

SUPPLEMENTARY DATA

Supplementary Table 1. Mediation Analyses

	Odds Ratio and Confidence Interval of Group Effect		
	Hyperfiltration	Elevated UAE	Hypertension
Direct group effect	4.71 (0.39, 57.39)	0.97 (0.08, 12.39)	1.20 (0.16, 9.05)
Combination of direct group effect and indirect (mediation) effect from the <i>change in HbA1c</i>	11.57 (1.08, 123.73) <i>Increased 6.86 folds</i>	2.97 (0.38, 23.14) <i>Increased 2.00 folds</i>	2.08 (0.30, 14.64) <i>Increased 0.88 folds</i>
Combination of direct group effect and indirect (mediation) effect from the <i>change in BMI</i>	4.40 (0.47, 41.60) <i>Decreased 0.31 folds</i>	1.52 (0.13, 18.18) <i>Increased 0.55 folds</i>	2.44 (0.35, 17.16) <i>Increased 1.24 folds</i>
Combination of direct group effect and indirect (mediation) effect from the change in <i>insulin sensitivity</i>	4.73 (0.40, 55.90) <i>Increased 0.02 folds</i>	1.01 (0.08, 12.63) <i>Increased 0.04 folds</i>	1.18 (0.15, 9.11) <i>Decreased 0.02 folds</i>
Combination of direct group effect and indirect (mediation) effect from the change in <i>triglycerides</i>	4.87 (0.39, 60.98) <i>Increased 0.16 folds</i>	1.77 (0.15, 21.34) <i>Increased 0.80 folds</i>	1.23 (0.17, 9.03) <i>Increased 0.03 folds</i>
Strongest Mediator	<i>Change in HbA1c</i>	<i>Change in HbA1c</i>	<i>Change in BMI</i>

Data are presented as odds ratios (OR) and 95% confidence intervals (CI) of group effect (TODAY vs. Teen-LABS, Teen-LABS as reference) from GEE models with change BMI, HbA1c and insulin sensitivity included as time-dependent variables. All models adjusted for baseline outcomes (hyperfiltration, increased UAE, or hypertension), in addition to baseline age, sex, HbA1c, BMI, insulin sensitivity, triglycerides. Please note, models for hyperfiltration and increased UAE were adjusted for baseline anti-HTN medicine use. Model for hypertension was not adjusted for baseline anti-HTN medicine use due to collinearity. The mediation analyses for hyperfiltration and hypertension use compound symmetry as their covariance structure. The mediation analysis for elevated UAE use an autoregressive covariance structure.

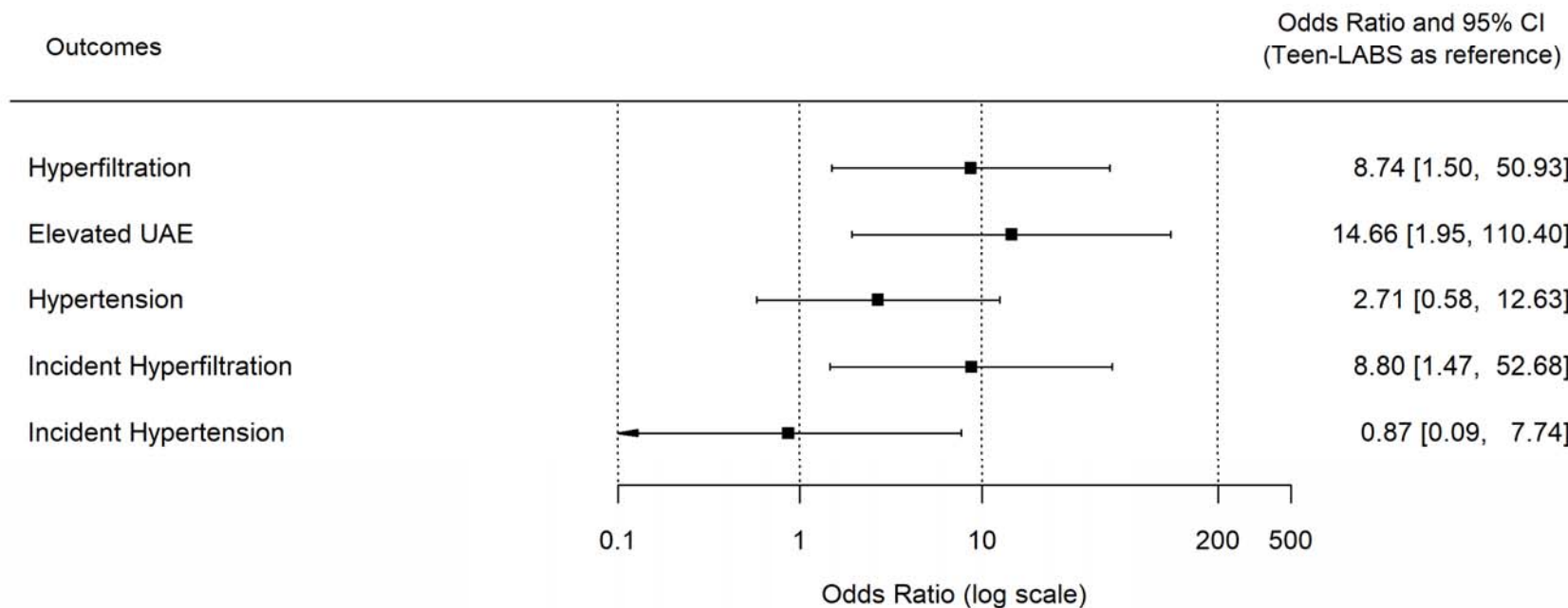
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Supplementary Table 2. Metabolic and Renal Data at Baseline and 5 Year Follow-up in Teen-LABS and TODAY Studies

