

SUPPLEMENTARY MATERIAL

LONGITUDINAL AND SECULAR TRENDS IN TOTAL CHOLESTEROL LEVELS AND LIPID-LOWERING DRUG USE AMONG NORWEGIAN WOMEN AND MEN BORN 1905-1977 IN THE POPULATION-BASED TROMSØ STUDY 1979-2016

Laila Arnesdatter Hopstock^{1,2}, Kaare Harald Bønnaa^{1,3,4}, Anne Elise Eggen¹, Sameline Grimsgaard¹, Bjarne K. Jacobsen¹, Maja-Lisa Løchen^{1,5}, Ellisiv B. Mathiesen^{6,7}, Inger Njølstad¹, Tom Wilsgaard¹.

¹Department of Community Medicine, UiT The Arctic University of Norway, Tromsø, Norway; ²Department of Health and Care Sciences, UiT The Arctic University of Norway, Tromsø, Norway; ³Department of Public Health and General Practice, Norwegian University of Science and Technology, Trondheim, Norway; ⁴Clinic for Heart Disease, St. Olavs University Hospital, Trondheim, Norway; ⁵Department of Cardiology, University Hospital of North Norway, Tromsø, Norway; ⁶Department of Clinical Medicine, UiT The Arctic University of Norway, Tromsø, Norway; ⁷Department of Neurology, University Hospital of North Norway, Tromsø, Norway.

Correspondence to Laila Arnesdatter Hopstock, Department of Community Medicine, UiT The Arctic University of Norway, N-9037 Tromsø, Norway. Fax: +47 77 64 48 31.

Telephone: +47 77 64 40 00. E-mail: laila.hopstock@uit.no.

Supplementary material Table 1. Descriptive characteristics by survey for participants aged 40-59 years^a. The Tromsø Study 1979-2016.

Age group	Tromsø 2	Tromsø 3	Tromsø 4	Tromsø 5	Tromsø 6	Tromsø 7
	1979-80	1986-87	1994-95	2001	2007-08	2015-16
	n=4685	n=8030	n=11045	n=2434	n=5938	n=12404
Male sex	58.7 (2827)	56.2 (4272)	53.2 (5481)	50.6 (966)	48.4 (2785)	45.4 (5812)
Total cholesterol, mmol/l	6.56 (1.25)	6.31 (1.24)	6.23 (1.22)	5.99 (1.13)	5.57 (1.04)	5.35 (1.02)
HDL cholesterol, mmol/l	1.85 (0.50)	1.72 (0.41)	1.69 (0.41)	1.56 (0.38)	1.62 (0.41)	1.68 (0.46)
Triglycerides, mmol/l	1.21 (0.93)	1.22 (0.93)	1.33 (1.09)	1.35 (1.06)	1.31 (1.11)	1.30 (1.03)
Systolic blood pressure, mmHg ^b	129.6 (16.8)	127.7 (17.0)	129.0 (17.2)	124.1 (17.4)	123.1 (18.6)	119.4 (17.5)
Diastolic blood pressure, mmHg ^b	83.7 (10.4)	78.7 (10.9)	77.6 (11.4)	76.5 (11.0)	75.4 (10.5)	72.6 (10.1)
Body mass index, kg/m ²	24.0 (3.3)	24.2 (3.4)	25.0 (3.8)	26.1 (4.3)	26.3 (4.3)	26.8 (4.7)
Daily smoker. %	49.3 (2233)	45.6 (3491)	40.1 (4393)	34.4 (843)	23.2 (1418)	15.3 (1830)

^aValues are means (standard deviation) or percent (number). Means and percent are age and sex adjusted using linear mixed models of generalized estimating equations.

^bBlood pressure was measured manually with Erkameter in Tromsø 2 and measured automatically with Dinamap in Tromsø 3 and later.

Supplementary material Table 2. Population 20th, 50th and 80th percentiles of total cholesterol (mmol/L) in women, by survey and age group. The Tromsø Study 1979-2016.

