 2008	Cross-sectional	Low	Low	Medium	Medium	Medium	**Moderate**
Tomar 2000	Cross-sectional	Low	Low	Low	Medium	Medium	**Low**
Turrell 2002	Nationwide cross-sectional survey	Low	Low	Low	Low	Low	**Low**
Unger 2007	Cross-sectional	Medium	Low	Low	Low	Low	**Low**
Van Kinh 2006	Cross-sectional	Medium	Low	Low	Low	Low	**Low**
vanWalbeek 2002	Cross-sectional	Medium	Medium	Low	low	Low	**High**
Vázquez-Segovia 2002	Nationwide cross-sectional survey	Low	Low	Low	Low	Low	**Low**
Virtanen 2007	Cross-sectional	High	Low	Low	Low	Low	**High**
Vorster 2007	Cross-sectional	Medium	Low	Low	Low	Low	**Low**
Watson 2003	Cohort	High	Low	Low	Low	Low	**High**
Webb 2008	Cross-sectional	High	Low	Low	Low	Low	**High**

Study ID (Author publication date)	Study Design	Participants' selection bias	Variable measurement bias	Control confounding bias	Design-specific bias*	Statistical methods bias*	Summary Risk of Bias
Wee 2001	Nationwide cross-sectional survey	Low	Low	Low	Low	Low	**Low**
Whitlock 1997	Cross-sectional	Medium	Low	Medium	Medium	Medium	**High**
Winkleby 1992	Cross-sectional	High	Low	Low	Medium	Low	**High**
Wister 1996	Cross-sectional	Medium	Medium	Low	Low	Low	**High**
Ylostalo 2004	Cohort study	Medium	Low	Low	Low	Low	**Low**

Table 4 Effect of income level categories on current smoking

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
AFRO	Africa	Nigeria	Obot 1989	low	619		29.70	Naira 1990
			Obot 1989	medium	261		26.80	Naira 1990
			Obot 1989	high	102		26.40	Naira 1990
AFRO	Africa	South Africa	Mfenyana 2006[†]	low				R2 000 = £200
			Mfenyana 2006	high				R2 000 = £200
AFRO	Africa	South Africa	vanWalbeek 2002 1993	low			29.4	Rands
			vanWalbeek 2002 1993	high			28.1	Rands
			vanWalbeek 2002 2000	low			23.5	Rands
			vanWalbeek 2002 2000	high			31	Rands
AFRO	Africa	South Africa	Vorster 2007 Female	low	161		23.20	South Africa Rand
			Vorster 2007 Female	high	43		1.90	South Africa Rand
			Vorster 2007 Male	low	101		47.40	South Africa Rand
			Vorster 2007 Male	high	50		51.60	South Africa Rand
SEARO	Asia	Bangladesh	Best 2007	low	9.890		17.90	taka 2005
			Best 2007	medium	11.291		20.50	taka 2006
			Best 2007	high	11.220		20.40	taka 2007
SEARO	Asia	Bangladesh	Efroymson 2001	low				USD
			Efroymson 2001	medium				USD
			Efroymson 2001	high				USD
WPRO	Asia	China	Chen 2004	low			29.55	US$ 2003
			Chen 2004	medium			36.90	US$ 2003
			Chen 2004	high			47.81	US$ 2003

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
	3000	none					
3000	5000						
5000							
	<2000	univariate	1.28				
>2000			1.00	0.61	1.00		
1	5988	age, gender					
144000							
1	5988						
144000							
0	1200						
36000							
0	1200						
36000							
	288						
2256	1704						
5664							
0	720						
1080	1440						
2160							

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
WPRO	Asia	China	Gong1995	low		563	63.77	yuan/yr (Exchange was 8.5 yuan per dollar)
			Gong1995	medium		949	69.02	
			Gong1995	high		451	65.19	
WPRO	Asia	China	Hesketh 2007 Male	low				RMB2007(US$1 = 8.2 Chinese Renminbi (RMB))
			Hesketh 2007 Male	high				RMB2007(US$1 = 8.2 Chinese Renminbi (RMB))
SEARO	Asia	India	Ramachandran 2002	low	1748	557	32	RsIndias
			Ramachandran 2002	high	635	110	17	RsIndias
SEARO	Asia	India	Singh 1997 Female	low		20	5.90	
			Singh 1997 Female	high		70	60.00	
			Singh 1997 Male	low		105	33.50	
			Singh 1997 Male	high		50	34.00	
SEARO	Asia	Indonesia	Best 2008	low	56.411		17.00	Dollar 2000
			Best 2008	medium	70.716		21.30	Dollar 2001
			Best 2008	high	69.482		20.90	Dollar 2002
WPRO	Asia	Japan	Fukuda 2005 Female	low				Yen 2002
			Fukuda 2005 Female	medium				Yen 2003
			Fukuda 2005 Female	high				Yen 2004
			Fukuda 2005 Male	low				Yen 2001
			Fukuda 2005 Male	medium				Yen 2001

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
	5000 y/a						
75000 y/y	9999 y/y						
15000 y/y							
	10800	age, residency	1.00				
10800			1.20	1.00	1.30		
	<30000						
>=60000							
		smoking, sedentary lifestyle, body mass index and blood pressure	0.52	0.31	0.92		
			1.00				
			0.89	0.64	0.99		
			1.00				
	1250000	age,marital status, occupation, region	2.03	1.76	2.33		
	2989000		1.34	1.16	1.54		
	6035000		1.00				
	1250000		1.29	1.17	1.43		
	2989000		1.12	1.02	1.23		

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Fukuda 2005 Male	high				Yen 2001
WPRO	Asia	Japan	Fukuda 2007 Female >60 y	low				Yen (2001)
			Fukuda 2007 Female >60 y	high				Yen (2001)
			Fukuda 2007 Female 20-59 y	low				Yen (2001)
			Fukuda 2007 Female 20-59 y	high				Yen (2001)
			Fukuda 2007 Male >60 y	low				Yen (2001)
			Fukuda 2007 Male >60 y	high				Yen (2001)
			Fukuda 2007 Male 20-59 y	low				Yen (2001)
			Fukuda 2007 Male 20-59 y	high				Yen (2001)
SEARO	Asia	Korea	Cho 2004 '90 Male	low			65.90	
			Cho 2004 '90 Male	high			52.90	
			Cho 2004 '92 Male	low			66.60	
			Cho 2004 '92 Male	high			52.30	
			Cho 2004 '94 Male	low			63.70	
			Cho 2004 '94 Male	high			48.40	
			Cho 2004 '96 Male	low			61.60	
			Cho 2004 '96 Male	high			45.70	
			Cho 2004 '98 Male	low			60.40	
			Cho 2004 '98 Male	high			44.30	
SEARO	Asia	Korea	Kim 2006-JPMPH Female	low				Korean Won
			Kim 2006-JPMPH Female	medium				Korean Won

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
	6035000		1.00				
	90	age	1.98	1.56	2.53		
1452			1.00				
	90		2.84	2.50	3.22		
1452			1.00				
	90		1.24	1.08	1.43		
1452			1.00				
	90		1.31	1.20	1.43		
1452			1.00				
0	500000		3.81	2.90	5.01		
1510000	2000000		1.38	1.05	1.81		

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Kim 2006-JPMPH Female	high				Korean Won
SEARO	Asia	Korea	Kim 2006-JPMPH Male	low				Korean Won
			Kim 2006-JPMPH Male	medium				Korean Won
			Kim 2006-JPMPH Male	high				Korean Won
WPRO	Asia	Malaysia	Siahpush 2008† Male	low				USD 2005
			Siahpush 2008 Male	medium				USD 2005
			Siahpush 2008 Male	high				USD 2005
EMRO	Asia	Pakistan	Alam 2008†	low	72	15	21.00	Pakistan Rupees 2004
			Alam 2008	medium	341	61	17.90	Pakistan Rupees 2004
			Alam 2008	high	558	76	13.60	Pakistan Rupees 2004
EMRO	Asia	Pakistan	Khuwaja 2004† Male	low	152	49	32.00	Pakistani rupees
			Khuwaja 2004 Male	medium	80	35	44.00	Pakistani rupees
			Khuwaja 2004 Male	high	164	51	31.00	Pakistani rupees
EMRO	Asia	Pakistan	Nisar 2007	low	124	86	69.3	Rupees 2005
			Nisar 2007	high	33	24	72.7	Rupees 2005
EMRO	Asia	Saudi Arabia	Merdad 2007 Female	low	230		8.7	
			Merdad 2007 Female	high	261		16.5	
SEARO	Asia	South Korea	Khang 2008 Male 30-44 y	low	176329		64.5	
			Khang 2008 Male 30-44 y	high	171338		56.3	
			Khang 2008 Male 45-54 y	low	80601		59.7	

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
>3010000			1.00				
0	500000		1.34	1.18	1.51		
1510000	2000000		1.20	1.09	1.31		
>3010000			1.00				
0	2892		1.064	0.93	1.20		
2893	8677						
8678	more		1.00				
0	<2000	age groups, gender, rural/ urban residence and educational level	1.00	0.42	2.00		
3500	4999		0.90				
<=9000	>9000		1.00				
<5000		age	0.91	0.59	1.67		
5000	10000						
	>10000		1.00				
	2000						
2000							
	<5000						
>20000							

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Khang 2008 Male 45-54 y	high	78684		48.4	
			Khang 2008 Male 55-64 y	low	32467		53.5	
			Khang 2008 Male 55-64 y	high	35958		41.9	
SEARO	Asia	Thailand	Siahpush 2008† Thai Male	low				USD 2005
			Siahpush 2008 Thai Male	medium				USD 2005
			Siahpush 2008 Thai Male	high				USD 2005
WPRO	Asia	Vietnam	Van Kinh 2006 Male	low			56.32	Vietnamese Dong (VND) 1997-8
WPRO	Asia	Vietnam	Van Kinh 2006 Male	medium			52.60	Vietnamese Dong (VND) 1997-8
			Van Kinh 2006 Male	high			45.36	Vietnamese Dong (VND) 1997-8
PAHO	Central America	Mexico	Anaya Ocampo 2006† Female	low	510	11		
			Anaya Ocampo 2006 Female	medium	743	26		
			Anaya Ocampo 2006 Female	high	442	46		
			Anaya Ocampo 2006 Male	low	157	24		
			Anaya Ocampo 2006 Male	medium	508	32		
			Anaya Ocampo 2006 Male	high	208	53		
PAHO	Central America	Mexico	Bird 2007	low	177		35.60	Mexican Peso 2000
			Bird 2007	medium	151		22.50	Mexican Peso 2000
			Bird 2007	high	178		19.70	Mexican Peso 2000

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
0	2892		0.855	0.76	0.95		
2893	8677						
8678	more		1.00				
		socioeconomic factors including education, employment, income, family structure, location, and living standards				11.91	
						11.44	
						10.40	
			0.74	0.26	1.69		
			1.00				
			2.857	1.33	7.69		
			1.00				
0	10000		0.55				
10001	25000		0.64				
25000	more		1.00				

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
PAHO	Central America	Mexico	Sesma-Vázquez 2002 1992	low				
			Sesma-Vázquez 2002 1992	medium				
			Sesma-Vázquez 2002 1992	high				
			Sesma-Vázquez 2002 1994	low				
			Sesma-Vázquez 2002 1994	medium				
			Sesma-Vázquez 2002 1994	high				
			Sesma-Vázquez 2002 1996	low				
			Sesma-Vázquez 2002 1996	medium				
			Sesma-Vázquez 2002 1996	high				
			Sesma-Vázquez 2002 1998	low				
			Sesma-Vázquez 2002 1998	medium				
			Sesma-Vázquez 2002 1998	high				
PAHO	Central America	Mexico	Smith 2007	low			14.80	Peso (US$1=9.47 pesos in 2000).
			Smith 2007	medium			17.40	Peso (US$1=9.47 pesos in 2000).
			Smith 2007	high			20.00	Peso (US$1=9.47 pesos in 2000).
PAHO	Central America	Mexico	Vázquez-Segovia 2002† 84-92	low	4.532.082	498529	11.00	
			Vázquez-Segovia 2002 84-92	high	4.573.604	1225726	26.80	
			Vázquez-Segovia 2002 94-00	low	8.485.237	509114	6.00	
			Vázquez-Segovia 2002 94-00	high	8.519.918	1133149	13.30	
EURO	Europe	Albania	Shapo 2003† Female	low			19.3	USD 2000

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
			.				
			.				
			.				
			.				
			.				
			.				
			.				
		age, gender, marital status, and household size					
		gender & education of the head of household, alcohol use, year of other survey	0.36	0.36	0.36		
			1.00				
			0.43	0.40	0.44		
			1.00				
0	1200	age, education, employment, gender	1.250	0.50	3.13		

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Shapo 2003 Female	medium			17.2	USD 2000
			Shapo 2003 Female	high			24.3	USD 2000
EURO	Europe	Albania	Shapo 2003 Male	low			36.1	USD 2000
			Shapo 2003 Male	medium			43.2	USD 2000
			Shapo 2003 Male	high			34.5	USD 2000
EURO	Europe	Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine	Pomerleau 2004† Female	low	4.319		8.50	
			Pomerleau 2004 Female	medium	5.135		9.20	
			Pomerleau 2004 Female	high	889		10.70	
			Pomerleau 2004 Male	low	2.946		57.80	
			Pomerleau 2004 Male	medium	4.127		55.00	
			Pomerleau 2004 Male	high	795		52.50	
EURO	Europe	Belaruse	Gilmore 2001 Female	low		185	11.40	
			Gilmore 2001 Female	medium		145	9.00	
			Gilmore 2001 Female	high		235	8.10	
			Gilmore 2001 Male	low		129	59.70	
			Gilmore 2001 Male	medium		117	54.70	
			Gilmore 2001 Male	high		208	50.20	
EURO	Europe	Estonia	Parna 2002 Female	low	495		26.2626	Euro 1999
			Parna 2002 Female	high	572		25.3497	Euro 1999

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
1200	2400						
2400			1.00	0.32	2.00		
0	1200		1.429	0.72	2.86		
1200	2400						
2400		age, education, employment, gender	1.00				
		age, gender, area of residence, marital status, religion, educational level, lack of social support	1.176	0.82	1.69		
			1.00				
			1.429	1.12	1.79		
			1.00				
		age/social position	1.25	0.50	3.13		
			1.34	0.55	3.29		
			1.00				
			1.32	0.67	2.59		
			0.89	0.49	1.62		
			1.00				
0	807.7	gender, age, type of residence, ethnicity, marital status, education, income level, employment	0.97	0.70	1.36		
807.7			1.00				

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Parna 2002 Male	low	395		64.3038	Euro 1999
			Parna 2002 Male	high	594		55.2189	Euro 1999
EURO	Europe	Estonia, Lithuania, Latvia	Pudule 1999† Female	low				
			Pudule 1999 Female	high				
			Pudule 1999 Male	low				
			Pudule 1999 Male	high				
EURO	Europe	Europe	Schaap 2008	low				Income/House size
			Schaap 2008	medium				Income/House size
			Schaap 2008	high				Income/House size
EURO	Europe	Finland	Paavola Meri 2004 1978	low			4.00	
EURO			Paavola Meri 2004 1978	high			4.00	
			Paavola Meri 2004 1980	low			24.00	
			Paavola Meri 2004 1980	high			19.00	
			Paavola Meri 2004 1986	low			36.00	
			Paavola Meri 2004 1986	high			31.00	
			Paavola Meri 2004 1993	low			34.00	
			Paavola Meri 2004 1993	high			26.00	
EURO	Europe	Finland	Virtanen 2007 Female 1-19 cig	low				Euro 2000-01
			Virtanen 2007 Female 1-19 cig	medium				Euro 2000-01
			Virtanen 2007 Female 1-19 cig	high				Euro 2000-01
			Virtanen 2007 Female 20+ cig	low				Euro 2000-01

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
0	807.7		1.00	0.67	1.49		
807.7			1.00				
		age, gender, education,country	0.95	0.66	1.39		
			1.00				
			1.41	2.33	0.598		
			1.00				
		education, occupation, activity,poverty, house owner	0.95	0.91	0.99		
			0.94	0.91	0.98		
			1.00				
21405	29865	age and occupational status, stratified by gender	1.23	1.05	1.45		
29888	44 080		1.08	0.94	1.24		
44 126	150 297		1.00				
21405	29865		1.58	1.05	2.39		

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Virtanen 2007 Female 20+ cig	medium				Euro 2000-01
			Virtanen 2007 Female 20+ cig	high				Euro 2000-01
			Virtanen 2007 Female CS	low				Euro 2000-01
			Virtanen 2007 Female CS	medium				Euro 2000-01
			Virtanen 2007 Female CS	high				Euro 2000-01
EURO	Europe	Finland	Virtanen 2007 Male 1-19 cig	low				Euro 2000-01
			Virtanen 2007 Male 1-19 cig	medium				Euro 2000-01
			Virtanen 2007 Male 1-19 cig	high		193		Euro 2000-01
			Virtanen 2007 Male 20+ cig	low				Euro 2000-01
			Virtanen 2007 Male 20+ cig	medium				Euro 2000-01
			Virtanen 2007 Male 20+ cig	high		193		Euro 2000-01
			Virtanen 2007 Male CS	low				Euro 2000-01
			Virtanen 2007 Male CS	medium				Euro 2000-01
			Virtanen 2007 Male CS	high		193	19.3	Euro 2000-01
EURO	Europe	Finland	Laaksonen 2003 Female	low			22.0	
			Laaksonen 2003 Female	medium			20.0	
			Laaksonen 2003 Female	high			15.0	
			Laaksonen 2003 Male	low			41.0	
			Laaksonen 2003 Male	medium			31.0	
			Laaksonen 2003 Male	high			22.0	
EURO	Europe	Finland	Laaksonen 2005 Female	low	1.148		29.0	

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
29888	44 080		1.23	0.86	1.77		
44 126	150 297		1.00				
21405	29865		1.25	1.06	1.48		
29888	44 080		1.08	0.94	1.24		
44 126	150 297		1.00				
21405	29865		1.40	1.11	1.76		
29888	44 080		1.19	0.96	1.48		
44 126	150 297		1.00				
21405	29865		1.89	1.35	2.64		
29888	44 080		1.15	0.83	1.59		
44 126	150 297		1.00				
21405	29865		1.56	1.27	1.91		
29888	44 080		1.18	0.97	1.42		
44 126	150 297		1.00				
			1.30	1.07	1.59		
			1.13	0.95	1.34		
			1.00				
			1.36	1.14	1.61		
			1.11	0.95	1.30		
			1.00				
		age, marital status	1.58	1.28	1.95		

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Laaksonen 2005 Female	high	1.386		17.0	
			Laaksonen 2005 Male	low	327		39.0	
			Laaksonen 2005 Male	high	293		21.0	
EURO	Europe	Finland	Rahkonen 2004 Female	low			29	HOUSEHOLD EQUIVALENT
			Rahkonen 2004 Female	high			17	
			Rahkonen 2004 Male	low			39	
			Rahkonen 2004 Male	high			23	
EURO	Europe	France	La Rosa 2004	low	757	420		EUR1998
			La Rosa 2004	high	1.052	450		EUR1998
EURO	Europe	Germany	Rathman 2006 Female	low	280	21	7.4	
			Rathman 2006 Female	medium	376	46	12.3	
			Rathman 2006 Female	high	50	8	15.5	
			Rathman 2006 Male	low	166	39	23.4	
			Rathman 2006 Male	medium	449	73	16.2	
			Rathman 2006 Male	high	148	21	14.3	
EURO	Europe	Netherlands	Reijneveld 2002	low				Mean income in quartiers
EURO	Europe	Netherlands	Reijneveld 2002	medium				Mean income in quartiers
			Reijneveld 2002	high				Mean income in quartiers
EURO	Europe	Poland	Kaleta 2007†	low				Euro 2006
			Kaleta 2007	medium				Euro 2006

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
			1.00				
			2.04	1.39	3.00		
			1.00				
0	10080						
10080							
		city, age, gender, educational level	1.36	1.26	1.46		
			1.15	1.06	1.23		
			1.00				
	124	age/education	0.855	0.72	3.13		
125	249						

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Kaleta 2007	high				Euro 2006
EURO	Europe	Spain	De Onis 1991 Female 16-24	low			41.20	Pesetas 1987
			De Onis 1991 Female 16-24	medium			47.50	Pesetas 1987
			De Onis 1991 Female 16-24	high			56.70	Pesetas 1987
			De Onis 1991 Female 25-44	low			26.50	Pesetas 1987
			De Onis 1991 Female 25-44	medium			32.50	Pesetas 1987
			De Onis 1991 Female 25-44	high			39.70	Pesetas 1987
			De Onis 1991 Female 45-65	low			2.50	Pesetas 1987
			De Onis 1991 Female 45-65	medium			5.90	Pesetas 1987
			De Onis 1991 Female 45-65	high			9.00	Pesetas 1987
			De Onis 1991 Female 65+	low			1.30	Pesetas 1987
			De Onis 1991 Female 65+	medium			2.20	Pesetas 1987
			De Onis 1991 Female 65+	high			0.60	Pesetas 1987
EURO	Europe	Spain	Silvestre Garcia 1990	low		91	32	Pesetas
			Silvestre Garcia 1990	high		83	44	Pesetas
EURO	Europe	Sweden	Pudaric 2000 Female	low				
			Pudaric 2000 Female	medium				
			Pudaric 2000 Female	high				
			Pudaric 2000 foreign	low	103	19	18.20	
			Pudaric 2000 foreign	medium	70	15	22.10	

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
249				1.00			
	599999						
600000	1200000						
1200001							
	599999						
600000	1200000						
1200001							
	599999						
600000	1200000						
1200001							
	599999						
600000	1200000						
1200001							
600000		age	0.67	0.40	1.12		
1800000			1.00				
			1.02	0.72	1.46		
			0.99	0.68	1.42		
			1.00				

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Pudaric 2000 foreign	high	80	18	21.90	
			Pudaric 2000 Male	low				
			Pudaric 2000 Male	medium				
			Pudaric 2000 Male	high				
			Pudaric 2000 swedes	low	920	304	33.00	
EURO	Europe	Sweden	Pudaric 2000 swedes	medium	967	249	25.70	
			Pudaric 2000 swedes	high	970	315	32.50	
EURO	Europe	Sweeden	Ekberg-Aronsson 2006 Female	low			39.00	We have aggregated groups 1 and 2 (low SES) and
			Ekberg-Aronsson 2006 Female	high			33.00	We have aggregated groups 1 and 2 (low SES) and
			Ekberg-Aronsson 2006 Male	low		3807	55.00	We have aggregated groups 1 and 2 (low SES) and
			Ekberg-Aronsson 2006 Male	high		3033	44.00	We have aggregated groups 1 and 2 (low SES) and
EURO	Europe	Turkey	Keles 2003 Female	low	319		11.3	USD 1990
			Keles 2003 Female	medium	339		17.2	USD 1990
			Keles 2003 Female	high	82		31.6	USD 1990
			Keles 2003 Male	low	272		57.40	USD 1990
			Keles 2003 Male	medium	324		60.10	USD 1990
			Keles 2003 Male	high	60		52.60	

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
			1.50	1.02	2.22		
			1.17	0.89	1.53		
			1.00				
			.				
		age, marital status					
	1824						
1824	11400						
11400							
	1824						
1824	11400						
11400							

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
PAHO	North America	Canada	Anonimous 2000 Male	low			38.00	
PAHO	North America	Canada	Anonimous 2000 Male	high			21.00	
PAHO	North America	Canada	Birch 2000	low	13203	5041		Canadian $, 1991
			Birch 2000	high	8643	2683		Canadian $, 1992
PAHO	North America	Canada	Choiniere 2000 Female	low			34.00	
			Choiniere 2000 Female	medium			27.00	
			Choiniere 2000 Female	high			19.00	
			Choiniere 2000 Male	low			40.00	
			Choiniere 2000 Male	medium			28.00	
			Choiniere 2000 Male	high			22.00	
PAHO	North America	Canada	Mao 2001 Female	low		704	27.80	U$ dollars, 1995
			Mao 2001 Female	high		363	14.30	U$ dollars, 1995
			Mao 2001 Male	low		548	21.60	U$ dollars, 1995
			Mao 2001 Male	high		458	18.00	U$ dollars, 1995
PAHO	North America	Canada	Millar 2004 Female	low			30.00	
			Millar 2004 Female	high			8.00	
PAHO	North America	Canada	Millar 2007	low	3.817		35.00	
			Millar 2007	high	8.471		19.00	
PAHO	North America	Canada	Pomerleau 1997	low	1037			Can $
			Pomerleau 1997	medium	3123			Can $
			Pomerleau 1997	high	3613			Can $

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
						17.4	
						17	
0	40000						
40001	>40001						
	20000-30000						
50000-100000	50000-100000						
	20000-30000						
50000-100000							
		age, gender, education,marital status, source of income, occupational prestige	1.84	1.57	2.16		
			1.33	1.19	1.49		
			1.00				

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
PAHO	North America	Canada	Seguin 2003 Female	low	339	118	34.81	$canadienses
			Seguin 2003 Female	medium	261	77	29.50	$canadienses
			Seguin 2003 Female	high	1576	335	21.26	$canadienses
PAHO	North America	Canada	Wister 1996[†] 25-44 y	low				Canadian dollars
			Wister 1996 25-44 y	medium				Canadian dollars
			Wister 1996 25-44 y	high				Canadian dollars
PAHO	North America	Canada	Wister 1996 45-64 y	low				Canadian dollars
			Wister 1996 45-64 y	medium				Canadian dollars
			Wister 1996 45-64 y	high				Canadian dollars
			Wister 1996 65+ y	low				Canadian dollars
			Wister 1996 65+ y	medium				Canadian dollars
			Wister 1996 65+ y	high				Canadian dollars
PAHO	North America	Samoa-Hawai-Los Angeles	Mishra 2005	low	1021	291		USD 1996
			Mishra 2005	high	568	384		USD 1996
PAHO	North America	United States	Fagan 2007 b	low	10.326	3150		USD 2003
			Fagan 2007 b	medium	9.848	2380		USD 2003
			Fagan 2007 b	high	10.716	1761		USD 2003
			Fagan 2008-NTR	low	5.640	2640		USD 1998-2002

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
27063	more						
16238	27063						
less	16238						
0	20000	education, income, and labour force status, gender, marital status, activity restriction, stress, occupational health promotion	1.68	1.38	2.05		
20000	39999						
40000			1.00				
0	20000		1.65	1.28	2.13		
20000	39999						
40000			1.00				
0	20000		1.65	0.93	2.91		
20000	39999						
40000			1.00				
	<20000						
>20000							
	<25000						
25000	49000						
	>=50000						
	<25000	gender, race/ethnicity, education, income, marital status, and occupation.	2.13	1.85	2.46		

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Fagan 2008-NTR	medium	3.548	1324		
			Fagan 2008-NTR	high	3.098	783		
PAHO	North America	United States	Friis 2006	low	78	10		USD 2004
			Friis 2006	medium	26	6		USD 2004
			Friis 2006	high	60	5		USD 2004
PAHO	North America	United States	McWhorter 1990	low	1.057	371		USD 1971-75
			McWhorter 1990	high	1.324	478		USD 1971-75
PAHO	North America	United States	Scholes 1992	low	112	42		USD 1984-85
			Scholes 1992 Female	medium	169	52		USD 1984-85
			Scholes 1992 Female	high	142	37		USD 1984-85
PAHO	North America	USA	Abma 1991 Female	low				
			Abma 1991 Female	medium				
			Abma 1991 Female	high				U$
PAHO	North America	USA	Abraido Lanza 2005†	low				U$
			Abraído Lanza 2005	high				U$
PAHO	North America	USA	Acevedo-Garcia 2005†	low	56.037		25.26	u$s 2000-2001
			Acevedo-Garcia 2005	high	29.203		13.17	u$s 2000-2001
PAHO	North America	USA	Ahrens 2005 Female	low			25.00	USD 2003
			Ahrens 2005 Female	high			13.00	USD 2003
PAHO	North America	USA	Ahrens 2005 Male	low			32.00	USD 2003

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
25000	49000		1.59	1.34	1.89		
	>=50000		1.00				
	9999						
10000	19999						
20000							
	<6000						
>15000							
	<15000						
15000	30000						
>30000							
	10000	gender, age, race/ethnicity, mother education, child's father present	1.60				
10000	20000		1.28				
20000			1.00				
<1000	>50000	age, race, both genders	1.01	1.00	1.02		
<1000	>50000		1.00				
0	11250	age,gender, race, education, occupation, place of residence	2.13	2.22	2.22		
31820			1.00				
10000	15000	unadjusted				14	
75000 o -	>75000					11	
10000	15000					18	

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Ahrens 2005 Male	high			13.00	USD 2003
PAHO	North America	USA	Conwell 2003 heavy smokers	low	253		13.70	U$D, 1995
			Conwell 2003 heavy smokers	high	253		27.80	U$D, 1995
			Conwell 2003 light smokers	low	341		14.00	U$D, 1995
			Conwell 2003 light smokers	high	341		29.20	U$D, 1995
PAHO	North America	USA	Coreil 1991 20-39 Female	low	1026	248	24.20	
			Coreil 1991 20-39 Male	low	922	391	42.40	
			Coreil 1991 40-64 Female	low	724	193	26.60	
			Coreil 1991 40-64 Male	low	584	264	45.20	
			Coreil 1991 65-74 Female	low	120	23	19.20	
			Coreil 1991 65-74 Male	low	88	36	41.20	
PAHO	North America	USA	Delva 2005	low			45.00	u$s 2002-2003
			Delva 2005	high			37.40	u$s 2002-2003
PAHO	North America	USA	Diez-Roux 1999	low	216		M: 9.4% F: 21.7%	u$s 1992-1994
			Diez-Roux 1999	high	132		M: 2.5 F: 7.4%	u$s 1992-1994
PAHO	North America	USA	Fagan 2007	low		3150	28.15	US 2003
			Fagan 2007	medium		2380	23.57	US 2003
			Fagan 2007	high		1761	16.12	US 2003
PAHO	North America	USA	Green 2007 18-34 y	low				USD
			Green 2007 18-34 y	medium				USD

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
75000 o -	>75000					13	
0	<15999						
16000	>16000						
0	<15999						
16000	>16000						
		all strata vs high stratum	1.02	1.00	1.05		
			1.04	1.02	1.07		
			1.01	0.98	1.03		
			1.01	0.98	1.05		
			1.01	0.94	1.09		
			1.01	0.89	1.15		
0	10000					9.2	7,7
30000	39999					9.1	7,5
0	7000	age, gender	3.70	1.60	8.90		
30000			1.00				
	25000						
25000	49000						
50000							
	19999	age, education, gender, occupation, annual household income	1.77	1.64	1.91		
20000	49999		1.43	1.34	1.53		

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Green 2007 18-34 y	high				USD
PAHO	North America	USA	Green 2007 adult educated	low		5687	18	USD
			Green 2007 adult educated	medium		4960	15.7	USD
			Green 2007 adult educated	high		2843	9	USD
			Green 2007 adult not college educated	low		9888	31.3	USD
			Green 2007 adult not college educated	medium		8783	27.8	USD
			Green 2007 adult not college educated	high		7582	24	USD
			Green 2007 young educated	low		3118	18.7	USD
			Green 2007 young educated	medium		2443	14.9	USD
			Green 2007 young educated	high		1817	10.9	USD
			Green 2007 young not college educated	low		5752	34.5	USD
			Green 2007 young not college educated	high		3935	24	USD
			Green 2007 young not college educated	medium		5099	31.1	USD
PAHO	North America	USA	Kahn 2005 Female	low				
			Kahn 2005 Female	high				
PAHO	North America	USA	Kanjilal 2008	low			37.4	
			Kanjilal 2008	high			13.9	
PAHO	North America	USA	Kesteloot 2003 Female	low	13917		30.70	USA dollars 1997

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
50000			1.00				
	19999						
20000	49999						
50000							
	19999						
20000	49999						
50000							
	19999						
20000	49999						
50000							
	19999						
50000							
20000	49999						
		SES, race, maternal age, ethnicity	2.80	1.70	4.70		
			1.00				
	<1.6						
>5.0							
	Below P	age					

