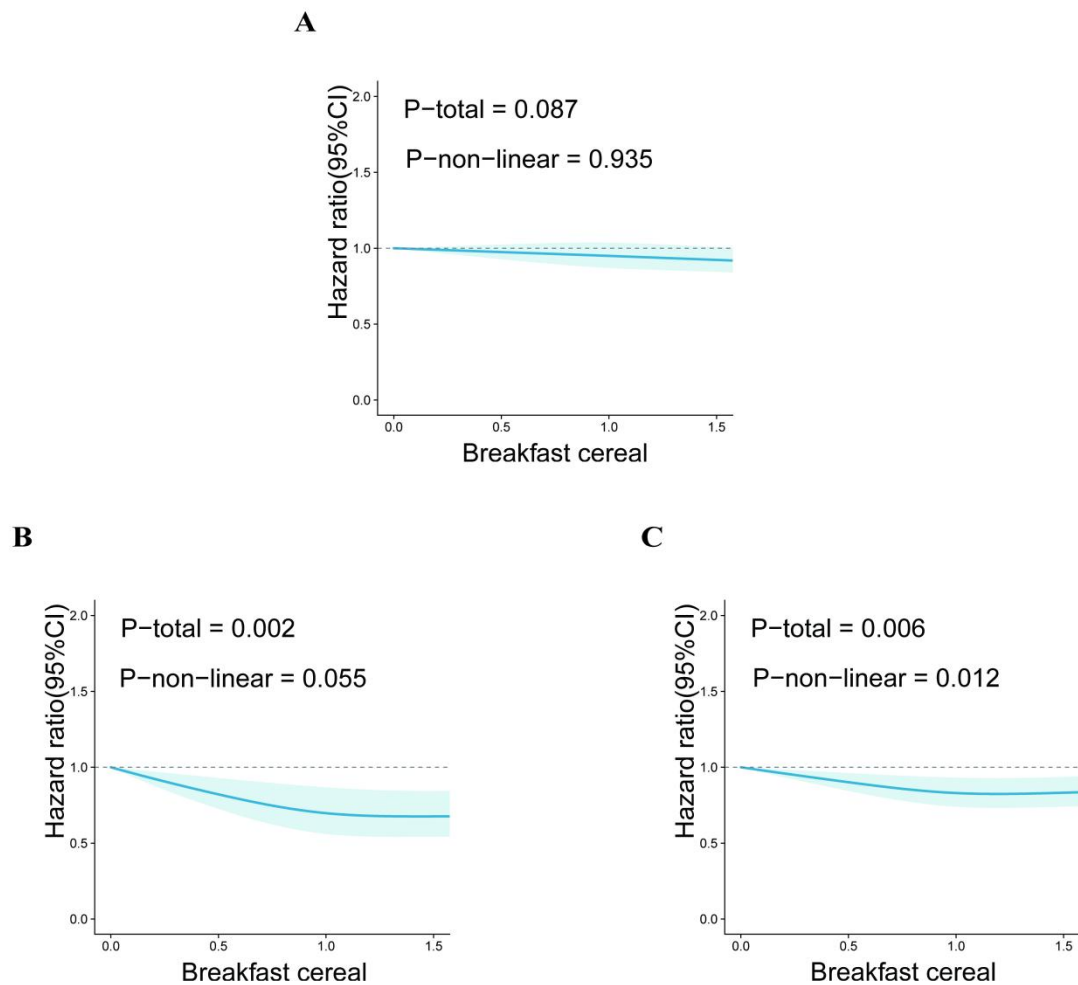


Supplementary information -Associations of Breakfast Cereal Consumption

With Risk of Cardiovascular Disease and Mortality in Individuals With Diabetes

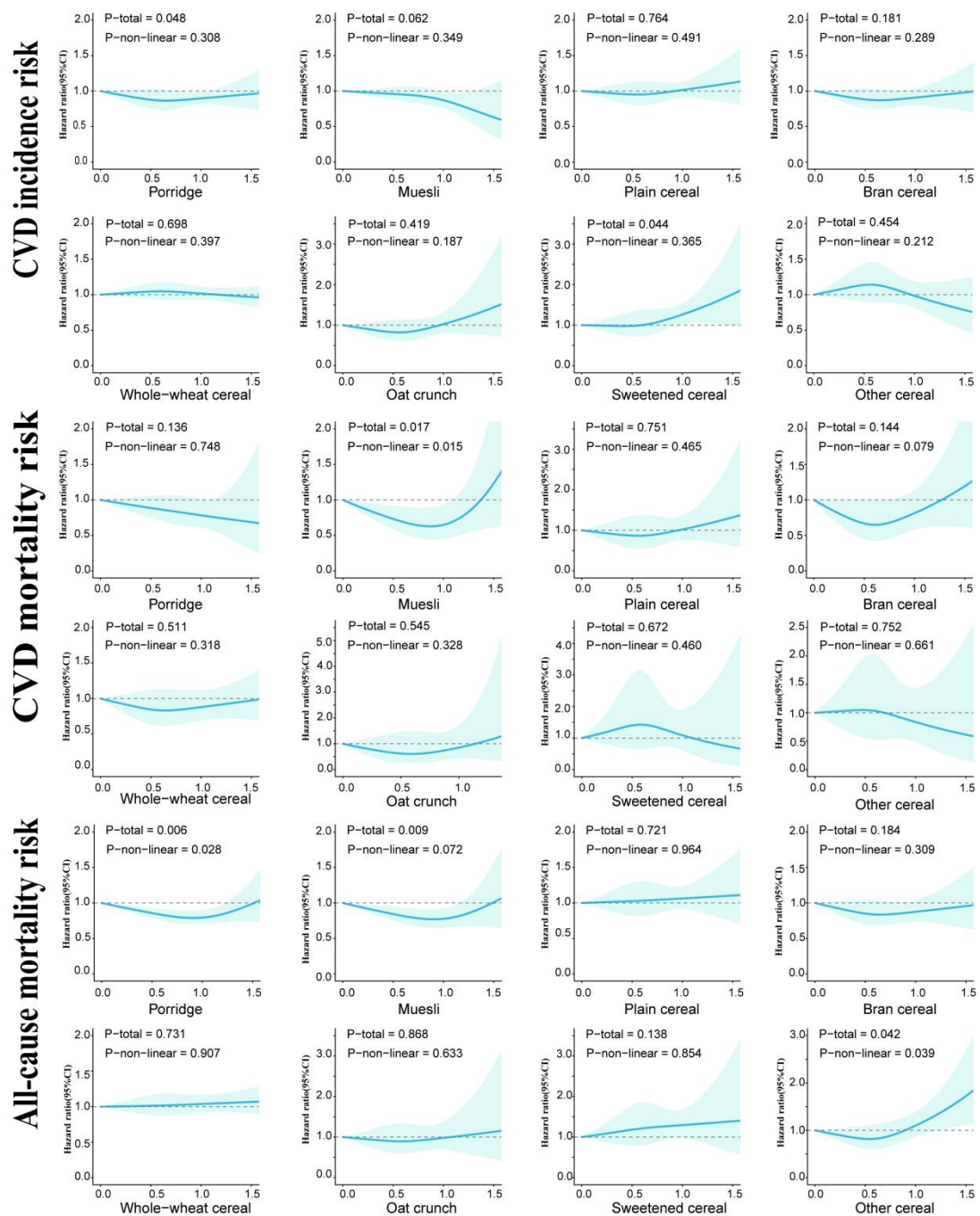
Contents

Supplemental Figure 1. Associations of breakfast cereal intake with CVD incidence, CVD mortality, and all-cause mortality.....	2
Supplemental Figure 2. Dose-response associations of different types of breakfast cereal consumption with CVD incidence, CVD mortality, and all-cause mortality.....	4
Supplemental Figure 3. The stratified analyses of associations between types of breakfast cereals with all-cause mortality.....	5
Supplemental Figure 4. The stratified analyses of associations between breakfast cereal consumption with all-cause mortality.....	7
Supplemental Table 1. Associations of breakfast cereal consumption with CVD incidence, CVD mortality, and all-cause mortality among patients with diabetes.....	8
Supplemental Table 2. Associations of cereal consumption with all-cause and cause-specific mortality after excluding participants with missing covariate.....	9
Supplemental Table 3. Associations of cereal consumption with all-cause and cause-specific mortality after excluding participants who had an outcome event during the first two years of follow-up.....	11
Supplemental Table 4. Associations of cereal consumption with all-cause and cause-specific mortality after excluding participants who ate cereal last year but not the day before.....	13
Supplemental Table 5. Associations of cereal consumption with all-cause and cause-specific mortality without adjusting for BMI.....	15
Supplemental Table 6. Associations of specific types of breakfast cereal consumption with all-cause and cause-specific mortality after adjustment for different breakfast cereal types.....	17



Supplemental Figure 1. Associations of breakfast cereal intake with CVD incidence, CVD mortality, and all-cause mortality.

