Supplementary Figure 1. Questions asking about habitual consumption of oily fish and non-oily fish in the UK Biobank
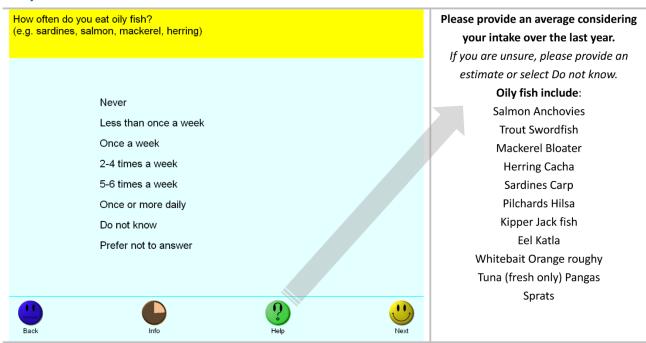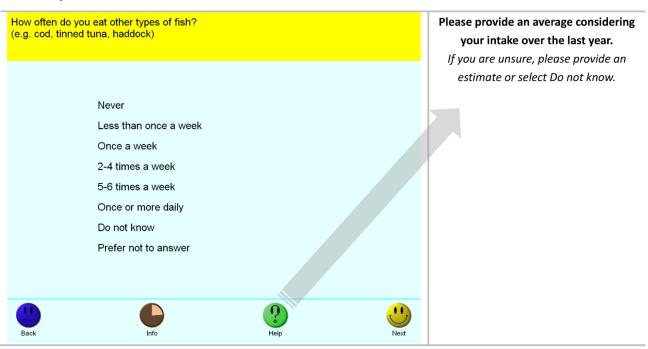
Oily fish

How often do you eat oily fish?
(e.g. sardines, salmon, mackerel, herring)

Never

Less than once a week

Once a week

2-4 times a week

5-6 times a week

Once or more daily

Do not know

Prefer not to answer

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Please provide an average considering your intake over the last year.
If you are unsure, please provide an estimate or select Do not know.
Oily fish include:
Salmon Anchovies
Trout Swordfish
Mackerel Bloater
Herring Cacha
Sardines Carp
Pilchards Hilsa
Kipper Jack fish
Eel Katla
Whitebait Orange roughy
Tuna (fresh only) Pangas
Sprats

Non-oily fish

How often do you eat other types of fish?
(e.g. cod, tinned tuna, haddock)

Never

Less than once a week

Once a week

2-4 times a week

5-6 times a week

Once or more daily

Do not know

Prefer not to answer

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Please provide an average considering your intake over the last year.
If you are unsure, please provide an estimate or select Do not know.

Supplementary Table 1. Baseline participant characteristics according to fish oil supplement use

	Regular use of fish oil supplements	
	No	**Yes**
No of participants	268,937	123,350
Age, years	54.8 ± 8.1	58.1 ± 7.5
Men, %	46.1	42.7
White ethnicity, %	90.6	91.4
Townsend deprivation index >0*	28.4	24.7
Smoking status, %		
Never	57.1	55.4
Former	31.8	36.6
Current	11.1	8.0
Alcohol 1-4 drinks/week, %	49.9	50.9
Total PA, MET-h/week	43.2 ± 44.8	48.1 ± 46.3
MVPA meets guideline†, %	52.9	59.5
BMI, kg/m^2	27.2 ± 4.7	26.9 ± 4.4
Hypertension, %	51.6	56.8
Hyperlipidemia, %	10.9	14.1
Coffee, cups/d	2.1 ± 2.1	1.9 ± 1.9
Cereal, bowls/d	0.6 ± 0.4	0.7 ± 0.4
Fresh fruit, pieces/d	2.1 ± 1.6	2.4 ± 1.6
Fresh vegetables, heaped tablespoons/d	4.8 ± 3.3	5.1 ± 3.3
Red meat ≥2 servings/week, %	50.0	49.5
Poultry ≥2 servings/week, %	48.4	48.5
Processed meat ≥2 servings/week, %	31.9	28.0
Oily fish ≥2 servings/week	15.4	22.1
Non-oily fish ≥2 servings/week	15.4	18.0

Data are presented as mean ± SD unless where otherwise indicated. BMI, body mass index; MET, metabolic equivalent; MVPA, moderate-to-vigorous physical activity; NA, not applicable; PA, physical activity.

