SUPPLEMENTARY MATERIAL

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

Table of Contents

Supplementary Table 1: PRISMA 2020 Checklist
APPENDIX 1: BMI and waist circumference and primary outcomes (all-cause mortality and PCa- specific mortality)
SUPPLEMENTARY TABLES
Supplementary Table 2 Commonly reported mean or median BMI values for the specific category range from relevant literature
Supplementary Table 3 Main characteristics of studies with post diagnosis data on BMI included in any analysis of all-cause or PCa-specific mortality
Supplementary Table 4A Studies excluded from the linear dose-response meta-analysis of post diagnosis BMI and all-cause mortality
Supplementary Table 4B Studies excluded from the categorical meta-analysis of BMI and all-cause mortality
Supplementary Table 4C Studies excluded from the linear dose-response meta-analysis of BMI and PCa-specific mortality
Supplementary Table 4D Studies excluded from the categorical meta-analysis of BMI and PCa- specific mortality
Supplementary Table 5 Hazard ratios (95% CI) for non-linear analysis of post-diagnosis BMI and all-cause mortality
Supplementary Table 6 Categorical meta-analyses of BMI and mortality outcomes, summary of main results
Supplementary Table 7 Hazard ratios (95% CI) for non-linear analysis of post-diagnosis BMI and PCa-specific mortality
Supplementary Table 8 Linear dose-response subgroup meta-analyses of BMI (per 5 kg/m ²) and all-cause mortality
Supplementary Table 9 Linear dose-response subgroup meta-analyses of BMI (per 5 kg/m ²) and PCa-specific mortality
Supplementary Table 10. Regression tests for funnel plot asymmetry in meta-analyses that included more than 10 studies (Egger's and Debray's test)
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
С	ategorical 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).
	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)50
	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
С	ategorical 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).
	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)55
	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
L	inear 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/m ² BMI increments for A) studies that included underweight groups and B) studies that excluded the underweight groups
	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/m ² 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/m ² 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/m ² 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/m ² 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/m ² 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)67
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) 68
Supplementary Figure 28 Summary hazard ratio estimate (95% CI) of all-cause mortality for post- diagnosis 5 kg/m ² 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)73
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
Supplementary Figure 33 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m ² BMI increments by study design74

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)77
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/m ² 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/m ² 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 no).	vs . 87
	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)	. 88
W	Vaist circumference and all-cause and PCa-specific mortality	. 89
	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	. 89
	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.	g .90
R	isk of bias assessment	.90
	Supplementary Figure 53 Risk of bias assessment of studies included in meta-analyses	.90
A n	PPENDIX 2: BMI and secondary outcomes (CVD-related mortality and non-PCa-specific nortality), descriptive overview	.91

Supplementary Table 1: PRISMA 2020 Checklist



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	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 INFORM	ATION						
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 protocol was not prepared.		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

<u>Note:</u> 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

- 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 vegetable*[tiab] OR fruit*[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 duck[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 ((fat[tiab] OR fats[tiab] OR fatty[tiab]) AND (diet*[tiab] OR food*[tiab])) OR ((fat[tiab] OR serum[tiab] OR plasma[tiab])) OR egg[tiab] OR eggs[tiab] OR blood[tiab] OR serum[tiab] OR food*[tiab] OR serum[tiab] OR food*[tiab] OR serum[tiab] OR food*[tiab] OR serum[tiab] OR food*[tiab] OR food*[tia
- 14. fluid intake[tiab] OR water[tiab] OR drinks[tiab] OR drinking[tiab] OR tea[tiab] OR coffee[tiab] OR caffeine[tiab] OR juice[tiab] OR beer[tiab] OR spirits[tiab] OR liquor[tiab] OR wine[tiab] OR alcohol[tiab] OR beer[tiab] OR (ethanol[tiab] AND (drink*[tiab] OR intake[tiab] OR consumption[tiab])) OR yerba mate[tiab] OR ilex paraguariensis[tiab]
- 15. pesticides[MeSH Terms] OR fertilizers[MeSH Terms] OR "veterinary drugs"[MeSH Terms]
- 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 dibenzofuran*[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 flavoring*[tiab] OR nitrates[tiab] OR nitrites[tiab] OR solvent[tiab] OR solvents[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 stewing[tiab] OR casserol*[tiab] OR broil[tiab] OR broil[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 heaterocyclic 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 starch[tiab] OR carbohydrate*[tiab] OR lipid*[tiab] OR linoleic acid*[tiab] OR starch[tiab] OR starch[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 serum[tiab] OR plasma[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 selenium[tiab] OR (calcium[tiab] AND (diet*[tiab] OR food*[tiab])) OR selenium[tiab] OR (iodine[tiab] AND (diet*[tiab] OR food*[tiab])) OR selenium[tiab] OR (iodine[tiab] AND (diet*[tiab] OR food*[tiab] OR food*[tiab] OR food*[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 cardiovascular activities[tiab] OR cardiovascular activity[tiab] OR endurance activity[tiab] OR resistance training[tiab] OR strength training[tiab] OR physical conditioning[tiab] OR functional training[tiab] OR lifestyle activity[tiab] OR tai chi[tiab] OR tai ji[tiab] OR yoga[tiab] OR free living activities[tiab] OR free living activity[tiab] OR walking[tiab] OR walking[tiab] OR free living activity[tiab] OR free
- 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 selenium or (iodine and (diet\$ or food\$ or supplement\$)) 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	Study design, characteristics,	Cancer characteristics	Exclusion of	Assessment of weight and height	N events,	Type analysis		
Country	at baseline	Treatments	deaths	Death confirmation	(Total men)	Covariates		
	Follow-up time							
Verma 2022, ¹ Multinational	Retrospective cohort Data from the ENTHUSE M1C(Fizazi et al 2013) Exclusions: Underweight men with BMI<18.5 kg/m² (n=3)	Advanced PCa: mCRPC <u>Treatments:</u> 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 <u>Treatments:</u> 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:		

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	Age range: 40 to 80 years (median: 69 years), men attending urology clinics. 56% diabetics, 92% hypertension, 39% PCa family history <u>Exclusions:</u> -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/m²	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 <u>Treatments:</u> Not stated	No	Demographic, pathological and survival information were obtained via electronic medical record review. <u>Death confirmation:</u> 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 <u>Treatments:</u> 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 <u>Exclusions</u> -No survey completed one to less than 6 years after diagnosis. -Follow-up ends less than four years from postdiagnosis	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 <u>Treatments:</u> 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. <u>Sensitivity</u> <u>analysis:</u> excluding men with follow-up	Postdiagnosis BMI obtained from self- reported weight on the first survey completed one to less than six years after diagnosis <u>Death confirmation:</u> 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)
	survey. -Implausible first postdiagnosis BMI. -Underweight men i.e. First postdiagnosis BMI <18.5 kg/m ² Follow-up: 7.3 median years		ending within 2- years of the first post-diagnosis survey			
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 <u>Treatments:</u> 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. <u>Death confirmation:</u> Medical records	ACM: 93 (186)	Cox proportional hazards regression models *Tested some other potential confounders in univariate analysis. <u>Adjusted for:</u> Liver metastases, high visceral-to- subcutaneous fat area ratio

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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) <u>Death confirmation:</u> 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 <u>Adjusted for:</u> 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 <u>Treatments:</u> Docetaxel/prednisone	No	BMI collected at baseline <u>Death confirmation:</u> 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 <u>Treatments:</u> Lack of information about treatment/s	No	Self-reported height and weight at/ around the time of diagnosis <u>Death confirmation:</u> 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, ¹ 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) <u>Treatments:</u> 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) <u>Death confirmation:</u> 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, Canada	 Prospective cohort Mean age (SD): 67.4 (7.4) <u>Follow-up:</u> 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	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. <u>Death confirmation:</u> 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. <u>Adjusted for:</u> 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) <u>Treatments:</u> 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 <u>Exclusions:</u> -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 <u>Follow-up:</u> 20 years minimum			*Validation study in HPFS showed that self-reported and technician-measured weights were highly correlated (Pearson r=0.97). <u>Death confirmation:</u> 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 <u>Treatments:</u> 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. <u>Death confirmation:</u> 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 <u>Adjusted for:</u> 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 <u>Treatments:</u> 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. <u>Death confirmation:</u> Record linkage and death certificates	ACM: 263 (780) PCSM: 81 (780)	Cox proportional hazards regression models for ACM and PCSM <u>Adjusted for:</u> 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 <u>Follow-up:</u> 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. <u>Death confirmation:</u> 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 <u>Adjusted for:</u> 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 <u>Follow-up</u> : 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 <u>Treatments:</u> 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 <u>Adjusted for:</u> 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 <u>Treatments:</u> Single agent docetaxel chemotherapy	No	BMI calculated using the recorded height and body weight closest to the date of the CT scan. <u>Death confirmation:</u> 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 <u>Pathological stage</u> : organ confined, focal/established capsular penetration, seminal vesicle involvement lymph node involvement. <u>Treatments</u> : Radical prostatectomy at a single tertiary referral centre	No	At time of surgery <u>Death confirmation:</u> 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 <u>Treatments:</u> All treated with definitive intensity-modulated radiotherapy and image-guided radiotherapy	No	Weight and height documented before the initiation of EBRT. <u>Death confirmation:</u> 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

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	70% no ADT, 30% ADT 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 <u>Treatments</u> Within 6 months of diagnosis:	Yes, sensitivity analysis with 18-months lag time (Model- free i.e., not estimated from	Self-reported current height, weight <u>Death confirmation:</u> 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,
	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.	surveillance, radical prostatectomy, radiation therapy	a Cox proportional hazard model)			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 <u>Treatments:</u> Radical prostatectomy at university hospital	No	BMI information obtained from the patient medical records <u>Death confirmation:</u> 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 $\ge 4 + 3$) Lymph node metastases (n=18) <u>Treatments:</u> 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 <u>Treatments:</u> ADT (bilateral orchiectomy or medical castration) at least three months before randomisation and had castrate testosterone levels at screening.	No	At baseline <u>Death confirmation:</u> 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 <u>Treatments:</u> 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. <u>Death confirmation:</u> Follow-up	ACM: NA (564) PCSM: NA (564)	Cox proportional hazards regression models <u>Adjusted for:</u> Age, hormonal therapy, T-stage, WHO grade, EBRT dose, Initial PSA levels

Van Roermund	Retrospective cohort	Clinically localised PCa.	No	Height and weight data were collected	ACM:	Cox proportional hazards regression
2010, ²⁶	Men treated at a single	Three risk groups according to Ash et al:		retrospectively by	193 (1530)	models
Netherlands	Medical centre.	Low rick: aT1h aT2a low grade (Glasson -6		reviewing anaestnesia records.		A divisted for:
	Median age: 67 years	$\underline{Low Hsk.}$ c110–c12a, low grade (Gleasoll×=0) and PSA \leq =10 ng/L)				Age risk group (low intermediate
	Exclusions:	High risk: $>cT3$ or PSA level of		Death confirmation:	PCSM:	high) treatment period number of
	-Patients with no data on	$\geq 20 \text{ ng/L} \text{ or } \geq 2$		Medical record review	61 (1530)	seeds
	height or weight missing	intermediate risk factors		Wiedlear record review		50005
	follow-up data or those who	Intermediate risk: The rest				
	received salvage PPB after					
	EBRT	Treatments:				
		Permanent prostate brachytherapy.				
	Follow-up: 47 median months	*Different treatment techniques used				
	_	throughout the study period (1989–2008).				
		18.4% received ADT (LHRH agonist) for 6				
		months before permanent prostate				
27		brachytherapy				
Davies 2009, ²⁷	Prospective cohort	Clinically localised (T1-T3, NX/N0, M0)	No	BMI information obtained from the	ACM:	Cox proportional hazards regression
USA				patient records	1044 (7274)	models
	Men from CAPSURE.	Gleason scores ranged from 2 to 4 (5%), 5 to 6				
	Men recruited consecutively	(58%), / (26%), to 8 to 10 (11%). Clinical		Death confirmation:		Adjusted for:
	from 40 primarily	staging was 11 (45%), 12 (50%) and 13 (5%)		Mortality information is obtained from	PCSM·	Age, clinical risk, presence of diabetes
	community-based urology	38% IOW FISK, 35% Intermediate FISK, 27% fight		National Daath Index	214 (7274)	and type of therapy
	practices	risk by the D Anneo classification.		National Death Index		
	across the USA.	Treatments:				
	Exclusions:	Initial therapy: RP (53%) ADT (14%) BT				
	-Men undergoing expectant	(11%), cryotherapy (4%), BT plus EBRT (3%)				
	management	and RP plus EBRT (1%), Secondary therapy:				
		ADT 79.7%, EBRT 15.6%, cryotherapy 2.1%,				
	Follow-up: 44 median months	BT 2% and RP 0.6%.				
Armstrong	Retrospective cohort	mCRPC with evidence of progression	No	Height and weight recorded at baseline	ACM:	Cox proportional hazards regression
2009,28	Secondary analysis of a			(upon trial entry).	800 (1006)	models
Multinational	TAX327 clinical trial,	Treatments:				
(centres in 24	international phase III	Docetaxel and prednisone or mitoxantrone and		Death confirmation:		Adjusted for:
countries)	randomized trial,	prednisone.		Follow-up		Baseline pain, presence of liver
	Age range 66 to 70					metastases, performance status,
						haemoglobin, alkaline phosphatase,
	Follow-up: 5 years maximum					PSA, PSA doubling time, number of
						sites of metastatic disease, type of
						progression (bone scan or measurable
						uisease), nign-grade disease (Gleason
		I				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 <u>Follow-up:</u> 5.5 median years	Either organ-confined or locally advanced with extracapsular extension. Non-metastatic. <u>Treatments:</u> Radical prostatectomy Some also received: neoadjuvant hormonal therapy, adjuvant hormonal therapy, adjuvant radiotherapy, adjuvant hormonal and radiotherapy or neoadjuvant and adjuvant therapy	No	Baseline <u>Death confirmation:</u> 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 <u>Treatments:</u> 53% prior radiotherapy 25% prostatectomy 65% LHRH agonists 44% surgical castration	No	BMI at study entry <u>Death confirmation:</u> 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 legions (secolut of palachies)	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	No	BMI calculated using patient height and weight data as measured at baseline (upon trial entry) <u>Death confirmation:</u> Follow-up	ACM: 476 (788)	Cox proportional hazards regression models Adjusted for: Age, race, treatment arm, prostatectomy, nodal involvement, Gleason score, clinical stage
	tumour dimensions >25 cm) not eligible <u>Follow-up:</u> 8.1 median years	T1-2) were eligible if there was evidence of spread to the regional lymph nodes either radiographically or histologically. <u>Treatments:</u> Radical prostatectomy and radiation therapy. Radiation therapy and immediate goserelin or radiation therapy alone followed by goserelin at			PCSM: 169 (788)	
Siddiqui 2006 ³²	Prospective cohort	recurrence	No	RMI calculated using patient height and	ACM:	Cox proportional barards reasonsion
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 <u>Pathologic Gleason score:</u> 458 Gleason score<6, 347 Gleason score=6, 307 Gleason score=7, 48 Gleason score 8+ <u>Pathologic stage:</u> n=307: T2AN0 n=478: T2Bn0 n=306: T34N0 n=72: TxN+ <u>Treatments:</u> 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. <u>Death confirmation:</u> 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, mCRPC 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	First author, Year			
these 61 assessed BMI post-diagnosis				
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	Chalfin 2014, ⁴¹ Montgomery 2007, ⁴² Wu 2015, ⁴³ Halabi 2007, ⁴⁴			
methods (Bekkering) (n=5)	Geinitz 2011 ⁴⁵			
Different definition of obesity and could not combine (n=1)	Mason 2018 ⁴⁶			
*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				
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	Xu 2020, ⁴⁷ Stangl-Kremser 2020, ⁴⁸ Wang 2015, ⁴⁹ Siddiqui			
on continuous scale) (n=8)	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.				