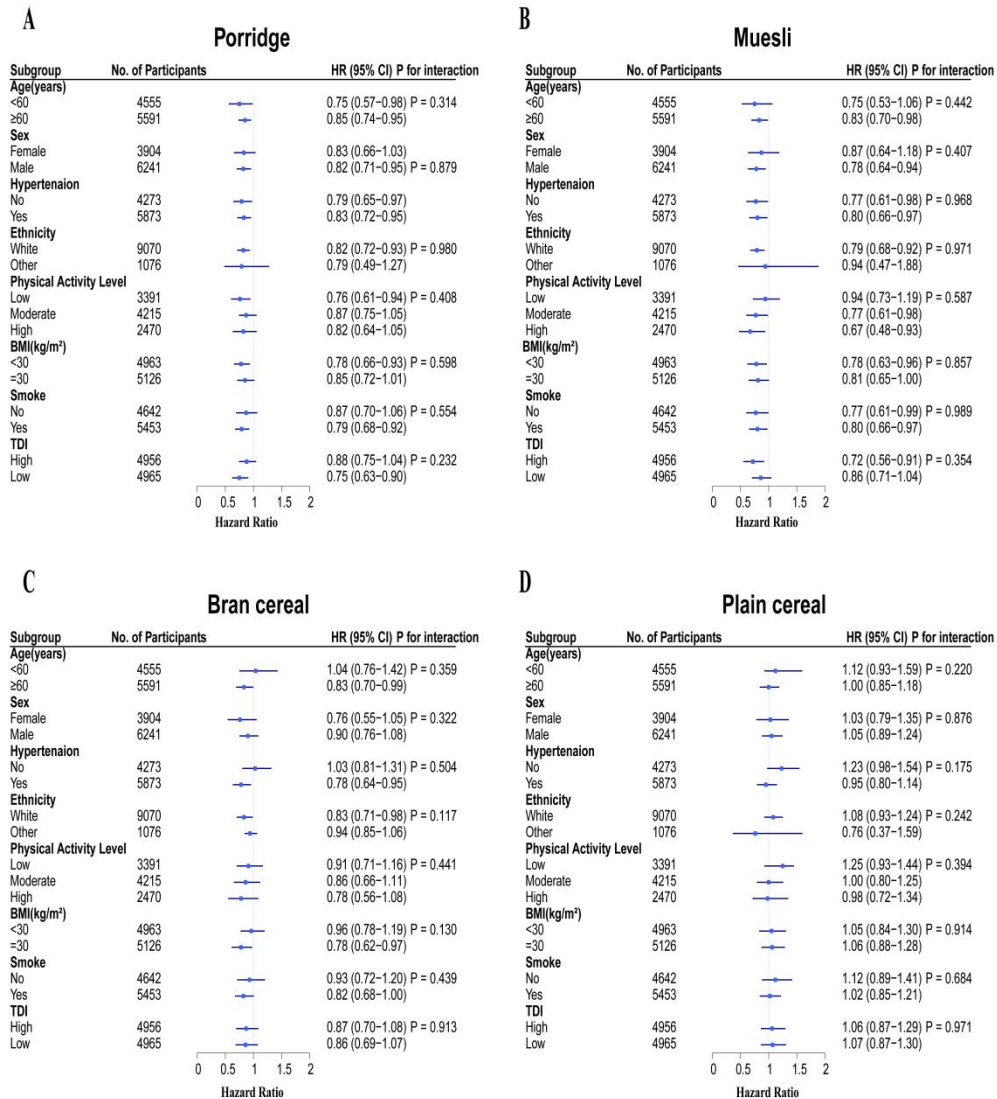
(A) CVD incidence. (B) CVD mortality. (C) All-cause mortality. Adjusted for age (continuous), sex (male, female), ethnicity (White or other), household income (>100000, 52 000–100 000, 31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), BMI (continuous), smoking status (current, former, or never), physical activity level (low, moderate or high), the Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee and tea intake, energy intake(continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).