	Teen LABS Study		TODAY Study	
	Baseline	5 years	Baseline	5 years
<i>Age (years)</i>				
No. with data	30	24	63	38
Mean (95% CI)	16.9 (16.5, 17.4)	22.0 (21.4, 22.5)	15.4 (15.0, 15.7)	20.18 (19.73, 20.64)
Range	(14.3, 19.4)	(19.7, 24.4)	(13.0, 18.0)	(18.0, 23.0)
<i>Female sex, %</i>	70%	70.8%	55.6%	57.9%
<i>Body Mass Index (kg/m²)</i>				
No. with data	30	22	63	35
Mean (95% CI)	54.4 (50.8, 58.0)	42.9 (37.0, 48.8)	40.5 (39.3, 41.8)	41.7 (39.3, 44.0)
<i>Weight (kg)</i>				
No. with data	30	24	63	37
Mean (95% CI)	155.1 (142.7, 167.5)	124.1 (106.8, 141.3)	117.4 (113.5, 121.2)	123.7 (117.5, 129.9)
<i>HbA1c (%)</i>				
No. with data	27	22	63	37
Mean (95% CI)	6.8 (6.1, 7.6)	5.9 (5.0, 6.8)	6.2 (6.0, 6.4)	8.8 (8.0, 9.7)
<i>Insulin sensitivity (1/IF, mL/μU)</i>				
No. with data	29	22	63	37
Mean (95% CI)	0.04 (0.02, 0.05)	0.12 (0.07, 0.17)	0.04 (0.03, 0.05)	0.03 (0.02, 0.05)
<i>Triglycerides (mg/dL)</i>				
No. with data	29	22	63	37
Mean (95% CI)	152.7 (126.6, 178.7)	91.59 (75.3, 107.9)	132.0 (106.7, 157.2)	187.0 (137.6, 236.4)
<i>UACR (mg/g)</i>				
No. with data	30	20	61	35
Median (Q1, Q3)	11.4 (4.7, 32.3)	5.9 (4.0, 7.4)	10.3 (5.0, 22.4)	16.9 (4.7, 61.4)
<i>eGFR (ml/min/1.73m²)</i>				
No. with data	29	22	42	29
Mean (95% CI)	118 (109, 126)	120 (112, 129)	115 (110, 119)	136 (127, 145)