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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	Xu 2020, ⁴⁷ Stangl-Kremser 2020, ⁴⁸ Wang 2015, ⁴⁹ Siddiqui				
continuous scale (n=8)	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)	Mason 2018 ⁴⁶				
*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					
Excluded from analysis of overweight vs normal weight and/or	DiBella 2020 ²² , Heo 2018, ²⁵ Hu 2018 ^{20‡} , Rudman 2016 ²⁴ ,				
obese vs normal because <u>either they only provided dichotomous</u>	Antoun 2015^{23+} and Froehner 2014 , ³⁵ Lee 2020 , ²⁶ Montgomery				
estimate comparing obese vs non-obese (i.e., 25 vs 25 or ≥ 30 vs	2007 ⁴² (different categories than WHO) Cantarutti 2015 ³⁰				
<30) or <u>not WHO categories</u> (n=11)	(different categories than WHO) and Chalfin 2014 ⁴¹ (different				
Vin addition forms was an building program to models and had and the day of t	categories than WHO for obese vs normal category), Pan 2021 ²⁹				

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	Chalfin 2014, ⁴¹ Yu 2018, ⁷² Halabi 2007, ⁴⁴ Geinitz 2011 ⁴⁵				
methods (Bekkering) (n=4)					
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	Siddiqui 2006 ⁵⁰ and Wang 2015 ⁴⁹ Jeong 2015 ⁵³				
continuous scale (n=3)					

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	Wang 2015, ⁴⁹ Jeong 2015, ⁵³ Siddiqui 2006 ⁵⁰			
continuous scale (n=3)				
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	DiBella 2020, ²² Rudman 2016, ²⁴ Bluethmann 2020, ⁷⁰ Meyer			
obese vs normal because either they only provided dichotomous	1999, ⁶⁹ Huang 2019, ⁷¹ Chalfin 2014, ⁴¹ (different categories than			
estimate comparing obese vs non-obese (i.e., 25 vs 25 or >=30 vs	WHO for obese vs normal category) Yu 2018,72 (different			
<30) or <u>not WHO categories</u> (n=8)	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	HR 95% CI	HR 95% CI				
kg/m ²						
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:	Chi-squared test:				
	X2 = 23, df = 2, P(>X2) = <0.001	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	Tau-squared		
		I	T	1			1	effects	
	Ν	N deaths/	Summary HR	Summary HR	$I^2 \%$	95% PI	Q value,	Egger's	
	studies	N total men	(95% CI)	(95% CI)	(95% CI)		p-value	p-value	
			Random effects	Fixed effect				(studies>10)	
All-cause mortality									
Overweight versus	19	Overweight:	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
normal weight		4413/20582							
(i.e., 25 to 30 vs <25 or		Normal weight:							
25 to 30 vs 18.5 to 25) [¥]		3321/12583							
Obese versus normal	18	Obese:	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
weight (i.e., >=30 vs <25		2177/7072							
or >=30 vs 18.5 to $25)^{\text{¥}}$		Normal weight:							
		3321/9461							
Prostate cancer-specific n	nortality								
Overweight versus	15	Overweight:	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
normal weight		1022/14734							
(i.e., 25 to 30 vs <25 or		Normal weight:							
25 to 30 vs 18.5 to 25) [¥]		775/13907							
Obese versus normal	14	Obese:	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
weight (i.e., >=30 vs <25		492/6376							
or >=30 vs 18.5 to 25)		Normal weight:							
		775/10785							
[¥] 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									
	Values from midpoint estimation for open ended categories	Values using common midpoint values from literature for open ended categories							
-------------------	--	---	--	--	--	--	--		
BMI	HR 95% CI	HR 95% CI							
kg/m ²									
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:	Chi-squared test:							
	X2 =2.9, df = 2, P(>X2) = 0.23	X2 = 2.6, df = 2, P(>X2) = 0.27							
ouare 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									0.14, 0.71	
low/underweight men		00/5/10 500				0.55 1.50	0.01			0.64
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
<i>Follow-up time</i> *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	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		-
(Europe/USA/Multicounty) ¥										
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	1	3026/6749	1.10 (1.04 to 1.15)	-	-	-	-	-		-
stage										
Group two: Mixed PCa i.e.,	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		-
low, intermediate, or high risk										
and maybe metastatic (or										
unknown if includes metastatic										
but could)										
Group three: Mixed PCa i.e.,	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
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]).										
Group four: Advanced/High	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
risk PCa (could include								,		
metastatic) ¥										
Adjustment for confounding									2.3, 0.68	
factors grouped in levels										
Level one: At least for age,	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
stage, and grade (clinical										
risk/state)										
Level two: At least for age,	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
stage and/or grade (clinical										
risk/state) and treatment (any)										
Level three: At least for age,	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
stage, grade (clinical risk/state)										
and treatment (any)										
Level four: At least for age,	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		-
stage, grade (clinical risk/state),										
treatment (any) and smoking										
Level five: At least for age,	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		-
stage, grade, treatment (any),										
	•		•	•	•		•	•		

		-					1		1		
smoking and PSA test	(PSA										
levels [baseline/at-arou	und										
diagnosis] as proxy)											
Adjustment for individ	ual									25, 0.01	
confounding factors											
(Even if accounted for	in										
univariate analysis or u	using a										
specific p-value as cut	-off)										
										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	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	1	-
(clinical and/or									,		
pathological/risk	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
classification/tumour											
extent)											
										18.9, <0.01	
Accounted for	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		-
Gleason score	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	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		-
treatment/s (any)	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	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
smoking	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	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		-
test/PSA levels	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 a	an include	d publicati	on was not given	and/or could not be esti	imated. NA, not availabl	le; PI, prediction	interval; n=stud	dies			

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
<i>By median deaths (events)</i> ¥									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 ma metastatic (or unknown if include metastatic but could)	ybe es	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 st. (or give info) that they excluded distant metastatic (M0) or state th PCa was clinically localised but could be high risk [e.g., if Gleaso score>8]).	r, 9 ate nat m	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 (could include metastatic)	PCa 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 facto grouped in levels	ors								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 grac (clinical risk/state) and treatment (any)	de 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 (an and smoking	y) 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 PS, test (PSA levels [baseline/at-arou diagnosis] as proxy)	A ind	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 univaria analysis or using a specific p-valu as cut-off)	ate Je								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	0.2.0((0.26
Adjusted for stage No	2	282/6124	1 13 (0 0/ to 1 26)	1 13 (0.04 to 1.26)	0.(0 to 86)	0.34 to 3.70	0	1 50 0 47	0.2, 0.66	
(clinical and/or Yes pathological/risk	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	No	1	451/1104	0.83 (0.70 to 0.98)	0.83 (0.70 to 0.98)	-	-	-	-		-
score	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	No	1	76/572	1.30 (0.93 to 1.83)	-	-	-	-	-		-
treatment/s (any)	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	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
smoking	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	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		-
test/PSA levels	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 a	n included pu	ublication	was not given and	/or could not be estima	ted. NA, not available;	PI, prediction in	terval; n=studie	s			

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 funne	el 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)	<u>0.04</u>	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	<u>0.01</u>						
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

Α

Study	Hazard R	atio HR	95% CI	Heterogeneity (*100)
Omitting Verma 2022		1.00	(0.94 to 1.06)	0.75
Omitting Martini 2021		0.99	(0.94 to 1.05)	0.76
Omitting Jackson 2020		0.99	(0.93 to 1.05)	0.78
Omitting Xu 2020		0.99	(0.94 to 1.05)	0.76
Omitting Kashiwagi 2020		0.99	(0.93 to 1.05)	0.77
Omitting Troeschel 2020		0.98	(0.92 to 1.04)	0.75
Omitting Stangl-Kremser 2020		0.99	(0.93 to 1.05)	0.77
Omitting Ikeda 2020		0.99	(0.93 to 1.05)	0.77
Omitting Abdel-Rahman 2019		0.99	(0.93 to 1.05)	0.76
Omitting Darcey 2019		0.98	(0.93 to 1.04)	0.78
Omitting Vidal 2018		1.00	(0.94 to 1.05)	0.71
Omitting Farris 2018		0.99	(0.93 to 1.05)	0.77
Omitting Taborelli 2017	-	0.98	(0.93 to 1.04)	0.78
Omitting Jeong 2015		0.97	(0.92 to 1.03)	0.74
Omitting Cantarutti 2015		0.98	(0.92 to 1.04)	0.78
Omitting Wang 2015		0.97	(0.92 to 1.03)	0.75
Omitting Bonn 2014		0.98	(0.92 to 1.04)	0.77
Omitting Froehner 2014		0.97	(0.92 to 1.03)	0.76
Omitting Smith 2011		0.99	(0.93 to 1.05)	0.78
Omitting van Roermund 2010		0.98	(0.93 to 1.04)	0.78
Omitting Davies 2009		0.98	(0.93 to 1.05)	0.77
Omitting Armstrong 2009		0.98	(0.92 to 1.04)	0.78
Omitting Pfitzenmaier 2009		0.98	(0.92 to 1.04)	0.77
Omitting Efstathiou 2007		0.98	(0.93 to 1.04)	0.78
Omitting Siddiqui 2006		0.98	(0.92 to 1.05)	0.78
Random effects model		0.98	(0.93 to 1.04)	
	0.95 1	1.05 1.1		

В

Study	Hazard Ratio	HR	95% CI	Heterogeneity (*100)
Omitting Martini 2021		1.10	(1.02 to 1.19)	0.42
Omitting Troeschel 2020	-	1.08	(0.99 to 1.18)	0.55
Omitting Jackson 2020		1.09	(1.00 to 1.18)	0.56
Omitting Darcey 2019	-	1.07	(0.99 to 1.16)	0.55
Omitting Farris 2018	-	1.09	(1.00 to 1.18)	0.57
Omitting Dickerman 2017		1.09	(1.00 to 1.19)	0.56
Omitting Jeong 2015		1.08	(0.99 to 1.18)	0.57
Omitting Cantarutti 2015		1.09	(0.99 to 1.20)	0.57
Omitting Wang 2015	-	1.05	(0.98 to 1.11)	0.27
Omitting Polesel 2015	-	1.07	(0.99 to 1.17)	0.56
Omitting Bonn 2014		1.08	(0.99 to 1.18)	0.57
Omitting Keto 2012		1.08	(1.00 to 1.17)	0.57
Omitting van Roermund 2010		1.08	(0.99 to 1.17)	0.57
Omitting Davies 2009		1.10	(1.01 to 1.19)	0.52
Omitting Efstathiou 2007		1.07	(0.98 to 1.16)	0.53
Omitting Siddiqui 2006		1.08	(0.99 to 1.18)	0.57
Random effects model		1.08	(1.00 to 1.17)	

0.95 1 1.05 1.1

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).

Α

Author Year	Hazard ratio	HR	95% CI	Weight (random)	Weight (fixed)	Overweight vs Normal weight
Verma 2022		0.68	(0.51 to 0.90)	4.5%	2.6%	25 to 30 vs 18.5 to 25
Martin 2021		0.90	(0.73 to 1.11)	6.5%	4.7%	25 to 30 vs <25
Jackson 2020		0.69	(0.37 to 1.28)	1.3%	0.5%	25 to 30 vs 18.5 to 25
Troeschel 2020	+	1.01	(0.94 to 1.09)	12.0%	37.7%	25 to 30 vs 18.5 to 25
Darcey 2019		0.71	(0.52 to 0.97)	3.9%	2.1%	25 to 30 vs <25
Vidal 2018		0.75	(0.58 to 0.96)	5.2%	3.2%	25 to 30 vs <25
Farris 2018		0.83	(0.66 to 1.05)	5.8%	3.8%	25 to 30 vs <25
Taborelli 2017		0.86	(0.66 to 1.13)	4.8%	2.8%	25 to 30 vs <25
Wu 2015		0.77	(0.56 to 1.07)	3.7%	1.9%	25 to 30 vs <25
Chalfin 2014		1.06	(0.91 to 1.24)	8.5%	8.6%	25 to 30 vs <25
Bonn 2014		1.06	(0.83 to 1.36)	5.4%	3.4%	25 to 30 vs <25
Smith 2011		0.75	(0.50 to 1.13)	2.6%	1.2%	25 to 30 vs <25
Geinitz 2011		1.29	(0.74 to 2.23)	1.6%	0.7%	25 to 30 vs <25
van Roermund 2010		0.98	(0.72 to 1.33)	4.0%	2.2%	25 to 30 vs <25
Davies 2009		0.80	(0.67 to 0.96)	7.6%	6.5%	25 to 30 vs <25
Pfitzenmaier 2009		0.94	(0.56 to 1.57)	1.8%	0.8%	25 to 30 vs <25
Armstrong 2009		0.85	(0.69 to 1.05)	6.3%	4.5%	25 to 30 vs <25
Halabi 2007		0.80	(0.68 to 0.94)	8.4%	8.4%	25 to 30 vs 18.5 to 25
Efstathiou 2007		1.09	(0.88 to 1.36)	6.2%	4.4%	25 to 30 vs <25
Fixed effect model		0.92	(0.88 to 0.97)		100.0%	
Random effects model		0.89	(0.82 to 0.95)	100.0%		
Prediction interval			(0.70 to 1.11)			
Heterogeneity: $I^2 = 47\%$, $\tau^2 = 0.01$, p	= 0.01					

В

Study	Hazard Ratio	HR	95% CI	Heterogeneity (*100)
Omitting Verma 2022		0.90	(0.84 to 0.97)	0.42
Omitting Martin 2021 -		0.88	(0.82 to 0.96)	0.50
Omitting Jackson 2020 -		0.89	(0.82 to 0.96)	0.48
Omitting Troeschel 2020 -		0.87	(0.81 to 0.94)	0.32
Omitting Darcey 2019		0.89	(0.83 to 0.96)	0.45
Omitting Vidal 2018		0.89	(0.83 to 0.96)	0.45
Omitting Farris 2018 -		0.89	(0.82 to 0.96)	0.48
Omitting Taborelli 2017 -		0.89	(0.82 to 0.96)	0.49
Omitting Wu 2015 -	iu	0.89	(0.83 to 0.96)	0.48
Omitting Chalfin 2014		0.87	(0.81 to 0.94)	0.44
Omitting Bonn 2014		0.88	(0.81 to 0.95)	0.48
Omitting Smith 2011 -		0.89	(0.83 to 0.96)	0.48
Omitting Geinitz 2011 -		0.88	(0.82 to 0.95)	0.48
Omitting van Roermund 2010 -		0.88	(0.82 to 0.95)	0.50
Omitting Davies 2009		0.89	(0.83 to 0.96)	0.45
Omitting Pfitzenmaier 2009 -		0.88	(0.82 to 0.95)	0.50
Omitting Armstrong 2009 -		0.89	(0.82 to 0.96)	0.49
Omitting Halabi 2007		0.89	(0.83 to 0.97)	0.44
Omitting Efstathiou 2007 -	-	0.87	(0.81 to 0.94)	0.46
Random effects model –		0.89	(0.82 to 0.95)	
	0.9 1 1.1			



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).

