SUPPLEMENTARY MATERIAL

Association between adiposity after diagnosis of prostate cancer and mortality: systematic review and meta-analysis

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Supplementary Table 1: PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Page 4-5
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 5
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 5
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 5
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Supplementary material
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 5
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Pages 5-6
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 5
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Pages 5-6
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 8-9
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Page 6
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Pages 5-6
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Pages 5-6

Supplementary Table 1: PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Page 6-7
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Page 6
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Page 7-8
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Page 8
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Pages 8-9 & 14
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Page 6-7
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Pages 9-10 and Figure 1 (flow chart)
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 9-10 & Supplementary tables 4A-D
Study characteristics	17	Cite each included study and present its characteristics.	Supplementary Table 3
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Supplementary Figure 52
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Main Figures 3 & 4 Main Table 1 and subgroup analyses shown in forest plots in supplementary material
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Supplementary Figure 52
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Main Figures 3 & 4 Main Table 1 and subgroup analyses shown in forest plots in supplementary material
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	All Figures/Results tables
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Supplementary Figures (Forest plots) and Supplementary Tables 7-8
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Supplementary Figure 52
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Forest plots
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Pages 14-15

Supplementary Table 1: PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
	23b	Discuss any limitations of the evidence included in the review.	Pages 17-18
	23c	Discuss any limitations of the review processes used.	Pages 17-19
	23d	Discuss implications of the results for practice, policy, and future research.	Pages 19-20
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Page 5
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page 5 (& link)
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	-
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Page 26
Competing interests	26	Declare any competing interests of review authors.	Page 26
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Page 26

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

SUPPLEMENTARY TEXT

Search strategies

Note: Our search strategy also includes terms for physical activity and diet because it is part of a broader project, but the focus of this manuscript is anthropometry (terms indicated in bold) and mortality after PCa diagnosis.

PubMed search strategy

a. Search for mortality, survival, recurrence, and second cancer

1. recurrence[MeSH Terms] OR “neoplasm recurrence, local”[MeSH Terms] OR "neoplasm metastasis"[MeSH Terms] OR “disease progression”[MeSH Terms] OR “disease-free survival”[MeSH Terms] OR prognosis[MeSH Terms] OR mortality[MeSH Terms] OR mortality[MeSH Subheading] OR survival[MeSH Terms] OR “survival analysis”[MeSH Terms] OR “neoplasms, second primary"[MeSH Terms]
2. recurrence[tiab] OR recurrences[tiab] OR relapse[tiab] OR relapses[tiab] OR remission[tiab] OR remissions[tiab] OR survivor[tiab] OR survivors[tiab] OR metasta*[tiab] OR progression[tiab] OR survival[tiab] OR mortality[tiab] OR death[tiab] OR second cancer[tiab] OR "secondary cancer"[tiab]
3. #1 OR #2

b. Search for prostate cancer

4. Prostatic neoplasms[MeSH Terms]
5. prostat*[tiab] AND cancer*[tiab]

6. prostat*[tiab] AND neoplasm*[tiab]
7. prostat*[tiab] AND carcinoma*[tiab]
8. prostat*[tiab] AND tumo*[tiab]
9. #4 OR #5 OR #6 OR #7 OR #8

c. Search for diet, body fatness and physical activity

10. "diet therapy"[MeSH Terms] OR nutrition[MeSH Terms]
11. diet[tiab] OR diets[tiab] OR dietetic[tiab] OR dietary[tiab] OR eating[tiab] OR intake[tiab] OR nutrient*[tiab] OR nutrition[tiab] OR vegetarian*[tiab] OR vegan*[tiab] OR "seventh day adventist"[tiab] OR macrobiotic[tiab]
12. "food and beverages"[MeSH Terms]
13. food*[tiab] OR cereal*[tiab] OR grain*[tiab] OR granary[tiab] OR wholegrain[tiab] OR wholewheat[tiab] OR roots[tiab] OR plantain*[tiab] OR tuber[tiab] OR tubers[tiab] OR vegetable*[tiab] OR fruit*[tiab] OR pulses[tiab] OR beans[tiab] OR lentils[tiab] OR chickpeas[tiab] OR legume*[tiab] OR soy[tiab] OR soya[tiab] OR nut[tiab] OR nuts[tiab] OR peanut*[tiab] OR groundnut*[tiab] OR (seeds[tiab] AND (diet*[tiab] OR food*[tiab])) OR meat[tiab] OR beef[tiab] OR pork[tiab] OR lamb[tiab] OR poultry[tiab] OR chicken[tiab] OR turkey[tiab] OR duck[tiab] OR (fish[tiab] AND (diet*[tiab] OR food*[tiab])) OR ((fat[tiab] OR fats[tiab] OR fatty[tiab]) AND (diet*[tiab] OR food*[tiab] OR adipose[tiab] OR blood[tiab] OR serum[tiab] OR plasma[tiab])) OR egg[tiab] OR eggs[tiab] OR bread[tiab] OR (oils[tiab] AND (diet*[tiab] OR food*[tiab] OR adipose[tiab] OR blood[tiab] OR serum[tiab] OR plasma[tiab])) OR shellfish[tiab] OR seafood[tiab] OR sugar[tiab] OR syrup[tiab] OR dairy[tiab] OR milk[tiab] OR herbs[tiab] OR spices[tiab] OR chilli[tiab] OR chillis[tiab] OR pepper*[tiab] OR condiments[tiab] OR tomato*[tiab]
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15. pesticides[MeSH Terms] OR fertilizers[MeSH Terms] OR "veterinary drugs"[MeSH Terms]
16. pesticide*[tiab] OR herbicide*[tiab] OR DDT[tiab] OR fertiliser*[tiab] OR fertilizer*[tiab] OR organic[tiab] OR contaminants[tiab] OR contaminate*[tiab] OR veterinary drug*[tiab] OR polychlorinated dibenzofuran*[tiab] OR PCDF*[tiab] OR polychlorinated dibenzodioxin*[tiab] OR PCDD*[tiab] OR polychlorinated biphenyl*[tiab] OR PCB[tiab] OR cadmium[tiab] OR arsenic[tiab] OR chlorinated hydrocarbon*[tiab] OR microbial contamination*[tiab]
17. "food preservation"[MeSH Terms]
18. (mycotoxin*[tiab] OR aflatoxin*[tiab] OR pickled[tiab] OR bottled[tiab] OR bottling[tiab] OR canned[tiab] OR canning[tiab] OR vacuum pack*[tiab] OR refrigerate*[tiab] OR refrigeration[tiab] OR cured[tiab] OR smoked[tiab] OR preserved[tiab] OR preservatives[tiab] OR nitrosamine[tiab] OR hydrogenation[tiab] OR fortified[tiab] OR additive*[tiab] OR colouring*[tiab] OR coloring*[tiab] OR flavouring*[tiab] OR flavoring*[tiab] OR nitrates[tiab] OR nitrites[tiab] OR solvent[tiab] OR solvents[tiab] OR ferment*[tiab] OR processed[tiab] OR antioxidant*[tiab] OR genetic modif*[tiab] OR genetically modif*[tiab] OR vinyl chloride[tiab] OR packaging[tiab] OR labelling[tiab] OR phthalates[tiab]) AND (diet*[tiab] OR food*[tiab] OR adipose[tiab] OR blood[tiab] OR serum[tiab] OR plasma[tiab])
19. cookery[MeSH Terms]
20. cooking[tiab] OR cooked[tiab] OR grill[tiab] OR grilled[tiab] OR fried[tiab] OR fry[tiab] OR roast[tiab] OR bake[tiab] OR baked[tiab] OR stewing[tiab] OR stewed[tiab] OR casserol*[tiab] OR broil[tiab] OR broiled[tiab] OR boiled[tiab] OR ((microwave[tiab] OR microwaved[tiab] OR re-heating[tiab] OR reheating[tiab] OR heating[tiab] OR re-heated[tiab] OR heated[tiab]) AND (diet*[tiab] OR food*[tiab])) OR poach[tiab] OR poached[tiab] OR steamed[tiab] OR barbecue*[tiab] OR chargrill*[tiab] OR heterocyclic amines[tiab] OR polycyclic aromatic hydrocarbons[tiab]
21. ((carbohydrates[MeSH Terms] OR proteins[MeSH Terms]) AND (diet*[tiab] OR food*[tiab])) OR "sweetening agents"[MeSH Terms]
22. (salt[tiab] OR salting[tiab] OR salted[tiab] OR fiber[tiab] OR fibre[tiab] OR polysaccharide*[tiab] OR starch[tiab] OR starchy[tiab] OR carbohydrate*[tiab] OR lipid*[tiab] OR linoleic acid*[tiab] OR sterols[tiab] OR stanols[tiab] OR sugar*[tiab] OR sweetener*[tiab] OR saccharin*[tiab] OR aspartame[tiab] OR acesulfame[tiab] OR cyclamates[tiab] OR maltose[tiab] OR mannitol[tiab] OR sorbitol[tiab] OR sucrose[tiab] OR xylitol[tiab] OR cholesterol[tiab] OR protein[tiab] OR proteins[tiab] OR hydrogenated dietary oils[tiab] OR hydrogenated lard[tiab] OR hydrogenated oils[tiab]) AND (diet*[tiab] OR food*[tiab] OR adipose[tiab] OR blood[tiab] OR serum[tiab] OR plasma[tiab])

23. vitamins[MeSH Terms]
24. supplements[tiab] OR supplement[tiab] OR vitamin*[tiab] OR retinol[tiab] OR carotenoid*[tiab] OR tocopherol[tiab] OR folate*[tiab] OR folic acid[tiab] OR methionine[tiab] OR riboflavin[tiab] OR thiamine[tiab] OR niacin[tiab] OR pyridoxine[tiab] OR cobalamin[tiab] OR mineral*[tiab] OR (sodium[tiab] AND (diet*[tiab] OR food*[tiab])) OR iron[tiab] OR (calcium[tiab] AND (diet*[tiab] OR food*[tiab] OR supplement*[tiab])) OR selenium[tiab] OR (iodine[tiab] AND (diet*[tiab] OR food*[tiab] OR supplement*[tiab] OR deficiency)) OR magnesium[tiab] OR potassium[tiab] OR zinc[tiab] OR copper[tiab] OR phosphorus[tiab] OR manganese[tiab] OR chromium[tiab] OR phytochemical[tiab] OR allium[tiab] OR isothiocyanate*[tiab] OR glucosinolate*[tiab] OR indoles[tiab] OR polyphenol*[tiab] OR phytestrogen*[tiab] OR genistein[tiab] OR saponin*[tiab] OR coumarin*[tiab] OR lycopene[tiab] OR "infant formula"[MeSH Terms] OR infant formula[tiab]
25. "physical fitness"[MeSH Terms] OR "physical exertion"[MeSH Terms] OR "physical endurance"[MeSH Terms] OR walking[MeSH Terms] OR exercise[MeSH Terms] OR "muscle stretching exercises"[MeSH Terms] OR "tai ji"[MeSH Terms] OR yoga[MeSH Terms] OR "sedentary behavior"[MeSH Terms]
26. recreational activit*[tiab] OR household activit*[tiab] OR occupational activit*[tiab] OR physical activit*[tiab] OR physical inactivit*[tiab] OR exercise[tiab] OR exercising[tiab] OR energy intake[tiab] OR energy expenditure[tiab] OR energy restriction[tiab] OR famine[MeSH Terms] OR famine[tiab] OR energy balance[tiab] OR energy density[tiab] OR sedentar*[tiab] OR standing[tiab] OR sitting[tiab] OR television[tiab] OR "screen time"[MeSH Terms] OR screen[tiab] OR aerobic activities[tiab] OR aerobic activity[tiab] OR cardiovascular activities[tiab] OR cardiovascular activity[tiab] OR endurance activities[tiab] OR endurance activity[tiab] OR resistance training[tiab] OR strength training[tiab] OR physical conditioning[tiab] OR functional training[tiab] OR leisure-time physical activity[tiab] OR lifestyle activities[tiab] OR lifestyle activity[tiab] OR qi gong[tiab] OR tai chi[tiab] OR tai ji[tiab] OR yoga[tiab] OR free living activities[tiab] OR free living activity[tiab] OR walk[tiab] OR walking[tiab]
27. **"body weight"[MeSH Terms] OR anthropometry[MeSH Terms] OR "body composition"[MeSH Terms] OR "body constitution"[MeSH Terms] OR "body size"[MeSH Terms] OR body size[tiab]**
28. **weight loss[tiab] OR weight gain[tiab] OR anthropometry[tiab] OR birth weight[tiab] OR birthweight[tiab] OR birth-weight[tiab] OR child development[tiab] OR height[tiab] OR body composition[tiab] OR body mass index[tiab] OR BMI[tiab] OR obesity[tiab] OR obese[tiab] OR overweight[tiab] OR over-weight[tiab] OR overweight[tiab] OR skinfold measurement*[tiab] OR skinfold thickness[tiab] OR DEXA[tiab] OR bio-impedence[tiab] OR waist circumference[tiab] OR hip circumference[tiab] OR waist hip ratio*[tiab]**
29. #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28

d. Limit to human studies

30. animal[MeSH Terms] NOT human[MeSH Terms]
31. #29 NOT #30

e. Combine the searches

32. #3 AND #9 AND #31

EMBASE search strategy

a. Search for mortality, survival, recurrence, second cancer.

1. *Recurrent disease/
2. *Disease exacerbation/
3. Disease free survival/
4. mortality/ or all cause mortality/ or cancer mortality/ or cardiovascular mortality/ or mortality rate/ or premature mortality/
5. Survival analysis/
6. Relapse/
7. Survivor/
8. Second cancer/

9. (recur$ or local recurrence or progression or relap$ or prognos$ or surviv$ or mortality or death or (second$ adj5 primar$)).ab,ti.
10. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9

b. Search for studies specifically on prostate cancer

11. prostate cancer/
12. (prostate and (cancer$ or neoplasm$ or tumour$ or tumor$ or carcinoma$ or adenocarcinoma$)).tw,kw.
13. 11 or 12

c. Search for all studies relating to diet, body fatness and physical activity

14. Diet therapy/
15. Nutrition/
16. (diet or diets or dietetic$ or dietary or eating or intake or nutrient$ or nutrition or vegetarian$ or vegan$ or (seventh adj1 day adj1 adventist) or macrobiotic).ab,ti.
17. 14 or 15 or 16
18. Food/
19. (food$ or cereal$ or grain$ or granary or wholegrain or wholewheat or roots or plantain$ or tuber or tubers or vegetable$ or fruit$ or pulses or beans or lentils or chickpeas or legume$ or soy or soya or nut or nuts or peanut$ or groundnut$ or (seeds and (diet$ or food$))).ab,ti.
20. (meat or beef or pork or lamb or poultry or chicken or turkey or duck or (fish and (diet$ or food$)) or ((fat or fats or fatty) and (diet$ or food$ or adipose or blood or serum or plasma)) or egg or eggs or bread or (oils and (diet$ or food$ or adipose or blood or serum or plasma)) or shellfish or seafood or sugar or syrup or dairy or milk or herbs or spices or chilli or chillis or pepper$ or condiments or tomato$).ab,ti.
21. 18 or 19 or 20
22. Beverage/
23. (fluid intake or water or drinks or drinking or tea or coffee or caffeine or juice or beer or spirits or liquor or wine or alcohol or alcoholic or beverage$ or (ethanol and (drink$ or intake or consumption)) or yerba mate or ilex or paraguariensis).ab,ti.
24. 22 or 23
25. *Pesticide/
26. *Fertilizer/
27. *Veterinary drug/
28. (pesticide$ or herbicide$ or DDT or fertiliser$ or fertilizer$ or organic or contaminents or contaminate$ or veterinary drug$ or polychlorinated dibenzofuran$ or PCDF$ or polychlorinated dibenzodioxin$ or PCDD$ or polychlorinated biphenyl$ or PCB$ or cadmium or arsenic or chlorinated hydrocarbon$ or microbial contamination$).ab,ti.
29. 25 or 26 or 27 or 28
30. Food Preservation/
31. ((mycotoxin$ or aflatoxin$ or pickled or bottled or bottling or canned or canning or vacuum pack$ or refrigerate$ or refrigeration or cured or smoked or preserved or preservatives or nitrosamine or hydrogenation or fortified or additive$ or colouring$ or coloring$ or flavouring$ or flavoring$ or nitrates or nitrites or solvent or solvents or ferment$ or processed or antioxidant$ or genetic modif$ or genetically modif$ or vinyl chloride or packaging or labelling or phthalates) and (diet$ or food$ or adipose or blood or serum or plasma)).ab,ti.
32. 30 or 31
33. Cooking/
34. (cooking or cooked or grill or grilled or fried or fry or roast or bake or baked or stewing or stewed or casserol$ or broil or broiled or boiled or ((microwave or microwaved or re-heating or reheating or heating or re-heated or heated) and (diet$ or food$)) or poach or poached or steamed or barbecue$ or chargrill$ or heterocyclic amines or polycyclic aromatic hydrocarbons).ab,ti.
35. 33 or 34
36. Carbohydrate/ and (diet$ or food$).ab,ti.
37. Protein/ and (diet$ or food$).ab,ti.
38. Sweetening agent/
39. ((salt or salting or salted or fiber or fibre or polysaccharide$ or starch or starchy or carbohydrate$ or lipid$ or linoleic acid$ or sterols or stanols or sugar$ or sweetener$ or saccharin$ or aspartame or acesulfame or cyclamates or maltose or mannitol or sorbitol or sucrose or xylitol or cholesterol or hydrogenated dietary oils or hydrogenated lard or hydrogenated oils or protein$) and (diet$ or food$ or adipose or blood or serum or plasma)).ab,ti.
40. 36 or 37 or 38 or 39

41. Vitamins/
42. Vitamin D/ or (supplements or supplement or vitamin$ or retinol or carotenoid$ or tocopherol or folate$ or folic acid or methionine or riboflavin or thiamine or niacin or pyridoxine or cobalamin or mineral$ or (sodium and (diet$ or food$)) or iron or (calcium and (diet$ or food$ or supplement$)) or selenium or (iodine and (diet$ or food$ or supplement$ or deficiency)) or magnesium or potassium or zinc or copper or phosphorus or manganese or chromium or phytochemical or allium or isothiocyanate$ or glucosinolate$ or indoles or polyphenol$ or phytoestrogen$ or genistein or saponin$ or coumarin$ or lycopene).ab,ti.
43. 41 or 42
44. *Fitness/
45. Exercise/
46. *Endurance/
47. Walking/
48. Stretching exercise/
49. Tai Chi/
50. Qigong/
51. Yoga/
52. Sedentary lifestyle/
53. (physical fitness or physical exertion or physical endurance or muscle stretching exercise$ or recreational activit$ or household activit$ or occupational activit$ or physical activit$ or physical inactivit$ or exercise$ or exercising or energy intake or energy expenditure or energy balance or energy density or sedentar$ or standing or sitting or television viewing or aerobic activit$ or cardiovascular activit$ or endurance activit$ or resistance training or strength training or physical conditioning or functional training or leisure time physical activit$ or lifestyle activit$ or qigong or tai chi or tai ji or yoga or free living activit$ or walk or walking).ab,ti.
54. 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53
55. Body weight/
56. Anthropometry/
57. Body Composition/
58. Body Constitution/
59. Body size/
60. (weight or weight loss or weight gain or anthropometry or birth weight or birthweight or birth weight or child development or height or body composition or fat distribution or body mass or BMI or obesity or obese or overweight or overweight or skinfold measurement$ or skinfold thickness or DEXA or bio-impedence or waist circumference or hip circumference or waist hip ratio$ or body size).ab,ti.
61. 55 or 56 or 57 or 58 or 59 or 60
62. 17 or 21 or 24 or 29 or 32 or 35 or 40 or 43 or 54 or 61
63. exp animal/
64. exp human/
65. 63 not 64
66. 62 not 65

d. Combine the above

67. 10 and 13 and 66

APPENDIX 1: BMI and waist circumference and primary outcomes (all-cause mortality and prostate cancer (PCa)-specific mortality)

SUPPLEMENTARY TABLES

Supplementary Table 2 Commonly reported mean or median BMI values for the specific category range from relevant literature

Low or upper open-ended category of BMI	What did we use as midpoint in the non-linear sensitivity analyses	References
<25	23	Zhu 2015,[1] Parekh 2010,[2] Perez-Cornago 2017,[3] van Roermund 2010,[4] Recalde 2021[5]
<30	27	Kelkar 2021,[6] Merrick 2007[7]
>30	33	Parekh 2010,[2] Vidal 2018,[8] Jackson 2020,[9] Recalde 2021,[5] Keto 2012[10]
>35	39	Parekh 2010,[2] Kaplan 2020[11]

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Supplementary Table 3 Main characteristics of studies with post diagnosis data on BMI included in any analysis of all-cause or PCa-specific mortality

First author Year, Country	Study design, characteristics, and any important exclusions at baseline Follow-up time	Cancer characteristics Treatments	Exclusion of early follow-up deaths	Assessment of weight and height Death confirmation	N events, (Total men)	Type analysis Covariates
Verma 2022,[1] Multinational	Retrospective cohort Data from the ENTHUSE M1C(Fizazi et al 2013) Exclusions: Underweight men with BMI<18.5 kg/m^2 (n=3)	Advanced PCa: mCRPC Treatments: Docetaxel-based chemotherapy	No	Height and weight measurements at the time of enrolment in the study.	ACM: 451, (466)	*Cox proportional hazards regression models* Adjusted for: Age at diagnosis, World Health Organization performance status, PSA, visceral metastasis, bone metastasis
Martini 2021,[2] Multinational	Retrospective cohort Data from the control arms of three phase III randomized control trials (RCTs), namely ASCENT2 —NCT00273338(Scher 2011), VENICE— NCT00519285 (Tannock 2013), and MAINSAIL— NCT00988208(Petrylak 2015), obtained from Project Data Sphere	Advanced PCa: mCRPC Treatments: Docetaxel and prednisone (also some radiotherapy and prostatectomy)	No	BMI was assessed at the time of randomization	ACM: 655, (1577) PCSM: 451, (1104)	*Cox proportional hazards regression models for ACM (VENICE, ASCENT2 and MAINSAIL trials) and Fine and Gray's regression model for PCSM (VENICE and MAINSAIL trials)* Adjusted for: Age at randomization, PSA, diabetes (absent vs. present), ECOG performance status (0 vs. 1 vs. 2), number of metastases (continuous), and prior treatment (radiotherapy or prostatectomy vs. no prior treatment), treatment dose, which was estimated according to each patient's body-surface area in m^2.
Jackson 2020,[3] Jamaica	Retrospective cohort Follow-up of cases from a case-control study	Non-metastatic. High and low grade PCa. Gleason score: 104 men=2-6, 82 men=7, 49 men=8-10 (some missing).	Yes, secondary analyses that excluded deaths occurring during the first	Weight and height measured to nearest 0.1kg and 0.1cm at study entry (at diagnosis). Measurements taken in duplicate.	ACM: 138, (239)	*Cox proportional hazards regression models* Adjusted for:

	Age range: 40 to 80 years (median: 69 years), men attending urology clinics. 56% diabetics, 92% hypertension, 39% PCa family history Exclusions: -Men with advanced metastatic cancer and/or severe weight loss previous prostate surgery or those on 5-alpha reductase inhibitors, prior or current hormone therapy -Underweight men with BMI<18.5 kg/m^2 Follow-up: 11.3 median years	Treatments: Radiation therapy, EBRT or ADT 30.1% radiation with ADT, 12.9% orchiectomy, 53% ADT only.	2 years of follow-up post-enrolment	Death confirmation: Death certificates or medical records confirmed by End Points Committee which included physicians, a nurse, urologists, and an expert Nosologist. Also, the mortality database of the Registrar General's Department.	PCSM: 55 (239)	Age at diagnosis, height, smoking status, diabetes, family history, Gleason score, treatment modalities, ADT
Xu 2020,[4] USA (Southeast region)	Retrospective cohort Age range: 50 to 97 years (median: 71.5 years), Men who presented to the Vanderbilt University Medical Center Comprehensive Prostate Cancer Clinic Exclusions: -Patients without CT imaging data and who were not treated by a urologist Follow-up: 33.9 median months	Advanced PCa: 47.8% mCRPC, 30.2% mHSPC and 22% nmCRPC Treatments: Not stated	No	Demographic, pathological and survival information were obtained via electronic medical record review. Death confirmation: Follow-up and medical records	ACM: 95 (182)	*Cox proportional hazards regression models* Adjusted for: Skeletal muscle index, skeletal muscle density, age, Charlson comorbidity index, race, clinical cancer stage
Kashiwagi 2020,[5] Japan	Retrospective cohort Age median (range): 72 (46-91) Follow-up: 32 median months	Hormone-naïve Metastatic PCa ct stage: T1c to T4 cN stage: N0-N1 cM stage: M0, most M1 Treatments: primary ADT	No	BMI calculated for each patient based on weight and height values recorded before therapy	ACM: 60 (178)	*Cox proportional hazards regression models* Adjusted for: Age, Gleason score, PSA at diagnosis, cT stage and cM stage.

Troeschel 2020,[6] USA (21 states)	Prospective cohort Follow-up of cases from a "non-cancer" cohort i.e., men from CPS II Nutrition Cohort, Age mean (SD): 70.9 (5.72), 25.3% family history Exclusions -No survey completed one to less than 6 years after diagnosis. -Follow-up ends less than four years from postdiagnosis survey. -Implausible first postdiagnosis BMI. -Underweight men i.e. First postdiagnosis BMI <18.5 kg/m^2 Follow-up: 7.3 median years	Non-metastatic PCa (Mainly localised) Gleason score: 53% 2-6, 24.8% 7, 10.5% 8-10, 8.5% low Gleason score (5-7) and 0.9% high Gleason score (7-10), 2.2% missing Treatments: 36.3% surgery, 36.5% radiation, 4% hormone only, 6.5% watchful waiting, 16.7% missing	Yes, in primary analyses excluded person-time/deaths within 4-years of completing the post-diagnosis surveys. Sensitivity analysis: excluding men with follow-up ending within 2-years of the first post-diagnosis survey	Postdiagnosis BMI obtained from self-reported weight on the first survey completed one to less than six years after diagnosis Death confirmation: Linkage with National Death Index	ACM: 3855 (8,330) PCSM: 603 (8,330)	*Cox proportional hazards regression models* Adjusted for: Age, initial treatment, tumour local extent, Gleason score, smoking status, post-diagnosis physical activity, education, year of diagnosis (pre-diagnosis BMI in supplemental analyses)
Stangl-Kremser 2020,[7] Austria	Retrospective cohort Age median (IQR) 68.8 (64.6–75.0) Exclusions: -Insufficient imaging -Lost to follow-up Follow-up: 24.1 median months	Advanced CRPC Metastatic site: 9.9% liver, 11% visceral (other than liver) 39.8% distant lymph nodes 82.5% bone Treatments: Docetaxel with prednisolone ADT before docetaxel initiation (authors unable to determine the precise duration prior to docetaxel)	No	BMI at chemotherapy initiation retrieved from the institutional electronic medical records database. Death confirmation: Medical records	ACM: 93 (186)	*Cox proportional hazards regression models* **Tested some other potential confounders in univariate analysis.* Adjusted for: Liver metastases, high visceral-to-subcutaneous fat area ratio

Ikeda 2020,[8] Japan (East-Asia)	Retrospective cohort Age median IQR: 73 (66-78) Follow-up: 39 median months	mHSPC No patients received any previous treatments for the disease	No	BMI at baseline (not clear information provided about source) Death confirmation: No information provided	ACM: 80 (197)	*Cox proportional hazards regression models* **Variables with a p-value <0.05 identified by univariate analysis were included in the multivariate analysis* Adjusted for: Sarcopenia, serum, Gleason score, latitude risk classification (high vs low risk), serum lactate dehydrogenase level
Abdel-Rahman 2019,[9] Multinational	Retrospective cohort Pooled analysis of the comparator arms of 3 clinical trials (NCT00988208; NCT00273338; NCT00519285) Follow-up: 453 mean days	Chemotherapy-naive patients with CRPC Stages: M1a, M1b and M1c Treatments: Docetaxel/prednisone	No	BMI collected at baseline Death confirmation: No information provided	ACM: NA (1600)	*Cox proportional hazards regression models* Adjusted for: baseline haemoglobin, baseline albumin, baseline BMI, age at diagnosis, duration of exposure to docetaxel, M stage, class of patients (nondiabetic, diabetic metformin, or diabetic no metformin), and baseline PSA.
Darcey 2019,[10] Australia (western)	Retrospective cohort Follow-up of cases from a case-control study Age range: 40 to 75 years (median: 63 years) Follow-up: 15 median years	Mixed: Gleason score <7 and>7 Treatments: Lack of information about treatment/s	No	Self-reported height and weight at/ around the time of diagnosis Death confirmation: Local cancer and death registries	ACM: 193 (572) PCSM: 76 (572)	*Cox proportional hazards regression models* Adjusted for: Age at diagnosis, recent physical activity, smoking status, and stratified by Gleason score (<7 vs 7 vs >7).