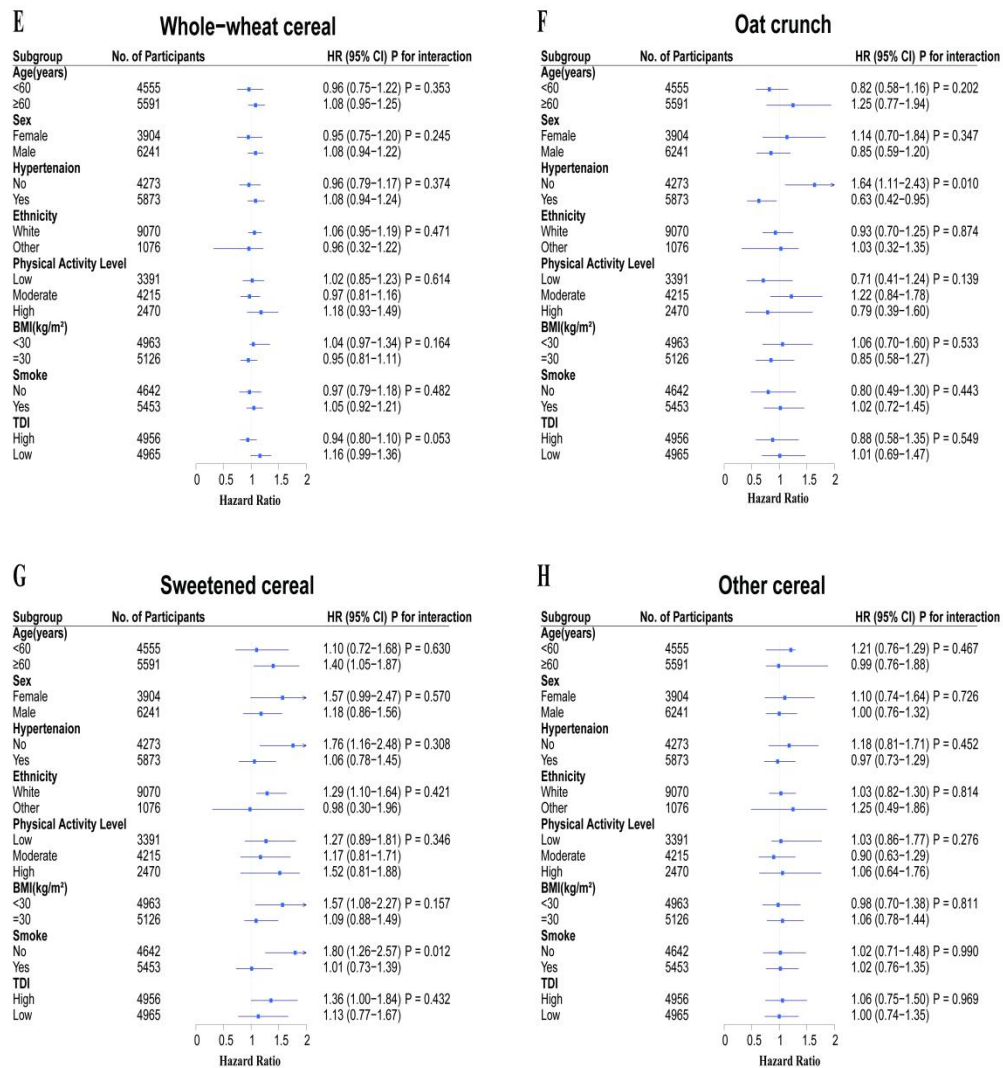


Supplemental Figure 2. Dose-response associations of different types of breakfast cereal consumption with CVD incidence, CVD mortality, and all-cause mortality.

Adjusted for age (continuous), sex (male, female), ethnicity (White or other), household income (>100000, 52 000–100 000, 31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), BMI (continuous), smoking status (current, former or never), physical activity level (low, moderate, or high), the

Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee and tea intake, energy intake(continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).