Α

Author Year	Hazard ratio	HR	95% CI	Weight (random)	(fixed)	Obese vs Normal weight
Verma 2022		0.59	(0.41 to 0.85)	5.4%	2.6%	>=30 vs 18.5 to 25
Martini 2021		0.71	(0.53 to 0.96)	6.3%	4.0%	>=30 vs <25
Jackson 2020		0.94	(0.44 to 2.00)	2.3%	0.6%	>=30 vs 18.5 to 25
Troeschel 2020	+	1.23	(1.12 to 1.36)	8.7%	36.7%	>=30 vs 18.5 to 25
Darcey 2019		1.17	(0.85 to 1.61)	6.0%	3.5%	>=30 vs <25
Vidal 2018		0.65	(0.50 to 0.85)	6.8%	5.2%	>=30 vs <25
Farris 2018		0.90	(0.70 to 1.16)	6.8%	5.3%	>=30 vs <25
Taborelli 2017		1.13	(0.78 to 1.63)	5.4%	2.6%	>=30 vs <25
Wu 2015		0.68	(0.47 to 0.98)	5.3%	2.6%	>=30 vs <25
Bonn 2014		1.47	(1.03 to 2.10)	5.5%	2.8%	>=30 vs <25
Smith 2011		0.87	(0.56 to 1.35)	4.6%	1.8%	>=30 vs <25
Geinitz 2011		1.31	(0.61 to 2.78)	2.3%	0.6%	>=30 vs <25
van Roermund 2010		1.09	(0.59 to 2.01)	3.1%	0.9%	>=30 vs <25
Davies 2009		0.98	(0.78 to 1.23)	7.2%	6.8%	>=30 vs <25
Pfitzenmaier 2009		- 1.66	(0.86 to 3.20)	2.8%	0.8%	>=30 vs <25
Armstrong 2009		0.98	(0.76 to 1.27)	6.9%	5.4%	>=30 vs <25
Halabi 2007		0.80	(0.68 to 0.94)	8.1%	13.4%	>=30 vs <25
Efstathiou 2007		1.00	(0.75 to 1.33)	6.4%	4.3%	>=30 vs <25
Fixed effect model	+	1.00	(0.94 to 1.06)		100.0%	
Random effects model	-	0.94	(0.83 to 1.08)	100.0%		
Prediction interval			(0.58 to 1.55)			
Heterogeneity: I ² = 73%, τ ² = 0.05, p < 0.0	1					
	0.5 1 2					

В

Study	Hazard Ratio	HR	95% CI	Heterogeneity (*100)
Omitting Verma 2022		0.97	(0.85 to 1.10)	0.70
Omitting Martini 2021		0.96	(0.84 to 1.10)	0.72
Omitting Jackson 2020		0.95	(0.83 to 1.08)	0.74
Omitting Troeschel 2020		0.91	(0.81 to 1.03)	0.55
Omitting Darcey 2019		0.93	(0.81 to 1.07)	0.74
Omitting Vidal 2018		0.97	(0.85 to 1.10)	0.69
Omitting Farris 2018		0.95	(0.82 to 1.09)	0.74
Omitting Taborelli 2017		0.94	(0.81 to 1.07)	0.74
Omitting Wu 2015		0.96	(0.84 to 1.10)	0.72
Omitting Bonn 2014		0.92	(0.80 to 1.05)	0.72
Omitting Smith 2011		0.95	(0.83 to 1.09)	0.74
Omitting Geinitz 2011		0.94	(0.82 to 1.07)	0.74
Omitting van Roermund 2010		0.94	(0.82 to 1.08)	0.74
Omitting Davies 2009		0.94	(0.82 to 1.09)	0.74
Omitting Pfitzenmaier 2009		0.93	(0.81 to 1.06)	0.73
Omitting Armstrong 2009		0.94	(0.82 to 1.09)	0.74
Omitting Halabi 2007		0.96	(0.83 to 1.10)	0.70
Omitting Efstathiou 2007		0.94	(0.82 to 1.08)	0.74
Random effects model		0.94	(0.83 to 1.08)	
	0.9 1 1.1			





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).

Α



В

Study	Hazard Ratio	HR	95% CI	Heterogeneity (*100)
Omitting Martini 2021		- 1.04	(0.89 to 1.20)	0.55
Omitting Jackson 2020		1.03	(0.90 to 1.17)	0.53
Omitting Troeschel 2020		0.99	(0.86 to 1.14)	0.46
Omitting Darcey 2019	i	1.02	(0.88 to 1.18)	0.56
Omitting Farris 2018		- 1.04	(0.91 to 1.20)	0.52
Omitting Dickerman 2017		- 1.04	(0.89 to 1.21)	0.55
Omitting Polesel 2015		1.01	(0.88 to 1.16)	0.55
Omitting Chalfin 2014		0.99	(0.86 to 1.13)	0.47
Omitting Bonn 2014		1.02	(0.89 to 1.18)	0.56
Omitting Keto 2012	E	1.01	(0.89 to 1.15)	0.49
Omitting Geinitz 2011		1.01	(0.88 to 1.16)	0.54
Omitting van Roermund 2010	i	1.02	(0.88 to 1.17)	0.56
Omitting Davies 2009		- 1.04	(0.89 to 1.20)	0.55
Omitting Halabi 2007		- 1.05	(0.91 to 1.21)	0.43
Omitting Efstathiou 2007		0.99	(0.87 to 1.13)	0.47
Random effects model	0.9 1 1.1	1.02	(0.89 to 1.17)	

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).

Α

Author Year	Hazard ratio	HR	95% CI	Weight (random)	Weight (fixed)	Obese vs Normal weight
Martini 2021		0.64	(0.44 to 0.93)	10.4%	8.6%	>=30 vs <25
Jackson 2020	<u> </u>	0.94	(0.29 to 3.05)	2.3%	0.8%	>=30 vs 18.5 to 25
Troeschel 2020	-	1.28	(0.97 to 1.69)	12.5%	15.2%	>=30 vs 18.5 to 25
Darcey 2019		1.80	(0.90 to 3.59)	5.3%	2.4%	>=30 vs <25
Farris 2018	-	0.97	(0.63 to 1.50)	9.1%	6.2%	>=30 vs <25
Dickerman 2017	-	1.09	(0.76 to 1.56)	10.7%	9.0%	>=30 vs <25
Polesel 2015	+	1.58	(0.81 to 3.08)	5.6%	2.6%	>=30 vs <25
Bonn 2014	- [1.29	(0.67 to 2.48)	5.7%	2.7%	>=30 vs <25
Keto 2012		6.59	(0.73 to 59.28)	0.7%	0.2%	>=30 vs <25
Geinitz 2011	<u> </u>	1.42	(0.28 to 7.20)	1.3%	0.4%	>=30 vs <25
van Roermund 2010	_ 	1.46	(0.50 to 4.27)	2.7%	1.0%	>=30 vs <25
Davies 2009		0.80	(0.56 to 1.15)	10.6%	8.8%	>30 vs <25
Halabi 2007		0.81	(0.68 to 0.97)	14.8%	36.9%	>30 vs <25
Efstathiou 2007	*	1.64	(1.01 to 2.66)	8.2%	5.0%	>30 vs <25
Fixed effect model	-	0.98	(0.88 to 1.09)		100.0%	
Random effects model	+	1.08	(0.89 to 1.31)	100.0%		
Prediction interval			(0.61 to 1.89)			
Heterogeneity: $I^2 = 54\%$, $\tau^2 = 0.06$, $p < 0.0$	1					
	0.1 0.512 10					

В

Study	Hazard Ratio	HR	95% CI	Heterogeneity (*100)
Omitting Martini 2021	<u> </u>	1.13	(0.94 to 1.37)	0.47
Omitting Jackson 2020		1.09	(0.89 to 1.32)	0.57
Omitting Troeschel 2020		- 1.05	(0.86 to 1.29)	0.50
Omitting Darcey 2019		- 1.04	(0.86 to 1.26)	0.52
Omitting Farris 2018		1.10	(0.89 to 1.36)	0.57
Omitting Dickerman 2017		1.09	(0.88 to 1.34)	0.57
Omitting Polesel 2015		- 1.05	(0.87 to 1.28)	0.54
Omitting Bonn 2014	i	1.07	(0.87 to 1.31)	0.56
Omitting Keto 2012		- 1.06	(0.88 to 1.28)	0.53
Omitting Geinitz 2011		<u> </u>	(0.88 to 1.31)	0.57
Omitting van Roermund 2010		1.07	(0.88 to 1.31)	0.57
Omitting Davies 2009		1.12	(0.91 to 1.39)	0.56
Omitting Halabi 2007		1.13	(0.92 to 1.39)	0.44
Omitting Efstathiou 2007		- 1.03	(0.85 to 1.25)	0.49
Random effects model		— 1.08 П	(0.89 to 1.31)	
Omitting Efstathiou 2007 Random effects model		- 1.03	(0.85 to 1.25) (0.89 to 1.31)	0.49



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.

Α

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.

	1				
Martini 2021		0.85	(0.74 to 0.98)	5.3%	3.9%
Xu 2020		0.70	(0.52 to 0.93)	2.8%	1.0%
Kashiwagi 2020		0.64	(0.38 to 1.08)	1.2%	0.3%
Stangl-Kremser 2020		0.77	(0.54 to 1.11)	2.1%	0.6%
Ikeda 2020		0.73	(0.51 to 1.07)	2.1%	0.6%
Abdel-Rahman 2019		0.89	(0.80 to 1.00)	5.9%	6.6%
Darcey 2019	<u> </u>	0.99	(0.81 to 1.22)	4.1%	1.9%
Vidal 2018	-	0.84	(0.78 to 0.91)	6.6%	14.3%
Farris 2018		0.96	(0.85 to 1.09)	5.6%	5.2%
Taborelli 2017	<u> </u>	1.02	(0.85 to 1.22)	4.6%	2.7%
Jeong 2015	-	1.16	(1.08 to 1.25)	6.6%	16.0%
Cantarutti 2015	+	1.01	(0.90 to 1.13)	5.9%	6.4%
Wang 2015		1.28	(1.11 to 1.47)	5.3%	4.1%
Bonn 2014		1.19	(1.00 to 1.42)	4.7%	2.7%
Froehner 2014		1.38	(1.09 to 1.75)	3.6%	1.5%
Smith 2011		0.95	(0.76 to 1.18)	3.9%	1.8%
van Roermund 2010	 }	1.01	(0.79 to 1.30)	3.4%	1.3%
Davies 2009	4	0.97	(0.88 to 1.08)	6.1%	7.8%
Armstrong 2009	+	1.03	(0.93 to 1.14)	6.1%	7.8%
Pfitzenmaier 2009	+	1.25	(0.90 to 1.73)	2.5%	0.8%
Efstathiou 2007	- }-	1.01	(0.88 to 1.16)	5.4%	4.2%
Siddiqui 2006	+	1.00	(0.90 to 1.11)	6.2%	8.4%
Fixed effect model		1.00	(0.97 to 1.03)		100.0%
Random effects model	4	0.99	(0.93 to 1.06)	100.0%	
Prediction interval			(0.77 to 1.29)		
Heterogeneity: $I^2 = 74\%$, $\tau^2 = 0.01$, $p < 0$	0.01 0.5 1 2				

Author Year	Hazard ratio	HR	95% Cl per 5 kg/m^2	Weight (random)	Weight (fixed)
Verma 2022 Jackson 2020 Troeschel 2020 Vidal 2018		0.75 0.90 1.08 0.88	(0.63 to 0.90) (0.65 to 1.25) (1.03 to 1.13) (0.80 to 0.98)	19.2% 11.9% 25.4% 23.3%	4.6% 1.4% 74.5% 13.9%
Cantarutti 2015	 	1.20	(1.02 to 1.40)	20.2%	5.6%
Fixed effect model Random effects model Prediction interval — Heterogeneity: $l^2 = 87\%$, $\tau^2 = 0.02$, $p < 0.01$		1.04 0.96	(1.00 to 1.08) (0.83 to 1.12) (0.56 to 1.65)	 100.0%	100.0%

В

Supplementary Figure 14 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by study design retrospective cohort versus prospective cohort.

			95% Cl per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
retrospective cohort					
Verma 2022	<u> </u>	0.75	(0.63 to 0.90)	5.4%	3.3%
Martini 2021	-+	0.85	(0.74 to 0.98)	6.1%	4.8%
Jackson 2020	,	0.90	(0.65 to 1.25)	2.8%	1.0%
Xu 2020		0.70	(0.52 to 0.93)	3.2%	1.2%
Kashiwagi 2020		0.64	(0.38 to 1.08)	1.4%	0.4%
Stangl-Kremser 2020		0.77	(0.54 to 1.11)	2.4%	0.8%
lkeda 2020		0.73	(0.51 to 1.07)	2.3%	0.7%
Abdel-Rahman 2019		0.89	(0.80 to 1.00)	6.9%	8.1%
Darcey 2019	<u> </u>	0.99	(0.81 to 1.22)	4.7%	2.4%
Vidal 2018	+	0.84	(0.78 to 0.91)	7.7%	17.6%
Taborelli 2017	_ 	1.02	(0.85 to 1.22)	5.3%	3.3%
Jeong 2015	-	1.16	(1.08 to 1.25)	7.8%	19.6%
Cantarutti 2015		1.01	(0.90 to 1.13)	6.8%	7.9%
Wang 2015	-+	1.28	(1.11 to 1.47)	6.1%	5.1%
Bonn 2014		1.19	(1.00 to 1.42)	5.4%	3.3%
Froehner 2014		1.38	(1.09 to 1.75)	4.1%	1.8%
Smith 2011	+_	0.95	(0.76 to 1.18)	4.4%	2.2%
van Roermund 2010		1.01	(0.79 to 1.30)	3.9%	1.6%
Armstrong 2009	+	1.03	(0.93 to 1.14)	7.1%	9.6%
Efstathiou 2007	<u> </u>	1.01	(0.88 to 1.16)	6.2%	5.2%
Fixed effect model	4	0.99	(0.96 to 1.02)		100.0%
Random effects model	-	0.97	(0.89 to 1.05)	100.0%	
Prediction interval			(0.70 to 1.33)		
Heterogeneity: I^2 = 79%, τ^2 = 0.02, p <	0.01				
prospective cohort					
Troeschel 2020	=	1.08	(1.03 to 1.13)	25.9%	66.4%
Farris 2018		0.96	(0.85 to 1.09)	20.5%	7.9%
Davies 2009		0.97	(0.88 to 1.08)	22.2%	11.8%
Pfitzenmaier 2009	++	1.25	(0.90 to 1.73)	8.8%	1.2%
Siddiqui 2006	-+-	1.00	(0.90 to 1.11)	22.5%	12.7%
Fixed effect model	•	1.05	(1.01 to 1.09)		100.0%
Random effects model	+	1.03	(0.96 to 1.09)	100.0%	
Prediction interval			(0.85 to 1.23)		
Heterogeneity: $I^2 = 47\%$, $\tau^2 = < 0.01$, p	= 0.11				
	0.5 1 2				

			95% Cl per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
More than median deaths	Í				
Verma 2022	_ 	0.75	(0.63 to 0.90)	6.6%	2.2%
Martini 2021	-+	0.85	(0.74 to 0.98)	7.4%	3.2%
Troeschel 2020		1.08	(1.03 to 1.13)	10.2%	35.5%
Vidal 2018	+	0.84	(0.78 to 0.91)	9.5%	11.6%
Farris 2018		0.96	(0.85 to 1.09)	8.0%	4.2%
Jeong 2015	+	1.16	(1.08 to 1.25)	9.6%	13.0%
Cantarutti 2015		1.01	(0.90 to 1.13)	8.4%	5.2%
Bonn 2014	+	1.19	(1.00 to 1.42)	6.6%	2.2%
Davies 2009		0.97	(0.88 to 1.08)	8.7%	6.3%
Armstrong 2009	-	1.03	(0.93 to 1.14)	8.7%	6.3%
Efstathiou 2007	<u> </u>	1.01	(0.88 to 1.16)	7.6%	3.4%
Siddiqui 2006	-	1.00	(0.90 to 1.11)	8.8%	6.8%
Fixed effect model	*	1.02	(0.99 to 1.05)		100.0%
Random effects model	+	0.99	(0.92 to 1.06)	100.0%	
Prediction interval			(0.77 to 1.27)		
Heterogeneity: $l^2 = 83\%$, $\tau^2 = 0.01$, $p < 0.01$					
Less than median deaths					
Jackson 2020		0.90	(0.65 to 1.25)	6.5%	4.7%
Xu 2020		0.70	(0.52 to 0.93)	7.4%	5.6%
Kashiwagi 2020 —		0.64	(0.38 to 1.08)	3.2%	1.8%
Stangl-Kremser 2020	+	0.77	(0.54 to 1.11)	5.5%	3.6%
lkeda 2020		0.73	(0.51 to 1.07)	5.3%	3.5%
Darcey 2019		0.99	(0.81 to 1.22)	10.7%	11.1%
Taborelli 2017		1.02	(0.85 to 1.22)	12.3%	15.3%
Wang 2015		1.28	(1.11 to 1.47)	14.1%	23.6%
Froehner 2014		1.38	(1.09 to 1.75)	9.4%	8.5%
Smith 2011		0.95	(0.76 to 1.18)	10.2%	10.1%
van Roermund 2010		1.01	(0.79 to 1.30)	8.9%	7.6%
Pfitzenmaier 2009	++	1.25	(0.90 to 1.73)	6.5%	4.6%
Fixed effect model	*	1.04	(0.97 to 1.12)		100.0%
Random effects model	+	0.98	(0.86 to 1.11)	100.0%	
Prediction interval			(0.65 to 1.49)		
Heterogeneity: $l^2 = 66\%$, $\tau^2 = 0.03$, $p < 0.01$					
	0.5 1 2				

Supplementary Figure 15 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments number of median deaths.