Vidal 2018,[11] USA	Retrospective cohort -Participants from SEARCH database that included men from eight Veterans Affairs Medical Centres. Age range: 66 to 87 Follow-up: 2-3 median years	NmCRPC (M0/Mx) Treatments: Primary localised treatment: none, radical prostatectomy and radiation or radiation alone	No	BMI calculated from height and weight abstracted from the medical records at the time closest to but prior to CRPC diagnosis (authors note that it was unknown if BMI was measured or self-reported) Death confirmation: Death hand abstracted from medical records based upon individual level chart reviews, supervised by a senior prostate cancer clinician	ACM: 809 (1192)	*Cox proportional hazards regression models* Adjusted for: Veterans Affairs centre and clinical characteristics: age at CRPC, race, year of CRPC diagnosis, treatment centre, primary prostate cancer treatment, biopsy grade group, PSA level at CRPC, Charlson Comorbidity Index
Farris 2018,[12] Canada	Prospective cohort Mean age (SD): 67.4 (7.4) Follow-up: 19 years maximum	High-risk/advanced tumours: all stage greater than T2 75% stage T2, 23.2% stage T3/4, 1.8% missing. 78.8% Gleason score<7 and 21.2% Gleason score>7 Treatments: 28.3% radical prostatectomy, 64.2% hormone therapy 42.9% radiation therapy	Yes, sensitivity analysis excluding deaths occurring in the first 2 years of follow-up	At baseline within six months of diagnosis, interviewers used standardised methods and calibrated weight scales to obtain current adiposity measurements from PCa cases i.e., height, weight, waist circumference and hip circumference. At follow-up 2–3 years post-diagnosis in the prospective cohort study (2000–2002), interviewers assessed the same current anthropometric measurements as done objectively at baseline. Death confirmation: Vital status updates performed to update information on treatment and prostate cancer status by the Alberta Cancer Registry and Cancer Surveillance.	ACM: 528 (829) PCSM: 252 (987)	*Cox proportional hazards regression models (presented)* **Testing for potential confounding (through backwards elimination) for the following: total lifetime physical activity, total average alcohol consumption, average daily caloric intake, education level, smoking status diagnosis, family history of cancer, region of residence, Gleason score at diagnosis, and how often (on average) participants went for a general check-up in their lifetime prior to diagnosis of prostate cancer.* Adjusted for: Age at diagnosis, stage, prostatectomy, hormone therapy, radiation therapy, PSA levels at diagnosis, post-diagnosis Charlson comorbidity index, total average alcohol consumption, region of residence and Gleason score at diagnosis
Dickerman 2017,[13] USA	Prospective cohort Participants with PCa diagnosis from the HPFS (cohort of male health professionals).	Clinically localised clinical stage T1/T2 Gleason grade: <7, 7 or >7 (mixed) Treatments: Radiation therapy, radical prostatectomy, hormones, no initial treatment/watchful waiting, other	No	Data on weight at the time of prostate cancer diagnosis. Men reported their current height and weight on the baseline 1986 questionnaire and their current weight every two years thereafter.	PCSM 371 (5158) *(Lethal prostate cancer i.e., either distant metastasis or	*Cox proportional hazards regression models* Adjusted for: Age at diagnosis, race, family history of prostate cancer, height, smoking status at diagnosis,

	Age range: 40 to 75 at enrolment Exclusions: -Men with weight <100 pounds (45.4 kg) at age 21 or at diagnosis -BMI <15 or >45 at age 21 or at diagnosis, weight change>18.1 kg in the 4 years preceding diagnosis and baseline diseases potentially associated with weight status Follow-up: 20 years minimum			*Validation study in HPFS showed that self-reported and technician-measured weights were highly correlated (Pearson r=0.97). Death confirmation: Review of medical records, physician and patient questionnaires and death certificates.	death due to prostate cancer):	diabetes at diagnosis, heart/lung disease by time of diagnosis, physical activity, energy intake, tomato sauce intake, coffee intake, alpha-linolenic acid and calcium intake, clinical stage, grade, PSA at diagnosis and primary treatment
Taborelli 2017,[14] Italy (North-eastern)	Retrospective cohort Follow-up of cases from a hospital-based case-control study. Age range: 46 to 74 years (median: 66 years). Follow-up: 12.7 median years	Gleason score: 50.6% 2-6, 36.4% 7-10, 13% unknown Treatments: Lack of information on treatments	No	Interviews during hospitalization by trained personnel. Structured questionnaire with information on age, education, and other sociodemographic characteristics, anthropometric measures, lifestyle habits. Death confirmation: Record-linkage procedure between the population-based databases of the health systems (Including the mortality database) and the population-based regional cancer registries of Friuli Venezia Giulia and Veneto regions	ACM: 263 (780) PCSM: 81 (780)	*Cox proportional hazards regression models for ACM and Fine and Gray's regression model for PCSM* Adjusted for: Area of residence at diagnosis, calendar period, age at diagnosis, years of education, and Gleason score
Polesel 2015,[15] Italy North-eastern (same population as Taborelli 2017)	Retrospective cohort Follow-up of cases from a hospital-based case-control study. Age range: 46 to 74 years (median: 66 years). Exclusions:	Gleason score: 2-10 and unknown Treatments: Did not undergo treatments	No	Interviews during hospitalization by trained personnel. Structured questionnaire with information on age, education, and other sociodemographic characteristics, anthropometric measures, lifestyle habits. Death confirmation: Record linkage and death certificates	ACM: 263 (780) PCSM: 81 (780)	*Cox proportional hazards regression models for ACM and PCSM* Adjusted for: Age at diagnosis, area, and year of diagnosis

	4% refused to participate to the original case–control study, and 3% lost at follow-up due to migration from the study areas Follow-up: 12.7 median years					
Jeong 2015,[16] USA	Retrospective cohort Follow-up: 9 median years	Gleason score: 2-10 T2, T3aF, T3aNF, T3b, LN+ Treatment: Surgery (no other information for other treatments)	No	Perioperative obesity collected prospectively and reviewed retrospectively. Death confirmation: Survival status and cause-of-death information were obtained from patient follow-up, the Social Security Administration Death Index, and the Centers for Disease Control National Death Index.	ACM: 1300 (15,565) PCSM: 314 (15,565)	*Cox proportional hazards regression models* Adjusted for: T substage, Age, PSA, Positive surgical margins, Gleason score, Surgery year
Cantarutti 2015,[17] Sweden	Retrospective cohort Follow-up of cases from a case-control study Men originally cases of the CAPS, identified and recruited from four of the six regional cancer registries in Sweden Mean age ~66 years Follow-up: 11 years maximum	High risk: defined as stage T3/T4 (tumour invades regions adjacent to the prostate), M1 (distant metastases) and N1 (lymph node metastases) at diagnosis, Gleason score >7 and prostate- specific antigen (PSA)>=20. Low/intermediate risk defined as T1/T2 stage (tumour confined within the prostate), N0 and M0 (no lymph node and no distant metastases) at diagnosis, Gleason score<7 and PSA <20 Treatments: Most received no treatment (surveillance), surgery, surgery, and radiation (radiation therapy only received in combination with surgery, i.e., no patients received radiation therapy exclusively), missing data	Yes, excluding men who died within the first two years of follow-up	Self-reported single measurement of BMI: men with PCa filled a short questionnaire about anthropometric data. Time between date of diagnosis and inclusion to the study at the time of returned questionnaire was on average six months. Death confirmation: Linkage to the population-based cause of death registry	ACM: 883 (3,032) PCSM: 658 (3,032)	*Cox proportional hazards regression models* Adjusted for: Age at inclusion (3-year categories), height and treatment

Wu 2015,[18] USA	Retrospective cohort Exclusions: -concurrent treatment with other cytotoxic chemotherapeutic agents or targeted therapy -lack of confirmation of metastatic disease, -incomplete medical records, -histological types of prostate cancer other than adenocarcinoma (e.g., small cell cancer), incompatible digital image formats of CT scans Follow-up: NA	Metastatic PCa Treatments: Single agent docetaxel chemotherapy	No	BMI calculated using the recorded height and body weight closest to the date of the CT scan. Death confirmation: Tumor Registry of MD Anderson Cancer Centre	ACM: NA (333)	*Cox proportional hazards regression models* Adjusted for: *Age, >5 years after diagnosis, African race, Gleason score, abnormal serum alkaline phosphatase, visceral fat-to-subcutaneous fat area ratio, visceral fat-to-muscle area ratio, Charlson Comorbidity Index, docetaxel dose*
Chalfin 2014,[19] USA	Retrospective cohort Mean age (SD): 58 (6.5) Follow-up: 5 median years	Gleason score: 6 or less, 3+4, 4+3, 8-10 Pathological stage: organ confined, focal/established capsular penetration, seminal vesicle involvement lymph node involvement. Treatments: Radical prostatectomy at a single tertiary referral centre	No	At time of surgery Death confirmation: Mortality status and cause of death information from Social Security Administration Death Master File and the Centers for Disease Control National Death Index.	ACM: 827 (11152) PCSM: 245 (11152) *Fine and Gray approach PCSM: 96 (3214)	*Cox proportional hazards regression models for ACM.* *Fine and Gray approach for PCSM* Adjusted for: Age, year of surgery, race, preoperative PSA test, Gleason sum, positive surgical margin
Wang 2015,[20] USA	Retrospective cohort 19% diabetes, 58% hypertension, 18% heart disease Follow-up: 47.6 median months	Mixed: Clinically localised (T1b-T4N0M0) Gleason score: 44% 6, 40% 7 and 16% 8-10. 33% low risk group, 45% intermediate risk group and 23% high risk Treatments: All treated with definitive intensity-modulated radiotherapy and image-guided radiotherapy	No	Weight and height documented before the initiation of EBRT. Death confirmation: Death certificate, medical record or physicians' notes	ACM: 122, (1442) PCSM: NA (1442)	*Cox proportional hazards regression models* Adjusted for: Stage, Gleason score, T classification, PSA level, age, ADT use, comorbidities

		70% no ADT, 30% ADT				
Bonn 2014,[21] Sweden (Nationwide: six health care regions)	Retrospective cohort Mean age (SD): 63.0 (5.1) Exclusions: -Patients with unknown primary treatment or missing progression data excluded from analysis as the definition of disease progress is dependent on primary treatment. -Patients primarily treated with hormones -Patients with unknown date of last record in medical journals or a missing date of termination of deferred treatment and patients with completely missing questionnaire data or incomplete data on self-reported BMI. Follow-up: 4 median years	Clinically localised PSA<20 ng/ml; local tumour stage T1–T2; and no signs of lymph node metastasis (NX or N0) or bone metastasis (MX or M0). Gleason score <6, 6 or >6 Treatments Within 6 months of diagnosis: surveillance, radical prostatectomy, radiation therapy	Yes, sensitivity analysis with 18-months lag time (Model-free i.e., not estimated from a Cox proportional hazard model)	Self-reported current height, weight Death confirmation: Swedish Cause of-Death registry using national identification numbers	ACM: 311 (3214) PCSM: 96 (3214)	*Cox proportional hazards regression models* Adjusted for: Age at diagnosis, primary treatment, Gleason score at diagnosis, PSA level, T-, N-, and M-stages at diagnosis, smoking habits and total MET-h at age 50
Froehner 2014,[22] Germany	Retrospective cohort Mean age: 64.2 years Exclusions: -Patients with missing data on Gleason score, local tumour stage or lymph node status Follow-up: 8.6 median years	Clinically localised, Gleason score: (20%) 8-10, (34%) 7 and (46%) <7, some lymph node metastatic disease Treatments: Radical prostatectomy at university hospital	No	BMI information obtained from the patient medical records Death confirmation: Follow-up data were collected from urologists and/or general practitioners, the patients, relatives, health insurance companies, local authorities or the local tumour register, whichever was necessary. Thereby, only one patient was lost to follow-up. Causes of death were assigned to relevant categories by senior urologist.	ACM: 301 (2131)	*Cox proportional hazards regression models* Adjusted for: Age, Gleason score, American Society of Anaesthesiologists physical status class, Charlson score, stage, pN1

Keto 2012,[23] USA	Retrospective cohort From SEARCH database (Men who underwent RP at five Veterans Affairs Hospitals in USA) Exclusions: Men treated with preoperative ADT or radiotherapy. Follow-up: 73 median months	Mixed: Pathological Gleason (2-6, 3 + 4 and ≥ 4 + 3) Lymph node metastases (n=18) Treatments: Radical prostatectomy and ADT	No	Height and weight obtained from progress notes within 1 year prior to ADT. Not obtained in a standardized manner and are subject to human error in measurement.	PCSM: 24 (287)	*Cox proportional hazards regression models* Adjusted for: Black race, positive surgical margins, seminal vesicle invasion, extracapsular extension, lymph node metastasis, pre-ADT PSA levels, age at ADT start, year of ADT start, pathological Gleason score
Smith 2011,[24] 183 sites of USA and Europe	Retrospective cohort. Men from placebo group of a double-blind RCT (Abbott M00-244) Mean (SD) age: 73 (8) years Exclusions: -If had received prior chemotherapy, bisphosphonates, radiopharmaceuticals, or an endothelin receptor antagonist. Subjects with cardiovascular disability (New York Heart Association class 2 or greater) also excluded. Follow-up: NA	CRPC and no radiographically detectable metastases. 71% Gleason sum>=7 Treatments: ADT (bilateral orchiectomy or medical castration) at least three months before randomisation and had castrate testosterone levels at screening.	No	At baseline Death confirmation: Follow-up	ACM: 66 (331)	*Cox proportional hazards regression models* Adjusted for: Age at baseline, prior prostatectomy, prior orchiectomy, Gleason sum, PSA level, Serum N-telopeptides, bone alkaline phosphatase, albumin, lactate dehydrogenase, and haemoglobin
Geinitz 2011,[25] Germany	Retrospective cohort Men treated at a single institution. Median age: 71 Follow-up: 51 median months	Clinically localised PCa. Stage: 18% T1, 58% T2, 24% T3 and 1% T4. Gleason score: 63%<=6, 29% 7 and 9% 8-10.17% low risk 76% intermediate risk Treatments: Risk-adapted conformal EBRT and endocrine treatment. None of the patients received treatment to the pelvic lymph nodes.	No	Weight and height before the start of EBRT routinely recorded in the patient charts and used to calculate BMI. Death confirmation: Follow-up	ACM: NA (564) PCSM: NA (564)	*Cox proportional hazards regression models* Adjusted for: Age, hormonal therapy, T-stage, WHO grade, EBRT dose, Initial PSA levels

Van Roermund 2010,[26] Netherlands	Retrospective cohort Men treated at a single medical centre. Median age: 67 years Exclusions: -Patients with no data on height or weight, missing follow-up data or those who received salvage PPB after EBRT Follow-up: 47 median months	Clinically localised PCa. Three risk groups according to Ash et al: Low risk: cT1b–cT2a, low grade (Gleason<=6 and PSA<=10 ng/L) High risk: ≥cT3 or PSA level of ≥20 ng/L or ≥2 intermediate risk factors Intermediate risk: The rest Treatments: Permanent prostate brachytherapy. *Different treatment techniques used throughout the study period (1989–2008). 18.4% received ADT (LHRH agonist) for 6 months before permanent prostate brachytherapy	No	Height and weight data were collected retrospectively by reviewing anaesthesia records. Death confirmation: Medical record review	ACM: 193 (1530) PCSM: 61 (1530)	*Cox proportional hazards regression models* Adjusted for: Age, risk group (low, intermediate, high), treatment period, number of seeds
Davies 2009,[27] USA	Prospective cohort Men from CAPSURE. Men recruited consecutively from 40 primarily community-based urology practices across the USA. Exclusions: -Men undergoing expectant management Follow-up: 44 median months	Clinically localised (T1-T3, NX/N0, M0) Gleason scores ranged from 2 to 4 (5%), 5 to 6 (58%), 7 (26%), to 8 to 10 (11%). Clinical staging was T1 (45%), T2 (50%) and T3 (5%) 38% low risk, 35% intermediate risk, 27% high risk by the D'Amico classification. Treatments: Initial therapy: RP (53%), ADT (14%), BT (11%), cryotherapy (4%), BT plus EBRT (3%) and RP plus EBRT (1%). Secondary therapy: ADT 79.7%, EBRT 15.6%, cryotherapy 2.1%, BT 2% and RP 0.6%.	No	BMI information obtained from the patient records Death confirmation: Mortality information is obtained from the Bureau of Vital Statistics or National Death Index	ACM: 1044 (7274) PCSM: 214 (7274)	*Cox proportional hazards regression models* Adjusted for: Age, clinical risk, presence of diabetes and type of therapy
Armstrong 2009,[28] Multinational (centres in 24 countries)	Retrospective cohort Secondary analysis of a TAX327 clinical trial, international phase III randomized trial, Age range 66 to 70 Follow-up: 5 years maximum	mCRPC with evidence of progression Treatments: Docetaxel and prednisone or mitoxantrone and prednisone.	No	Height and weight recorded at baseline (upon trial entry). Death confirmation: Follow-up	ACM: 800 (1006)	*Cox proportional hazards regression models* Adjusted for: Baseline pain, presence of liver metastases, performance status, haemoglobin, alkaline phosphatase, PSA, PSA doubling time, number of sites of metastatic disease, type of progression (bone scan or measurable disease), high-grade disease (Gleason or WHO) and treatment group

Pfitzenmaier 2009,[29] Germany	Prospective cohort Men from a urological cancer database of mid-Europeans. Median age: 64.3 years Follow-up: 5.5 median years	Either organ-confined or locally advanced with extracapsular extension. Non-metastatic. Treatments: Radical prostatectomy Some also received: neoadjuvant hormonal therapy, adjuvant hormonal therapy, adjuvant radiotherapy, adjuvant hormonal and radiotherapy or neoadjuvant and adjuvant therapy	No	Baseline Death confirmation: Follow-up	ACM: 89 (620)	*Cox proportional hazards regression models* Adjusted for: Age, tumour extension, lymph node, tumour grading, PSA level, resection margin, year of surgery.
Halabi 2007,[30] USA	Retrospective cohort Secondary analysis of men treated on 9 CALGB multi–institutional clinical trials. Median age: Exclusions: -Patients who had received prior treatment with chemotherapy, immunotherapy, or other nonhormonal therapy were excluded from these trials. -There were 11 men who were underweight (BMI <18.5 kg/m^2) and were excluded from the analysis. -If had either missing height or weight data Follow-up: 33.8 median months	Advanced PCa mCRPC Gleason score: 8% 2-4, 47% 5-7 and 44% 8-10 Treatments: 53% prior radiotherapy 25% prostatectomy 65% LHRH agonists 44% surgical castration	No	BMI at study entry Death confirmation: Cause of death determined based on the case report forms submitted by the local treating physician.	ACM 1152 (1226) PCSM 968 (1226)	*Cox proportional hazards regression models* Adjusted for: ECOG performance status, presence of visceral disease, prior radiotherapy, Gleason score, age, testosterone, haemoglobin, race, alkaline phosphatase, years since diagnosis, PSA, LDH

Efstathiou 2007,[31] USA	Retrospective cohort Secondary analysis of a phase III trial RTOG 85-31 Exclusions: Patients with bulky primary lesions (product of palpable tumour dimensions >25 cm) not eligible Follow-up: 8.1 median years	Locally advanced prostate cancer histologically confirmed adenocarcinoma of the prostate and either had grossly palpable tumor beyond the confines of the prostate (clinical stage T3) or documented involvement of the regional lymphatics. Patients with primary tumor confined to the prostate (clinical stage T1-2) were eligible if there was evidence of spread to the regional lymph nodes either radiographically or histologically. Treatments: Radical prostatectomy and radiation therapy. Radiation therapy and immediate goserelin or radiation therapy alone followed by goserelin at recurrence	No	BMI calculated using patient height and weight data as measured at baseline (upon trial entry) Death confirmation: Follow-up	ACM: 476 (788) PCSM: 169 (788)	*Cox proportional hazards regression models* Adjusted for: Age, race, treatment arm, prostatectomy, nodal involvement, Gleason score, clinical stage
Siddiqui 2006,[32] USA	Prospective cohort Exclusions: -Patients who received neoadjuvant therapies prior to surgery -If refused research authorization, or -If not have their BMI recorded Follow-up: 10.1 median years	High and low risk PCa *a higher proportion of the patients in the current study have high-risk PCa Pathologic Gleason score: 458 Gleason score<6, 347 Gleason score=6, 307 Gleason score=7, 48 Gleason score 8+ Pathologic stage: n=307: T2AN0 n=478: T2Bn0 n=306: T34N0 n=72: TxN+ Treatments: Radical retropubic prostatectomy and pelvic lymphadenectomy and adjuvant therapy (any form of ADT or radiation therapy within 90 days of surgery).	No	BMI calculated using patient height and weight as measured on the day of surgery. Death confirmation: Cause of death verified by death certificates or correspondence to the treating physician.	ACM: 967 (5313) PCSM: 151 (5313)	*Cox proportional hazards regression models* Adjusted for: Pathologic Gleason score, pre-operation PSA, positive seminal vesicle, positive margin, adjuvant treatment

Abbreviations: ACM *All-cause mortality*, PCSM *Prostate cancer-specific mortality*, PCa *Prostate cancer*, BMI Body mass index, CT *Computed tomography*, EBRT *external beam radiation therapy,* ADT *androgen deprivation therapy,* RT *radical prostatectomy,* PCa *Prostate Cancer, WHO* World Health Organisation, NA *Not available,* mCRPC Metastatic castrate-resistant prostate cancer, mHSPC Metastatic hormone-sensitive prostate cancer, nmCRPC Nonmetastatic castrate-resistant prostate cancer, PROSCARE the Prostate Cancer Risk Evaluation study, CPS II Nutrition Cohort *Cancer Prevention Study II Nutrition Cohort*, PA physical activity, CRPC *castration-resistant prostate cancer, SD standard deviation,* IQR *Inter-quartile range,* CAPS *Cancer Prostate in Sweden,* PSA *Prostate-specific antigen,* PROCAP*, PROgression in CAncer of the Prostate,* CAPSURE *the Cancer of the Prostate Strategic Urological Research Endeavor database,* USA *United States of America,,* BT *brachytherapy,* HPFS *Health Professionals Follow-up Study.*

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Supplementary Table 4A Studies excluded from the linear dose-response meta-analysis of post diagnosis BMI and all-cause mortality

67 publications identified that included more than 100 men. Of these 61 assessed BMI post-diagnosis	**First author, Year**
BMI assessed before PCa diagnosis **(n=6)**	Park 2006,[1] DeRouen 2018,[2] Polesel 2016,[3] Reichle 2015,[4] Nair-Shalliker 2020[5] and Kim 2017[6]
Reason for exclusion from linear-dose response meta-analysis	
Combined BMI and pre-diagnosis weight loss (**n=1**)	Martinez-Tapia 2020[7]
Overlapping population **(n=3)**	From CAPSURE: Langlais 2019[8] used Davies 2009[9] From the Italian study: Polesel 2015[10] used Taborelli 2017[11] Post-hoc trial analysis: Modonutti 2022[12¥] used Verma 2022[13] and Martini 2021[14]
Only univariate/crude estimate provided **(n=7)**	Tendulkar 2013,[15] Pak 2020,[16] Pak 2019,[17] Gravis 2015,[18¥] Frantellizzi 2020,[19] Koo 2015,[20] Han 2010[21]
Only dichotomous estimate provided **(n=8)**	DiBella 2020,[22] Heo 2018,[23] Rudman 2016,[24] Antoun 2015,[25¥] Hu 2018,[26¥] Greenlee 2017,[27] Lee 2020[28], Pan 2021[29]
Only Kaplan Meier/p-values provided (or only Figure) **(n=11)**	Delouya 2018,[30] Tomaszewski 2013,[31] Kim 2017,[32] Palma 2007,[33] Merrick 2007,[34] Fang 2011,[35] Taira 2011,[36] Taira 2010,[37] Taira 2012[38], Merrick 2021[39], Tu 2022[40]
Lacked necessary data and/or could not be estimated using standard methods (Bekkering) **(n=5)**	Chalfin 2014,[41] Montgomery 2007,[42] Wu 2015,[43] Halabi 2007,[44] Geinitz 2011[45]
Different definition of obesity and could not combine **(n=1)** *Patients being classified as obese or non-obese according to the National Health and Nutrition Examination Survey (NHANES) standards for obesity i.e., fat mass index>9kg/m^2	Mason 2018[46]
Reason for exclusion from non-linear dose-response meta-analysis (but included in linear dose-response meta-analysis)	
Only provided continuous estimate (i.e., only analysed the exposure on continuous scale) **(n=8)**	Xu 2020,[47] Stangl-Kremser 2020,[48] Wang 2015,[49] Siddiqui 2006,[50] Ikeda 2020,[51] Kashiwagi 2020,[52] Jeong 2015,[53] Abdel-Rahman 2019[54]
¥In addition, focus on building prognostic models and had prognostication aims.	

Supplementary Table 4B Studies excluded from the categorical meta-analysis of BMI and all-cause mortality	
Reason for exclusion	**First author, Year**
Combined BMI and pre-diagnosis weight loss (**n=1**)	Martinez-Tapia 2020[7]
Only provided continuous estimate i.e., analysed the exposure on continuous scale **(n=8)**	Xu 2020,[47] Stangl-Kremser 2020,[48] Wang 2015,[49] Siddiqui 2006,[50] Ikeda 2020,[51] Kashiwagi 2020,[52] Jeong 2015,[53] Abdel-Rahman 2019[54]
Only univariate/crude estimate provided **(n=7)**	Pak 2020,[16] Pak 2019,[17] Gravis 2015,[18¥] Tendulkar 2013,[15] Han 2010,[21] Koo 2015,[20] Frantellizzi 2020[19]
Only p-value/Kaplan Meier (or only Figure) **(n=11)**	Delouya 2018,[30] Kim 2017,[32] Tomaszewski 2013,[31] Fang 2011,[35] Taira 2011,[36] Taira 2010,[37] Taira 2012[38] Palma 2007,[33] Merrick 2007[34] Merrick 2021[39], Tu 2022[40]
Overlapping population **(n=4)**	From CAPSURE: Langlais 2019[8] used Davies 2009[9] instead. From SWOG trials: Greenlee 2017,[27] used Montgomery[42] 2007 instead. From the Italian case-control study: Polesel 2015[10] Used Taborelli 2017 instead. Post-hoc trial analysis: Modonutti 2022[12¥] used Verma 2022[13] and Martini 2021[14]
Different definition of obesity and could not combine **(n=1)** *Patients being classified as obese or non-obese according to the National Health and Nutrition Examination Survey (NHANES) standards for obesity i.e., fat mass index>9kg/m^2	Mason 2018[46]
Excluded from analysis of overweight vs normal weight and/or obese vs normal because either they only provided dichotomous estimate comparing obese vs non-obese (i.e., 25 vs 25 or >=30 vs <30) or not WHO categories **(n=11)**	DiBella 2020[22], Heo 2018,[23] Hu 2018[26¥], Rudman 2016[24], Antoun 2015[25¥] and Froehner 2014,[55] Lee 2020,[28] Montgomery 2007[42] (different categories than WHO) Cantarutti 2015[56] (different categories than WHO) and Chalfin 2014[41] (different categories than WHO for obese vs normal category), Pan 2021[29]
¥In addition, focus was on building prognostic models and had prognostication aims.	

Supplementary Table 4C Studies excluded from the linear dose-response meta-analysis of BMI and PCa-specific mortality	
45 publications identified that included more than 100 men. Of these 36 assessed BMI post-diagnosis	
BMI assessed before PCa diagnosis **(n=9)**	DeRouen 2018, [2] Polesel 2016,[3] Reichle 2015,[4] Nair-Shalliker 2020,[5] Kim 2017,[32] Moller 2015,[57] Ma 2008,[58] Aarestrup 2015,[59] Gong 2007[60]
Reason for exclusion from linear-dose response analysis	**First author, Year**
Overlapping population **(n=4)**	From SEARCH database: Vidal 2017,[61] Vidal 2018[62] and Vidal 2020[63] from SEARCH database and used Keto 2012[64] instead *Also, Vidal publications used competing-risks regression analysis so another reason why Keto 2012 was used. From the cases of the Italian case-control study: Taborelli 2017[11] Used Polesel 2015 instead. *Also, Taborelli 2017[11] used competing-risks regression so another reason why Polesel 2015[10] used instead.
Only univariate-crude estimate provided **(n=5)**	Koo 2015,[65] Lee 2018,[66] Tendulkar 2013, [15] McDonald 2017[67], Chiang 2022[68]
Only dichotomous estimate provided **(n=5)**	Meyer 1999,[69] DiBella 2020,[22] Rudman 2016,[24] Bluethmann 2020[70] Huang 2019[71]
Only Kaplan Meier/p-values **(n=2)**	Palma 2007,[33] Taira 2012[38]
Lacked necessary data and/or could not be estimated using standard methods (Bekkering) (**n=4**)	Chalfin 2014,[41] Yu 2018,[72] Halabi 2007,[44] Geinitz 2011[45]
Reason for exclusion from non-linear dose-response meta-analysis (included in linear dose-response meta-analysis)	
Only provided continuous estimate i.e., analysed the exposure on continuous scale **(n=3)**	Siddiqui 2006[50] and Wang 2015[49] Jeong 2015[53]

Supplementary Table 4D Studies excluded from the categorical meta-analysis of BMI and PCa-specific mortality	
Reason for exclusion	**First author, Year**
Only provided continuous estimate i.e., analysed the exposure on continuous scale **(n=3)**	Wang 2015,[49] Jeong 2015,[53] Siddiqui 2006[50]
Only univariate-crude estimate provided **(n=5)**	Koo 2015,[65] Lee 2018,[66] Tendulkar 2013,[15] McDonald 2017[67], Chiang 2022[68]
Only Kaplan Meier/p-values **(n=2)**	Palma 2007[33] and Taira 2012[38]
Overlapping population **(n=4)**	From SEARCH database: Vidal 2017,[61] Vidal 2018[62] and Vidal 2020[63] from SEARCH database and used Keto 2012[64] instead *Also, Vidal publications used competing-risks regression analysis so another reason why Keto 2012 was used. From the cases of the Italian case-control study: Taborelli 2017[11] Used Polesel 2015[10] instead (Taborelli also conducted competing risks)
Excluded from analysis of overweight vs normal weight and/or obese vs normal because either they only provided dichotomous estimate comparing obese vs non-obese (i.e., 25 vs 25 or >=30 vs <30) or not WHO categories **(n=8)**	DiBella 2020,[22] Rudman 2016,[24] Bluethmann 2020,[70] Meyer 1999,[69] Huang 2019,[71] Chalfin 2014,[41] (different categories than WHO for obese vs normal category) Yu 2018,[72] (different categories than WHO) Cantarutti 2015[56](different categories than WHO)

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Supplementary Table 5 Hazard ratios (95% CI) for non-linear analysis of post-diagnosis BMI and all-cause mortality

	Values from midpoint estimation for open ended categories			**Values using common midpoint values from literature for open ended categories**		
BMI kg/m²	**HR**	**95% CI**		**HR**	**95% CI**	
17	1.23	1.07	1.41	1.33	1.13	1.57
18	1.20	1.06	1.35	1.28	1.11	1.48
19	1.17	1.05	1.30	1.24	1.09	1.41
20	1.14	1.04	1.25	1.20	1.08	1.34
21	1.11	1.03	1.20	1.16	1.06	1.27
22	1.09	1.02	1.15	1.12	1.05	1.20
23	1.06	1.01	1.11	1.08	1.03	1.14
24	1.03	1.01	1.06	1.05	1.02	1.08
25	1.01	1.00	1.03	1.02	1.01	1.04
26 (ref)	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
27	0.99	0.98	1.01	0.99	0.97	1.00
28	1.00	0.97	1.03	0.99	0.96	1.01
29	1.01	0.97	1.06	1.00	0.96	1.04
30	1.04	0.97	1.10	1.02	0.96	1.07
31	1.07	0.98	1.15	1.04	0.97	1.12
32	1.10	0.99	1.22	1.08	0.98	1.18
33	1.14	1.01	1.28	1.11	0.99	1.25
34	1.17	1.02	1.36	1.15	1.01	1.32
35	1.21	1.03	1.43	1.19	1.02	1.40
36	1.25	1.04	1.51	1.24	1.03	1.49
37	1.30	1.05	1.60	1.28	1.04	1.58
38	1.34	1.06	1.69	1.33	1.05	1.67
39	1.39	1.08	1.78	1.37	1.06	1.77
40	1.43	1.09	1.88	1.42	1.07	1.88
Wald Test	Chi-squared test: X2 = 23, df = 2, P(>X2) =<0.001			Chi-squared test: X2 = 15.5, df = 2, P(>X2) = < 0.001		
I-square statistic	64%			65%		

Supplementary Table 6 Categorical meta-analyses of BMI and mortality outcomes, summary of main results

					Heterogeneity			Small study effects	Tau-squared
	N studies	N deaths/ N total men	Summary HR (95% CI) Random effects	Summary HR (95% CI) Fixed effect	I^2 % (95% CI)	95% PI	Q value, p-value	Egger's p-value (studies>10)	
All-cause mortality									
Overweight versus normal weight (i.e., 25 to 30 vs <25 or 25 to 30 vs 18.5 to 25) ¥	19	Overweight: 4413/20582 Normal weight: 3321/12583	0.89 (0.82 to 0.95)	0.92 (0.88 to 0.97)	47 (9 to 69)	0.70 to 1.11	34, 0.01	0.04	0.01
Obese versus normal weight (i.e., >=30 vs <25 or >=30 vs 18.5 to 25) ¥	18	Obese: 2177/7072 Normal weight: 3321/9461	0.94 (0.83 to 1.08)	1.00 (0.94 to 1.06)	73 (56 to 83)	0.58 to 1.55	62, <0.01	0.26	0.05
Prostate cancer-specific mortality									
Overweight versus normal weight (i.e., 25 to 30 vs <25 or 25 to 30 vs 18.5 to 25) ¥	15	Overweight: 1022/14734 Normal weight: 775/13907	1.02 (0.89 to 1.17)	0.98 (0.91 to 1.07)	52 (14 to 74)	0.68 to 1.53	29, <0.01	0.27	0.03
Obese versus normal weight (i.e., >=30 vs <25 or >=30 vs 18.5 to 25)	14	Obese: 492/6376 Normal weight: 775/10785	1.08 (0.89 to 1.31)	0.98 (0.88 to 1.09)	54 (16 to 75)	0.61 to 1.89	28, <0.01	0.03	0.06
¥Number of deaths in an included publication was not given and/or could not be estimated per category. NA, not available; N, number.; PI, Prediction Interval									

Supplementary Table 7 Hazard ratios (95% CI) for non-linear analysis of post-diagnosis BMI and PCa-specific mortality.						
	Values from midpoint estimation for open ended categories			**Values using common midpoint values from literature for open ended categories**		
BMI kg/m²	**HR**	**95% CI**		**HR**	**95% CI**	
17	1.06	0.88	1.28	1.04	0.85	1.27
18	1.05	0.89	1.24	1.03	0.87	1.23
19	1.04	0.91	1.20	1.03	0.89	1.19
20	1.03	0.93	1.15	1.02	0.91	1.15
21	1.03	0.95	1.11	1.02	0.93	1.11
22	1.02	0.96	1.07	1.01	0.95	1.07
23	1.01	0.98	1.03	1.00	0.98	1.03
24 (ref)	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
25	1.00	0.97	1.02	1.00	0.97	1.02
26	1.00	0.96	1.04	1.00	0.95	1.05
27	1.00	0.95	1.06	1.00	0.94	1.07
28	1.02	0.96	1.09	1.01	0.94	1.09
29	1.05	0.97	1.14	1.03	0.95	1.12
30	1.08	0.97	1.21	1.06	0.96	1.16
31	1.13	0.97	1.30	1.09	0.97	1.22
32	1.18	0.97	1.42	1.12	0.97	1.29
33	1.23	0.97	1.55	1.16	0.97	1.38
34	1.28	0.96	1.70	1.19	0.96	1.48
35	1.34	0.96	1.87	1.23	0.96	1.58
36	1.40	0.95	2.05	1.27	0.95	1.70
37	1.46	0.95	2.25	1.31	0.94	1.83
38	1.52	0.94	2.47	1.35	0.93	1.96
39	1.59	0.93	2.71	1.40	0.93	2.11
40	1.66	0.93	2.97	1.44	0.92	2.27
Wald Test	Chi-squared test: X2 =2.9, df = 2, P(>X2) = 0.23			Chi-squared test: X2 = 2.6, df = 2, P(>X2) = 0.27		
I-square statistic	50%			48%		

Supplementary Table 8 Linear dose-response subgroup meta-analyses of BMI (per 5 kg/m^2) and all-cause mortality.