Age group	Tromsø 2 1979-80 n=8110	Tromsø 3 1986-87 n=10131	Tromsø 4 1994-95 n=14142	Tromsø 5 2001-02 n=4560	Tromsø 6 2007-08 n=6833	Tromsø 7 2015-16 n=10989
20 th percentile						
20-29 years	4.4	4.2	4.3	.	.	
30-39 years	4.8	4.5	4.5	4.3	4.1	
40-49 years	5.3	5.0	4.9	4.7	4.4	4.3
50-59 years	.	5.8	5.6	5.5	5.0	4.9
60-69 years	.	.	6.1	5.6	5.1	5.0
70-79 years	.	.	6.1	5.7	5.0	4.7
80-89 years	.	.	5.9	5.7	5.0	4.6
50 th percentile						
20-29 years	5.1	4.8	5.0	.	.	.
30-39 years	5.6	5.2	5.2	5.0	4.8	.
40-49 years	6.2	5.9	5.7	5.5	5.1	5.0
50-59 years	.	6.8	6.7	6.4	5.8	5.7
60-69 years	.	.	7.1	6.5	6.0	5.9
70-79 years	.	.	7.1	6.7	5.9	5.7
80-89 years	.	.	7.0	6.6	6.0	5.5
80 th percentile						
20-29 years	6.0	5.7	5.8	.	.	.
30-39 years	6.6	6.1	6.1	5.8	5.4	.
40-49 years	7.3	6.9	6.8	6.4	5.9	5.8
50-59 years	.	7.9	7.7	7.4	6.8	6.5
60-69 years	.	.	8.2	7.5	6.9	6.8
70-79 years	.	.	8.3	7.6	6.9	6.6
80-89 years	.	.	8.1	7.6	7.0	6.6

Supplementary material Table 3. Population 20th, 50th and 80th percentiles of total cholesterol (mmol/L) in men, by survey and age group. The Tromsø Study 1979-2016.

Age group	Tromsø 2 1979-80 n=8449	Tromsø 3 1986-87 n=10373	Tromsø 4 1994-95 n=12769	Tromsø 5 2001-02 n=3468	Tromsø 6 2007-08 n=5994	Tromsø 7 2015-16 n=9936
20 th percentile						
20-29 years	4.4	4.1	4.3	.	.	
30-39 years	5.0	4.8	4.8	4.6	4.3	
40-49 years	5.5	5.3	5.2	5.2	4.7	4.6
50-59 years	5.8	5.6	5.5	5.4	4.9	4.7
60-69 years	.	5.5	5.5	5.1	4.6	4.4
70-79 years	.	.	5.5	5.0	4.4	4.0
80-89 years	.	.	5.0	5.1	4.1	3.8
50 th percentile						
20-29 years	5.1	4.9	5.1	.	.	.
30-39 years	5.9	5.6	5.6	5.3	5.0	.
40-49 years	6.5	6.2	6.1	5.9	5.5	5.4
50-59 years	6.8	6.5	6.4	6.4	5.7	5.5
60-69 years	.	6.4	6.5	6.0	5.5	5.3
70-79 years	.	.	6.4	5.9	5.2	5.0
80-89 years	.	.	6.1	5.8	5.0	4.7
80 th percentile						
20-29 years	6.1	5.7	5.9	.	.	.
30-39 years	6.9	6.6	6.6	6.2	6.0	.
40-49 years	7.6	7.2	7.1	6.8	6.4	6.2
50-59 years	7.8	7.5	7.4	7.4	6.5	6.4
60-69 years	.	7.4	7.5	7.0	6.4	6.2
70-79 years	.	.	7.5	6.9	6.2	6.0
80-89 years	.	.	7.1	6.6	6.1	5.8

Supplementary material Table 4. Mean population total cholesterol (mmol/L) in those who participated in Tromsø 6 only (first participation 2008) or both Tromsø 4 and 6 (repeated participation both 1994 and 2008), with corresponding number of observations (n), by sex and age group. The Tromsø Study 1994-2008.