*A higher Townsend deprivation index indicates a greater degree of deprivation (or lower socioeconomic status).

†At or above 150 min/week of moderate activity or 75 min/week of vigorous activity.

Supplementary Table 2. Subgroup analysis for the associations of oily and non-oily fish intake and fish oil supplements with risk of type 2 diabetes*

Subgroup	Cases, n	Oily fish, per 1 serv/week			Non-oily fish, per 1 serv/week			Fish oil, yes vs. no		
		RR (95% CI)	P	P-int	RR (95% CI)	P	P-int	RR (95% CI)	P	P-int
Age										
<60 y	3,464	0.92 (0.87-0.97)	0.003	0.660	0.99 (0.94-1.03)	0.570	0.670	0.91 (0.84-0.98)	0.017	0.560
≥60 y	3,798	0.93 (0.89-0.98)	0.003		0.99 (0.95-1.04)	0.790		0.91 (0.85-0.97)	0.004	
Sex										
Women	3,197	0.93 (0.88-0.98)	0.012	0.620	0.96 (0.92-1.01)	0.170	0.230	0.89 (0.82-0.96)	0.003	0.870
Men	4,065	0.92 (0.87-0.96)	<0.001		1.01 (0.96-1.06)	0.730		0.92 (0.86-0.99)	0.026	
Smoking status										
Never	3,375	0.93 (0.89-0.99)	0.012	0.220	0.96 (0.91-1.01)	0.082	0.360	0.90 (0.83-0.97)	0.006	0.650
Former	2,802	0.94 (0.89-0.995)	0.034		1.04 (0.98-1.10)	0.230		0.93 (0.86-1.01)	0.075	
Current	1,060	0.87 (0.79-0.95)	0.004		0.99 (0.91-1.08)	0.860		0.90 (0.78-1.04)	0.160	
Alcohol drinking										
Never	883	0.87 (0.79-0.96)	0.006	0.360	1.05 (0.96-1.14)	0.280	0.590	0.77 (0.66-0.91)	0.002	0.048
≤2 drinks/week	3,868	0.94 (0.89-0.99)	0.013		0.98 (0.93-1.02)	0.290		0.95 (0.89-1.02)	0.150	
>2 drinks/week	2,507	0.93 (0.88-0.99)	0.026		0.98 (0.92-1.05)	0.580		0.90 (0.82-0.98)	0.015	
BMI										
<25	628	0.83 (0.74-0.94)	0.004	0.029	1.07 (0.96-1.20)	0.220	0.020	0.75 (0.63-0.89)	0.001	0.017
25-<30	2,492	0.90 (0.85-0.96)	0.001		0.93 (0.88-0.99)	0.025		0.85 (0.78-0.93)	<0.001	
≥30	4,075	0.96 (0.92-1.01)	0.092		1.00 (0.96-1.05)	0.950		0.99 (0.93-1.06)	0.820	
Meet PA recommendation										
No	3,027	0.90 (0.85-0.96	<0.001	0.340	1.00 (0.95-1.05)	0.900	0.990	0.94 (0.87-1.03)	0.230	0.560
Yes	2,643	0.94 (0.89-0.996)	0.035		0.96 (0.91-1.02)	0.200		0.91 (0.84-0.99)	0.027	
Hypertension										
No	1,700	0.88 (0.81-0.94)	<0.001	0.480	1.03 (0.96-1.10)	0.410	0.290	0.85 (0.76-0.95)	0.004	0.630
Yes	5,562	0.94 (0.90-0.98)	0.002		0.97 (0.94-1.01)	0.190		0.92 (0.87-0.98)	0.007	
Hyperlipidemia										
No	5,259	0.91 (0.87-0.95)	<0.001	0.280	1.00 (0.96-1.04)	0.960	0.370	0.87 (0.82-0.92)	<0.001	0.035
Yes	2,003	0.96 (0.89-1.02)	0.170		0.96 (0.89-1.02)	0.180		1.01 (0.92-1.10)	0.920	