	N studies	N deaths/ N total men	Summary HR (95% CI) Random effects	Summary HR (95% CI) Fixed effect	I^2 % (95%CI)	95% PI	Tau^2	Q value, p-value	Q value, p-value across subgroups	Egger's p-value (When studies>10)
Excluded or included low/underweight men									0.14, 0.71	
Included them¥	22	9367/49539	0.99 (0.93 to 1.06)	1.00 (0.97 to 1.03)	74 (61 to 83)	0.77 to 1.29	0.01	82, <0.01		0.64
Excluded (or provided an estimate but we could exclude it in sensitivity analysis)	5	6003/12963	0.96 (0.83 to 1.12)	1.04 (1.00 to 1.08)	87 (71 to 94)	0.56 to 1.65	0.02	30, <0.01		-
By study design									1.27, 0.26	
Prospective cohort (includes prospective cohorts and follow-up of cases from a non-cancer cohort)	5	6483/22366	1.03 (0.96 to 1.09)	1.05 (1.01 to 1.09)	47 (0 to 81)	0.85 to 1.23	<0.01	7.5, 0.11		-
Retrospective cohort (includes retrospective cohorts, follow-up of cases from case-control and post-hoc trial analysis/secondary analysis)	20	7328/36208	0.97 (0.89 to 1.05)	0.99 (0.96 to 1.02)	79 (68 to 86)	0.70 to 1.33	0.02	89, <0.01		0.37
By median deaths (events)									0.02, 0.89	
Less than median deaths n<306	12	1693/8388	0.98 (0.86 to 1.11)	1.04 (0.97 to 1.12)	66 (38 to 82)	0.65 to 1.49	0.03	33, <0.01		0.02
More than median deaths n>306	12	12118/48586	0.99 (0.92 to 1.06)	1.02 (0.99 to 1.05)	83 (72 to 90)	0.77 to 1.27	0.01	64, <0.01		0.16
Anthropometry assessment									3.64, 0.16	
Self-reported	6	6549/23202	1.05 (1.00 to 1.11)	1.06 (1.02 to 1.10)	22 (0 to 66)	0.94 to 1.17	<0.01	6, 0.27		-
Measured	9	4197/11838	0.96 (0.87 to 1.06)	0.99 (0.94 to 1.03)	73 (47 to 86)	0.70 to 1.31	0.01	30, <0.01		-
Medical records¥	10	3065/23534	0.96 (0.84 to 1.09)	0.98 (0.94 to 1.02)	84 (73 to 91)	0.62 to 1.49	0.03	57, <0.01		0.74
Follow-up time *Two studies provided maximum follow-up, so they were not used in analysis and in one median follow-up was unclear so not included in this analysis.									0.03, 0.85	
More than 10 median years	5	2089/7733	0.99 (0.92 to 1.06)	0.99 (0.92 to 1.06)	0 (NA)	0.89 to 1.10	0	0.6, 0.96		-
Less than 10 median years¥	17	9973/46472	0.98 (0.90 to 1.06)	1.02 (0.99 to 1.05)	84 (76 to 90)	0.71 to 1.35	0.02	101, <0.01		0.24
Geographic Location									**11, 0.03**	
North America/Caribbean	10	9373/41154	1.00 (0.92 to 1.09)	1.03 (1.01 to 1.06)	85 (74 to 91)	0.75 to 1.33	0.01	59, <0.01		0.35

(USA, Canada, Jamaica)										
Oceania (Australia)	1	193/572	0.99 (0.81 to 1.22)	-	-	-	-	-		-
Europe (Austria, Italy, Sweden, Germany, Netherlands)	7	2133/11493	1.08 (0.97 to 1.21)	1.07 (1.00 to 1.15)	46 (0 to 77)	0.81 to 1.44	<0.01	11, 0.08		-
Multinational (Europe/USA/Multicounty) ¥	5	1972/4980	0.90 (0.81 to 1.00)	0.91 (0.86 to 0.97)	64 (6 to 86)	0.63 to 1.27	<0.01	11, 0.02		-
East Asia (Japan)	2	140/375	0.70 (0.52 to 0.95)	0.70 (0.52 to 0.95)	0 (NA)	-	0	0.2, 0.68		-
Tumour risk stratification									**26, <0.01**	
Group one: Low risk/Early stage	1	3026/6749	1.10 (1.04 to 1.15)	-	-	-	-	-		-
Group two: Mixed PCa i.e., low, intermediate, or high risk and maybe metastatic (or unknown if includes metastatic but could)	3	1339/4384	1.01 (0.92 to 1.10)	1.01 (0.92 to 1.10)	0 (NA)	0.57 to 1.78	0	0.04, 0.98		-
Group three: Mixed PCa i.e., low, intermediate/high risk but they state (or give info) that they excluded distant metastatic (M0) or state that PCa was clinically localised but could be high risk [e.g., if Gleason score>8]).	10	8320/45658	1.10 (1.03 to 1.17)	1.09 (1.06 to 1.13)	60 (10 to 80)	0.92 to 1.31	<0.01	22, 0.01		0.64
Group four: Advanced/High risk PCa (could include metastatic) ¥	13	4858/9871	0.90 (0.84 to 0.96)	0.92 (0.88 to 0.95)	63 (33 to 80)	0.72 to 1.12	<0.01	33, <0.01		0.16
Adjustment for confounding factors grouped in levels									2.3, 0.68	
Level one: At least for age, stage, and grade (clinical risk/state)	15	10156/46653	1.04 (0.96 to 1.12)	1.04 (1.02 to 1.07)	79 (67 to 87)	0.80 to 1.35	0.01	68, <0.01		0.72
Level two: At least for age, stage and/or grade (clinical risk/state) and treatment (any)	20	12175/50179	0.99 (0.93 to 1.05)	1.02 (0.99 to 1.04)	78 (67 to 86)	0.77 to 1.27	0.01	87, <0.01		0.18
Level three: At least for age, stage, grade (clinical risk/state) and treatment (any)	13	9775/44325	1.03 (0.96 to 1.11)	1.04 (1.01 to 1.07)	80 (66 to 88)	0.80 to 1.33	0.01	59, <0.01		0.68
Level four: At least for age, stage, grade (clinical risk/state), treatment (any) and smoking	3	4694/12373	1.07 (0.97 to 1.17)	1.07 (1.03 to 1.12)	52 (0 to 86)	0.41 to 2.74	<0.01	4, 0.12		-
Level five: At least for age, stage, grade, treatment (any),	2	839/4043	1.06 (0.86 to 1.31)	1.04 (0.93 to 1.15)	73 (0 to 94)	-	0.02	4, 0.06		-

smoking and PSA test (PSA levels [baseline/at-around diagnosis] as proxy)											
Adjustment for individual confounding factors (Even if accounted for in univariate analysis or using a specific p-value as cut-off)										25, 0.01	
										0.6, 0.43	
Accounted for age	No	2	1767/6319	1.02 (0.94 to 1.09)	1.02 (0.94 to 1.09)	0 (NA)	-	0	0.18, 0.67		-
	Yes¥	23	12044/52255	0.98 (0.92 to 1.05)	1.02 (0.99 to 1.04)	79 (68 to 86)	0.75 to 1.28	0.02	103, <0.01		0.15
										0.15, 0.70	
Accounted for stage (clinical and/or pathological/risk classification/tumour extent)	No	4	2561/6904	1.00 (0.92 to 1.08)	1.00 (0.92 to 1.08)	0 (NA)	0.84 to 1.18	0	0.43, 0.93		-
	Yes	21	12250/51670	0.98 (0.92 to 1.05)	1.02 (0.99 to 1.04)	80 (71 to 84)	0.75 to 1.29	0.02	102, <0.01		0.17
										18.9, <0.01	
Accounted for Gleason score	No	5	1294/4011	0.83 (0.77 to 0.90)	0.83 (0.77 to 0.90)	7 (0 to 81)	0.71 to 0.97	<0.01	4, 0.36		-
	Yes	20	12517/54563	1.03 (0.97 to 1.09)	1.04 (1.01 to 1.06)	73 (57 to 82)	0.83 to 1.28	<0.01	69, <0.01		0.54
										0.1, 0.74	
Accounted for treatment/s (any)	No	4	682/3071	0.94 (0.70 to 1.27)	0.99 (0.87 to 1.13)	80 (46 to 92)	0.25 to 3.55	0.07	15, <0.01		-
	Yes	21	13129/55503	0.99 (0.93 to 1.05)	1.02 (0.99 to 1.04)	77 (66 to 85)	0.78 to 1.25	0.01	88, <0.01		0.16
										2.3, 0.13	
Accounted for smoking	No	20	8786/45390	0.97 (0.90 to 1.04)	0.99 (0.96 to 1.02)	78 (67 to 86)	0.73 to 1.29	0.02	87, <0.01		0.42
	Yes	5	5025/13184	1.05 (0.98 to 1.13)	1.07 (1.03 to 1.11)	31 (0 to 73)	0.87 to 1.27	<0.01	6, 0.22		-
										0, 1.00	
Accounted for PSA test/PSA levels	No	8	5996/14109	0.99 (0.92 to 1.07)	1.05 (1.01 to 1.09)	49 (0 to 77)	0.81 to 1.21	<0.01	14, 0.05		-
	Yes	17	7815/44465	0.99 (0.92 to 1.07)	0.99 (0.96 to 1.02)	81 (70 to 88)	0.73 to 1.35	0.02	84, <0.01		0.86

¥Number of deaths in an included publication was not given and/or could not be estimated. NA, not available; PI, prediction interval; n=studies

Supplementary Table 9 Linear dose-response subgroup meta-analyses of BMI (per 5 kg/m^2) and PCa-specific mortality.

	N studies	N studies, (N deaths/ N total men)	Summary HR (95% CI) Random effects	Summary HR (95% CI) Fixed effect	I^2 % (95% CI)	95% PI	Tau^2	Q value, p-value	Q value, p-value across subgroups	Egger's p-value (When studies>10)
Excluded or included underweight									1.1, 0.29	
Included them¥	14	2857/46888	1.08 (0.99 to 1.19)	1.04 (0.99 to 1.10)	57 (23 to 77)	0.82 to 1.43	0.01	31, <0.01		0.13
Excluded (or provided an estimate but we could exclude it in sensitivity analysis)	3	1136/11305	1.17 (1.04 to 1.31)	1.17 (1.05 to 1.29)	9 (0 to 91)	0.49 to 2.78	<0.01	2, 0.34		-
By study design									1.7, 0.20	
Prospective cohort: (includes prospective cohorts and follow-up of cases from a non-cancer cohort)	5	1427/26904	1.03 (0.95 to 1.13)	1.04 (0.96 to 1.12)	24 (0 to 69)	0.83 to 1.28	<0.01	5, 0.26		-
Retrospective cohort: (includes retrospective cohorts, follow-up of cases from case-control and post-hoc trial analysis/secondary analysis)	11	1985/28553	1.14 (1.00 to 1.29)	1.07 (1.01 to 1.13)	63 (29 to 81)	0.78 to 1.65	0.02	27, <0.01		0.22
By median deaths (events)¥									1.9, 0.17	
Less than median deaths n<169	7	544/11935	1.15 (1.00 to 1.31)	1.15 (1.00 to 1.31)	0 (0 to 6)	0.96 to 1.37	0	1.9, 0.93		-
More than median deaths n>=169	8	2868/42080	1.03 (0.95 to 1.11)	1.03 (0.98 to 1.08)	54 (0 to 79)	0.82 to 1.28	<0.01	15, 0.03		-
Anthropometry assessment									0.3, 0.86	
Self-reported	4	1610/17300	1.06 (1.00 to 1.13)	1.06 (1.00 to 1.12)	8 (0 to 86)	0.90 to 1.25	<0.01	3, 0.35		-
Measured	6	1011/9715	1.13 (0.89 to 1.42)	1.05 (0.95 to 1.16)	79 (55 to 91)	0.52 to 2.44	0.06	24, <0.01		-
Medical records	6	791/28442	1.05 (0.94 to 1.16)	1.04 (0.94 to 1.16)	3 (0 to 75)	0.89 to 1.23	<0.01	5, 0.40		-
Follow-up time *Two studies reported maximum or minimum follow-up and not included in this analysis									0.01, 0.93	
Less than 10 median years	9	1835/39534	1.12 (0.96 to 1.29)	1.07 (1.00 to 1.14)	72 (45 to 86)	0.71 to 1.76	0.03	29, <0.01		-
More than 10 median years	5	548/7733	1.11 (0.97 to 1.26)	1.11 (0.97 to 1.26)	0 (0 to 67)	0.90 to 1.37	0	3, 0.64		-
Geographic Location									10, 0.02	
North America/Caribbean (i.e., USA, Canada, Jamaica)	11	2050/46755	1.11 (1.00 to 1.23)	1.09 (1.02 to 1.16)	53 (7 to 76)	0.83 to 1.48	0.01	21, 0.02		0.43
Oceania (i.e., Australia)	1	76/572	1.30 (0.93 to 1.83)	-	-	-	-	-		-
Europe (i.e., Austria, Italy, Sweden, Germany, Netherlands)	3	835/7026	1.05 (0.98 to 1.13)	1.05 (0.98 to 1.13)	0 (0 to 83)	0.65 to 1.69	0	1.2, 0.54		-
Multinational (i.e., Europe/USA)	1	451/1104	0.83 (0.70 to 0.98)	-	-	-	-	-		-
Tumour risk stratification									4, 0.27	
Group one: Low risk PCa/early stage	1	311/6749	1.24 (1.06 to 1.45)	-	-	-	-	-		

Group two: Mixed PCa i.e., low, intermediate, or high risk and maybe metastatic (or unknown if includes metastatic but could)		4	1400/28763	1.06 (0.99 to 1.14)	1.06 (0.99 to 1.14)	0 (0 to 83)	0.90 to 1.25	0	3, 0.44		-
Group three: Mixed PCa i.e., low, intermediate/high risk but they state (or give info) that they excluded distant metastatic (M0) or state that PCa was clinically localised but could be high risk [e.g., if Gleason score>8]).		9	1207/23973	1.10 (0.98 to 1.24)	1.08 (1.01 to 1.15)	58 (12 to 80)	0.79 to 1.53	0.02	19, 0.01		-
Group four: Advanced/High risk PCa (could include metastatic)		4	974/4060	1.01 (0.85 to 1.21)	0.99 (0.89 to 1.09)	66 (1 to 88)	0.48 to 2.12	0.02	9, 0.03		-
Adjustment for confounding factors grouped in levels										0.5, 0.97	
Level one: Age, stage, and grade (clinical risk/state)		12	2679/48229	1.10 (1.01 to 1.20)	1.07 (1.02 to 1.13)	51 (5 to 75)	0.87 to 1.39	<0.01	22, 0.02		0.15
Level two: Age, stage and/or grade (clinical risk/state) and treatment (any)		14	3185/49572	1.07 (0.98 to 1.17)	1.05 (1.00 to 1.10)	58 (24 to 77)	0.82 to 1.40	0.01	31, <0.01		0.35
Level three: Age, stage, grade (clinical risk/state) and treatment (any)*Same studies as level one		12	2679/48229	1.10 (1.01 to 1.20)	1.07 (1.02 to 1.13)	51 (5 to 75)	0.87 to 1.39	<0.01	22, 0.02		0.15
Level four: Age, stage, grade (clinical risk/state), treatment (any) and smoking		4	1152/17531	1.07 (0.98 to 1.17)	1.07 (0.98 to 1.17)	0 (0 to 78)	0.89 to 1.29	0	2, 0.55		-
Level five: Age, stage, grade, treatment (any), smoking and PSA test (PSA levels [baseline/at-around diagnosis] as proxy)		2	281/4043	1.05 (0.88 to 1.25)	1.05 (0.88 to 1.25)	0 (NA)	-	0	0.1, 0.73		-
Adjustment for individual confounding factors. (Even if accounted for in univariate analysis or using a specific p-value as cut-off)										11, 0.43	
										0.02, 0.89	
Adjusted for age	No	1	151/5313	1.10 (0.86 to 1.41)	-	-	-		-		-
	Yes	15	3261/50144	1.08 (0.99 to 1.18)	1.05 (1.01 to 1.10)	57 (23 to 76)	0.83 to 1.40	0.01	32, <0.01		0.26
										0.2, 0.66	
Adjusted for stage (clinical and/or pathological/risk	No	3	282/6124	1.13 (0.94 to 1.36)	1.13 (0.94 to 1.36)	0 (0 to 86)	0.34 to 3.79	0	1.50, 0.47		-
	Yes	13	3130/49333	1.08 (0.99 to 1.18)	1.05 (1.00 to 1.10)	61 (28 to 79)	0.82 to 1.42	0.01	31, <0.01		0.26

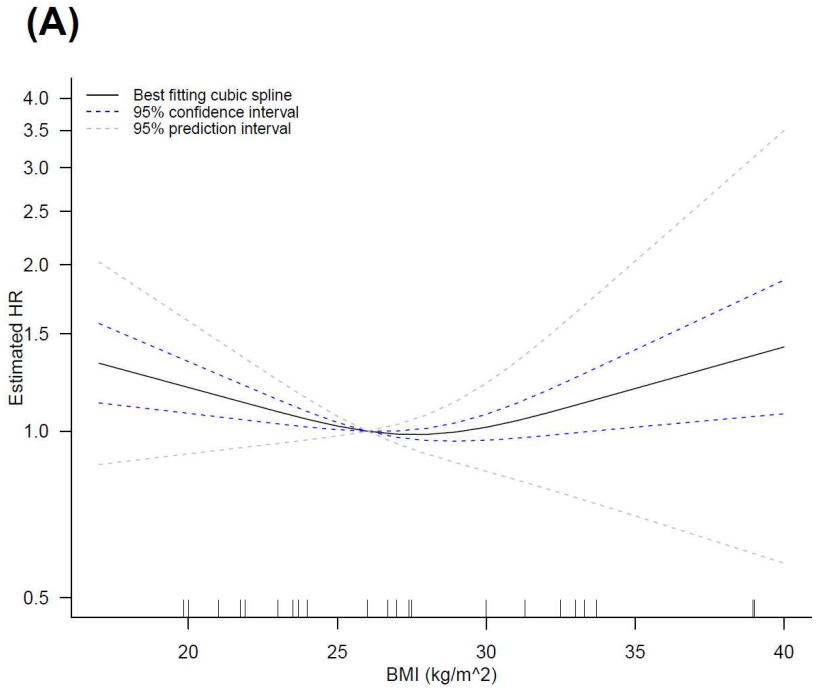
classification/tumour extent))											
										8.9, <0.01	
Accounted for Gleason score	No	1	451/1104	0.83 (0.70 to 0.98)	0.83 (0.70 to 0.98)	-	-	-	-		-
	Yes	15	2961/54353	1.10 (1.02 to 1.19)	1.08 (1.03 to 1.13)	42 (0 to 68)	0.90 to 1.35	<0.01	24, 0.04		0.15
										1.2, 0.27	
Accounted for treatment/s (any)	No	1	76/572	1.30 (0.93 to 1.83)	-	-	-	-	-		-
	Yes	15	3336/54885	1.07 (0.99 to 1.16)	1.05 (1.00 to 1.10)	55 (20 to 75)	0.84 to 1.38	0.01	31, <0.01		0.32
										0.06, 0.81	
Accounted for smoking	No	10	2129/37115	1.10 (0.97 to 1.25)	1.04 (0.99 to 1.10)	68 (39 to 84)	0.76 to 1.60	0.02	28, <0.01		0.25
	Yes	6	1283/18342	1.08 (0.99 to 1.17)	1.08 (0.99 to 1.17)	0 (0 to 67)	0.96 to 1.21	0	4, 0.58		-
										0.01, 0.91	
Accounted for PSA test/PSA levels	No	7	1910/18899	1.09 (1.01 to 1.17)	1.07 (1.02 to 1.14)	17 (0 to 61)	0.95 to 1.25	<0.01	7, 0.30		-
	Yes	9	1502/36558	1.08 (0.93 to 1.25)	1.02 (0.94 to 1.10)	67 (33 to 84)	0.69 to 1.69	0.03	24, <0.01		-
¥ Number of deaths in an included publication was not given and/or could not be estimated. NA, not available; PI, prediction interval; n=studies											

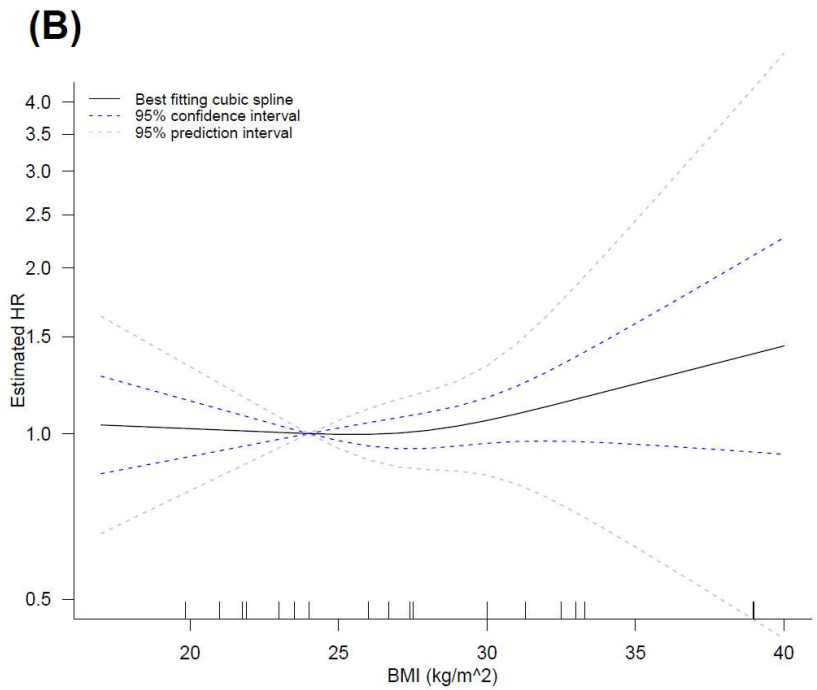
Supplementary Table 10. Regression tests for funnel plot asymmetry in meta-analyses that included more than 10 studies (Egger's and Debray's test)		
Meta-analysis	**Test for funnel plot asymmetry**	
	Egger's test, p-value	**Debray's test,p-value***
All-cause mortality		
Main analysis	0.13	0.49
Included low/underweight men	0.64	0.89
Retrospective cohort	0.37	0.71
Less than median deaths	**0.02**	0.18
More than median deaths	0.16	0.18
Follow-up less than 10 years	0.24	0.66
Geographic location: North America/Caribbean (USA, Canada, Jamaica)	0.35	0.91
Tumour risk classification: Group four	0.16	0.23
Adjustment for confounding factors grouped in levels: Level one	0.72	0.93
Adjustment for confounding factors grouped in levels: Level two	0.18	0.83
Adjustment for confounding factors grouped in levels: Level three	0.75	0.94
Adjusted for age (yes)	0.15	0.50
Adjusted for stage (yes)	0.17	0.56
Adjusted for Gleason score (yes)	0.54	0.85
Adjusted for smoking (no)	0.42	0.87
Adjusted for treatment (yes)	0.16	0.27
Adjusted for PSA (yes)	0.86	0.75
Categorical (obese versus normal weight)	0.26	0.87
Categorical (overweight versus normal weight)	**0.04**	0.32
Prostate cancer-specific mortality		
Main analysis	0.23	0.32
Included low/underweight men	0.13	0.15
Retrospective cohort	0.22	0.26
Geographic location: North America/Caribbean (USA, Canada, Jamaica)	0.43	0.91
Adjustment for confounding factors grouped in levels: Level one	0.15	0.44
Adjustment for confounding factors grouped in levels: Level two	0.35	0.55
Adjustment for confounding factors grouped in levels: Level three	0.15	0.44
Adjusted for age (yes)	0.26	0.36
Adjusted for stage (yes)	0.26	0.44
Adjusted for Gleason score (yes)	0.15	0.35
Adjusted for treatment (yes)	0.32	0.50
Categorical (obese versus normal weight)	**0.03**	**0.01**
Categorical (overweight versus normal weight)	0.27	0.35

Measure of asymmetry:
Egger's test: Models log HR (dependent variable) as a function of the estimated standard error (SE) of log (HR)
Debray's test: Models log HR (dependent variable) as a function of the number of events per study. *Before applying Debray's test we excluded any study that did not provide the number of observed events (deaths), or if these could not be estimated [one from the linear dose-response analyses of all-cause mortality, one from the analyses of prostate cancer specific mortality, two from the categorical subgroup analysis of all-cause mortality and one from categorical analysis of PCa-specific mortality. When Chalfin 2014 and Halabi 2007 were used in categorical analyses the total number of events was used as the closest estimation.

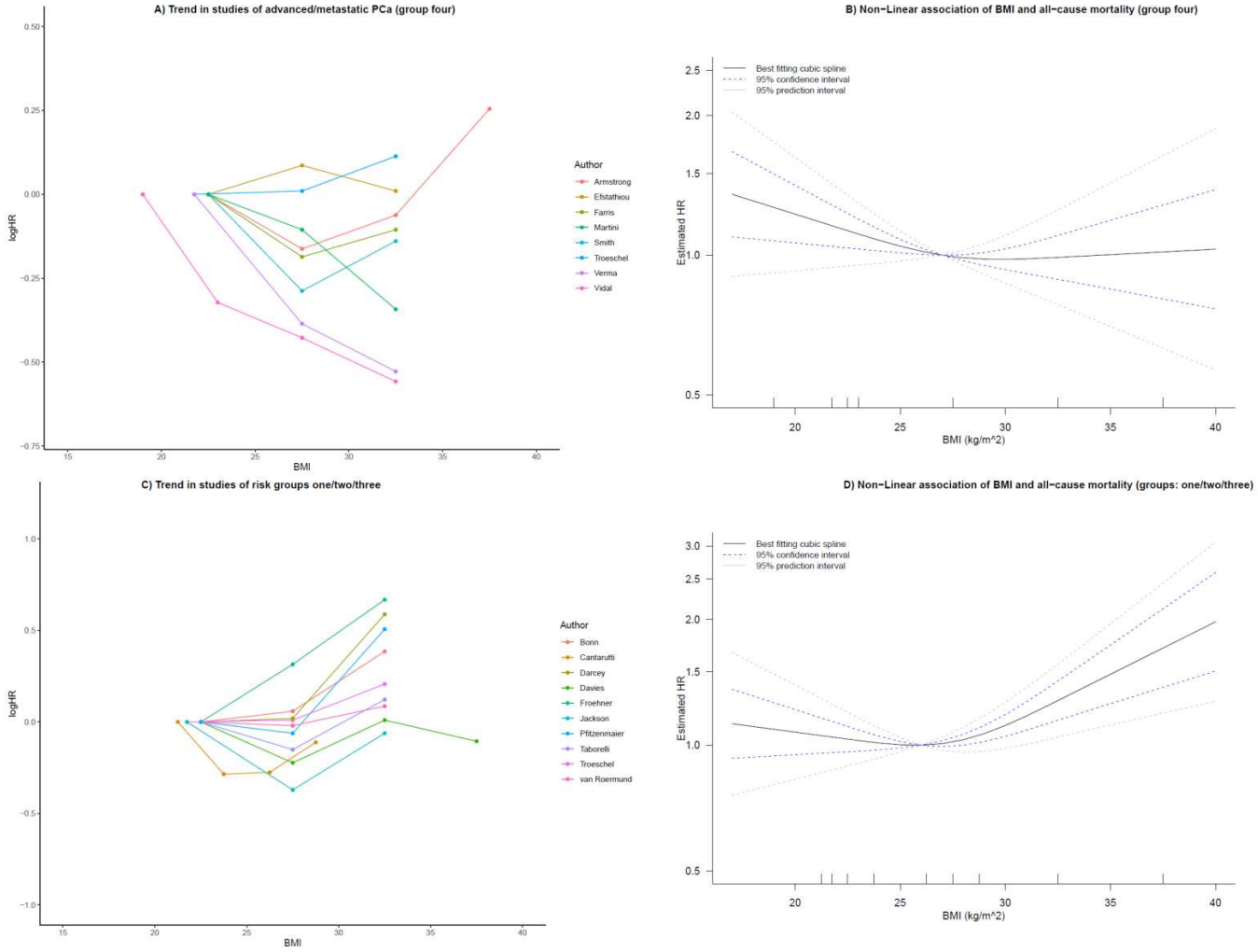
SUPPLEMENTARY FIGURES

Supplementary Figure 1 Non-Linear meta-analysis for the association between BMI A) and all-cause mortality and B) PCa-specific mortality using midpoint values for open ended categories obtained from the literature (with 95% confidence intervals and 95% prediction intervals of the curve).



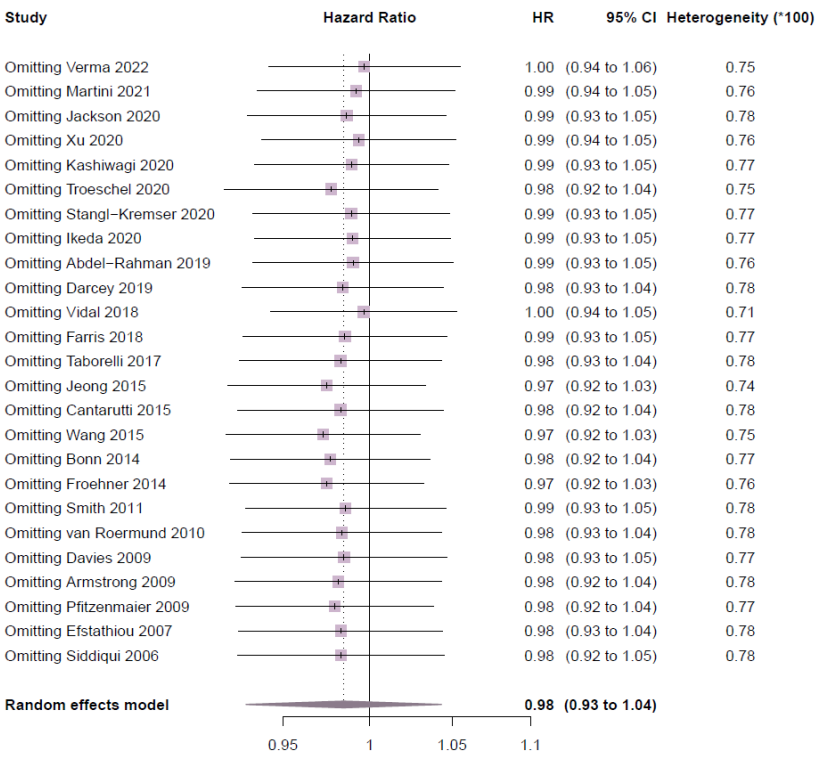


Supplementary Figure 2 A) Relation between BMI and all-cause mortality with the estimated trend of the natural logarithm of HR according to BMI level in each included study of high risk/advanced PCa and B) Non-linear association between post-diagnosis BMI and all-cause mortality; C) Relation between BMI and all-cause mortality with the estimated trend of the natural logarithm of HR according to BMI level in each included study of risk groups one/two/three and D) Non-linear association between post-diagnosis BMI and all-cause mortality in groups one/two/three.

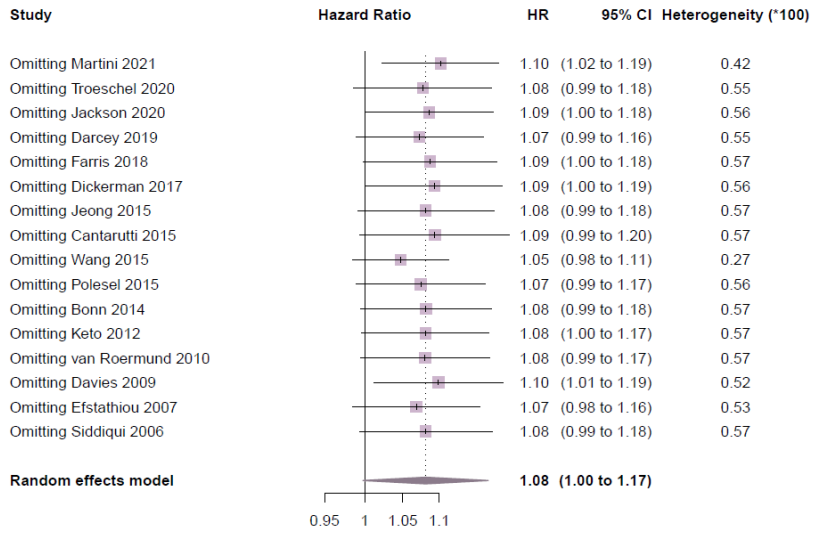


Supplementary Figure 3 Influence (leave-one-out) analysis for postdiagnosis BMI and A) all-cause mortality and B) PCa-specific mortality

A



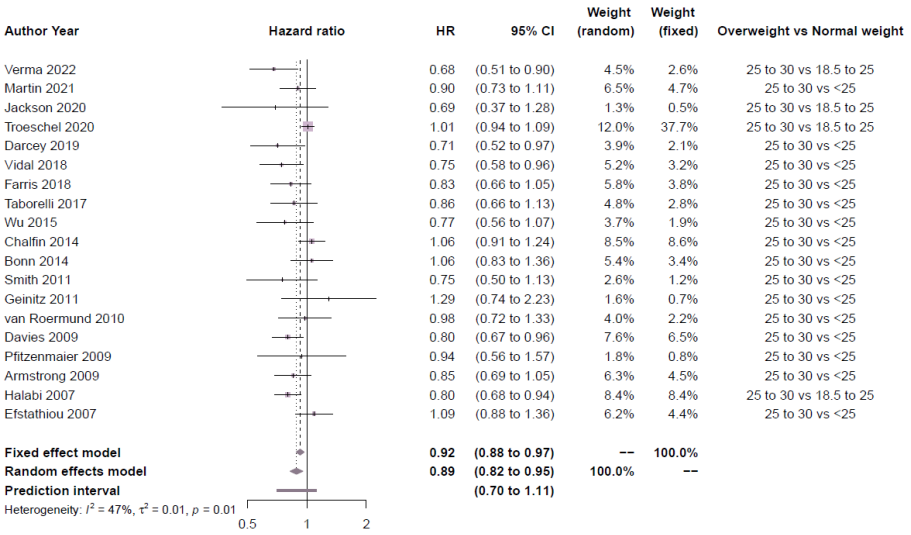
B



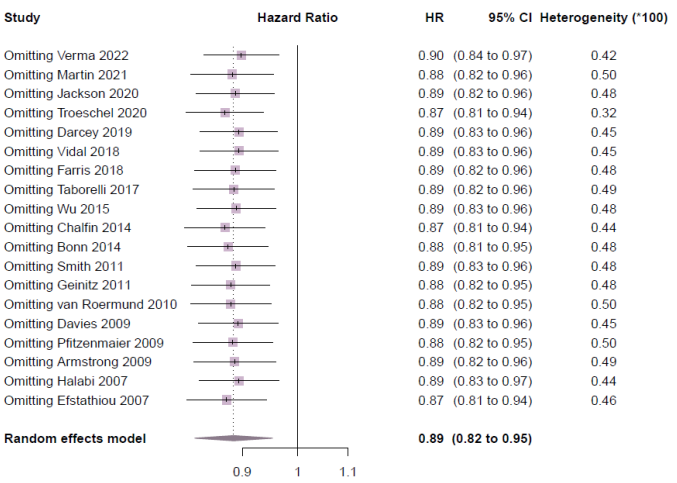
Categorical meta-analyses (all-cause mortality)

Supplementary Figure 4 Summary hazard ratio estimate (95% CI) of A) all-cause mortality comparing overweight versus normal weight men with PCa B) Sensitivity (leave one out analysis).

