Thirty-Year Changes in Average Blood Lipids Levels in Populations of the Russian Federation and the USA

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Aim. To conduct a comparative study of the changes in blood lipids profiles in populations of the Russian Federation (RF) and the United States of America (USA) in different age and gender groups over the period from 1975 to 2014.

Material and methods. Using a secondary analysis of data obtained from the RF population studies carried out in 1975–1982, the multicenter epidemiological study of cardiovascular diseases in different regions of the RF (ESSE-RF), conducted in 2012–2014, as well as the NHANES series of cross-sectional surveys in the civilian non-institutionalized population of the USA (NHANES II in 1976–1980 and Continuous NHANES in 2007–2012), we evaluated average lipids in blood tests in men and women of different age groups, with a total number of 48,974 observations.

Results. At present, in the RF population, as compared to the USA one, most age groups demonstrate a higher concentration of total cholesterol, i.e. p<0.05 in all groups except for men aged 25–34 years (distinctions are absent) and women aged 25–34 (the concentrations are lower in Russia, p=0.05); a higher concentration of high-density lipoprotein cholesterol, i.e. p<0.005 in all men and p≤0.05 in women younger than 45 years, while in women aged 45–54 years the differences are non-significant; in 55–64-year-old women high-density lipoprotein cholesterol is higher in the USA; the concentration of triglycerides in Russia is lower in comparison with the USA in all age groups of men and women (p<0.01). Over the three decades, the total cholesterol concentration has declined in both countries; the patterns in the United States in comparison with Russia are characterized by an increase in the concentration of high-density lipoprotein cholesterol in all age groups and by the absence of a negative trend in triglyceride concentrations.

Conclusion. Currently, in Russia, the total cholesterol and low-density lipoprotein cholesterol levels are worse, while triglycerides and partly high-density lipoprotein cholesterol concentrations are better than in the USA. In general, the thirty-year trends for the aggregate of lipid metabolism parameters are better in the USA population as compared to Russia.

Keywords: dyslipidemia, risk factors, cardiovascular diseases, NHANES II, Continuous NHANES, ESSE-RF study.

For citation: Shalnova S.A., Vilkov V.G., Metelskaya V.A., Balanova J.A., Kapustina A.V. Thirty-Year Changes in Average Blood Lipids Levels in Populations of the Russian Federation and the USA. Rational Pharamcotherapy in Cardiology 2018;14(1):4-11. (In Russ). DOI: 10.20996/1819-6446-2018-14-1-4-11
Lipid metabolism disorders attract the attention of medical community more than a century, in the years since N.N. Anichkov and S.S. Khalatov. Different theories of atherogenesis have been proposed and rejected during these years, however the cholesterol theory is still the leading one. The vessel wall lesions, lipid plaques formation and cardiovascular events incidence rates were proved to increase along with increment in total cholesterol (TC) and potentially atherogenic low-density lipoprotein cholesterol (LDL-C) blood levels [1, 2]. At the same time large-scale international studies demonstrate that decrease in TC and LDL-C levels can prevent complications development. For example, a meta-analysis of data from 19 studies, estimated lipid-lowering drugs influence on mortality rates, revealed statistically significant decrease in coronary death relative odds by 23%, cardiovascular mortality – by 19% and in all-cause mortality – by 14% [3]. The authors concluded that effective treatment is necessary both in primary and secondary coronary heart disease prevention. A more recent meta-analysis (the Cholesterol Treatment Trialists' Collaborators study), based on 27 randomized trials results, demonstrated cardiovascular risk decrease by 10 per mille for every 1 mmol/l LDL-C level reduction during 5 years [4].

At the present time the question of atherosclerosis primary prevention is debated a lot, in other words – lowering of TC and LDL-C levels in people with no signs of cardiovascular diseases [5].

Multiple risk factors promote atherosclerosis development. Estimation of changes in TC and cholesterol of different lipoprotein classes’ levels in various populations over a long time, that is to say, evaluation of atherosclerosis natural history, will help forward understanding of atherogenesis and possible influence of new medical technologies, drugs and preventive interventions on it.

The aim of this study was to compare the lipids blood levels in people of different sex and age in populations of the Russian Federation (RF) and the USA in 1975-1982 and 2007-2014 years.