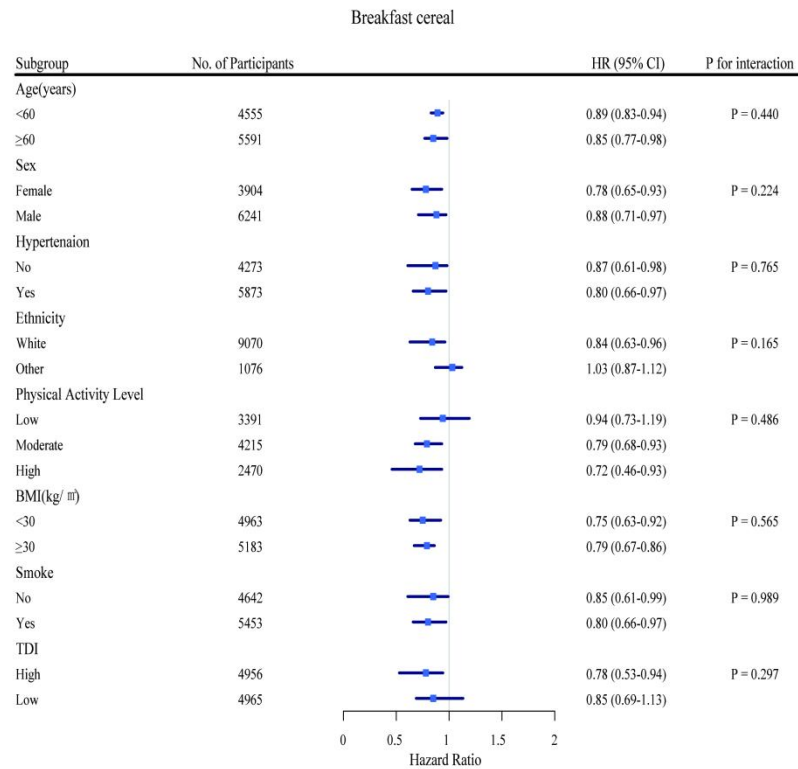




Supplemental Figure 3. The stratified analyses of associations between types of breakfast cereals with all-cause mortality.

(A) porridge, (B) muesli, (C) plain cereal, (D) bran cereal, (E) whole-wheat cereal, (F) oat crunch, (G) sweetened cereal, and (H) others cereal consumption with all-cause mortality. Adjusted for ,age (continuous), sex (male, female),ethnicity (White or other), household income (>100000, 52 000–100 000,31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), BMI (continuous), smoking status (current, former, or never), physical activity level (low, moderate, or high), the Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no),

family history of cancer (yes or no), coffee and tea intake ,energy intake(continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).



Supplemental Figure 4. The stratified analyses of associations between breakfast cereal consumption with all-cause mortality.

Adjusted for ,age (continuous), sex (male, female),ethnicity (White or other), household income (>100000, 52 000–100 000,31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), BMI (continuous), smoking status (current, former, or never), physical activity level (low, moderate, or high), the Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee

and tea intake ,energy intake(continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).

Supplemental Table 1. Associations of breakfast cereal consumption with CVD incidence, CVD mortality, and all-cause mortality among patients with diabetes.

	CVD incidence	CVD mortality	All-cause mortality
No. cases/total	3264/10146	515/10146	1882/10146
Model 1	0.87(0.80-0.93)	0.66(0.54-0.80)	0.78(0.70-0.88)
<i>P</i>	<0.001	<0.001	<0.001
Model 2	0.89(0.71-1.14)	0.75(0.60-0.94)	0.85(0.76-0.96)
<i>P</i>	0.38	0.01	0.007
Model 3	0.95(0.87-1.05)	0.78(0.65-0.92)	0.86(0.74-0.95)
<i>P</i>	0.36	0.01	0.001

Adjusted for age (continuous), sex (male, female), ethnicity (White or other), household income (>100000, 52 000–100 000, 31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), BMI (continuous), smoking status (current, former, or never), physical activity level (low, moderate or high), the Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee and tea intake, energy intake(continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).

Supplemental Table 2. Associations of cereal consumption with all-cause and cause-specific mortality after excluding participants with missing covariates.