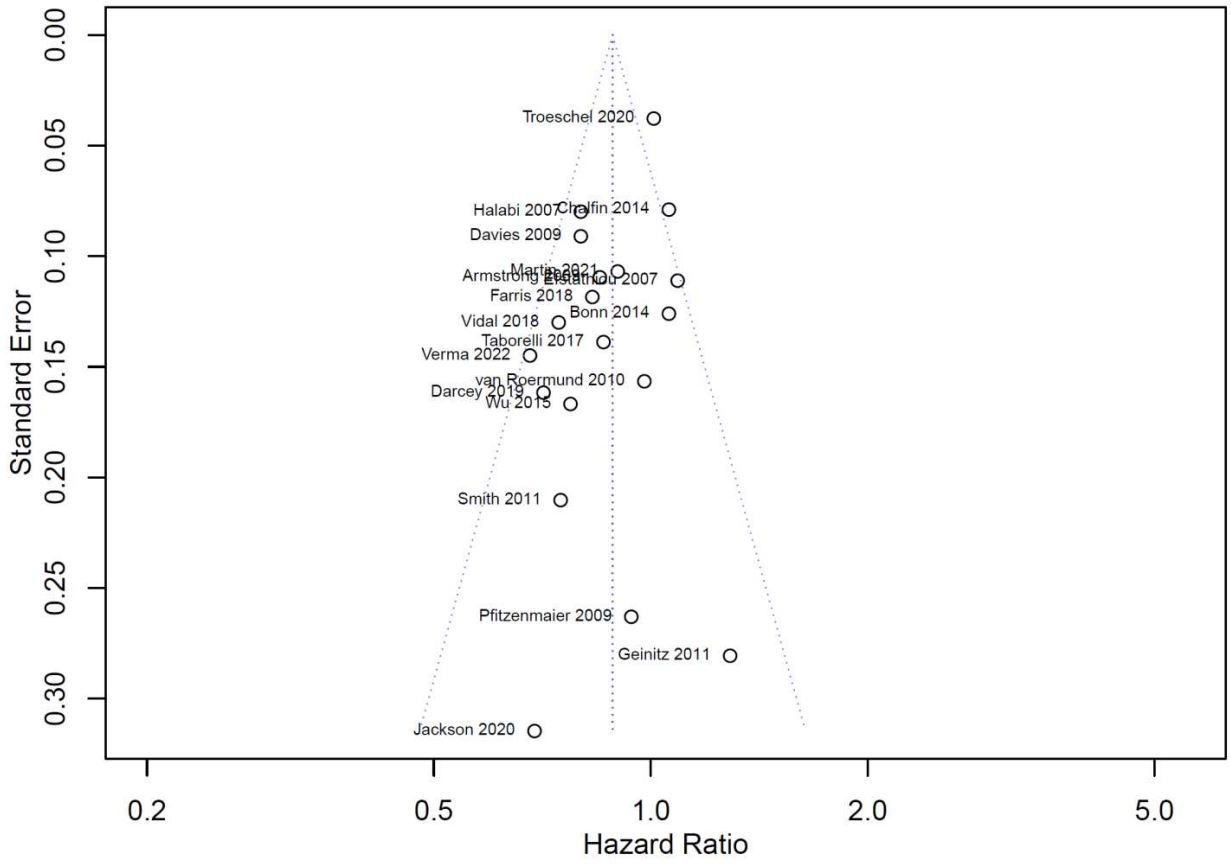
A



B

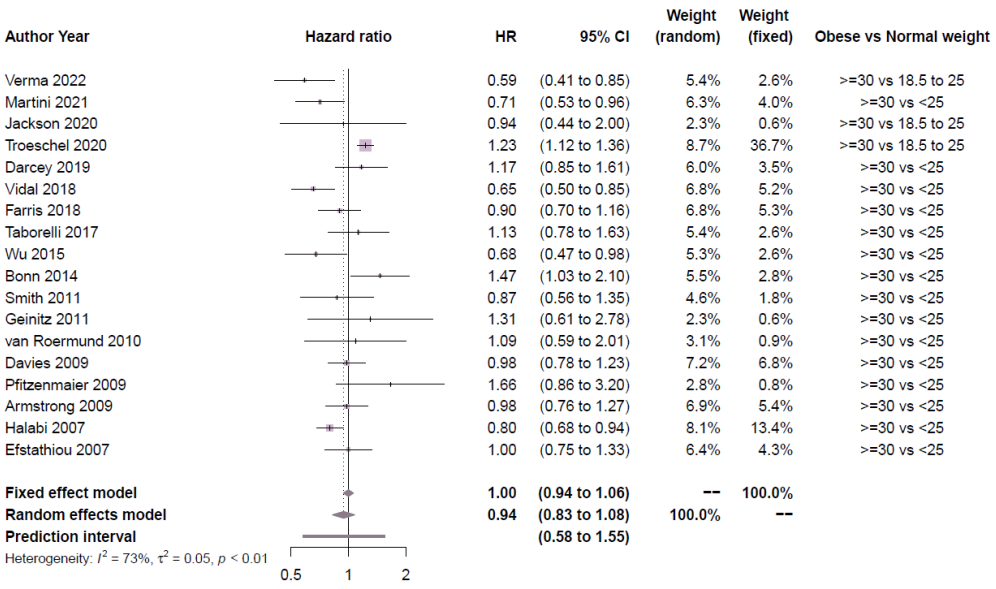


Supplementary Figure 5 Funnel plot of studies included in the categorical analysis of overweight versus normal weight men with PCa for all-cause mortality.

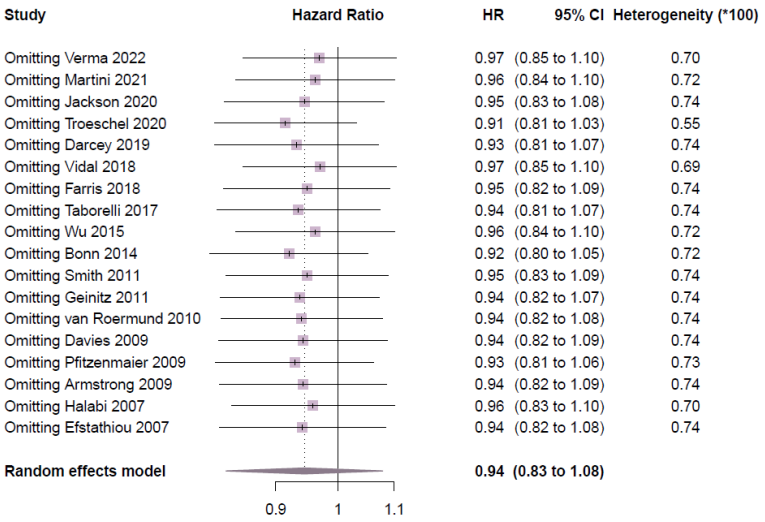


Supplementary Figure 6 A) Summary hazard ratio estimate (95% CI) of all-cause mortality comparing obese versus normal weight men with PCa B) Sensitivity (leave one out analysis).

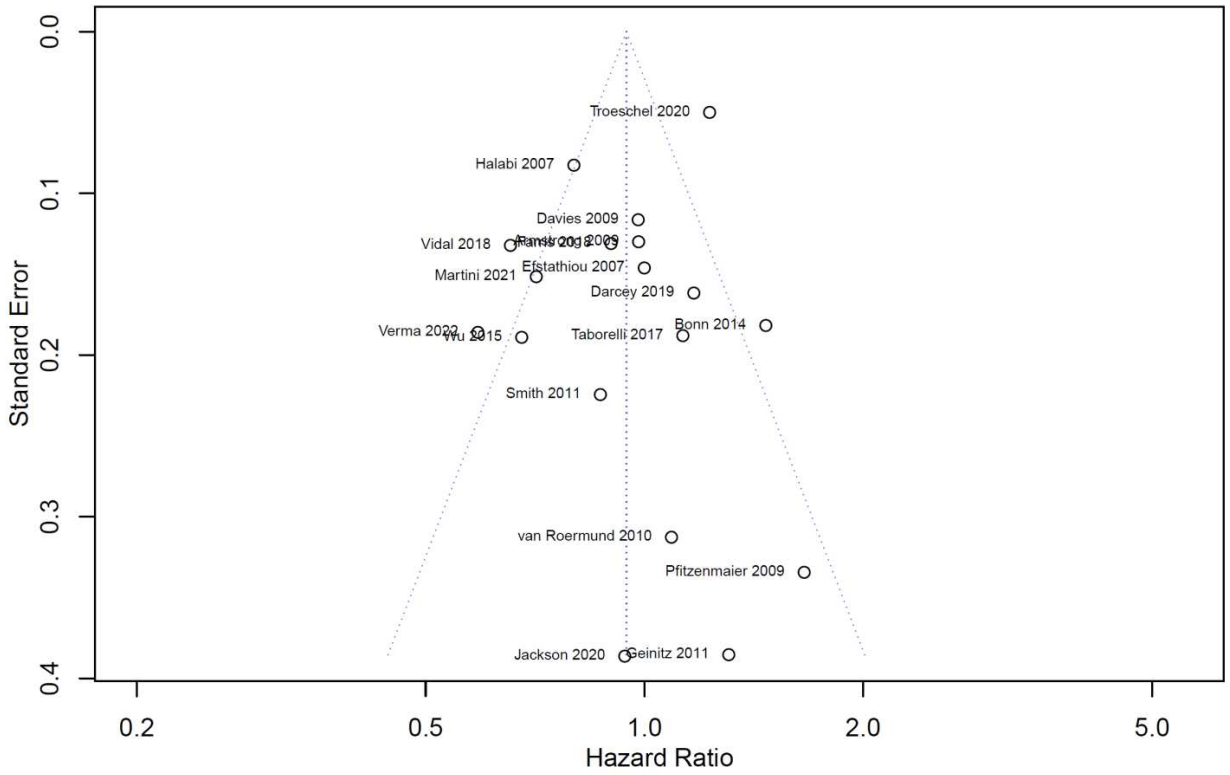
A



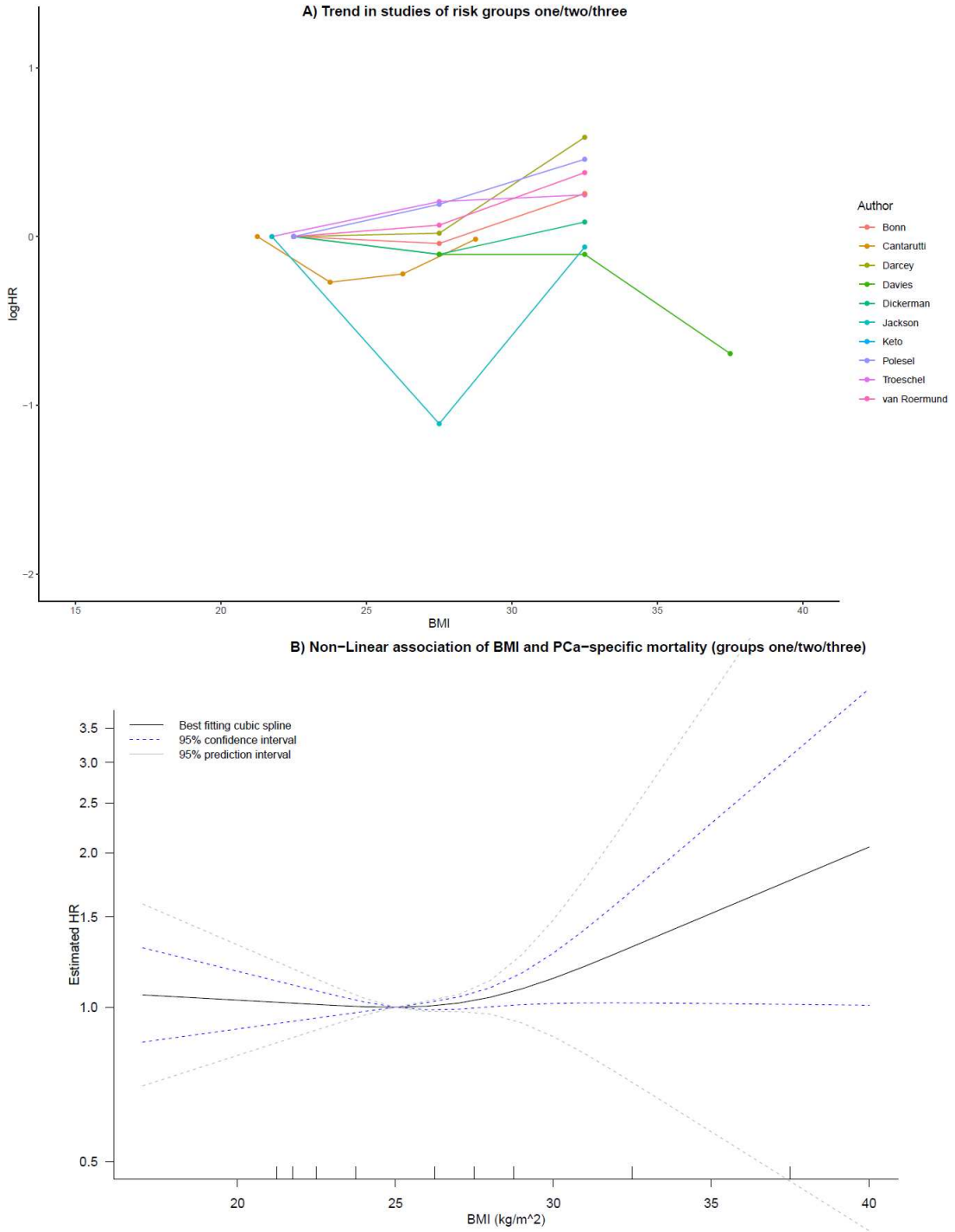
B



Supplementary Figure 7 Funnel plot of studies included in the categorical analysis of obese versus normal weight men with PCa for all-cause mortality.



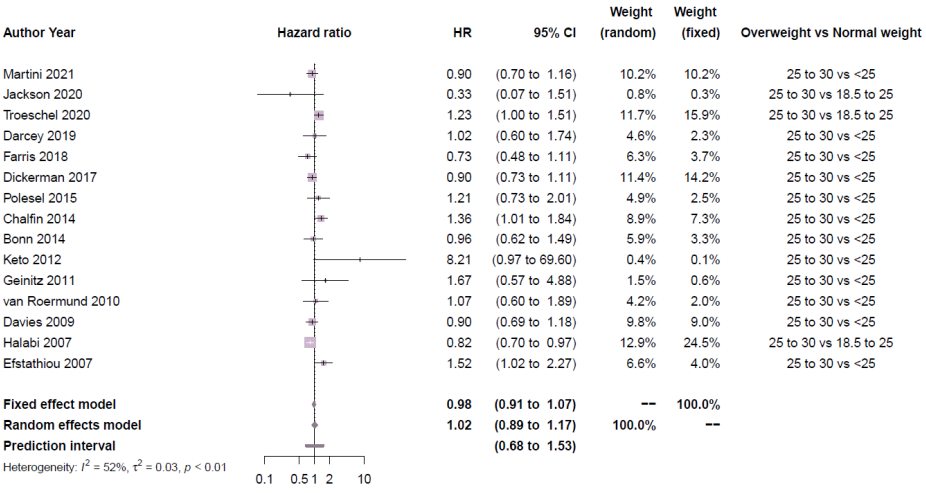
Supplementary Figure 8 A) Relation between BMI and PCa-specific mortality with the estimated trend of the natural logarithm of HR according to BMI level in each included study of risk groups one/two/three and B) Non-linear association between post-diagnosis BMI and PCa-specific mortality in risk groups one/two/three.



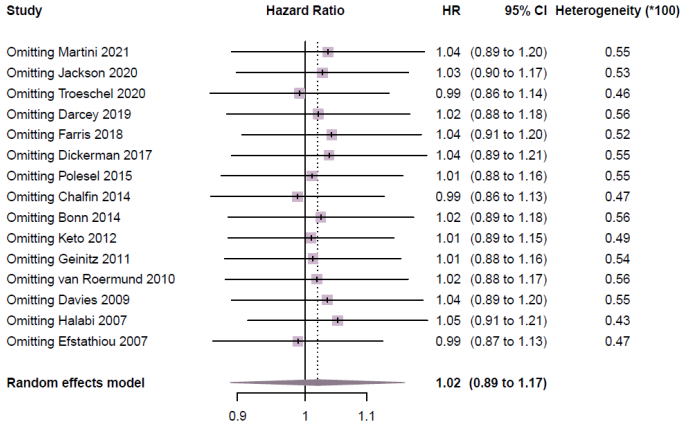
Categorical meta-analyses (PCa-specific mortality)

Supplementary Figure 9 A) Summary hazard ratio estimate (95% CI) of PCa-specific mortality comparing overweight versus normal weight men with PCa B) Sensitivity (leave one out analysis).

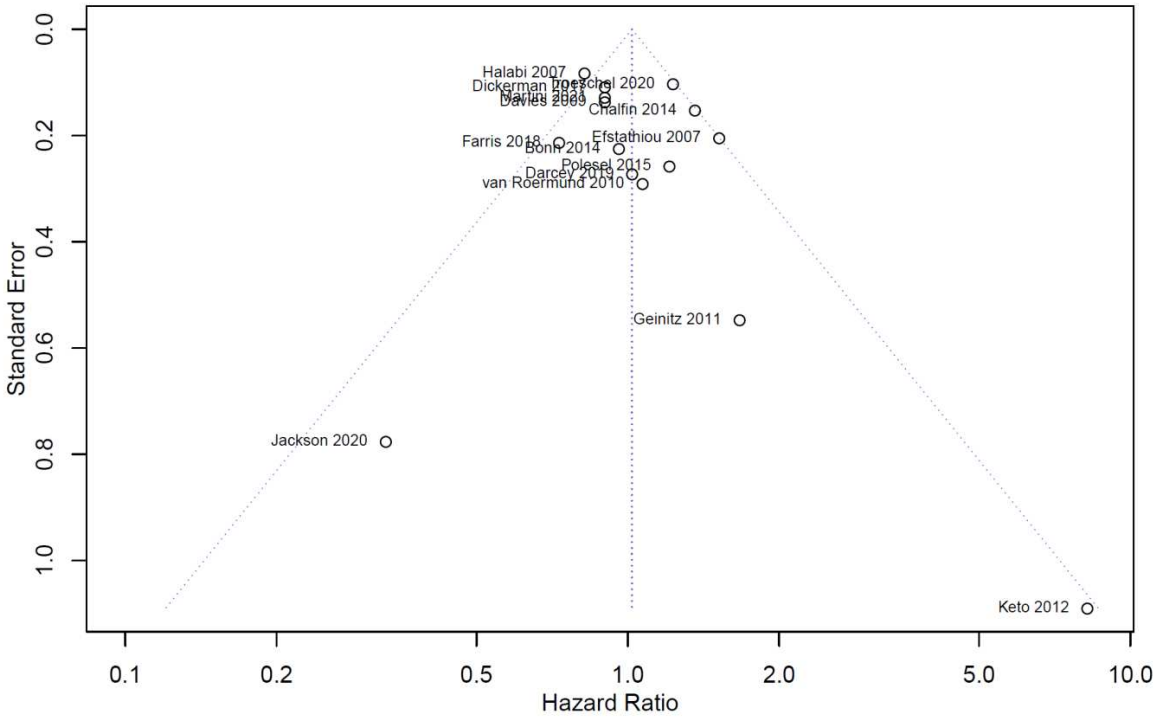
A



B

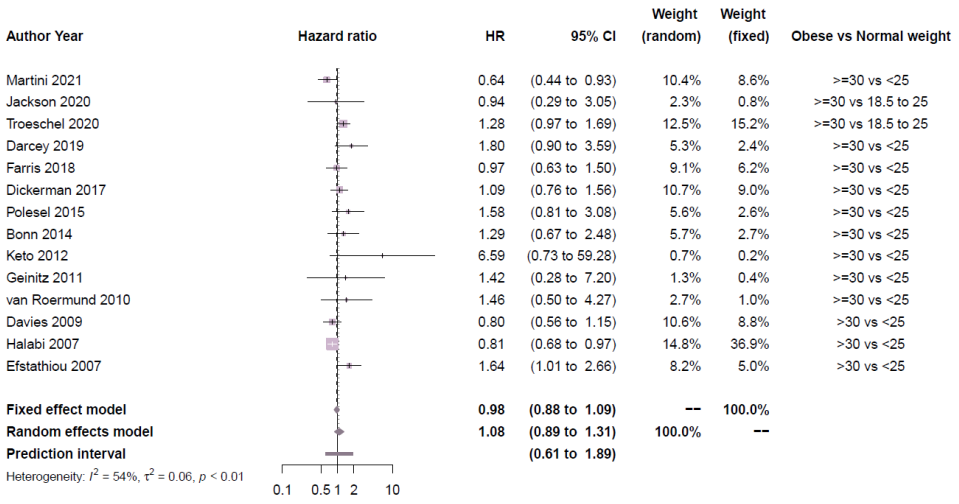


Supplementary Figure 10 Funnel plot of studies included in the categorical analysis of overweight versus normal weight men with PCa and risk of PCa-specific mortality.

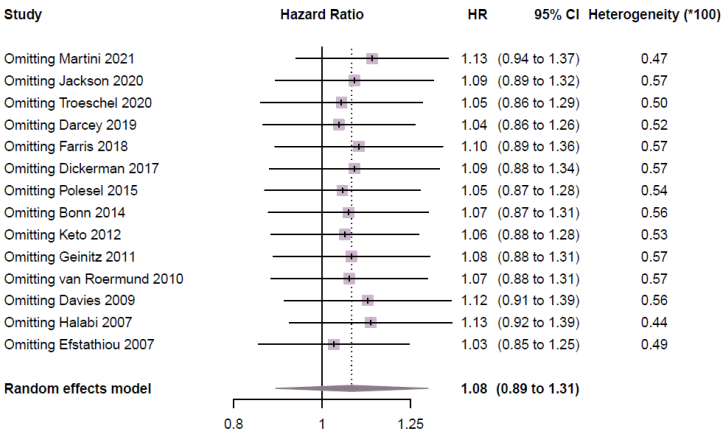


Supplementary Figure 11 A) Summary hazard ratio estimate (95% CI) of PCa-specific mortality comparing obese versus normal weight men with PCa B) Sensitivity (leave one out analysis).

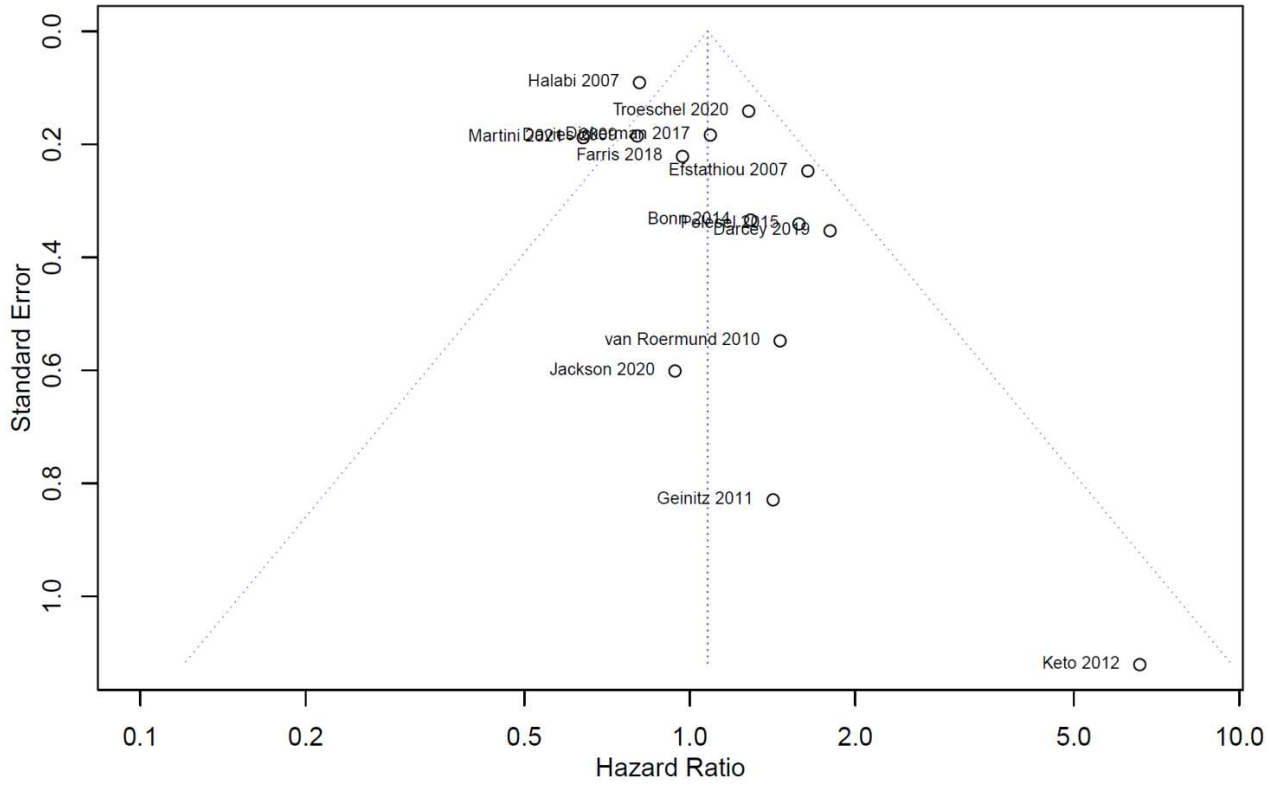
A



B



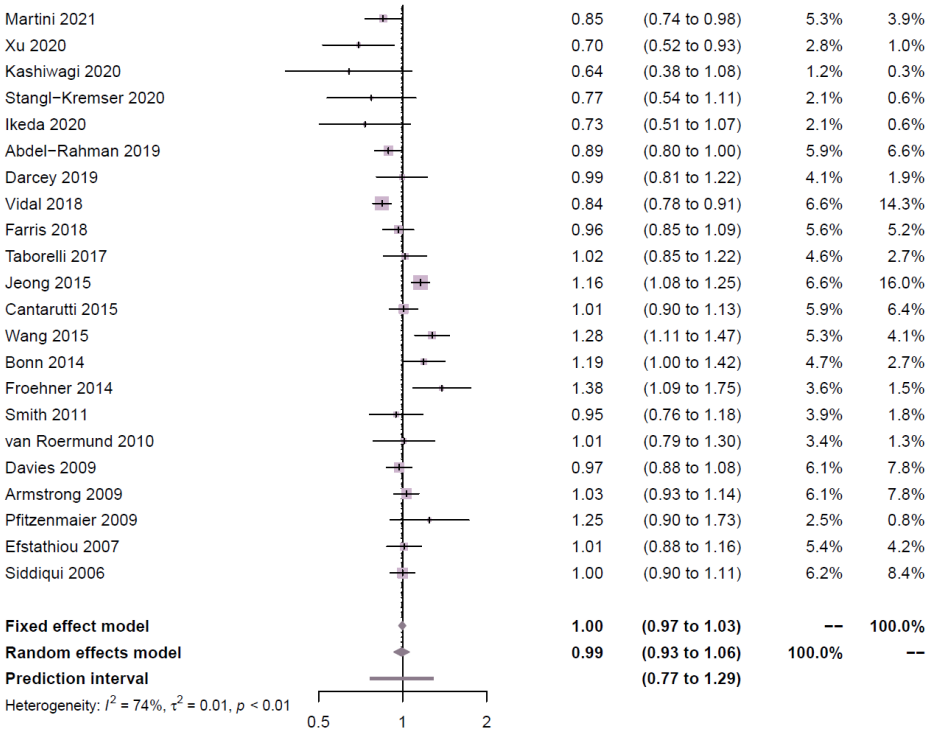
Supplementary Figure 12 Funnel plot of studies included in the categorical analysis of obese versus normal weight men with PCa and risk of PCa-specific mortality.



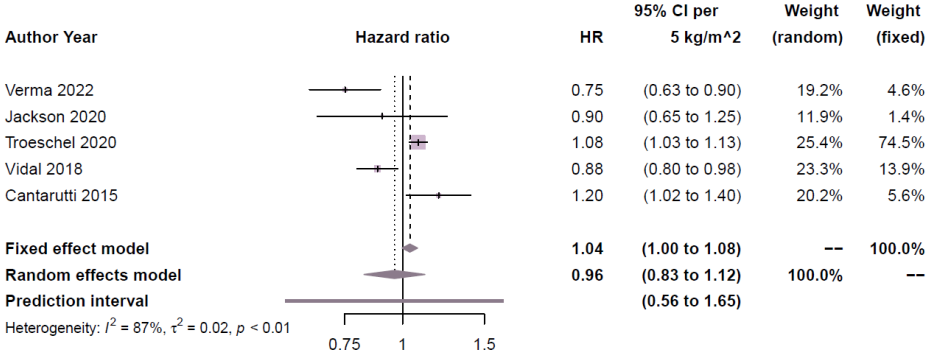
Linear dose-response subgroup meta-analyses (BMI and all-cause mortality)

Supplementary Figure 13 Summary hazard ratio estimate (95% CI) of all-cause mortality for postdiagnosis 5 kg/m² BMI increments for A) studies that included underweight groups and B) studies that excluded the underweight groups.