Material and methods

The work used data from the following population trials:
- studies conducted at the All-Union Cardiologic Scientific Center of the USSR in 1975-1982 years, reports of the studies were published earlier [6, 7]; these data were brought together in the sample with a working title – the RF-1980;
- the “Epidemiology of cardiovascular diseases in the RF regions” (ESSE-RF) multi-center observational study, which was performed in the State Research

Nарушения липидного обмена занимают внимание медицинского сообщества уже более сотни лет, во времена Н.Н. Аничкова и С.С. Халатова. За эти годы были предложены и отвергнуты различные теории развития атеросклероза, однако ведущей до сих пор остается холестериновая теория. Доказано, что с ростом в плазме крови концентрации общего холестерина (ОХС) и холестерина, входящего в состав потенциально атерогенных липопротеинов низкой плотности (ХС ЛПНП), нарастают симптомы поражения сосудистой стенки, формируются липидные бляшки и отмечается рост сердечно-сосудистых осложнений [1, 2]. В то же время, как показывают результаты крупных международных исследований, предупредить развитие осложнений можно снижением уровня ОХС и ХС ЛПНП. Так, в мета-анализе 19 исследований, в которых было изучено влияние липидснижающих препаратов на смертность, показано статистически значимое снижение относительного риска коронарной смерти на 23%, сердечно-сосудистой смертности на 19% и смертности от всех причин на 14% [3]. Авторы делают заключение, что эффективная терапия необходима как при первичной, так и при вторичной профилактике ишемической болезни сердца. В более позднем мета-анализе (Cholesterol Treatment Trialists’ Collaborators), основанном на результатах 27 рандомизированных исследований, показано, что снижение ХС ЛПНП на каждый 1 ммоль/л снижает риск основных сосудистых событий приблизительно на 10 промилле в течение 5 лет [4].

В настоящее время активно обсуждаются вопросы первичной профилактики атеросклероза, когда речь идет о снижении уровней ОХС и ХС ЛПНП у лиц без клинических проявлений сердечно-сосудистых заболеваний [5].

Многчисленные факторы риска способствуют развитию атеросклероза и поддерживают негативные тенденции, связанные с риском его развития. Изучение динамики уровня ОХС и холестерина в составе липопротеинов различных классов в течение длительного времени в разных популяциях или, иначе говоря, изучение естественного течения атеросклероза способствует пониманию процессов развития атеросклероза и возможного влияния новых лечебных технологий, лекарственных средств и профилактических вмешательств.

Цель настоящей работы – сравнительное изучение липидных показателей крови у лиц разного пола и возраста в популяциях Российской Федерации (РФ) и Соединенных Штатов Америки (США) в 1975-1982 и 2007-2014 гг.

Материал и методы

В работе использовали данные следующих популяционных исследований:
- выполненных в 1975-1982 гг. во Всесоюзном кардиологическом научном центре АМН СССР протокол которых опубликован ранее [6, 7], в настоящей работе эти данные были объединены в выборку с условным названием РФ-1980;

Rational Pharmacotherapy in Cardiology 2018;14(1) / Рациональная Фармакотерапия в Кардиологии 2018;14(1) 5
Center for Preventive Medicine at the Ministry of Health of the RF in 2012-2014 years. The study used a random systematic stratified multi-stage sample formed by the territorial principle [8]. The study was approved by the Ethics Committees of the “State Research Center for Preventive Medicine”, “Centre of Heart, Blood and Endocrinology named after V.A. Almazov” and “Russian Cardiology Research and Production Complex”. All participants of the study had signed informed consent for processing of personal data.

The data of these studies were compared with results of cross-sectional trials dealt with the civilian noninstitutionalized population of the USA: the NHANES II (1976-1980 years) and Continuous NHANES (C.NHANES, 2007-2012 years) of the National Health and Nutrition Examination Survey (NHANES) series. The studies design and methods of indices assessment had been reported in the relevant documentation provided on the National Center for Health Statistics (NCHS) of the USA Web site [9].

Age, gender, blood concentrations of TC, high-density lipoprotein cholesterol (HDL-C), LDL-C and triglycerides (TG) were analyzed. The concentrations were compared in men and women in age groups of 25-34, 35-44, 45-54 and 55-64 years in each population study.