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Kesteloot 2003 Female	high	26188		16.30	USA dollars 1997
			Kesteloot 2003 Male	low	11175		38.20	USA dollars 1997
			Kesteloot 2003 Male	high	21047		20.30	USA dollars 1997
PAHO	North America	USA	Kiefe 2001 Female	low				
			Kiefe 2001 Female	medium				
			Kiefe 2001 Female	high				
			Kiefe 2001 Male	low				
			Kiefe 2001 Male	medium				
			Kiefe 2001 Male	high				
PAHO	North America	USA	Kiefe 1998	low	1333		39.00	U$ dollars, 1992
			Kiefe 1998	medium	1456		24.00	U$ dollars, 1992
			Kiefe 1998	high	1208		15.00	U$ dollars, 1992
PAHO	North America	USA	Kim 2006 Female	low	1245	647	51.97	U$ dollars, 1995
			Kim 2006 Female	medium	812	462	56.90	U$ dollars, 1995
			Kim 2006 Female	high	640	327	51.09	U$ dollars, 1995
PAHO	North America	USA	King 1999†	low	5741	2055	35.8	USD 1990
			King 1999	high	2260	493	21.8	USD 1990
PAHO	North America	USA	Lantz 1998	low			37.7	USD 1986-1994
			Lantz 1998	medium			34.2	USD 1986-1994
			Lantz 1998	high			27.4	USD 1986-1994

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
More than 4P							
	Below P						
More than 4P							
	25 000 us/y	age	0.93	0.43	2.03		
25 000 us/y	49999 us/y	age	0.71	0.36	1.40		
50000 us/y			1.00				
	25 000 us/y		2.96	1.41	6.41		
25 000 us/y	49999 us/y		1.94	1.03	3.78		
50000 us/y			1.00	1.00			
	25 000 us/y	age					
25 000 us/y	49999 us/y						
50000 us/y							
<100% poverty level	199%						
200%	399%						
400%							
<15000	>50000	age, gender, education, household income, years in the U.S., nativity, employment status, marital status, and region of residence within the US	1.64	1.30	2.08		
<15000	>50000		1.00				
0	9999						
10000	29999						
30000							

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
PAHO	North America	USA	Lawrence 2007	low	5.391	1585	29.4	USD1998-1999
			Lawrence 2007	high	9.016	2209	24.5	USD1998-1999
PAHO	North America	USA	Luepker 1993 1980-82 Female	low	441	181	41.00	U$
			Luepker 1993 1980-82 Female	medium	897	269	30.00	U$
			Luepker 1993 1980-82 Female	high	373	97	26.00	U$
			Luepker 1993 1980-82 Male	low	199	86	43.00	U$
			Luepker 1993 1980-82 Male	medium	929	307	33.00	U$
			Luepker 1993 1980-82 Male	high	424	110	26.00	U$
			Luepker 1993 1985-87 Female	low	615	215	35.00	U$ ajustado por inflación de 5.23% annual
			Luepker 1993 1985-87 Female	medium	1.111	278	25.00	U$ ajustado por inflación de 5.23% annual
			Luepker 1993 1985-87 Female	high	624	100	16.00	U$ ajustado por inflación de 5.23% annual
PAHO	North America	USA	Luepker 1993 1985-87 Male	low	295	136	46.00	U$ ajustado por inflación de 5.23% annual
			Luepker 1993 1985-87 Male	medium	1.088	305	28.00	U$ ajustado por inflación de 5.23% annual
			Luepker 1993 1985-87 Male	high	804	161	20.00	U$ ajustado por inflación de 5.23% annual
PAHO	North America	USA	Malmstadt 2001	low		426	34.00	USA dollars 1994
			Malmstadt 2001	high		389	15.00	USA dollars 1994

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
0	19999	gender, race/ethnicity, employment status, occupation, geographic region, income, metropolitan status, school enrollment.	1.47	1.33	1.63		
20000			1.00				
less	<20000	none					
20000	44999						
45000	more						
less	<20000						
20000	44999						
45000	more						
less	<20000						
20000	44999	none					
45000	more						
less	<20000						
20000	44999						
45000	more						
0	14999	age					
50000							

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
PAHO	North America	USA	MMRW 1998 (Anonimo 1998-b)	low	154602		31.70	
			MMRW 1998 (Anonimo 1998-b)	high	156940		27.50	
PAHO	North America	USA	Mody† 2006	low			34.80	
			Mody 2006	medium			36.40	
			Mody 2006	high			28.80	
PAHO	North America	USA	Mostashari 2005	low	412000		24.10	U$
			Mostashari 2005	medium	397000		23.50	U$
			Mostashari 2005	high	320000		18.40	U$
PAHO	North America	USA	Novotny 1988 blacks	low	3.291		48.10	
			Novotny 1988 blacks	high	3.291		38.00	
			Novotny 1988 white	low	18.302		43.90	
			Novotny 1988 white	high	18.302		32.30	
PAHO	North America	USA	Rahman 2005 Male	low	196	56		USD2001
			Rahman 2005 Male	high	168	42		USD2001
PAHO	North America	USA	Resnicow 2001 Female	low	80,52	12	14.50	
			Resnicow 2001 Female	high	314,76	21	6.80	
			Resnicow 2001 Male	low	14	4	30.00	U$

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
<=median income						19.24	
	>median income					20.82	
		age, gender, race, education level, marital status, annual household income, BMI, presence of at least one comorbid disease condition	3.45	3.23	3.85		
			0.49				
			1.00				
	25000	age, education, employment, marital status, neighborhood, country, etc.	1.30	1.10	1.60		
25000	50000		1.30	1.10	1.50		
50000			1.00				
		gender, employment, education, marital status, service					
0	50000	length of stay, age, education, income, marital status, behaviour	1.22	0.75	1.97		
50000			1.00				
0	<10000						
>40000	more						
0	<10000						

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Resnicow 2001 Male	high	153	25	16.50	
PAHO	North America	USA	Rogers 1996	low			30.20	USD 1991
			Rogers 1997	high			23.70	USD 1992
PAHO	North America	USA	Ross 2000	low				
			Ross 2000	high				
PAHO	North America	USA	Lowry 1996	low	1.563	388	24.80	u$
			Lowry 1996	medium	1.699	325	19.10	u$
			Lowry 1996	high	2.083	356	17.10	u$
PAHO	North America	USA	Samet 1992† Female	low				
			Samet 1992 Female	medium				
			Samet 1992 Female	high				
			Samet 1992 Male	low				
			Samet 1992 Male	medium				
			Samet 1992 Male	high				
PAHO	North America	USA	Scarinci† 2002	low	1251			U$ (PROMEDIO DEL ZIP)
			Scarinci 2002	medium	1218			U$ (PROMEDIO DEL ZIP)
			Scarinci 2002	high	1344			U$ (PROMEDIO DEL ZIP)
PAHO	North America	USA	Shavers 2005 African Americans	low	2.947	610	20.7	USD 1999
			Shavers 2005 African Americans	medium	3.156	836	26.5	USD 1999

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
>40000	more						
	20000	age, gender, ethnicity, education, income				18.3	
20000						19.4	
Linea de pobreza							
less	<20000						
20000	44999						
45000	more						
	<10000 <high school	age	1.67	10.00	1.427		
Rest people							
>30000> high school			1.00				
	<10000 <high school		1.35	5.56	0.994		
Rest people							
>30000> high school			1.00				
less	<20001	ethnicity	0.23				
20001	26500		0.43				
26500	more		1.00				
0	25000	age , income , education, industry (categorical), occupation , workplace smoking policies	1.17	0.95	1.45		
25000	49999		1.54	1.28	1.85		

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
PAHO			Shavers 2005 African Americans	high	2.183	356	16.3	USD 1999
			Shavers 2005 American Indian / Alaska natives	low	334	110	32.9	USD 1999
			Shavers 2005 American Indian / Alaska natives	medium	371	160	43.2	USD 1999
			Shavers 2005 American Indian / Alaska natives	high	257	61	23.6	USD 1999
	North America	USA	Shavers 2005 Asian American/ Pacific Islanders	low	973	160	16.4	USD 1999
			Shavers 2005 Asian American/ Pacific Islanders	medium	658	135	20.5	USD 1999
			Shavers 2005 Asian American/ Pacific Islanders	high	1.548	167	10.8	USD 1999
			Shavers 2005 Hispanics	low	2.807	502	17.9	USD 1999
			Shavers 2005 Hispanics	medium	3.278	675	20.6	USD 1999
			Shavers 2005 Hispanics	high	1.846	251	13.6	USD 1999
			Shavers 2005 non-Hispanic whites	low	27.476	8023	29.2	USD 1999
			Shavers 2005 non-Hispanic whites	medium	14.475	5674	39.2	USD 1999
			Shavers 2005 non-Hispanic whites	high	39.178	7091	18.1	USD 1999
PAHO	North America	USA	Shelley 2006 Female	low	163	28		USD 2003
			Shelley 2006 Female	high	211	47		USD 2003
			Shelley 2006 Male	low	206	27		USD 2003

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
50000			1.00				
0	25000		1.46	0.86	2.46		
25000	49999		1.84	1.04	3.27		
50000			1.00				
0	25000		1.95	1.41	2.69		
25000	49999		1.19	0.71	2.00		
50000			1.00				
0	25000		1.27	1.06	1.52		
25000	49999		1.49	1.23	1.82		
50000			1.00				
0	25000		1.40	1.33	1.48		
25000	49999		1.92	1.81	2.03		
50000			1.00				
0	10000	age, education, employment, gender, other					
40000	more						
0	10000						

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Shelley 2006 Male	high	375	89		USD 2003
PAHO	North America	USA	Siegel 1996	low	776		43.00	u$s 1998-2000
			Siegel 1996	high	106		29.00	u$s 1998-2000
PAHO	North America	USA	Tomar 2000 Female	low	2.365	764	3.3	USD 1988-94
			Tomar 2000 Female	medium	2.275	628	27.6	USD 1988-94
			Tomar 2000 Female	high	1.893	373	19.7	USD 1988-94
			Tomar 2000 Male	low	1.829	797	43.6	USD 1988-94
			Tomar 2000 Male	medium	2.126	721	33.9	USD 1988-94
			Tomar 2000 Male	high	1.945	478	24.6	USD 1988-94
PAHO	North America	USA	Unger 2007	low			23.00	US$ 2002
PAHO	North America	USA	Unger 2007	medium			21.00	US$ 2002
			Unger 2007	high			10.00	US$ 2002
PAHO	North America	USA	Watson 2003 Female	low		44	31.88	u$s 1994-97
			Watson 2003 Female	medium		62	44.93	u$s 1994-97
			Watson 2003 Female	high		32	23.19	u$s 1994-97

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
40000	more						
0	11999						
	1,35						
1,35	2,99						
3							
	1,35						
1,35	2,99						
3							
		age, gender, ethnicity (Asian vs. White, Hispanic vs. White, other ethnicity vs. White), friends' smoking, parents' smoking, parental monitoring, SES scale, spending money, perceived ability to afford basic necessities, perceived wealth relative to others, perceived wealth relative to last year					
0	20000	age, body mass index (BMI), kilocalories per kilogram body weight, fat, alcohol, and caffeine per 1000 kcal intake, income, education, and occupation,	2.01	0.99	4.05		
20000	40000		2.70	1.41	5.18		
40000			1.00				

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
PAHO	North America	USA	Webb 2008† G1 Female	low	220		43.17	u$s 1999
			Webb 2008 G1 Female	medium	35		54.76	u$s 1999
			Webb 2008 G1 Female	high	8		25.00	u$s 1999
PAHO	North America	USA	Webb 2008 G2 Female	low	220		6.36	u$s 1999
			Webb 2008 G2 Female	medium	35		0.91	u$s 1999
			Webb 2008 G2 Female	high	8		0.00	u$s 1999
			Webb 2008 G3 Female	low	220		23.18	u$s 1999
			Webb 2008 G3 Female	medium	35		0.91	u$s 1999
			Webb 2008 G3 Female	high	8		0.00	u$s 1999
PAHO	North America	USA	Wee 2001	low	807		30.00	u$s 2000
			Wee 2001	medium	2174		26.93	u$s 2000
			Wee 2001	high	754		18.00	u$s 2000
PAHO	North America	USA	Winkleby 1992 Female	low	168		32.00	u$s 1979-90
			Winkleby 1992 Female	medium	326		24.00	u$s 1979-91
			Winkleby 1992 Female	high	226		19.00	u$s 1979-92
			Winkleby 1992 Male	low	69		50.00	u$s 1979-87
			Winkleby 1992 Male	medium	295		31.00	u$s 1979-88
			Winkleby 1992 Male	high	283		25.00	u$s 1979-89
PAHO	North America	USA	Kahn 2002 Female	low		2614	39.40	USD 1988

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
0	9588	age, education, monthly income, number of children, perceived stress, anger, current alcohol use, drinking intensity, frequency of heavy drinking	2.17	1.52	3.13		
9600	19188						
19200			1.00				
0	9588		2.56	1.35	5.00		
9600	19188						
19200			1.00				
0	9588		3.70	2.22	6.25		
9600	19188						
19200			1.00				
0	14999	age, education					
15000	49999						
50000							
0	10000						
20000	29999						
40000							
0	10000						
20000	29999						
40000							
<10000		SES, age	1.90	1.40	2.70	15	

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Kahn 2002 Female	medium		1846	30.70	USD 1988
			Kahn 2002 Female	high		890	16.80	USD 1988
PAHO	North America	USA California	Gilpin 1990	low		0	4.40	USD 1990
			Gilpin 1990	medium		0	5.20	USD 1990
			Gilpin 1990	high		0	5.40	USD 1990
			Gilpin 1996	low		0	5.50	USD 1996
			Gilpin 1996	medium		0	7.70	USD 1996
			Gilpin 1996	high		0	13.10	USD 1996
WPRO	Oceania	Australia	Lawlor 2005	low			18.6	AU$1995-98
			Lawlor 2005	high			12.9	AU$1995-98
WPRO	Oceania	Australia	Najman 1998† 3-5 days after birth	low				Australian dollar, 1981-89
			Najman 1998 3-5 days after birth	high				Australian dollar, 1981-89
			Najman 1998 5 year f-up	medium				Australian dollar, 1981-89
			Najman 1998 5 year f-up	high				Australian dollar, 1981-89
WPRO	Oceania	Australia	Najman 1998 5 year f-up	low				Australian dollar, 1981-89
			Najman 1998 6 month f-up	low				Australian dollar, 1981-89
			Najman 1998 6 month f-up	medium				Australian dollar, 1981-89
			Najman 1998 6 month f-up	high				Australian dollar, 1981-89
			Najman 1998 at first clinic visit	low				Australian dollar, 1981-89
			Najman 1998 at first clinic visit	medium				Australian dollar, 1981-89
			Najman 1998 at first clinic visit	high				Australian dollar, 1981-89

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
10000	49,999		1.50	1.10	2.00	15	
50000			1.00	1.00		15	
	20000						
20000	50000						
50000							
	20000						
20000	50000						
50000							
0	25998						
25999							
		age, marital status	1.19				
		age, marital status	1.00				
			1.23				
			1.00				
			1.36				
			1.09				
			1.08				
			1.00				
			1.22				
			1.18				
			1.00				

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Najman 1998 Before pregnancy	low	285	177		Australian dollar, 1981-89
			Najman 1998 Before pregnancy	medium	4.228	1936		Australian dollar, 1981-89
			Najman 1998 Before pregnancy	high	565	219		Australian dollar, 1981-89
			Najman 1998 3-5 days after birth	medium				Australian dollar, 1981-89
WPRO	Oceania	Australia	Najman 2006 - (2001) Female	low			25.10	Australian dollar, 1990
			Najman 2006 - (2001) Female	medium			24.00	Australian dollar, 1990
			Najman 2006 - (2001) Female	high			17.00	Australian dollar, 1990
			Najman 2006 - (2001) Male	low			35.00	Australian dollar, 1990
			Najman 2006 - (2001) Male	medium			29.40	Australian dollar, 1990
			Najman 2006 - (2001) Male	high			19.40	Australian dollar, 1990
			Najman 2006 - (1990) Female	low			24.60	Australian dollar, 1990
			Najman 2006 - (1990) Female	medium			28.60	Australian dollar, 1990
WPRO	Oceania	Australia	Najman 2006 - (1990) Female	high			19.40	Australian dollar, 1990
			Najman 2006 - (1990) Male	low			37.20	Australian dollar, 1990

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
			1.09				
			1.05				
			1.00				
			1.18				
Q1		age, marital status					
Q3							
Q5							
Q1							
Q3							
Q5							
Q1							
Q3							
Q5							
Q1							

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Najman 2006 - (1990) Male	medium			32.50	Australian dollar, 1990
			Najman 2006 - (1990) Male	high			25.70	Australian dollar, 1990
			Najman 2006 - (1995) Female	low			24.50	Australian dollar, 1990
			Najman 2006 - (1995) Female	medium			22.60	Australian dollar, 1990
			Najman 2006 - (1995) Female	high			17.90	Australian dollar, 1990
			Najman 2006 - (1995) Male	low			33.50	Australian dollar, 1990
			Najman 2006 - (1995) Male	medium			29.20	Australian dollar, 1990
			Najman 2006 - (1995) Male	high			23.20	Australian dollar, 1990
WPRO	Oceania	Australia	Siahpush 2001 Female	low			25.6	
			Siahpush 2001 Female	medium			22.9	
			Siahpush 2001 Female	high			17.8	
			Siahpush 2001 Male	low			34.2	
			Siahpush 2001 Male	medium			31.1	
			Siahpush 2001 Male	high			21.9	
WPRO	Oceania	Australia	Siahpush 2002-ANZ Living alone	low			23.7	
			Siahpush 2002-ANZ Living alone	medium			18.1	

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
Q3							
Q5							
Q1							
Q3							
Q5							
Q1							
Q3							
Q5							
		age, marital status, region, country of birth, IRDS, education	1.43	1.26	1.63		
			1.23	1.09	1.40		
			1.00				
			1.53	1.37	1.72		
			1.46	1.31	1.64		
			1.00				
		education, source of income, type of occupancy, IRSD, age					

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Siahpush 2002-ANZ Living alone	high			15.1	
			Siahpush 2002-ANZ Lone mothers	low			54.8	
			Siahpush 2002-ANZ Lone mothers	medium			45.2	
			Siahpush 2002-ANZ Lone Mothers	high			31.6	
			Siahpush 2002-ANZ Mothers with partners	low			19	
			Siahpush 2002-ANZ Mothers with partners	medium			15.2	
			Siahpush 2002-ANZ Mothers with partners	high			12	
			Siahpush 2002-ANZ Other Female	low			26.1	
			Siahpush 2002-ANZ Other Female	medium			21.1	
			Siahpush 2002-ANZ Other Female	high			15.6	
WPRO	Oceania	Australia	Siahpush 2003-JECH	low			32.9	
WPRO	Oceania	Australia	Siahpush 2003-JECH	medium			33.6	
			Siahpush 2003-JECH	high			32.8	
WPRO	Oceania	Australia	Siahpush 2006-SCM	low	464	90	19.40	?

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
			1.5	1.3	1.7		
			1.2	1.1	1.4		
			1.00				
		number of persons aged >15, number of men aged >18, age of head of household.	0.96	0.41	2.24		
			0.82	0.01	57.26		
			1.00				
0	41600						

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
			Siahpush 2006-SCM	medium	967	215	22.20	?
			Siahpush 2006-SCM	high	887	177	20.00	?
WPRO	Oceania	Australia	Thomas 2008†	low			42.50	
			Thomas 2008	medium			28.20	
			Thomas 2008	high			29.30	
WPRO	Oceania	New Zealand	Erick-Peleti 2007† Female	low		84	23.10	$NZ 2000
			Erick-Peleti 2007 Female	medium		93	37.30	$NZ 2000
			Erick-Peleti 2007 Female	high		10	25.60	$NZ 2000
WPRO	Oceania	New Zealand	Metcalf 2007	low	284			New Zealand $ 1990
			Metcalf 2007	high	2.687			New Zealand $ 1990
WPRO	Oceania	New Zealand	Metcalf 2008	low	1.211			New Zealand $ 2002
			Metcalf 2008	high	982			New Zealand $ 2002
WPRO	Oceania	New Zealand	Whitlock 1997	low			27.00	NZ dollars 1991
			Whitlock 1997	medium			23.00	NZ dollars 1991
			Whitlock 1997	high			15.00	NZ dollars 1991
WPRO	Oceania	Australia	Stewart 2008 Australia	low			11.00	
			Stewart 2008 Australia	medium			9.00	
			Stewart 2008 Australia	high			9.00	
WPRO	Oceania	Australia	Turrell 2002	low	251		F: 40.6 Male: 47.8	Australian $ 1995
			Turrell 2002	medium	766		F: 22.2 Male: 32.0	Australian $ 1995
			Turrell 2002	high	239		F: 16.1 Male: 26.4	Australian $ 1995

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
41600	129948						
129948	more						
		age, gender	2.500	1.96	3.18		
			1.00				
	7200	age	0.870	0.41	1.85		
14448	21600						
28848			1.00				
	<20000	age, gender, ethnicity	1.82	1.38	2.39		
>40000			1.00				
	<30000		1.94	1.38	2.73		
>70000			1.00				
15000	32000	age-gender				12	11,1-13,1
32000	45000					12	10,6-12,5
45000	69000					11	10,5-12,4
0	22499	age, age left school, highest post-school qualification, occupation, family income	2.02	1.17	3.49		
22500	54999		1.11	0.71	1.72		
55000			1.00				

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
WPRO	Oceania	New Zealand	Butler 2004 Female	low	159	36	22.60	NZ $ 2000
			Butler 2004 Female	medium	706	149	21.10	NZ $ 2000
			Butler 2004 Female	high	452	142	31.40	NZ $ 2000
WPRO	Oceania	New Zealand	Stewart 2008 New Zeland	low			12.00	
			Stewart 2008 New Zeland	medium			11.00	
			Stewart 2008 New Zeland	high			7.00	
PAHO	South America	Argentina	Ferrante 2007	low		5620	29.80	$ Arg. 2005
			Ferrante 2007	medium		4341	32.00	$ Arg. 2005
			Ferrante 2007	high		1728	26.40	$ Arg. 2005
PAHO	South America	Brasil	Gonçalves-Silva 2005	low	1095	504	46.03	reais 1999 (136 reais= 75 USD)
			Gonçalves-Silva 2005	medium	511	160	31.31	reais 1999 (136 reais= 75 USD)
			Gonçalves-Silva 2005	high	431	104	24.13	reais 1999 (136 reais= 75 USD)
PAHO	South America	Brasil	Marinho 2008	low	4.318	852	19.70	(brazilian Minimum Wages) BMW=100U$
			Marinho 2008	high	2.411	405	16.80	(brazilian Minimum Wages) BMW=100U$
PAHO	South America	Brazil	De Lima 2003 Female	low	42		24.00	
			De Lima 2003 Female	high	75		13.50	

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
0	20000	age, whether born in New Zealand, marital status, ethnicity (self-identified), education, English fluency (self-categorised), years in New Zealand, household income, housing tenure, parity, other smokers in the home, whether pregnancy was planned, attendance at antenatal classes					
20001	40000						
>40000							
0	600						
601	1500						
1501							
< 136 reais/ mes= < 1salario	1632	age, SES	1.91	1.59	2.28		
1632	3264		1.30	1.05	1.60		
3264			1.00				
	<=2	gender, religion, respiratory disease, income, education, age, etc.	1.52	1.26	1.82		
>2			1.00				
0	1 Minimum Wage						
<=5 MWs	>5 MWs						

WHO Region	Continent	Country	Study and Subgroups of Smokers	Annual Family Income Stratum	N	N Smokers	% of Smokers	Monetary Unit, Year
PAHO	South America	Brazil	Momino 2003 Female	low	275	59		
			Momino 2003 Female	high	137	7		
PAHO	South America	Brazil	Monteiro 2007 Female	low			32.7	
			Monteiro 2007 Female	medium			25.1	
			Monteiro 2007 Female	high			22.8	
			Monteiro 2007 Female 2003	low			23.4	
			Monteiro 2007 Female 2003	medium			16.9	
			Monteiro 2007 Female 2003	high			13.4	
			Monteiro 2007 Male	low			50.5	
			Monteiro 2007 Male	medium			42.1	
			Monteiro 2007 Male	high			35.2	
			Monteiro 2007 Male 2003	low			35.8	
			Monteiro 2007 Male 2003	medium			24.9	
			Monteiro 2007 Male 2003	high			18.9	
PAHO	South America	Brazil	Moreira 1995†	low	346			
			Moreira 1995	medium	278			
			Moreira 1995	high	467			

† Converted OR to a high income reference

Annual Family Income limits		Adjusting variables	OR (95% CI) for Current Smoking			Number of cigarettes per day (mean)	N° of cigarettes per day (SD)
Lower	Upper		OR	CI Lower Limit	CI Upper Limit		
						13.3	
						13.3	
						13.3	
						13.3	
						13.3	
						13.3	
						11.6	
< 2 minimum wages		gender, age, schooling, profession, alcohol	1.031	0.84	1.27		
2- 3.99 minimum wages							
<3 minimum wages			1.00				

Table 5 Effect of income level categories on tobacco attributable diseases

WHO Region	Continent	ID (Author, pub date, ethnic and gender group)	Country	Recruitment Year	Outcome	N per strata
Independent variables: current smoking + income level category (adjusted by current smoking and other variables)						
PAHO	North America	Simms 2007 African American	USA	1998-9	**LBW**	643
		Simms 2007 African American	USA	1998-9	**LBW**	8582
		Simms 2007 African American	USA	1998-9	**LBW**	1930
		Simms 2007 Latino	USA	1998-9	**LBW**	61
		Simms 2007 Latino	USA	1998-9	**LBW**	4338
		Simms 2007 Latino	USA	1998-9	**LBW**	1871
		Simms 2007 white latino	USA	1998-9	**LBW**	47
		Simms 2007 white latino	USA	1998-9	**LBW**	36865
		Simms 2007 white latino	USA	1998-9	**LBW**	41211
Independent variable: income level category (adjusted by current smoking and other variables)						
SEARO	Asia	Khang 2008 M 30-44 y	South Korea	1995-03	**Death**	176329
		Khang 2008 M 30-44 y	South Korea	1995-03	**Death**	171338
		Khang 2008 M 45-54 y	South Korea	1995-03	**Death**	80601
		Khang 2008 M 45-54 y	South Korea	1995-03	**Death**	78684
SEARO	Asia	Khang 2008 M 55-64 y	South Korea	1995-03	**Death**	32467
		Khang 2008 M 55-64 y	South Korea	1995-03	**Death**	35958
EURO	Europe	Prescott 2003 F	Denmark	1976-92	**Death**	-
		Prescott 2003 F	Denmark	1976-92	**Death**	-
		Prescott 2003 M	Denmark	1976-92	**Death**	-
		Prescott 2003 M	Denmark	1976-92	**Death**	-

% with Outcome	Monetary Unit	Annual family income limits		Income Strata	OR (95% CI)	Adjusting variables
		Lower	Upper			
	USD 1990		12499	Low	2.8 (1.56 - 5.05)	age, gender, education, marital status, prenatal care, gestation
	USD 1991	12500	34999	Medium	2.53 (1.86 - 3.43)	
	USD 1992	35000		High	1	
	USD 1993		12499	Low	2.74 (0.48 - 4.63)	
	USD 1994	12500	34999	Medium	1.93 (1.15 - 3.24)	
	USD 1995	35000		High	1	
-	USD 1996		12499	Low	-	
-	USD 1997	12500	34999	Medium	2.1 (1.84 - 2.4)	
-	USD 1998	35000		High	1	
-	salary	-	-	Low	1.7 (1.6 - 1.8)	age, cardiovascular risk factors
-	salary	-	-	High	1	
-	salary	-	-	Low	1.82 (1.73 - 1.91)	
-	salary	-	-	High	1	
-	salary	-	-	Low	1.51 (1.43 - 1.6)	
-	salary	-	-	High	1	
-	DKR (8 DKR =1 €)		50000#	Low	†0.96 (0.84 - 1.10)	indices of education, housing, employment grade, income, family type
-	DKR (8 DKR =1 €)	50000#		High	1	
-	DKR (8 DKR =1 €)		50000#	Low	†1.14 (1.03 - 1.27)	
-	DKR (8 DKR =1 €)	50000#		High	1	

WHO Region	Continent	ID (Author, pub date, ethnic and gender group)	Country	Recruitment Year	Outcome	N per strata
SEARO	Asia	Khang 2008 M 30-44 y	South Korea	1995-03	**CV Death**	176329
		Khang 2008 M 30-44 y	South Korea	1995-03	**CV Death**	171338
		Khang 2008 M 45-54 y	South Korea	1995-03	**CV Death**	80601
		Khang 2008 M 45-54 y	South Korea	1995-03	**CV Death**	78684
		Khang 2008 M 55-64 y	South Korea	1995-03	**CV Death**	32467
		Khang 2008 M 55-64 y	South Korea	1995-03	**CV Death**	35958
WPRO	Oceania	Stewart 2008 Australia	Australia	1990-9	**CV Death**	-
		Stewart 2008 Australia	Australia	1990-9	**CV Death**	-
WPRO	Oceania	Stewart 2008 New Zeland	New Zealand	1990-9	**CV Death**	-
		Stewart 2008 New Zeland	New Zealand	1990-9	**CV Death**	-
SEARO	Asia	Singh 1997 M	India	1991	**CHD**	313
		Singh 1997 M	India	1991	**CHD**	147
SEARO	Asia	Singh 1997 F	India	1991	**CHD**	335
		Singh 1997 F	India	1991	**CHD**	115
PAHO	North America	Anand 2001	Canada	2000	**CHD**	-
		Anand 2001	Canada	2000	**CHD**	-
PAHO	North America	Mo 2006	Canada	2002-3	**CHD**	-
		Mo 2006	Canada	2002-3	**CHD**	-
PAHO	North America	Kivimäki 2007 M	USA	2000-2	**CHD**	2.583
		Kivimäki 2007 M	USA	2000-2	**CHD**	2593
		Kivimäki 2007 M	USA	2000-2	**CHD**	2719
		Kivimäki 2007 F	USA	2000-2	**CHD**	11218
		Kivimäki 2007 F	USA	2000-2	**CHD**	10.903
		Kivimäki 2007 F	USA	2000-2	**CHD**	11.886

% with Outcome	Monetary Unit	Annual family income limits		Income Strata	OR (95% CI)	Adjusting variables
		Lower	Upper			
-	salary	-	-	Low	1.44 (1.25 - 1.67)	age, cardiovascular risk factors
-	salary	-	-	High	1	
-	salary	-	-	Low	1.62 (1.44 - 1.82)	
-	salary	-	-	High	1	
-	salary	-	-	Low	1.38 (1.22 - 1.55)	
-	salary	-	-	High	1	
12	-	-	-	Low	1.2 (1.08 - 1.32)	age and gender
9	-	-	-	High	1	
16	-	-	-	Low	1.16 (1.04 - 1.35)	age and gender
13	-	-	-	High	1	
0.3	-	-	-	Low	0.83 (0.66 - 0.95)	age, cardiovascular risk factors
11.6	-	-	-	High	1	
0.0	-	-	-	Low	0.61 (0.42 - 0.81)	
10.4	-	-	-	High	1	
-	Canada $ 1997-8		20000	Low	2.37 (1.33 - 4.23)	Age, gender, smoking, HbA, hypertension. Low strata: lowest quartile.
-	Canada 1997-8	20000		High	1	
-	Canada $ 2003	-	-	Low	1.9 (1.86 - 1.95)	age, gender, overwight,alcohol, smoking, physical actvity
-	Canada $ 2003	-	-	High	1	
3.0	USD 2000-2002	-	-	Low	2.24 (1.55 - 3.24)	age, smoking, alcohol consumption, physical inactivity, obesity
2.3	USD 2000-2002	-	-	Medium	1.59 (1.07 - 2.36)	
2.0	USD 2000-2002	-	-	High	1	
1.4	USD 2000-2002	-	-	Low	1.98 (1.47 - 2.67)	
0.9	USD 2000-2002	-	-	Medium	1.53 (1.11 - 2.11)	
0.6	USD 2000-2002	-	-	High	1	