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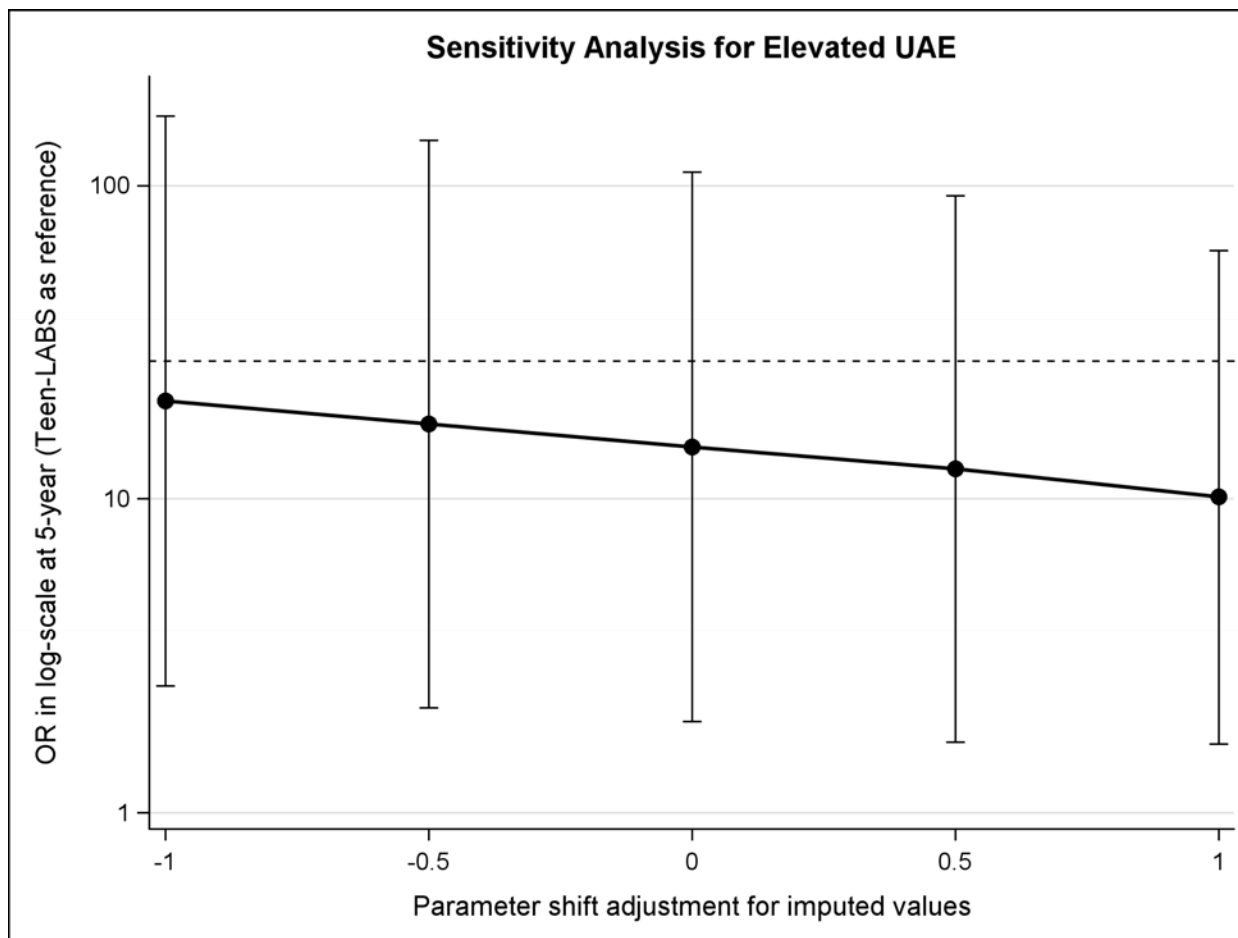
Supplementary Figure 1. Forest plots for odds of DKD and hypertension at year 5 with multiple imputations (under MAR)



Forest plot for odds ratios (ORs) of group effect. Teen-LABS is the reference group. The X axis is in log scale. ORs on the left-hand-side of one favor TODAY, ORs on the right-hand-side of one favor Teen-LABS. Numbers next to the forest plot indicate ORs and 95% confidence intervals (CI, lower bound, upper bound). Hyperfiltration, elevated UAE, and incident hyperfiltration models were adjusted for baseline age, sex, BMI, HbA1c, insulin sensitivity, triglycerides and antihypertensive use. Baseline antihypertensive use was not included in hypertension and incident hypertension models due to collinearity. Multiple imputation by chained equations (FCS in SAS) employed; fifty imputed data sets were generated. SAS PROC MIANALYZE was used to estimate the pooled results of fifty fittings.