Statistical analysis was conducted using standard statistical methods. At the groups comparison non-parametric methods were preferred, in particular, Mann-Whitney U test was used. Mean values and standard deviations (M and SD) were also calculated.

Results and discussion

Tables 1 and 2 present results of comparison of the blood lipids indices in the populations of the RF and the USA in the end of the 2010 years and 30 years earlier, respectively.

According to the contemporary data (Table 1, the ESSE-RF and Continuous NHANES 2007-2012 studies) TC and LDL-C levels were higher in all groups of men and women above 34 years in the RF as compared to the USA; HDL-C levels were higher in the RF in men of all age groups and women under 45 years, at that women above 44 years revealed gradual change of the trend of HDL-C level distinctions on the inverse. Significantly lower levels of TG were reported in all groups in the RF.

Three decades earlier (Table 2) TC levels were not differed in men of all age groups and in women of 35-54 years in the RF as compared to the USA; HDL-C levels were higher in the RF in men of all age groups and women under 45 years, at that women above 44 years revealed gradual change of the trend of HDL-C level distinctions on the inverse. Significantly lower levels of TG were reported in all groups in the RF.

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So, ratios of HDL-C and TG mean values in the RF and the USA in recent years and 30 years earlier were in general the same. HDL-C levels were higher and TG levels – lower in majority of age groups in the RF as compared to the USA. TC indices had worsened in the RF as compared to the USA – if in the 80-th years of the 20-th century TC levels were lower in the RF or distinctions were insignificant, at the present-day TC levels are higher in almost all the groups.

Over the three decades TC levels had declined and TG concentration increased in all groups in the RF, the distinctions were statistically significant (Table 3). HDL-C level changes were less uniform: men of 25-34 and women of 25-34 years had reduced HDL-C levels in comparison to the USA, distinctions in HDL-C levels in women of 45-64 years were statistically insignificant.

| Age, years | Index | Men / Мужчины | Women / Женщины |
|------------|-------|---------------|-----------------|
|            |       | ESSE-RF ХССЕ-РФ | C.NHANES | p | ESSE-RF ХССЕ-РФ | C.NHANES | p |
| 25-34      | n     | 2.059         | 500     | 2.333 | 517 |
|            | TC  / ОХС | 4.84±1.04 | 4.81±0.93 | 0.9 | 4.71±0.96 | 4.80±0.93 | 0.05 |
|            | LDL-C / ХС ЛПНП | 3.00±0.88 | 2.90±0.82 | 0.03 | 2.76±0.85 | 2.77±0.80 | 0.5 |
|            | HDL-C / ХС ЛПВП | 1.29±0.32 | 1.19±0.32 | 0.0001 | 1.49±0.34 | 1.45±0.41 | 0.0001 |
|            | TG  / ТГ | 1.33±1.04 | 1.58±0.88 | 0.0001 | 0.99±0.59 | 1.31±0.74 | 0.0001 |
| 35-44      | n     | 1.687         | 517     | 2.509 | 600 |
|            | TC  / ОХС | 5.39±1.15 | 5.17±0.99 | 0.0001 | 5.13±0.99 | 5.0±1.02 | 0.04 |
|            | LDL-C / ХС ЛПНП | 3.42±0.98 | 3.10±0.87 | 0.0001 | 3.13±0.89 | 2.94±0.89 | 0.0001 |
|            | HDL-C / ХС ЛПВП | 1.31±0.34 | 1.20±0.35 | 0.0001 | 1.50±0.36 | 1.48±0.43 | 0.05 |
|            | TG  / ТГ | 1.64±1.32 | 1.90±1.01 | 0.0001 | 1.17±0.70 | 1.40±0.84 | 0.0001 |
| 45-54      | n     | 2.050         | 538     | 3.84±0.9 | 553 |
|            | TC  / ОХС | 5.55±1.17 | 5.20±1.06 | 0.0001 | 5.66±1.12 | 5.41±1.01 | 0.0001 |
|            | LDL-C / ХС ЛПНП | 3.55±0.98 | 3.16±0.96 | 0.0001 | 3.57±0.99 | 3.16±0.88 | 0.0001 |
|            | HDL-C / ХС ЛПВП | 1.28±0.34 | 1.21±0.33 | 0.0001 | 1.48±0.35 | 1.53±0.44 | 0.2 |
|            | TG  / ТГ | 1.77±1.50 | 1.79±0.94 | 0.0001 | 1.44±0.89 | 1.57±0.87 | 0.0001 |
| 55-64      | n     | 2.095         | 490     | 4.47±0.9 | 501 |
|            | TC  / ОХС | 5.46±1.15 | 5.01±1.04 | 0.0001 | 5.93±1.20 | 5.5±1.00 | 0.0001 |
|            | LDL-C / ХС ЛПНП | 3.50±1.00 | 2.95±0.94 | 0.0001 | 3.71±0.94 | 3.21±0.88 | 0.0001 |
|            | HDL-C / ХС ЛПВП | 1.30±0.33 | 1.27±0.36 | 0.005 | 1.44±0.34 | 1.53±0.45 | 0.0001 |
|            | TG  / ТГ | 1.62±1.08 | 1.73±0.89 | 0.0001 | 1.63±0.95 | 1.72±0.89 | 0.01 |