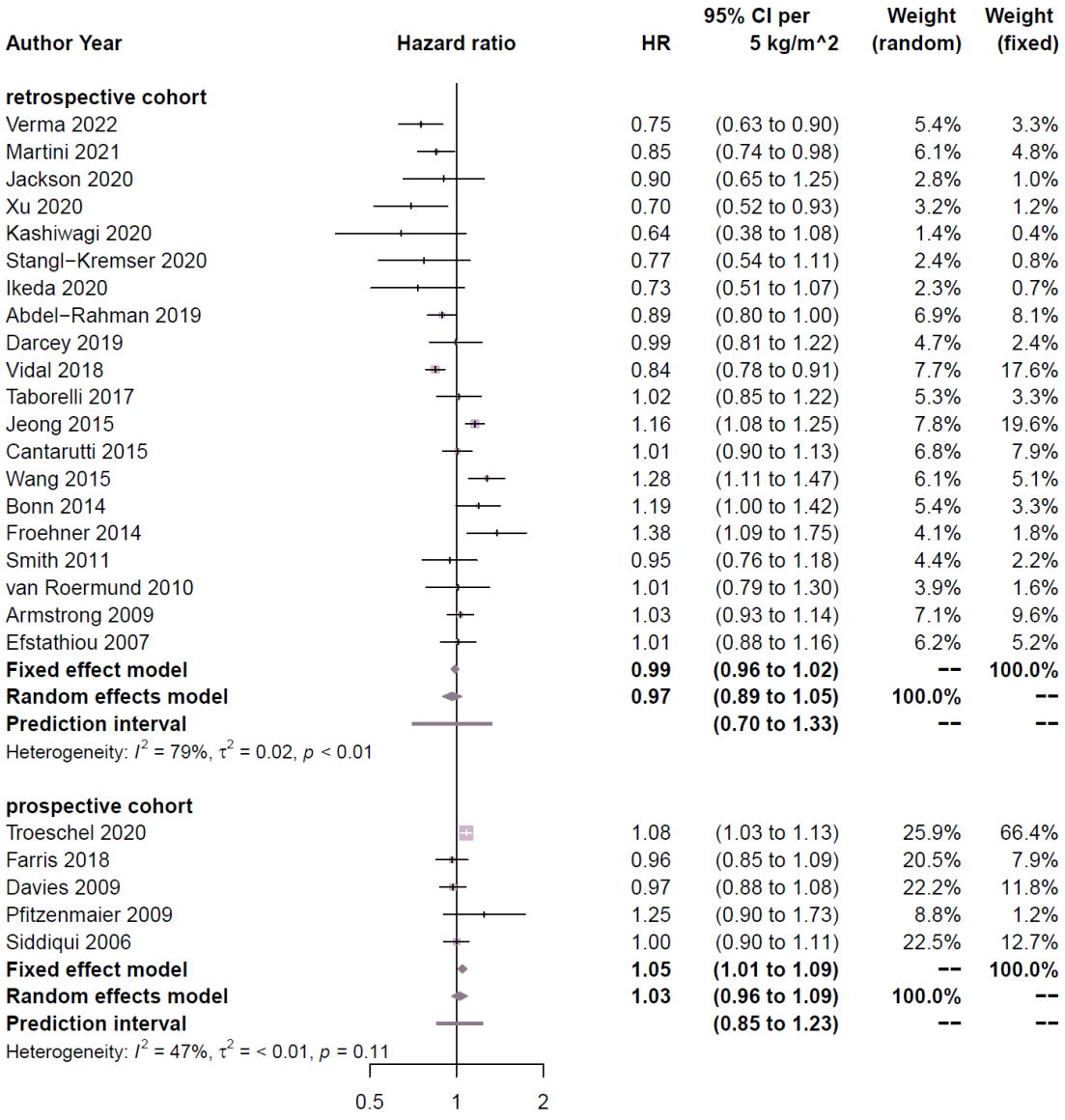
A



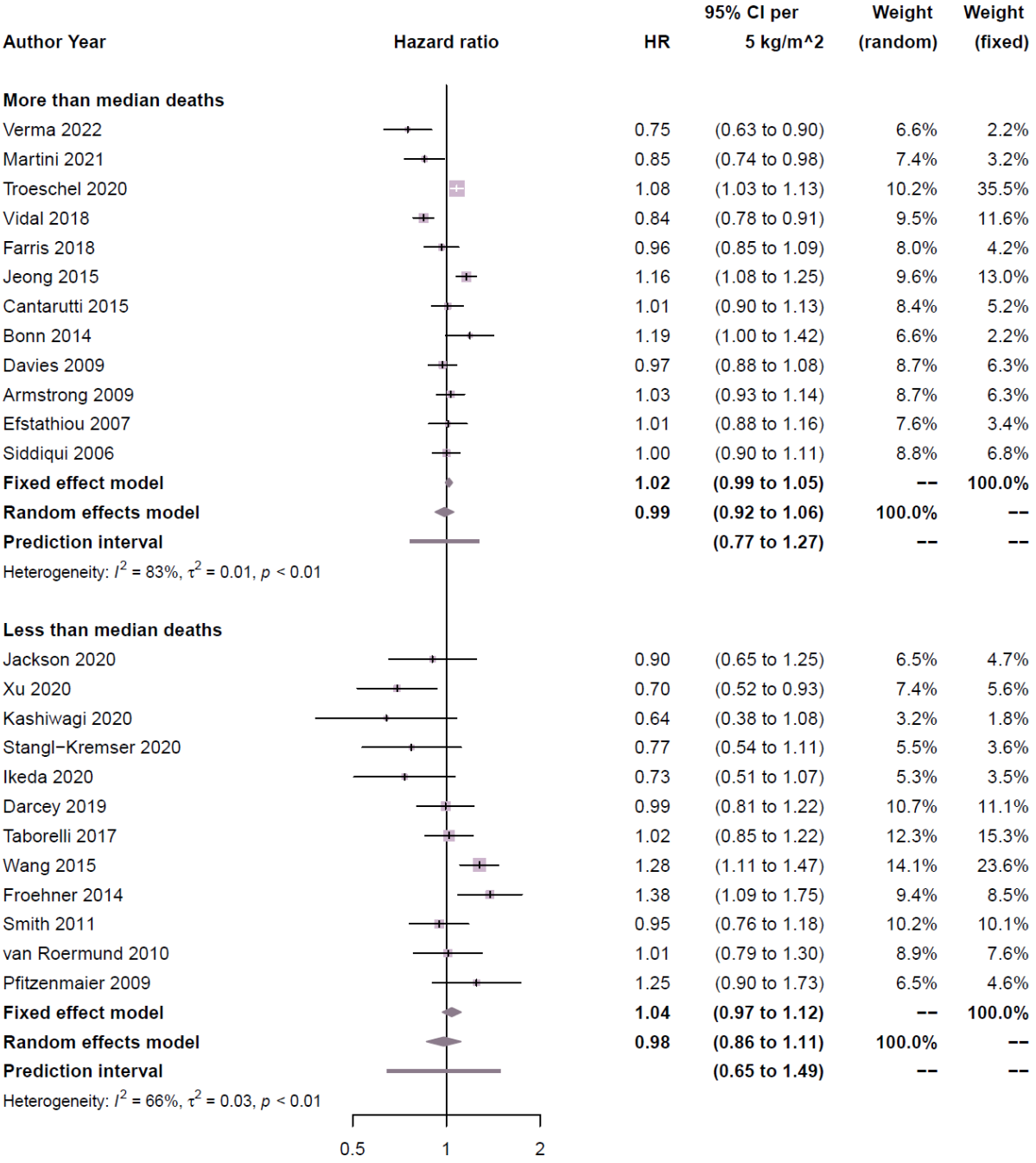
B



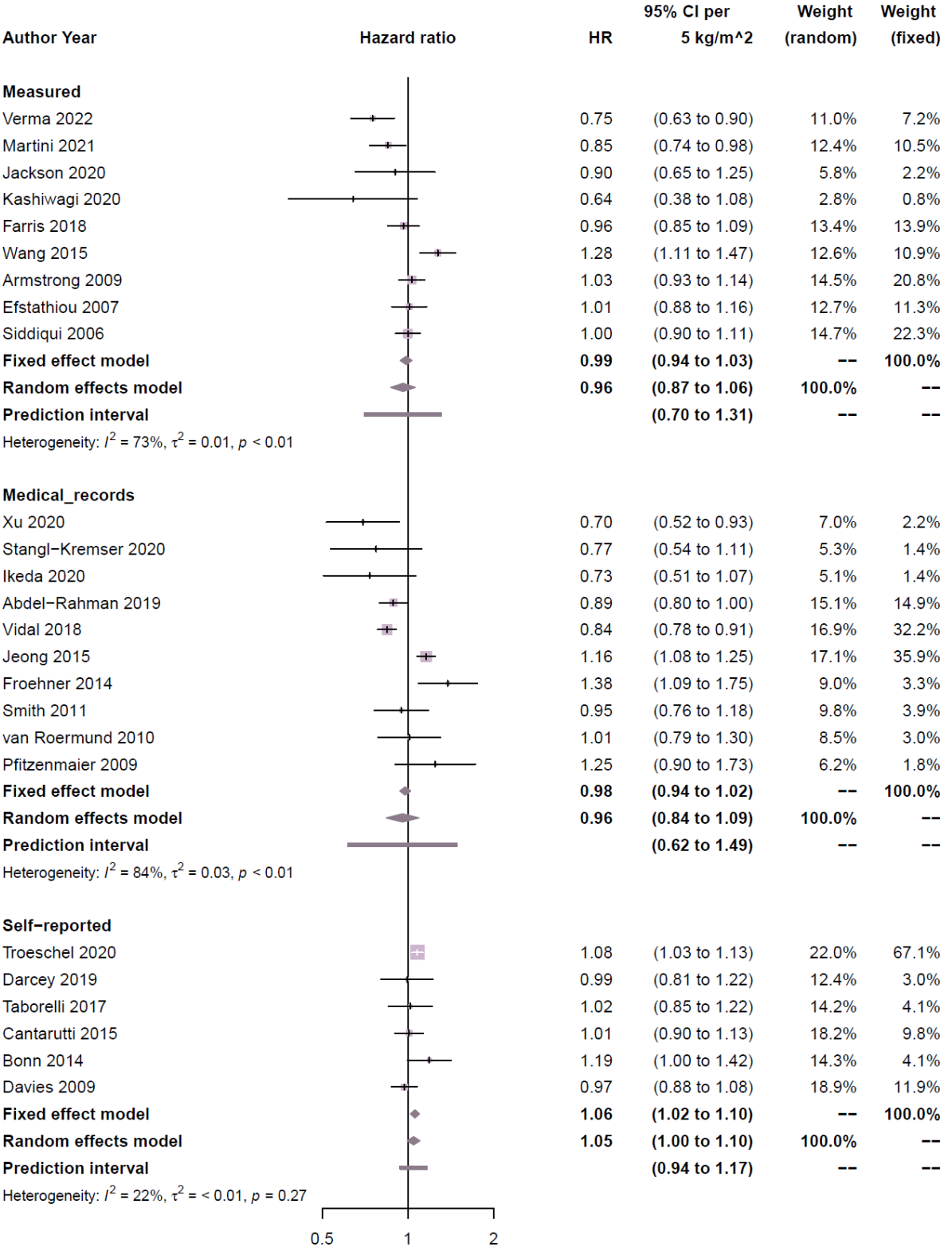
Supplementary Figure 14 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by study design retrospective cohort versus prospective cohort.



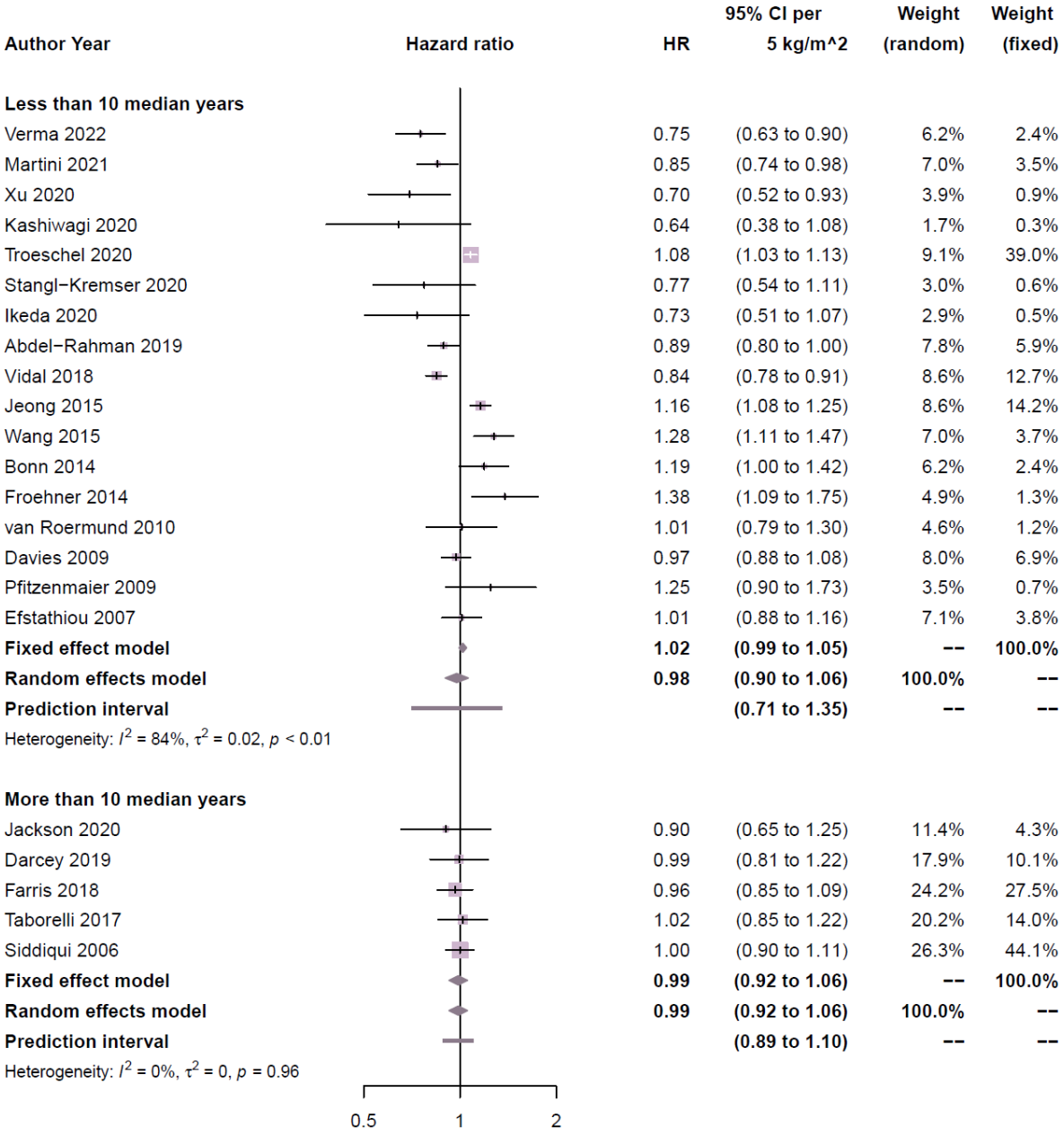
Supplementary Figure 15 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments number of median deaths.



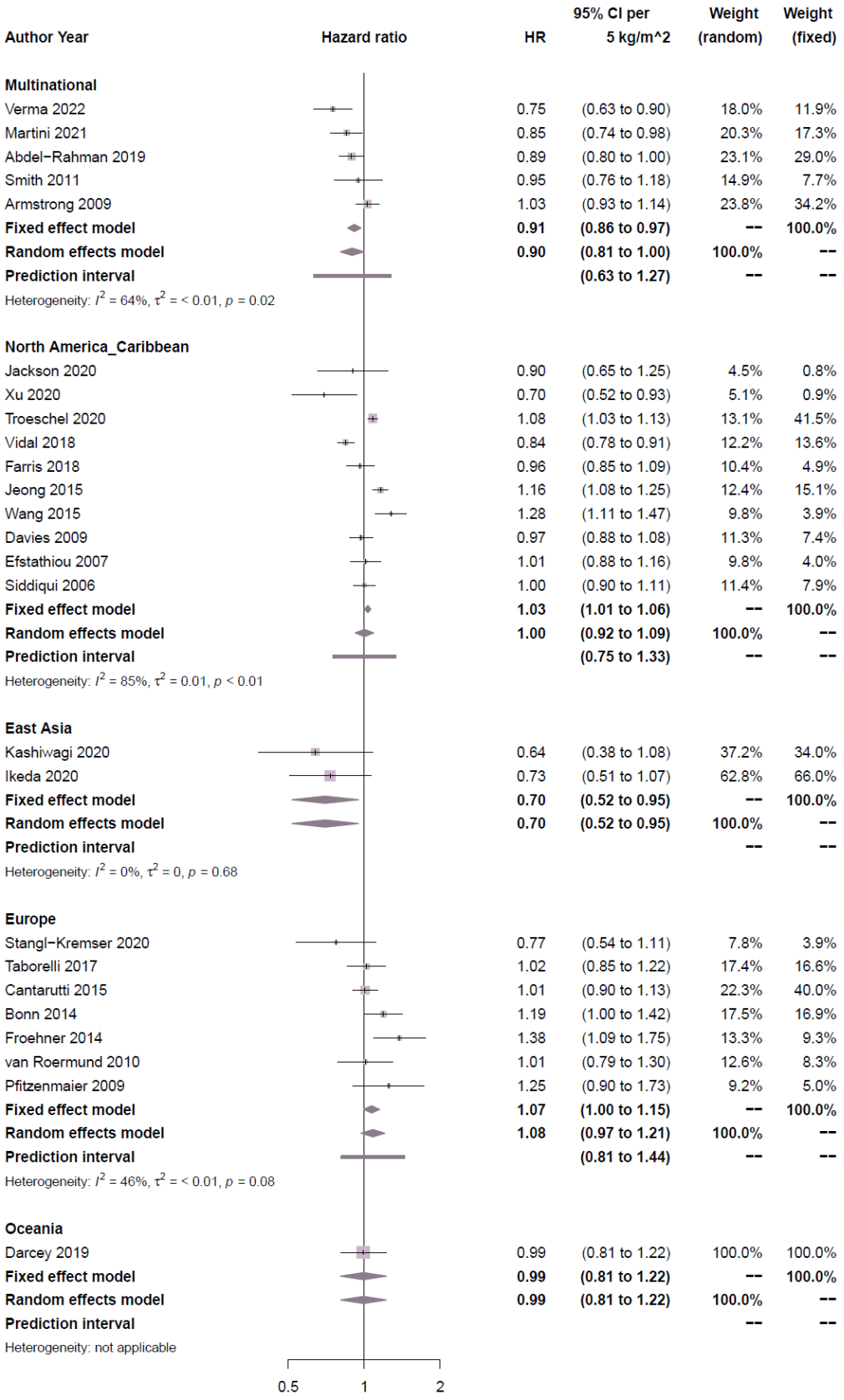
Supplementary Figure 16 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by method of anthropometry assessment.



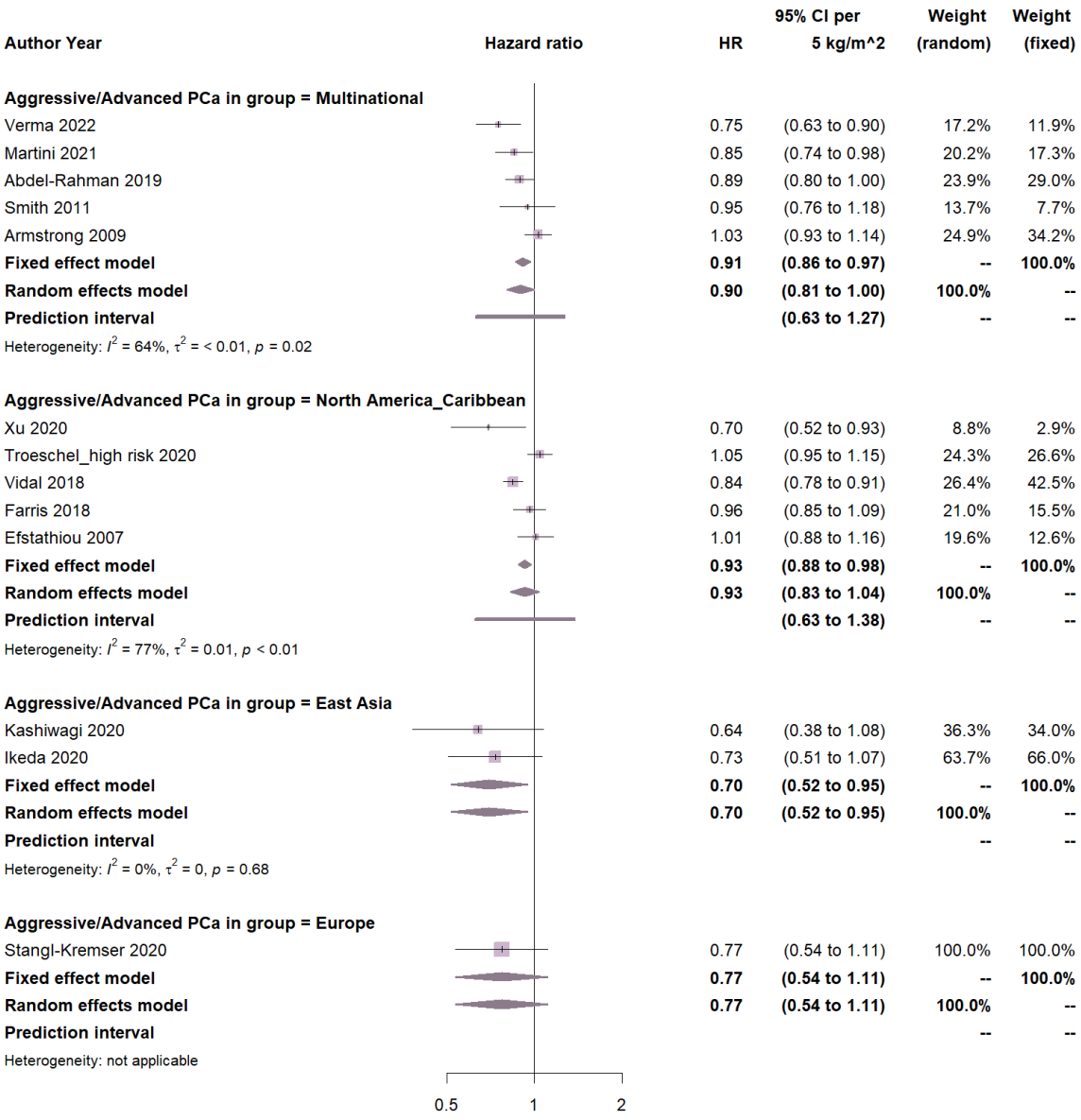
Supplementary Figure 17 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by median follow-up time 10 years.



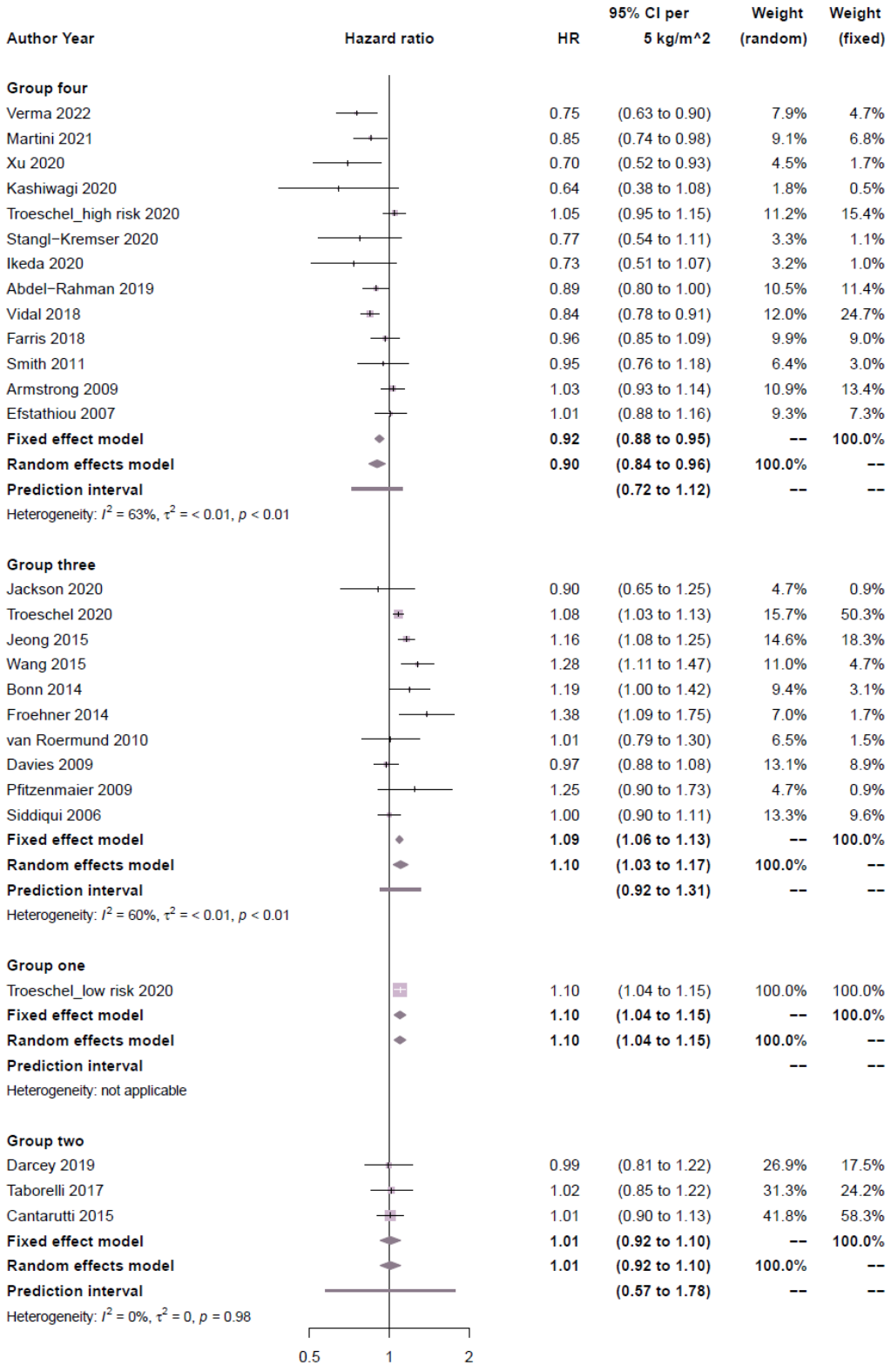
Supplementary Figure 18 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by geographic location of study.



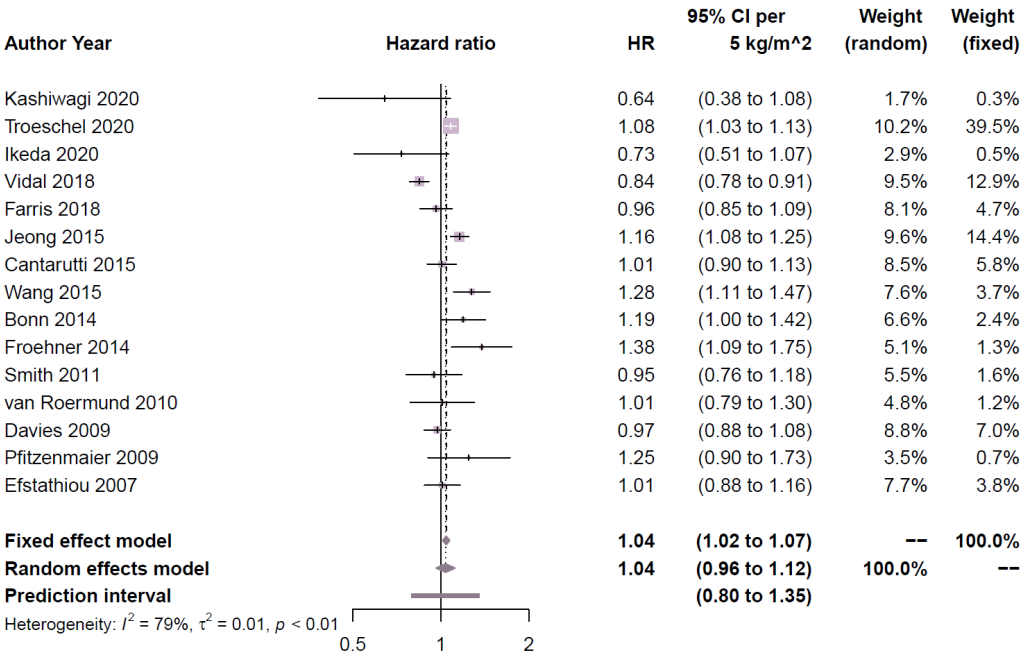
Supplementary Figure 19 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by geographic location of study among the studies in "group 4" (advanced/metastatic).



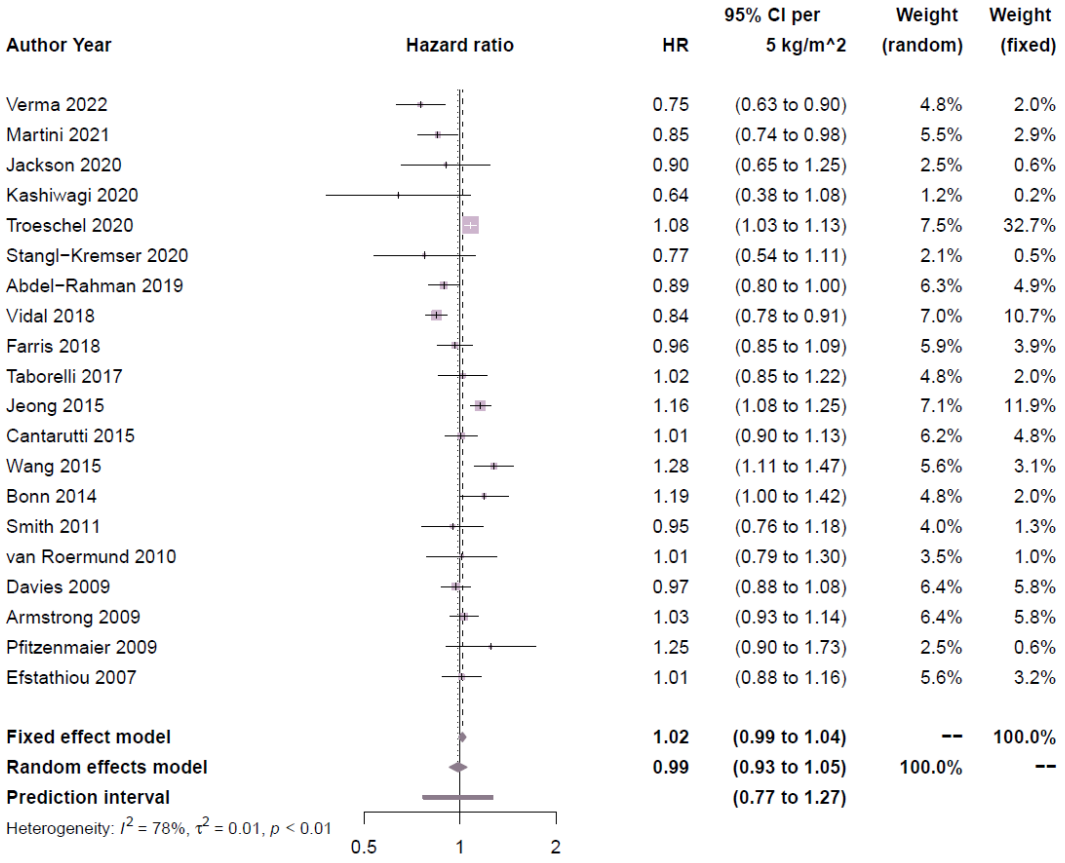
Supplementary Figure 20 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by tumour risk groups (group one: low risk/early stage, group two: Mixed PCa i.e., low, and high risk could include metastatic or not, group three: Mixed PCa i.e., low, and high risk but state excludes advanced/metastatic, group four: Advanced/High risk PCa and could include metastatic.



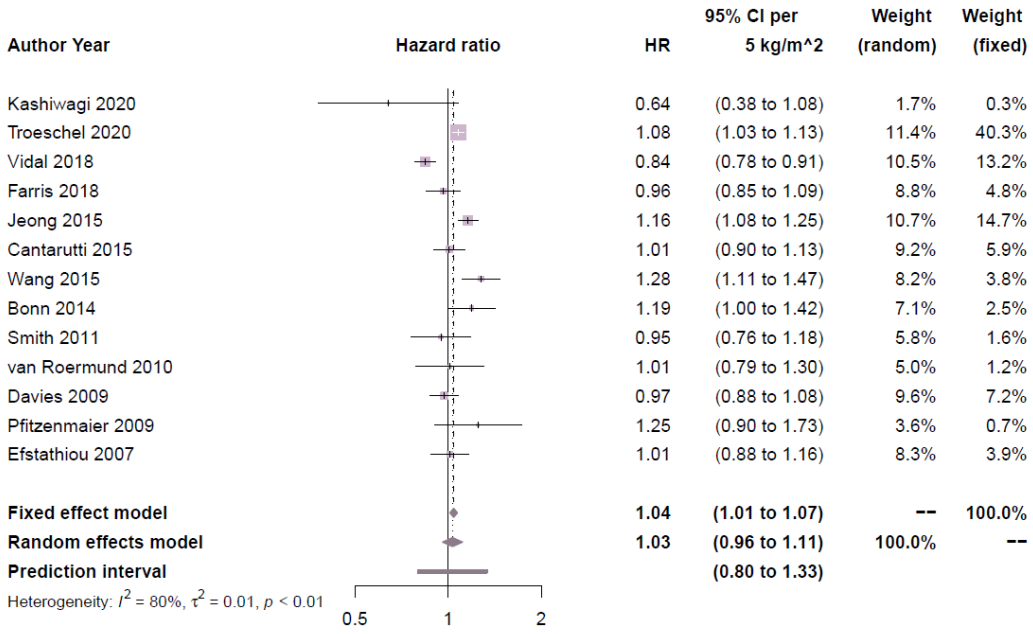
Supplementary Figure 21 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments for adjustment level one: adjusted at least for age, stage and grade (clinical risk/state).



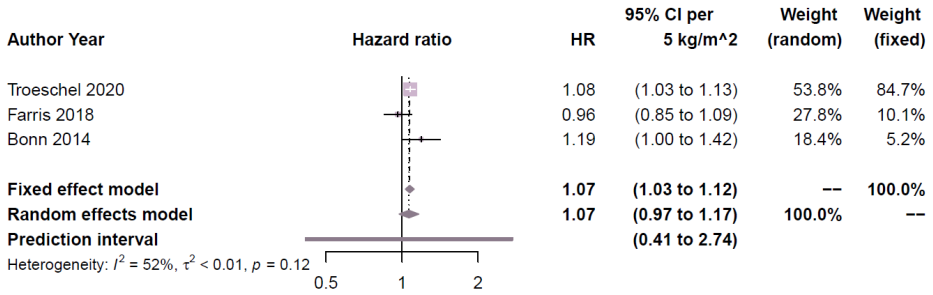
Supplementary Figure 22 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments for adjustment level two: adjusted at least for age, stage OR grade (clinical risk/state).



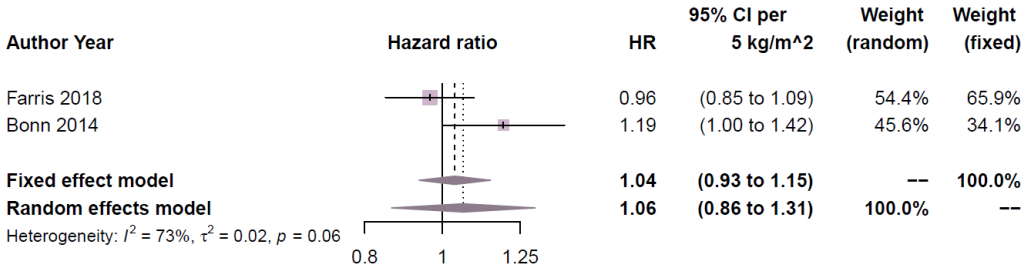
Supplementary Figure 23 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments for adjustment level three: adjusted at least for age, stage, grade (clinical risk/state) and treatment (any).