Supplementary Figure 16 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by method of anthropometry assessment.

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Measured	I				
Verma 2022	+	0.75	(0.63 to 0.90)	11.0%	7.2%
Martini 2021	_	0.85	(0.74 to 0.98)	12.4%	10.5%
Jackson 2020		0.90	(0.65 to 1.25)	5.8%	2.2%
Kashiwagi 2020		0.64	(0.38 to 1.08)	2.8%	0.8%
Farris 2018		0.96	(0.85 to 1.09)	13.4%	13.9%
Wang 2015		1.28	(1.11 to 1.47)	12.6%	10.9%
Armstrong 2009		1.23	(0.93 to 1.14)	14 5%	20.8%
Efstathiou 2007	<u> </u>	1.00	(0.88 to 1.14)	12.7%	11 3%
Siddiqui 2006		1.01	(0.00 to 1.10)	14 7%	22.3%
Fixed effect model	I	0.99	(0.94 to 1.03)	14.770	100.0%
Pandom offocts model	I	0.95	(0.97 to 1.05)	100.0%	100.0 %
Prodiction interval		0.50	(0.37 to 1.30)	100.070	
Hotorogeneity: $l^2 = 72\%$ $z^2 = 0.01$ $p < 0.01$			(0.70 (0 1.51)		
Heterogeneity: $T = 75\%$, $\tau = 0.01$, $p < 0.01$					
Medical_records					
Xu 2020	<u> </u>	0.70	(0.52 to 0.93)	7.0%	2.2%
Stangl-Kremser 2020		0.77	(0.54 to 1.11)	5.3%	1.4%
Ikeda 2020		0.73	(0.51 to 1.07)	5.1%	1.4%
Abdel-Rahman 2019		0.89	(0.80 to 1.00)	15.1%	14.9%
Vidal 2018	+	0.84	(0.78 to 0.91)	16.9%	32.2%
Jeong 2015	-	1.16	(1.08 to 1.25)	17.1%	35.9%
Froehner 2014	— 	1.38	(1.09 to 1.75)	9.0%	3.3%
Smith 2011	+	0.95	(0.76 to 1.18)	9.8%	3.9%
van Roermund 2010	_	1.01	(0.79 to 1.30)	8.5%	3.0%
Pfitzenmaier 2009	++	1.25	(0.90 to 1.73)	6.2%	1.8%
Fixed effect model		0.98	(0.94 to 1.02)		100.0%
Random effects model	-	0.96	(0.84 to 1.09)	100.0%	
Prediction interval			(0.62 to 1.49)		
Heterogeneity: $l^2 = 84\%$, $\tau^2 = 0.03$, $p < 0.01$					
Self-reported					
Troeschel 2020		1 08	(1.03 to 1.13)	22.0%	67 1%
Darcey 2019		0.99	(0.81 to 1.22)	12.0%	3.0%
Taborelli 2017	_ _	1 02	(0.85 to 1.22)	14.2%	4 1%
Cantarutti 2015		1.02	(0.90 to 1.13)	18.2%	9.8%
Bonn 2014		1.01	(0.00 to 1.10)	14.3%	4 1%
	`	0.97	(1.00 to 1.42)	18.9%	11 9%
Fixed effect model		1.06	(0.00 to 1.00)	10.370	100.0%
Random effects model		1.00	(1.02 to 1.10)	100 0%	.00.0 %
Prediction interval	Ĺ	1.05	(1.00 (0 1.10))	100.0%	
Heterogeneity: $l^2 = 220^4$, $z^2 = < 0.01$, $p = 0.27$			(0.34 (0 1.17)		
1 = 10000 = 100000 = 100000 = 100000 = 10000000 = 100000000	r1				
(0.5 1 2				

Supplementary Figure 17 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by median follow-up time 10 years.

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Less than 10 median years					
Verma 2022	→	0.75	(0.63 to 0.90)	6.2%	2.4%
Martini 2021	-+	0.85	(0.74 to 0.98)	7.0%	3.5%
Xu 2020		0.70	(0.52 to 0.93)	3.9%	0.9%
Kashiwagi 2020 —		0.64	(0.38 to 1.08)	1.7%	0.3%
Troeschel 2020	E	1.08	(1.03 to 1.13)	9.1%	39.0%
Stangl-Kremser 2020	+	0.77	(0.54 to 1.11)	3.0%	0.6%
Ikeda 2020		0.73	(0.51 to 1.07)	2.9%	0.5%
Abdel-Rahman 2019		0.89	(0.80 to 1.00)	7.8%	5.9%
Vidal 2018	+	0.84	(0.78 to 0.91)	8.6%	12.7%
Jeong 2015	+	1.16	(1.08 to 1.25)	8.6%	14.2%
Wang 2015	-+	1.28	(1.11 to 1.47)	7.0%	3.7%
Bonn 2014	-+	1.19	(1.00 to 1.42)	6.2%	2.4%
Froehner 2014		1.38	(1.09 to 1.75)	4.9%	1.3%
van Roermund 2010		1.01	(0.79 to 1.30)	4.6%	1.2%
Davies 2009	-	0.97	(0.88 to 1.08)	8.0%	6.9%
Pfitzenmaier 2009	- +	1.25	(0.90 to 1.73)	3.5%	0.7%
Efstathiou 2007	<u> </u>	1.01	(0.88 to 1.16)	7.1%	3.8%
Fixed effect model	•	1.02	(0.99 to 1.05)		100.0%
Random effects model	+	0.98	(0.90 to 1.06)	100.0%	
Prediction interval			(0.71 to 1.35)		
Heterogeneity: $l^2 = 84\%$, $\tau^2 = 0.02$, $p < 0.01$					
More than 10 median years					
Jackson 2020	+	0.90	(0.65 to 1.25)	11.4%	4.3%
Darcey 2019	-+	0.99	(0.81 to 1.22)	17.9%	10.1%
Farris 2018	-	0.96	(0.85 to 1.09)	24.2%	27.5%
Taborelli 2017	- 	1.02	(0.85 to 1.22)	20.2%	14.0%
Siddiqui 2006	+	1.00	(0.90 to 1.11)	26.3%	44.1%
Fixed effect model	+	0.99	(0.92 to 1.06)		100.0%
Random effects model	+	0.99	(0.92 to 1.06)	100.0%	
Prediction interval	+		(0.89 to 1.10)		
Heterogeneity: $l^2 = 0\%$, $\tau^2 = 0$, $p = 0.96$					
	0.5 1 2				

Supplementary Figure 18 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by geographic location of study.

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Multinational					
Verma 2022		0.75	(0.63 to 0.90)	18.0%	11.9%
Martini 2021		0.85	(0.74 to 0.98)	20.3%	17.3%
Abdel-Rahman 2019	-	0.89	(0.80 to 1.00)	23.1%	29.0%
Smith 2011		0.95	(0.76 to 1.18)	14.9%	7.7%
Armstrong 2009	-	1.03	(0.93 to 1.14)	23.8%	34.2%
Fixed effect model	•	0.91	(0.86 to 0.97)		100.0%
Random effects model	•	0.90	(0.81 to 1.00)	100.0%	
Prediction interval			(0.63 to 1.27)		
Heterogeneity: $I^2 = 64\%$, $\tau^2 = < 0.01$, $p = 0.02$					
North America_Caribbean					
Jackson 2020		0.90	(0.65 to 1.25)	4.5%	0.8%
Xu 2020		0.70	(0.52 to 0.93)	5.1%	0.9%
Troeschel 2020	*	1.08	(1.03 to 1.13)	13.1%	41.5%
Vidal 2018	-#-	0.84	(0.78 to 0.91)	12.2%	13.6%
Farris 2018		0.96	(0.85 to 1.09)	10.4%	4.9%
Jeong 2015	-	1.16	(1.08 to 1.25)	12.4%	15.1%
Wang 2015		1.28	(1.11 to 1.47)	9.8%	3.9%
Davies 2009		0.97	(0.88 to 1.08)	11.3%	7.4%
Efstathiou 2007	_ 	1.01	(0.88 to 1.16)	9.8%	4.0%
Siddiqui 2006	+	1.00	(0.90 to 1.11)	11.4%	7.9%
Fixed effect model	٠	1.03	(1.01 to 1.06)		100.0%
Random effects model	+	1.00	(0.92 to 1.09)	100.0%	
Prediction interval			(0.75 to 1.33)		
Heterogeneity: $I^2 = 85\%$, $\tau^2 = 0.01$, $p < 0.01$					
East Asia					
Kashiwagi 2020 —		0.64	(0.38 to 1.08)	37.2%	34.0%
Ikeda 2020		0.73	(0.51 to 1.07)	62.8%	66.0%
Fixed effect model		0.70	(0.52 to 0.95)		100.0%
Random effects model		0.70	(0.52 to 0.95)	100.0%	
Prediction interval					
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.68$					
Furana					
Europe Stangl-Kromoor 2020		0.77	$(0.54 \pm 0.1.11)$	7 9%	3 0%
Stangi-Kremser 2020		0.77	(0.54 to 1.11)	1.8%	3.9%
		1.02	(0.05 to 1.22)	17.470	10.0%
Cantarutti 2015	Τ.	1.01	(0.90 to 1.13)	22.3%	40.0%
Bohn 2014		1.19	(1.00 to 1.42)	17.5%	10.9%
Froenner 2014		1.38	(1.09 to 1.75)	13.3%	9.3%
van Roermund 2010		1.01	(0.79 to 1.30)	12.6%	8.3%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	9.2%	5.0%
Fixed effect model	•	1.07	(1.00 to 1.15)		100.0%
Random effects model	-	1.08	(0.97 to 1.21)	100.0%	
Prediction interval			(0.81 to 1.44)		
Heterogeneity: $I^2 = 46\%$, $\tau^2 = < 0.01$, $p = 0.08$					
Oceania					
Darcey 2019		0 00	(0.81 to 1.22)	100.0%	100.0%
Fixed effect model	Ţ	0.00	(0.01 (0 1.22)		100.0%
Pandom effects model		0.99	(0.81 to 1.22)	100.0%	
Prediction interval		0.99	(0.01 (0 1.22)	100.0 /0	
Heterogeneity: not annlieghte					
notorogonoity, not applicable					
	0.5 1 2				

Supplementary Figure 19 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by geographic location of study among the studies in "group 4" (advanced/metastatic).

			95% Cl per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Aggressive/Advanced PCa in group = Multinational					
Verma 2022		0.75	(0.63 to 0.90)	17.2%	11.9%
Martini 2021		0.85	(0.74 to 0.98)	20.2%	17.3%
Abdel-Rahman 2019		0.89	(0.80 to 1.00)	23.9%	29.0%
Smith 2011		0.95	(0.76 to 1.18)	13.7%	7.7%
Armstrong 2009		1.03	(0.93 to 1.14)	24.9%	34.2%
Fixed effect model	•	0.91	(0.86 to 0.97)		100.0%
Random effects model	-	0.90	(0.81 to 1.00)	100.0%	
Prediction interval			(0.63 to 1.27)		
Heterogeneity: I^2 = 64%, τ^2 = < 0.01, p = 0.02					
A	Caribbaan				
Aggressive/Advanced PCa in group = North America	_Caribbean	0.70	(0.50 to 0.00)	0.00/	2.00/
Au 2020		0.70	(0.52 to 0.93)	8.8%	2.9%
Videl 2018	-	1.05	$(0.95 \ to \ 1.15)$	24.3%	20.0%
	_	0.04	(0.78 to 0.91)	20.4%	42.3%
Faills 2010		0.96	(0.85 to 1.09)	21.0%	10.0%
Eistatilliou 2007		0.03	(0.88 to 0.98)	19.076	100.0%
Pixed effects model		0.93	(0.88 to 0.98)	100.0%	100.0%
Prediction interval		0.93	(0.83 to 1.04)	100.0%	
Hotoropointy $l^2 = 770(-2^2 = 0.01)$ m < 0.01			(0.03 10 1.38)		
Heterogeneity: $I = II\%$, $\tau = 0.01$, $p < 0.01$					
Aggressive/Advanced PCa in group = East Asia					
Kashiwagi 2020 —		0.64	(0.38 to 1.08)	36.3%	34.0%
Ikeda 2020		0.73	(0.51 to 1.07)	63.7%	66.0%
Fixed effect model		0.70	(0.52 to 0.95)		100.0%
Random effects model		0.70	(0.52 to 0.95)	100.0%	
Prediction interval					
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.68$					
Aggressive/Advanced PCa in group = Europe					
Standl-Kremser 2020		0 77	(0.54 to 1 11)	100 0%	100 0%
Fixed effect model		0.77	(0.54 to 1.11)		100.0%
Random effects model		0.77	(0.54 to 1.11)	100.0%	
Prediction interval			(
Heterogeneity: not applicable					
• ·····					
	0.5 1 2				

Supplementary Figure 20 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² 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.

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
	1				
Group four					
Verma 2022		0.75	(0.63 to 0.90)	7.9%	4.7%
Martini 2021		0.85	(0.74 to 0.98)	9.1%	6.8%
Xu 2020		0.70	(0.52 to 0.93)	4.5%	1.7%
Kashiwagi 2020		0.64	(0.38 to 1.08)	1.8%	0.5%
Iroeschel_high risk 2020		1.05	(0.95 to 1.15)	11.2%	15.4%
Stangi-Kremser 2020		0.77	(0.54 to 1.11)	3.3%	1.1%
Ikeda 2020		0.73	(0.51 to 1.07)	3.2%	1.0%
Abdel-Ranman 2019		0.89	(0.80 to 1.00)	10.5%	11.4%
Vidal 2018	*	0.84	(0.78 to 0.91)	12.0%	24.7%
Family 2018		0.90	(0.85 to 1.09)	9.9%	9.0%
American 2000		0.95	(0.76 to 1.18)	0.4%	3.0%
Efetethicu 2007		1.03	(0.93 to 1.14)	0.2%	13.4%
Eistathiou 2007		1.01	(0.88 to 1.16)	9.3%	1.3%
Pixed effect model	•	0.92	(0.88 to 0.95)	400.0%	100.0%
Random effects model	•	0.90	(0.84 to 0.96)	100.0%	
			(0.72 to 1.12)		
Heterogeneity: $T = 65\%$, $\tau = < 0.01$, $p < 0.01$					
Group three					
Jackson 2020		0.90	(0.65 to 1.25)	4.7%	0.9%
Troeschel 2020	-	1.08	(1.03 to 1.13)	15.7%	50.3%
Jeong 2015	+	1.16	(1.08 to 1.25)	14.6%	18.3%
Wang 2015		1.28	(1.11 to 1.47)	11.0%	4.7%
Bonn 2014	—	1.19	(1.00 to 1.42)	9.4%	3.1%
Froehner 2014		1.38	(1.09 to 1.75)	7.0%	1.7%
van Roermund 2010		1.01	(0.79 to 1.30)	6.5%	1.5%
Davies 2009	-	0.97	(0.88 to 1.08)	13.1%	8.9%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	4.7%	0.9%
Siddiaui 2006	+	1.00	(0.90 to 1.11)	13.3%	9.6%
Fixed effect model	*	1.09	(1.06 to 1.13)		100.0%
Random effects model	*	1.10	(1.03 to 1.17)	100.0%	
Prediction interval			(0.92 to 1.31)		
Heterogeneity: $I^2 = 60\%$, $\tau^2 = < 0.01$, $p < 0.01$			(
Group one					
Troeschel_low risk 2020		1.10	(1.04 to 1.15)	100.0%	100.0%
Fixed effect model	*	1.10	(1.04 to 1.15)		100.0%
Random effects model	*	1.10	(1.04 to 1.15)	100.0%	
Prediction interval					
Heterogeneity: not applicable					
Group two					
Darcey 2019		0.00	(0.91 to 1.22)	26.0%	17 504
Taborelli 2017	1	1.00	(0.01 to 1.22)	20.8% 21.20/	0/ 00/
		1.02	(0.00 to 1.22)	31.3% 11.00/	24.2%
Canaluli 2013	I	1.01		41.8%	100.0%
Fixeu effect model	I	1.01	(0.92 to 1.10)	100.0%	100.0%
Ranuom enecis model	T	1.01	(0.52 to 1.10)	100.0%	
Prediction interval			(0.57 to 1.78)		
$\tau = 0.98$	r1				
0	.5 1 2				

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).