Table 1. Blood lipoproteins levels in the populations of the RF (ESSE-RF, 2012-2014 years) and the USA (C.NHANES, 2007-2012 years)

Таблица 1. Показатели спектра липопротеинов крови в популяциях РФ (ЭССЕ-РФ, 2012-2014 гг.) и США (C.NHANES, 2007-2012 гг.)
## Table 2. Values of blood lipoproteins in the populations of the RF (RF-1980, 1975-1982 years) and the USA (NHANES II, 1976-1980 years)

| Age, years | Index | RF-1980 1975-1982 | RF-1980 2012-2014 | RF-1980 p | NHANES II 1976-1980 | NHANES II 2012-2014 | NHANES II p |
|------------|-------|-------------------|-------------------|-----------|---------------------|---------------------|-----------|
| 25-34      | n     | 715               | 95                | 932       | 120                 |                     |           |
|            | TC / ОХС | 5.13±0.99 | 5.20±0.99 | 0.7 | 4.78±0.83 | 5.08±1.07 | 0.002 |
|            | HDL-C / ХС ЛПВП | 1.31±0.31 | 1.20±0.31 | 0.002 | 1.53±0.35 | 1.45±0.32 | 0.01 |
|            | TG / TT | 1.06±0.72 | 1.49±1.00 | 0.0001 | 0.85±0.45 | 1.22±0.63 | 0.0001 |
| 35-44      | n     | 2,886             | 69                | 1,431     | 72                  |                     |           |
|            | TC / ОХС | 5.70±1.05 | 5.71±1.10 | 0.8 | 5.30±0.99 | 5.23±1.01 | 0.3 |
|            | HDL-C / ХС ЛПВП | 1.38±0.43 | 1.22±0.34 | 0.002 | 1.50±0.37 | 1.41±0.41 | 0.02 |
|            | TG / TT | 1.28±0.84 | 1.68±0.75 | 0.0001 | 0.96±0.62 | 1.41±0.90 | 0.002 |
| 45-54      | n     | 5,248             | 90                | 1,390     | 80                  |                     |           |
|            | TC / ОХС | 5.73±1.05 | 5.8±1.27 | 0.3 | 5.81±1.12 | 6.02±1.27 | 0.2 |
|            | HDL-C / ХС ЛПВП | 1.38±0.93 | 1.16±0.33 | 0.001 | 1.46±0.35 | 1.47±0.38 | 0.7 |
|            | TG / TT | 1.37±0.93 | 2.07±1.27 | 0.0001 | 1.15±0.66 | 1.32±0.63 | 0.02 |
| 55-64      | n     | 1,971             | 122               | 1,332     | 138                 |                     |           |
|            | TC / ОХС | 5.75±1.09 | 5.9±1.19 | 0.3 | 6.25±1.18 | 6.51±1.13 | 0.009 |
|            | HDL-C / ХС ЛПВП | 1.32±0.40 | 1.20±0.27 | 0.008 | 1.41±0.36 | 1.49±0.44 | 0.1 |
|            | TG / TT | 1.40±1.57 | 1.92±0.85 | 0.0001 | 1.42±0.72 | 1.55±0.80 | 0.2 |

The RF-1980 combined sample included men and women, residents of Moscow and Leningrad cities. The NHANES II groups included residents of cities with population above 3 million of people.