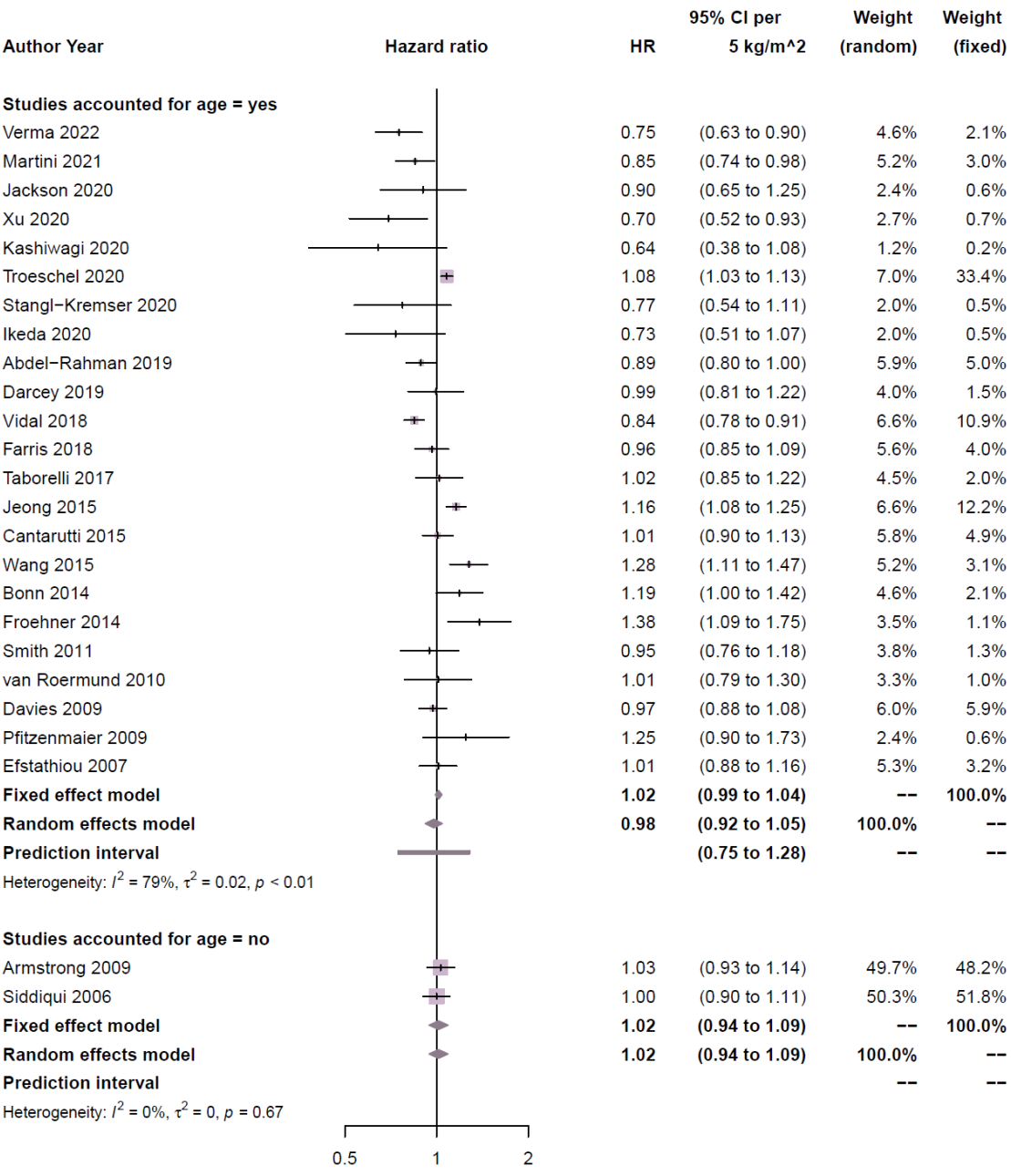
Supplementary Figure 24 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments for adjustment level four: age, stage, grade (clinical risk/state), treatment (any) and smoking.



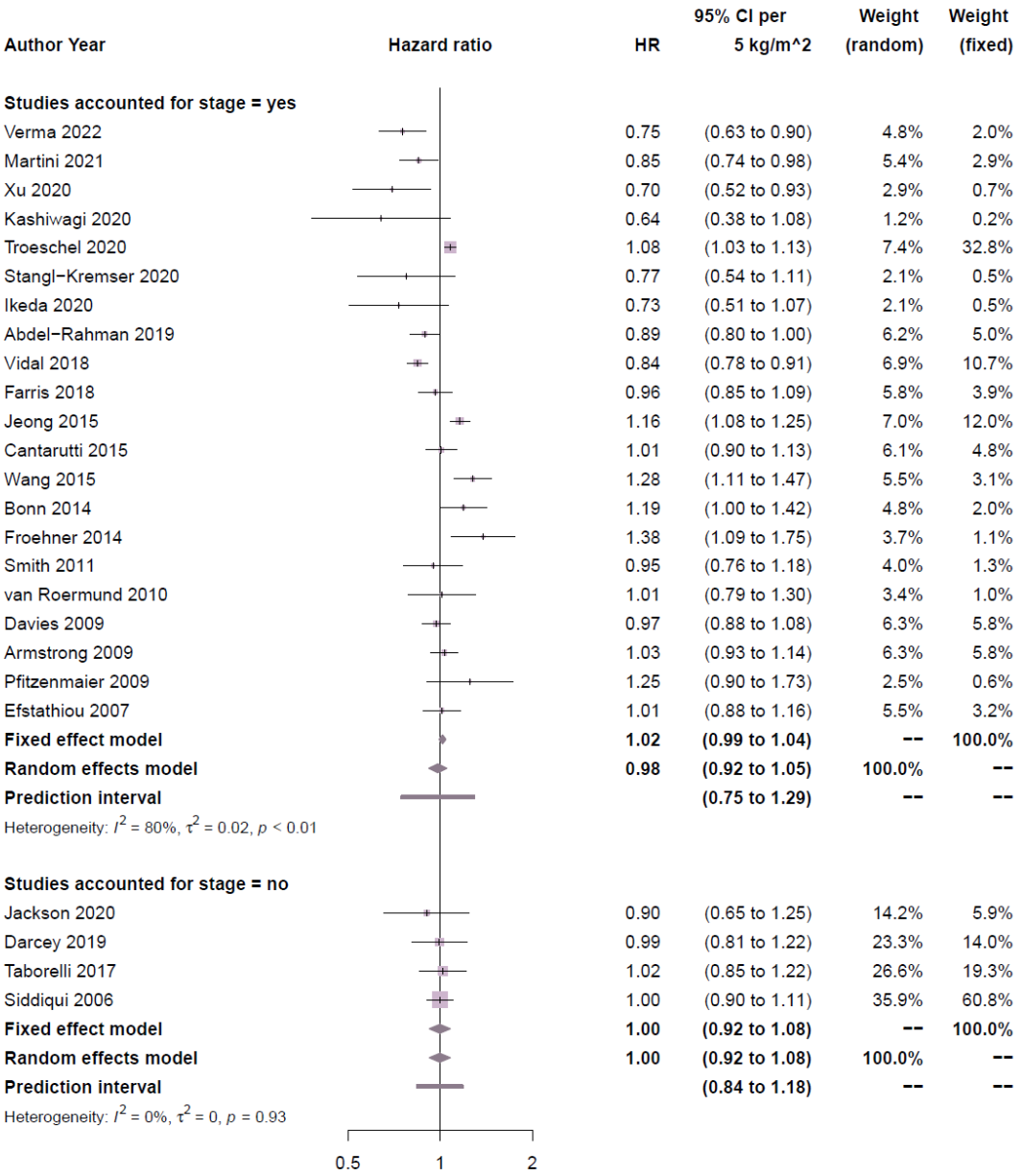
Supplementary Figure 25 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments for adjustment level five: age, stage, grade, treatment (any), smoking and PSA test (PSA levels as proxy).



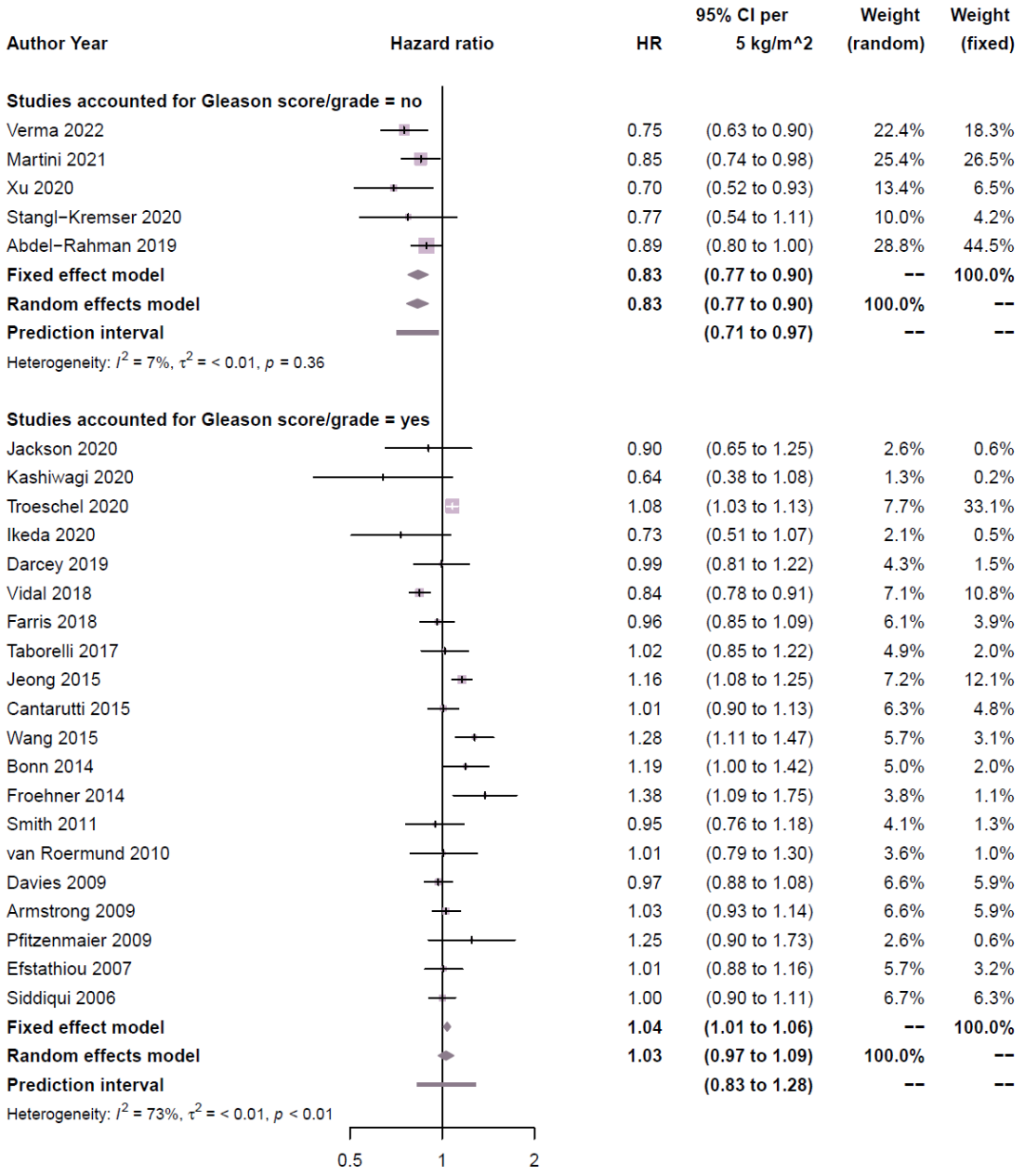
Supplementary Figure 26 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for age (yes vs no).



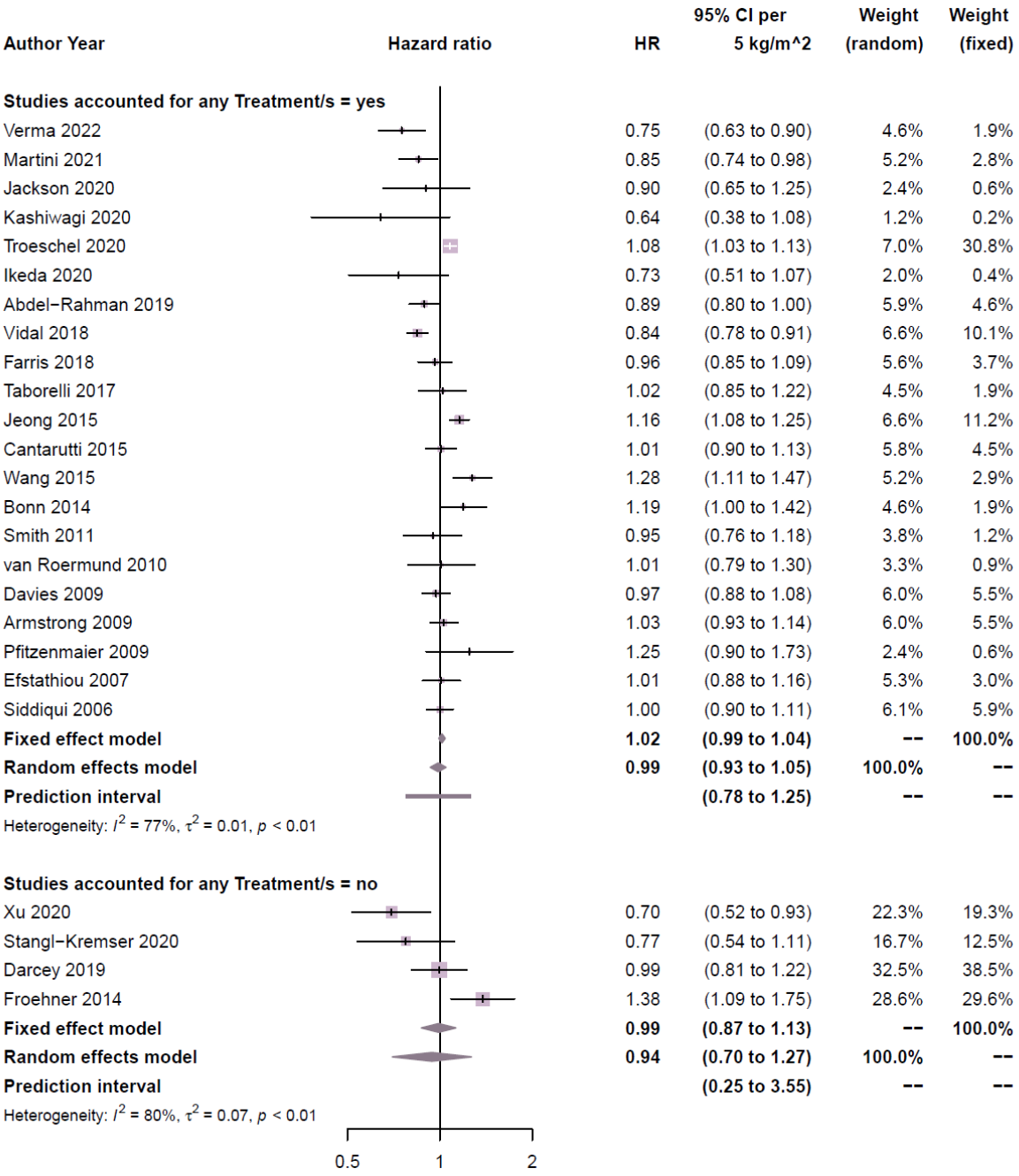
Supplementary Figure 27 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for stage (yes vs no).



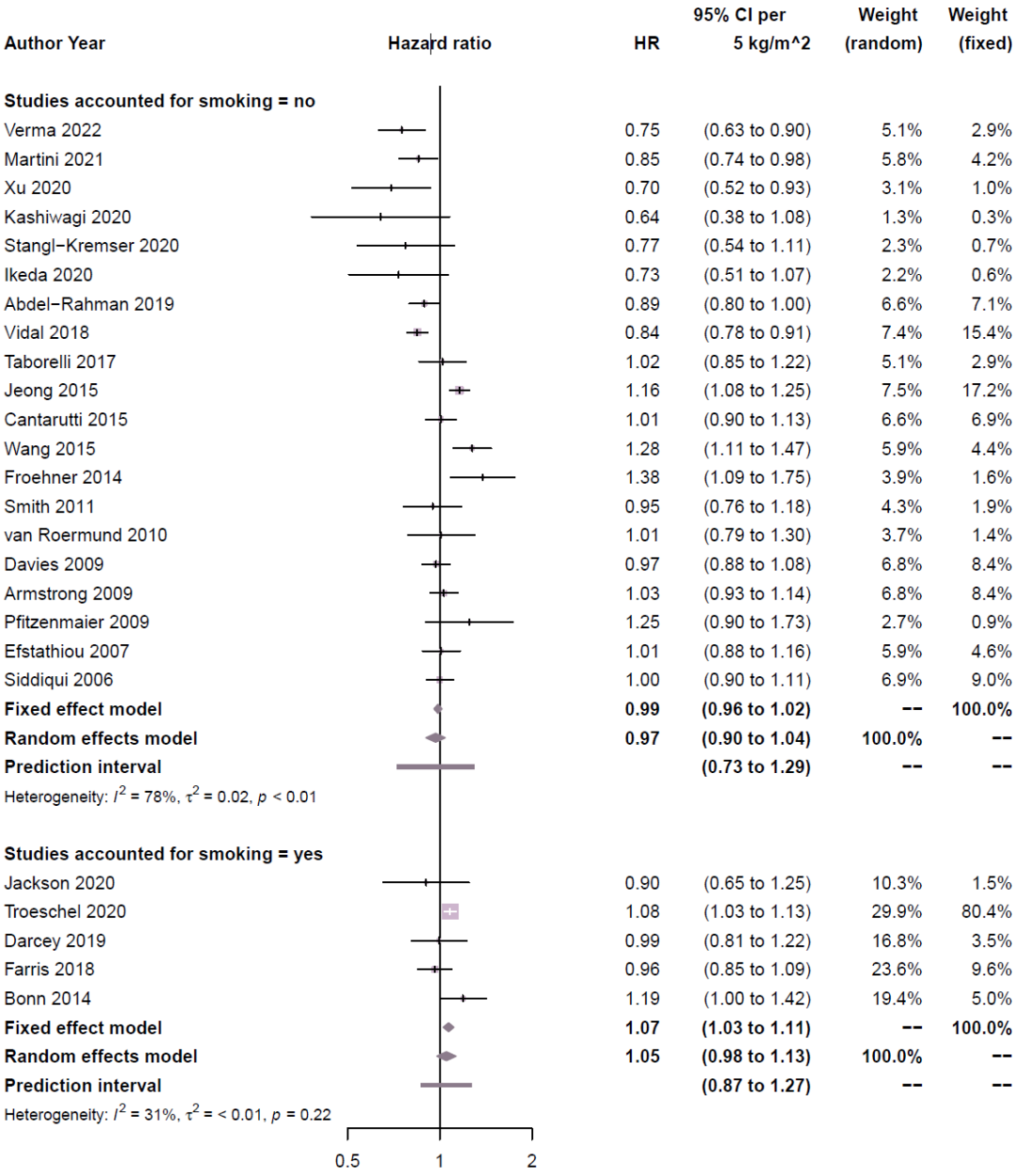
Supplementary Figure 28 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for Gleason score (yes vs no).



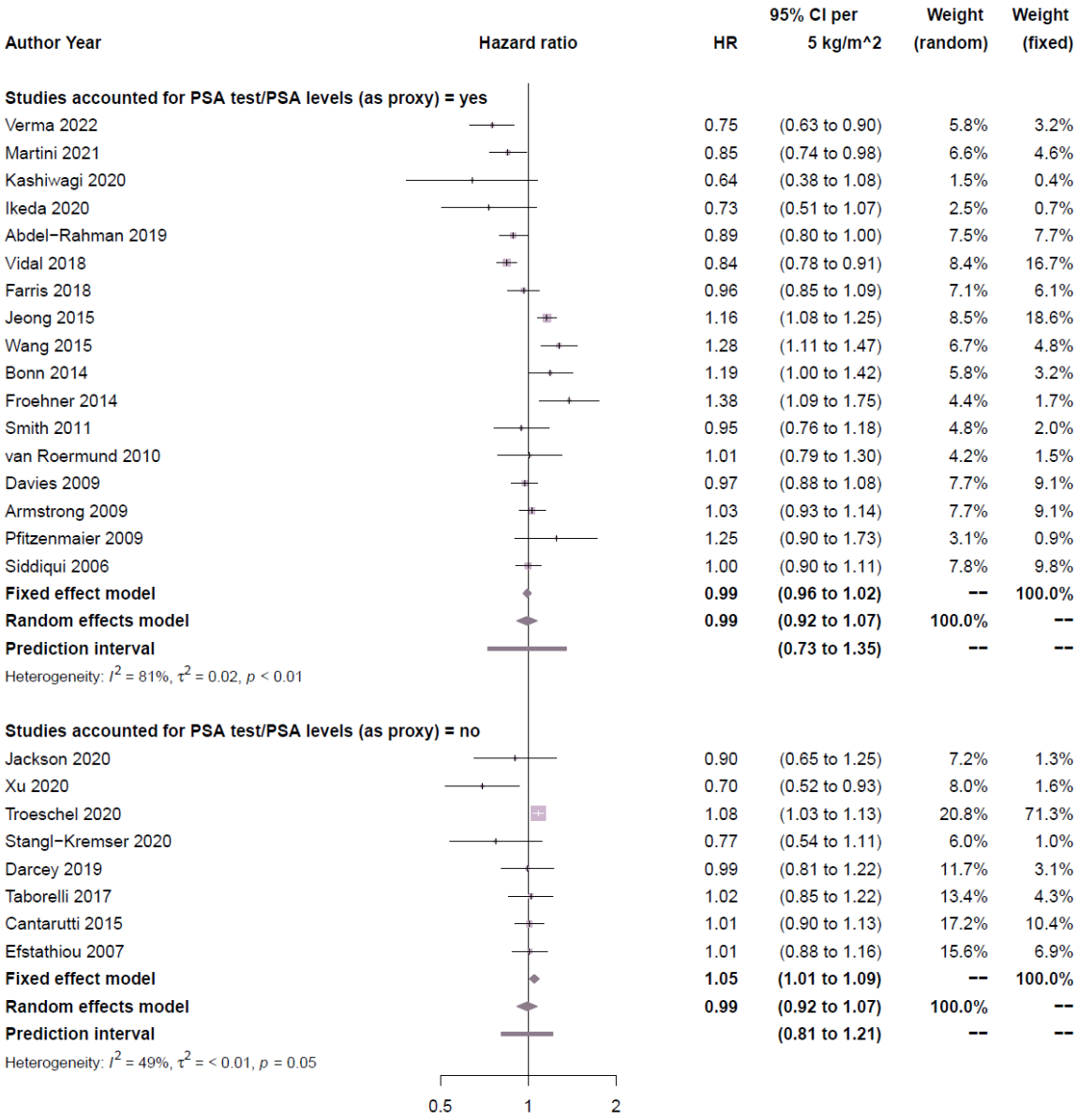
Supplementary Figure 29 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for treatments (yes vs no).



Supplementary Figure 30 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for smoking (yes vs no).



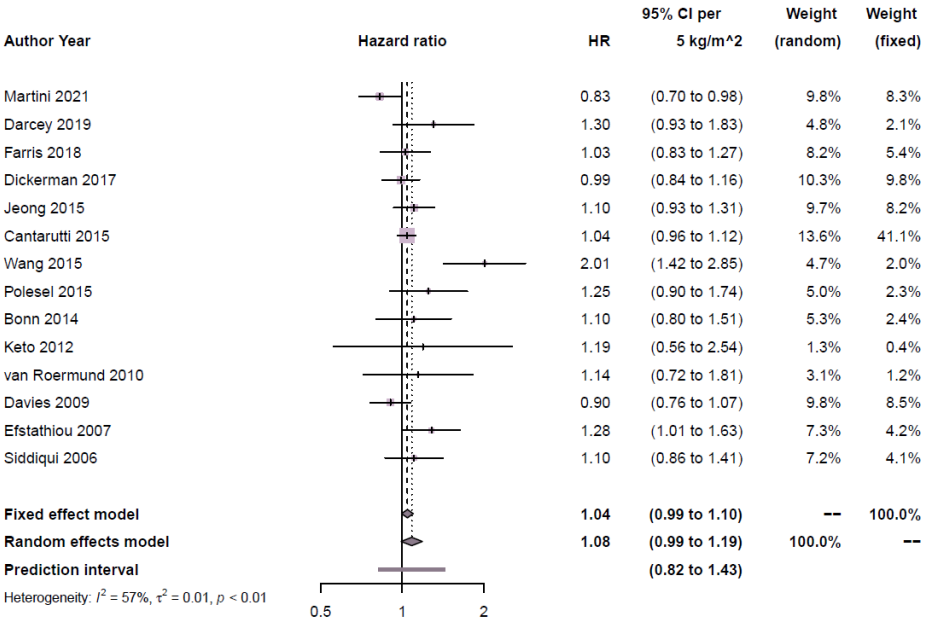
Supplementary Figure 31 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for PSA test/PSA levels (yes vs no).



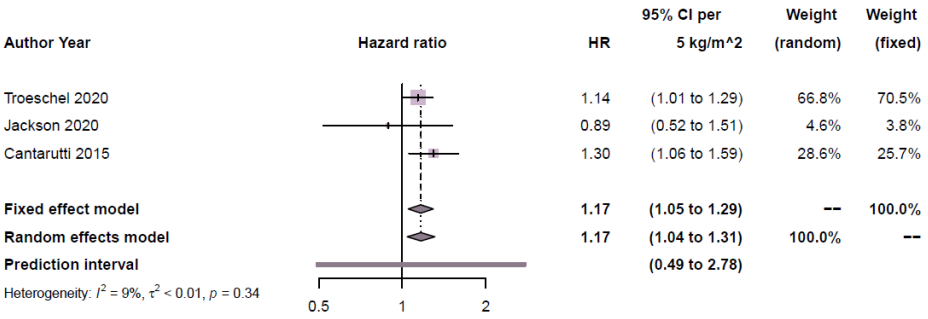
Linear dose-response subgroup meta-analyses (BMI and PCa-specific mortality)

Supplementary Figure 32 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for postdiagnosis 5 kg/m^2 BMI increments for A) studies that included underweight groups and B) studies that excluded the underweight groups.

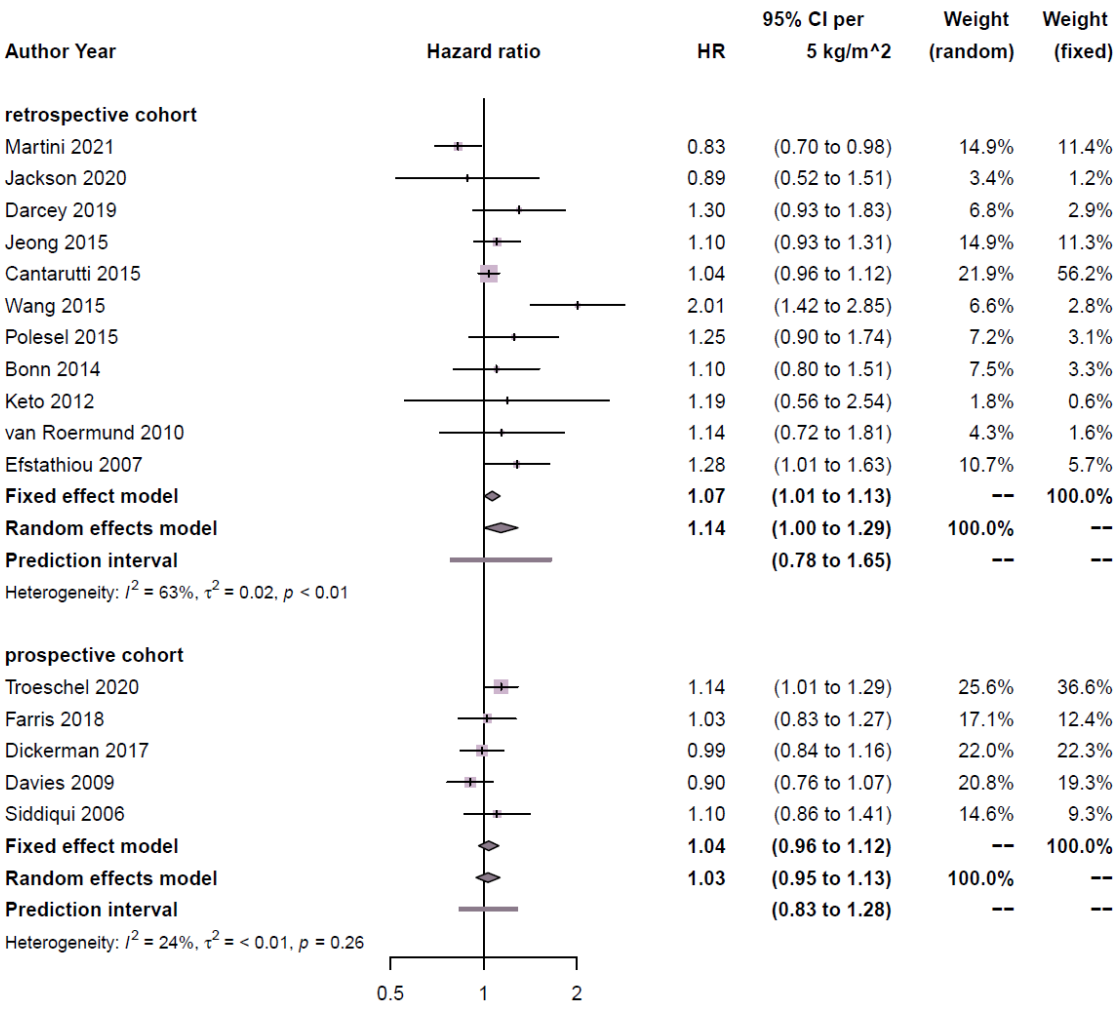
A



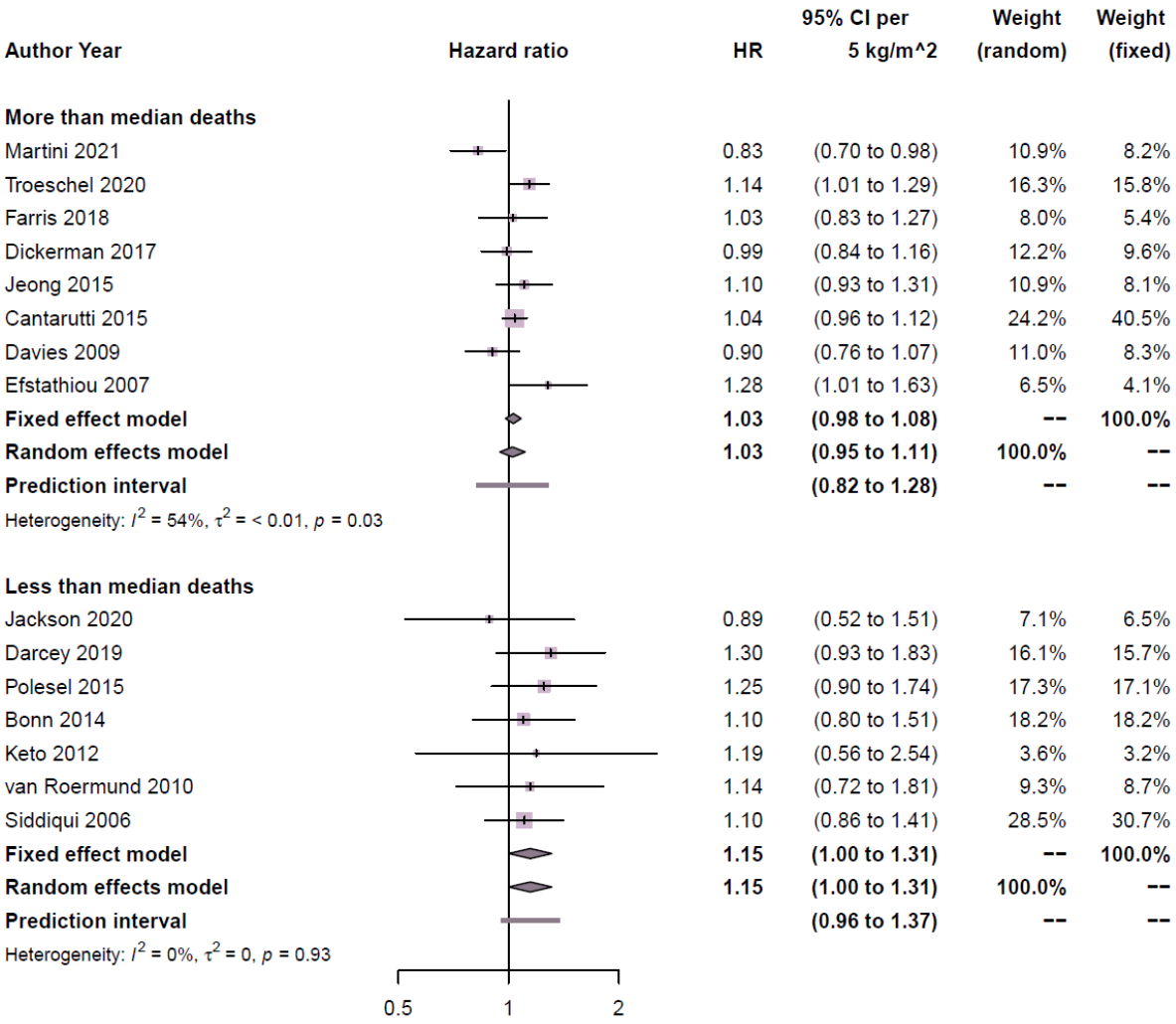
B



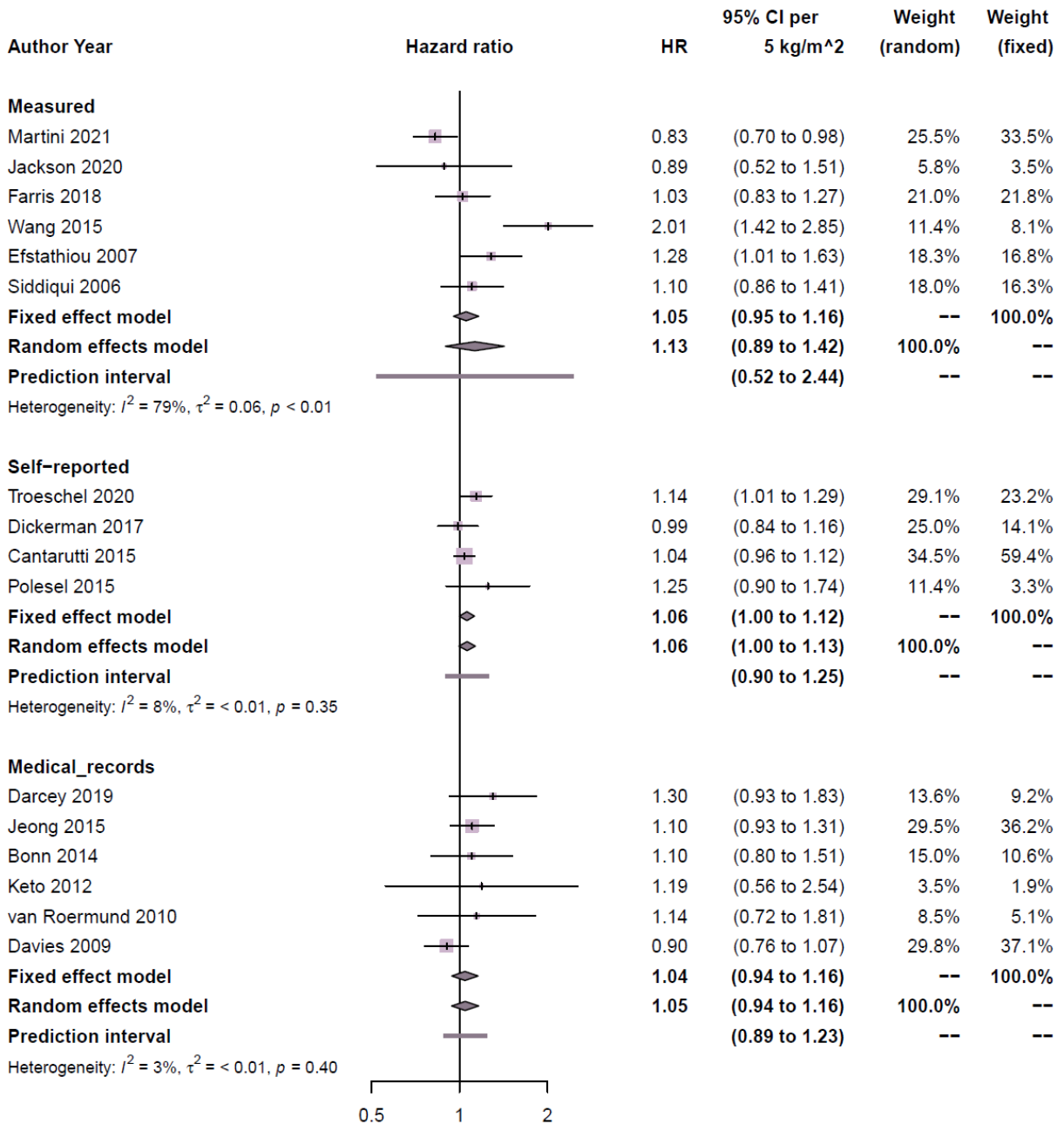
Supplementary Figure 33 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by study design.