WHO Region	Continent	ID (Author, pub date, ethnic and gender group)	Country	Recruitment Year	Outcome	N per strata
PAHO	North America	Mo 2006	Canada	2002-3	**Stroke**	1053
		Mo 2006	Canada	2002-3	**Stroke**	1272
EURO	Europe	Ekberg-Aronsson 2006 F	Sweden	1974-03	**Lung cancer**	4230
		Ekberg-Aronsson 2006 F	Sweden	1974-03	**Lung cancer**	4269
EURO	Europe	Ekberg-Aronsson 2006 M	Sweden	1974-03	**Lung cancer**	6962
		Ekberg-Aronsson 2006 M	Sweden	1974-03	**Lung cancer**	6962
PAHO	North America	Mao 2001 F	Canada	1994-7	**Lung cancer**	833
		Mao 2001 F	Canada	1994-7	**Lung cancer**	519
		Mao 2001 M	Canada	1994-7	**Lung cancer**	764
		Mao 2001 M	Canada	1994-7	**Lung cancer**	681
PAHO	North America	Chen2000 M	Canada	1994-5	**COPD**	522
		Chen2000 M	Canada	1994-5	**COPD**	893
		Chen2000 M	Canada	1994-5	**COPD**	2090
		Chen2000 F	Canada	1994-5	**COPD**	764
		Chen2000 F	Canada	1994-5	**COPD**	1070
		Chen2000 F	Canada	1994-5	**COPD**	2047
PAHO	South America	Menezes 1994	Brazil	1990	**COPD**	256
PAHO	South America	Menezes 1994	Brazil	1990	**COPD**	256
PAHO	North America	Starfield 1991 F	USA	1979-88	**LBW**	901
		Starfield 1991 F	USA	1979-88	**LBW**	2.859

% with Outcome	Monetary Unit	Annual family income limits		Income Strata	OR (95% CI)	Adjusting variables
		Lower	Upper			
3.3	Canada $ 2003	-	-	Low	1.94 (1.90 - 1.97)	age, gender, overweight, alcohol, smoking, physical actvity
7.4	Canada $ 2004	-	-	High	1	
1.8	-	-	-	Low	1.56 (2.34 - 1.04)	age and marital status, smoking.
1.2	-	-	-	High	1	
3.8	-	-	-	Low	1.39 (1.73 - 1.11)	
2.3	-	-	-	High		
-	USD 1995		30000	Low	1.5 (1.1 - 2)	10 years age group and province, years of exposure to passive smoking, consumption of vegetables and meat
-	USD 1995	50000		High	1	
-	USD 1995		30000	Low	1.7 (1.3 - 2.2)	
-	USD 1995	50000		High	1	
6.6	Canada $ 1994-5		$10,000^{(1-4)}$ $15,000^{\geq(5)}$	Low	3.65 (1.90 - 7.01)	age, immigrant, status, history of allergy, income adequacy, body mass index, and smoking status. Low strata: <$10,000 (1-4 household members) <$15,000 (≥5). Medium strata: $15000 to 29999 (1-2); 20000 to 39999 (3-4); 30000 to 59999 (≥59)
2.4	Canada $ 1994-5	$15000^{(1-2)}$ $20000^{(3-4)}$ $30000^{\geq(5)}$	29999^{(1-2)} 39999^{(3-4)} 59999^{\geq(5)}	Medium	1.42 (0.73 - 2.78)	
1.6	Canada $ 1994-5	$30000^{(1-2)}$ $40000^{(3-4)}$ $60000^{\geq(5)}$		High	1	
7	Canada $ 1994-5		$10,000^{(1-4)}$ $15,000^{\geq(5)}$	Low	1.68 (0.95 - 2.97)	
4.6	Canada $ 1994-5	$15000^{(1-2)}$ $20000^{(3-4)}$ $30000^{\geq(5)}$	29999^{(1-2)} 39999^{(3-4)} 59999^{\geq(5)}	Medium	1.46 (0.88 - 2.43)	
2.2	Canada $ 1994-5	$30000^{(1-2)}$ $40000^{(3-4)}$ $60000^{\geq(5)}$		High	1	
-	-	-	-	Low	2.6 (1.47 - 4.47)	age, gender, schooling, smoking, passive smoking, exposure to dust, housing, indoor pollution, childhood respiratory infections.
-	-	-	-	High	1	
-	-		Poverty line	Low	1.86 (1.37 - 2.54)	Mother's education, mother age, age by parity, marital status, and smoking
-	-	Poverty line		High	1	

WHO Region	Continent	ID (Author, pub date, ethnic and gender group)	Country	Recruitment Year	Outcome	N per strata
PAHO	South America	Azenha 2008 F	Brazil	1978-9 /94	**LBW**	2161
		Azenha 2008 F	Brazil	1978-9 /94	**LBW**	657
PAHO	South America	Rondó 1997 F	Brazil	1997	**LBW**	405
		Rondó 1997 F	Brazil	1997	**LBW**	307
PAHO	South America	Silva 2006 Ribeirão Preto F	Brazil	1994	**LBW**	237
		Silva 2006 Ribeirão Preto F	Brazil	1994	**LBW**	593
		Silva 2006 Ribeirão Preto F	Brazil	1994	**LBW**	1179
PAHO	South America	Silva 2006 São Luís F	Brazil	1997-8	**LBW**	786
		Silva 2006 São Luís F	Brazil	1997-8	**LBW**	718
		Silva 2006 São Luís F	Brazil	1997-8	**LBW**	772
PAHO	North America	Millar 2007	Canada	2003	**Periodontitis**	1819
PAHO	North America	Millar 2007	Canada	2003	**Periodontitis**	7238
PAHO	North America	Dolan 1997	USA	1995	**Periodontitis***	289
		Dolan 1997	USA	1995	**Periodontitis***	205
		Dolan 1997	USA	1995	**Periodontitis**	266
EURO	Europe	Ylostalo 2004	Finland	1997-8	**Tooth loss**	889
		Ylostalo 2004	Finland	1997-8	**Tooth loss**	424

CHD: Coronary Heart Disease; **COPD**: Chronic Obstructive Pulmonary Disease; **LBW**: Low Birth Weight For Gestational Age, **CV Death**: Cardiovascular Death

***** % subjects with ≥1 tooth with 7+ mm attachment loss; [#] Family head income; [†] Converted OR to a high income reference

% with Outcome	Monetary Unit	Annual family income limits		Income Strata	OR (95% CI)	Adjusting variables
		Lower	Upper			
2.6	minimum wage		36	Low	†1.39 (1.08 - 1.75)	maternal age, work, schooling and smoking, previous abortion or stillbirth, live births, maternal marital status, occupation group, type of hospital, mode of insurance, antenatal visits, type of delivery; newborn gender and gestational age
16.9	minimum wage	120		High	1	
	Minimum wage=100USD		12	Low	†2.02 (1.35 - 3.03)	maternal body weight, education, marital status, parity, cigarette smoking, weight gain in pregnancy, prior history of LBW, coffee and beer intake, maternal ferritin.
	Minimum wage=100USD	12		High	1	
-	USD 1994		768	Low	1.5 (0.95 - 2.39)	family income, parity, maternal age, number of cigarettes smoked, route of delivery, type of insurance
-	USD 1994	769	2304	Medium	1.52 (1.08 - 2.15)	
-	USD 1994	2305		High	1	
-	USD 1998		960	Low	1.07 (0.72 - 1.59)	family income, parity, maternal age, number of cigarettes smoked, route of delivery, type of insurance
-	USD 1998	961	2880	Medium	0.71 (0.46 - 1.09)	
-	USD 1998	2881		High	1	
23	USD 2003	-	-	Low		age
9	USD 2003	-	-	High		
51	USD 1995		15000	Low		smoking status, variables of dental health care
27	USD 1995	15000	35000	Medium		
25	USD 1995	35000		High		
-	Markka, Finland (FIM) 1998		50000	Low	†1.01 (0.45 - 2.5)	basic education. employment history, health-oriented lifestyle, need for orthodontic treatment, gender, smoking, tooth brushing
-	Markka, Finland (FIM) 1999	200000		High	1	

Table 6 Tobacco expenditures by income level

WHO Region	Continent	Country	D (author/ reporting date)	Year	N household/ /Total Population	Smoking prevalence % [cigarettes/ day]
SEARO	Asia	Bangladesh	Best 2007[16]	2005 2006	77,678 Household	parental tobacco 69.9%
SEARO	Asia	Bangladesh	Efroymson 2001[4]	1996 1996	1,299 Household	70.3% men aged 35-49
PAHO	Central America	Mexico	Vázquez-Segovia 2002[60]	1984-2000	5,264 to 16,875 Houshold	21 % (1984) 9 % (2000)
PAHO	Central America	Mexico	Sesma-Vázquez 2002[181]	1992 1998	More than 10,000 household (people >35 y)	22.4 % Household [9.8] (1998)
SEARO	Asia	Vietnam	Van Kinh[61] 2006	1997 1998	6,000 household/ 28,518 people over 15 y	34.60 % people [11.1]

Sampling	Monetary unit	Tobacco spending / total expenditure (%)	Commentary
Bangladesh Nutrition Surveillance Project (2005–2006).	Taka 2007	Low 6.0% High 1.8%	Parental tobacco use may exacerbate child malnutrition and divert household funds away from food and other necessities.
Bangladesh Bureau of Statistics (BBS).	Taka converted to USD	Total 2.90% Low 4.40% Med 2.90% High 1.70%	
National Household Income and Expenditure Survey, 1984-2000	Mexican pesos	1984-1992 Low 13% High 1% 1984-2000 Low 16% High 1%	Households with higher income consumed more tobacco; nevertheless, households with the lowest income devoted a greater proportion of income to tobacco consumption.
National Survey of Household Income and Spending) (NHSIS)	Mexican pesos	4.0 (Mean 1998) '92 / '94 / '96 / '98 Low 11.5/10.7/ 8.9/10.8% Med 3.6 /4.6/3.8 /3.5% High 1.8 /2/1.9/1.5%	The poorest allocated a greater share of income than higher quintiles.
Second Vietnam Living Standard Survey (VLSS)	Vietnamese Dong (VND) 1997-8	**Total 3.48%** Low 5.29% Med 4.30% High 3.60%	

Summary Results Tables

Table 7 OR of smoking comparing Low vs. High Income level of all studies and by decade, continent, WHO region, Country Mortality Stratum, and risk of bias

Category	N studies	OR	LL	UL
General	94	1.415	1.276	1.569
By decade of dataset				
< 1989	13	1.054	1.008	1.101
Between 1989 and 1998	34	1.474	1.276	1.702
> 1998	42	1.498	1.339	1.676
By Continent				
Oceania	9	1.653	1.440	1.897
South America	3	1.445	1.025	2.038
Asia	17	1.314	1.083	1.593
North America	40	1.296	1.759	41.92
Europe	24	1.296	1.153	1.456
Africa	1	1.282	1.001	1.641
By WHO region*				
WPRO	17	1.538	1.309	1.808
PAHO	43	1.505	1.299	1.743
EURO	26	1.297	1.162	1.448
SEARO	4	1.180	0.750	1.857
EMRO	2	0.936	0.607	1.444
AFRO	1	1.282	1.001	1.641
By Country Mortality Stratum#				
Low (Stratum A+B)	74	1.530	1.414	1.656
High: (Stratum C+D+E)	15	1.220	0.983	1.513
Risk of bias				
High	39	1.336	1.257	1.420
Medium	17	1.439	1.218	1.701
Low	35	1.374	1.225	1.540

***WHO region**: African Region (AFRO), Region of the Americas (PAHO), Eastern Mediterranean Region (EMRO), European Region (EURO), South-East Asia Region (SEARO), and Western Pacific Region (WPRO)

 # Stratum: **A**=very low child mortality and very low adult mortality; **B**=low child mortality and low adult mortality; **C**=low child mortality and high adult mortality; **D**=high child mortality and high adult mortality; **E**=high child mortality and very high adult mortality.

Table 8 OR of smoking comparing Low income level vs. High income level/Medium income level considering only studies that reported results in three categories

Comparison	N studies	OR	LL	UL
Low vs. High	37	1.545	1.387	1.720
Medium vs. High		1.246	1.164	1.334

Table 9 OR of smoking comparing Low vs. High income level considering all studies that included females/males

Category	N studies including both genders	OR	LL	UL
OR: Low vs. High	N studies	OR	LL	UL
Females	23	1.376	1.229	1.542
Males		1.328	1.223	1.440

Table 10 OR of smoking comparing Low income level vs. High income level/Medium income level considering only studies of females/males that reported results in three categories

Females	N studies	OR	LL	UL
Low vs. High	10	1.509	1.213	1.877
Medium vs. High		1.172	1.092	1.259
Males	**N studies**	**OR**	**LL**	**UL**
Low vs. High	10	1.430	1.325	1.543
Medium vs. High		1.207	1.114	1.307

Table 11 OR of smoking comparing Low vs. High income level considering all studies that included first/second/third age group

Category	N studies	OR	LL	UL
Age between 15 and 44 years	11	1.512	1.306	1.751
Age between 45 and 64 years	7	1.494	1.236	1.806
Age higher than 64 years	6	1.305	1.075	1.583

Table 12 OR of smoking comparing Low vs. High income level/ Medium vs. High income level considering only studies that included individuals with an age between 16 and 44 years and that reported results in three categories

Comparison	N studies	OR	LL	UL
Low vs. High	3	1.727	1.097	2.720
Medium vs. High		1.313	0.861	2.001

Table 13 OR of smoking comparing Low vs. High income level / by decade of dataset and Mortality level of the countries

Decade	Mortality Stratum	N studies	OR	LL	UL
< 1989	Low	13	1.054	1.008	1.101
	High	-	-	-	-
1989 - 1998	Low	29	1.609	1.384	1.870
	High	4	0.873	0.711	1.072
> 1998	Low	29	1.590	1.402	1.803
	High	11	1.413	1.111	1.797

Table 14 OR comparing Low vs. High Income Level. Sensitivity analysis considering only prospective of low risk of bias studies

Comparison	N studies	OR	LL	UL
Low vs. High	3	2.170	1.440	3.272

TOBACCO ATTRIBUTABLE DISEASES

Table 15 Summary OR comparing Low vs. High Income Level of tobacco attributable diseases

Disease	N studies	OR	LL	UL
Cardiovascular disease	5	1.078	0.824	1.409
Cardiovascular disease*	1	1.483	1.379	1.595
Coronary disease	6	1.446	0.941	2.223
Coronary disease*	3	1.902	1.858	1.948

Death	5	1.398	1.170	1.669
Lung cancer	4	1.514	1.318	1.740
Low Birth Weight	5	1.522	1.310	1.768

*Sensitivity analysis excluding studies with mythological flaws.

Table 16 Summary OR comparing Low vs. High Income Level/ Medium vs. High Income Level considering only studies that reported results in three categories for Coronary diseases

Comparison	N studies	OR	LL	UL
Low vs. High	2	2.079	1.649	2.622
Medium vs. High		1.554	1.211	1.993

Table 17 OR comparing Low vs. High Income Level/Medium vs. High Income Level considering only studies that reported results in three categories for Low Birth Weight

Comparison	N studies	OR	LL	UL
Low vs. High	2	1.235	0.914	1.668
Medium vs. High		1.051	0.499	2.215

Table 18 Median, Mean, SD of percent of tobacco spending related to total expenditures

Study	Stratum by income level		
	Low	Medium	High
Best 2007	6		1,8
Efroymson 2001	4,4	2,9	1,7
Vázquez-Segovia 2002	13		1
	16		1
Sesma-Vázquez 2002	11,5	3,6	1,8
	10,7	4,6	2
	8,9	3,8	1,9
	10,8	3,5	1,5
	5,29	4,3	3,6
Median	**10,7**	**3,7**	**1,8**
Mean	**9,62**	**3,78**	**1,81**
SD	**3,84**	**0,60**	**0,76**

META-ANALYSIS TABLES AND GRAPHS.

Meta-analysis 1 Low vs. High (All studies)

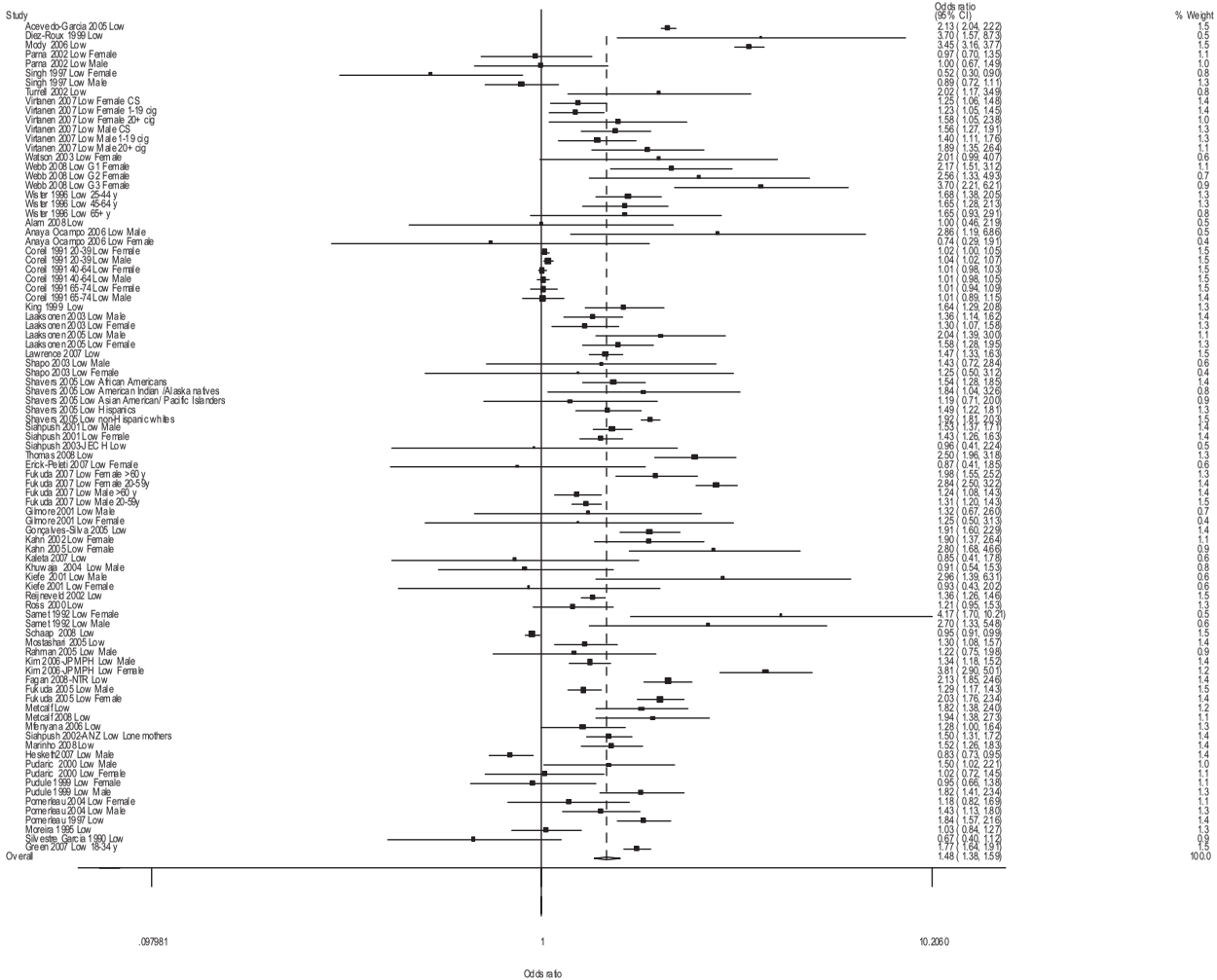
Study	OR	LL	UL	% Weight
Acevedo-Garcia 2005 Low	2.128	2.039	2.220	1.49
Diez-Roux 1999 Low	3.700	1.569	8.726	0.49
Mody 2006 Low	3.448	3.158	3.765	1.46
Parna 2002 Low Female	0.970	0.696	1.352	1.14
Parna 2002 Low Male	1.000	0.671	1.491	1.03
Singh 1997 Low Female	0.520	0.302	0.896	0.82
Singh 1997 Low Male	0.890	0.716	1.107	1.32
Turrell 2002 Low	2.020	1.170	3.489	0.81
Virtanen 2007 Low Female CS	1.250	1.058	1.477	1.39
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	1.39
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	1.01
Virtanen 2007 Low Male CS	1.560	1.272	1.913	1.34
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	1.30
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	1.14
Watson 2003 Low Female	2.010	0.994	4.065	0.62
Webb 2008 Low G1 Female	2.174	1.514	3.122	1.09
Webb 2008 Low G2 Female	2.564	1.333	4.932	0.68
Webb 2008 Low G3 Female	3.704	2.208	6.211	0.85
Wister 1996 Low 25-44 y	1.682	1.383	2.046	1.35
Wister 1996 Low 45-64 y	1.649	1.278	2.127	1.26
Wister 1996 Low 65+ y	1.649	0.934	2.911	0.78
Alam 2008 Low	1.000	0.456	2.191	0.55
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	0.47
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	0.43
Coreil 1991 20-39 Low Female	1.024	1.002	1.047	1.49
Coreil 1991 20-39 Low Male	1.045	1.017	1.074	1.49
Coreil 1991 40-64 Low Female	1.008	0.983	1.034	1.49
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	1.49
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	1.47
Coreil 1991 65-74 Low Male	1.010	0.891	1.145	1.43
King 1999 Low	1.639	1.294	2.076	1.29
Laaksonen 2003 Low Male	1.360	1.144	1.616	1.38
Laaksonen 2003 Low Female	1.300	1.066	1.585	1.35
Laaksonen 2005 Low Male	2.040	1.389	2.997	1.06
Laaksonen 2005 Low Female	1.580	1.280	1.950	1.33

Lawrence 2007 Low	1.470	1.328	1.627	1.45
Shapo 2003 Low Male	1.429	0.719	2.837	0.64
Shapo 2003 Low Female	1.250	0.500	3.125	0.44
Shavers 2005 Low African Americans	1.540	1.281	1.851	1.36
Shavers 2005 Low American Indian/ Alaska natives	1.840	1.038	3.263	0.78
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	0.85
Shavers 2005 Low Hispanics	1.490	1.225	1.812	1.35
Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	1.48
Siahpush 2001 Low Male	1.530	1.365	1.714	1.44
Siahpush 2001 Low Female	1.430	1.257	1.626	1.43
Siahpush 2003-JECH Low	0.960	0.411	2.244	0.49
Thomas 2008 Low	2.500	1.963	3.184	1.28
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	0.57
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	1.28
Fukuda 2007 Low Female 20-59 y	2.840	2.502	3.223	1.43
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	1.42
Fukuda 2007 Low Male 20-59 y	1.310	1.200	1.430	1.46
Gilmore 2001 Low Male	1.320	0.671	2.595	0.65
Gilmore 2001 Low Female	1.250	0.500	3.127	0.44
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	1.37
Kahn 2002 Low Female	1.900	1.368	2.639	1.15
Kahn 2005 Low Female	2.800	1.684	4.656	0.87
Kaleta 2007 Low	0.855	0.410	1.781	0.59
Khuwaja 2004 Low Male	0.909	0.540	1.530	0.85
Kiefe 2001 Low Male	2.960	1.388	6.311	0.57
Kiefe 2001 Low Female	0.930	0.428	2.021	0.55
Reijneveld 2002 Low	1.360	1.263	1.464	1.47
Ross 2000 Low	1.207	0.952	1.530	1.29
Samet 1992 Low Female	4.167	1.701	10.206	0.46
Samet 1992 Low Male	2.703	1.333	5.480	0.62
Schaap 2008 Low	0.950	0.911	0.991	1.49
Mostashari 2005 Low	1.300	1.078	1.568	1.36
Rahman 2005 Low Male	1.220	0.753	1.977	0.90
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	1.43
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	1.23
Fagan 2008-NTR Low	2.130	1.847	2.456	1.41

Fukuda 2005 Low Male	1.290	1.167	1.426	1.45
Fukuda 2005 Low Female	2.030	1.764	2.336	1.42
Metcalf Low	1.820	1.383	2.395	1.23
Metcalf 2008 Low	1.940	1.379	2.729	1.13
Mfenyana 2006 Low	1.282	1.001	1.641	1.27
Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	1.42
Marinho 2008 Low	1.520	1.265	1.827	1.36
Hesketh 2007 Low Male	0.833	0.731	0.950	1.42
Pudaric 2000 Low Male	1.500	1.017	2.213	1.05
Pudaric 2000 Low Female	1.020	0.716	1.452	1.11
Pudule 1999 Low Female	0.952	0.655	1.384	1.07
Pudule 1999 Low Male	1.818	1.415	2.336	1.27
Pomerleau 2004 Low Female	1.176	0.818	1.692	1.09
Pomerleau 2004 Low Male	1.429	1.133	1.801	1.30
Pomerleau 1997 Low	1.840	1.569	2.158	1.39
Moreira 1995 Low	1.031	0.840	1.265	1.34
Silvestre Garcia 1990 Low	0.670	0.400	1.121	0.86
Green 2007 Low 18-34 y	1.770	1.640	1.910	1.47
D+L pooled ES (Random)	**1.480**	**1.376**	**1.592**	**100.00**
I-V pooled ES (Fixed)	**1.192**	**1.179**	**1.204**	**100.00**

Heterogeneity chi-squared = 3119.20 (d.f. = 88) p = 0.000
I-squared (variation in ES attributable to heterogeneity) = 97.2%
Estimate of between-study variance Tau-squared = 0.0927
Test of ES=1 : z= 10.53 p = 0.000

Forest Plot 1: Low vs. High (All studies)



Meta-analysis 2 Low vs. High (All studies) by decade

Study	OR	LL	UL	% Weight
Year < 1989				
Coreil 1991 20-39 Low Female	1.024	1.002	1.047	1.49
Coreil 1991 20-39 Low Male	1.045	1.017	1.074	1.49
Coreil 1991 40-64 Low Female	1.008	0.983	1.034	1.49
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	1.49
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	1.47
Coreil 1991 65-74 Low Male	1.010	0.891	1.145	1.43
Kahn 2002 Low Female	1.900	1.368	2.639	1.15
Samet 1992 Low Female	4.167	1.701	10.206	0.46
Samet 1992 Low Male	2.703	1.333	5.480	0.62
Metcalf Low	1.820	1.383	2.395	1.23
Pudaric 2000 Low Male	1.500	1.017	2.213	1.05
Pudaric 2000 Low Female	1.020	0.716	1.452	1.11
Silvestre Garcia 1990 Low	0.670	0.400	1.121	0.86
D+L pooled ES (Random) Year < 1989	1.054	1.008	1.101	15.33
I-V pooled ES (Fixed) Year < 1989	1.026	1.013	1.039	63.62
Year between 1989 and 1998				
Acevedo-Garcia 2005 Low	2.128	2.039	2.220	2.220
Diez-Roux 1999 Low	3.700	1.569	8.726	8.726
Mody 2006 Low	3.448	3.158	3.765	3.765
Parna 2002 Low Female	0.970	0.696	1.352	1.352
Parna 2002 Low Male	1.000	0.671	1.491	1.491
Singh 1997 Low Female	0.520	0.302	0.896	0.896
Singh 1997 Low Male	0.890	0.716	1.107	1.107
Turrell 2002 Low	2.020	1.170	3.489	3.489
Watson 2003 Low Female	2.010	0.994	4.065	4.065
Wister 1996 Low 25-44 y	1.682	1.383	2.046	2.046
Wister 1996 Low 45-64 y	1.649	1.278	2.127	2.127
Wister 1996 Low 65+ y	1.649	0.934	2.911	2.911
King 1999 Low	1.639	1.294	2.076	2.076
Laaksonen 2003 Low Male	1.360	1.144	1.616	1.616
Laaksonen 2003 Low Female	1.300	1.066	1.585	1.585
Laaksonen 2005 Low Male	2.040	1.389	2.997	2.997
Laaksonen 2005 Low Female	1.580	1.280	1.950	1.950
Lawrence 2007 Low	1.470	1.328	1.627	1.627

Shavers 2005 Low African Americans	1.540	1.281	1.851	1.851
Shavers 2005 Low American Indian /Alaska natives	1.840	1.038	3.263	3.263
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	1.997
Shavers 2005 Low Hispanics	1.490	1.225	1.812	1.812
Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	2.033
Siahpush 2001 Low Male	1.530	1.365	1.714	1.714
Siahpush 2001 Low Female	1.430	1.257	1.626	1.626
Siahpush 2003-JECH Low	0.960	0.411	2.244	2.244
Reijneveld 2002 Low	1.360	1.263	1.464	1.464
Ross 2000 Low	1.207	0.952	1.530	1.530
Schaap 2008 Low	0.950	0.911	0.991	0.991
Fagan 2008-NTR Low	2.130	1.847	2.456	2.456
Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	1.715
Pomerleau 1997 Low	1.840	1.569	2.158	2.158
Moreira 1995 Low	1.031	0.840	1.265	1.265
D+L pooled ES (Random) Year 1989 and 1998	1.494	1.295	1.723	1.723
I-V pooled ES(Fixed) Year 1989 and 1998	1.559	1.528	1.591	25.17
Year higher than 1999				
Virtanen 2007 Low Female CS	1.250	1.058	1.477	1.39
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	1.39
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	1.01
Virtanen 2007 Low Male CS	1.560	1.272	1.913	1.34
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	1.30
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	1.14
Webb 2008 Low G1 Female	2.174	1.514	3.122	1.09
Webb 2008 Low G2 Female	2.564	1.333	4.932	0.68
Webb 2008 Low G3 Female	3.704	2.208	6.211	0.85
Alam 2008 Low	1.000	0.456	2.191	0.55
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	0.47
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	0.43
Shapo 2003 Low Male	1.429	0.719	2.837	0.64
Shapo 2003 Low Female	1.250	0.500	3.125	0.44
Thomas 2008 Low	2.500	1.963	3.184	1.28
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	0.57

Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	1.28
Fukuda 2007 Low Female 20-59y	2.840	2.502	3.223	1.43
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	1.42
Fukuda 2007 Low Male 20-59y	1.310	1.200	1.430	1.46
Gilmore 2001 Low Male	1.320	0.671	2.595	0.65
Gilmore 2001 Low Female	1.250	0.500	3.127	0.44
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	1.37
Kaleta 2007 Low	0.855	0.410	1.781	0.59
Khuwaja 2004 Low Male	0.909	0.540	1.530	0.85
Mostashari 2005 Low	1.300	1.078	1.568	1.36
Rahman 2005 Low Male	1.220	0.753	1.977	0.90
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	1.43
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	1.23
Fukuda 2005 Low Male	1.290	1.167	1.426	1.45
Fukuda 2005 Low Female	2.030	1.764	2.336	1.42
Metcalf 2008 Low	1.940	1.379	2.729	1.13
Mfenyana 2006 Low	1.282	1.001	1.641	1.27
Marinho 2008 Low	1.520	1.265	1.827	1.36
Hesketh2007 Low Male	0.833	0.731	0.950	1.42
Pudule 1999 Low Female	0.952	0.655	1.384	1.07
Pudule 1999 Low Male	1.818	1.415	2.336	1.27
Pomerleau 2004 Low Female	1.176	0.818	1.692	1.09
Pomerleau 2004 Low Male	1.429	1.133	1.801	1.30
Green 2007 Low 18-34 y	1.770	1.640	1.910	1.47
D+L pooled ES (Random) Year higher than 1998	1.545	1.387	1.722	43.26
I-V pooled ES (Fixed) Year higher than 1998	1.522	1.476	1.569	11.14