Author Year	Hazard ratio	HR	95% Cl per 5 kg/m^2	Weight (random)	Weight (fixed)
Kashiwagi 2020	+ <u>i</u>	0.64	(0.38 to 1.08)	1.7%	0.3%
Troeschel 2020	ļa —	1.08	(1.03 to 1.13)	10.2%	39.5%
Ikeda 2020		0.73	(0.51 to 1.07)	2.9%	0.5%
Vidal 2018		0.84	(0.78 to 0.91)	9.5%	12.9%
Farris 2018		0.96	(0.85 to 1.09)	8.1%	4.7%
Jeong 2015	-	1.16	(1.08 to 1.25)	9.6%	14.4%
Cantarutti 2015	- <u>4</u>	1.01	(0.90 to 1.13)	8.5%	5.8%
Wang 2015	!	1.28	(1.11 to 1.47)	7.6%	3.7%
Bonn 2014	<u>;</u>	1.19	(1.00 to 1.42)	6.6%	2.4%
Froehner 2014	<u>i</u> ,	1.38	(1.09 to 1.75)	5.1%	1.3%
Smith 2011		0.95	(0.76 to 1.18)	5.5%	1.6%
van Roermund 2010		1.01	(0.79 to 1.30)	4.8%	1.2%
Davies 2009		0.97	(0.88 to 1.08)	8.8%	7.0%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	3.5%	0.7%
Efstathiou 2007		1.01	(0.88 to 1.16)	7.7%	3.8%
Fixed effect model	3	1.04	(1.02 to 1.07)		100.0%
Random effects model	÷	1.04	(0.96 to 1.12)	100.0%	
Prediction interval			(0.80 to 1.35)		
Heterogeneity: I^2 = 79%, τ^2 = 0.01, ρ < 0	0.01				
	0.5 1 2				

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).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Verma 2022	_ +	0.75	(0.63 to 0.90)	4.8%	2.0%
Martini 2021		0.85	(0.74 to 0.98)	5.5%	2.9%
Jackson 2020		0.90	(0.65 to 1.25)	2.5%	0.6%
Kashiwagi 2020	+	0.64	(0.38 to 1.08)	1.2%	0.2%
Troeschel 2020	+	1.08	(1.03 to 1.13)	7.5%	32.7%
Stangl-Kremser 2020	+ <u>i</u> -	0.77	(0.54 to 1.11)	2.1%	0.5%
Abdel-Rahman 2019		0.89	(0.80 to 1.00)	6.3%	4.9%
Vidal 2018	-	0.84	(0.78 to 0.91)	7.0%	10.7%
Farris 2018		0.96	(0.85 to 1.09)	5.9%	3.9%
Taborelli 2017		1.02	(0.85 to 1.22)	4.8%	2.0%
Jeong 2015	-	1.16	(1.08 to 1.25)	7.1%	11.9%
Cantarutti 2015		1.01	(0.90 to 1.13)	6.2%	4.8%
Wang 2015		1.28	(1.11 to 1.47)	5.6%	3.1%
Bonn 2014		1.19	(1.00 to 1.42)	4.8%	2.0%
Smith 2011		0.95	(0.76 to 1.18)	4.0%	1.3%
van Roermund 2010		1.01	(0.79 to 1.30)	3.5%	1.0%
Davies 2009		0.97	(0.88 to 1.08)	6.4%	5.8%
Armstrong 2009	-	1.03	(0.93 to 1.14)	6.4%	5.8%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	2.5%	0.6%
Efstathiou 2007		1.01	(0.88 to 1.16)	5.6%	3.2%
Fixed effect model		1.02	(0.99 to 1.04)		100.0%
Random effects model	+	0.99	(0.93 to 1.05)	100.0%	
Prediction interval	<u> </u>		(0.77 to 1.27)		
Heterogeneity: I^2 = 78%, τ^2 = 0.01, $p < 0.0^{-1}$					
	0.5 1 2				

Author Year	Hazard ratio	HR	95% Cl per 5 kg/m^2	Weight (random)	Weight (fixed)
Kashiwagi 2020 —	1	0.64	(0.38 to 1.08)	1.7%	0.3%
Troeschel 2020	+	1.08	(1.03 to 1.13)	11.4%	40.3%
Vidal 2018		0.84	(0.78 to 0.91)	10.5%	13.2%
Farris 2018		0.96	(0.85 to 1.09)	8.8%	4.8%
Jeong 2015		1.16	(1.08 to 1.25)	10.7%	14.7%
Cantarutti 2015		1.01	(0.90 to 1.13)	9.2%	5.9%
Wang 2015		1.28	(1.11 to 1.47)	8.2%	3.8%
Bonn 2014	/ 1 1	1.19	(1.00 to 1.42)	7.1%	2.5%
Smith 2011		0.95	(0.76 to 1.18)	5.8%	1.6%
van Roermund 2010	<u> </u>	1.01	(0.79 to 1.30)	5.0%	1.2%
Davies 2009		0.97	(0.88 to 1.08)	9.6%	7.2%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	3.6%	0.7%
Efstathiou 2007		1.01	(0.88 to 1.16)	8.3%	3.9%
Fixed effect model	i •	1.04	(1.01 to 1.07)		100.0%
Random effects model	-	1.03	(0.96 to 1.11)	100.0%	
Prediction interval			(0.80 to 1.33)		
Heterogeneity: $I^2 = 80\%$, $\tau^2 = 0.01$, $p < 0.01$					
	0.5 1 2				

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.

			95% Cl per	Weight	Weight	
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)	
Troeschel 2020	ė.	1.08	(1.03 to 1.13)	53.8%	84.7%	
Farris 2018		0.96	(0.85 to 1.09)	27.8%	10.1%	
Bonn 2014	9 9 9 9	1.19	(1.00 to 1.42)	18.4%	5.2%	
Fixed effect model	1 1	1.07	(1.03 to 1.12)		100.0%	
Random effects model	-	1.07	(0.97 to 1.17)	100.0%		
Prediction interval		-	(0.41 to 2.74)			
Heterogeneity: $I^2 = 52\%$, $\tau^2 < 0.01$, $p = 0.1$	2					
	0.5 1 2					

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).

					95% CI per	Weight	Weight
Author Year	Haz	ard rati	0	HR	5 kg/m^2	(random)	(fixed)
Farris 2018				0.96	(0.85 to 1.09)	54.4%	65.9%
Bonn 2014			-	1.19	(1.00 to 1.42)	45.6%	34.1%
Fixed effect model			-	1.04	(0.93 to 1.15)		100.0%
Random effects model				1.06	(0.86 to 1.31)	100.0%	
Heterogeneity: $I^2 = 73\%$, $\tau^2 = 0.02$, $p = 0.06$	I	I	I				
	0.8	1	1.25				

Supplementary Figure 26 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for age (yes vs no).

			95% Cl per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies accounted for age = yes					
Verma 2022	— —	0.75	(0.63 to 0.90)	4.6%	2.1%
Martini 2021		0.85	(0.74 to 0.98)	5.2%	3.0%
Jackson 2020		0.90	(0.65 to 1.25)	2.4%	0.6%
Xu 2020		0.70	(0.52 to 0.93)	2.7%	0.7%
Kashiwagi 2020 —		0.64	(0.38 to 1.08)	1.2%	0.2%
Troeschel 2020	±	1.08	(1.03 to 1.13)	7.0%	33.4%
Stangl-Kremser 2020		0.77	(0.54 to 1.11)	2.0%	0.5%
Ikeda 2020		0.73	(0.51 to 1.07)	2.0%	0.5%
Abdel-Rahman 2019	-+	0.89	(0.80 to 1.00)	5.9%	5.0%
Darcey 2019	<u> </u>	0.99	(0.81 to 1.22)	4.0%	1.5%
Vidal 2018	+	0.84	(0.78 to 0.91)	6.6%	10.9%
Farris 2018		0.96	(0.85 to 1.09)	5.6%	4.0%
Taborelli 2017	<u> </u>	1.02	(0.85 to 1.22)	4.5%	2.0%
Jeong 2015	+	1.16	(1.08 to 1.25)	6.6%	12.2%
Cantarutti 2015	+	1.01	(0.90 to 1.13)	5.8%	4.9%
Wang 2015		1.28	(1.11 to 1.47)	5.2%	3.1%
Bonn 2014		1.19	(1.00 to 1.42)	4.6%	2.1%
Froehner 2014	— —	1.38	(1.09 to 1.75)	3.5%	1.1%
Smith 2011	+	0.95	(0.76 to 1.18)	3.8%	1.3%
van Roermund 2010	_	1.01	(0.79 to 1.30)	3.3%	1.0%
Davies 2009		0.97	(0.88 to 1.08)	6.0%	5.9%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	2.4%	0.6%
Efstathiou 2007	+	1.01	(0.88 to 1.16)	5.3%	3.2%
Fixed effect model	*	1.02	(0.99 to 1.04)		100.0%
Random effects model		0.98	(0.92 to 1.05)	100.0%	
Prediction interval			(0.75 to 1.28)		
Heterogeneity: $l^2 = 79\%$, $\tau^2 = 0.02$, $p < 0.01$					
Studies accounted for age = no					
Armstrong 2009	+	1.03	(0.93 to 1.14)	49.7%	48.2%
Siddiqui 2006	+	1.00	(0.90 to 1.11)	50.3%	51.8%
Fixed effect model	+	1.02	(0.94 to 1.09)		100.0%
Random effects model	+	1.02	(0.94 to 1.09)	100.0%	
Prediction interval					
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.67$					
	0.5 1 2				

Supplementary Figure 27 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for stage (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies accounted for stage = yes					
Verma 2022	+	0.75	(0.63 to 0.90)	4.8%	2.0%
Martini 2021		0.85	(0.74 to 0.98)	5.4%	2.9%
Xu 2020		0.70	(0.52 to 0.93)	2.9%	0.7%
Kashiwagi 2020 -		0.64	(0.38 to 1.08)	1.2%	0.2%
Troeschel 2020	+	1.08	(1.03 to 1.13)	7.4%	32.8%
Stangl-Kremser 2020	_	0.77	(0.54 to 1.11)	2.1%	0.5%
Ikeda 2020		0.73	(0.51 to 1.07)	2.1%	0.5%
Abdel-Rahman 2019		0.89	(0.80 to 1.00)	6.2%	5.0%
Vidal 2018		0.84	(0.78 to 0.91)	6.9%	10.7%
Farris 2018	-+	0.96	(0.85 to 1.09)	5.8%	3.9%
Jeong 2015	+	1.16	(1.08 to 1.25)	7.0%	12.0%
Cantarutti 2015	<u> </u>	1.01	(0.90 to 1.13)	6.1%	4.8%
Wang 2015		1.28	(1.11 to 1.47)	5.5%	3.1%
Bonn 2014	-+	1.19	(1.00 to 1.42)	4.8%	2.0%
Froehner 2014		1.38	(1.09 to 1.75)	3.7%	1.1%
Smith 2011		0.95	(0.76 to 1.18)	4.0%	1.3%
van Roermund 2010		1.01	(0.79 to 1.30)	3.4%	1.0%
Davies 2009		0.97	(0.88 to 1.08)	6.3%	5.8%
Armstrong 2009		1.03	(0.93 to 1.14)	6.3%	5.8%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	2.5%	0.6%
Efstathiou 2007		1.01	(0.88 to 1.16)	5.5%	3.2%
Fixed effect model	*	1.02	(0.99 to 1.04)		100.0%
Random effects model	+	0.98	(0.92 to 1.05)	100.0%	
Prediction interval			(0.75 to 1.29)		
Heterogeneity: $l^2 = 80\%$, $\tau^2 = 0.02$, $p < 0.01$					
Studies accounted for stage = no					
Jackson 2020		0.90	(0.65 to 1.25)	14.2%	5.9%
Darcey 2019		0.99	(0.81 to 1.22)	23.3%	14.0%
Taborelli 2017		1.02	(0.85 to 1.22)	26.6%	19.3%
Siddiqui 2006	+	1.00	(0.90 to 1.11)	35.9%	60.8%
Fixed effect model	+	1.00	(0.92 to 1.08)		100.0%
Random effects model	+	1.00	(0.92 to 1.08)	100.0%	
Prediction interval			(0.84 to 1.18)		
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.93$					
	0.5 1 2				

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).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies accounted for Gleason score	e/grade = no				
Verma 2022		0.75	(0.63 to 0.90)	22.4%	18.3%
Martini 2021		0.85	(0.74 to 0.98)	25.4%	26.5%
Xu 2020	-	0.70	(0.52 to 0.93)	13.4%	6.5%
Stangl-Kremser 2020		0.77	(0.54 to 1.11)	10.0%	4.2%
Abdel-Rahman 2019	-	0.89	(0.80 to 1.00)	28.8%	44.5%
Fixed effect model	•	0.83	(0.77 to 0.90)		100.0%
Random effects model	•	0.83	(0.77 to 0.90)	100.0%	
Prediction interval	—		(0.71 to 0.97)		
Heterogeneity: $l^2 = 7\%$, $\tau^2 = < 0.01$, $p = 0.36$	5				
Studies accounted for Gleason score	e/grade = yes				
Jackson 2020	— • _	0.90	(0.65 to 1.25)	2.6%	0.6%
Kashiwagi 2020 -		0.64	(0.38 to 1.08)	1.3%	0.2%
Troeschel 2020		1.08	(1.03 to 1.13)	7.7%	33.1%
lkeda 2020		0.73	(0.51 to 1.07)	2.1%	0.5%
Darcey 2019	<u> </u>	0.99	(0.81 to 1.22)	4.3%	1.5%
Vidal 2018	+	0.84	(0.78 to 0.91)	7.1%	10.8%
Farris 2018	-+-	0.96	(0.85 to 1.09)	6.1%	3.9%
Taborelli 2017		1.02	(0.85 to 1.22)	4.9%	2.0%
Jeong 2015	+	1.16	(1.08 to 1.25)	7.2%	12.1%
Cantarutti 2015	+	1.01	(0.90 to 1.13)	6.3%	4.8%
Wang 2015	-+-	1.28	(1.11 to 1.47)	5.7%	3.1%
Bonn 2014	 +	1.19	(1.00 to 1.42)	5.0%	2.0%
Froehner 2014	—+—	1.38	(1.09 to 1.75)	3.8%	1.1%
Smith 2011	+	0.95	(0.76 to 1.18)	4.1%	1.3%
van Roermund 2010		1.01	(0.79 to 1.30)	3.6%	1.0%
Davies 2009	-+-	0.97	(0.88 to 1.08)	6.6%	5.9%
Armstrong 2009		1.03	(0.93 to 1.14)	6.6%	5.9%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	2.6%	0.6%
Efstathiou 2007	+	1.01	(0.88 to 1.16)	5.7%	3.2%
Siddiqui 2006	+	1.00	(0.90 to 1.11)	6.7%	6.3%
Fixed effect model	•	1.04	(1.01 to 1.06)		100.0%
Random effects model	*	1.03	(0.97 to 1.09)	100.0%	
Prediction interval			(0.83 to 1.28)		
Heterogeneity: $l^2 = 73\%$, $\tau^2 = < 0.01$, $p < 0.0$	01				
	0.5 1 2				