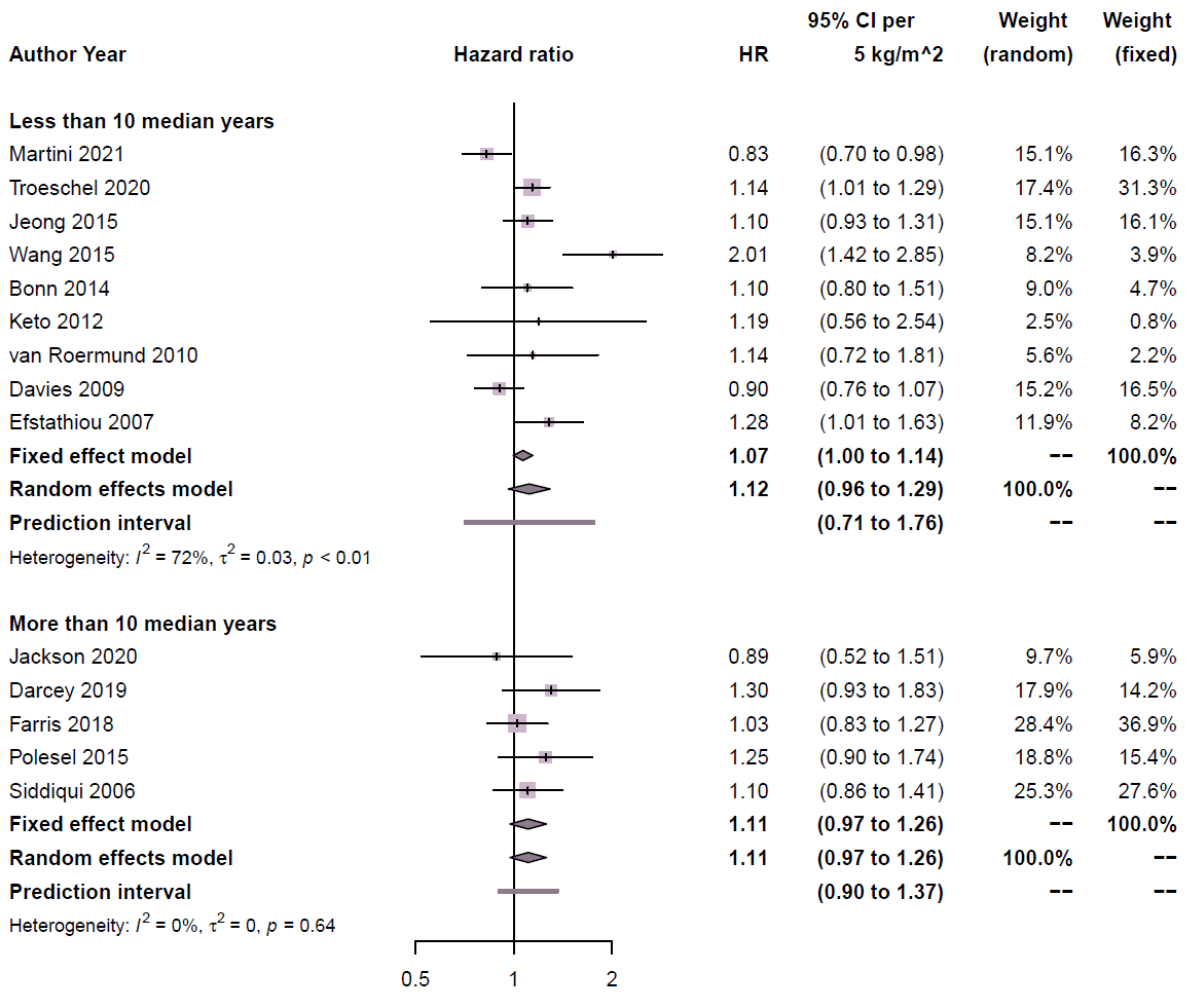
Supplementary Figure 34 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by median deaths.



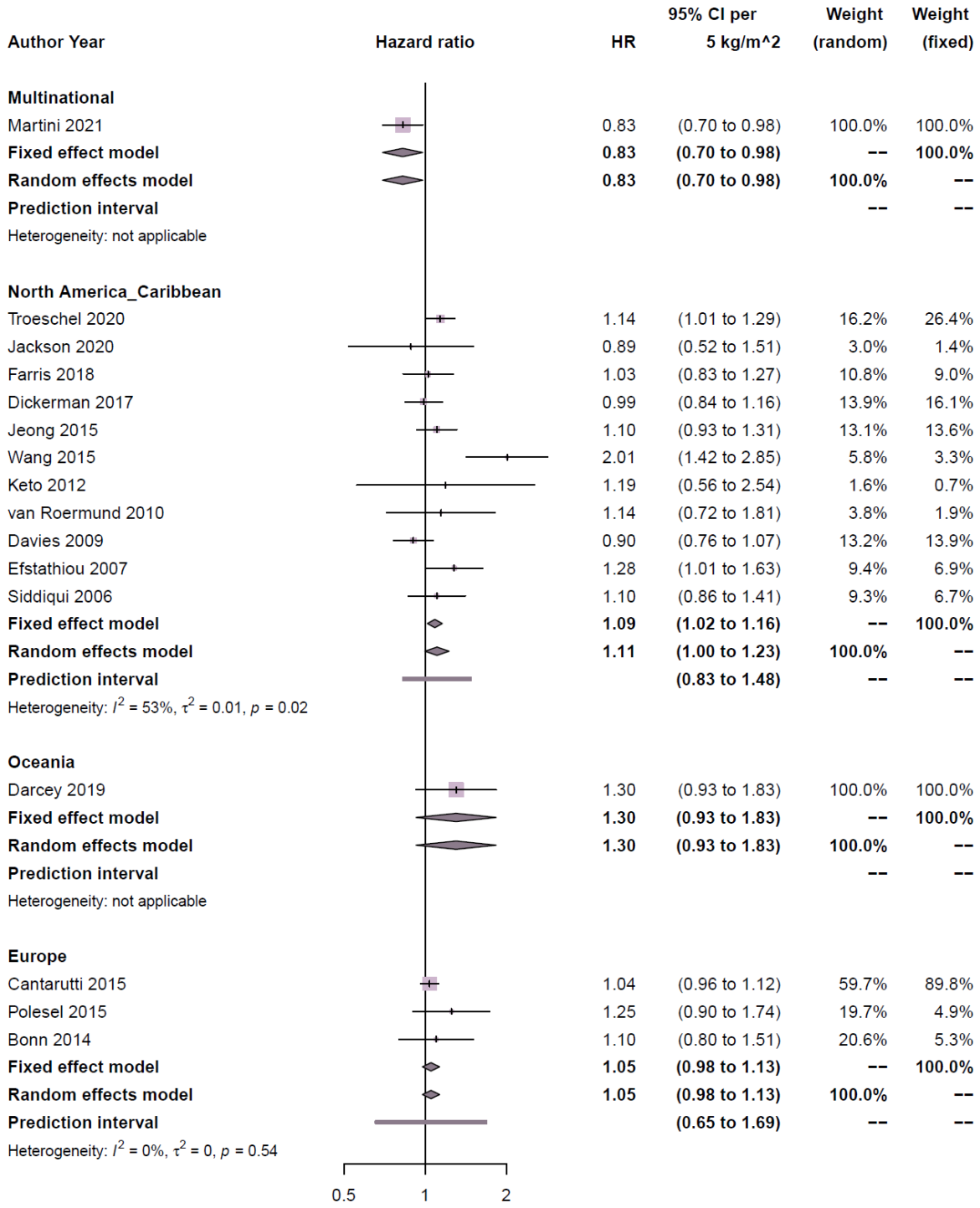
Supplementary Figure 35 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by method of anthropometry assessment.



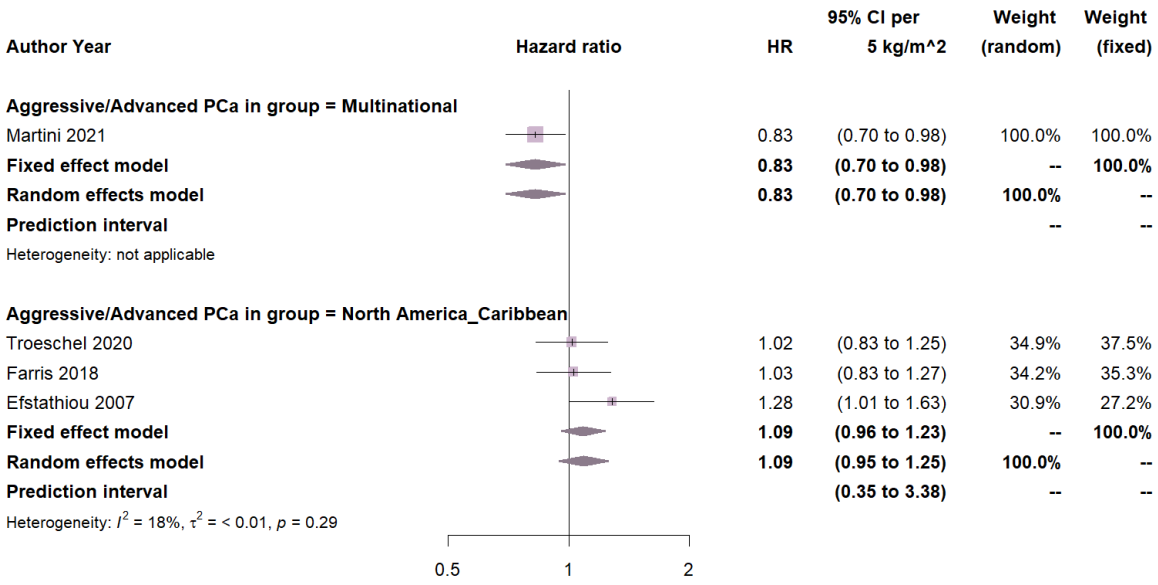
Supplementary Figure 36 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by median follow-up (10 years).



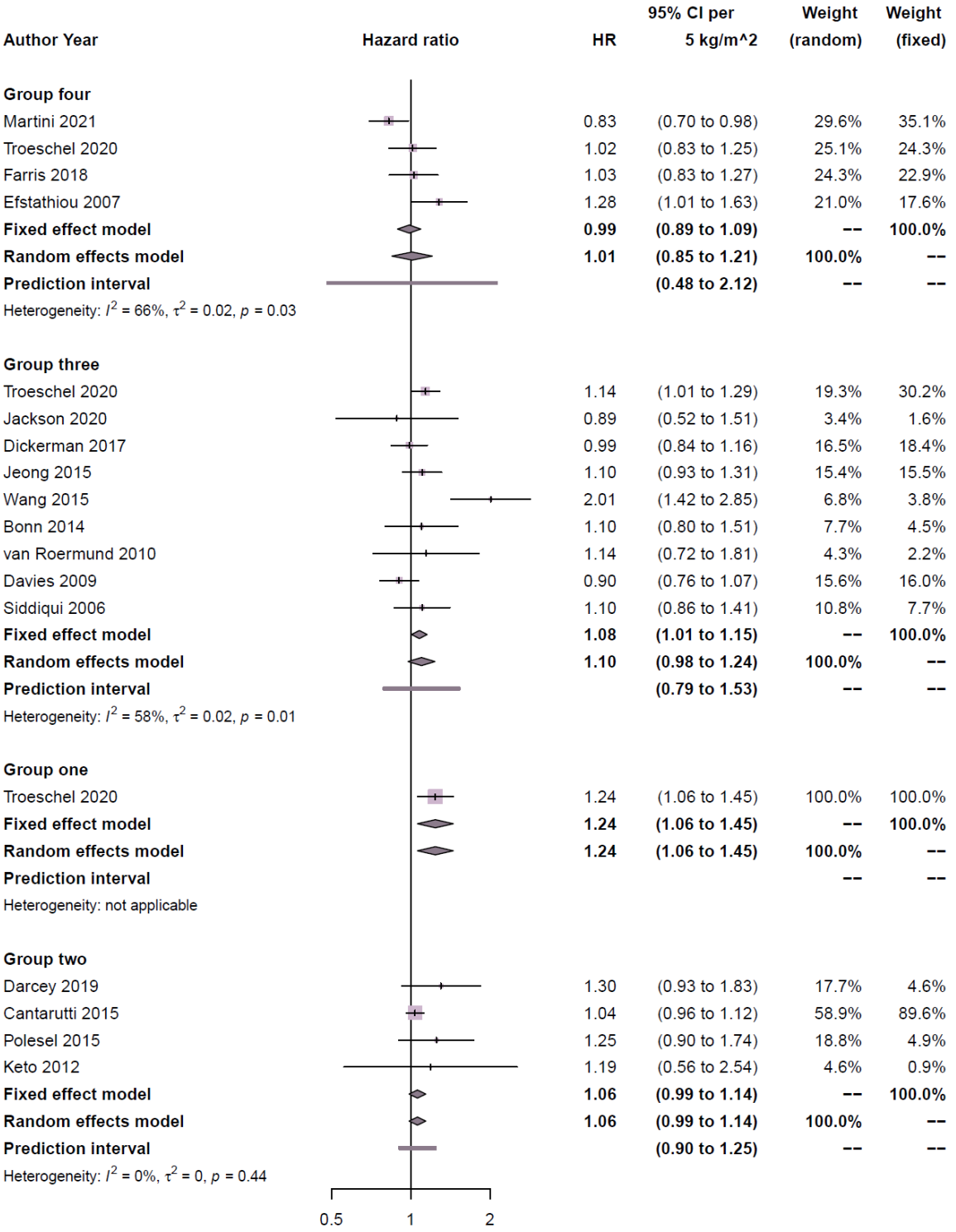
Supplementary Figure 37 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by geographic location of study.



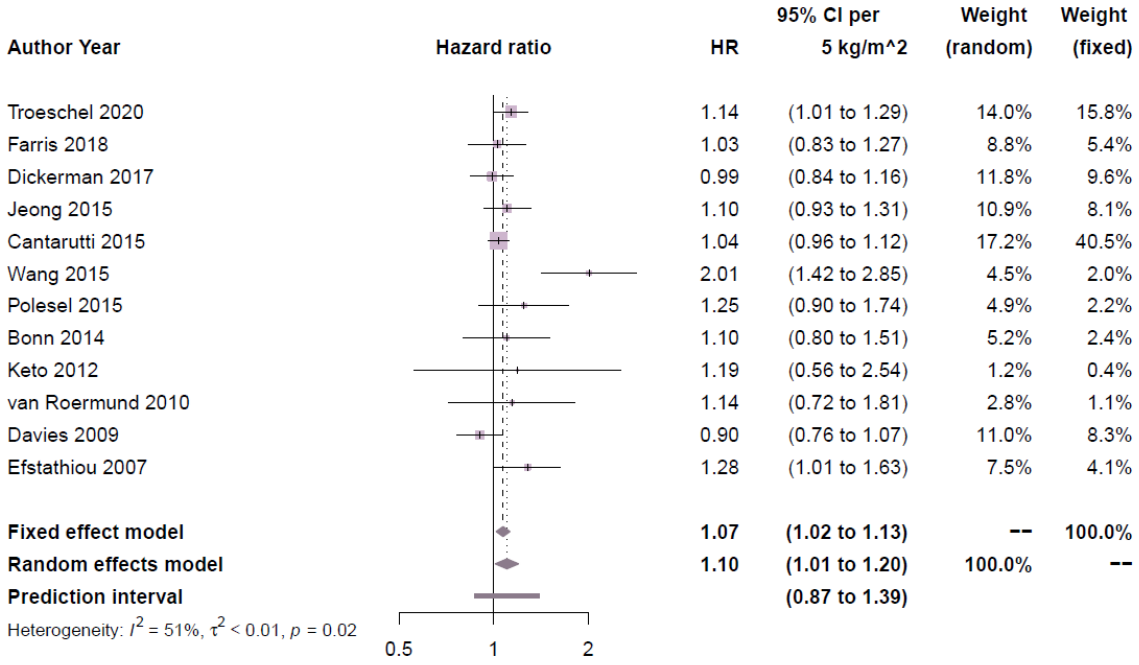
Supplementary Figure 38 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by geographic location of study among the studies in "group 4" (advanced/metastatic).



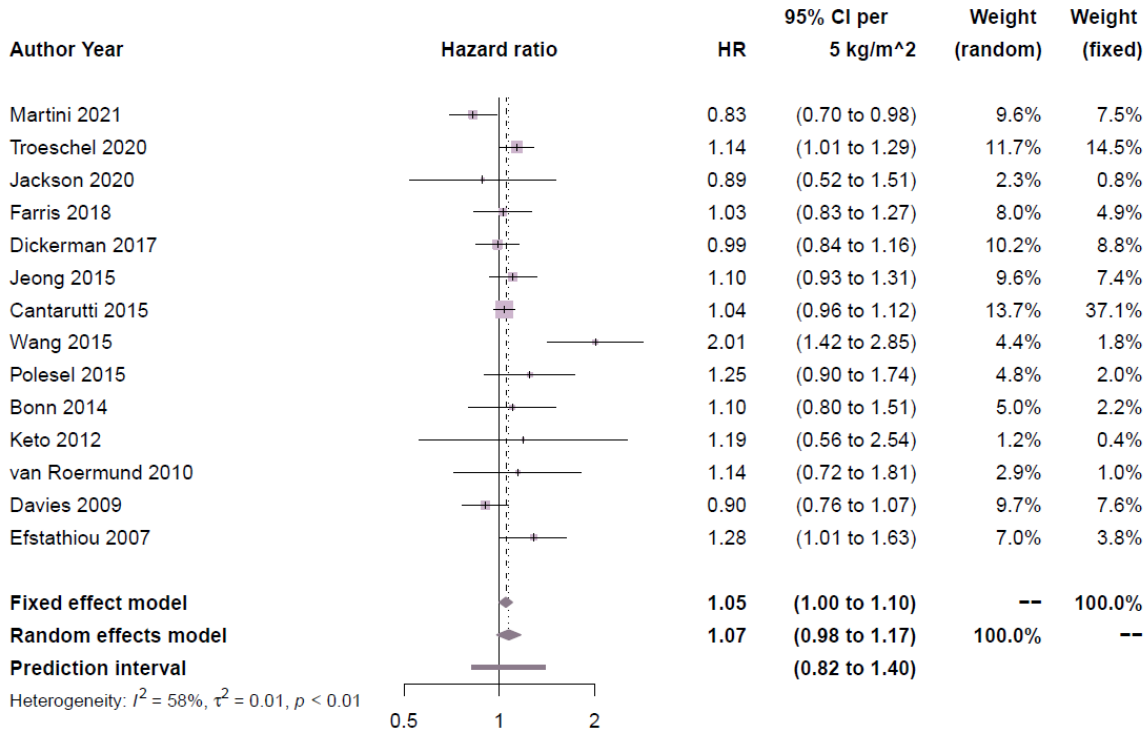
Supplementary Figure 39 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by tumour risk groups (group one: low risk/early stage, group two: Mixed PCa i.e., low, and high risk could include metastatic or not, group three: Mixed PCa i.e., low, and high risk but state excludes advanced/metastatic, group four: Advanced/High risk PCa and could include metastatic.



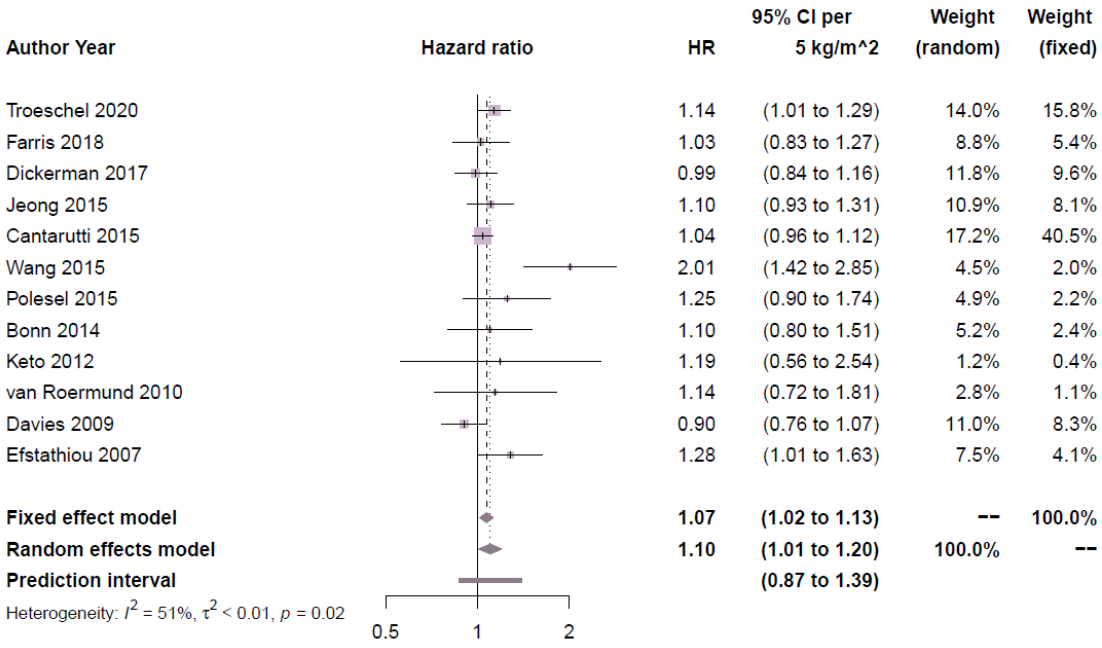
Supplementary Figure 40 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments for adjustment level one: adjusted at least for age, stage and grade (clinical risk/state).



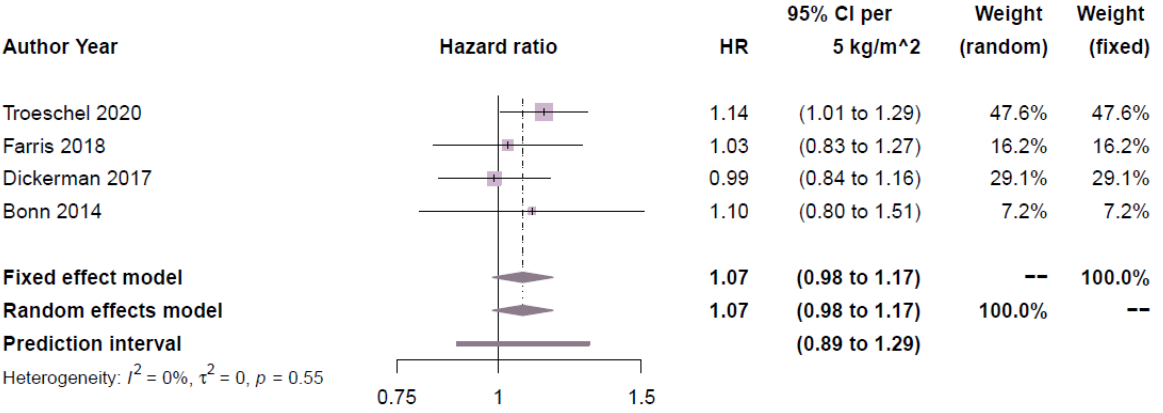
Supplementary Figure 41 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments for adjustment level two: adjusted at least for age, stage OR grade (clinical risk/state).



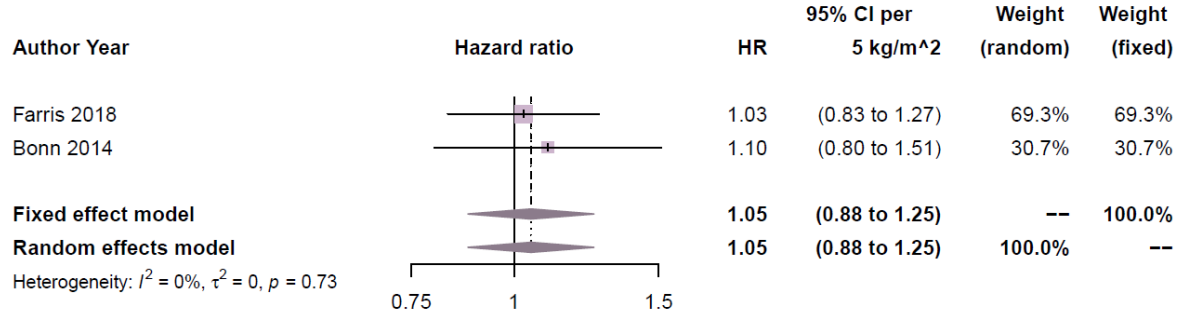
Supplementary Figure 42 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments for adjustment level three: adjusted at least for age, stage, grade (clinical risk/state) and treatment (any).



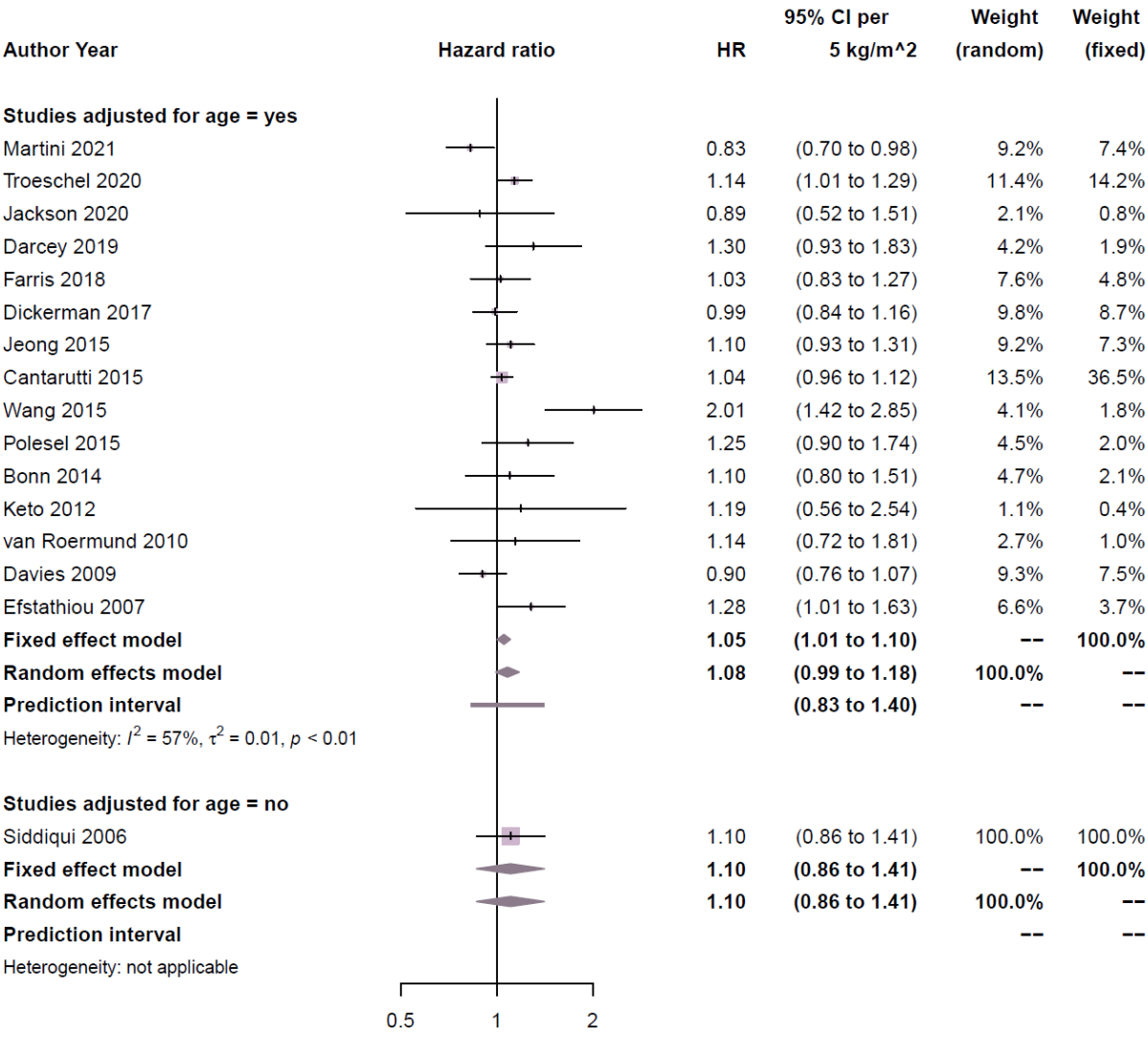
Supplementary Figure 43 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments for adjustment level four: age, stage, grade (clinical risk/state), treatment (any) and smoking.