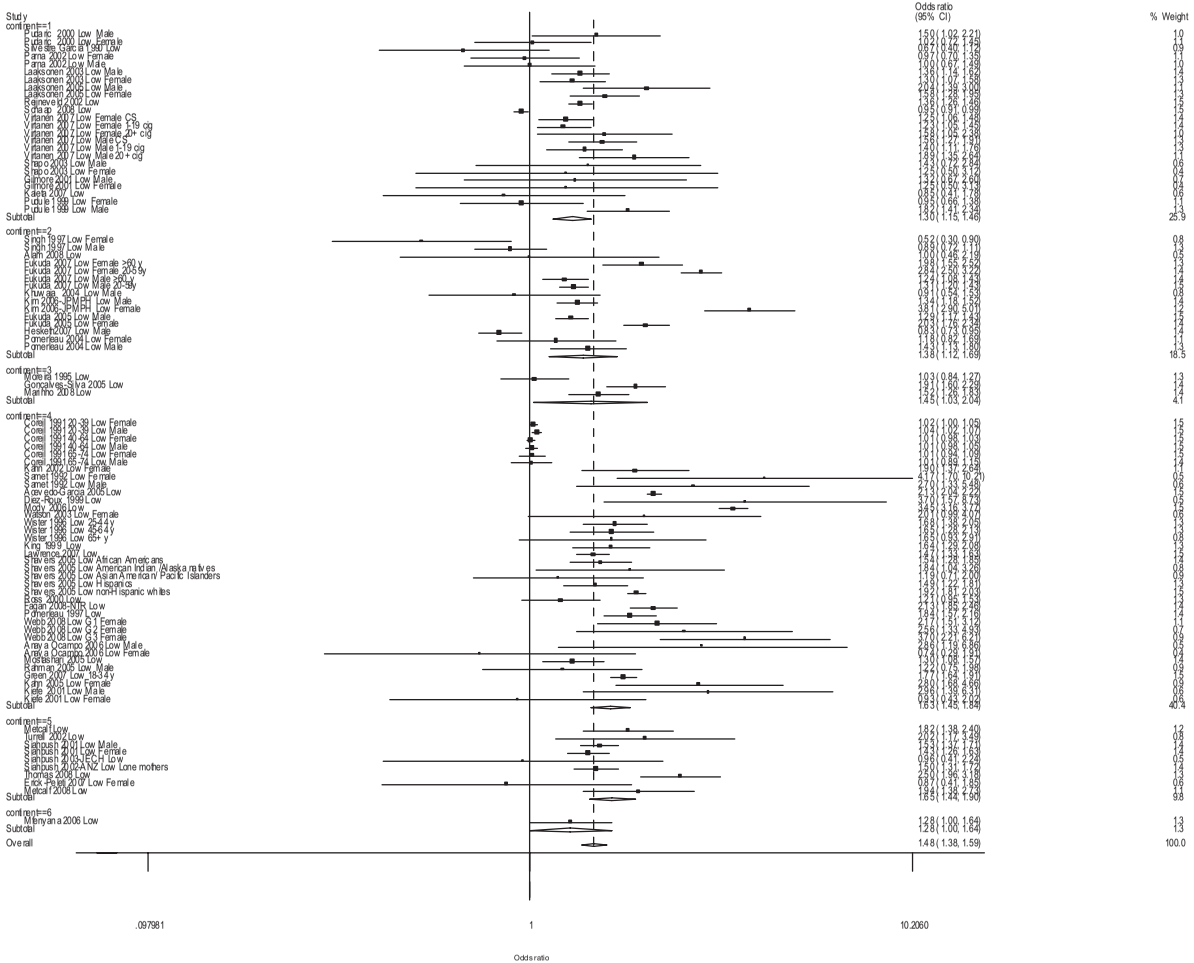
Test(s) of heterogeneity:

	Heterogeneity statistic	degrees of freedom	P	I-squared**		Tau-squared
year_cat==1		57.40	12	0.000	79.1%	0.0026
year_cat==2		1229.19	32	0.000	97.4%	0.1496
year_cat==3		373.07	39	0.000	89.5%	0.0877
Overall		3119.20	88	0.000	97.2%	0.0927

Overall Test for heterogeneity between sub-groups :

1453.35 3 0.000

Forest Plot 2: Low vs. High (All studies) by year



Meta-analysis 3 Low vs. High (All studies) by continent

Study	OR	LL	UL	% Weight
Continent: Europe				
Pudaric 2000 Low Male	1.500	1.017	2.213	1.05
Pudaric 2000 Low Female	1.020	0.716	1.452	1.11
Silvestre Garcia 1990 Low	0.670	0.400	1.121	0.86
Parna 2002 Low Female	0.970	0.696	1.352	1.14
Parna 2002 Low Male	1.000	0.671	1.491	1.03
Laaksonen 2003 Low Male	1.360	1.144	1.616	1.38
Laaksonen 2003 Low Female	1.300	1.066	1.585	1.35
Laaksonen 2005 Low Male	2.040	1.389	2.997	1.06
Laaksonen 2005 Low Female	1.580	1.280	1.950	1.33
Reijneveld 2002 Low	1.360	1.263	1.464	1.47
Schaap 2008 Low	0.950	0.911	0.991	1.49
Virtanen 2007 Low Female CS	1.250	1.058	1.477	1.39
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	1.39
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	1.01
Virtanen 2007 Low Male CS	1.560	1.272	1.913	1.34
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	1.30
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	1.14
Shapo 2003 Low Male	1.429	0.719	2.837	0.64
Shapo 2003 Low Female	1.250	0.500	3.125	0.44
Gilmore 2001 Low Male	1.320	0.671	2.595	0.65
Gilmore 2001 Low Female	1.250	0.500	3.127	0.44
Kaleta 2007 Low	0.855	0.410	1.781	0.59
Pudule 1999 Low Female	0.952	0.655	1.384	1.07
Pudule 1999 Low Male	1.818	1.415	2.336	1.27
D+L pooled ES (Random) Europe	**1.296**	**1.153**	**1.456**	**25.93**
I-V pooled ES (Fixed) Europe	**1.116**	**1.081**	**1.151**	**10.77**
Continent: Asia				
Singh 1997 Low Female	0.520	0.302	0.896	0.82
Singh 1997 Low Male	0.890	0.716	1.107	1.32
Alam 2008 Low	1.000	0.456	2.191	0.55
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	1.28

Fukuda 2007 Low Female 20-59y	2.840	2.502	3.223	1.43
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	1.42
Fukuda 2007 Low Male 20-59y	1.310	1.200	1.430	1.46
Khuwaja 2004 Low Male	0.909	0.540	1.530	0.85
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	1.43
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	1.23
Fukuda 2005 Low Male	1.290	1.167	1.426	1.45
Fukuda 2005 Low Female	2.030	1.764	2.336	1.42
Hesketh2007 Low Male	0.833	0.731	0.950	1.42
Pomerleau 2004 Low Female	1.176	0.818	1.692	1.09
Pomerleau 2004 Low Male	1.429	1.133	1.801	1.30
D+L pooled ES (Random) Asia	**1.379**	**1.122**	**1.694**	**18.47**
I-V pooled ES (Fixed) Asia	**1.424**	**1.368**	**1.484**	**6.29**
Continent: South America				
Moreira 1995 Low	1.031	0.840	1.265	1.34
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	1.37
Marinho 2008 Low	1.520	1.265	1.827	1.36
D+L pooled ES (Random) South America	**1.445**	**1.025**	**2.038**	**4.07**
I-V pooled ES (fixed) South America	**1.480**	**1.328**	**1.651**	**0.88**
Continent: North America				
Coreil 1991 20-39 Low Female	1.024	1.002	1.047	1.49
Coreil 1991 20-39 Low Male	1.045	1.017	1.074	1.49
Coreil 1991 40-64 Low Female	1.008	0.983	1.034	1.49
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	1.49
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	1.47
Coreil 1991 65-74 Low Male	1.010	0.891	1.145	1.43
Kahn 2002 Low Female	1.900	1.368	2.639	1.15
Samet 1992 Low Female	4.167	1.701	10.206	0.46
Samet 1992 Low Male	2.703	1.333	5.480	0.62
Acevedo-Garcia 2005 Low	2.128	2.039	2.220	1.49
Diez-Roux 1999 Low	3.700	1.569	8.726	0.49
Mody 2006 Low	3.448	3.158	3.765	1.46
Watson 2003 Low Female	2.010	0.994	4.065	0.62
Wister 1996 Low 25-44 y	1.682	1.383	2.046	1.35

Wister 1996 Low 45-64 y	1.649	1.278	2.127	1.26
Wister 1996 Low 65+ y	1.649	0.934	2.911	0.78
King 1999 Low	1.639	1.294	2.076	1.29
Lawrence 2007 Low	1.470	1.328	1.627	1.45
Shavers 2005 Low African Americans	1.540	1.281	1.851	1.36
Shavers 2005 Low American Indian/ Alaska natives	1.840	1.038	3.263	0.78
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	0.85
Shavers 2005 Low Hispanics	1.490	1.225	1.812	1.35
Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	1.48
Ross 2000 Low	1.207	0.952	1.530	1.29
Fagan 2008-NTR Low	2.130	1.847	2.456	1.41
Pomerleau 1997 Low	1.840	1.569	2.158	1.39
Webb 2008 Low G1 Female	2.174	1.514	3.122	1.09
Webb 2008 Low G2 Female	2.564	1.333	4.932	0.68
Webb 2008 Low G3 Female	3.704	2.208	6.211	0.85
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	0.47
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	0.43
Mostashari 2005 Low	1.300	1.078	1.568	1.36
Rahman 2005 Low Male	1.220	0.753	1.977	0.90
Green 2007 Low 18-34 y	1.770	1.640	1.910	1.47
Kahn 2005 Low Female	2.800	1.684	4.656	0.87
Kiefe 2001 Low Male	2.960	1.388	6.311	0.57
Kiefe 2001 Low Female	0.930	0.428	2.021	0.55
D+L pooled ES (Random) North America	**1.634**	**1.453**	**1.838**	**40.45**
I-V pooled ES (Fixed) North America	**1.172**	**1.159**	**1.186**	**79.39**
Continent: Australian Continent				
Metcalf Low	1.820	1.383	2.395	1.23
Turrell 2002 Low	2.020	1.170	3.489	0.81
Siahpush 2001 Low Male	1.530	1.365	1.714	1.44
Siahpush 2001 Low Female	1.430	1.257	1.626	1.43
Siahpush 2003-JECH Low	0.960	0.411	2.244	0.49

Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	1.42
Thomas 2008 Low	2.500	1.963	3.184	1.28
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	0.57
Metcalf 2008 Low	1.940	1.379	2.729	1.13
D+L pooled ES (Random) Australian Continent	**1.653**	**1.440**	**1.897**	**9.81**
I-V pooled ES (Fixed) Australian Continent	**1.575**	**1.476**	**1.680**	**2.49**
Continent: Africa				
Mfenyana 2006 Low	1.282	1.001	1.641	1.27
D+L pooled ES (Random) Africa	**1.282**	**1.001**	**1.641**	**1.27**
I-V pooled ES (Fixed) Africa	**1.282**	**1.001**	**1.641**	**1.27**

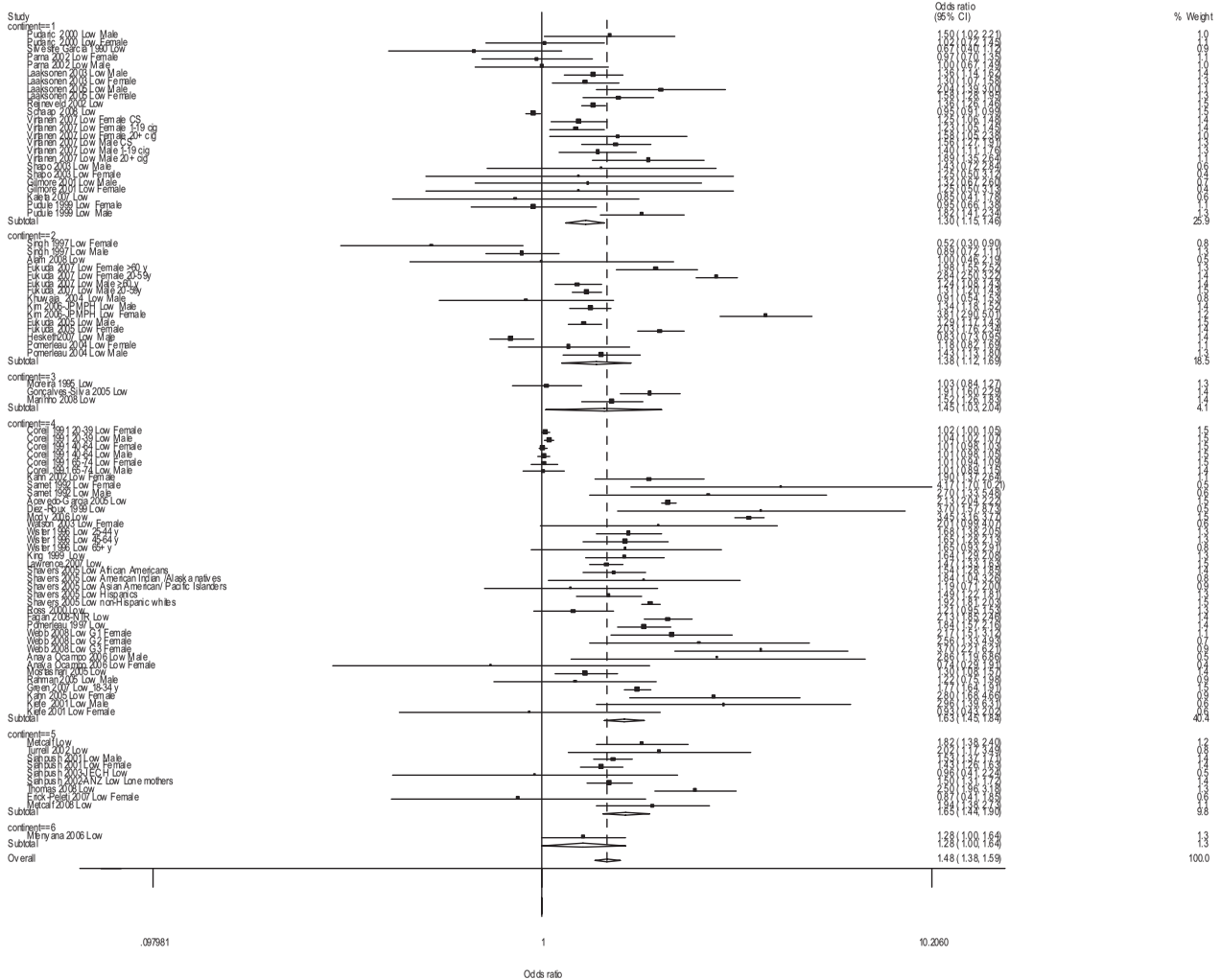
Test(s) of heterogeneity:

	Heterogeneity statistic	degrees of freedom	P	I-squared**		Tau-squared
continent==1	164.36	23	0.000	86.0%		0.0536
continent==2	307.47	14	0.000	95.4%		0.1443
continent==3	19.75	2	0.000	89.9%		0.0828
continent==4	2417.86	36	0.000	98.5%		0.0982
continent==5	23.90	8	0.002	66.5%		0.0226
continent==6	0.00	0	.	.%		0.0000
Overall	3119.20	88	0.000	97.2%		0.0927

Overall Test for heterogeneity between sub-groups :

185.86	5	0.000

Forest Plot 3: Low vs. High (All studies) by continent



Meta-analysis 4 Low vs. High (All studies) by WHO Region

Study	OR	LL	UL	% Weight
WHO Region: WPRO				
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	1.28
Fukuda 2007 Low Female 20–59 y	2.840	2.502	3.223	1.43
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	1.42
Fukuda 2007 Low Male 20–59 y	1.310	1.200	1.430	1.46
Fukuda 2005 Low Male	1.290	1.167	1.426	1.45
Fukuda 2005 Low Female	2.030	1.764	2.336	1.42
Hesketh 2007 Low Male	0.833	0.731	0.950	1.42
Metcalf Low	1.820	1.383	2.395	1.23
Turrell 2002 Low	2.020	1.170	3.489	0.81
Siahpush 2001 Low Male	1.530	1.365	1.714	1.44
Siahpush 2001 Low Female	1.430	1.257	1.626	1.43
Siahpush 2003-JECH Low	0.960	0.411	2.244	0.49
Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	1.42
Thomas 2008 Low	2.500	1.963	3.184	1.28
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	0.57
Metcalf 2008 Low	1.940	1.379	2.729	1.13
D+L pooled ES (Random) WPRO	**1.580**	**1.337**	**1.867**	**19.69**
I-V pooled ES (Fixed) WPRO	**1.490**	**1.435**	**1.547**	**7.37**
WHO Region: PAHO				
Moreira 1995 Low	1.031	0.840	1.265	1.34
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	1.37
Marinho 2008 Low	1.520	1.265	1.827	1.36
Coreil 1991 20–39 Low Female	1.024	1.002	1.047	1.49
Coreil 1991 20–39 Low Male	1.045	1.017	1.074	1.49
Coreil 1991 40–64 Low Female	1.008	0.983	1.034	1.49
Coreil 1991 40–64 Low Male	1.013	0.978	1.049	1.49
Coreil 1991 65–74 Low Female	1.014	0.939	1.095	1.47
Coreil 1991 65–74 Low Male	1.010	0.891	1.145	1.43
Kahn 2002 Low Female	1.900	1.368	2.639	1.15
Samet 1992 Low Female	4.167	1.701	10.206	0.46
Samet 1992 Low Male	2.703	1.333	5.480	0.62
Acevedo-Garcia 2005 Low	2.128	2.039	2.220	1.49
Diez-Roux 1999 Low	3.700	1.569	8.726	0.49

Mody 2006 Low	3.448	3.158	3.765	1.46
Watson 2003 Low Female	2.010	0.994	4.065	0.62
Wister 1996 Low 25-44 y	1.682	1.383	2.046	1.35
Wister 1996 Low 45-64 y	1.649	1.278	2.127	1.26
Wister 1996 Low 65+ y	1.649	0.934	2.911	0.78
King 1999 Low	1.639	1.294	2.076	1.29
Lawrence 2007 Low	1.470	1.328	1.627	1.45
Shavers 2005 Low African Americans	1.540	1.281	1.851	1.36
Shavers 2005 Low American Indian/ Alaska natives	1.840	1.038	3.263	0.78
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	0.85
Shavers 2005 Low Hispanics	1.490	1.225	1.812	1.35
Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	1.48
Ross 2000 Low	1.207	0.952	1.530	1.29
Fagan 2008-NTR Low	2.130	1.847	2.456	1.41
Pomerleau 1997 Low	1.840	1.569	2.158	1.39
Webb 2008 Low G1 Female	2.174	1.514	3.122	1.09
Webb 2008 Low G2 Female	2.564	1.333	4.932	0.68
Webb 2008 Low G3 Female	3.704	2.208	6.211	0.85
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	0.47
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	0.43
Mostashari 2005 Low	1.300	1.078	1.568	1.36
Rahman 2005 Low Male	1.220	0.753	1.977	0.90
Green 2007 Low 18-34 y	1.770	1.640	1.910	1.47
Kahn 2005 Low Female	2.800	1.684	4.656	0.87
Kiefe 2001 Low Male	2.960	1.388	6.311	0.57
Kiefe 2001 Low Female	0.930	0.428	2.021	0.55
D+L pooled ES (Random) PAHO	**1.616**	**1.445**	**1.807**	**44.52**
I-V pooled ES (Fixed) PAHO	**1.175**	**1.162**	**1.189**	**80.27**
WHO Region: EURO				
Pudaric 2000 Low Male	1.500	1.017	2.213	1.05
Pudaric 2000 Low Female	1.020	0.716	1.452	1.11
Silvestre Garcia 1990 Low	0.670	0.400	1.121	0.86
Parna 2002 Low Female	0.970	0.696	1.352	1.14
Parna 2002 Low Male	1.000	0.671	1.491	1.03

Laaksonen 2003 Low Male	1.360	1.144	1.616	1.38
Laaksonen 2003 Low Female	1.300	1.066	1.585	1.35
Laaksonen 2005 Low Male	2.040	1.389	2.997	1.06
Laaksonen 2005 Low Female	1.580	1.280	1.950	1.33
Reijneveld 2002 Low	1.360	1.263	1.464	1.47
Schaap 2008 Low	0.950	0.911	0.991	1.49
Virtanen 2007 Low Female CS	1.250	1.058	1.477	1.39
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	1.39
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	1.01
Virtanen 2007 Low Male CS	1.560	1.272	1.913	1.34
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	1.30
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	1.14
Shapo 2003 Low Male	1.429	0.719	2.837	0.64
Shapo 2003 Low Female	1.250	0.500	3.125	0.44
Gilmore 2001 Low Male	1.320	0.671	2.595	0.65
Gilmore 2001 Low Female	1.250	0.500	3.127	0.44
Kaleta 2007 Low	0.855	0.410	1.781	0.59
Pudule 1999 Low Female	0.952	0.655	1.384	1.07
Pudule 1999 Low Male	1.818	1.415	2.336	1.27
Pomerleau 2004 Low Female	1.176	0.818	1.692	1.09
Pomerleau 2004 Low Male	1.429	1.133	1.801	1.30
D+L pooled ES (Random) EURO	**1.297**	**1.162**	**1.448**	**28.32**
I-V pooled ES (Fixed) EURO	**1.121**	**1.087**	**1.156**	**11.05**
WHO Region: SEARO				
Singh 1997 Low Female	0.520	0.302	0.896	0.82
Singh 1997 Low Male	0.890	0.716	1.107	1.32
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	1.43
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	1.23
D+L pooled ES (Random) SEARO	**1.275**	**0.691**	**2.354**	**4.80**
I-V pooled ES (Fixed) SEARO	**1.369**	**1.240**	**1.510**	**1.08**
WHO Region: EMRO				
Alam 2008 Low	1.000	0.456	2.191	0.55
Khuwaja 2004 Low Male	0.909	0.540	1.530	0.85
D+L pooled ES (Random) EMRO	0.936	0.607	1.444	1.40
I-V pooled ES (Fixed) EMRO	0.936	0.607	1.444	0.06

WHO Region: AFRO				
Mfenyana 2006 Low	1.282	1.001	1.641	1.15
D+L pooled ES (Random) AFRO	**1.282**	**1.001**	**1.641**	**1.15**
I-V pooled ES (Fixed) AFRO	**1.282**	**1.001**	**1.641**	**1.15**

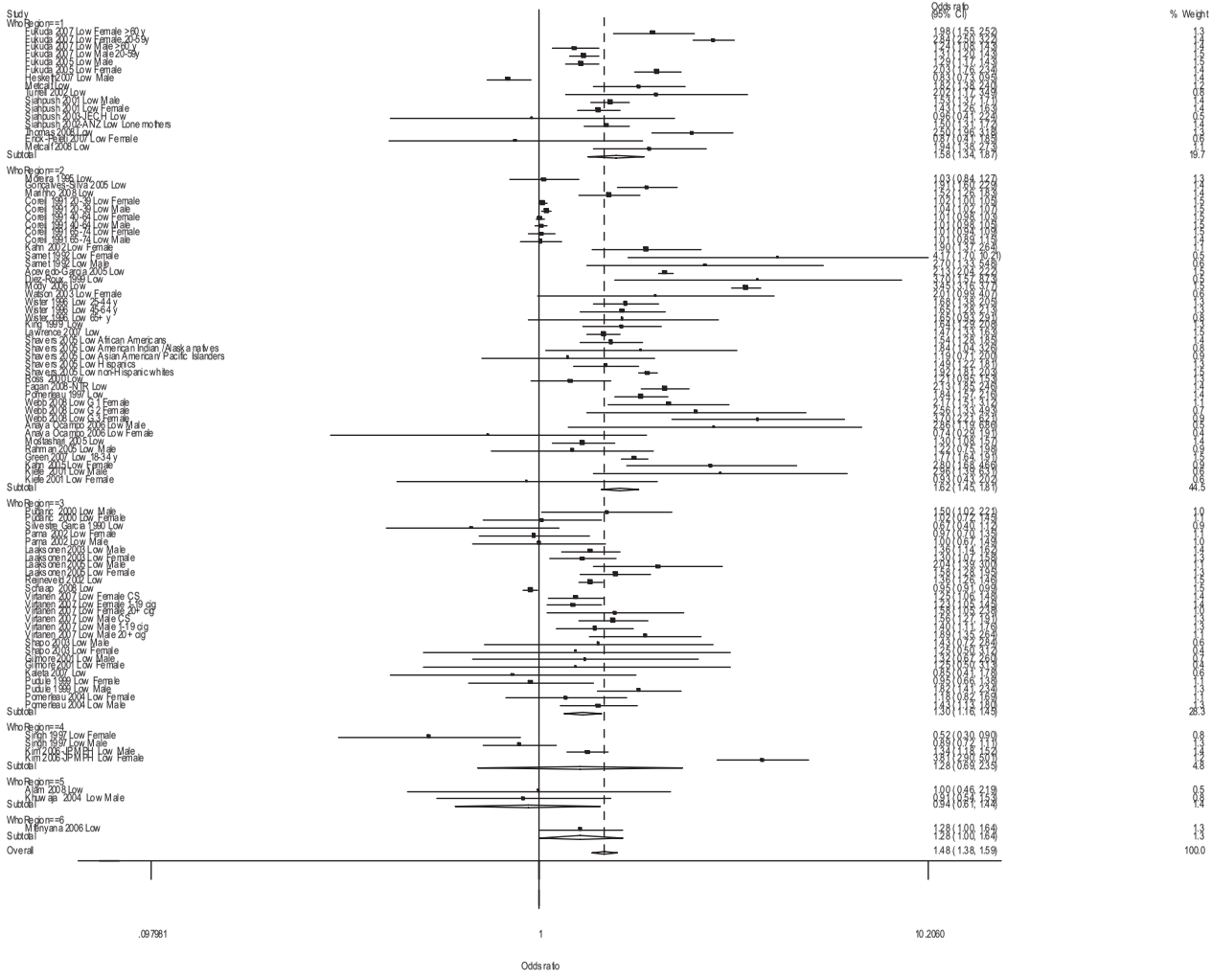
Test(s) of heterogeneity:

	Heterogeneity statistic	degrees of freedom	P	I-squared**		Tau-squared
WhoRegion==1	248.66	15	0.000	94.0%		0.0961
WhoRegion==2	2455.06	39	0.000	98.4%		0.0981
WhoRegion==3	168.72	25	0.000	85.2%		0.0519
WhoRegion==4	81.12	3	0.000	96.3%		0.3652
WhoRegion==5	0.04	1	0.843	0.0%		0.0000
WhoRegion==6	0.00	0	.	.%		0.0000
Overall	3119.20	88	0.000	97.2%		0.0927

Overall Test for heterogeneity between sub-groups :

	165.61	5	0.000

Forest Plot 4: Low vs. High (All studies) by Who Region



Meta-analysis 5 Low vs. High (All studies) by by the Mortality level of the countries

Study	OR	LL	UL	% Weight
Low Mortality Countries				
Acevedo-Garcia 2005 Low	2.128	2.039	2.220	1.49
Diez-Roux 1999 Low	3.700	1.569	8.726	0.49
Mody 2006 Low	3.448	3.158	3.765	1.46
Turrell 2002 Low	2.020	1.170	3.489	0.81
Virtanen 2007 Low Female CS	1.250	1.058	1.477	1.39
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	1.39
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	1.01
Virtanen 2007 Low Male CS	1.560	1.272	1.913	1.34
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	1.30
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	1.14
Watson 2003 Low Female	2.010	0.994	4.065	0.62
Webb 2008 Low G1 Female	2.174	1.514	3.122	1.09
Webb 2008 Low G2 Female	2.564	1.333	4.932	0.68
Webb 2008 Low G3 Female	3.704	2.208	6.211	0.85
Wister 1996 Low 25-44 y	1.682	1.383	2.046	1.35
Wister 1996 Low 45-64 y	1.649	1.278	2.127	1.26
Wister 1996 Low 65+ y	1.649	0.934	2.911	0.78
Coreil 1991 20-39 Low Female	1.024	1.002	1.047	1.49
Coreil 1991 20-39 Low Male	1.045	1.017	1.074	1.49
Coreil 1991 40-64 Low Female	1.008	0.983	1.034	1.49
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	1.49
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	1.47
Coreil 1991 65-74 Low Male	1.010	0.891	1.145	1.43
King 1999 Low	1.639	1.294	2.076	1.29
Laaksonen 2003 Low Male	1.360	1.144	1.616	1.38
Laaksonen 2003 Low Female	1.300	1.066	1.585	1.35
Laaksonen 2005 Low Male	2.040	1.389	2.997	1.06
Laaksonen 2005 Low Female	1.580	1.280	1.950	1.33
Lawrence 2007 Low	1.470	1.328	1.627	1.45
Shavers 2005 Low African Americans	1.540	1.281	1.851	1.36
Shavers 2005 Low American Indian/ Alaska natives	1.840	1.038	3.263	0.78
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	0.85

Shavers 2005 Low Hispanics	1.490	1.225	1.812	1.35
Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	1.48
Siahpush 2001 Low Male	1.530	1.365	1.714	1.44
Siahpush 2001 Low Female	1.430	1.257	1.626	1.43
Siahpush 2003-JECH Low	0.960	0.411	2.244	0.49
Thomas 2008 Low	2.500	1.963	3.184	1.28
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	0.57
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	1.28
Fukuda 2007 Low Female 20-59y	2.840	2.502	3.223	1.43
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	1.42
Fukuda 2007 Low Male 20-59y	1.310	1.200	1.430	1.46
Kahn 2002 Low Female	1.900	1.368	2.639	1.15
Kahn 2005 Low Female	2.800	1.684	4.656	0.87
Kiefe 2001 Low Male	2.960	1.388	6.311	0.57
Kiefe 2001 Low Female	0.930	0.428	2.021	0.55
Reijneveld 2002 Low	1.360	1.263	1.464	1.47
Ross 2000 Low	1.207	0.952	1.530	1.29
Samet 1992 Low Female	4.167	1.701	0.206	0.46
Samet 1992 Low Male	2.703	1.333	5.480	0.62
Schaap 2008 Low	0.950	0.911	0.991	1.49
Mostashari 2005 Low	1.300	1.078	1.568	1.36
Rahman 2005 Low Male	1.220	0.753	1.977	0.90
Fagan 2008-NTR Low	2.130	1.847	2.456	1.41
Fukuda 2005 Low Male	1.290	1.167	1.426	1.45
Fukuda 2005 Low Female	2.030	1.764	2.336	1.42
Metcalf Low	1.820	1.383	2.395	1.23
Metcalf 2008 Low	1.940	1.379	2.729	1.13
Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	1.42
Pudaric 2000 Low Male	1.500	1.017	2.213	1.05
Pudaric 2000 Low Female	1.020	0.716	1.452	1.11
Pomerleau 1997 Low	1.840	1.569	2.158	1.39
Silvestre Garcia 1990 Low	0.670	0.400	1.121	0.86
Green 2007 Low 18-34 y	1.770	1.640	1.910	1.47
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	0.47
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	0.43
Shapo 2003 Low Male	1.429	0.719	2.837	0.64
Shapo 2003 Low Female	1.250	0.500	3.125	0.44