Exposure	CVD incidence	CVD-specific mortality	All-cause mortality
Breakfast cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1.5	0.98(0.90-1.07)	0.71(0.57-0.89)	0.86(0.76-0.96)
≥1.5	0.86(0.77-0.96)	0.64(0.49-0.85)	0.81(0.70-0.94)
Porridge, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.88(0.70-1.11)	0.81(0.43-1.52)	0.87(0.64-1.19)
≥1	0.89(0.82-0.98)	0.77(0.59-0.99)	0.80(0.71-0.91)
Muesli, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.89(0.76-1.05)	0.68(0.43-1.08)	0.73(0.58-0.92)
≥1	0.88(0.75-0.99)	0.67(0.47-0.98)	0.83(0.69-0.99)
Plain cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.97(0.79-1.19)	0.82(0.46-1.47)	1.03(0.79-1.34)
≥1	1.02(0.90-1.15)	1.05(0.77-1.43)	1.07(0.91-1.25)
Bran cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.93(0.78-1.11)	0.77(0.48-1.26)	0.88(0.69-1.11)
≥1	0.88(0.78-1.03)	0.77(0.52-1.15)	0.86(0.70-1.04)

Whole wheat cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	1.08(0.92-1.28)	0.97(0.61-1.52)	0.86(0.67-1.09)
≥1	0.99(0.90-1.09)	0.88(0.68-1.13)	1.08(0.96-1.22)
Oat crunch, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.84(0.59-1.18)	0.52(0.18-1.63)	0.82(0.52-1.29)
> 0.5	1.02(0.78-1.34)	0.92(0.44-1.95)	1.03(0.72-1.47)
Sweetened cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.94(0.63-1.40)	1.18(0.47-2.87)	1.22(0.76-1.94)
> 0.5	1.28(1.04-1.58)	1.15(0.33-2.10)	1.29(1.04-1.82)
Other cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	1.09(0.80-1.47)	0.95(0.42-2.14)	0.77(0.49-1.21)
> 0.5	0.99(0.80-1.21)	0.85(0.48-1.52)	1.16(0.90-1.15)

Adjusted for age (continuous), sex (male, female), ethnicity (White or other), household income (>100000, 52 000–100 000, 31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), BMI (continuous), smoking status (current, former or never), physical activity level (low, moderate, or high), the Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee and tea intake, energy intake (continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).

Supplemental Table 3. Associations of cereal consumption with all-cause and cause-specific mortality after excluding participants who had an outcome event during the first two years of follow-up.

Exposure	CVD incidence	CVD-specific mortality	All-cause mortality
Breakfast cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1.5	0.99(0.90-1.08)	0.73(0.58-0.92)	0.87(0.77-0.98)
≥1.5	0.85(0.75-0.95)	0.65(0.48-0.87)	0.83(0.71-0.96)
Porridge, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.87(0.68-1.10)	0.79(0.41-1.54)	0.86(0.63-1.19)
≥1	0.89(0.81-0.98)	0.78(0.60-0.99)	0.82(0.72-0.94)
Muesli, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.89(0.75-1.05)	0.69(0.43-1.12)	0.72(0.57-0.91)
≥1	0.86(0.74-0.99)	0.61(0.40-0.94)	0.83(0.68-1.01)
Plain cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.95(0.78-1.18)	0.82(0.45-1.50)	0.98(0.72-1.29)
≥1	1.02(0.90-1.15)	1.10(0.73-1.41)	1.05(0.89-1.24)
Bran cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.94(0.78-1.12)	0.86(0.52-1.39)	0.89(0.70-1.13)

≥1	0.90(0.78-1.05)	0.78(0.58-1.19)	0.86(0.69-1.05)
Whole wheat cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	1.07(0.90-1.27)	0.93(0.58-1.50)	0.79(0.62-1.03)
≥1	0.98(0.89-1.08)	0.91(0.70-1.18)	1.11(0.98-1.25)
Oat crunch, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.83(0.58-1.20)	0.62(0.20-1.93)	0.80(0.49-1.29)
> 0.5	1.06(0.80-1.40)	0.98(0.46-2.08)	1.08(0.46-2.08)
Sweetened cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.92(0.60-1.40)	1.01(0.37-2.71)	1.21(0.75-1.95)
> 0.5	1.27(1.02-1.57)	1.21(0.69-2.15)	1.37(1.04-1.81)
Other cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	1.11(0.81-1.51)	1.03(0.46-2.32)	0.82(0.52-1.29)
> 0.5	0.98(0.79-1.21)	0.93(0.52-1.66)	1.19(0.91-1.54)

Adjusted for age (continuous), sex (male, female), ethnicity (White or other), household income (>100000, 52 000–100 000, 31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), BMI (continuous), smoking status (current, former, or never), physical activity level (low, moderate or high), the Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee and tea intake, energy intake (continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).