Age group in Tromsø 6	Tromsø 6 2008 only	Tromsø 4 1994 and Tromsø 6 2008	Difference Tromsø 6 2008 only vs both Tromsø 4 1994 and Tromsø 6 2008
Women			
40-49 years	5.09 (n=622)	5.26 (n=1256)	0.17**
50-59 years	5.85 (n=223)	5.91 (n=1052)	0.06
60-69 years	6.01 (n=171)	6.00 (n=1910)	-0.01
70-79 years	6.03 (n=69)	5.95 (n=904)	-0.08
Men			
40-49 years	5.50 (n=639)	5.63 (n=1007)	0.13*
50-59 years	5.80 (n=212)	5.66 (n=927)	-0.14
60-69 years	5.58 (n=203)	5.49 (n=1776)	-0.09
70-79 years	5.41 (n=39)	5.28 (n=789)	-0.13

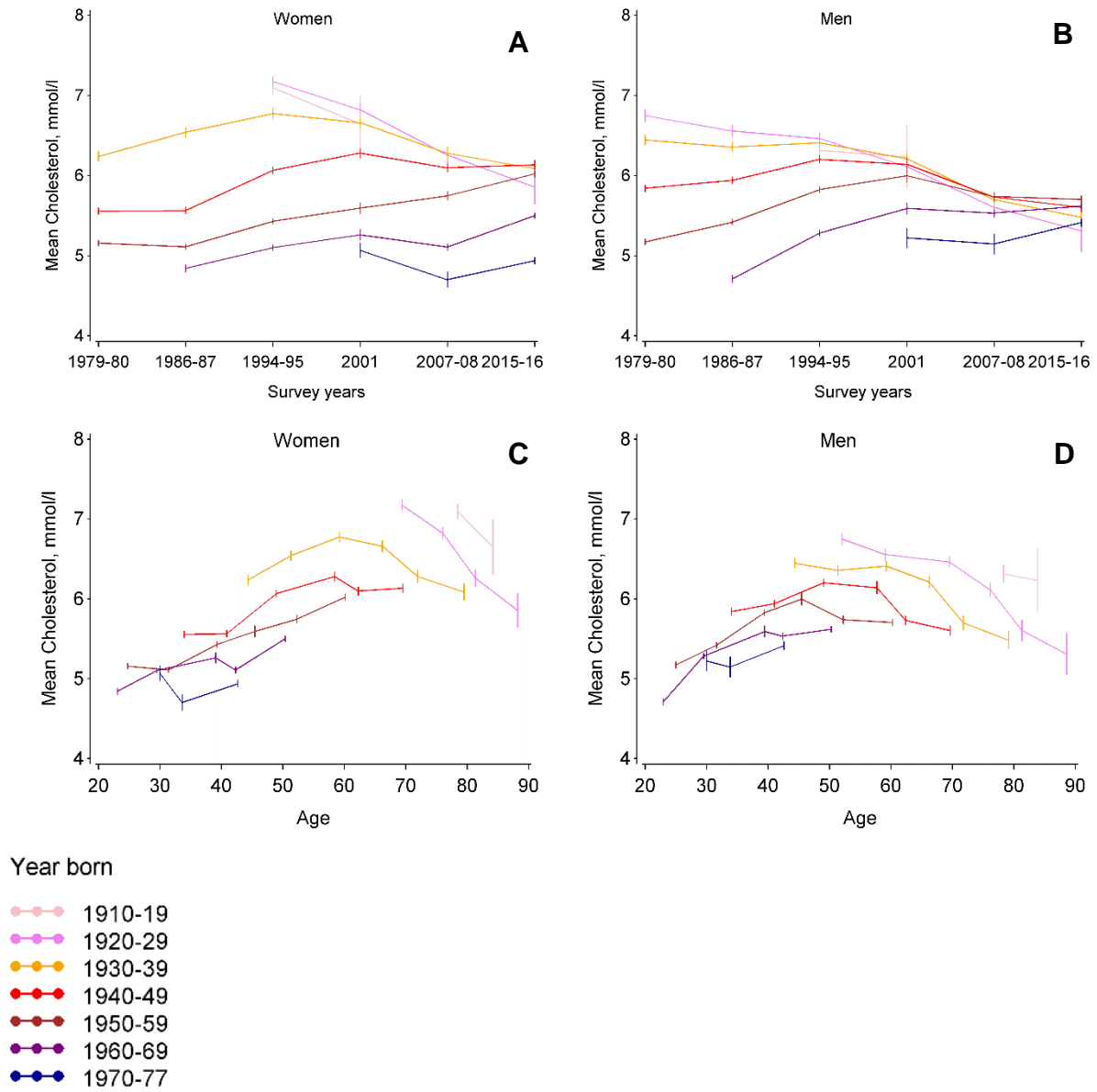
* p=0.02, **p=0.0005

Supplementary material Table 5. Mean population total cholesterol (mmol/L) in those who participated in Tromsø 4 only (lost to follow-up in Tromsø 6) or both Tromsø 4 and 6 (repeated participation both 1994 and 2008), with corresponding number of observations (n), by sex and age group. The Tromsø Study 1994-2008.