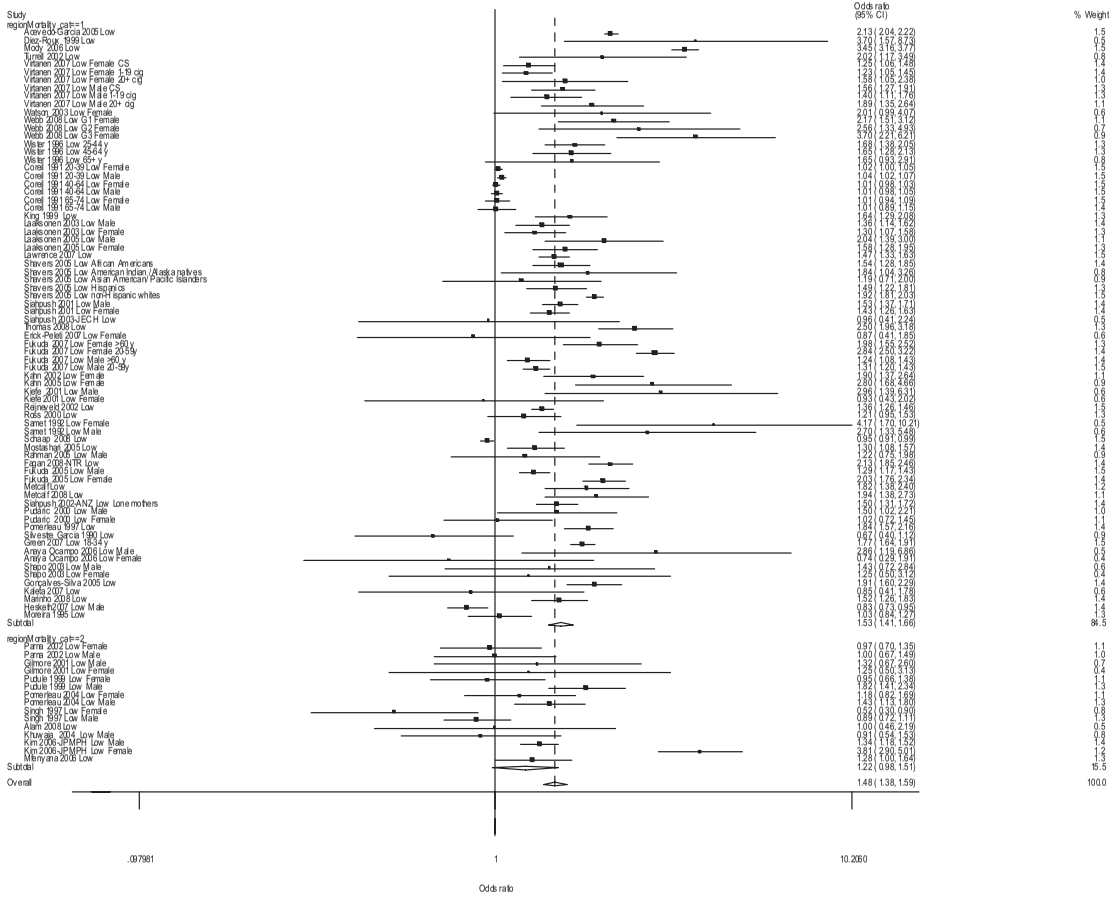
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	1.37
Kaleta 2007 Low	0.855	0.410	1.781	0.59
Marinho 2008 Low	1.520	1.265	1.827	1.36
Hesketh 2007 Low Male	0.833	0.731	0.950	1.42
Moreira 1995 Low	1.031	0.840	1.265	1.34
D+L pooled ES (Random) Low Mortality Countries	**1.530**	**1.414**	**1.656**	**84.53**
I-V pooled ES (Fixed) Low Mortality Countries	**1.189**	**1.177**	**1.201**	**97.99**
High Mortality Countries				
Parna 2002 Low Female	0.970	0.696	1.352	1.14
Parna 2002 Low Male	1.000	0.671	1.491	1.03
Gilmore 2001 Low Male	1.320	0.671	2.595	0.65
Gilmore 2001 Low Female	1.250	0.500	3.127	0.44
Pudule 1999 Low Female	0.952	0.655	1.384	1.07
Pudule 1999 Low Male	1.818	1.415	2.336	1.27
Pomerleau 2004 Low Female	1.176	0.818	1.692	1.09
Pomerleau 2004 Low Male	1.429	1.133	1.801	1.30
Singh 1997 Low Female	0.520	0.302	0.896	0.82
Singh 1997 Low Male	0.890	0.716	1.107	1.32
Alam 2008 Low	1.000	0.456	2.191	0.55
Khuwaja 2004 Low Male	0.909	0.540	1.530	0.85
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	1.43
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	1.23
Mfenyana 2006 Low	1.282	1.001	1.641	1.27
D+L pooled ES (Random) High Mortality Countries	**1.220**	**0.983**	**1.513**	**15.47**
I-V pooled ES (Fixed) High Mortality Countries	**1.321**	**1.230**	**1.420**	**2.01**

Test(s) of heterogeneity:	Heterogeneity statistic	degrees of freedom	P	I-squared**	Tau-squared
regionMortality_cat=	3011.76	73	0.000	97.6%	0.0922
regionMortality_cat=	99.34	14	0.000	85.9%	0.1373
Overall	3119.20	88	0.000	97.2%	0.0927

Overall Test for heterogeneity between sub-groups :

	8.09	1	0.004

Forest Plot 5: Low vs. High by subgroups of Mortality



Meta-analysis 6 Low vs. High (All studies) by quality

Study	OR	UL	LL	% Weight
Bias: High				
Metcalf Low	1.820	1.383	2.395	1.23
Siahpush 2001 Low Male	1.530	1.365	1.714	1.44
Siahpush 2001 Low Female	1.430	1.257	1.626	1.43
Siahpush 2003-JECH Low	0.960	0.411	2.244	0.49
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	0.57
Metcalf 2008 Low	1.940	1.379	2.729	1.13
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Coreil 1991 20-39 Low Female	1.024	1.002	1.047	1.49
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Coreil 1991 40-64 Low Female	1.008	0.983	1.034	1.49
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	1.49
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	1.47
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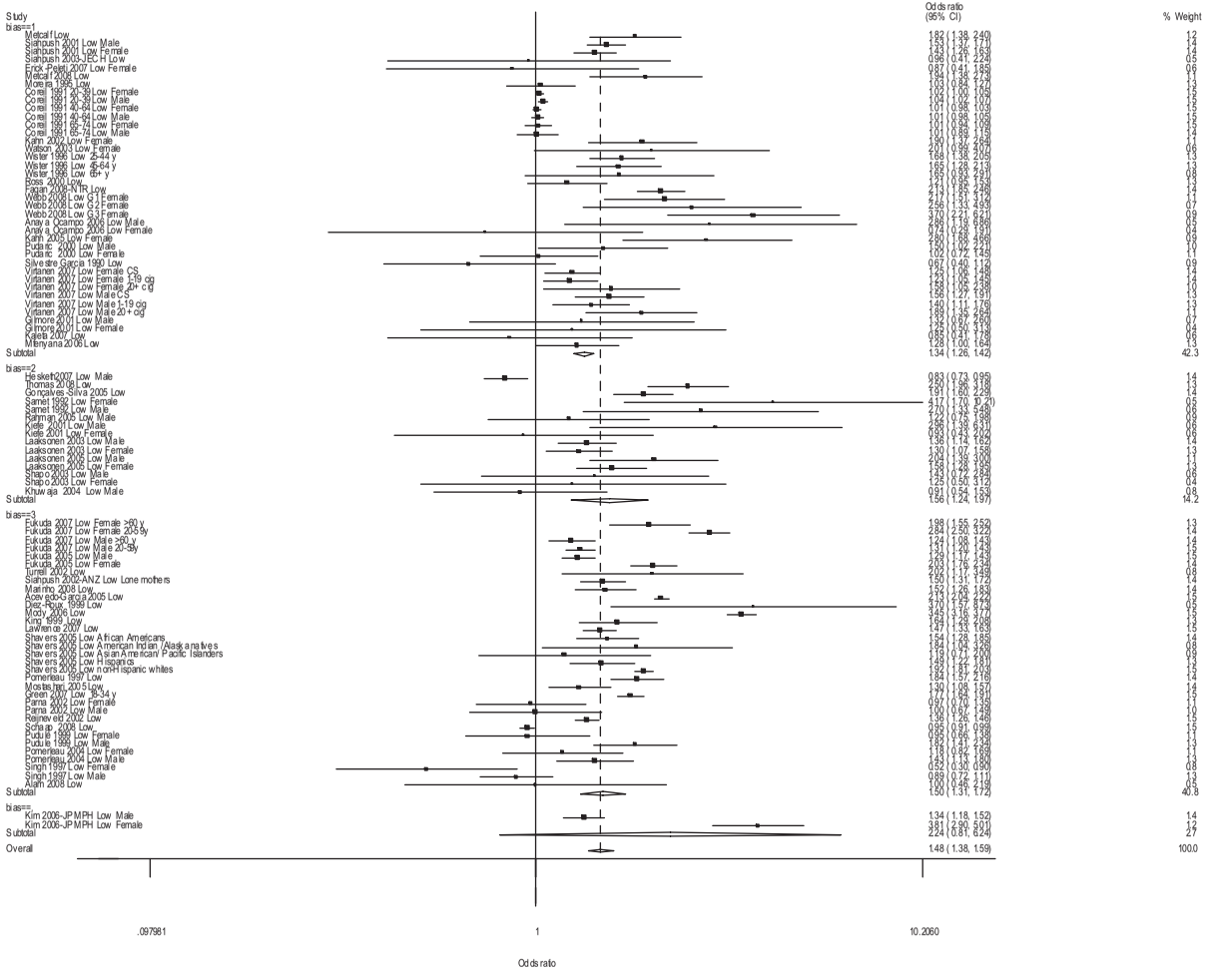
Wister 1996 Low 65+ y	1.649	0.934	2.911	0.78
Ross 2000 Low	1.207	0.952	1.530	1.29
Fagan 2008-NTR Low	2.130	1.847	2.456	1.41
Webb 2008 Low G1 Female	2.174	1.514	3.122	1.09
Webb 2008 Low G2 Female	2.564	1.333	4.932	0.68
Webb 2008 Low G3 Female	3.704	2.208	6.211	0.85
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	0.47
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	0.43
Kahn 2005 Low Female	2.800	1.684	4.656	0.87
Pudaric 2000 Low Male	1.500	1.017	2.213	1.05
Pudaric 2000 Low Female	1.020	0.716	1.452	1.11
Silvestre Garcia 1990 Low	0.670	0.400	1.121	0.86
Virtanen 2007 Low Female CS	1.250	1.058	1.477	1.39
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	1.39
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	1.01
Virtanen 2007 Low Male CS	1.560	1.272	1.913	1.34
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	1.30
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	1.14

Gilmore 2001 Low Male	1.320	0.671	2.595	0.65
Gilmore 2001 Low Female	1.250	0.500	3.127	0.44
Kaleta 2007 Low	0.855	0.410	1.781	0.59
Mfenyana 2006 Low	1.282	1.001	1.641	1.27
D+L pooled ES (Random) High Bias	**1.336**	**1.257**	**1.420**	**42.29**
I-V pooled ES (Fixed) High Bias	**1.053**	**1.040**	**1.066**	**68.39**
Bias: Medium				
Hesketh2007 Low Male	0.833	0.731	0.950	1.42
Thomas 2008 Low	2.500	1.963	3.184	1.28
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	1.37
Samet 1992 Low Female	4.167	1.701	10.206	0.46
Samet 1992 Low Male	2.703	1.333	5.480	0.62
Rahman 2005 Low Male	1.220	0.753	1.977	0.90
Kiefe 2001 Low Male	2.960	1.388	6.311	0.57
Kiefe 2001 Low Female	0.930	0.428	2.021	0.55
Laaksonen 2003 Low Male	1.360	1.144	1.616	1.38
Laaksonen 2003 Low Female	1.300	1.066	1.585	1.35
Laaksonen 2005 Low Male	2.040	1.389	2.997	1.06
Laaksonen 2005 Low Female	1.580	1.280	1.950	1.33
Shapo 2003 Low Male	1.429	0.719	2.837	0.64
Shapo 2003 Low Female	1.250	0.500	3.125	0.44
Khuwaja 2004 Low Male	0.909	0.540	1.530	0.85
D+L pooled ES (Random) Medium Bias	**1.563**	**1.242**	**1.967**	**14.23**
I-V pooled ES (Fixed) Medium Bias	**1.353**	**1.263**	**1.449**	**2.21**
Bias: Low				
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	1.28
Fukuda 2007 Low Female 20-59y	2.840	2.502	3.223	1.43
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	1.42
Fukuda 2007 Low Male 20-59y	1.310	1.200	1.430	1.46
Fukuda 2005 Low Male	1.290	1.167	1.426	1.45
Fukuda 2005 Low Female	2.030	1.764	2.336	1.42
Turrell 2002 Low	2.020	1.170	3.489	0.81
Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	1.42
Marinho 2008 Low	1.520	1.265	1.827	1.36
Acevedo-Garcia 2005 Low	2.128	2.039	2.220	1.49
Diez-Roux 1999 Low	3.700	1.569	8.726	0.49
Mody 2006 Low	3.448	3.158	3.765	1.46

King 1999 Low	1.639	1.294	2.076	1.29
Lawrence 2007 Low	1.470	1.328	1.627	1.45
Shavers 2005 Low African Americans	1.540	1.281	1.851	1.36
Shavers 2005 Low American Indian/ Alaska natives	1.840	1.038	3.263	0.78
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	0.85
Shavers 2005 Low Hispanics	1.490	1.225	1.812	1.35
Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	1.48
Pomerleau 1997 Low	1.840	1.569	2.158	1.39
Mostashari 2005 Low	1.300	1.078	1.568	1.36
Green 2007 Low 18-34 y	1.770	1.640	1.910	1.47
Parna 2002 Low Female	0.970	0.696	1.352	1.14
Parna 2002 Low Male	1.000	0.671	1.491	1.03
Reijneveld 2002 Low	1.360	1.263	1.464	1.47
Schaap 2008 Low	0.950	0.911	0.991	1.49
Pudule 1999 Low Female	0.952	0.655	1.384	1.07
Pudule 1999 Low Male	1.818	1.415	2.336	1.27
Pomerleau 2004 Low Female	1.176	0.818	1.692	1.09
Pomerleau 2004 Low Male	1.429	1.133	1.801	1.30
Singh 1997 Low Female	0.520	0.302	0.896	0.82
Singh 1997 Low Male	0.890	0.716	1.107	1.32
Alam 2008 Low	1.000	0.456	2.191	0.55
D+L pooled ES (Random) Low Bias	**1.498**	**1.306**	**1.719**	**40.82**
I-V pooled ES (Fixed) Low Bias	**1.572**	**1.542**	**1.602**	**28.57**

Test(s) of heterogeneity:			Heterogeneity		degrees of
	statistic	freedom	P	I-squared**	Tau-squared
bias==1	379.58	38	0.000	90.0%	0.0174
bias==2	115.06	14	0.000	87.8%	0.1467
bias==3	1347.26	32	0.000	97.6%	0.1409
bias==.	46.65	1	0.000	97.9%	0.5343
Overall	3119.20	88	0.000	97.2%	0.0927
Overall Test for heterogeneity between sub-groups :					
	1230.65	3	0.000		

Forest Plot 6: Low vs. High (All studies) by quality



Meta-analysis 7 Low vs. High (Only Studies that have included the medium option)

Study	OR	LL	UL	% Weight
Turrell 2002 Low	2.020	1.170	3.489	1.83
Virtanen 2007 Low Female CS	1.250	1.058	1.477	3.21
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	3.23
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	2.31
Virtanen 2007 Low Male CS	1.560	1.272	1.913	3.09
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	3.00
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	2.60
Watson 2003 Low Female	2.010	0.994	4.065	1.40
Laaksonen 2003 Low Male	1.360	1.144	1.616	3.20
Laaksonen 2003 Low Female	1.300	1.066	1.585	3.12
Shavers 2005 Low African Americans	1.540	1.281	1.851	3.16
Shavers 2005 Low American Indian/ Alaska natives	1.840	1.038	3.263	1.75
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	1.93
Shavers 2005 Low Hispanics	1.490	1.225	1.812	3.12
Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	3.45
Siahpush 2001 Low Male	1.530	1.365	1.714	3.35
Siahpush 2001 Low Female	1.430	1.257	1.626	3.32
Siahpush 2003-JECH Low	0.960	0.411	2.244	1.10
Gilmore 2001 Low Male	1.320	0.671	2.595	1.47
Gilmore 2001 Low Female	1.250	0.500	3.127	0.99
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	3.17
Kahn 2002 Low Female	1.900	1.368	2.639	2.63
Kiefe 2001 Low Male	2.960	1.388	6.311	1.28
Kiefe 2001 Low Female	0.930	0.428	2.021	1.24
Reijneveld 2002 Low	1.360	1.263	1.464	3.43
Schaap 2008 Low	0.950	0.911	0.991	3.46
Mostashari 2005 Low	1.300	1.078	1.568	3.15
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	3.33
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	2.84
Fagan 2008-NTR Low	2.130	1.847	2.456	3.28
Fukuda 2005 Low Male	1.290	1.167	1.426	3.38
Fukuda 2005 Low Female	2.030	1.764	2.336	3.29
Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	3.30
Pudaric 2000 Low Male	1.500	1.017	2.213	2.39

Pudaric 2000 Low Female	1.020	0.716	1.452	2.53
Pomerleau 1997 Low	1.840	1.569	2.158	3.23
Green 2007 Low 18-34 y	1.770	1.640	1.910	3.42
D+L pooled ES (Random)	**1.545**	**1.387**	**1.720**	**100.00**
I-V pooled ES (Fixed)	**1.391**	**1.361**	**1.421**	**100.00**

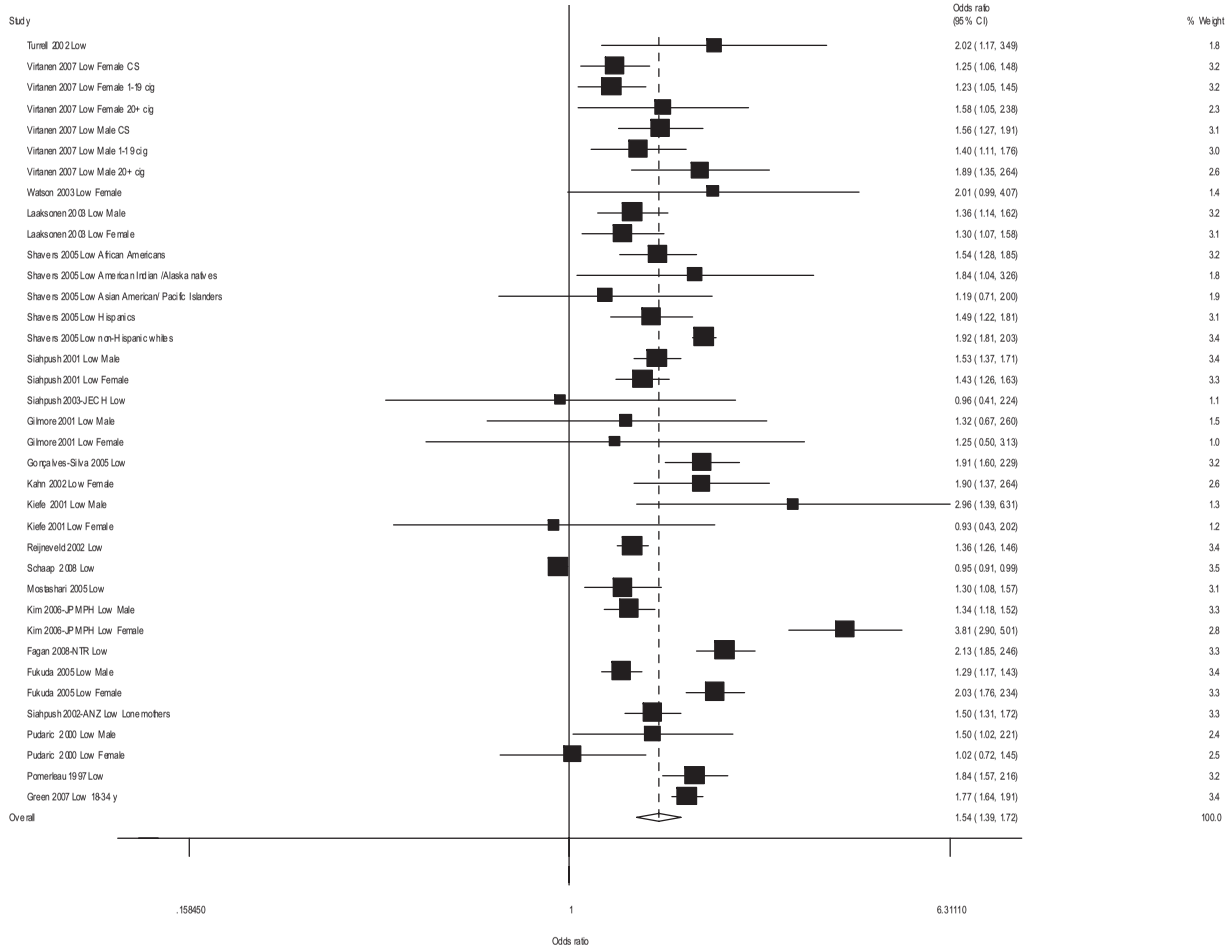
Heterogeneity chi-squared = 647.14 (d.f. = 36) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 94.4%

Estimate of between-study variance Tau-squared = 0.0866

Test of ES = 1 : z = 7.92 p = 0.000

Forest Plot 7: Low vs. High (Only Studies that have included the medium option)



Meta-analysis 8 Low vs. Medium (Only Studies that have included the medium option)

Study	OR	LL	UL	% Weight
Turrell 2002 Medium	1.110	0.713	1.728	1.51
Virtanen 2007 Medium Female CS	1.080	0.940	1.240	3.54
Virtanen 2007 Medium Female 1-19cig	1.080	0.940	1.240	3.54
Virtanen 2007 Medium Female 20+ cig	1.230	0.857	1.765	1.92
Virtanen 2007 Medium Male CS	1.180	0.975	1.428	3.14
Virtanen 2007 Medium Male 1-19 cig	1.190	0.958	1.478	2.93
Virtanen 2007 Medium Male 20+ cig	1.150	0.831	1.592	2.14
Watson 2003 Medium Female	2.700	1.409	5.175	0.87
Laaksonen 2003 Medium Male	1.110	0.949	1.298	3.40
Laaksonen 2003 Medium Female	1.130	0.951	1.342	3.28
Shavers 2005 Medium African Americans	1.170	0.947	1.445	2.97
Shavers 2005 Medium American Indian/ Alaska nativesmedium	1.460	0.863	2.469	1.20
Shavers 2005 Medium Asian American/ Pacific Islanders Medium	1.950	1.412	2.693	2.15
Shavers 2005 Medium Hispanics	1.270	1.061	1.521	3.22
Shavers 2005 Medium non-Hispanic whites	1.400	1.327	1.477	4.05
Siahpush 2001 Medium Male	1.460	1.305	1.634	3.73
Siahpush 2001 Medium Female	1.230	1.085	1.394	3.64
Siahpush 2003-JECH Medium	0.820	0.012	57.236	0.03
Gilmore 2001 Medium Male	0.890	0.489	1.618	0.99
Gilmore 2001 Medium Female	1.340	0.548	3.277	0.51
Gonçalves-Silva 2005 Medium	1.300	1.053	1.605	2.97
Kahn 2002 Medium Female	1.500	1.112	2.023	2.31
Kiefe 2001 Medium Male	1.940	1.013	3.716	0.87
Kiefe 2001 Medium Female	0.710	0.360	1.400	0.81
Reijneveld 2002 Medium	1.150	1.068	1.239	3.96
Schaap 2008 Medium	0.940	0.906	0.975	4.10
Mostashari 2005 Medium	1.300	1.113	1.518	3.42
Kim 2006-JPMPH Medium Male	1.200	1.095	1.316	3.86
Kim 2006-JPMPH Medium Female	1.380	1.051	1.812	2.50
Fagan 2008-NTR Medium	1.590	1.339	1.888	3.28
Fukuda 2005 Medium Male	1.120	1.020	1.230	3.85
Fukuda 2005 Medium Female	1.340	1.163	1.544	3.52
Siahpush 2002-ANZ Medium Lone mothers	1.200	1.064	1.354	3.67

Pudaric 2000 Medium Male	1.170	0.892	1.534	2.51
Pudaric 2000 Medium Female	0.990	0.685	1.431	1.88
Pomerleau 1997 Medium	1.330	1.189	1.488	3.73
Green 2007 Medium 18-34 y	1.430	1.338	1.528	3.99
D+L pooled ES (Random)	**1.246**	**1.164**	**1.334**	**100.0**
I-V pooled ES (Fixed)	**1.171**	**1.148**	**1.195**	**100.00**

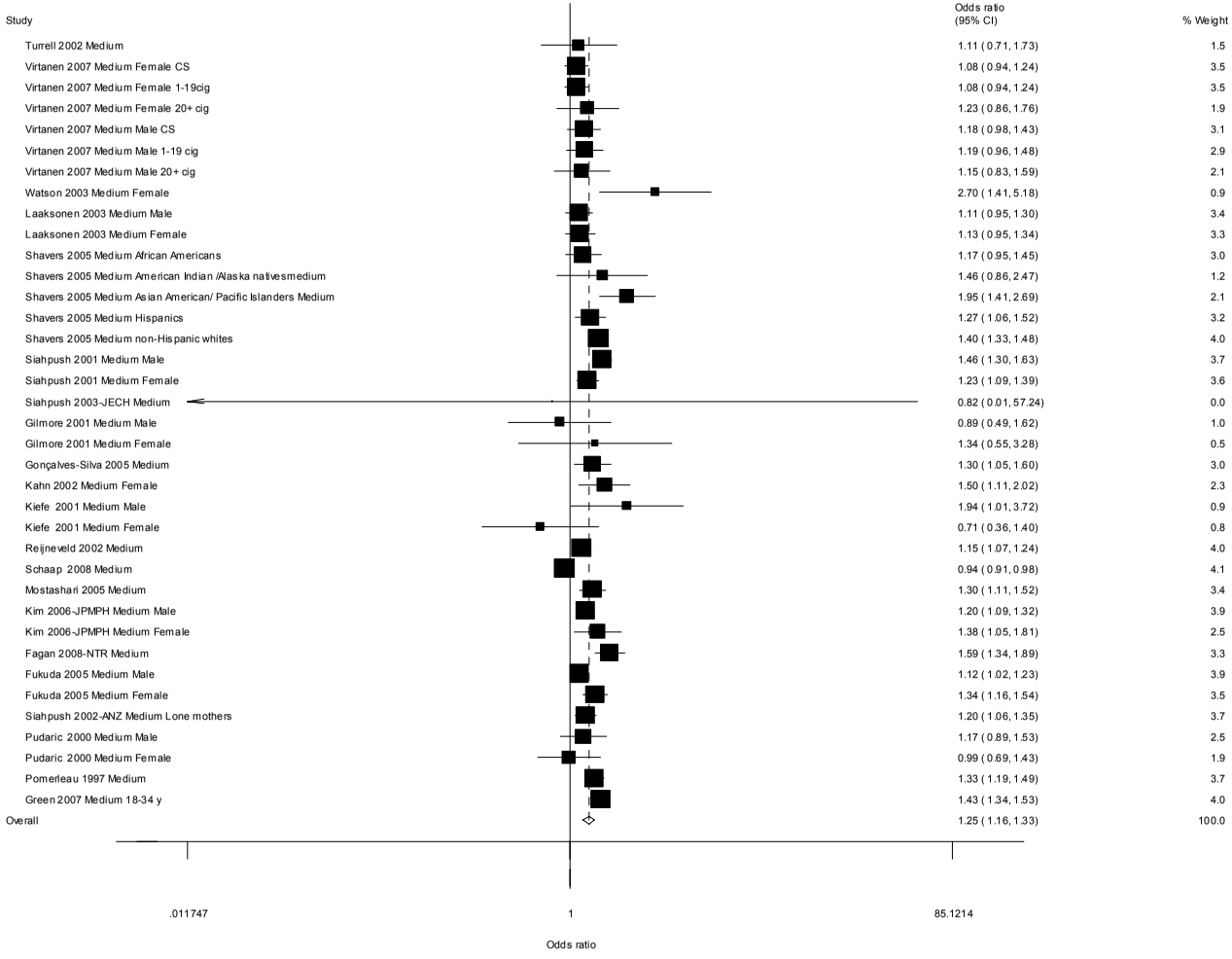
Heterogeneity chi-squared = 284.03 (d.f. = 36) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 87.3%

Estimate of between-study variance Tau-squared = 0.0292

Test of ES=1 : z = 6.32 p = 0.000

Forest Plot 8: Low vs. Medium (Only Studies that have included the medium option)



Meta-analysis 9 Low vs. High (All studies): FEMALES

Study	OR	LL	UL	% Weight
Parna 2002 Low Female	0.970	0.696	1.352	4.26
Singh 1997 Low Female	0.520	0.302	0.896	2.64
Virtanen 2007 Low Female CS	1.250	1.058	1.477	5.85
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	5.90
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	3.57
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	1.19
Coreil 1991 20-39 Low Female	1.024	1.002	1.047	6.68
Coreil 1991 40-64 Low Female	1.008	0.983	1.034	6.67
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	6.50
Laaksonen 2003 Low Female	1.300	1.066	1.585	5.56
Laaksonen 2005 Low Female	1.580	1.280	1.950	5.45
Shapo 2003 Low Female	1.250	0.500	3.125	1.25
Siahpush 2001 Low Female	1.430	1.257	1.626	6.17
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	5.14
Fukuda 2007 Low Female 20-59y	2.840	2.502	3.223	6.18
Gilmore 2001 Low Female	1.250	0.500	3.127	1.25
Kiefe 2001 Low Female	0.930	0.428	2.021	1.62
Samet 1992 Low Female	4.167	1.701	10.206	1.30
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	4.83
Fukuda 2005 Low Female	2.030	1.764	2.336	6.08
Pudaric 2000 Low Female	1.020	0.716	1.452	4.06
Pudule 1999 Low Female	0.952	0.655	1.384	3.88
Pomerleau 2004 Low Female	1.176	0.818	1.692	3.97
D+L pooled ES (Random) Females	**1.376**	**1.229**	**1.542**	**100.00**
I-V pooled ES (Fixed) Females	**1.062**	**1.046**	**1.078**	**100.00**

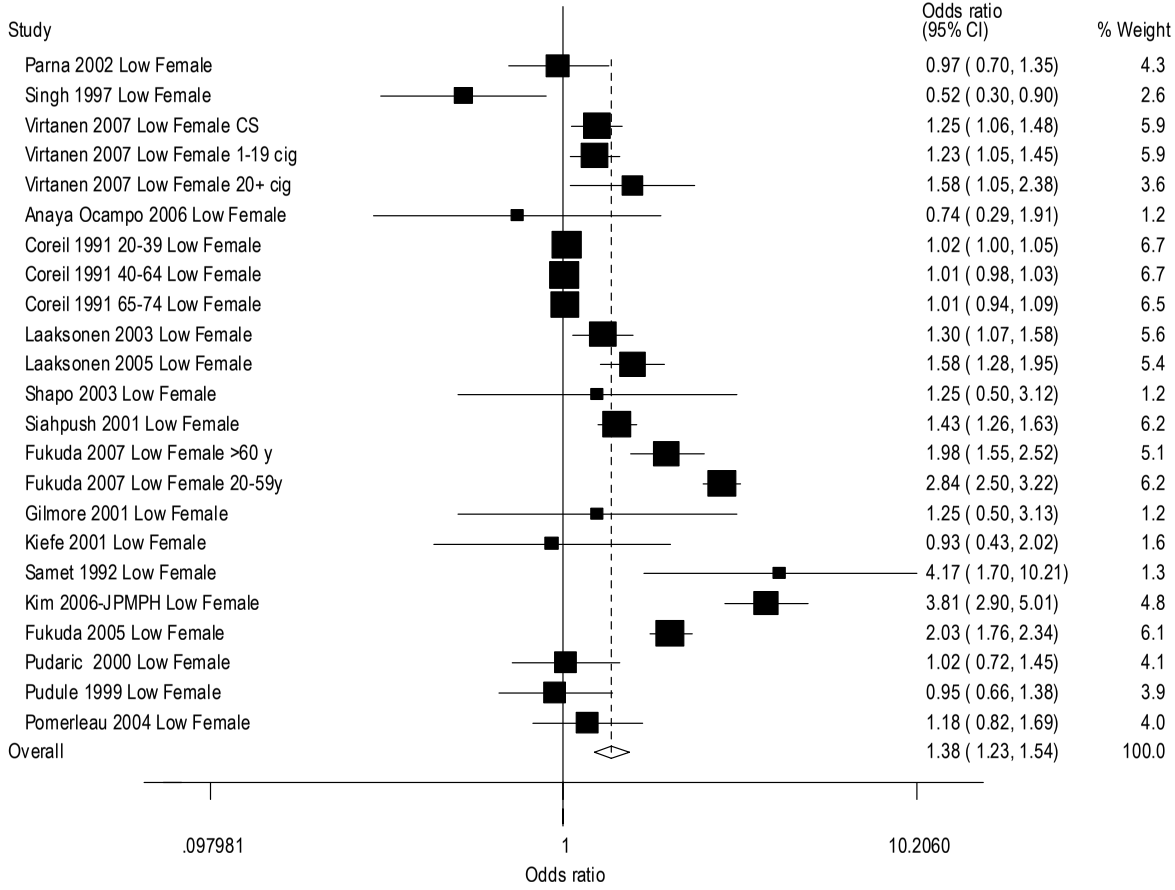
Heterogeneity chi-squared = 517.84 (d.f. = 22) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 95.8%