Fish oil supplement										
No	5,111	0.89 (0.85-0.94)	<0.001	0.005	0.98 (0.94-1.02)	0.340	0.310	NA	NA	NA
Yes	2,151	0.98 (0.92-1.04)	0.500		1.01 (0.95-1.08)	0.440		NA	NA	
Oily fish intake										
<1 serv/week	3,463	NA	NA	NA	0.96 (0.91-1.00)	0.053	0.037	0.86 (0.79-0.93)	<0.001	0.044
≥1 serv/week	3,799	NA	NA		1.02 (0.97-1.07)	0.450		0.94 (0.88-1.01)	0.100	
Processed meat intake										
<2 serv/week	4,477	0.93 (0.89-0.98)	0.003	0.670	0.99 (0.94-1.03)	0.510	0.920	0.91 (0.85-0.97)	0.003	0.730
≥2 serv/week	2,785	0.91 (0.86-0.96)	0.001		0.99 (0.94-1.05)	0.700		0.92 (0.84-0.998)	0.044	

*Where appropriate, results were adjusted for covariates listed for model 3 in the footnotes to Table 2 (for fish) or Table 3 (for fish oil) in the article.

Supplementary Table 3. Associations of oily and non-oily fish intake and fish oil supplements with risk of type 2 diabetes in 86,204 obese participants (BMI ≥30 kg/m^2), according to hypertension/hyperlipidemia status*

Subgroup	Cases, n	Oily fish, per 1 serv/week			Non-oily fish, per 1 serv/week			Fish oil, yes vs. no		
		RR (95% CI)	P	P-int	RR (95% CI)	P	P-int	RR (95% CI)	P	P-int
Hypertension										
Yes	3,283	0.97 (0.92-1.02)	0.21	0.95	0.99 (0.94-1.04)	0.59	0.24	1.03 (0.95-1.11)	0.48	0.10
No	792	0.93 (0.83-1.04)	0.18		1.06 (0.96-1.17)	0.24		**0.83 (0.70-0.99)**	**0.033**	
Hyperlipidemia										
Yes	1,143	1.00 (0.91-1.09)	0.91	0.75	0.95 (0.87-1.04)	0.26	0.24	1.11 (0.98-1.26)	0.090	0.081
No	2,932	0.95 (0.90-1.00)	0.060		1.02 (0.97-1.08)	0.44		0.94 (0.86-1.02)	0.15	
Hypertension & hyperlipidemia										
With both	1,042	1.01 (0.92-1.10)	0.88	0.80	0.95 (0.87-1.05)	0.32	0.13	1.10 (0.96-1.25)	0.16	**0.022**
With only one	2,342	0.95 (0.89-1.01)	0.080		1.00 (0.94-1.06)	0.97		1.00 (0.91-1.10)	0.96	
With neither	691	0.94 (0.84-1.05)	0.29		1.09 (0.98-1.21)	0.13		**0.77 (0.64-0.93)**	**0.006**	

*Where appropriate, results were adjusted for covariates listed for model 3 in the footnotes to Table 2 (for fish) or Table 3 (for fish oil) in the article.

Supplementary Table 4. Oily and non-oily fish intake and fish oil supplements in relation to risk of type 2 diabetes, excluding 142,530 participants who reported major dietary changes in the past 5 years

	No. of cases/participants	HR (95% CI), model 3
Oily fish intake		
Never	555/27,868	1.00 (Referent)
<1 serving/week	1,355/88,312	0.84 (0.75-0.94)
1 serving/week	1,317/94,699	0.78 (0.70-0.88)
≥2 servings/week	524/38,878	0.73 (0.64-0.84)
P for trend		<0.001
Per 1 serving/week	3,751/249,757	0.90 (0.85-0.95)
Non-oily fish intake		
Never	208/12,159	1.00 (Referent)
<1 serving/week	1,131/74,682	0.90 (0.77-1.07)
1 serving/week	1,907/125,504	0.96 (0.82-1.14)
≥2 servings/week	505/37,412	0.88 (0.73-1.06)
P for trend		0.40
Per 1 serving/week	3,751/249,757	0.98 (0.93-1.03)
Fish oil supplements		
0 (No)	2,659/173,335	1.00 (Referent)
1 (Yes)	1,092/76,422	0.93 (0.86-1.00)
P value		0.053

Supplementary Table 5. Oily and non-oily fish intake and fish oil supplements in relation to risk of type 2 diabetes, excluding 2,084 incident cases that occurred within the first 4 years of follow-up