Supplementary Figure 29 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for treatments (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies accounted for any Treatment/s =	= yes				
Verma 2022	_ -	0.75	(0.63 to 0.90)	4.6%	1.9%
Martini 2021		0.85	(0.74 to 0.98)	5.2%	2.8%
Jackson 2020	— • •	0.90	(0.65 to 1.25)	2.4%	0.6%
Kashiwagi 2020 —		0.64	(0.38 to 1.08)	1.2%	0.2%
Troeschel 2020	+	1.08	(1.03 to 1.13)	7.0%	30.8%
lkeda 2020		0.73	(0.51 to 1.07)	2.0%	0.4%
Abdel-Rahman 2019		0.89	(0.80 to 1.00)	5.9%	4.6%
Vidal 2018	-	0.84	(0.78 to 0.91)	6.6%	10.1%
Farris 2018		0.96	(0.85 to 1.09)	5.6%	3.7%
Taborelli 2017	+_ _	1.02	(0.85 to 1.22)	4.5%	1.9%
Jeong 2015	-	1.16	(1.08 to 1.25)	6.6%	11.2%
Cantarutti 2015	+	1.01	(0.90 to 1.13)	5.8%	4.5%
Wang 2015	-+	1.28	(1.11 to 1.47)	5.2%	2.9%
Bonn 2014	-+	1.19	(1.00 to 1.42)	4.6%	1.9%
Smith 2011		0.95	(0.76 to 1.18)	3.8%	1.2%
van Roermund 2010		1.01	(0.79 to 1.30)	3.3%	0.9%
Davies 2009		0.97	(0.88 to 1.08)	6.0%	5.5%
Armstrong 2009		1.03	(0.93 to 1.14)	6.0%	5.5%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	2.4%	0.6%
Efstathiou 2007	- -	1.01	(0.88 to 1.16)	5.3%	3.0%
Siddiqui 2006	+	1.00	(0.90 to 1.11)	6.1%	5.9%
Fixed effect model	•	1.02	(0.99 to 1.04)		100.0%
Random effects model		0.99	(0.93 to 1.05)	100.0%	
Prediction interval			(0.78 to 1.25)		
Heterogeneity: $l^2 = 77\%$, $\tau^2 = 0.01$, $p < 0.01$					
Studies accounted for any Treatment/s =	= no				
Xu 2020		0.70	(0.52 to 0.93)	22.3%	19.3%
Stangl-Kremser 2020		0.77	(0.54 to 1.11)	16.7%	12.5%
Darcey 2019		0.99	(0.81 to 1.22)	32.5%	38.5%
Froehner 2014		1.38	(1.09 to 1.75)	28.6%	29.6%
Fixed effect model	-	0.99	(0.87 to 1.13)		100.0%
Random effects model		0.94	(0.70 to 1.27)	100.0%	
Prediction interval			(0.25 to 3.55)		
Heterogeneity: l^2 = 80%, τ^2 = 0.07, p < 0.01					
<u>^</u>					
0	.5 1 2				

Supplementary Figure 30 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for smoking (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies accounted for smoking = no					
Verma 2022	<u> </u>	0.75	(0.63 to 0.90)	5.1%	2.9%
Martini 2021	_+_	0.85	(0.74 to 0.98)	5.8%	4.2%
Xu 2020	+	0.70	(0.52 to 0.93)	3.1%	1.0%
Kashiwagi 2020 —		0.64	(0.38 to 1.08)	1.3%	0.3%
Stangl-Kremser 2020		0.77	(0.54 to 1.11)	2.3%	0.7%
lkeda 2020		0.73	(0.51 to 1.07)	2.2%	0.6%
Abdel-Rahman 2019	-+	0.89	(0.80 to 1.00)	6.6%	7.1%
Vidal 2018	+	0.84	(0.78 to 0.91)	7.4%	15.4%
Taborelli 2017	<u> </u>	1.02	(0.85 to 1.22)	5.1%	2.9%
Jeong 2015	+	1.16	(1.08 to 1.25)	7.5%	17.2%
Cantarutti 2015	+	1.01	(0.90 to 1.13)	6.6%	6.9%
Wang 2015		1.28	(1.11 to 1.47)	5.9%	4.4%
Froehner 2014	—+—	1.38	(1.09 to 1.75)	3.9%	1.6%
Smith 2011	+	0.95	(0.76 to 1.18)	4.3%	1.9%
van Roermund 2010		1.01	(0.79 to 1.30)	3.7%	1.4%
Davies 2009		0.97	(0.88 to 1.08)	6.8%	8.4%
Armstrong 2009	+	1.03	(0.93 to 1.14)	6.8%	8.4%
Pfitzenmaier 2009	- 	1.25	(0.90 to 1.73)	2.7%	0.9%
Efstathiou 2007	+	1.01	(0.88 to 1.16)	5.9%	4.6%
Siddiqui 2006	+	1.00	(0.90 to 1.11)	6.9%	9.0%
Fixed effect model	4	0.99	(0.96 to 1.02)		100.0%
Random effects model	-	0.97	(0.90 to 1.04)	100.0%	
Prediction interval			(0.73 to 1.29)		
Heterogeneity: I^2 = 78%, τ^2 = 0.02, p < 0.01					
Studies accounted for smoking = yes					
Jackson 2020	+	0.90	(0.65 to 1.25)	10.3%	1.5%
Troeschel 2020		1.08	(1.03 to 1.13)	29.9%	80.4%
Darcey 2019	<u> </u>	0.99	(0.81 to 1.22)	16.8%	3.5%
Farris 2018		0.96	(0.85 to 1.09)	23.6%	9.6%
Bonn 2014	 +	1.19	(1.00 to 1.42)	19.4%	5.0%
Fixed effect model	•	1.07	(1.03 to 1.11)		100.0%
Random effects model	•	1.05	(0.98 to 1.13)	100.0%	
Prediction interval	+		(0.87 to 1.27)		
Heterogeneity: $l^2 = 31\%$, $\tau^2 = < 0.01$, $p = 0.22$					
	0.5 1 2				

Supplementary Figure 31 Summary hazard ratio estimate (95% CI) of all-cause mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for PSA test/PSA levels (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
	1				
Studies accounted for PSA test/PSA levels (as proxy)	= yes				
Verma 2022		0.75	(0.63 to 0.90)	5.8%	3.2%
Martini 2021		0.85	(0.74 to 0.98)	6.6%	4.6%
Kashiwagi 2020 ——	-+	0.64	(0.38 to 1.08)	1.5%	0.4%
Ikeda 2020		0.73	(0.51 to 1.07)	2.5%	0.7%
Abdel-Rahman 2019	-+	0.89	(0.80 to 1.00)	7.5%	7.7%
Vidal 2018	+	0.84	(0.78 to 0.91)	8.4%	16.7%
Farris 2018	-+	0.96	(0.85 to 1.09)	7.1%	6.1%
Jeong 2015	-#-	1.16	(1.08 to 1.25)	8.5%	18.6%
Wang 2015	-+	1.28	(1.11 to 1.47)	6.7%	4.8%
Bonn 2014	-+	1.19	(1.00 to 1.42)	5.8%	3.2%
Froehner 2014		1.38	(1.09 to 1.75)	4.4%	1.7%
Smith 2011	+	0.95	(0.76 to 1.18)	4.8%	2.0%
van Roermund 2010		1.01	(0.79 to 1.30)	4.2%	1.5%
Davies 2009		0.97	(0.88 to 1.08)	7.7%	9.1%
Armstrong 2009		1.03	(0.93 to 1.14)	7.7%	9.1%
Pfitzenmaier 2009		1.25	(0.90 to 1.73)	3.1%	0.9%
Siddiqui 2006	-	1.00	(0.90 to 1.11)	7.8%	9.8%
Fixed effect model		0.99	(0.96 to 1.02)		100.0%
Random effects model	+	0.99	(0.92 to 1.07)	100.0%	
Prediction interval			(0.73 to 1.35)		
Heterogeneity: $l^2 = 81\%$, $\tau^2 = 0.02$, $p < 0.01$			· · ·		
Studies accounted for PSA test/PSA levels (as proxy)	= no				
Jackson 2020		0.90	(0.65 to 1.25)	7.2%	1.3%
Xu 2020		0.70	(0.52 to 0.93)	8.0%	1.6%
Troeschel 2020	+	1.08	(1.03 to 1.13)	20.8%	71.3%
Stangl-Kremser 2020		0.77	(0.54 to 1.11)	6.0%	1.0%
Darcev 2019		0.99	(0.81 to 1.22)	11.7%	3.1%
Taborelli 2017	_ _	1.02	(0.85 to 1.22)	13.4%	4.3%
Cantarutti 2015	_	1.01	(0.90 to 1.13)	17.2%	10.4%
Efstathiou 2007		1.01	(0.88 to 1.16)	15.6%	6.9%
Fixed effect model	•	1.05	(1.01 to 1.09)		100.0%
Random effects model	4	0.99	(0.92 to 1.07)	100.0%	
Prediction interval			(0.81 to 1.21)		
Heterogeneity: $l^2 = 49\% \tau^2 = <0.01 \ p = 0.05$			(
[
0.	5 1 2				
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/m² BMI increments for A) studies that included underweight groups and B) studies that excluded the underweight groups. **A**

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Martini 2021		0.83	(0.70 to 0.98)	9.8%	8.3%
Darcey 2019	-	1.30	(0.93 to 1.83)	4.8%	2.1%
Farris 2018	<u> </u>	1.03	(0.83 to 1.27)	8.2%	5.4%
Dickerman 2017		0.99	(0.84 to 1.16)	10.3%	9.8%
Jeong 2015	-	1.10	(0.93 to 1.31)	9.7%	8.2%
Cantarutti 2015		1.04	(0.96 to 1.12)	13.6%	41.1%
Wang 2015		- 2.01	(1.42 to 2.85)	4.7%	2.0%
Polesel 2015		1.25	(0.90 to 1.74)	5.0%	2.3%
Bonn 2014	<u> </u>	1.10	(0.80 to 1.51)	5.3%	2.4%
Keto 2012		1.19	(0.56 to 2.54)	1.3%	0.4%
van Roermund 2010	<u> </u>	1.14	(0.72 to 1.81)	3.1%	1.2%
Davies 2009		0.90	(0.76 to 1.07)	9.8%	8.5%
Efstathiou 2007	<u>;</u>	1.28	(1.01 to 1.63)	7.3%	4.2%
Siddiqui 2006		1.10	(0.86 to 1.41)	7.2%	4.1%
Fixed effect model	tu e	1.04	(0.99 to 1.10)		100.0%
Random effects model	÷	1.08	(0.99 to 1.19)	100.0%	
Prediction interval	<u> </u>		(0.82 to 1.43)		
Heterogeneity: $l^2 = 57\%$, $\tau^2 = 0.01$, $p < 0.01$	0.5 1 2		. ,		

			95% CI per	Weight	Weight	
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)	
Troeschel 2020	1	1.14	(1.01 to 1.29)	66.8%	70.5%	
Jackson 2020	+	0.89	(0.52 to 1.51)	4.6%	3.8%	
Cantarutti 2015		1.30	(1.06 to 1.59)	28.6%	25.7%	
Fixed effect model	-	1.17	(1.05 to 1.29)		100.0%	
Random effects model		1.17	(1.04 to 1.31)	100.0%		
Prediction interval			(0.49 to 2.78)			
Heterogeneity: $I^2 = 9\%$, $\tau^2 < 0.01$, $p = 0.34$	0.5 1 2					

Supplementary	Figure 33 S	Summary	hazard ratio	estimate	(95% CI) of PCa-sj	pecific	mortality	for post	t-diagnosis :	5 kg/m ²
BMI increment	ts by study d	lesign.									

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
retrospective cohort					
Martini 2021		0.83	(0.70 to 0.98)	14.9%	11.4%
Jackson 2020		0.89	(0.52 to 1.51)	3.4%	1.2%
Darcey 2019		1.30	(0.93 to 1.83)	6.8%	2.9%
Jeong 2015		1.10	(0.93 to 1.31)	14.9%	11.3%
Cantarutti 2015	<u>_</u>	1.04	(0.96 to 1.12)	21.9%	56.2%
Wang 2015	-	2.01	(1.42 to 2.85)	6.6%	2.8%
Polesel 2015	 .	1.25	(0.90 to 1.74)	7.2%	3.1%
Bonn 2014	.	1.10	(0.80 to 1.51)	7.5%	3.3%
Keto 2012		1.19	(0.56 to 2.54)	1.8%	0.6%
van Roermund 2010	_	1.14	(0.72 to 1.81)	4.3%	1.6%
Efstathiou 2007		1.28	(1.01 to 1.63)	10.7%	5.7%
Fixed effect model	♦	1.07	(1.01 to 1.13)		100.0%
Random effects model	<	1.14	(1.00 to 1.29)	100.0%	
Prediction interval			(0.78 to 1.65)		
Heterogeneity: $l^2 = 63\%$, $\tau^2 = 0.02$, $p < 0.01$					
prospective cohort					
Troeschel 2020	-	1.14	(1.01 to 1.29)	25.6%	36.6%
Farris 2018	_	1.03	(0.83 to 1.27)	17.1%	12.4%
Dickerman 2017	<u> </u>	0.99	(0.84 to 1.16)	22.0%	22.3%
Davies 2009		0.90	(0.76 to 1.07)	20.8%	19.3%
Siddiqui 2006		1.10	(0.86 to 1.41)	14.6%	9.3%
Fixed effect model	\$	1.04	(0.96 to 1.12)		100.0%
Random effects model	•	1.03	(0.95 to 1.13)	100.0%	
Prediction interval			(0.83 to 1.28)		
Heterogeneity: $I^2 = 24\%$, $\tau^2 = < 0.01$, $p = 0.26$					
- ·					
	0.5 1 2				

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.

			95% Cl per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
More than median deaths					
Martini 2021		0.83	(0.70 to 0.98)	10.9%	8.2%
Troeschel 2020		1.14	(1.01 to 1.29)	16.3%	15.8%
Farris 2018	_	1.03	(0.83 to 1.27)	8.0%	5.4%
Dickerman 2017	_ 	0.99	(0.84 to 1.16)	12.2%	9.6%
Jeong 2015		1.10	(0.93 to 1.31)	10.9%	8.1%
Cantarutti 2015	+	1.04	(0.96 to 1.12)	24.2%	40.5%
Davies 2009		0.90	(0.76 to 1.07)	11.0%	8.3%
Efstathiou 2007		1.28	(1.01 to 1.63)	6.5%	4.1%
Fixed effect model	\$	1.03	(0.98 to 1.08)		100.0%
Random effects model	\$	1.03	(0.95 to 1.11)	100.0%	
Prediction interval			(0.82 to 1.28)		
Heterogeneity: $l^2 = 54\%$, $\tau^2 = < 0.01$, $p = 0.03$					
Less than median deaths					
Jackson 2020 -		0.89	(0.52 to 1.51)	7.1%	6.5%
Darcey 2019		1.30	(0.93 to 1.83)	16.1%	15.7%
Polesel 2015		1.25	(0.90 to 1.74)	17.3%	17.1%
Bonn 2014		1.10	(0.80 to 1.51)	18.2%	18.2%
Keto 2012	*	- 1.19	(0.56 to 2.54)	3.6%	3.2%
van Roermund 2010		1.14	(0.72 to 1.81)	9.3%	8.7%
Siddiqui 2006		1.10	(0.86 to 1.41)	28.5%	30.7%
Fixed effect model	\diamond	1.15	(1.00 to 1.31)		100.0%
Random effects model	\diamond	1.15	(1.00 to 1.31)	100.0%	
Prediction interval	<u> </u>		(0.96 to 1.37)		
Heterogeneity: $l^2 = 0\%$, $\tau^2 = 0$, $p = 0.93$					
0.5	1 2				

Supplementary Figure 35 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by method of anthropometry assessment.