Estimate of between-study variance Tau-squared = 0.0501

Test of ES=1 : z = 5.51 p = 0.000

Forest Plot 9: Low vs. High (All studies): FEMALES



Meta-analysis 10 Low vs. High (Only Studies that have included the medium option): FEMALES

Study	OR	LL	UL	% Weight
Virtanen 2007 Low Female CS	1.250	1.058	1.477	12.22
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	12.27
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	8.97
Laaksonen 2003 Low Female	1.300	1.066	1.585	11.87
Siahpush 2001 Low Female	1.430	1.257	1.626	12.58
Gilmore 2001 Low Female	1.250	0.500	3.127	3.96
Kiefe 2001 Low Female	0.930	0.428	2.021	4.95
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	10.91
Fukuda 2005 Low Female	2.030	1.764	2.336	12.48
Pudaric 2000 Low Female	1.020	0.716	1.452	9.79
D+L pooled ES (Random)	**1.509**	**1.213**	**1.877**	**100.00**
I-V pooled ES (Fixed)	**1.521**	**1.426**	**1.622**	**100.00**

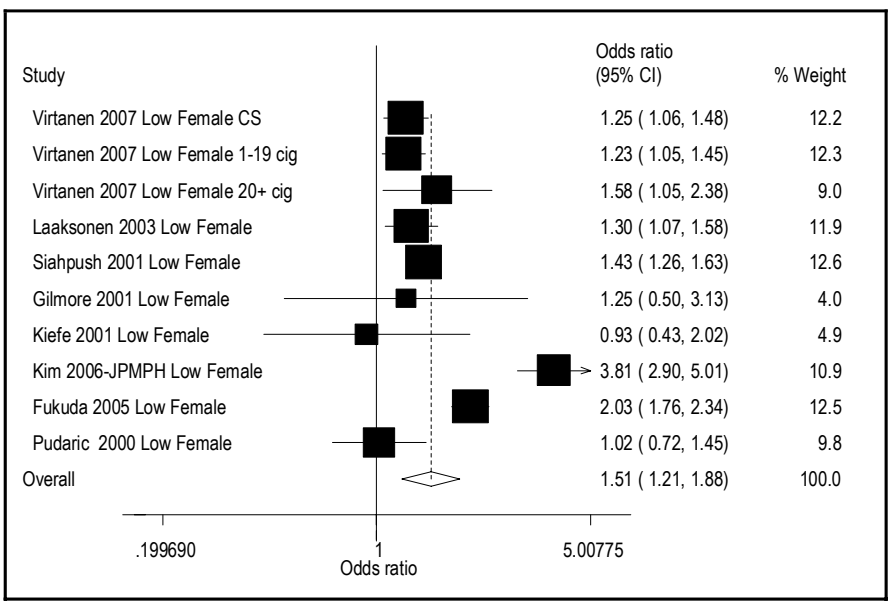
Heterogeneity chi-squared = 81.54 (d.f. = 9) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 89.0%

Estimate of between-study variance Tau-squared = 0.0944

Test of ES=1 : z = 3.69 p = 0.000

Forest Plot 10: Low vs. High (Only Studies that have included the medium option): FEMALES



Meta-analysis 11 Low vs. Medium (Only Studies that have included the medium option): FEMALES

Study	OR	LL	UL	% Weight
Virtanen 2007 Medium Female CS	1.080	0.940	1.240	18.38
Virtanen 2007 Medium Female 1-19cig	1.080	0.940	1.240	18.38
Virtanen 2007 Medium Female 20+ cig	1.230	0.857	1.765	2.71
Laaksonen 2003 Medium Female	1.130	0.951	1.342	11.92
Siahpush 2001 Medium Female	1.230	1.085	1.394	22.50
Gilmore 2001 Medium Female	1.340	0.548	3.277	0.44
Kiefe 2001 Medium Female	0.710	0.360	1.400	0.76
Kim 2006-JPMPH Medium Female	1.380	1.051	1.812	4.75
Fukuda 2005 Medium Female	1.340	1.163	1.544	17.56
Pudaric 2000 Medium Female	0.990	0.685	1.431	2.60
D+L pooled# ES (Random)	**1.172**	**1.092**	**1.259**	**100.00**
I-V pooled* ES (Fixed)	**1.174**	**1.106**	**1.245**	**100.00**

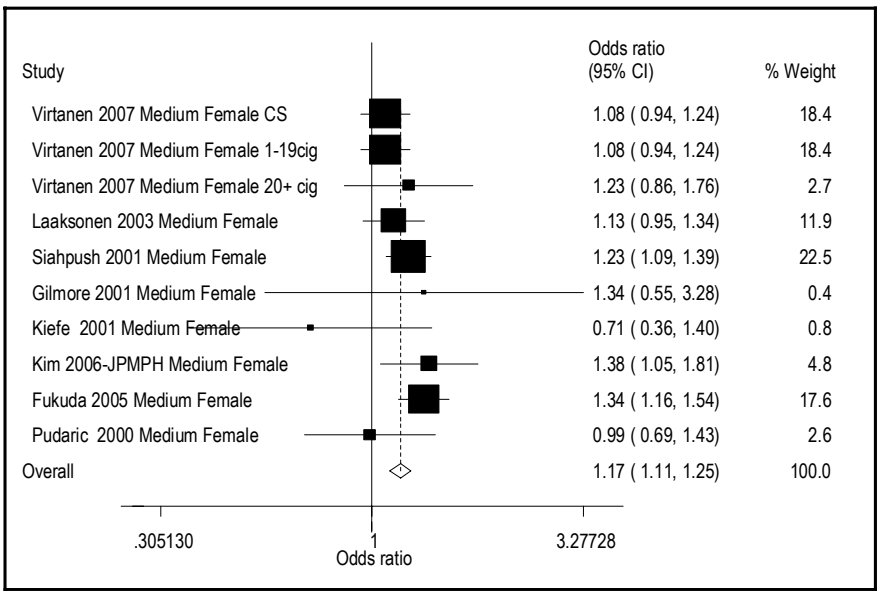
Heterogeneity chi-squared = 11.29 (d.f. = 9) p = 0.256

I-squared (variation in ES attributable to heterogeneity) = 20.3%

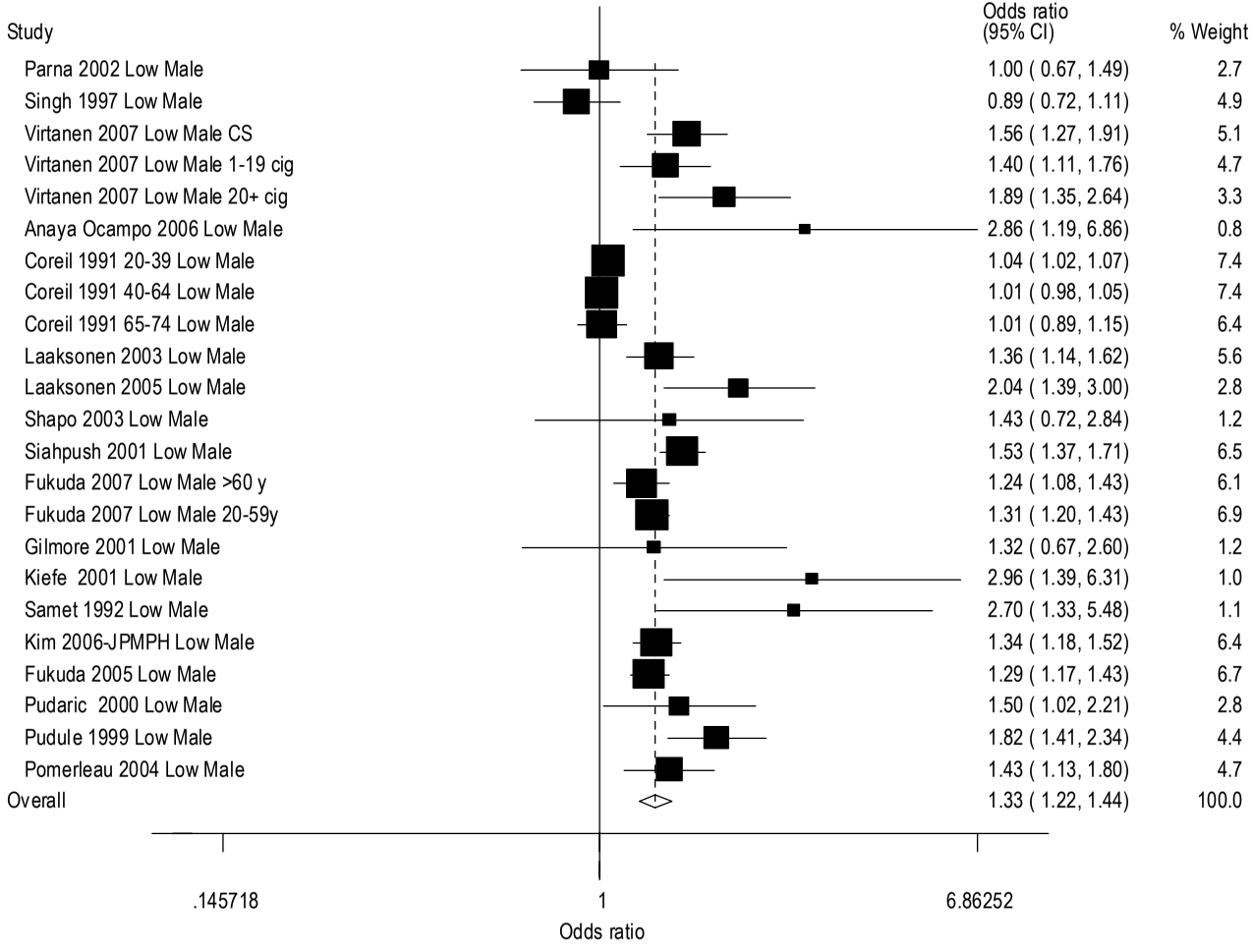
Test of ES=1 : z = 5.29 p = 0.000

*inverse variance pooled estimate # Der Simonian-Laird pooled estimate

Forest Plot 11: Low vs. Medium (Only Studies that have included the medium option): FEMALES



Forest Plot 12: Low vs. High (All studies): MALES



Meta-analysis 12 Low vs. High (All studies): MALES

Study	OR	LL	UL	% Weight
Parna 2002 Low Male	1.000	0.671	1.491	2.68
Singh 1997 Low Male	0.890	0.716	1.107	4.87
Virtanen 2007 Low Male CS	1.560	1.272	1.913	5.10
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	4.68
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	3.31
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	0.78
Coreil 1991 20-39 Low Male	1.045	1.017	1.074	7.42
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	7.38
Coreil 1991 65-74 Low Male	1.010	0.891	1.145	6.36
Laaksonen 2003 Low Male	1.360	1.144	1.616	5.60
Laaksonen 2005 Low Male	2.040	1.389	2.997	2.81
Shapo 2003 Low Male	1.429	0.719	2.837	1.19
Siahpush 2001 Low Male	1.530	1.365	1.714	6.53
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	6.12
Fukuda 2007 Low Male 20-59y	1.310	1.200	1.430	6.89
Gilmore 2001 Low Male	1.320	0.671	2.595	1.22
Kiefe 2001 Low Male	2.960	1.388	6.311	1.01
Samet 1992 Low Male	2.703	1.333	5.480	1.13
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	6.39
Fukuda 2005 Low Male	1.290	1.167	1.426	6.72
Pudaric 2000 Low Male	1.500	1.017	2.213	2.77
Pudule 1999 Low Male	1.818	1.415	2.336	4.38
Pomerleau 2004 Low Male	1.429	1.133	1.801	4.67
D+L pooled ES (Random) Males	**1.328**	**1.223**	**1.440**	**100.00**
I-V pooled ES (Fixed) Males	**1.095**	**1.075**	**1.116**	**100.00**

Heterogeneity chi-squared = 191.80 (d.f. = 22) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 88.5%

Estimate of between-study variance Tau-squared = 0.0232

Test of ES=1 : z = 6.80 p = 0.000

Meta-analysis 13 Low vs. High (Only Studies that have included the medium option): MALES

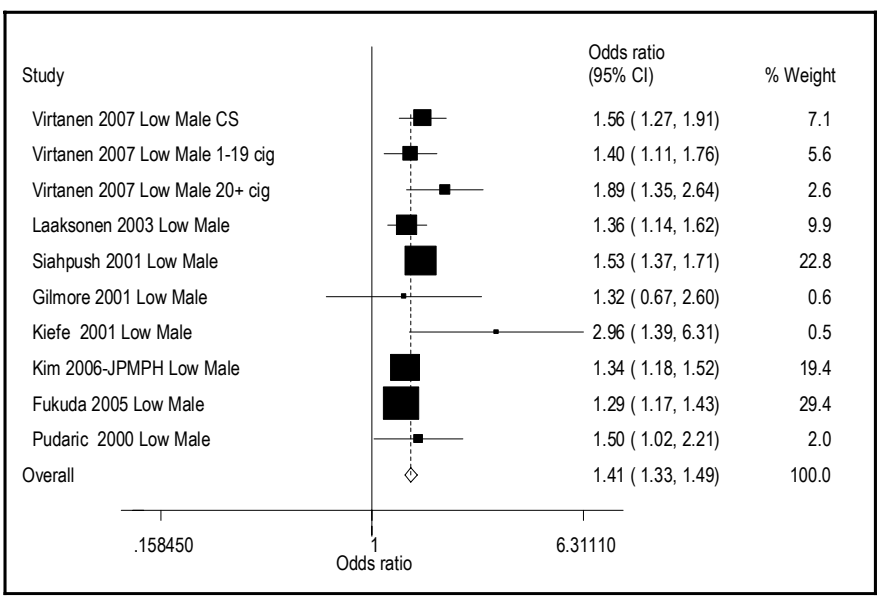
Study	OR	LL	UL	% Weight
Virtanen 2007 Low Male CS	1.560	1.272	1.913	7.10
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	5.57
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	2.63
Laaksonen 2003 Low Male	1.360	1.144	1.616	9.92
Siahpush 2001 Low Male	1.530	1.365	1.714	22.85
Gilmore 2001 Low Male	1.320	0.671	2.595	0.65
Kiefe 2001 Low Male	2.960	1.388	6.311	0.52
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	19.45
Fukuda 2005 Low Male	1.290	1.167	1.426	29.37
Pudaric 2000 Low Male	1.500	1.017	2.213	1.96
D+L pooled ES (Random)	**1.430**	**1.325**	**1.543**	**100.00**
I-V pooled ES (Fixed)	**1.407**	**1.333**	**1.486**	**100.00**

Heterogeneity chi-squared = 13.52 (d.f. = 9) p = 0.141

I-squared (variation in ES attributable to heterogeneity) = 33.4%

Test of ES=1 : z = 12.32 p = 0.000

Forest Plot 13: Low vs. High (Only Studies that have included the medium option): MALES



Meta-analysis 14 Low vs. Medium (Only Studies that have included the medium option): MALES

Study	OR	LL	UL	% Weight
id Virtanen 2007 Medium Male CS	1.180	0.975	1.428	10.28
Virtanen 2007 Medium Male 1-19 cig	1.190	0.958	1.478	8.79
Virtanen 2007 Medium Male 20+ cig	1.150	0.831	1.592	4.85
Laaksonen 2003 Medium Male	1.110	0.949	1.298	12.68
Siahpush 2001 Medium Male	1.460	1.305	1.634	16.66
Gilmore 2001 Medium Male	0.890	0.489	1.618	1.66
Kiefe 2001 Medium Male	1.940	1.013	3.716	1.42
Kim 2006-JPMPH Medium Male	1.200	1.095	1.316	18.69
Fukuda 2005 Medium Male	1.120	1.020	1.230	18.52
Pudaric 2000 Medium Male	1.170	0.892	1.534	6.43
D+L pooled ES (Random)	**1.207**	**1.114**	**1.307**	**100.00**
I-V pooled ES (Fixed)	**1.210**	**1.153**	**1.269**	**100.00**

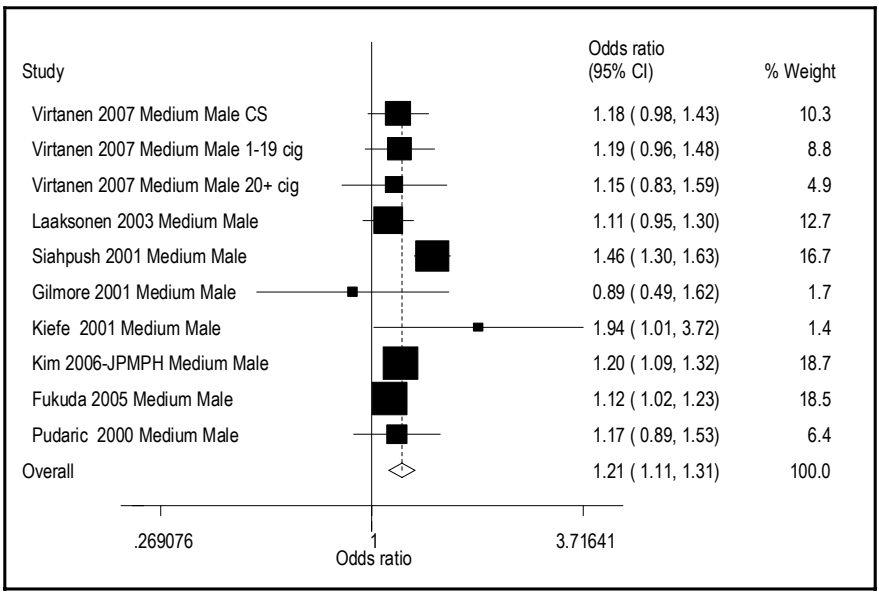
Heterogeneity chi-squared = 17.83 (d.f. = 9) p = 0.037

I-squared (variation in ES attributable to heterogeneity) = 49.5%

Estimate of between-study variance Tau-squared = 0.0067

Test of ES=1 : z = 4.62 p = 0.000

Forest Plot 14: Low vs. Medium (Only Studies that have included the medium option): MALES



Meta-analysis 15 Low vs. High (All studies): Age between 16 and 44 years

Study	OR	LL	UL	% Weight
Webb 2008 Low G1 Female	2.174	1.514	3.122	8.06
Webb 2008 Low G2 Female	2.564	1.333	4.932	3.82
Webb 2008 Low G3 Female	3.704	2.208	6.211	5.34
Wister 1996 Low 25-44 y	1.682	1.383	2.046	12.35
Coreil 1991 20-39 Low Female	1.024	1.002	1.047	15.79
Coreil 1991 20-39 Low Male	1.045	1.017	1.074	15.75
Lawrence 2007 Low	1.470	1.328	1.627	14.72
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	3.04
Kiefe 2001 Low Male	2.960	1.388	6.311	3.03
Kiefe 2001 Low Female	0.930	0.428	2.021	2.92
Green 2007 Low 18-34 y	1.770	1.640	1.910	15.19
D+L pooled ES (Random)	**1.512**	**1.306**	**1.751**	**100.00**
I-V pooled ES (Fixed)	**1.075**	**1.058**	**1.092**	**100.00**

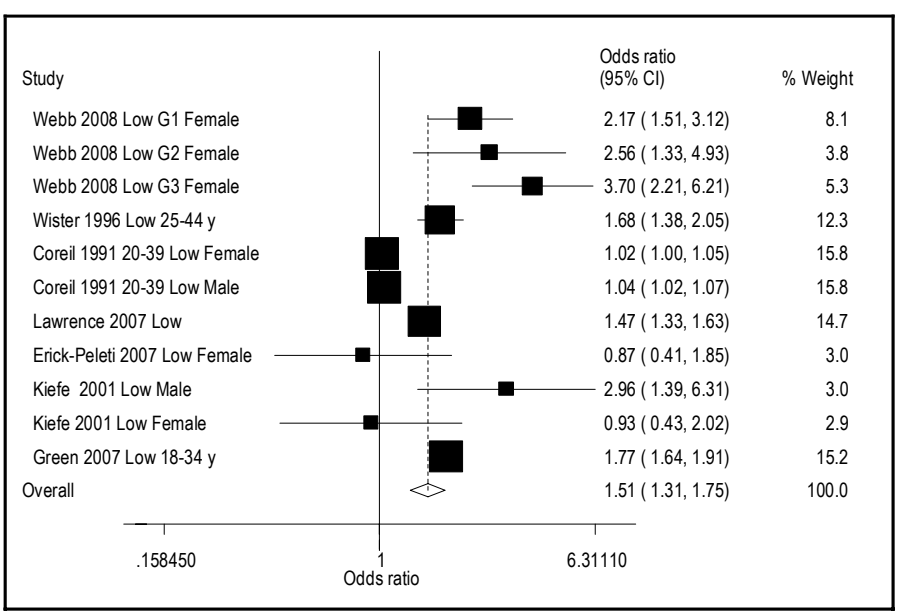
Heterogeneity chi-squared = 294.93 (d.f. = 10) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 96.6%

Estimate of between-study variance Tau-squared = 0.0354

Test of ES=1 : z = 5.52 p = 0.000

Forest Plot 15: Low vs. High (All studies): Age between 16 and 44 years



Meta-analysis 16 Low vs. High (Only Studies that have included the medium option): Age between 16 and 44 years

Study	OR	LL	UL	% Weight
Kiefe 2001 Low Male	2.960	1.388	6.311	0.99
Kiefe 2001 Low Female	0.930	0.428	2.021	0.95
Green 2007 Low 18-34 y	1.770	1.640	1.910	98.06
D+L pooled ES (Random)	**1.727**	**1.097**	**2.720**	**100.00**
I-V pooled ES (Fixed)	**1.768**	**1.640**	**1.907**	**100.00**

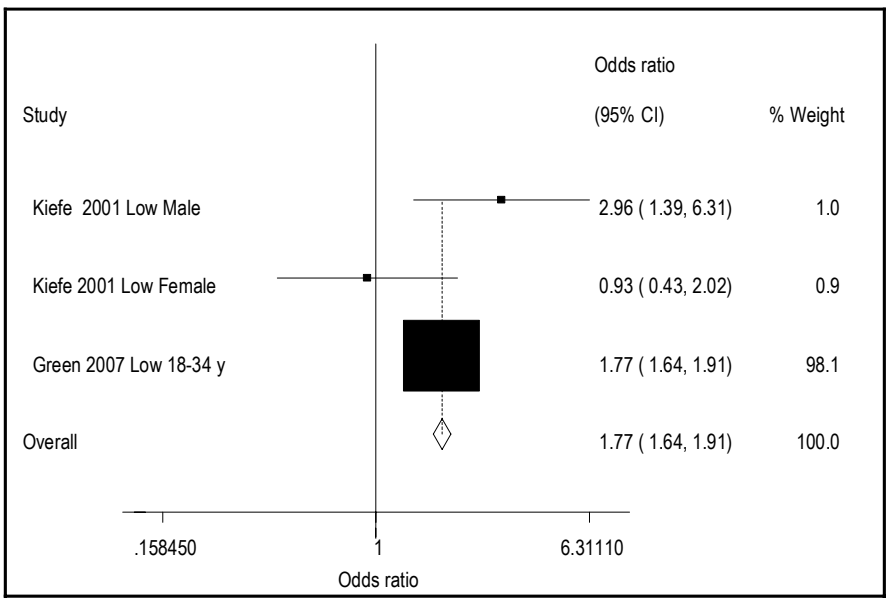
Heterogeneity chi-squared = 4.41 (d.f. = 2) p = 0.110

I-squared (variation in ES attributable to heterogeneity) = 54.7%

Estimate of between-study variance Tau-squared = 0.0936

Test of ES=1 : z = 2.36 p = 0.018

Forest Plot 16: Low vs. High (Only Studies that have included the medium option): Age between 16 and 44 years



Meta-analysis 17 Medium vs. High (Only Studies that have included the medium option): Age between 16 and 44 years

Study	OR	LL	UL	% Weight
Kiefe 2001 Medium Male	1.940	1.013	3.716	23.73
Kiefe 2001 Medium Female	0.710	0.360	1.400	22.57
Green 2007 Medium 18-34 y	1.430	1.338	1.528	53.70
D+L pooled ES (Random)	**1.313**	**0.861**	**2.001**	**100.00**
I-V pooled ES (Fixed)	**1.425**	**1.335**	**1.522**	**100.00**

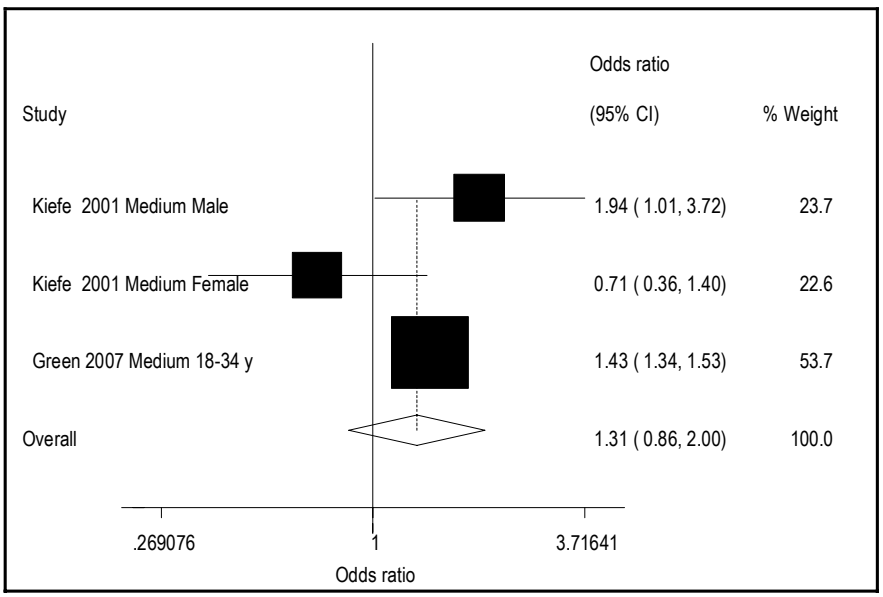
Heterogeneity chi-squared = 4.92 (d.f. = 2) p = 0.085

I-squared (variation in ES attributable to heterogeneity) = 59.3%

Estimate of between-study variance Tau-squared = 0.0850

Test of ES=1 : z = 1.26 p = 0.206

Forest Plot 17: Low vs. Medium (Only Studies that have included the medium option): Age between 16 and 44 years



Meta-analysis 18 Low vs. High (All studies): Age between 45 and 64 years

Study	OR	LL	UL	% Weight
Wister 1996 Low 45-64 y	1.649	1.278	2.127	12.67
Coreil 1991 40-64 Low Female	1.008	0.983	1.034	16.37
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	16.33
Laaksonen 2005 Low Male	2.040	1.389	2.997	9.80
Laaksonen 2005 Low Female	1.580	1.280	1.950	13.66
Fukuda 2007 Low Female 20-59y	2.840	2.502	3.223	15.30
Fukuda 2007 Low Male 20-59y	1.310	1.200	1.430	15.87
D+L pooled ES (Random)	**1.494**	**1.236**	**1.806**	**100.00**
I-V pooled ES (Fixed)	**1.058**	**1.038**	**1.079**	**100.00**

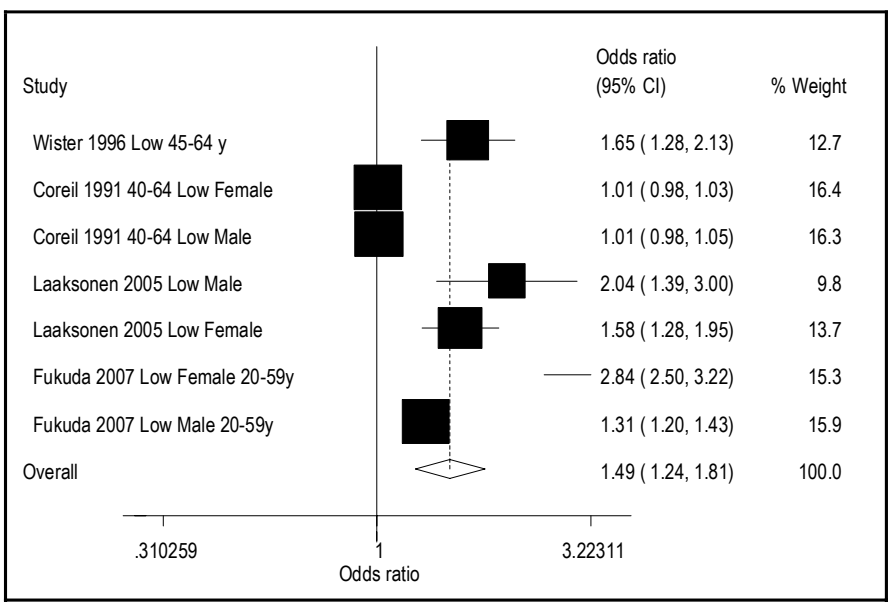
Heterogeneity chi-squared = 313.15 (d.f. = 6) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 98.1%

Estimate of between-study variance Tau-squared = 0.0570

Test of ES =1 : z = 4.15 p = 0.000

Forest Plot: 18 Low vs. High (All studies): Age between 45 and 64 years



Meta-analysis 19 Low vs. High (All studies): Age higher than 64

Study	OR	LL	UL	% Weight
Wister 1996 Low 65+ y	1.649	0.934	2.911	7.48
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	20.46
Coreil 1991 65-74 Low Male	1.010	0.891	1.145	19.41
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	15.89
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	19.02
Marinho 2008 Low	1.520	1.265	1.827	17.75
D+L pooled ES (Random)	**1.305**	**1.075**	**1.583**	**100.00**
I-V pooled ES (Fixed)	**1.125**	**1.065**	**1.188**	**100.00**

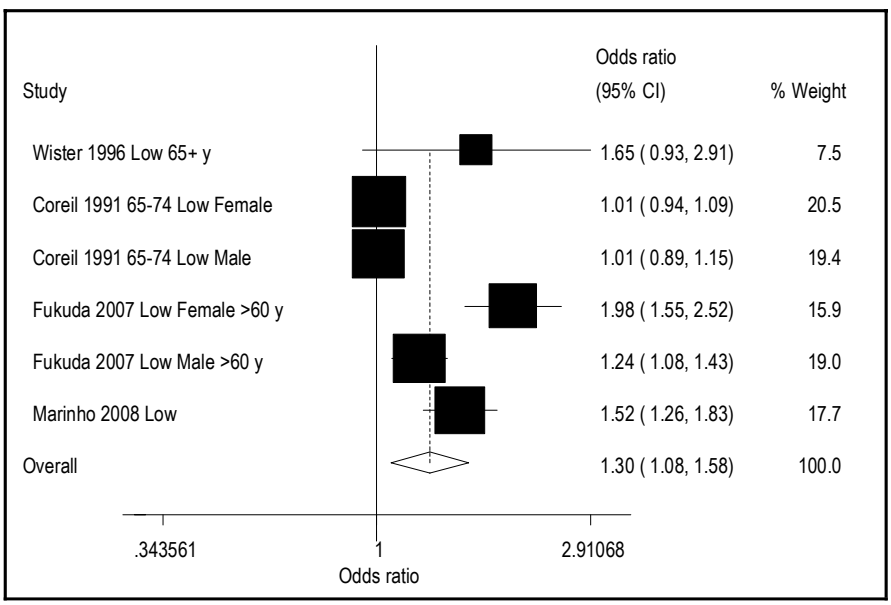
Heterogeneity chi-squared = 44.80 (d.f. = 5) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 88.8%

