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## Expert assessment of outpatient health care quality in hypertensive patients in a big city

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### Abstract

We present the data based on the Registry of hypertensive patients including the results of the expert assessment of the health care in 1539 hypertensive patients. The clinical indicators were evaluated in accordance with the National guidelines on the prevention, diagnosis and management of arterial hypertension. **Objective.** To perform an expert assessment of out-patient medical care quality in hypertensive patients based on the automated information and analytical system “Registry of Hypertension”. **Design and methods.** Medical data of 1539 hypertensive patients examined in 2004–2010 were analyzed. Special software (Web-based Registry of Hypertension) produced by Moscow Cardio logical, Scientific and Clinical Centre and Saratov Research Institute of Cardiology was used. It allows continuous data entry and analysis. **Results.** There is a positive dynamics by improving the quality control of health care in 1539 patients with risk factors and arterial hypertension. **Conclusions.** Technology “Registry of Hypertension” can be used in treatment and prevention measures in order to perform an expert assessment and improve the quality of health care in hypertensive patients.

**Key words:** hypertension, quality of health care, quality indicators

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## Экспертная оценка качества оказания амбулаторной медицинской помощи больным артериальной гипертензией в крупном городе

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### Резюме

В статье приведен опыт ведения Регистра больных с артериальной гипертензией (АГ), включающего проведение экспертной оценки медицинской помощи 1539 больным АГ на основе выделения клинических индикаторов на всех этапах лечебно-диагностического процесса в соответствии с Российскими рекомендациями по профилактике, диагностике и лечению АГ. **Цель исследования** — экспертная оценка качества оказания амбулаторной медицинской помощи больным АГ на основе автоматизированной информационно-аналитической системы «Регистр АГ». **Материалы и методы.** Применена компьютерная программа с автоматизированной информационно-аналитической системой «Регистр АГ». В разработке данной программы приняли участие специалисты российского кардиологического научно-производственного комплекса (Москва) совместно с центром информационных технологий ФГУ НИИ кардиологии (Саратов). **Результаты.** Продемонстрирована положительная динамика путем оптимизации контроля качества медицинской помощи, оказанной 1539 пациентам с факторами риска и АГ на основе инновационных технологий при динамическом амбулаторном мониторинге. **Выводы.** Технология «Регистр АГ» может быть использована в лечебно-профилактических учреждениях с целью экспертной оценки и совершенствования качества оказания медицинской помощи больным АГ.

**Ключевые слова:** артериальная гипертензия, качество медицинской помощи, индикаторы качества

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## Introduction

The problem of quality of healthcare for patients with cardiovascular diseases (CVD) including arterial hypertension (HTN) is of crucial importance in the health care system [1]. HTN contributes to the cardiovascular morbidity, mortality and disability of the adult population of the Russian Federation [2, 3]. High HTN prevalence, non-modifiable and modifiable risk factors (MRF) determine the risk of cardiovascular complications (CVC) [4–7]. Considering unfavorable epidemiological situation regarding HTN, early diagnostics and identification individuals at high risk, and their subsequent treatment follow-up are required. Follow-up is performed in accordance with the recommendations of the Russian Medical Society on Arterial Hypertension and the Russian Society of Cardiology [8–10]. For the improvement of diagnostics, treatment, and prevention approaches in hypertensive patients modern diagnostic equipment, and implementation of novel technologies are essential. One of these techniques is automatic information and analytical

system “Registry of HTN” [11, 12]. The system can be used for expertise of the quality of medical care in HTN outpatients [13–15].

**Objective of our study** was an expert assessment of the quality of outpatient medical care in HTN patients based on the “Registry of HTN”.

## Design and methods

From 2004 till 2010, the quality of outpatient medical care, delivered to 1,539 patients with HTN in seven outpatient clinics of St Petersburg, was assessed with the help of the software (certificate No. 2005611088 dd. 05.05.2005) for the automated analytical system “Registry of HTN”. Total risk and clinical indicators were calculated in accordance with the Russian recommendations for prevention, diagnosis, and treatment of HTN [2]. Expertise was performed by a trained physician accredited to use the system “Registry of HTN”. User access was provided at website <http://62.117.81.30>. The data of medical record No. 025/u-04 were entered into the “Registry of HTN”. Patients were registered online, and the following forms were filled in: general information,