Supplemental Table 4. Associations of cereal consumption with all-cause and cause-specific mortality after excluding participants who ate cereal last year but not the day before.

Exposure	CVD incidence	CVD-specific mortality	All-cause mortality
Breakfast cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1.5	1.04(0.90-1.19)	0.65(0.47-0.90)	0.82(0.68-0.98)
≥1.5	0.90(0.77-1.06)	0.59(0.40-0.86)	0.77(0.63-0.94)
Porridge, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.90(0.71-1.13)	0.86(0.46-1.64)	0.90(0.66-1.23)
≥1	0.90(0.82-1.00)	0.82(0.63-1.05)	0.82(0.72-0.93)
Muesli, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.91(0.77-1.07)	0.71(0.45-1.14)	0.74(0.59-0.93)
≥1	0.90(0.78-1.04)	0.74(0.94-1.10)	0.84(0.70-1.02)
Plain cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.98(0.80-1.21)	0.88(0.49-1.57)	1.07(0.82-1.40)
≥1	1.04(0.92-1.17)	1.12(0.82-1.54)	1.10(0.93-1.29)
Bran cereal, bowls			

0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.94(0.79-1.12)	0.81(0.50-1.32)	0.90(0.71-1.13)
≥1	0.90(0.78-1.04)	0.82(0.54-1.22)	0.87(0.71-1.06)
Whole wheat cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	1.11(0.94-1.31)	1.05(0.67-1.65)	0.90(0.70-1.14)
≥1	1.01(0.92-1.12)	0.95(0.73-1.23)	1.12(0.99-1.27)
Oat crunch, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.85(0.60-1.20)	0.56(0.18-1.74)	0.84(0.53-1.32)
> 0.5	1.04(0.79-1.37)	0.97(0.46-2.05)	1.04(0.73-1.49)
Sweetened cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.95(0.64-1.43)	1.24(0.51-3.03)	1.25(0.78-2.00)
> 0.5	1.31(1.06-1.61)	1.25(0.71-2.18)	1.33(1.01-1.75)
Other cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	1.12(0.83-1.52)	1.04(0.46-2.36)	0.80(0.51-1.26)
> 0.5	1.00(0.81-1.23)	0.89(0.50-1.60)	1.19(0.92-1.54)

Adjusted for age (continuous) and sex (male, female), ethnicity (White or other), household income (>100000, 52 000–100 000, 31 000–51 999, 18 000–30 999, or <18 000£), education level

(degree or no degree), BMI (continuous), smoking status (current, former, or never), physical activity level (low, moderate or high), the Townsend deprivation index, vitamin use (yes or no),

mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee and tea intake, energy

intake(continuous) and a modified AHEI score, further adjusted for hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).

Supplemental Table 5. Associations of cereal consumption with all-cause and cause-specific mortality without adjusting for BMI.

Exposure	CVD incidence	CVD-specific mortality	All-cause mortality
Breakfast cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1.5	0.99(0.91-1.07)	0.71(0.58-0.89)	0.85(0.74-0.95)
≥1.5	0.87(0.77-0.97)	0.64(0.51-0.85)	0.83(0.71-0.93)
Porridge, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.87(0.70-1.11)	0.82(0.43-1.53)	0.88(0.65-1.20)
≥1	0.89(0.81-0.98)	0.77(0.59-1.00)	0.80(0.71-0.91)
Muesli, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.90(0.76-1.06)	0.68(0.43-1.09)	0.73(0.58-0.92)
≥1	0.88(0.77-1.01)	0.70(0.47-0.99)	0.83(0.69-1.00)
Plain cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.96(0.79-1.19)	0.82(0.46-1.46)	1.03(0.79-1.35)
≥1	1.02(0.91-1.16)	1.04(0.77-1.42)	1.06(0.91-1.23)
Bran cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.93(0.78-1.11)	0.77(0.47-1.26)	0.88(0.69-1.11)
≥1	0.89(0.77-1.03)	0.76(0.51-1.14)	0.85(0.71-1.04)