	No. of cases/participants	HR (95% CI), model 3
Oily fish intake		
Never	735/42,333	1.00 (Referent)
<1 serving/week	1,753/131,589	0.86 (0.78-0.95)
1 serving/week	1,804/147,895	0.80 (0.72-0.88)
≥2 servings/week	886/68,386	0.80 (0.72-0.90)
P for trend		<0.001
Per 1 serving/week	5,178/390,203	0.93 (0.89-0.97)
Non-oily fish intake		
Never	283/18,118	1.00 (Referent)
<1 serving/week	1,496/114,177	0.88 (0.76-1.02)
1 serving/week	2,593/194,571	0.94 (0.81-1.08)
≥2 servings/week	806/63,337	0.88 (0.75-1.02)
P for trend		0.25
Per 1 serving/week	5,178/390,203	0.98 (0.94-1.02)
Fish oil supplements		
0 (No)	3,648/267,474	1.00 (Referent)
1 (Yes)	1,530/122,729	0.92 (0.86-0.97)
P value		0.005

Supplementary Table 6. Oily and non-oily fish intake and fish oil supplements in relation to risk of type 2 diabetes, adjusting for metabolic biomarkers*

	No. of cases/ participants	Model 3	Model 3 + triglycerides	Model 3 + HDL-C	Model 3 + non-HDL-C	Model 3 + CRP	Model 3 + HbA1c
Oily fish intake							
Never	876/36,738	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
<1 serving/week	2,083/113,952	0.85 (0.79-0.93)	0.86 (0.79-0.94)	0.87 (0.80-0.95)	0.85 (0.78-0.93)	0.86 (0.79-0.94)	0.84 (0.77-0.92)
1 serving/week	2,236/128,170	0.81 (0.74-0.88)	0.84 (0.77-0.92)	0.84 (0.77-0.92)	0.81 (0.74-0.88)	0.83 (0.76-0.90)	0.80 (0.73-0.88)
≥2 servings/week	1,069/59,274	0.78 (0.71-0.87)	0.85 (0.77-0.94)	0.84 (0.76-0.93)	0.78 (0.71-0.87)	0.81 (0.73-0.90)	0.79 (0.71-0.88)
P for trend		<0.001	0.016	0.005	<0.001	0.001	<0.001
Per 1 serving/week	6,264/338,134	0.93 (0.89-0.96)	0.96 (0.92-1.00)	0.95 (0.92-0.99)	0.93 (0.89-0.96)	0.94 (0.90-0.97)	0.93 (0.89-0.97)
Non-oily fish intake							
Never	335/15,636	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
<1 serving/week	1,782/98,731	0.86 (0.75-0.98)	0.88 (0.78-1.01)	0.88 (0.77-1.00)	0.86 (0.75-0.98)	0.86 (0.76-0.98)	0.92 (0.81-1.06)
1 serving/week	3,148/168,793	0.91 (0.81-1.04)	0.94 (0.82-1.07)	0.94 (0.82-1.07)	0.91 (0.80-1.04)	0.92 (0.81-1.05)	0.98 (0.86-1.12)
≥2 servings/week	999/54,974	0.87 (0.76-1.01)	0.90 (0.78-1.04)	0.90 (0.78-1.04)	0.87 (0.76-1.00)	0.88 (0.77-1.02)	0.94 (0.81-1.08)
P for trend		0.28	0.40	0.49	0.28	0.41	0.49
Per 1 serving/week	6,264/338,134	0.98 (0.94-1.02)	0.99 (0.95-1.02)	0.99 (0.95-1.02)	0.98 (0.94-1.02)	0.98 (0.95-1.02)	0.99 (0.95-1.02)
Fish oil supplements							
0 (No)	4,406/231,801	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
1 (Yes)	1,858/106,333	0.90 (0.86-0.96)	0.89 (0.85-0.94)	0.92 (0.87-0.97)	0.90 (0.85-0.95)	0.91 (0.86-0.96)	0.89 (0.84-0.95)
P value		<0.001	<0.001	0.002	<0.001	0.001	<0.001

CRP, C-reactive protein; HbA1c, hemoglobin A1c; HDL-C, high-density lipoprotein cholesterol.

*The analyses included 338,134 participants with measurements of all metabolic biomarkers. Covariates for model 3 were listed in the footnotes to Table 2 (for fish) or Table 3 (for fish oil) in the article, and further included fasting time (hours) for blood samples.