Age group in Tromsø 4	Tromsø 4 1994 only	Tromsø 4 1994 and Tromsø 6 2008	Difference Tromsø 6 2008 only vs both Tromsø 4 1994 and Tromsø 6 2008
Women			
20-29 years	5.07 (n=1121)	5.05 (n=658)	-0.02
30-39 years	5.31 (n=2610)	5.35 (n=963)	0.04
40-49 years	5.81 (n=1903)	5.91 (n=1459)	0.10*
50-59 years	6.83 (n=676)	6.66 (n=1522)	-0.17*
60-69 years	7.22 (n=862)	7.06 (n=753)	-0.16
70-79 years	7.23 (n=1082)	7.33 (n=135)	0.10
Men			
20-29 years	5.12 (n=1015)	5.21 (n=488)	0.09
30-39 years	5.67 (n=2406)	5.75 (n=780)	0.08
40-49 years	6.13 (n=1944)	6.26 (n=1331)	0.13*
50-59 years	6.57 (n=774)	6.41 (n=1432)	-0.16*
60-69 years	6.55 (n=884)	6.50 (n=592)	-0.05
70-79 years	6.47 (n=841)	6.51 (n=80)	0.04

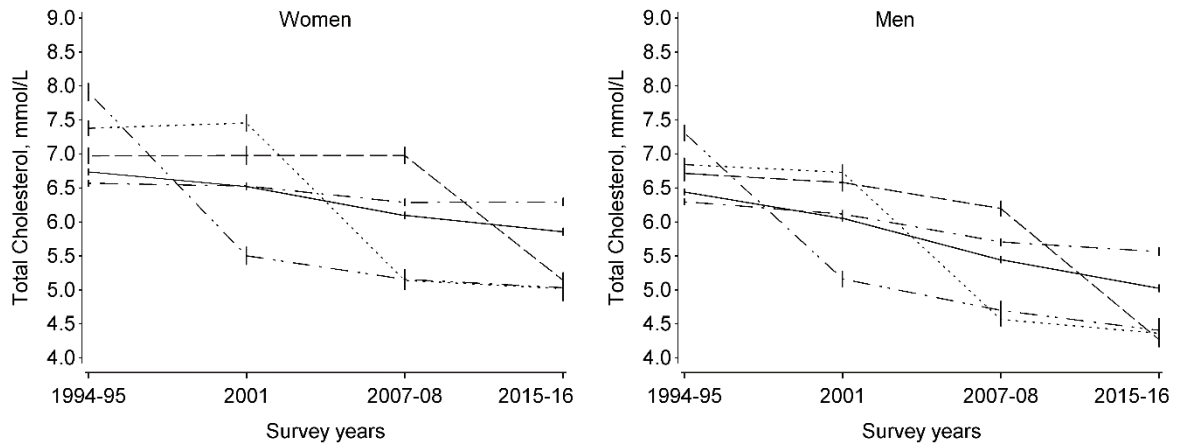
*0.001 < p < 0.01

Supplementary material Figure 1.



Supplementary material Figure 1. Observed longitudinal cholesterol (mmol/L) trends in female and male never users of lipid-lowering drugs, over surveys (1979-2016) (A and B) or age (20-89 years) (C and D) in 10-year birth cohorts (born 1910-1977) with 95% confidence intervals. The Tromsø Study 1979-2016.

Supplementary material Figure 2.



Supplementary material Figure 2. Longitudinal trends in birth-year-adjusted mean total cholesterol (mmol/L) from 1994-2016 in women and men born 1920-49; never users (dash-dot line), current users in 2016 only (dashed line), current users in 2008 and 2016 (dotted line), current users in 2011, 2008 and 2016 (dot-dash-dot dot line) of lipid lowering medication, and all (solid line), with 95% confidence intervals. The Tromsø Study 1994-2016.