Whole wheat cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	1.09(0.92-1.28)	0.97(0.61-1.52)	0.85(0.67-1.09)
≥1	0.99(0.90-1.09)	0.87(0.68-1.12)	1.08(0.96-1.22)
Oat crunch, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.84(0.59-1.19)	0.52(0.17-1.61)	0.81(0.52-1.28)
> 0.5	1.02(0.78-1.35)	0.91(0.43-1.93)	1.03(0.72-1.47)
Sweetened cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.93(0.63-1.40)	1.19(0.49-2.88)	1.23(0.77-1.95)
> 0.5	1.29(1.06-1.59)	1.14(0.65-1.98)	1.27(1.02-1.67)
Other cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	1.08(0.80-1.46)	0.92(0.42-2.06)	0.76(0.53-1.21)
> 0.5	0.99(0.80-1.22)	0.84(0.48-1.51)	1.17(0.91-1.15)

Adjusted for age (continuous), sex (male, female), ethnicity (White or other), household income (>100000, 52 000–100 000, 31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), smoking status (current, former or never), physical activity level (low, moderate, or high), the Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee and tea intake, energy intake (continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), and aspirin use (yes or no).

Supplemental Table 6. Associations of specific types of breakfast cereal consumption with all-cause and cause-specific mortality after adjustment for different breakfast cereal types.

Exposure	CVD incidence	CVD-specific mortality	All-cause mortality
Breakfast cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1.5	0.99(0.91-1.07)	0.71(0.57-0.90)	0.88(0.79-0.98)
≥1.5	0.85(0.74-0.95)	0.63(0.49-0.86)	0.83(0.71-0.95)
Porridge, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.86(0.69-1.09)	0.81(0.42-1.53)	0.85(0.69-1.23)
≥1	0.88(0.80-0.97)	0.75(0.59-0.98)	0.82(0.71-0.94)
Muesli, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.88(0.78-1.05)	0.69(0.44-1.13)	0.72(0.53-0.95)
≥1	0.87(0.74-0.98)	0.72(0.44-0.97)	0.82(0.65-0.98)
Plain cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	0.98(0.83-1.21)	0.86(0.45-1.37)	1.08(0.81-1.27)
≥1	1.07(0.89-1.28)	1.06(0.78-1.43)	1.03(0.95-1.17)
Bran cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)

0-1	0.96(0.81-1.14)	0.79(0.53-1.34)	0.89(0.71-1.12)
≥1	0.78(0.82-1.10)	0.81(0.61-1.17)	0.88(0.76-1.14)
Whole wheat cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-1	1.07(0.87-1.23)	0.95(0.64-1.53)	0.87(0.69-1.10)
≥1	0.96(0.89-1.07)	0.88(0.69-1.12)	1.09(0.98-1.24)
Oat crunch, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.85(0.61-1.23)	0.54(0.23-1.82)	0.85(0.57-1.23)
> 0.5	1.05(0.81-1.37)	0.94(0.53-1.97)	1.00(0.71-1.47)
Sweetened cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	0.93(0.63-1.41)	1.21(0.53-2.91)	1.23(0.78-1.95)
> 0.5	1.28(1.03-1.59)	1.17(0.69-1.98)	1.29(1.04-1.67)
Other cereal, bowls			
0	1.00(Reference)	1.00(Reference)	1.00(Reference)
0-0.5	1.10(0.84-1.50)	0.92(0.41-2.06)	0.79(0.57-1.23)
> 0.5	1.03(0.83-1.24)	0.86(0.49-1.56)	1.21(0.91-1.25)

Adjusted for age (continuous), sex (male, female), ethnicity (White or other), household income (>100000, 52 000–100 000, 31 000–51 999, 18 000–30 999, or <18 000£), education level (degree or no degree), BMI (continuous), smoking status (current, former or never), physical activity level (low, moderate, or high), the Townsend deprivation index, vitamin use (yes or no), mineral and other dietary supplement use (yes or no), healthy sleep pattern (yes or no), family history of CVD (yes or no), family history of cancer (yes or no), coffee and tea intake, energy

intake (continuous) and a modified AHEI score, hypertension (yes or no), hypercholesterolemia (yes or no), aspirin use (yes or no), porridge (yes or no), muesli (yes or no), plain cereal (yes or no), bran cereal (yes or no), whole wheat cereal (yes or no), oat crunch (yes or no), sweetened cereal (yes or no), and other cereal (yes or no).