TC – total cholesterol, HDL-C – high-density lipoprotein cholesterol, TG – triglycerides.

## Table 3. Values of blood lipoproteins in the population of the RF in 1975-1982 years (RF-1980) and in 2012-2014 years (ESSE-RF)

| Age, years | Index | 1975-1982 | 2012-2014 | 1975-1982 | 2012-2014 | 1975-1982 | 2012-2014 |
|------------|-------|-----------|-----------|-----------|-----------|-----------|-----------|
| 25-34      | n     | 715       | 2,059     | 932       | 2,333     |           |
|            | TC / ОХС | 5.13±0.99 | 4.8±1.04  | 0.0001 | 4.78±0.83 | 4.71±0.96 | 0.004 |
|            | HDL-C / ХС ЛПВП | 1.31±0.31 | 1.29±0.32 | 0.04 | 1.53±0.35 | 1.49±0.34 | 0.03 |
|            | TG / TT | 1.06±0.72 | 1.33±1.04 | 0.0001 | 0.85±0.45 | 0.99±0.59 | 0.0001 |
| 35-44      | n     | 2,886     | 1,687     | 1,431     | 2,509     |           |
|            | TC / ОХС | 5.70±1.05 | 5.39±1.15 | 0.0001 | 5.30±0.99 | 5.13±0.99 | 0.001 |
|            | HDL-C / ХС ЛПВП | 1.38±0.43 | 1.31±0.34 | 0.0001 | 1.50±0.37 | 1.50±0.36 | 0.6 |
|            | TG / TT | 1.28±0.84 | 1.64±1.32 | 0.0001 | 0.96±0.62 | 1.17±0.70 | 0.0001 |
| 45-54      | n     | 5,248     | 2,050     | 1,390     | 3,842     |           |
|            | TC / ОХС | 5.73±1.05 | 5.5±1.17  | 0.0001 | 5.81±1.12 | 5.66±1.12 | 0.0001 |
|            | HDL-C / ХС ЛПВП | 1.38±0.93 | 1.28±0.34 | 0.0001 | 1.46±0.35 | 1.48±0.35 | 0.2 |
|            | TG / TT | 1.37±0.93 | 1.77±1.50 | 0.0001 | 1.15±0.66 | 1.44±0.89 | 0.0001 |
| 55-64      | n     | 1,971     | 2,095     | 1,332     | 4,472     |           |
|            | TC / ОХС | 5.75±1.09 | 5.46±1.15 | 0.0001 | 6.25±1.18 | 5.93±1.20 | 0.0001 |
|            | HDL-C / ХС ЛПВП | 1.32±0.40 | 1.30±0.33 | 0.5 | 1.41±0.36 | 1.44±0.34 | 0.001 |
|            | TG / TT | 1.40±1.57 | 1.62±1.08 | 0.0001 | 1.42±0.72 | 1.63±0.95 | 0.05 |

TC – total cholesterol, HDL-C – high-density lipoprotein cholesterol, TG – triglycerides.

OKS – общая холестерин, ХС ЛПВП – холестерин липопротеинов высокой плотности, ТГ – триглицериды.
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Table 4. Values of blood lipoproteins in the population of the USA in 1976-1980 years (NHANES II) and in 2007-2012 years (C.NHANES)