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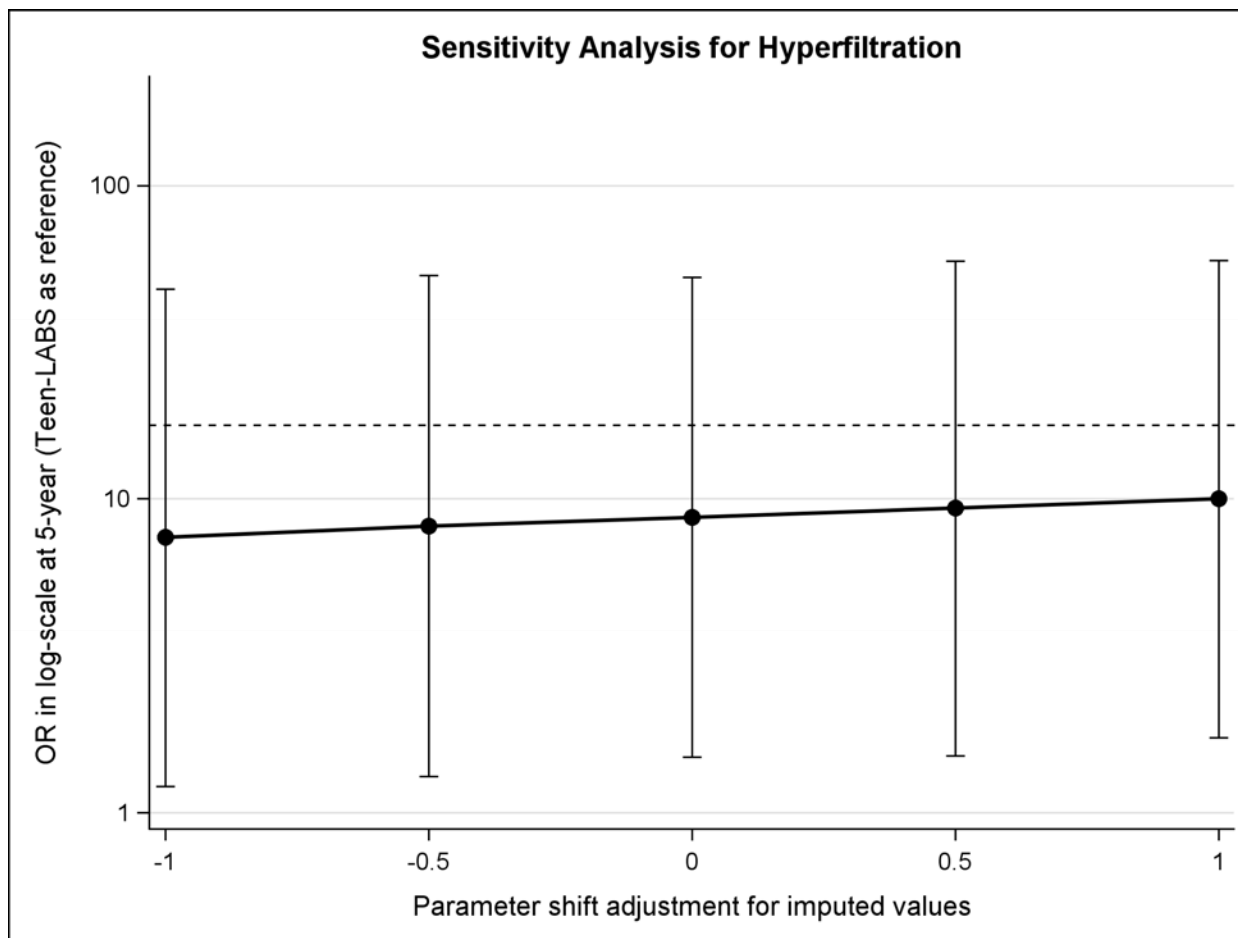
Supplementary Figure 2. Sensitivity Analyses for Elevated UAE



X axis: the shift parameter for imputed values under missing not at random (MNAR) adjustment; Y axis: odds ratio on log-scale of group effect (TODAY vs Teen-LABS) at 5-year; Dashed line indicates the odds ratio provided in the main analyses for elevated UAE (OR = 27.46); Black dots and error bars stand for odds ratio (mean and 95% CI) at 5-year when shift adjustment (-1, -0.5, 0 [no adjustment], 0.5, and 1) was made to elevated UAE imputation. The odds ratio provided in the main analyses lies in all confidence intervals of sensitivity adjustments, which indicates a reliable conclusion has been made.

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Supplementary Figure 3. Sensitivity Analyses for Hyperfiltration



X axis: the shift parameter for imputed values under missing not at random (MNAR) adjustment; Y axis: odds ratio on log-scale of group effect (TODAY vs Teen-LABS) at 5-year; Dashed line indicates the odds ratio provided in the main analyses for hyperfiltration (OR = 17.15); Black dots and error bars stand for odds ratio (mean and 95% CI) at 5-year when shift adjustment (-1, -0.5, 0 [no adjustment], 0.5, and 1) was made to hyperfiltration imputation. The odds ratio provided in the main analyses lies in all confidence intervals of sensitivity adjustments, which indicates a reliable conclusion has been made.

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