Table 1

### INCLUSION CRITERIA FOR THE REGISTRY OF HTN: THE INDICATOR OF HEALTH CARE QUALITY

Key indicators for assessing medical records of patients with HTN and one or more modifiable risk factors and recommendations for lifestyle modification once per year	
No.	Criteria (indicators)
1	BP measurement was performed according to standard methodology. Age and SBP assessment were considered.
2	BP level criteria: SBP 140 mm Hg and higher, DBP 90 mm Hg and higher.
3	BP level was registered at least at 2 visits.
4	BP measurement was performed twice during each visit.
5	Inter-visit intervals: <ul style="list-style-type: none"> <li>• degree 1 hypertension — 3 months</li> <li>• degree 2 hypertension — 3 months and 2 weeks</li> <li>• degree 3 hypertension without comorbidities and target organ damage — 1 to 2 weeks</li> <li>• degree 3 hypertension with comorbidities and target organ damage — 1 week (or therapy prescription at the first visit)</li> </ul>
6	Ambulatory BP monitoring performed according to the National Guidelines on HTN.
7	Reports confirming at least one modifiable risk factor during 1-year follow-up.
8	Reports confirming at least one recommendation for lifestyle modification during 1-year follow-up.

**Note:** HTN — arterial hypertension; BP — blood pressure; SBP — systolic blood pressure; DBP — diastolic blood pressure.

blood pressure (BP) level — two measurements, medical history of hereditary CVD, clinical and instrumental tests, lifestyle, antihypertensive drugs, and comorbidities. Personal risk (PR) of 10-year development of fatal CVD according to the SCORE European system was calculated automatically.

**Results of monitoring of expert assessment of the quality of delivery of outpatient medical care to patients with AHE** Expert assessment over 6 years (from 2004 till 2010) was performed according to the National Guidelines. Cardiovascular risk factors, target organ damage, comorbidities, anti-hypertensive therapy and its adequacy, and preventive measures were evaluated based on the medical reports.

The following terms will be used for the results description:

1) "Medical Care Quality Indicator" is a quantitative parameter that shows the structure, process

or result of medical care delivery (A. Donabedian).

2) Medical care quality is a combination of characteristics of health care. It includes the indicators of the effective disease prevention and treatment, improvement of the quality of life, and an increase of life expectancy.

These clinical indicators correspond to the level of evidence I and confidence level A or B (Table 2) [12].

#### Indicator "HTN diagnostics"

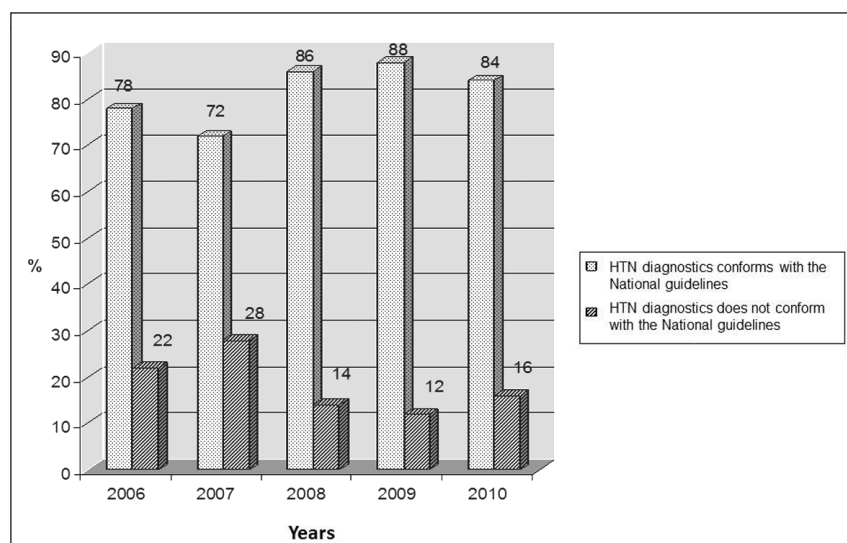
The patient's medical record should contain all details that confirm HTN diagnosis in accordance with the criteria (Table 1). The indicator was confirmed only when the criteria were met. Proper quality of physicians' work at was found regarding the quality of HTN diagnostics according to the criteria of increased systolic BP (BP) and/or diastolic BP (DBP) (SBP > 140 mm Hg or DBP >