| Age, years | Index | Men / Мужчины | Women / Женщины |
|------------|-------|---------------|-----------------|
|            |       | 1976–1980     | 2007–2012 p  | 1976–1980 | 2007–2012 p  |
| 25-34      | n     | 901           | 500           | 1,000     | 517           |
| TC / ОХС   | 5.13±1.06 | 4.81±0.93    | 0.0001        | 4.96±1.01 | 4.80±0.93    | 0.005       |
| HDL-C / ХС ЛПВП | 1.14±0.29 | 1.19±0.32    | 0.008         | 1.34±0.32 | 1.43±0.41    | 0.001       |
| TG / ТГ    | 1.58±1.10 | 1.58±0.88    | 0.5           | 1.23±0.71 | 1.31±0.74    | 0.07        |
| 35-44      | n     | 653           | 517           | 726       | 600           |
| TC / ОХС   | 5.60±1.09 | 5.17±0.99    | 0.0001        | 5.33±1.20 | 5.06±1.02    | 0.0001      |
| HDL-C / ХС ЛПВП | 1.12±0.30 | 1.20±0.35    | 0.0001        | 1.35±0.36 | 1.48±0.43    | 0.0001      |
| TG / ТГ    | 1.95±1.38 | 1.90±1.01    | 0.6           | 1.30±0.71 | 1.40±0.84    | 0.3         |
| 45-54      | n     | 617           | 538           | 647       | 553           |
| TC / ОХС   | 5.83±1.12 | 5.20±1.06    | 0.0001        | 5.91±1.20 | 5.41±1.01    | 0.0001      |
| HDL-C / ХС ЛПВП | 1.12±0.30 | 1.21±0.33    | 0.0001        | 1.41±0.40 | 1.53±0.44    | 0.0001      |
| TG / ТГ    | 2.20±2.48 | 1.79±0.94    | 0.04          | 1.55±0.91 | 1.57±0.87    | 0.8         |
| 55-64      | n     | 1,086         | 490           | 1,176     | 501           |
| TC / ОХС   | 5.90±1.16 | 5.01±1.04    | 0.0001        | 6.41±1.25 | 5.52±1.00    | 0.0001      |
| HDL-C / ХС ЛПВП | 1.16±0.34 | 1.27±0.36    | 0.0001        | 1.42±0.41 | 1.53±0.45    | 0.0001      |
| TG / ТГ    | 1.89±1.20 | 1.73±0.89    | 0.08          | 1.80±0.93 | 1.72±0.89    | 0.5         |

As distinct from Table 2 the NHANES II trial included all cases and not only residents of large cities
TC – total cholesterol, HDL-C – high-density lipoprotein cholesterol, TG – triglycerides
ОХС – общий холестерин, ХС ЛПВП – холестерин липопротеинов высокой плотности, ТГ – триглицериды

level, men of 55-64 and women of 55-64 years had no changes, women aged 55-64 years revealed increased HDL-C concentration.

In the same period in the USA TC declined and HDL-C increased in all groups. TG level changes were statistically insignificant in almost all the groups (Table 4).

Mean values of serum TC began to decline in the USA since at least 1960 [10-12]. Reducing of increased TC level, which has been observed in recent years, can most likely be explained by correction of some behavioral factors, advanced awareness of lipid metabolism disorders, improved food ration with decreased consumption of trans fats and by wider use of lipid-lowering drugs (statins) [13]. Despite these improvements, cardiovascular diseases remain the most important cause of death in the USA [14].

It should be noted that reducing of LDL-C levels continued from 2001 to 2008 years [12] but stopped in 2009 and remains unchanged up to the present [15]. This plateau was seen in groups of all ages and both genders.

So, both countries had achieved decrease in TC blood level over the three decades. The USA population had demonstrated better dynamics per totality оказалась статистически значимыми (табл. 3). Динамика концентрации ХС ЛПВП менее единообразна – у мужчин 25-54 лет и женщин 25-34 лет концентрация ХС ЛПВП уменьшилась, у мужчин 55-64 лет и женщин 35-54 лет сдвиги отсутствуют, у женщин 55-64 лет концентрация ХС ЛПВП увеличилась.

В США за этот же период во всех группах снизилась концентрация ОХС и повысилась концентрация ХС ЛПВП. Изменение концентрации ТГ почти во всех группах оказалось статистически незначимым (табл. 4).

Средние значения ОХС в крови в США начали снижаться, по меньшей мере, с 1960 г. [10, 11, 12]. Уменьшение повышенного уровня ОХС, наблюдаемое в последние годы, наиболее вероятно связано с коррекцией ряда поведенческих факторов, включая повышенную осведомленность о нарушениях липидного профиля, улучшением рациона питания и снижением потребления транс-жиров, а также более широким использованием липид-снижающих лекарственных средств (статинов) [13]. Несмотря на эти улучшения, сердечно-сосудистые заболевания по-прежнему остаются важнейшей причиной смертности в США [14].