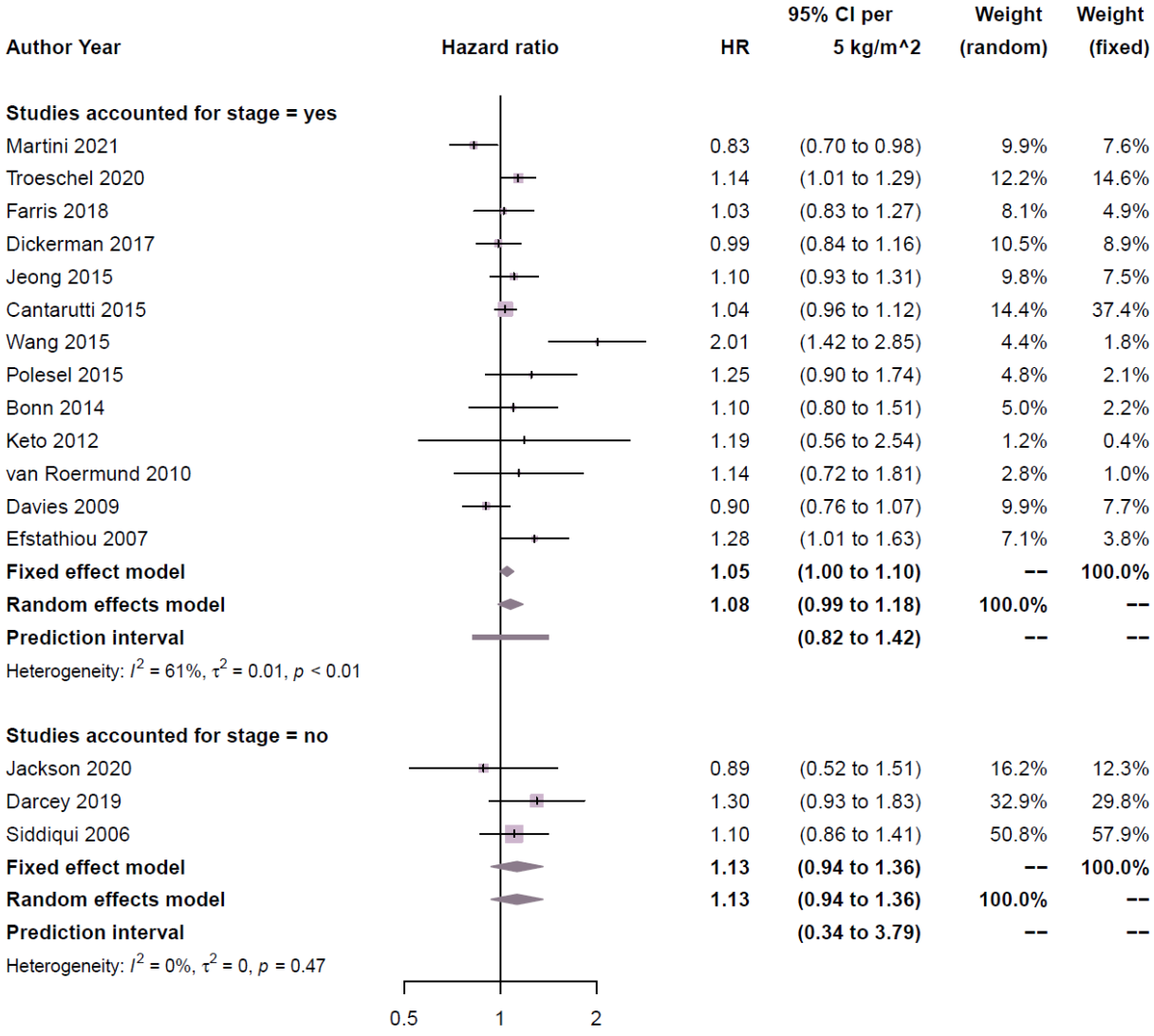
Supplementary Figure 44 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments for adjustment level five: age, stage, grade, treatment (any), smoking and PSA test (PSA levels as proxy).



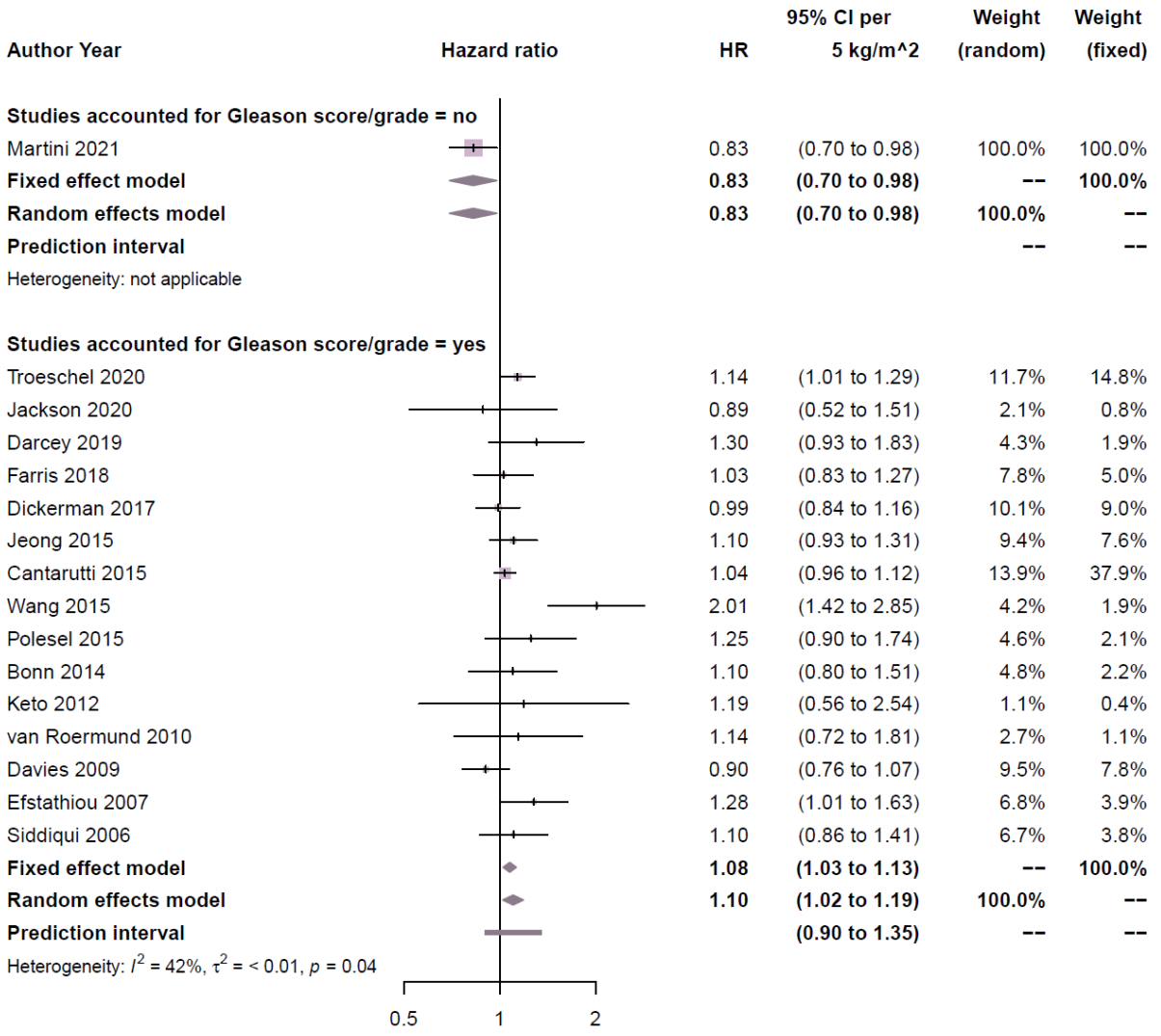
Supplementary Figure 45 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for age (yes vs no).



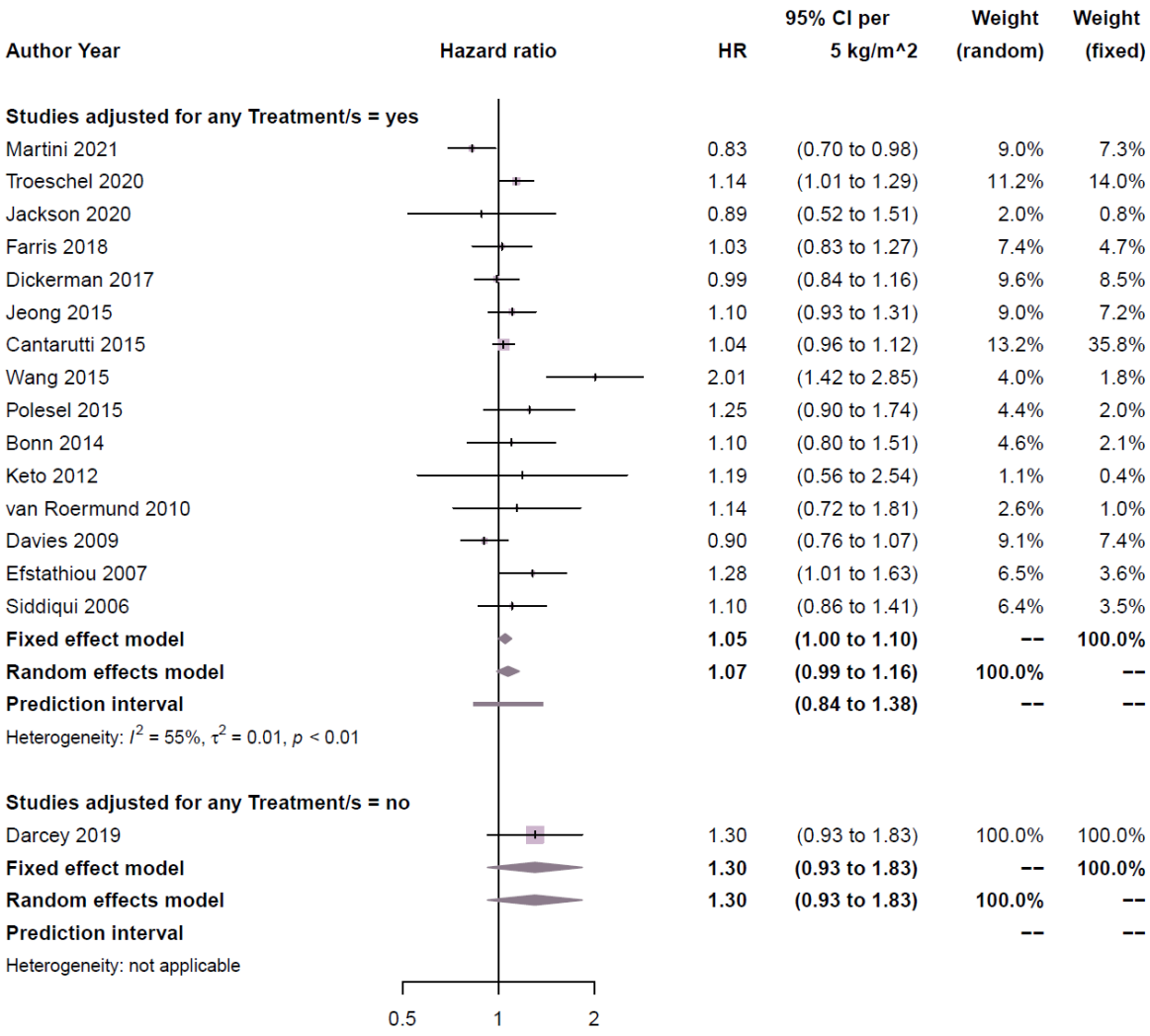
Supplementary Figure 46 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for stage (yes vs no).



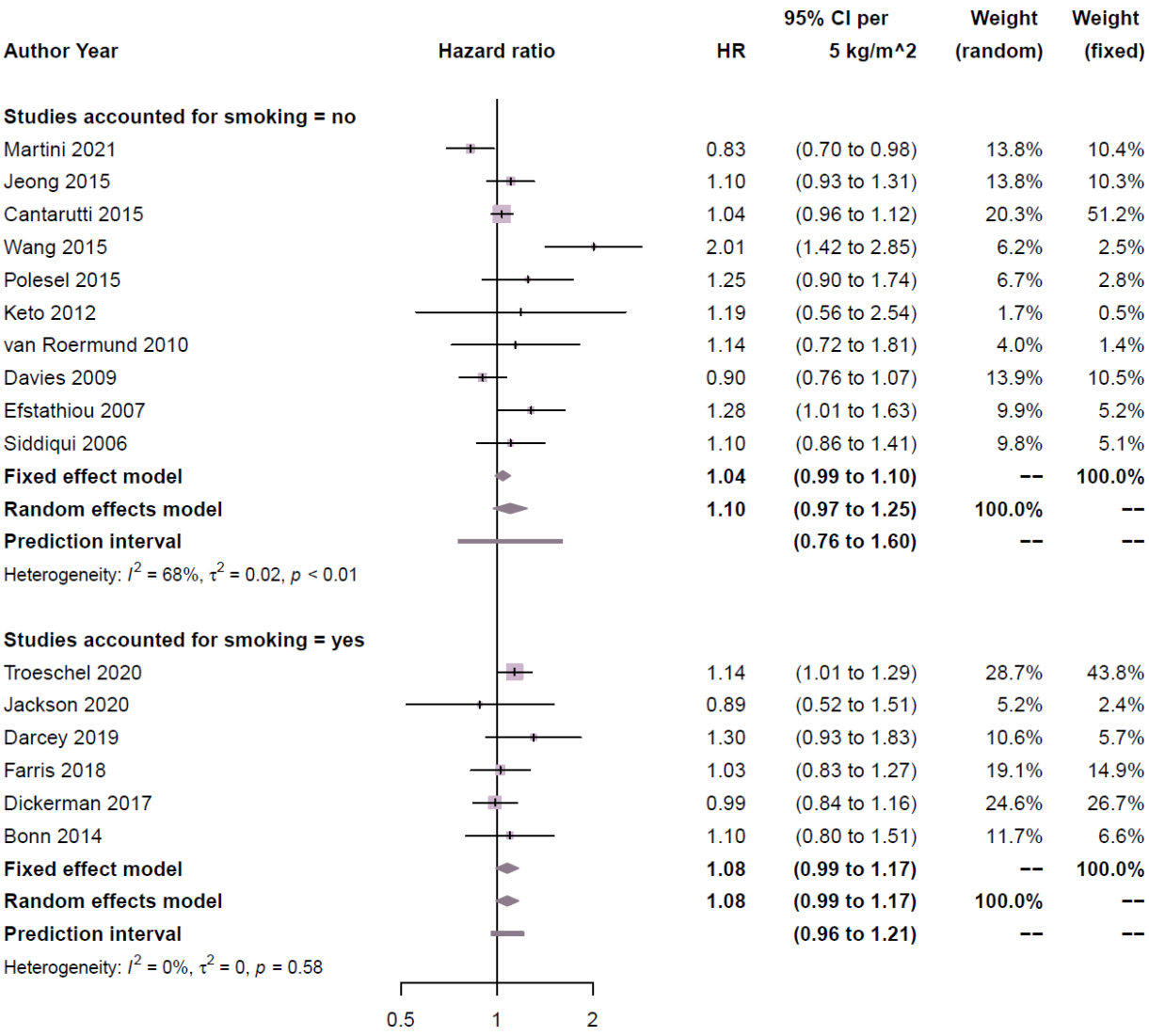
Supplementary Figure 47 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for Gleason score (yes vs no).



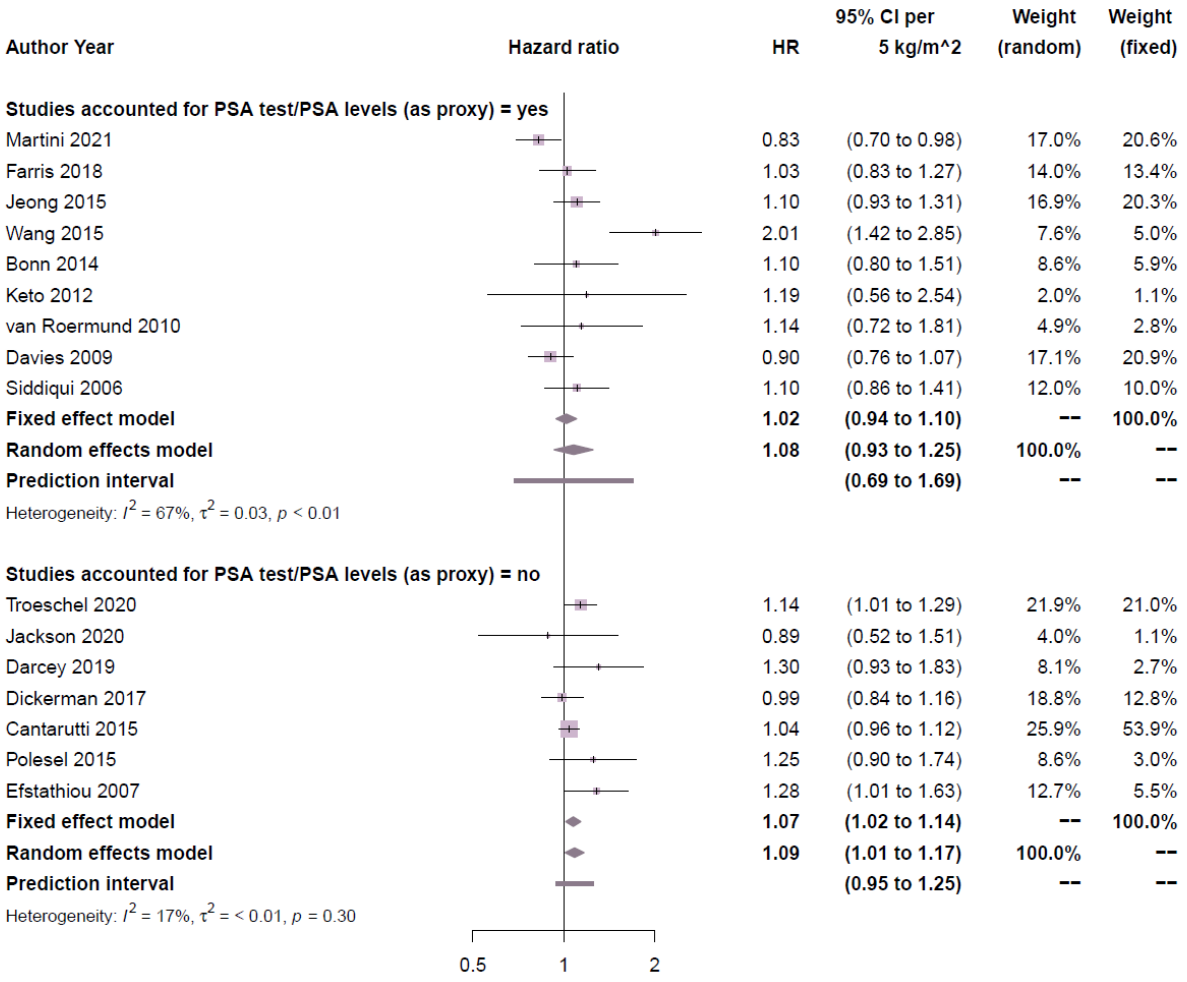
Supplementary Figure 48 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for treatments (yes vs no).



Supplementary Figure 49 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for smoking (yes vs no).



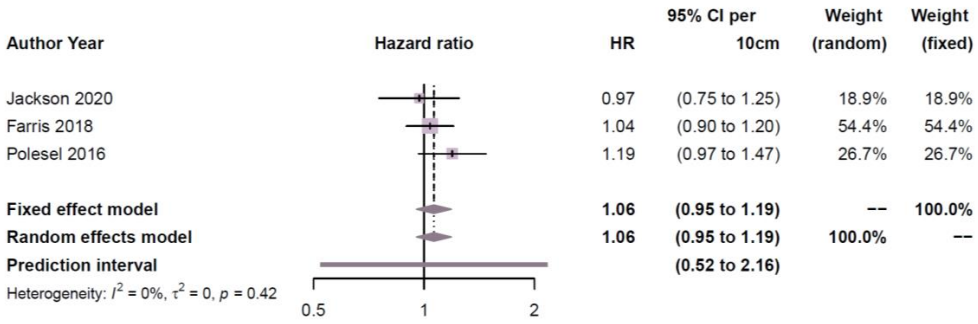
Supplementary Figure 50 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m^2 BMI increments by individual confounders: Accounted for PSA test/PSA levels (yes vs no).



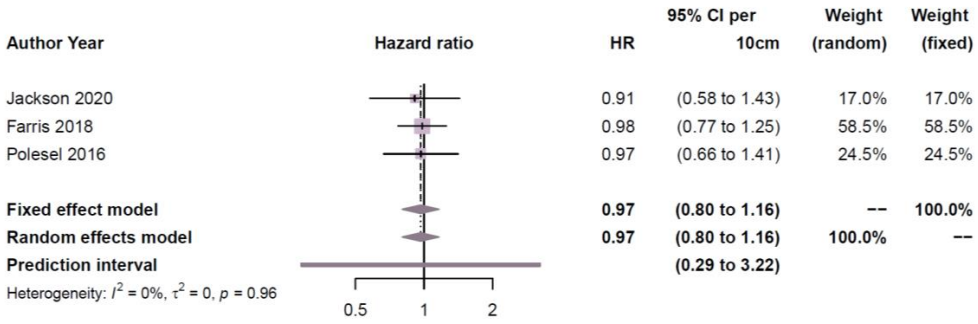
Waist circumference and all-cause and PCa-specific mortality

Supplementary Figure 51 Summary hazard ratio estimate (95% CI) for post-diagnosis 10 cm increments of waist circumference for A) all-cause mortality and B) PCa-specific mortality.

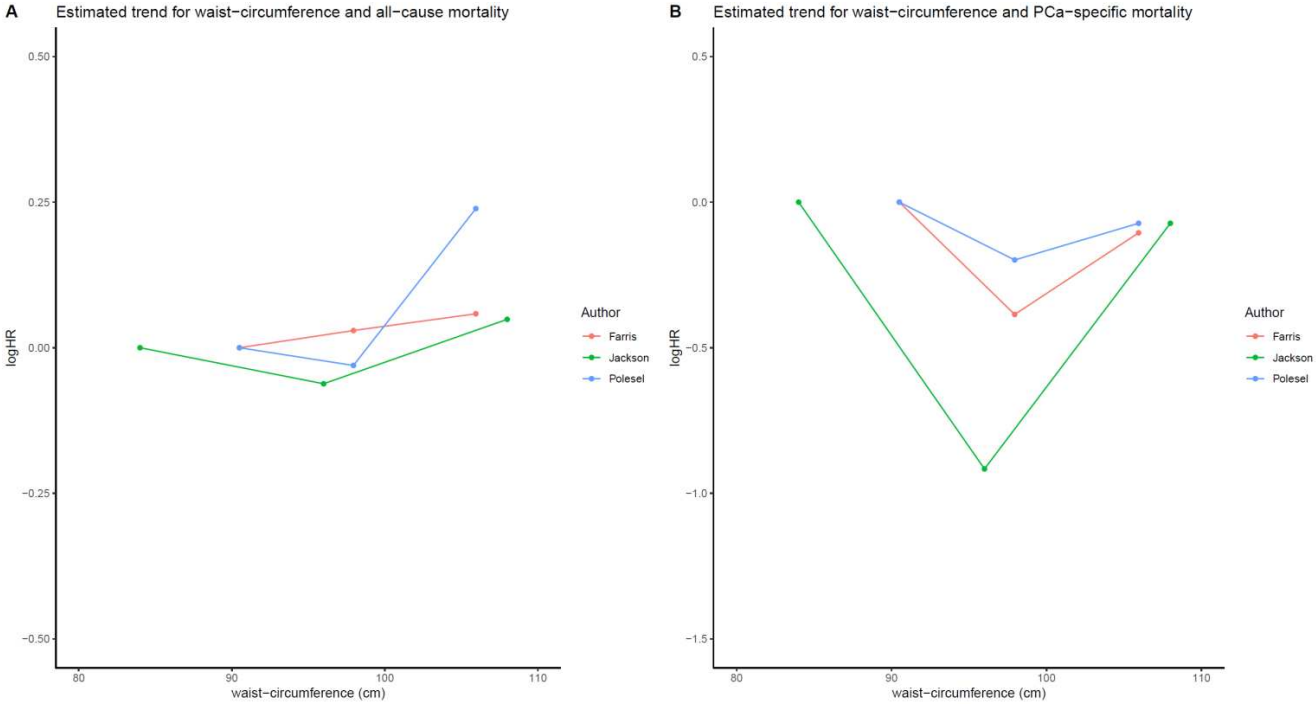
A



B

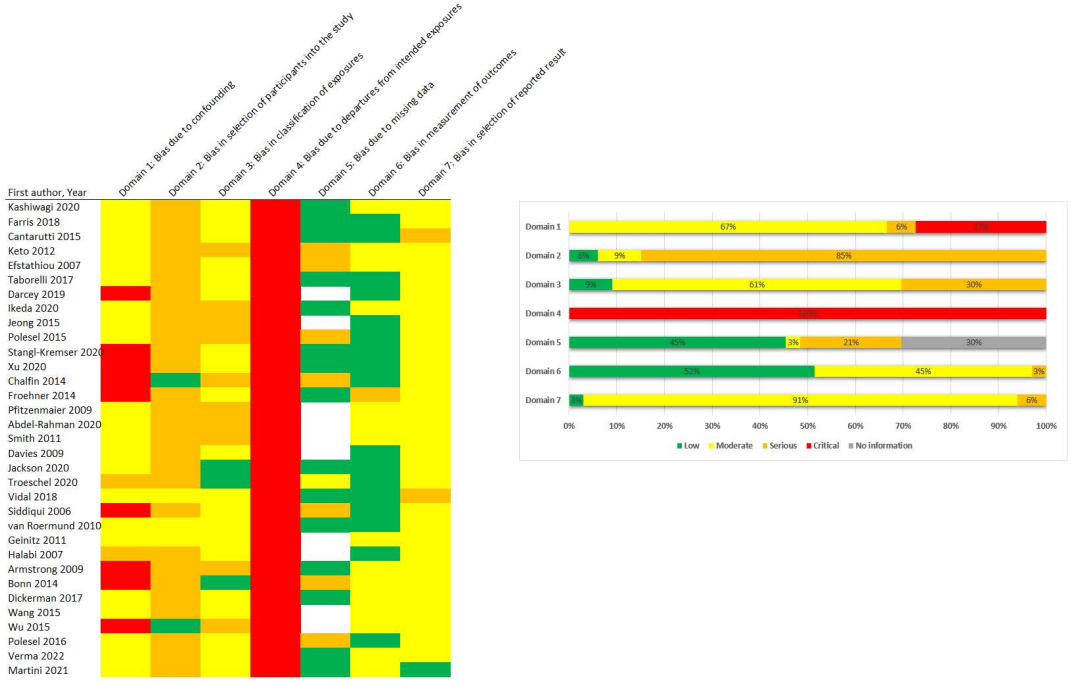


Supplementary Figure 52 Non-Linear association between waist-circumference and A) all-cause mortality and B) PCa-specific mortality. Estimated trend of the natural logarithm of HR according to the level of waist-circumference in each study.



Risk of bias assessment

Supplementary Figure 53 Risk of bias assessment of studies included in meta-analyses.



APPENDIX 2: BMI and secondary outcomes (cardiovascular (CVD)-related mortality and non-PCa-specific mortality), descriptive overview

BMI and secondary outcomes of interest, descriptive overview

BMI and CVD-related mortality.

Three studies investigated post-diagnosis BMI and CVD-mortality.[1-3] One[1] reported an association between post-diagnosis adiposity and CVD-mortality (HR per 5 kg/m^2=1.10, 95%CI:1.01-1.19). The other two studies reported no associations.

BMI and Non-PCa-specific mortality

Eight studies[4-11] investigated postdiagnosis BMI and non-PCa-specific mortality. Only one[9]reported that median BMI≥27.4 kg/m^2 was associated with higher rate of non-PCSM (HR=2.98, 95%CI:1.04-8.53; p=0.04) in men with unfavourable risk localized PCa initially randomised to radiation therapy with or without hormonal therapy. The other seven studies found no associations.

Other adiposity indices and mortality outcomes, descriptive overview

Hip circumference.

No studies were identified.

Waist-to-hip ratio.

Two studies[12, 13] reported no association between waist-to-hip ratio when treated as categorical variable and all-cause and PCa-specific mortality. Jackson et al[12] found a lower risk of PCa-specific mortality per 0.1-unit increment (HR=0.50, 95%CI:0.28-0.93) but this association disappeared upon further adjustment for androgen-deprivation therapy (HR per 0.1-unit increment=0.58, 95%CI:0.31-1.07).

Weight change.

Four studies[1, 13-15] reported data on weight change (both weight loss and weight gain) with mixed results. Troeschel et al[1] (total men=6,942) found that only in men who gained ≥5% body weight had a higher rate of PCa-specific mortality compared to those with stable post-diagnosis weight (HR=1.65, 95%CI:1.21-2.25). Higher rate of all-cause mortality was observed in men who either gained ≥5% body weight (HR=1.27, 95%CI:1.12-1.45), lost 3-5% (HR=1.15, 95%CI:1.02 to 1.31) or lost ≥5% (HR=1.30, 95%CI:1.16-1.46) compared to maintaining stable post-diagnosis weight. Results were similar upon exclusion of men treated with hormone therapy but slightly stronger (with wider confidence intervals) for 5% weight gain and PCa-specific mortality. Exclusion of follow-up within 2 years of survey completion, yielded similar results except that associations of weight loss with all-cause mortality were stronger suggesting reverse causation. There was no association between post-diagnosis weight gain (3-5 or >5% of body weight) or weight loss (3-5 or >5% of body weight) as compared to maintaining a stable weight (+/-<3% body weight) and CVD-mortality. Consistent with Troeschel[1], Bonn et al[14] (total men=3,214) reported that men who gained more than 5% body weight versus no change in weight had higher rate of PCa-specific mortality (HR=1.93, 95%CI 1.18-3.16) but not with all-cause mortality. Men who lost ≥5% body weight versus no change in weight had higher rate of all-cause mortality (HR=1.94, 95%CI:1.41-2.66) but there was no association for PCa-specific mortality. Farris et al[13] (total men=829) investigated weight change (in kg) 2-3 years post-diagnosis: <-4.5, -4.5 to <-1.6, -1.6 to <1.2 (referent) and >1.2 but observed null associations across all categories for all-cause and PCa-specific mortality. Griffin et al[15] (total men=357) examined the impact of weight gain in men undergoing ADT on

PCa prognosis. There was an indication of a higher rate of PCa-specific mortality for weight gain≥2.3kg versus stable or mild weight gain (0-≤2.2 kg) however the 95%CI included the null (HR=2.44, 95%CI 0.84-7.11). Similarly, there was no association with all-cause mortality (HR=0.97, 95%CI 0.56-1.68). Comparing weight loss to mild weight gain (0-≤2.2 kg), there was a higher rate of all-cause (HR=2.16, 95%CI:1.25-3.74) and PCa-specific mortality (HR=4.73, 95%CI:1.59-14.0). One study[16] reported only on weight loss (defined as >10% of weight in a month versus no weight loss) in advanced castration-resistant prostate cancer (CRPC*)* but found no association will survival. The 95%CIs crossed the null and were very wide.

Visceral adipose tissue (VAT) and Subcutaneous adipose tissue (SAT)

Nine studies[11, 17-24] reported data on VAT and SAT indices in relation to mortality outcomes. Pak et al[21] (total men=2,402) showed that subcutaneous fat index (SFI) (HR for SFI 48≥ versus<48=0.70 95%CI, 0.5-0.98, p=0.039) but not visceral fat index (VFI) was associated with lower all-cause mortality in men with castration-resistant PCa treated with docetaxel or androgen receptor signalling inhibitors. Lee et al 2018[23] (total men=282) found that men with higher SFI had lower risk of death from PCa (HR for SFI 39.9≥ versus <39.9, 95%CI, 0.48-0.87, p=0.004). Xu et al[17] (total men=182) reported that VAT index was associated with lower risk of all-cause mortality (HR=0.99, p=0.003) and there was an indication of an inverse association for SAT index and all-cause mortality (HR=0.99, p=0.06) but not with VAT/SAT ratio (HR=0.65, p=0.21). Wu et al [24] found that patients with high (above median) visceral fat-to-subcutaneous fat ratio (VSR) had worse prognosis in comparison to the low VSR group. The other studies[11, 18-20, 22] did not find any associations with all-cause or prostate cancer-specific mortality.

Two systematic reviews were identified[25, 26] that combined the identified studies in high versus low meta-analysis despite heterogenous cut-offs and included studies with less than 100 individuals. None of these meta-analyses identified associations between visceral adiposity and all-cause or PCa specific mortality (HR high versus low for all-cause mortality=1.07, 95%CI:0.84 to 1.35, I^2=52, studies=7, for PCa-specific mortality=1.02, 95%CI:0.76 to 1.35, I^2=0, studies=2[25] and HR high versus low for all-cause mortality=1.03, 95%CI:0.74 to 1.43, I^2=52, studies=4[26]) but found inverse associations between subcutaneous adipose tissue and mortality (HR high versus low for all-cause mortality=0.69, 95%CI:0.57 to 0.84, I^2=0, studies=5; for PCa specific mortality=0.73, 95%CI:0.55 to 0.98, I^2=0, studies=2[25] and HR high versus low for all-cause mortality=0.68, 95%CI:0.54 to 0.84, I^2=0, studies=3[26])

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