Table 2

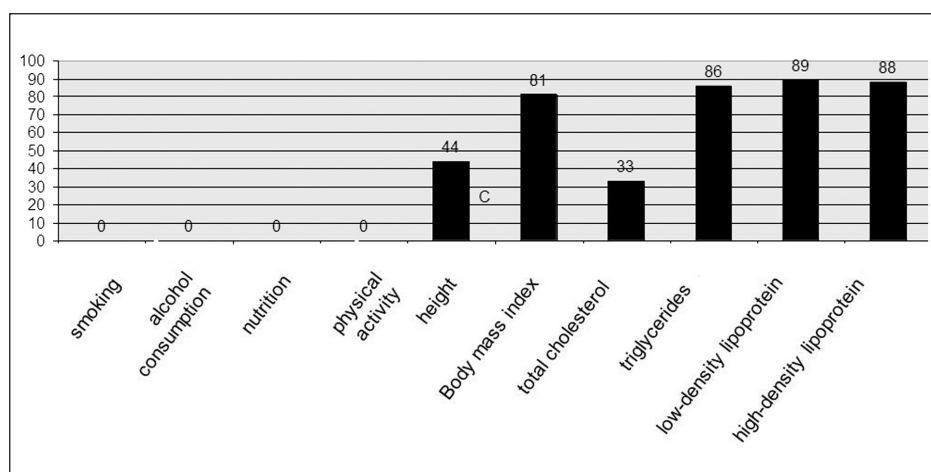
CRITERIA OF ARTERIAL HYPERTENSION  
AND LEVEL OF EVIDENCE

Criteria of HTN. Clinical Indicator	Level of Evidence	Compounds of Clinical Indicator
Registration of patients with HTN and one or more modifiable risk factors who received recommendations for lifestyle modification once a year	Grade I, Level A Grade I, Level A	<b>1. Clinical Indicator "Registration of Patients with HTN")</b> <ul style="list-style-type: none"> <li>• standard BP measurement</li> <li>• SBP</li> <li>• DBP</li> <li>• number of visits</li> <li>• number of BP measurements during one visit</li> <li>• inter-visit intervals</li> </ul>
	Grade I, Level B Grade I, Level B	<b>2. Modifiable risk factor:</b> <ul style="list-style-type: none"> <li>• smoking</li> <li>• overweight</li> <li>• physical activity level</li> <li>• alcohol consumption</li> <li>• nutrition</li> </ul>
	Grade I, Level A	<b>3. Recommendations Regarding Lifestyle Modification:</b>
	Grade I, Level A Grade I, Level A  Grade I, Level B Grade I, Level B	<ul style="list-style-type: none"> <li>• smoking cessation</li> <li>• weight normalization</li> <li>• rational physical activity</li> <li>• rational alcohol consumption</li> <li>• balanced diet</li> <li>• limitation of salt consumption</li> </ul>

**Note:** HTN — arterial hypertension; BP — blood pressure; SBP — systolic blood pressure; DBP — diastolic blood pressure.

**Figure 1. Expert assessment of the quality of arterial hypertension diagnostics**

**Note:** HTN — arterial hypertension.

**Figure 2. Reasons of low diagnostics of modified risk factors in subjects with arterial hypertension (2007)**

90 mm Hg). During follow-up in 2007, the indicator was verified in 72 % of patients according to the National Guidelines. In 2008, it was verified in 86 %, and in 2009 — in 88 % (Fig. 1).

The indicator did not match the criteria due to noncompliance of intervisit intervals: in 2007 in 36 %, in 2008 — in 13.4 %, in 2009 — in 12.4 %, in 2010 — in 15 %.

#### **Indicator “Diagnostics of the modifiable risk factors”**

Smoking, physical activity, nutrition, and alcohol consumption, as well as anthropometry, body mass index, laboratory data were verified according to the medical records. The indicator was confirmed when at least one modifiable risk

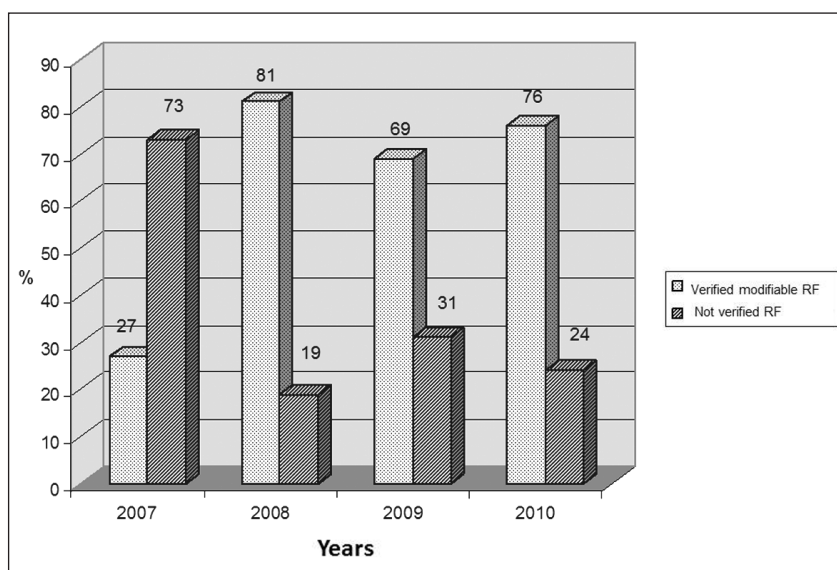
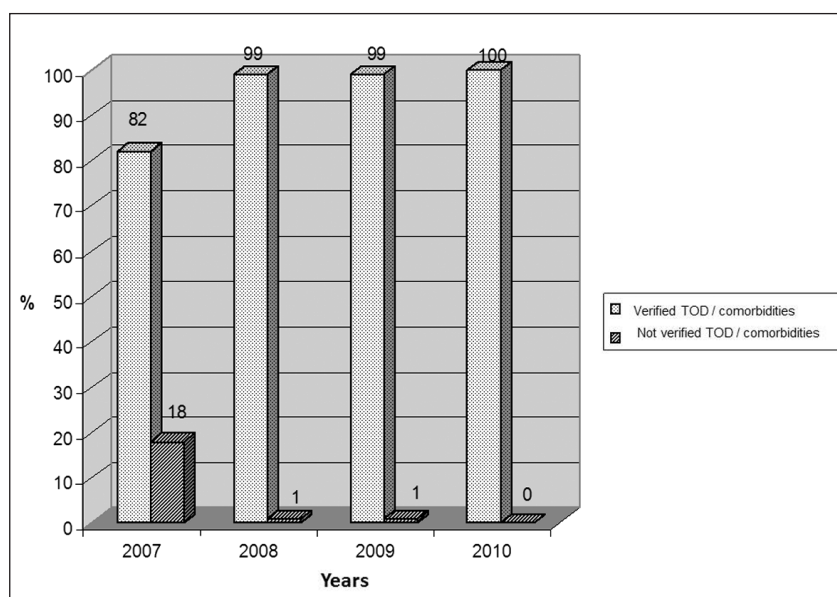
factor was found. The indicator was not confirmed upon absence of data on risk factors and non-performance of laboratory tests (Fig. 2).