Следует отметить, что снижение уровней ХС ЛПВП в США продолжалось с 2001 по 2008 гг. [12], но остановилось в 2009 г., и остается практически неизменным до на-
of all the indices as compared to the RF: HDL-C level increased in all the groups (in majority of cases in Russia the changes were negative or absent), TG level remained unchanged (increased in the RF).

The above described (Table 1) advantages of the RF population as compared to the USA one (lower TG and higher HDL-C levels in majority of the groups) can be explained by significant distinctions in these indices in favor of Russia in the 80th years of the 20th century (Table 2), these advantages are not yet fully neutralized by a loss in the 30-year changes of the indices in comparison with the USA.

Conclusion

Consistent outputs were received in four large-scale samples of two different populations – the RF and the USA (RF-1980, ESSE-RF, NHANES II and Continuous NHANES). The total number of the analyzed cases was 48,974.

Systematic distinctions have been found out between the populations of the RF and the USA. The RF population revealed worse TC and LDL-C indices, better TG and partly better HDL-C values.

Both countries have achieved reduction in TC level during the three decades, cumulative dynamics of indices was better in the USA population as compared to the RF one.

Acknowledgement

The authors express gratitude to the ESSE-RF study participants for acquisition of the RF population data, used in this article.

Besides, our study had become possible due to free access to the data of the trials of the NHANES series provided by the National Center for Health Statistics (NCHS) of the USA. The authors of the article are responsible for analysis results, interpretations and conclusions, the NCHS responsibility is limited by the primary data.

The work was conducted in the frame of the State task: “Epidemiology of cardiovascular diseases in regions of the RF (ESSE-RF-prospective). Development of the system of observation for epidemiological situation concerning cardiovascular diseases and their risk factors in the RF regions (ESSE-RF-2)”, identification number AAAA-A17-117070760036-6.

Disclosures. The publication of the article is supported by Pfizer, but it did not affect authors’ own opinion.

стоящего времени [15]. Это плато наблюдалось для всех возрастов и обоих полов.

Таким образом, в обеих странах за три десятилетия достигнуто снижение концентрации в крови ОХС. В популяции США динамика по совокупности показателей лучше в сравнении с РФ – во всех группах повысилась концентрация ХС ЛПВП (в РФ изменения негативные или отсутствуют в большинстве случаев), концентрация ТГ оставалась на прежнем уровне (в РФ повысилась).

Описанные выше (табл. 1) преимущества популяции РФ в сравнении с США (более низкий уровень ТГ и более высокая концентрация ХС ЛПВП в большинстве групп) объясняются сильными различиями в пользу РФ по этим показателям в 80-х годах XX века (табл. 2), эти преимущества еще не полностью нивелированы проигрышем в сравнении с США в тридцатилетней динамике показателей.

Заключение

Непротиворечивые выводы получены в четырех крупных выборках (RF-1980, ЭССЕ-РФ, NHANES II и Continuous NHANES) из двух разных популяций – РФ и США. Общее число проанализированных в настоящей работе наблюдений составило 48974.

Выявлены систематические различия между популяциями РФ и США. В РФ показатели хуже по ОХС и ХС ЛПНП, лучше по ТГ и, отчасти, лучше по ХС ЛПВП.

За три десятилетия в обеих странах достигнуто снижение ОХС, по совокупности показателей динамика лучше в популяции США в сравнении с РФ.

Благодарности

Авторы благодарят участников исследования ЭССЕ-РФ, усилиями которых были собраны российские данные, использованные в этой статье.

Кроме того, настоящая работа стала возможной благодаря свободному доступу к данным исследований серии NHANES, предоставленному the National Center for Health Statistics (NCHS) США. Ответственность за результаты анализа, интерпретации и выводы лежит на авторах, ответственность NCHS ограничивается первичными данными.

Работа выполнена в рамках Государственного задания «Эпидемиология сердечно-сосудистых заболеваний в регионах РФ (ЭССЕ-РФ-проспективное). Развитие системы динамического наблюдения за эпидемиологической ситуацией, связанной с сердечно-сосудистыми заболеваниями и их факторами риска в регионах РФ (ЭССЕ-РФ-2)», регистрационный номер AAAA-A17-117070760036-6.

Конфликт интересов. Публикация статьи поддержана компанией Пфайзер, что никоим образом не повлияло на собственное мнение авторов.
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