Estimate of between-study variance Tau-squared = 0.0461

Test of ES =1 : z = 2.69 p = 0.007

Forest Plot 19: Low vs. High (All studies): Age higher than 64



Meta-analysis 20 Low vs. High by the Mortality level of the countries

Study	OR	LL	UL	% Weight
Low Mortality Countries				
Acevedo-Garcia 2005 Low	2.128	2.039	2.220	1.49
Diez-Roux 1999 Low	3.700	1.569	8.726	0.49
Mody 2006 Low	3.448	3.158	3.765	1.46
Turrell 2002 Low	2.020	1.170	3.489	0.81
Virtanen 2007 Low Female CS	1.250	1.058	1.477	1.39
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	1.39
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	1.01
Virtanen 2007 Low Male CS	1.560	1.272	1.913	1.34
Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	1.30
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	1.14
Watson 2003 Low Female	2.010	0.994	4.065	0.62
Webb 2008 Low G1 Female	2.174	1.514	3.122	1.09
Webb 2008 Low G2 Female	2.564	1.333	4.932	0.68
Webb 2008 Low G3 Female	3.704	2.208	6.211	0.85
Wister 1996 Low 25-44 y	1.682	1.383	2.046	1.35
Wister 1996 Low 45-64 y	1.649	1.278	2.127	1.26
Wister 1996 Low 65+ y	1.649	0.934	2.911	0.78
Coreil 1991 20-39 Low Female	1.024	1.002	1.047	1.49
Coreil 1991 20-39 Low Male	1.045	1.017	1.074	1.49
Coreil 1991 40-64 Low Female	1.008	0.983	1.034	1.49
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	1.49
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	1.47
Coreil 1991 65-74 Low Male	1.010	0.891	1.145	1.43
King 1999 Low	1.639	1.294	2.076	1.29
Laaksonen 2003 Low Male	1.360	1.144	1.616	1.38
Laaksonen 2003 Low Female	1.300	1.066	1.585	1.35
Laaksonen 2005 Low Male	2.040	1.389	2.997	1.06
Laaksonen 2005 Low Female	1.580	1.280	1.950	1.33
Lawrence 2007 Low	1.470	1.328	1.627	1.45
Shavers 2005 Low African Americans	1.540	1.281	1.851	1.36
Shavers 2005 Low American Indian/ Alaska natives	1.840	1.038	3.263	0.78
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	0.85
Shavers 2005 Low Hispanics	1.490	1.225	1.812	1.35

Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	1.48
Siahpush 2001 Low Male	1.530	1.365	1.714	1.44
Siahpush 2001 Low Female	1.430	1.257	1.626	1.43
Siahpush 2003-JECH Low	0.960	0.411	2.244	0.49
Thomas 2008 Low	2.500	1.963	3.184	1.28
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	0.57
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	1.28
Fukuda 2007 Low Female 20-59y	2.840	2.502	3.223	1.43
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	1.42
Fukuda 2007 Low Male 20-59y	1.310	1.200	1.430	1.46
Kahn 2002 Low Female	1.900	1.368	2.639	1.15
Kahn 2005 Low Female	2.800	1.684	4.656	0.87
Kiefe 2001 Low Male	2.960	1.388	6.311	0.57
Kiefe 2001 Low Female	0.930	0.428	2.021	0.55
Reijneveld 2002 Low	1.360	1.263	1.464	1.47
Ross 2000 Low	1.207	0.952	1.530	1.29
Samet 1992 Low Female	4.167	1.701	0.206	0.46
Samet 1992 Low Male	2.703	1.333	5.480	0.62
Schaap 2008 Low	0.950	0.911	0.991	1.49
Mostashari 2005 Low	1.300	1.078	1.568	1.36
Rahman 2005 Low Male	1.220	0.753	1.977	0.90
Fagan 2008-NTR Low	2.130	1.847	2.456	1.41
Fukuda 2005 Low Male	1.290	1.167	1.426	1.45
Fukuda 2005 Low Female	2.030	1.764	2.336	1.42
Metcalf Low	1.820	1.383	2.395	1.23
Metcalf 2008 Low	1.940	1.379	2.729	1.13
Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	1.42
Pudaric 2000 Low Male	1.500	1.017	2.213	1.05
Pudaric 2000 Low Female	1.020	0.716	1.452	1.11
Pomerleau 1997 Low	1.840	1.569	2.158	1.39
Silvestre Garcia 1990 Low	0.670	0.400	1.121	0.86
Green 2007 Low 18-34 y	1.770	1.640	1.910	1.47
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	0.47
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	0.43
Shapo 2003 Low Male	1.429	0.719	2.837	0.64
Shapo 2003 Low Female	1.250	0.500	3.125	0.44
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	1.37

Kaleta 2007 Low	0.855	0.410	1.781	0.59
Marinho 2008 Low	1.520	1.265	1.827	1.36
Hesketh2007 Low Male	0.833	0.731	0.950	1.42
Moreira 1995 Low	1.031	0.840	1.265	1.34
D+L pooled ES (Random) Low Mortality Countries	**1.530**	**1.414**	**1.656**	**84.53**
I-V pooled ES (Fixed) Low Mortality Countries	**1.189**	**1.177**	**1.201**	**97.99**
High Mortality Countries				
Parna 2002 Low Female	0.970	0.696	1.352	1.14
Parna 2002 Low Male	1.000	0.671	1.491	1.03
Gilmore 2001 Low Male	1.320	0.671	2.595	0.65
Gilmore 2001 Low Female	1.250	0.500	3.127	0.44
Pudule 1999 Low Female	0.952	0.655	1.384	1.07
Pudule 1999 Low Male	1.818	1.415	2.336	1.27
Pomerleau 2004 Low Female	1.176	0.818	1.692	1.09
Pomerleau 2004 Low Male	1.429	1.133	1.801	1.30
Singh 1997 Low Female	0.520	0.302	0.896	0.82
Singh 1997 Low Male	0.890	0.716	1.107	1.32
Alam 2008 Low	1.000	0.456	2.191	0.55
Khuwaja 2004 Low Male	0.909	0.540	1.530	0.85
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	1.43
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	1.23
Mfenyana 2006 Low	1.282	1.001	1.641	1.27
D+L pooled ES (Random) High Mortality Countries	**1.220**	**0.983**	**1.513**	**15.47**
I-V pooled ES (Fixed) High Mortality Countries	**1.321**	**1.230**	**1.420**	**2.01**

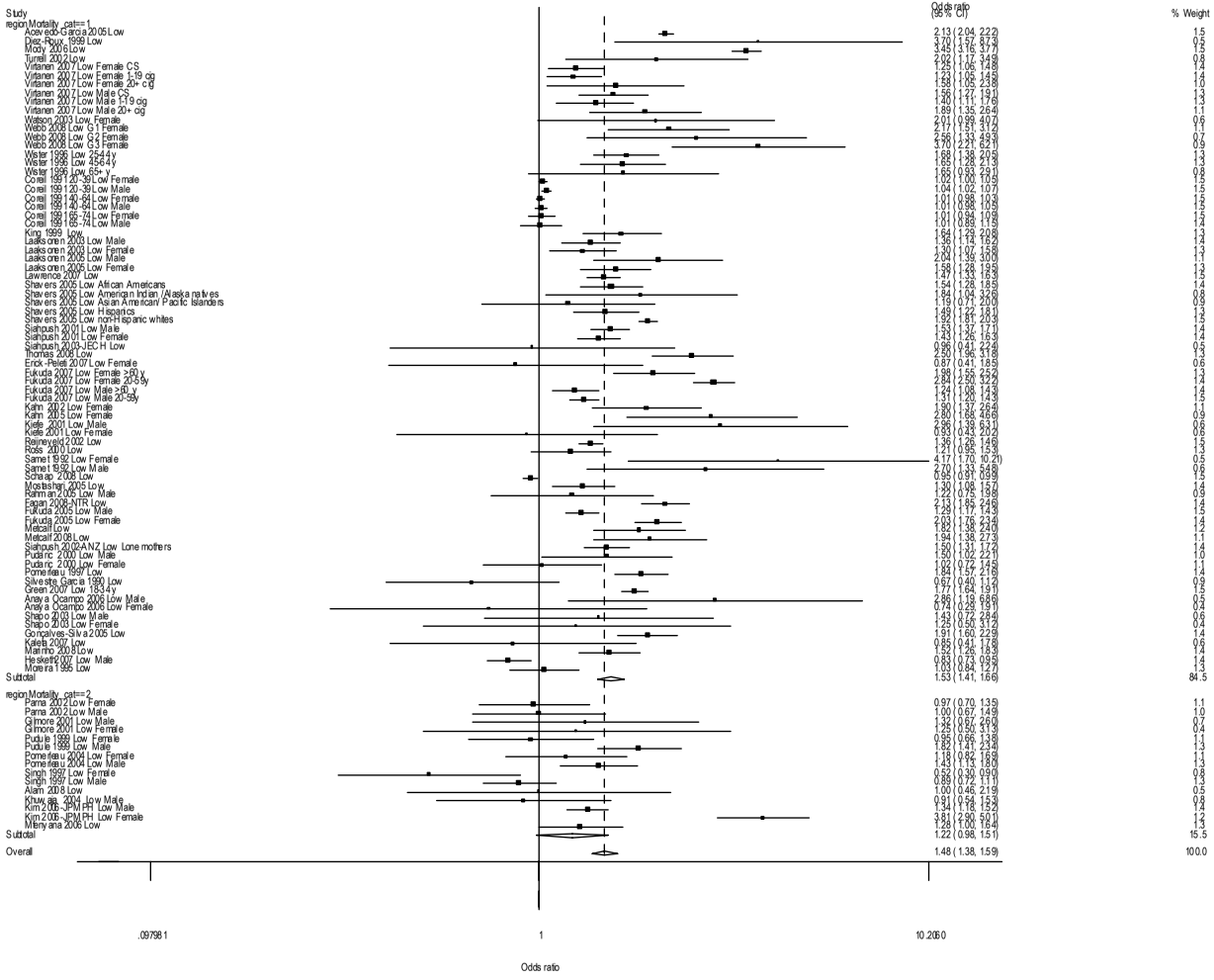
Test(s) of heterogeneity:

	Heterogeneity statistic	degrees of freedom	P	I-squared**	Tau-squared
regionMortality_cat=3	011.76	73	0.000	97.6%	0.0922
regionMortality_cat=	99.34	14	0.000	85.9%	0.1373
Overall	3119.20	88	0.000	97.2%	0.0927

Overall Test for heterogeneity between sub-groups :

8.09	1	0.004

Forest Plot 20: Low vs. High by subgroups of Mortality



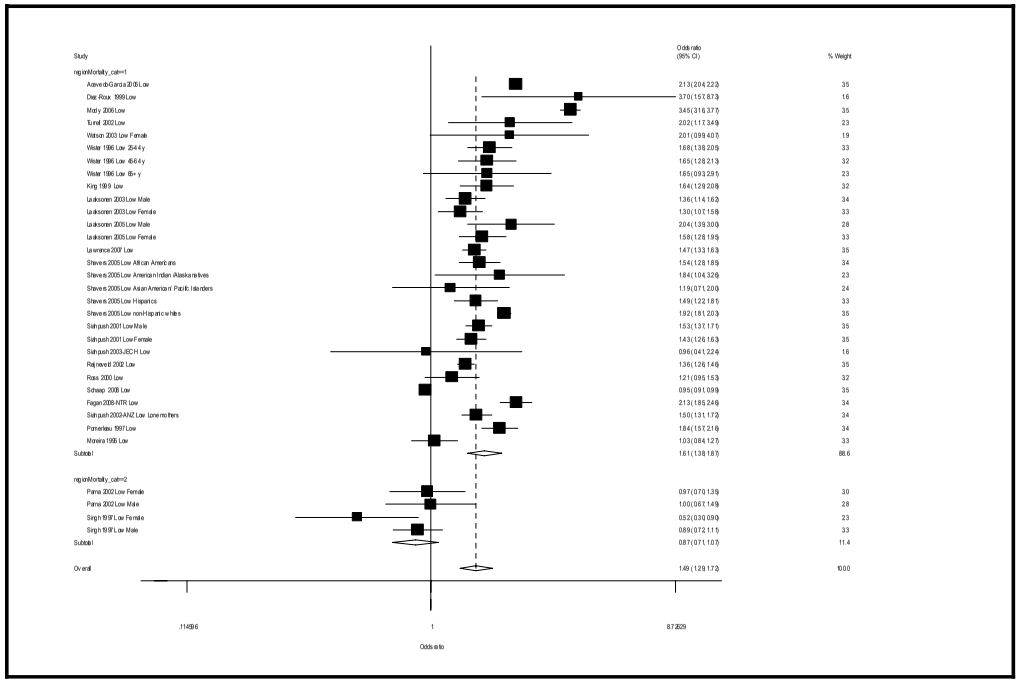
Meta-analysis 21 Low vs. High by decade and Mortality level of the countries

Study	OR	LL	UL	% Weight
Year < 1989				
Low Mortality countries				
Coreil 1991 20-39 Low Female	1.024	1.002	1.047	1.49
Coreil 1991 20-39 Low Male	1.045	1.017	1.074	1.49
Coreil 1991 40-64 Low Female	1.008	0.983	1.034	1.49
Coreil 1991 40-64 Low Male	1.013	0.978	1.049	1.49
Coreil 1991 65-74 Low Female	1.014	0.939	1.095	1.47
Coreil 1991 65-74 Low Male	1.010	0.891	1.145	1.43
Kahn 2002 Low Female	1.900	1.368	2.639	1.15
Samet 1992 Low Female	4.167	1.701	10.206	0.46
Samet 1992 Low Male	2.703	1.333	5.480	0.62
Metcalf Low	1.820	1.383	2.395	1.23
Pudaric 2000 Low Male	1.500	1.017	2.213	1.05
Pudaric 2000 Low Female	1.020	0.716	1.452	1.11
Silvestre Garcia 1990 Low	0.670	0.400	1.121	0.86
D+L pooled ES (Random) Year < 1989	**1.054**	**1.008**	**1.101**	**15.33**
I-V pooled ES (Fixed) Year < 1989	**1.026**	**1.013**	**1.039**	**100.00**
Year between 1989 and 1998				
Low Mortality countries				
Acevedo-Garcia 2005 Low	2.128	2.039	2.220	3.55
Diez-Roux 1999 Low	3.700	1.569	8.726	1.56
Mody 2006 Low	3.448	3.158	3.765	3.51
Turrell 2002 Low	2.020	1.170	3.489	2.34
Watson 2003 Low Female	2.010	0.994	4.065	1.91
Wister 1996 Low 25-44 y	1.682	1.383	2.046	3.33
Wister 1996 Low 45-64 y	1.649	1.278	2.127	3.20
Wister 1996 Low 65+ y	1.649	0.934	2.911	2.28
King 1999 Low	1.639	1.294	2.076	3.24
Laaksonen 2003 Low Male	1.360	1.144	1.616	3.38
Laaksonen 2003 Low Female	1.300	1.066	1.585	3.33
Laaksonen 2005 Low Male	2.040	1.389	2.997	2.83
Laaksonen 2005 Low Female	1.580	1.280	1.950	3.30
Lawrence 2007 Low	1.470	1.328	1.627	3.49
Shavers 2005 Low African Americans	1.540	1.281	1.851	3.36

Shavers 2005 Low American Indian/ Alaska natives	1.840	1.038	3.263	2.26
Shavers 2005 Low Asian American/ Pacific Islanders	1.190	0.709	1.997	2.43
Shavers 2005 Low Hispanics	1.490	1.225	1.812	3.33
Shavers 2005 Low non-Hispanic whites	1.920	1.813	2.033	3.54
Siahpush 2001 Low Male	1.530	1.365	1.714	3.48
Siahpush 2001 Low Female	1.430	1.257	1.626	3.46
Siahpush 2003-JECH Low	0.960	0.411	2.244	1.58
Reijneveld 2002 Low	1.360	1.263	1.464	3.52
Ross 2000 Low	1.207	0.952	1.530	3.24
Schaap 2008 Low	0.950	0.911	0.991	3.55
Fagan 2008-NTR Low	2.130	1.847	2.456	3.44
Siahpush 2002-ANZ Low Lone mothers	1.500	1.312	1.715	3.45
Pomerleau 1997 Low	1.840	1.569	2.158	3.41
Moreira 1995 Low	1.031	0.840	1.265	3.31
D+L pooled ES (Random) year between 1990 and 1998 on Low Mortality countries	**1.609**	**1.384**	**1.870**	**88.60**
I-V pooled ES (Fixed) year between 1990 and 1998 on Low Mortality countries	**1.574**	**1.542**	**1.607**	**98.35**
High Mortality countries				
Parna 2002 Low Female	0.970	0.696	1.352	2.98
Parna 2002 Low Male	1.000	0.671	1.491	2.78
Singh 1997 Low Female	0.520	0.302	0.896	2.35
Singh 1997 Low Male	0.890	0.716	1.107	3.29
D+L pooled ES (Random) year between 1990 and 1998 on High Mortality countries	0.873	0.711	1.072	11.40
I-V pooled ES (Fixed) year between 1990 and 1998 on High Mortality countries	**0.883**	**0.754**	**1.035**	**1.65**
Year higher than 1998				
Low Mortality countries				
Virtanen 2007 Low Female CS	1.250	1.058	1.477	3.23
Virtanen 2007 Low Female 1-19 cig	1.230	1.047	1.445	3.24
Virtanen 2007 Low Female 20+ cig	1.580	1.047	2.384	2.32
Virtanen 2007 Low Male CS	1.560	1.272	1.913	3.11

Virtanen 2007 Low Male 1-19 cig	1.400	1.112	1.763	3.02
Virtanen 2007 Low Male 20+ cig	1.890	1.352	2.643	2.62
Webb 2008 Low G1 Female	2.174	1.514	3.122	2.51
Webb 2008 Low G2 Female	2.564	1.333	4.932	1.54
Webb 2008 Low G3 Female	3.704	2.208	6.211	1.95
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	1.06
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	0.96
Shapo 2003 Low Male	1.429	0.719	2.837	1.46
Shapo 2003 Low Female	1.250	0.500	3.125	1.00
Thomas 2008 Low	2.500	1.963	3.184	2.97
Erick-Peleti 2007 Low Female	0.870	0.408	1.852	1.29
Fukuda 2007 Low Female >60 y	1.980	1.555	2.522	2.98
Fukuda 2007 Low Female 20-59y	2.840	2.502	3.223	3.33
Fukuda 2007 Low Male >60 y	1.240	1.078	1.427	3.30
Fukuda 2007 Low Male 20-59y	1.310	1.200	1.430	3.41
Gonçalves-Silva 2005 Low	1.910	1.595	2.287	3.18
Kaleta 2007 Low	0.855	0.410	1.781	1.34
Mostashari 2005 Low	1.300	1.078	1.568	3.16
Rahman 2005 Low Male	1.220	0.753	1.977	2.06
Fukuda 2005 Low Male	1.290	1.167	1.426	3.39
Fukuda 2005 Low Female	2.030	1.764	2.336	3.30
Metcalf 2008 Low	1.940	1.379	2.729	2.60
Marinho 2008 Low	1.520	1.265	1.827	3.17
Hesketh2007 Low Male	0.833	0.731	0.950	3.32
Green 2007 Low 18-34 y	1.770	1.640	1.910	3.43
D+L pooled ES (Random) year higher than 1998 on Low Mortality countries	**1.590**	**1.402**	**1.803**	**74.26**
I-V pooled (Fixed) ES year higher than 1998 on Low Mortality countries	**1.531**	**1.482**	**1.583**	**85.63**
High Mortality countries				
Alam 2008 Low	1.000	0.456	2.191	1.24
Gilmore 2001 Low Male	1.320	0.671	2.595	1.48
Gilmore 2001 Low Female	1.250	0.500	3.127	1.00
Khuwaja 2004 Low Male	0.909	0.540	1.530	1.93
Kim 2006-JPMPH Low Male	1.340	1.185	1.516	3.34
Kim 2006-JPMPH Low Female	3.810	2.899	5.008	2.86
Mfenyana 2006 Low	1.282	1.001	1.641	2.96
Pudule 1999 Low Female	0.952	0.655	1.384	2.47

Forest Plot 21 1899-1998: Low vs. High by subgroups of Mortality for the years between 1899 and 1998



Test of heterogeneity by subgroups of Mortality for years higher than 1998

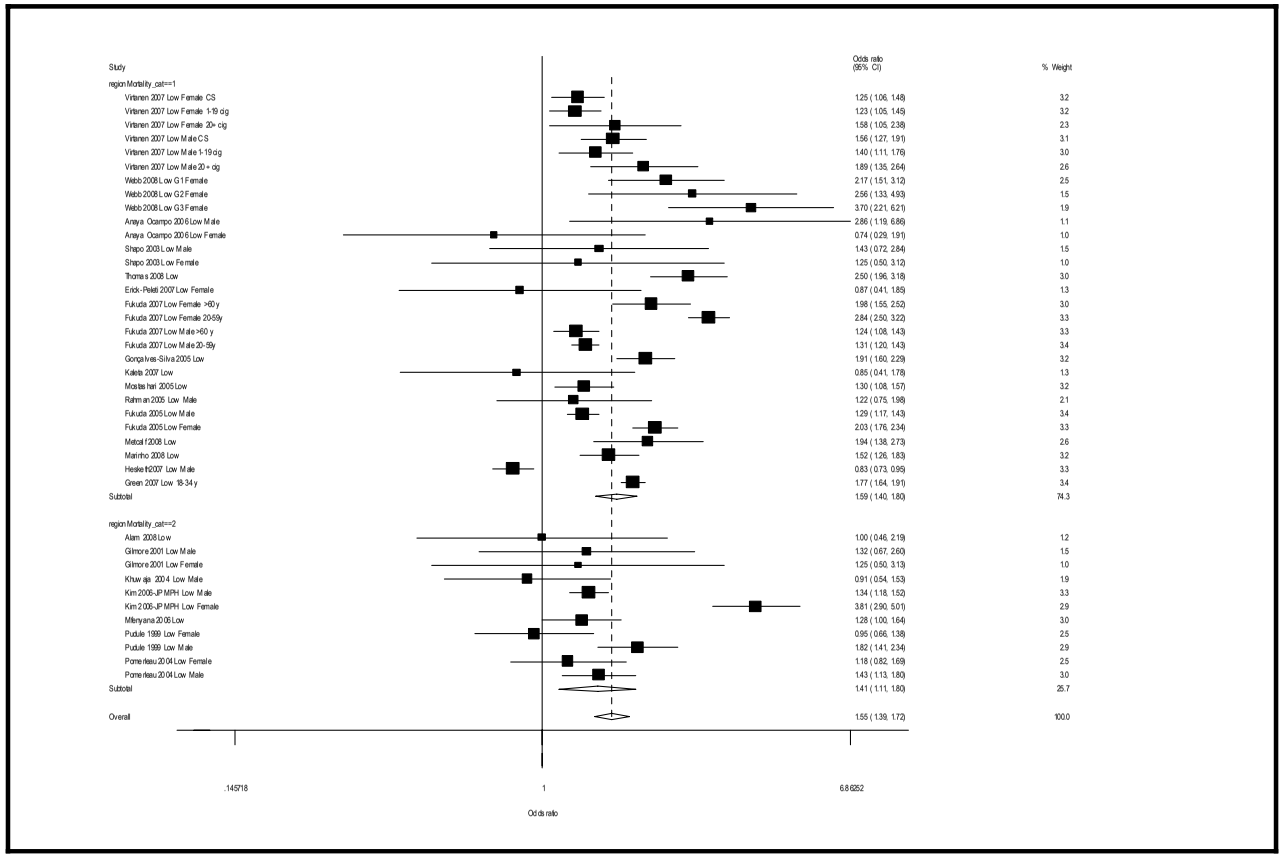
Test(s) of heterogeneity:

	Heterogeneity statistic	degrees of freedom	P	I-squared**		Tau-squared	
regionMortality_cat=3	8.29	28	0.000	90.9%	0.0877		
regionMortality_cat=	63.83	10	0.000	84.3%	0.1191		
Overall		373.07	39	0.000	89.5%	0.0877	

Overall Test for heterogeneity between sub-groups :

	0.94	1	0.331

Forest Plot 21 >1998: Low vs. High by subgroups of Mortality for years higher than 1998



Pudule 1999 Low Male	1.818	1.415	2.336	2.94
Pomerleau 2004 Low Female	1.176	0.818	1.692	2.51
Pomerleau 2004 Low Male	1.429	1.133	1.801	3.01
D+L pooled ES (Random) year higher than 1998 on High Mortality countries	**1.413**	**1.111**	**1.797**	**25.74**
I-V pooled ES (Fixed) year higher than 1998 on High Mortality countries	**1.467**	**1.353**	**1.590**	**14.37**

Test of heterogeneity by subgroups of Mortality for the years between 1899 and 1998

Test(s) of heterogeneity:

	Heterogeneity statistic	degrees of freedom	P	I-squared**	Tau-squared
regionMortality_cat=1	1174.73	28	0.000	97.6%	0.1465
regionMortality_cat=2	4.33	3	0.228	30.7%	0.0137
Overall	1229.19	32	0.000	97.4%	0.1496

Overall Test for heterogeneity between sub-groups :

50.14	1	0.000	

Meta-analysis 22 Low vs. High: Cardiovascular disease

Study	OR	LL	UL	% Weight
Khang 2008 Low Male 30-44 y	1.440	1.246	1.664	19.41
Khang 2008 Low Male 45-54 y	1.620	1.441	1.821	19.80
Khang 2008 Low Male 55-64 y	1.380	1.224	1.555	19.77
Stewart 2008 Low Australia	0.659	0.637	0.681	20.51
Stewart 2008 Low New Zeland	0.712	0.689	0.737	20.51
D+L pooled ES (Random)	**1.078**	**0.824**	**1.409**	**100.00**
I-V pooled ES (Fixed)	**0.738**	**0.722**	**0.755**	**100.00**

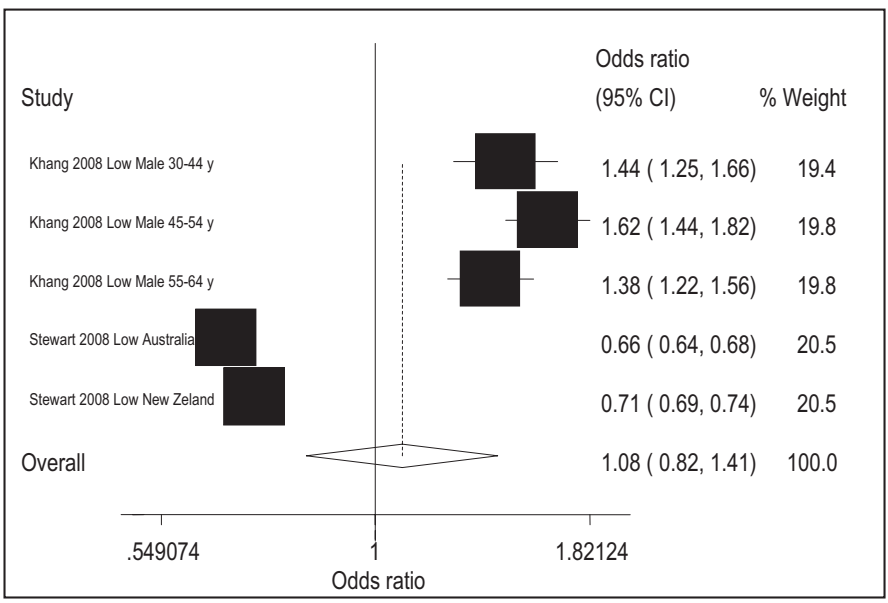
Heterogeneity chi-squared = 408.71 (d.f. = 4) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 99.0%

Estimate of between-study variance Tau-squared = 0.0908

Test of ES=1 : z = 0.55 p = 0.585

Forest Plot 22: Low vs. High: Cardiovascular disease



Meta-analysis 23 Low vs. High: Coronary disease

Study	OR	LL	UL	% Weight
Singh 1997 Low Male	0.830	0.692	0.996	17.86
Singh 1997 Low Female	0.610	0.439	0.847	16.66
Anand 2001 Low	2.370	1.329	4.227	13.83
Mo 2006 Low	1.900	1.856	1.945	18.44
Kivimäki 2007 Low Male	2.240	1.549	3.239	16.25
Kivimäki 2007 Low Female	1.980	1.469	2.668	16.95
D+L pooled ES (Random)	**1.446**	**0.941**	**2.223**	**100.00**
I-V pooled ES (Fixed)	**1.866**	**1.823**	**1.910**	**100.00**

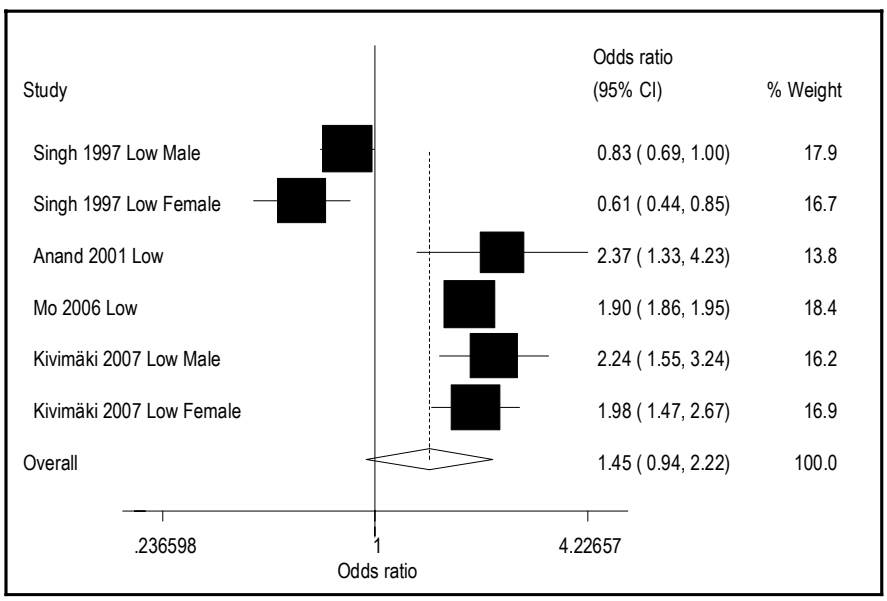
Heterogeneity chi-squared = 124.55 (d.f. = 5) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 96.0%

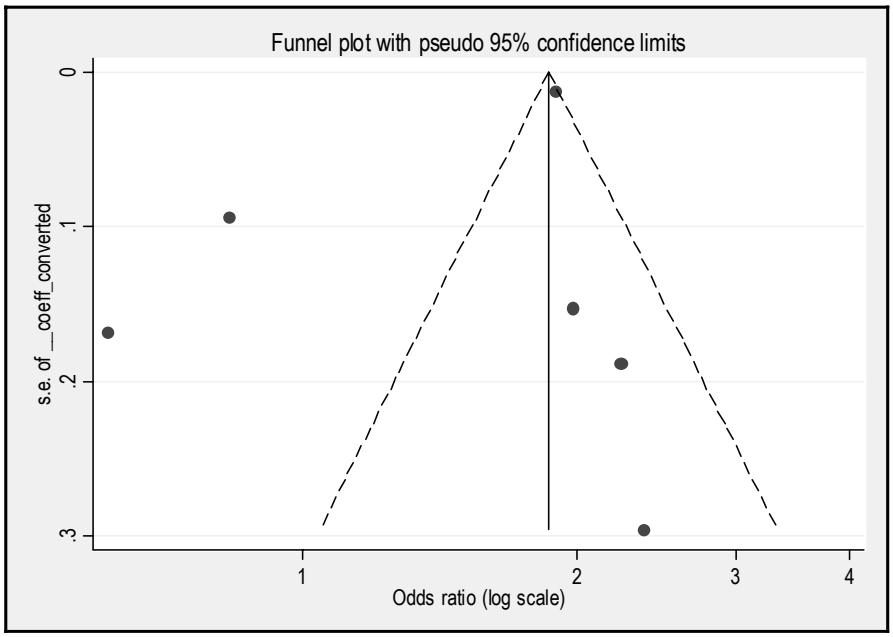
Estimate of between-study variance Tau-squared = 0.2607

Test of ES = 1 : z = 1.68 p = 0.093

Forest Plot 23: Low vs. High: Coronary disease



Funnel plot of Meta-analysis 23: Low vs. High: Coronary disease



Meta-analysis 24 Low vs. High: Coronary disease (Only Studies that have included the medium option)

Study	OR	LL	UL	% Weight
Kivimäki 2007 Low Male	2.240	1.549	3.239	39.58
Kivimäki 2007 Low Female	1.980	1.469	2.668	60.42
D+L pooled ES (Random)	**2.079**	**1.649**	**2.622**	**100.00**
I-V pooled ES (Fixed)	2.079	1.649	2.622	100.00