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Measured					
Martini 2021		0.83	(0.70 to 0.98)	25.5%	33.5%
Jackson 2020	+	0.89	(0.52 to 1.51)	5.8%	3.5%
Farris 2018	_ 	1.03	(0.83 to 1.27)	21.0%	21.8%
Wang 2015		2.01	(1.42 to 2.85)	11.4%	8.1%
Efstathiou 2007		1.28	(1.01 to 1.63)	18.3%	16.8%
Siddiqui 2006		1.10	(0.86 to 1.41)	18.0%	16.3%
Fixed effect model	►	1.05	(0.95 to 1.16)		100.0%
Random effects model		1.13	(0.89 to 1.42)	100.0%	
Prediction interval			(0.52 to 2.44)		
Heterogeneity: $l^2 = 79\%$, $\tau^2 = 0.06$, $p < 0.01$					
Self-reported					
Troeschel 2020	-	1.14	(1.01 to 1.29)	29.1%	23.2%
Dickerman 2017	_ + _	0.99	(0.84 to 1.16)	25.0%	14.1%
Cantarutti 2015	+	1.04	(0.96 to 1.12)	34.5%	59.4%
Polesel 2015		1.25	(0.90 to 1.74)	11.4%	3.3%
Fixed effect model	\$	1.06	(1.00 to 1.12)		100.0%
Random effects model	\$	1.06	(1.00 to 1.13)	100.0%	
Prediction interval	+		(0.90 to 1.25)		
Heterogeneity: $l^2 = 8\%$, $\tau^2 = < 0.01$, $p = 0.35$					
Medical_records					
Darcey 2019		1.30	(0.93 to 1.83)	13.6%	9.2%
Jeong 2015	-	1.10	(0.93 to 1.31)	29.5%	36.2%
Bonn 2014	+-	1.10	(0.80 to 1.51)	15.0%	10.6%
Keto 2012	+ •	1.19	(0.56 to 2.54)	3.5%	1.9%
van Roermund 2010		1.14	(0.72 to 1.81)	8.5%	5.1%
Davies 2009		0.90	(0.76 to 1.07)	29.8%	37.1%
Fixed effect model	►	1.04	(0.94 to 1.16)		100.0%
Random effects model	<	1.05	(0.94 to 1.16)	100.0%	
Prediction interval	+-		(0.89 to 1.23)		
Heterogeneity: I^2 = 3%, τ^2 = < 0.01, p = 0.40					
	0.5 1 2				

Supplementary Figure 36 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by median follow-up (10 years).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Less than 10 median years					
Martini 2021		0.83	(0.70 to 0.98)	15 1%	16 3%
Troeschel 2020		1 14	(1.01 to 1.29)	17.4%	31.3%
Jeong 2015	-	1.14	(0.93 to 1.31)	15.1%	16.1%
Wang 2015		2 01	(1.42 to 2.85)	8.2%	3.9%
Bonn 2014		1 10	(0.80 to 1.51)	9.2%	4 7%
Keto 2012		1.10	(0.56 to 2.54)	2.5%	0.8%
van Roermund 2010		1.10	(0.72 to 1.81)	5.6%	2.0%
		0.00	(0.72 to 1.01)	15 2%	16.5%
Efetathiou 2007	-	1.28	(0.70 to 1.07)	11 0%	8.2%
Eistatiliou 2007	<u>,</u>	1.20	(1.01 to 1.03)	11.570	100.0%
Pixed effect model		1.07	(1.00 to 1.14)	400.0%	100.0%
Random effects model		1.12	(0.96 (0 1.29)	100.0%	
			(0.71 to 1.76)		
Heterogeneity: $l^{2} = 72\%$, $\tau^{2} = 0.03$, $p < 0.01$					
More than 10 median years					
Jackson 2020		0.89	(0.52 to 1.51)	9.7%	5.9%
Darcey 2019		1.30	(0.93 to 1.83)	17.9%	14.2%
Farris 2018	_ <u>+</u>	1.03	(0.83 to 1.27)	28.4%	36.9%
Polesel 2015		1.25	(0.90 to 1.74)	18.8%	15.4%
Siddiqui 2006		1.10	(0.86 to 1.41)	25.3%	27.6%
Fixed effect model		1.11	(0.97 to 1.26)		100.0%
Random effects model		1.11	(0.97 to 1.26)	100.0%	
Prediction interval			(0.90 to 1.37)		
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.64$					
	0.5 1 2				

Supplementary Figure 37 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by geographic location of study.

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Multinational					
Martini 2021		0.83	(0.70 to 0.98)	100.0%	100.0%
Fixed effect model	$ \diamond$	0.83	(0.70 to 0.98)		100.0%
Random effects model		0.83	(0.70 to 0.98)	100.0%	
Prediction interval					
Heterogeneity: not applicable					
North America_Caribbean					
Troeschel 2020		1.14	(1.01 to 1.29)	16.2%	26.4%
Jackson 2020	+	0.89	(0.52 to 1.51)	3.0%	1.4%
Farris 2018	_ - - _	1.03	(0.83 to 1.27)	10.8%	9.0%
Dickerman 2017	-	0.99	(0.84 to 1.16)	13.9%	16.1%
Jeong 2015	+	1.10	(0.93 to 1.31)	13.1%	13.6%
Wang 2015		2.01	(1.42 to 2.85)	5.8%	3.3%
Keto 2012		1.19	(0.56 to 2.54)	1.6%	0.7%
van Roermund 2010	— <u></u> +	1.14	(0.72 to 1.81)	3.8%	1.9%
Davies 2009		0.90	(0.76 to 1.07)	13.2%	13.9%
Efstathiou 2007		1.28	(1.01 to 1.63)	9.4%	6.9%
Siddiqui 2006	-++	1.10	(0.86 to 1.41)	9.3%	6.7%
Fixed effect model	\$	1.09	(1.02 to 1.16)		100.0%
Random effects model	◆	1.11	(1.00 to 1.23)	100.0%	
Prediction interval			(0.83 to 1.48)		
Heterogeneity: $I^2 = 53\%$, $\tau^2 = 0.01$, $p = 0.02$					
Oceania					
Darcey 2019		1.30	(0.93 to 1.83)	100.0%	100.0%
Fixed effect model		1.30	(0.93 to 1.83)		100.0%
Random effects model		1.30	(0.93 to 1.83)	100.0%	
Prediction interval					
Heterogeneity: not applicable					
Europe					
Cantarutti 2015		1.04	(0.96 to 1.12)	59.7%	89.8%
Polesel 2015	- •	1.25	(0.90 to 1.74)	19.7%	4.9%
Bonn 2014	 +•	1.10	(0.80 to 1.51)	20.6%	5.3%
Fixed effect model	•	1.05	(0.98 to 1.13)		100.0%
Random effects model	•	1.05	(0.98 to 1.13)	100.0%	
Prediction interval			(0.65 to 1.69)		
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.54$					
	0.0 1 2				

Supplementary Figure 38 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by geographic location of study among the studies in "group 4" (advanced/metastatic).

					95% CI per	Weight	Weight
Author Year	Ha	azard ratio		HR	5 kg/m^2	(random)	(fixed)
Aggressive/Advanced PCa in group = Multination	onal						
Martini 2021				0.83	(0.70 to 0.98)	100.0%	100.0%
Fixed effect model	-			0.83	(0.70 to 0.98)		100.0%
Random effects model		-		0.83	(0.70 to 0.98)	100.0%	
Prediction interval							
Heterogeneity: not applicable							
Aggressive/Advanced PCa in group = North Am	erica_Caribb	ean					
Troeschel 2020				1.02	(0.83 to 1.25)	34.9%	37.5%
Farris 2018				1.03	(0.83 to 1.27)	34.2%	35.3%
Efstathiou 2007				1.28	(1.01 to 1.63)	30.9%	27.2%
Fixed effect model				1.09	(0.96 to 1.23)		100.0%
Random effects model				1.09	(0.95 to 1.25)	100.0%	
Prediction interval					(0.35 to 3.38)		
Heterogeneity: $I^2 = 18\%$, $\tau^2 = < 0.01$, $p = 0.29$							
		1					
	0.5	1	2				

Supplementary Figure 39 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² 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.

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
	1				
Group four					
Martini 2021		0.83	(0.70 to 0.98)	29.6%	35.1%
Troeschel 2020		1.02	(0.83 to 1.25)	25.1%	24.3%
Farris 2018	<u> </u>	1.03	(0.83 to 1.27)	24.3%	22.9%
Efstathiou 2007		1.28	(1.01 to 1.63)	21.0%	17.6%
Fixed effect model		0.99	(0.89 to 1.09)		100.0%
Random effects model	\rightarrow	1.01	(0.85 to 1.21)	100.0%	
Prediction interval			(0.48 to 2.12)		
Heterogeneity: $l^2 = 66\%$, $\tau^2 = 0.02$, $p = 0.03$					
Group three					
Troeschel 2020		1.14	(1.01 to 1.29)	19.3%	30.2%
Jackson 2020		0.89	(0.52 to 1.51)	3.4%	1.6%
Dickerman 2017		0.99	(0.84 to 1.16)	16.5%	18.4%
Jeong 2015	++	1.10	(0.93 to 1.31)	15.4%	15.5%
Wang 2015		2.01	(1.42 to 2.85)	6.8%	3.8%
Bonn 2014	 +	1.10	(0.80 to 1.51)	7.7%	4.5%
van Roermund 2010	<u>_</u>	1.14	(0.72 to 1.81)	4.3%	2.2%
Davies 2009		0.90	(0.76 to 1.07)	15.6%	16.0%
Siddiqui 2006	_ +	1.10	(0.86 to 1.41)	10.8%	7.7%
Fixed effect model	•	1.08	(1.01 to 1.15)		100.0%
Random effects model		1.10	(0.98 to 1.24)	100.0%	
Prediction interval			(0.79 to 1.53)		
Heterogeneity: l^2 = 58%, τ^2 = 0.02, p = 0.01			. ,		
Group one					
Troeschel 2020		1.24	(1.06 to 1.45)	100.0%	100.0%
Fixed effect model	\Leftrightarrow	1.24	(1.06 to 1.45)		100.0%
Random effects model	<	1.24	(1.06 to 1.45)	100.0%	
Prediction interval					
Heterogeneity: not applicable					
Group two					
Darcey 2019	+ +	1.30	(0.93 to 1.83)	17.7%	4.6%
Cantarutti 2015	÷	1.04	(0.96 to 1.12)	58.9%	89.6%
Polesel 2015	++	1.25	(0.90 to 1.74)	18.8%	4.9%
Keto 2012		1.19	(0.56 to 2.54)	4.6%	0.9%
Fixed effect model	♦	1.06	(0.99 to 1.14)		100.0%
Random effects model	•	1.06	(0.99 to 1.14)	100.0%	
Prediction interval	+		(0.90 to 1.25)		
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.44$			-		
-					
	0.5 1 2				

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).

			95% CI per	Weight	Weight	
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)	
Troeschel 2020	tim-	1.14	(1.01 to 1.29)	14.0%	15.8%	
Farris 2018		1.03	(0.83 to 1.27)	8.8%	5.4%	
Dickerman 2017		0.99	(0.84 to 1.16)	11.8%	9.6%	
Jeong 2015	-	1.10	(0.93 to 1.31)	10.9%	8.1%	
Cantarutti 2015	불	1.04	(0.96 to 1.12)	17.2%	40.5%	
Wang 2015	÷	- 2.01	(1.42 to 2.85)	4.5%	2.0%	
Polesel 2015	- <u>i</u> : 	1.25	(0.90 to 1.74)	4.9%	2.2%	
Bonn 2014		1.10	(0.80 to 1.51)	5.2%	2.4%	
Keto 2012		1.19	(0.56 to 2.54)	1.2%	0.4%	
van Roermund 2010	i	1.14	(0.72 to 1.81)	2.8%	1.1%	
Davies 2009		0.90	(0.76 to 1.07)	11.0%	8.3%	
Efstathiou 2007		1.28	(1.01 to 1.63)	7.5%	4.1%	
Fixed effect model	0 9 •	1.07	(1.02 to 1.13)		100.0%	
Random effects model	•	1.10	(1.01 to 1.20)	100.0%		
Prediction interval			(0.87 to 1.39)			
Heterogeneity: $I^2 = 51\%$, $\tau^2 < 0.01$, $p = 0.02$	0.5 1 2					

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).

			95% Cl per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Martini 2021		0.83	(0.70 to 0.98)	9.6%	7.5%
Troeschel 2020		1.14	(1.01 to 1.29)	11.7%	14.5%
Jackson 2020		0.89	(0.52 to 1.51)	2.3%	0.8%
Farris 2018		1.03	(0.83 to 1.27)	8.0%	4.9%
Dickerman 2017		0.99	(0.84 to 1.16)	10.2%	8.8%
Jeong 2015		1.10	(0.93 to 1.31)	9.6%	7.4%
Cantarutti 2015		1.04	(0.96 to 1.12)	13.7%	37.1%
Wang 2015	· · · · · · · · · · · · · · · · · · ·	- 2.01	(1.42 to 2.85)	4.4%	1.8%
Polesel 2015		1.25	(0.90 to 1.74)	4.8%	2.0%
Bonn 2014		1.10	(0.80 to 1.51)	5.0%	2.2%
Keto 2012		1.19	(0.56 to 2.54)	1.2%	0.4%
van Roermund 2010		1.14	(0.72 to 1.81)	2.9%	1.0%
Davies 2009		0.90	(0.76 to 1.07)	9.7%	7.6%
Efstathiou 2007	<u>t</u> t ₩ t	1.28	(1.01 to 1.63)	7.0%	3.8%
Fixed effect model	0 6 6	1.05	(1.00 to 1.10)		100.0%
Random effects model	-	1.07	(0.98 to 1.17)	100.0%	
Prediction interval			(0.82 to 1.40)		
Heterogeneity: I^2 = 58%, τ^2 = 0.01, $p < 0.01$					
	0.5 1 2				

Supplementary Figure 42 Summary hazard ratio estimate (95% CI) of PCa-specific 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).

Author Year	Hazard ratio	HR	95% CI per 5 kg/m^2	Weight (random)	Weight (fixed)
Troeschel 2020	<u>i</u> .	1.14	(1.01 to 1.29)	14.0%	15.8%
Farris 2018		1.03	(0.83 to 1.27)	8.8%	5.4%
Dickerman 2017	-	0.99	(0.84 to 1.16)	11.8%	9.6%
Jeong 2015		1.10	(0.93 to 1.31)	10.9%	8.1%
Cantarutti 2015		1.04	(0.96 to 1.12)	17.2%	40.5%
Wang 2015	1: 1: 1:	2.01	(1.42 to 2.85)	4.5%	2.0%
Polesel 2015	- <u>1</u> 2 #	1.25	(0.90 to 1.74)	4.9%	2.2%
Bonn 2014	1: 	1.10	(0.80 to 1.51)	5.2%	2.4%
Keto 2012		1.19	(0.56 to 2.54)	1.2%	0.4%
van Roermund 2010		1.14	(0.72 to 1.81)	2.8%	1.1%
Davies 2009		0.90	(0.76 to 1.07)	11.0%	8.3%
Efstathiou 2007	1: 1. 1: 1: 1:	1.28	(1.01 to 1.63)	7.5%	4.1%
Fixed effect model	10 10 10	1.07	(1.02 to 1.13)		100.0%
Random effects model		1.10	(1.01 to 1.20)	100.0%	
Prediction interval			(0.87 to 1.39)		
Heterogeneity: $l^2 = 51\%$, $\tau^2 < 0.01$, $p = 0.02$	0.5 1 2				

Supplementary Figure 43 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments for adjustment level four: age, stage, grade (clinical risk/state), treatment (any) and smoking.

			95% CI per	Weight	Weight
Author Year	Hazard ratio	н	R 5 kg/m^2	(random)	(fixed)
Troeschel 2020		1.1	4 (1.01 to 1.29)	47.6%	47.6%
Farris 2018		1.0	3 (0.83 to 1.27)	16.2%	16.2%
Dickerman 2017		0.9	9 (0.84 to 1.16)	29.1%	29.1%
Bonn 2014		— 1.1	0 (0.80 to 1.51)	7.2%	7.2%
Fixed effect model		1.0	7 (0.98 to 1.17)		100.0%
Random effects model		1.0	7 (0.98 to 1.17)	100.0%	
Prediction interval			(0.89 to 1.29)		
neterogeneity. $T = 0\%$, $\tau = 0$, $p = 0.55$	0.75 1	1.5			

Supplementary Figure 44 Summary hazard ratio estimate (95% CI) of PCa-specific 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).

					95% CI per	Weight	Weight
Author Year	H	lazard ratio		HR	5 kg/m^2	(random)	(fixed)
Farris 2018	_			1.03	(0.83 to 1.27)	69.3%	69.3%
Bonn 2014				1.10	(0.80 to 1.51)	30.7%	30.7%
Fixed effect model				1.05	(0.88 to 1.25)		100.0%
Random effects model				1.05	(0.88 to 1.25)	100.0%	
Heterogeneity: $l^2 = 0\%$, $\tau^2 = 0$, $p = 0.73$		I					
	0.75	1	1.5				

82

Supplementary Figure 45 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for age (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies adjusted for age = yes					
Martini 2021	-+	0.83	(0.70 to 0.98)	9.2%	7.4%
Troeschel 2020	-+	1.14	(1.01 to 1.29)	11.4%	14.2%
Jackson 2020		0.89	(0.52 to 1.51)	2.1%	0.8%
Darcey 2019	,	1.30	(0.93 to 1.83)	4.2%	1.9%
Farris 2018		1.03	(0.83 to 1.27)	7.6%	4.8%
Dickerman 2017	-	0.99	(0.84 to 1.16)	9.8%	8.7%
Jeong 2015	++	1.10	(0.93 to 1.31)	9.2%	7.3%
Cantarutti 2015	+	1.04	(0.96 to 1.12)	13.5%	36.5%
Wang 2015		- 2.01	(1.42 to 2.85)	4.1%	1.8%
Polesel 2015	++	1.25	(0.90 to 1.74)	4.5%	2.0%
Bonn 2014	++	1.10	(0.80 to 1.51)	4.7%	2.1%
Keto 2012		1.19	(0.56 to 2.54)	1.1%	0.4%
van Roermund 2010		1.14	(0.72 to 1.81)	2.7%	1.0%
Davies 2009	-+-	0.90	(0.76 to 1.07)	9.3%	7.5%
Efstathiou 2007		1.28	(1.01 to 1.63)	6.6%	3.7%
Fixed effect model	•	1.05	(1.01 to 1.10)		100.0%
Random effects model	•	1.08	(0.99 to 1.18)	100.0%	
Prediction interval			(0.83 to 1.40)		
Heterogeneity: $l^2 = 57\%$, $\tau^2 = 0.01$, $p < 0.01$					
Studies adjusted for age = no					
Siddiqui 2006	<u> </u>	1.10	(0.86 to 1.41)	100.0%	100.0%
Fixed effect model		1.10	(0.86 to 1.41)		100.0%
Random effects model		1.10	(0.86 to 1.41)	100.0%	
Prediction interval					
Heterogeneity: not applicable					
	0.5 1 2				

Supplementary Figure 46 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for stage (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies accounted for stage = yes					
Martini 2021	-+	0.83	(0.70 to 0.98)	9.9%	7.6%
Troeschel 2020	-	1.14	(1.01 to 1.29)	12.2%	14.6%
Farris 2018	_ 	1.03	(0.83 to 1.27)	8.1%	4.9%
Dickerman 2017	-	0.99	(0.84 to 1.16)	10.5%	8.9%
Jeong 2015		1.10	(0.93 to 1.31)	9.8%	7.5%
Cantarutti 2015	+	1.04	(0.96 to 1.12)	14.4%	37.4%
Wang 2015		- 2.01	(1.42 to 2.85)	4.4%	1.8%
Polesel 2015	- -	1.25	(0.90 to 1.74)	4.8%	2.1%
Bonn 2014	 +	1.10	(0.80 to 1.51)	5.0%	2.2%
Keto 2012		1.19	(0.56 to 2.54)	1.2%	0.4%
van Roermund 2010	— <u></u>	1.14	(0.72 to 1.81)	2.8%	1.0%
Davies 2009		0.90	(0.76 to 1.07)	9.9%	7.7%
Efstathiou 2007		1.28	(1.01 to 1.63)	7.1%	3.8%
Fixed effect model	•	1.05	(1.00 to 1.10)		100.0%
Random effects model	•	1.08	(0.99 to 1.18)	100.0%	
Prediction interval			(0.82 to 1.42)		
Heterogeneity: $l^2 = 61\%$, $\tau^2 = 0.01$, $p < 0.01$					
Studies accounted for stage = no					
Jackson 2020		0.89	(0.52 to 1.51)	16.2%	12.3%
Darcey 2019		1.30	(0.93 to 1.83)	32.9%	29.8%
Siddiqui 2006		1.10	(0.86 to 1.41)	50.8%	57.9%
Fixed effect model	-	1.13	(0.94 to 1.36)		100.0%
Random effects model	-	1.13	(0.94 to 1.36)	100.0%	
Prediction interval			(0.34 to 3.79)		
Heterogeneity: $l^2 = 0\%$, $\tau^2 = 0$, $p = 0.47$					
	0.5 1 2				

Supplementary Figure 47 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for Gleason score (yes vs no).

			95% Cl per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies accounted for Gleason score/g	rade = no				
Martini 2021		0.83	(0.70 to 0.98)	100.0%	100.0%
Fixed effect model		0.83	(0.70 to 0.98)		100.0%
Random effects model		0.83	(0.70 to 0.98)	100.0%	
Prediction interval					
Heterogeneity: not applicable					
Studies accounted for Gleason score/g	rade = yes				
Troeschel 2020	*	1.14	(1.01 to 1.29)	11.7%	14.8%
Jackson 2020		0.89	(0.52 to 1.51)	2.1%	0.8%
Darcey 2019	+	1.30	(0.93 to 1.83)	4.3%	1.9%
Farris 2018	_ 	1.03	(0.83 to 1.27)	7.8%	5.0%
Dickerman 2017	<u> </u>	0.99	(0.84 to 1.16)	10.1%	9.0%
Jeong 2015	-+	1.10	(0.93 to 1.31)	9.4%	7.6%
Cantarutti 2015	+	1.04	(0.96 to 1.12)	13.9%	37.9%
Wang 2015		2.01	(1.42 to 2.85)	4.2%	1.9%
Polesel 2015	- •	1.25	(0.90 to 1.74)	4.6%	2.1%
Bonn 2014	— <u></u> +	1.10	(0.80 to 1.51)	4.8%	2.2%
Keto 2012		1.19	(0.56 to 2.54)	1.1%	0.4%
van Roermund 2010		1.14	(0.72 to 1.81)	2.7%	1.1%
Davies 2009	-+-	0.90	(0.76 to 1.07)	9.5%	7.8%
Efstathiou 2007	⊢ +−−	1.28	(1.01 to 1.63)	6.8%	3.9%
Siddiqui 2006	_ ++	1.10	(0.86 to 1.41)	6.7%	3.8%
Fixed effect model	•	1.08	(1.03 to 1.13)		100.0%
Random effects model	•	1.10	(1.02 to 1.19)	100.0%	
Prediction interval			(0.90 to 1.35)		
Heterogeneity: I^2 = 42%, τ^2 = < 0.01, p = 0.04					
	0.5 1 2				

Supplementary Figure 48 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for treatments (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies adjusted for any Treatment/s = ye	s				
Martini 2021		0.83	(0.70 to 0.98)	9.0%	7.3%
Troeschel 2020		1.14	(1.01 to 1.29)	11.2%	14.0%
Jackson 2020		0.89	(0.52 to 1.51)	2.0%	0.8%
Farris 2018		1.03	(0.83 to 1.27)	7.4%	4.7%
Dickerman 2017		0.99	(0.84 to 1.16)	9.6%	8.5%
Jeong 2015	_+*	1.10	(0.93 to 1.31)	9.0%	7.2%
Cantarutti 2015	+	1.04	(0.96 to 1.12)	13.2%	35.8%
Wang 2015	,	2.01	(1.42 to 2.85)	4.0%	1.8%
Polesel 2015		1.25	(0.90 to 1.74)	4.4%	2.0%
Bonn 2014	++	1.10	(0.80 to 1.51)	4.6%	2.1%
Keto 2012		1.19	(0.56 to 2.54)	1.1%	0.4%
van Roermund 2010	— <u></u>	1.14	(0.72 to 1.81)	2.6%	1.0%
Davies 2009	-+-	0.90	(0.76 to 1.07)	9.1%	7.4%
Efstathiou 2007		1.28	(1.01 to 1.63)	6.5%	3.6%
Siddiqui 2006	+,	1.10	(0.86 to 1.41)	6.4%	3.5%
Fixed effect model	•	1.05	(1.00 to 1.10)		100.0%
Random effects model	•	1.07	(0.99 to 1.16)	100.0%	
Prediction interval			(0.84 to 1.38)		
Heterogeneity: $l^2 = 55\%$, $\tau^2 = 0.01$, $p < 0.01$					
Studies adjusted for any Treatment/s = no	,				
Darcey 2019	<u> </u>	1.30	(0.93 to 1.83)	100.0%	100.0%
Fixed effect model		1.30	(0.93 to 1.83)		100.0%
Random effects model		1.30	(0.93 to 1.83)	100.0%	
Prediction interval					
Heterogeneity: not applicable					
Г					
0.3	5 1 2				

Supplementary Figure 49 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for smoking (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
	I				
Studies accounted for smoking = no					
Martini 2021		0.83	(0.70 to 0.98)	13.8%	10.4%
Jeong 2015		1.10	(0.93 to 1.31)	13.8%	10.3%
Cantarutti 2015	*	1.04	(0.96 to 1.12)	20.3%	51.2%
Wang 2015		2.01	(1.42 to 2.85)	6.2%	2.5%
Polesel 2015	+	1.25	(0.90 to 1.74)	6.7%	2.8%
Keto 2012		1.19	(0.56 to 2.54)	1.7%	0.5%
van Roermund 2010		1.14	(0.72 to 1.81)	4.0%	1.4%
Davies 2009		0.90	(0.76 to 1.07)	13.9%	10.5%
Efstathiou 2007	*	1.28	(1.01 to 1.63)	9.9%	5.2%
Siddiqui 2006		1.10	(0.86 to 1.41)	9.8%	5.1%
Fixed effect model	•	1.04	(0.99 to 1.10)		100.0%
Random effects model	-	1.10	(0.97 to 1.25)	100.0%	
Prediction interval			(0.76 to 1.60)		
Heterogeneity: $I^2 = 68\%$, $\tau^2 = 0.02$, $p < 0.01$					
Studies accounted for smoking = yes					
Troeschel 2020	-	1.14	(1.01 to 1.29)	28.7%	43.8%
Jackson 2020		0.89	(0.52 to 1.51)	5.2%	2.4%
Darcey 2019	+	1.30	(0.93 to 1.83)	10.6%	5.7%
Farris 2018		1.03	(0.83 to 1.27)	19.1%	14.9%
Dickerman 2017	- + -	0.99	(0.84 to 1.16)	24.6%	26.7%
Bonn 2014		1.10	(0.80 to 1.51)	11.7%	6.6%
Fixed effect model	*	1.08	(0.99 to 1.17)		100.0%
Random effects model	•	1.08	(0.99 to 1.17)	100.0%	
Prediction interval			(0.96 to 1.21)		
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.58$					
	0.5 1 2				

Supplementary Figure 50 Summary hazard ratio estimate (95% CI) of PCa-specific mortality for post-diagnosis 5 kg/m² BMI increments by individual confounders: Accounted for PSA test/PSA levels (yes vs no).

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	5 kg/m^2	(random)	(fixed)
Studies accounted for PSA test/PSA levels (as n					
Martini 2021	(xy) = ycs	0.83	(0.70 to 0.98)	17.0%	20.6%
Earris 2018		1.03	(0.83 to 1.27)	1/.0%	13 /1%
loopg 2015		1.05	(0.83 to 1.27)	16.0%	20.3%
Wong 2015		- 2.01	(0.95 to 1.51)	7 60/	20.3 %
Repr 2014	· · ·	2.01	$(1.42 \ 10 \ 2.63)$	0.60/	5.0%
Bonn 2014		1.10	(0.80 to 1.51)	0.0%	5.9%
Reto 2012		1.19	(0.56 to 2.54)	2.0%	1.1%
Van Roermund 2010		1.14	(0.72 to 1.81)	4.9%	2.8%
Davies 2009		0.90	(0.76 to 1.07)	17.1%	20.9%
Siddiqui 2006		1.10	(0.86 to 1.41)	12.0%	10.0%
Fixed effect model	*	1.02	(0.94 to 1.10)		100.0%
Random effects model	-	1.08	(0.93 to 1.25)	100.0%	
Prediction interval			(0.69 to 1.69)		
Heterogeneity: $I^2 = 67\%$, $\tau^2 = 0.03$, $p < 0.01$					
Studies accounted for PSA test/PSA levels (as n	roxy() = no				
Troeschel 2020		1 14	(1.01 to 1.29)	21.9%	21.0%
lookoon 2020		0.99	(1.01 to 1.23)	21.0%	21.070
	· .	1.30	(0.02 to 1.01)	4.0 /0	2 70/
Dalcey 2019	Ţ	1.50	(0.93 to 1.83)	0.1%	2.1 %
Dickerman 2017		0.99	(0.84 to 1.16)	18.8%	12.8%
	Ť	1.04	(0.96 to 1.12)	25.9%	53.9%
		1.25	(0.90 to 1.74)	8.6%	3.0%
Efstathiou 2007		1.28	(1.01 to 1.63)	12.7%	5.5%
Fixed effect model	•	1.07	(1.02 to 1.14)		100.0%
Random effects model	•	1.09	(1.01 to 1.17)	100.0%	
Prediction interval	+		(0.95 to 1.25)		
Heterogeneity: $I^2 = 17\%$, $\tau^2 = < 0.01$, $p = 0.30$					
	0.5 1 2				
	0.5 1 2				

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.

Α

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	10cm	(random)	(fixed)
	15				
Jackson 2020		0.97	(0.75 to 1.25)	18.9%	18.9%
Farris 2018	- <u>₩</u> -	1.04	(0.90 to 1.20)	54.4%	54.4%
Polesel 2016	+ -	1.19	(0.97 to 1.47)	26.7%	26.7%
Fixed effect model	+	1.06	(0.95 to 1.19)		100.0%
Random effects model	-	1.06	(0.95 to 1.19)	100.0%	
Prediction interval			(0.52 to 2.16)		
Heterogeneity: $l^2 = 0\%$, $\tau^2 = 0$, $p = 0.42$					
• • • • • • • • • • • • • • • • • • •	0.5 1 2				

В

			95% CI per	Weight	Weight
Author Year	Hazard ratio	HR	10cm	(random)	(fixed)
Jackson 2020		0.91	(0.58 to 1.43)	17.0%	17.0%
Farris 2018	-#	0.98	(0.77 to 1.25)	58.5%	58.5%
Polesel 2016	<u> </u>	0.97	(0.66 to 1.41)	24.5%	24.5%
Fixed effect model	+	0.97	(0.80 to 1.16)		100.0%
Random effects model	÷	0.97	(0.80 to 1.16)	100.0%	
Prediction interval			(0.29 to 3.22)		
Heterogeneity: $l^2 = 0\%$, $\tau^2 = 0$, $p = 0.96$					
	0.5 1 2				

Supplementary Figure 52 Non-Linear association between waist-circumference and A) all-cause mortality and B) PCaspecific 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 One¹ reported an association between post-diagnosis adiposity and CVD-mortality (HR per 5 kg/m²=1.10, 95%CI:1.01-1.19). The other two studies reported no associations.

BMI and Non-PCa-specific mortality

Eight studies⁴⁻¹¹ investigated postdiagnosis BMI and non-PCa-specific mortality. Only one⁹reported that median BMI \geq 27.4 kg/m² 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 PCaspecific mortality. Jackson et al¹² 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 al¹ (total men=6,942) found that only in men who gained \geq 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 \geq 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 \geq 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 (+/-<3% body weight) and CVD-mortality. Consistent with Troeschel¹, Bonn et al¹⁴ (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=1.94, 95%CI:1.41-2.66) but there was no association for PCa-specific mortality. Farris et al¹³ (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 al¹⁵ (total men=357) examined the impact of weight gain in men undergoing ADT on

91

PCa prognosis. There was an indication of a higher rate of PCa-specific mortality for weight gain ≥ 2.3 kg 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 study¹⁶ 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 al²¹ (total men=2,402) showed that subcutaneous fat index (SFI) (HR for SFI 48 \geq 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 2018²³ (total men=282) found that men with higher SFI had lower risk of death from PCa (HR for SFI 39.9 \geq versus <39.9, 95%CI, 0.48-0.87, p=0.004). Xu et al¹⁷ (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, I²=52, studies=7, for PCa-specific mortality=1.02, 95%CI:0.76 to 1.35, I²=0, studies= 2^{25} and HR high versus low for all-cause mortality=1.03, 95%CI:0.74 to 1.43, I²=52, studies= 4^{26}) but found inverse associations between subcutaneous adipose tissue and mortality (HR high versus low for all-cause mortality=0.68, 95%CI:0.55 to 0.98, I²=0, studies= 2^{25} and HR high versus low for all-cause mortality=0.73, 95%CI:0.55 to 0.98, I²=0, studies= 2^{25} and HR high versus low for all-cause mortality=0.68, 95%CI:0.54 to 0.84, I²=0, studies= 3^{26})

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