Heterogeneity chi-squared = 0.26 (d.f. = 1) p = 0.610

I-squared (variation in ES attributable to heterogeneity) = 0.0%

Estimate of between-study variance Tau-squared = 0.0000

Test of ES = 1 : z = 6.19 p = 0.000

Meta-analysis 25 Medium vs. High: Coronary disease (Only Studies that have included the medium option)

Study	OR	LL	UL	% Weight
Kivimäki 2007 Medium Male	1.590	1.071	2.361	39.74
Kivimäki 2007 Medium Female	1.530	1.110	2.109	60.26
D+L pooled ES (Random)	**1.554**	**1.211**	**1.993**	**100.00**
I-V pooled ES (Fixed)	**1.554**	**1.211**	**1.993**	**100.00**

Heterogeneity chi-squared = 0.02 (d.f. = 1) p = 0.882

I-squared (variation in ES attributable to heterogeneity) = 0.0%

Test of ES = 1 : z = 3.46 p = 0.001

Meta-analysis 26 Low vs. High: Death

Study	OR	LL	UL	% Weight
Khang 2008 Low Male 30-44 y	1.700	1.603	1.803	20.50
Khang 2008 Low Male 45-54 y	1.820	1.732	1.912	20.64
Khang 2008 Low Male 55-64 y	1.510	1.428	1.597	20.54
Prescott 2003 Female Low	0.962	0.841	1.100	18.73
Prescott 2003 Male Low	1.136	1.026	1.259	19.60
D+L pooled ES (Random)	**1.398**	**1.170**	**1.669**	**100.00**
I-V pooled ES (Fixed)	**1.588**	**1.542**	**1.635**	**100.00**

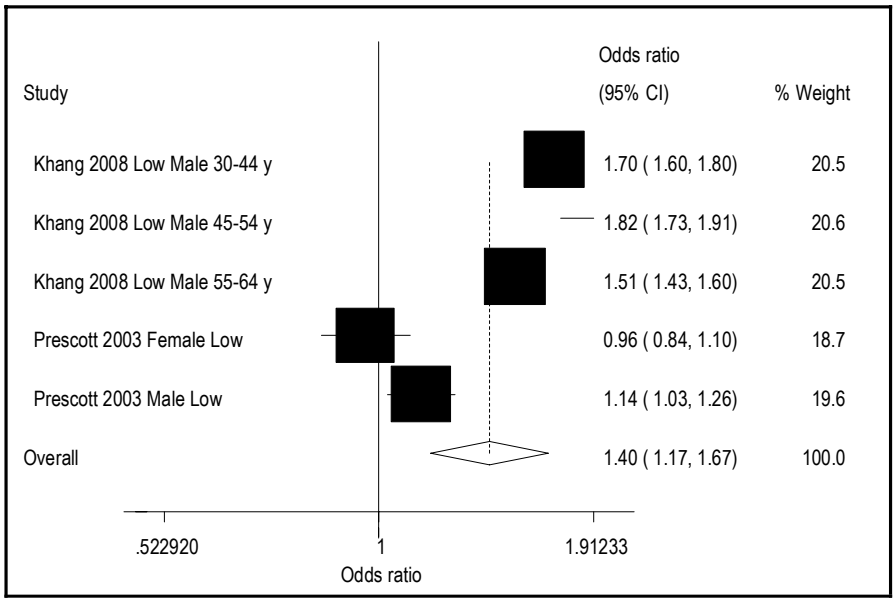
Heterogeneity chi-squared = 131.98 (d.f. = 4) p = 0.000

I-squared (variation in ES attributable to heterogeneity) = 97.0%

Estimate of between-study variance Tau-squared = 0.0391

Test of ES = 1 : z = 3.70 p = 0.000

Forest Plot 26: Low vs. High: Death



Meta-analysis 27 Low vs. High: Lung Cancer

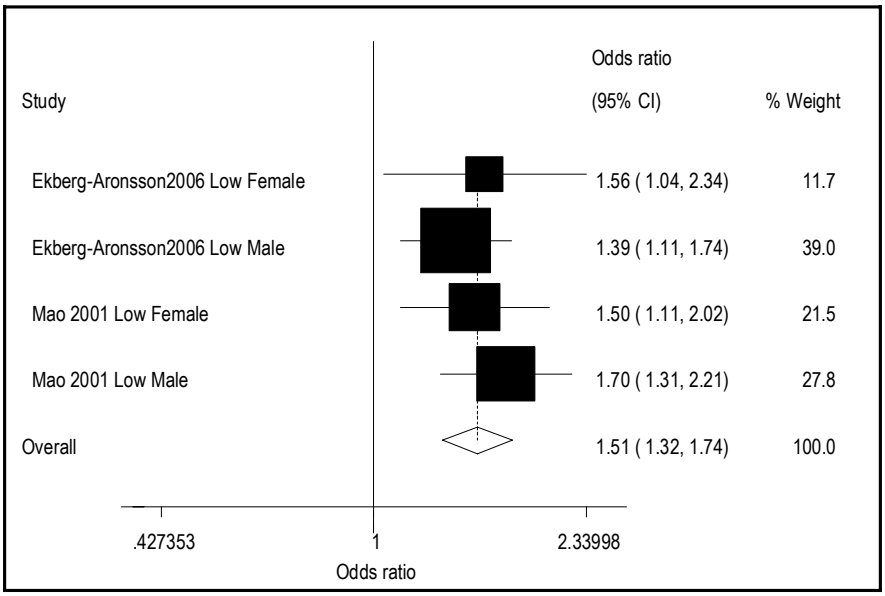
Study	OR	UL	LL	% Weight
Ekberg-Aronsson2006 Low Female	1.560	1.040	2.340	11.69
Ekberg-Aronsson2006 Low Male	1.390	1.113	1.735	39.03
Mao 2001 Low Female	1.500	1.112	2.023	21.51
Mao 2001 Low Male	1.700	1.307	2.211	27.77
D+L pooled ES (Random)	**1.514**	**1.318**	**1.740**	**100.00**
I-V pooled ES (Fixed)	**1.514**	**1.318**	**1.740**	**100.00**

Heterogeneity chi-squared = 1.34 (d.f. = 3) p = 0.720

I-squared (variation in ES attributable to heterogeneity) = 0.0%

Test of ES = 1 : z = 5.87 p = 0.000

Forest Plot 27: Low vs. High: Lung Cancer



Meta-analysis 28 Low vs. High: Low Birth Weight

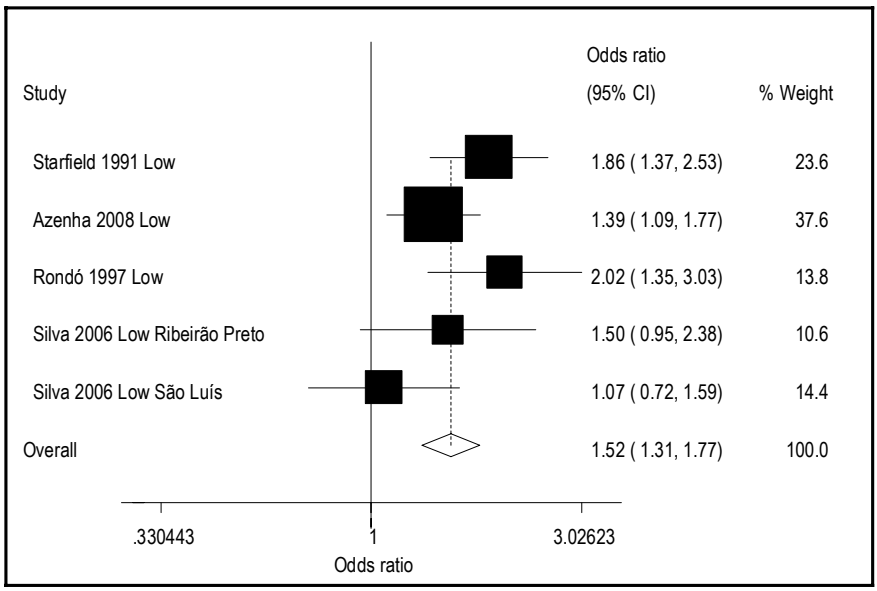
Study	OR	LL	UL	% Weight
Starfield 1991 Low	1.860	1.366	2.533	23.65
Azenha 2008 Low	1.389	1.087	1.774	37.61
Rondó 1997 Low	2.020	1.348	3.026	13.79
Silva 2006 Low Ribeirão Preto	1.500	0.946	2.379	10.59
Silva 2006 Low São Luís	1.070	0.720	1.590	14.36
D+L pooled ES (Random)	**1.529**	**1.242**	**1.883**	**100.00**
I-V pooled ES (Fixed)	**1.522**	**1.310**	**1.768**	**100.00**

Heterogeneity chi-squared = 7.09 (d.f. = 4) p = 0.131

I-squared (variation in ES attributable to heterogeneity) = 43.6%

Test of ES = 1 : z = 5.48 p = 0.000

Forest Plot 28: Low vs. High: Low Birth Weight



Meta-analysis 29 Low vs. High: Low Birth Weight (Only Studies that have included the medium option)

Study	OR	LL	UL	% Weight
Silva 2006 Low Ribeirão Preto	1.500	0.946	2.379	42.44
Silva 2006 Low São Luís	1.070	0.720	1.590	57.56
D+L pooled ES (Random)	**1.240**	**0.893**	**1.722**	**100.00**
I-V pooled ES (Fixed)	**1.235**	**0.914**	**1.668**	**100.00**

Heterogeneity chi-squared = 1.19 (d.f. = 1) p = 0.276

I-squared (variation in ES attributable to heterogeneity) = 15.7%

Test of ES = 1 : z = 1.38 p = 0.169

Meta-analysis 30 Medium vs. High: Low Birth Weight (Only Studies that have included the medium option)

Study	OR	LL	UL	% Weight
Silva 2006 Medium Ribeirão Preto	1.520	1.077	2.145	51.52
Silva 2006 Medium São Luís	0.710	0.461	1.093	48.48
D+L pooled ES (Random)	**1.051**	**0.499**	**2.215**	**100.00**
I-V pooled ES (Fixed)	**1.130**	**0.864**	**1.479**	**100.00**

Heterogeneity chi-squared = 7.31 (d.f. = 1) p = 0.007

I-squared (variation in ES attributable to heterogeneity) = 86.3%

Estimate of between-study variance Tau-squared = 0.2501

Test of ES=1 : z= 0.13 p = 0.896

SENSITIVITY ANALYSIS

Meta-analysis 31 Low vs. High: Sensitivity analysis of the Cardiovascular disease outcome

Study	OR	LL	UL	% Weight
Khang 2008 Low Male 30-44 y	1.440	1.246	1.664	25.04
Khang 2008 Low Male 45-54 y	1.620	1.441	1.821	38.31
Khang 2008 Low Male 55-64 y	1.380	1.224	1.555	36.66
D+L pooled ES (Random)	**1.480**	**1.340**	**1.636**	**100.00**
I-V pooled ES (Fixed)	**1.483**	**1.379**	**1.595**	**100.00**

Heterogeneity chi-squared = 3.74 (d.f. = 2) p = 0.154

I-squared (variation in ES attributable to heterogeneity) = 46.5%

Test of ES = 1 : z =10.66 p = 0.000

Meta-analysis 32 Low vs. High: Sensitivity analysis of the Coronary disease outcome

Study	OR	LL	UL	% Weight
Anand 2001 Low	2.370	1.329	4.227	0.16
Mo 2006 Low	1.900	1.856	1.945	98.81
Kivimäki 2007 Low Male	2.240	1.549	3.239	0.41
Kivimäki 2007 Low Female	1.980	1.469	2.668	0.62
D+L pooled ES (Random)	**1.902**	**1.858**	**1.948**	**100.00**
I-V pooled ES (Fixed)	**1.902**	**1.858**	**1.948**	**100.00**

Heterogeneity chi-squared = 1.39 (d.f. = 3) p = 0.708

I-squared (variation in ES attributable to heterogeneity) = 0.0%

Test of ES = 1 : z = 53.67 p = 0.000

Meta-analysis 33 Low vs. High: Sensitivity analysis of Current smoker in prospective studies

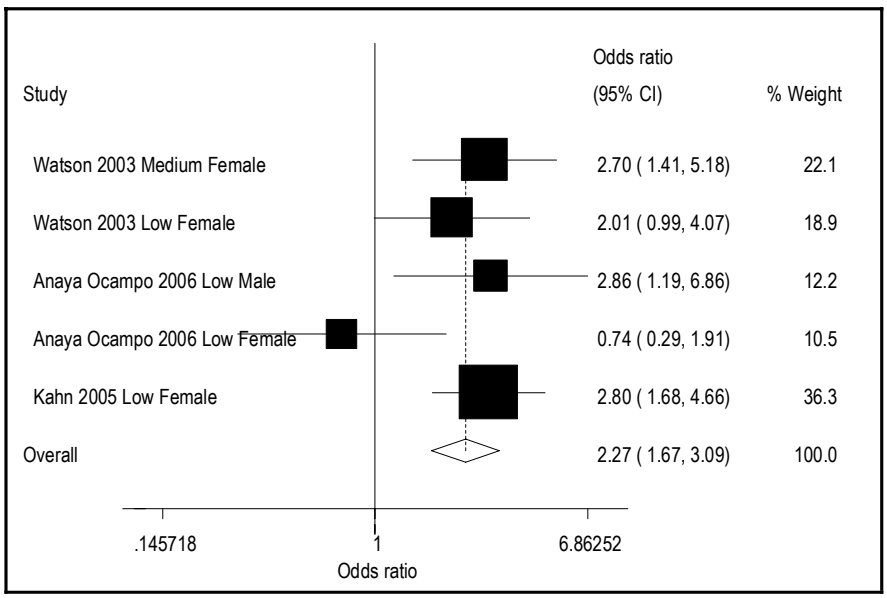
Study	OR	LL	UL	% Weight
Watson 2003 Medium Female	2.700	1.409	5.175	22.15
Watson 2003 Low Female	2.010	0.994	4.065	18.90
Anaya Ocampo 2006 Low Male	2.857	1.190	6.863	12.21
Anaya Ocampo 2006 Low Female	0.741	0.288	1.907	10.49
Kahn 2005 Low Female	2.800	1.684	4.656	36.26
D+L pooled ES (Random)	**2.170**	**1.440**	**3.272**	**100.00**
I-V pooled ES (Fixed)	**2.275**	**1.675**	**3.090**	**100.00**

Heterogeneity chi-squared = 6.69 (d.f. = 4) p = 0.153

I-squared (variation in ES attributable to heterogeneity) = 40.3%

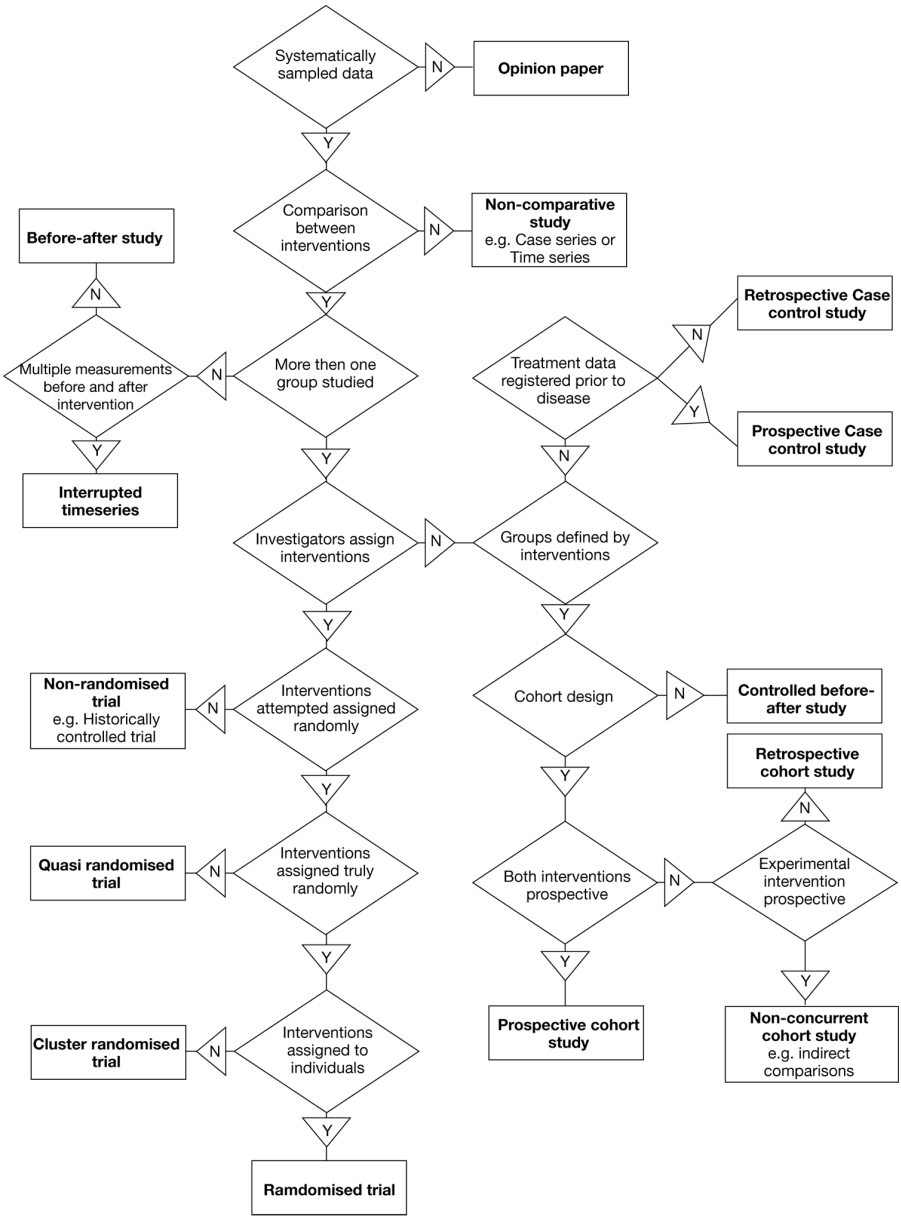
Test of ES = 1 : z = 5.26 p = 0.000

Forest Plot 33: Low vs. High: Sensibility analysis



Annex 2: Quality Assessment Methodology

2.1 Design Algorithm[1]



2.2 Tool for assessing susceptibility to bias in observational studies

Criteria category	Domain	Tool item must address	Risk of Bias[#] (H, M, L, ?)[#]
Major*	***Methods for selecting study participants**	Appropriate source population (cases, controls and cohorts) and inclusion or exclusion criteria	
	***Methods for measuring exposure and outcome variables**	Appropriate measurement methods for both exposure(s) and/or outcome(s)	
	***Methods to control confounding**	Appropriate design and/or analytical methods	
Minor	**Design-specific sources of bias (excluding confounding)**	Appropriate methods outlined to deal with any design-specific issues such as recall bias, interviewer bias, biased loss to follow or blinding	
	Statistical methods (excluding control of confounding)	Appropriate use of statistics for primary analysis of effect	

*Around half of the checklists included what we regard as the three most fundamental domains of appropriate selection of participants, appropriate measurement of variables and appropriate control of confounding.[(2)]

[#]**Risk of Bias** (See Guidelines in next pages to better decide de Risk):

H (High Risk of Bias) clearly indicates bias in each domain

M (Moderate Risk of Bias) suggests potential bias in each domain

L (Low Risk of Bias) clearly excludes bias in each domain

? (Doubtful Risk of Bias) suggests doubts about potential bias in each domain

Summary judgement of the study: High, Moderate, or Low Risk of Bias

High Risk of Bias: ≥ 1 of any criteria clearly (H) indicates bias, or ≥2 major criteria* suggest potential bias (M) or doubts (?)

Moderate Risk of Bias: ≥2 of any criteria suggest potential bias (M) or doubts (?) (<2 major criteria*)

Low Risk of Bias: Low (L) Risk of bias in all major criteria* and <2 of minor criteria suggest potential bias (M) or doubts (?)

2.3 Critical appraisal guidelines for cohort, case-control, cross-sectional studies[(3)]

The next step, having identified the study objectives and overall design, is to conduct a detailed appraisal of the methods and results. The following six guidelines, each in the form of a question about the research and including a checklist of criteria, are summarised in the box.

(1) Is the study design appropriate to objectives?

Deciding if the overall study design is appropriate may require more common sense than a detailed knowledge of epidemiological methods. If, for example, the purpose of a study is to evaluate a new treatment a controlled trial is almost imperative, as a trial without a control group would be fraught with difficulties in knowing whether improvement in patients was due to the treatment. Similarly, a project examining prognosis would normally require follow up by means of a cohort study. On the other hand, research investigating the cause of disease might adopt any of the designs shown in the figure.

(2) Is the study sample representative?

Source of sample

If research is to be applicable and relevant to other populations the study sample (group selected to participate) must be representative of the group from which it is drawn (study population), which in turn should be typical of the wider population to whom the research might apply (target population). Appropriateness of the target and study populations is usually a subjective assessment based on our knowledge of the topic under investigation. For example, research concerned with the pathogenesis of coronary artery disease might be of limited value if restricted to a target population of women over 80 years of age.

Sampling method

In population based studies random sampling is the ideal method of avoiding selection bias and producing a sample typical of the study population. In other studies non-random sampling may be adequate; for example, consecutive patients attending a clinic may be included in a controlled trial, or every nth person may be selected from a register. In studies based in hospital, however, beware that referral bias may lead to an atypical study sample.

Sample size

A statement in the methods section that a sample size was chosen in order to have sufficient power to detect a medically meaningful result at a certain level of statistical significance would normally be adequate evidence that steps had been taken to ensure an appropriate sample size. In the absence of such a statement it may be necessary to seek help from a statistician or an appropriate text to establish whether the sample size was adequate. But it is also important to assess the biological representativeness of the sample. Was the sample large enough to encompass the full range of disease? Or was it so small that there was a danger of a biased homogeneous group having a disproportionate effect on the results? It is not uncommon, for example, to read of statistically valid randomised controlled trials containing fewer than 20 patients. Was it likely with such a small number of patients that they were truly representative of all those presenting to clinicians in other centres?

Entry criteria and exclusions
The criteria for entering subjects into a study must be examined carefully; the stage of disease or time of onset, for example, may have a profound effect on the results of treatment or in the detection of aetiological factors. Exclusion criteria should also be defined appropriately. Furthermore, any description of the study participants must be scrutinised in order to assess whether the sample was representative.

Non-respondents
In most studies some subjects do not respond to invitations, some refuse to participate, and others do not attend for examination. The response rate is often viewed as an indicator of the representativeness of participants, but the size of response is only one aspect of sampling and may be less important than the comparability between participants and non-respondents.

For example, a response rate of 30% may be satisfactory if there is good evidence that participants do not have atypical characteristics which might affect the results of the research. Thus comparisons should be sought between participants and the non-respondents or the total study population.

Example
Collin et al carried out a community screening programme for abdominal aortic neurysm in men aged 65–74.2 Invitations to attend hospital for an examination were sent to 843 men identified from the age-gender registers of two large group practices. Four hundred and twenty six men attended, giving a response rate of 50 5%. Although the authors' main interest was in those who attended, the respondents may have differed from the non-respondents in important respects-for example, past medical history, current illness, and socioeconomic state. Thus scope for extrapolating the results to a wider population was limited.

(3) Is the control group acceptable?

Definition of controls
In studies using a comparison or control group it is important to assess whether this group was adequate for the purpose under study. In a case-control study, for example, were the criteria for defining controls appropriate and was the control group checked to ensure that it did not contain cases?

Source of controls
In case-control and cohort studies the source of controls should be such that the distributions of characteristics (not under direct investigation) are similar to those in the cases or study cohort. For example, in a study of exposure to lead and mental ability in children the source of controls should ideally be a group whose social class distribution is similar to that from which the cases were derived.

Matching and randomisation
In case-control studies cases and controls are often matched for certain characteristics, such as age and gender. Did the matching process seem to have been carried out correctly? In controlled trials, on the other hand, subjects are often randomly allocated to intervention and control groups. The method of randomisation should be assessed to ensure that the subjects were truly randomised-for example, by use of computer generated random numbers.

Comparable characteristics
In controlled trials random allocation to intervention and control groups usually leads to comparability, but not necessarily so, and the distributions of age, gender, and other prognostic variables should therefore be compared between the two groups. Similarly, in case-control and cohort studies matching or other methods of selecting controls are not infallible and the comparability of the groups must be assessed.

Example
In a case-control study in Adelaide of diet, alcohol, and weight in relation to gall stone disease 267 cases were compared with 359 hospital controls and 241 community controls, which were selected at random from the electoral register.3 The authors pointed out that the diet and lifestyle of the hospital controls were probably atypical because many had gastrointestinal disease. Also, the community controls were probably of a higher socioeconomic state because the cases were selected only in public hospitals whereas some of the controls participated in private health care schemes. But these socioeconomic differences had no effect on the results of the study.

(4) What is the quality of measurements and outcomes?

Validity
It is important to assess the validity of measurements made in a research study -that is, the extent to which they reflect the true situation. Dietary questionnaires, for example, are notoriously inaccurate in obtaining a true picture of a person's regular nutritional intake.

When a single test is used as a proxy measure of disease the validity of the test (sensitivity and specificity) should be stated in the article. In a randomised controlled trial the results may depend on the measurement of one outcome and it is thus essential that this is an important end point which is sensitive to change.

Reproducibility
In the interests of expediency many research projects pay too little attention to the reproducibility of the measurements. Would the same results have been obtained if the measurements had been taken by a different observer or on a different day? In many larger projects repeatability checks are made at

intervals to assess the consistency of measurement. For example, split blood samples may be sent to the laboratory without an indication that they are from the same subject. Evidence on the repeatability of the principal measurements should be sought in the article.

Blindness

During data collection a common source of bias is that the subjects or those collecting the data are not blind to the purpose of the research. The problems that may occur in controlled trials are well known: subjects, observers, and researchers, by wishing the intervention to succeed, produce an unrealistically good success rate. Inadequate blindness may be a problem in other studies. In case-control studies, for example, patients (cases) who are aware of a possible relation between a risk factor and the disease may over report the risk factor in themselves. Similarly, an observer may make greater efforts to detect a possible risk factor in cases than in controls, or may even unconsciously slant the questions in questionnaires to obtain the desired response. Clearly, in many studies total blindness is not feasible, but for the purposes of appraisal it is necessary to consider how this might put the results in doubt.

Quality control

Overall, the extent to which the researchers have instituted quality control measures for the examination of subjects, collection of data, and laboratory tests should give some idea of the likely quality of data. Measures might include testing the accuracy and repeatability of observers, checking the calibration and accuracy of instruments, and random checks for errors in data recording. Laboratories often participate in external quality control schemes, but many clinical researchers do not give adequate attention to this concept.

Example

In retrospective survey information on the symptoms, signs, clinical investigations, and outcomes of 1442 patients with mild head injury admitted to a neurosurgical unit were abstracted from medical records.14 Although the quality of data may have been satisfactory, there may have been deficiencies in the completeness and accuracy of the medical records and observer bias in detecting abnormalities in the records of patients with poor outcomes. Studies in which data are abstracted from medical records are very prone to such errors.

(5) What is the level of completeness?

Compliance

The end results of a study may be incomplete in relation to the number of subjects who were first enrolled. This need not necessarily lead to bias in the results, but careful assessment is required. In controlled trials continuing compliance of subjects with a regimen may be a serious problem and,

although this may partly be overcome by carrying out an "intention to treat" analysis (in which the outcomes of all subjects entering the trial are included in the analysis irrespective of compliance with treatment), when appraising the study it may be quite difficult to assess whether the treatment worked.

Drop outs and deaths

In cohort studies as well as in controlled trials drop outs and deaths in the study sample may occur. It is important to assess not only the proportion of drop outs in each group but also why they dropped out, as this may give a clue to possible bias. For example, more healthy people may move and be lost to follow up, so that a cohort study excluding them might produce an unrealistically gloomy outcome.

Missing data

Incomplete results may often occur due to difficulties in obtaining specimens, laboratory tests going awry, and lost data. The extent and nature of the loss must be assessed in order to estimate possible bias. Also, selectivity in reporting of results and the exclusion of data from tables may have an effect on the conclusions that can be drawn from the research. It is worth checking that in addressing the objectives of the study the authors have presented data on the most appropriate measurements and that some have not mysteriously disappeared.

Example

In a cohort study of 5362 subjects born in one week in 1946 blood pressure was measured at 36 years of age to determine associations with social and family factors, smoking, and body mass. A blood pressure measurement was obtained in only 3322 subjects (62%). This substantial loss could have biased the results, but it was shown in comparisons with other data that the cohort was still representative of native born men and women of that generation.

(6) Are there any distorting influences?

Extraneous treatments

The results of studies are often distorted by outside influences. In controlled trials, for example, a common problem is that subjects may be exposed to treatments in addition to the one being evaluated. Thus in assessing a trial the question has to be asked, "Could there possibly be extraneous treatments which might have influenced the results? Have these been identified in the study and the results interpreted accordingly?"

Contamination

Another problem in controlled trials is contamination, in which one group is affected by another. For example, in a dietary intervention study people in a control group may change their diet because they hear about supposed benefits from dietary changes in the intervention group.

Changes over time
Be wary of studies in which data on a characteristic have been collected from two groups of subjects at different times. Observed differences between the groups might be due to changes in the characteristic or its measurement over time, and not to real differences between the groups.

Confounding factors
Distorting influences may exist in studies examining the association between a risk factor and disease where the purpose is to find out whether the association is real or spurious (caused by a confounding factor influencing both the risk factor and the disease). In such studies it is necessary to account for possible confounding factors. This may be satisfied by matching in the selection of controls or by evidence of comparability between cases and controls.

Distortion reduced by analysis
Distorting influences may also be minimised by some form of stratification or adjustment procedure in the analysis. For example, if smoking is believed to be a confounding factor the results can be examined separately in smokers and non-smokers (stratification) or the results can be adjusted by calculations which take account of different smoking habits (standardisation).

1 Age and gender are frequent confounding factors and invariably should be accounted for by describing age standardised, gender-specific rates. Multiple regression is a statistical technique which is often used to analyse independent associations of variables while taking account of confounding factors."6 In controlled trials outcome measures may have to be analysed separately within subgroups-for example, those exposed and not exposed to extraneous treatments.

Example
In a randomised controlled trial a high fibre diet and certain minor surgical procedures were compared in the treatment of haemorrhoids.'7 Contamination may have occurred because patients in the surgical groups could have changed their diet. Also, an unknown number of subjects may have had extraneous treatments, such as topical ointments, sitz baths, and stool softeners. Information was not collected on these possible sources of bias, so that the authors were not able to make adjustments in the analysis and interpretation of the results was difficult.

Making a judgment
Once a detailed appraisal of the methods and results has been conducted a decision must be made on whether the methods were adequate and the results clear cut enough so that the objectives were achieved and useful information produced. Unfortunately, there is no magical formula which will convert assessments of detail into an overall score on the worth of a paper. The pros

and cons of the research have to be weighed implicitly and a judgment made. This is one reason why there is such scope for diametrically opposed views to be expressed in the correspondence columns of journals.

Some aspects of study design may have a more important influence than others but it is impossible to be categorical as much depends on the objectives and overall study design. For example, in trial deficiencies in the allocation of controls would probably be more important than inadequate evidence on the reproducibility of measurements. When checking the criteria for each guideline, as shown in the box, assigning problems for each criterion as major (++) or minor (±) in terms of their expected effect on the results may be helpful in drawing conclusions. (H, M, L or ? risk of bias)

In attempting to sum up a paper it may be helpful to ask three questions:

(1) **Bias**-Are the results erroneously biased in a certain direction? This may not necessarily negate the value of a study as long as the direction and magnitude of the bias are known.

(2) **Confounding**-Are there any serious confounding or other distorting influences? Often these cannot be adequately accounted for in the analysis and may have a substantial effect on the results.

(3) **Chance**-Is it likely that the results occurred by chance? The answer depends primarily on appraisal of the statistical content,'7 and help from a statistician may be required.

If the answer to each question is categorically "No" the research is probably quite sound.

In conclusion, conducting a critical appraisal of a paper is a worthwhile task but the overall judgment is often difficult. Papers are rarely judged to be "very good" or "very bad" but usually lie on a continuum in between. Most are likely to be of some value but accompanied by reservations. "This study has produced some interesting results but has its problems."

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