During the period from 2004 till 2010 a proper quality of physician’s work was found. The indicator “Diagnostics of the modifiable risk factors” was confirmed in 27 % of subjects with HTN (2007), in 2008 — in 81 %, while in 2009 — in 69 %, and in 2010 — in 76 % (Fig. 3).

#### **Indicator “Diagnostics of target organ damage (TOD) and associated comorbidities”**

Target organ damage (TOD) and comorbidities were verified based on the patients’ medical records in accordance with the Russian Recommendations (2008). The indicator was confirmed when



**Figure 3. The quality of the diagnostics of modifiable risk factors in patients with arterial hypertension****Figure 4. The quality of the diagnostics of target organ damage and comorbidities in patients with arterial hypertension**

**Note:** TOD — target organ damage.

at least one TOD or comorbidity was verified. A proper quality of physician's work regarding assessment of TOD and comorbidities was found. The indicator of the diagnostics of TOD and comorbidities was confirmed in 82 % (2007), in 2008 — in 99 %, and in 2010 — in 100 % (Fig. 4).

#### **Indicator "Implementation of non-pharmacological cardiovascular prevention in patients**

#### **with arterial hypertension and modified risk factors"**

A physician's record of recommendations regarding healthy lifestyle was considered a confirmation of this indicator: smoking cessation, rational alcohol consumption, balanced diet, physical activity, and weight loss. Proper quality of physician's work was found from 2007 till 2010 regarding non-pharmacological preventive measures. Recommendations for changing lifestyle

were provided in 99 % in 2007, in 98 % in 2008, in 99 % in 2009, and in 100 % in 2010. The number of hypertensive patients for calculation of personal 10-year risk of fatal CVC, was registered.

**Indicator “Registration of patients with HTN and sufficient data for calculation of personal 10-year risk of fatal CVC (according to the SCORE scale)”**

Personal risk (according to the SCORE scale) of development of fatal CVCs was calculated based on the medical records data. The indicator was confirmed when complete data was available according to the SCORE scale and National Recommendations for prevention, diagnostics, and treatment of HTN. In 2007, sufficient data for calculation of personal risk (PR) was provided only for 21 % of patients. The indicator could not be assessed in the absence of the data on SBP or smoking, as well as when laboratory tests were absent (cholesterol level); in 87 % of patients cholesterol level was not assessed in 2007. Proper quality of physicians’ work was found regarding fatal risk calculation in hypertensive patients in 2008. The fatal risk calculation according to the European SCORE model in 2008 was implemented in 94.1 % (941 out of 1,000 hypertensive patients). Cholesterol level as reported only in 5 % of medical reports. In 2009, fatal CVC risk was calculated in 73 %, in 2010 — in 95 %. Total cardiovascular risk calculation according to the SCORE scale is a key point of the National Guidelines for Cardiovascular Health (2011). The decision on antihypertensive treatment was based on the individual risk calculation.

Treatment measures were determined by the following indicators:

- indicator “The need in antihypertensive therapy”;
- indicator “Adequacy of antihypertensive drug choice”;
- indicator “Achievement and maintaining of target BP”;
- indicator “Patients with resistant HTN or suspected secondary HTN consulted by a specialist”.

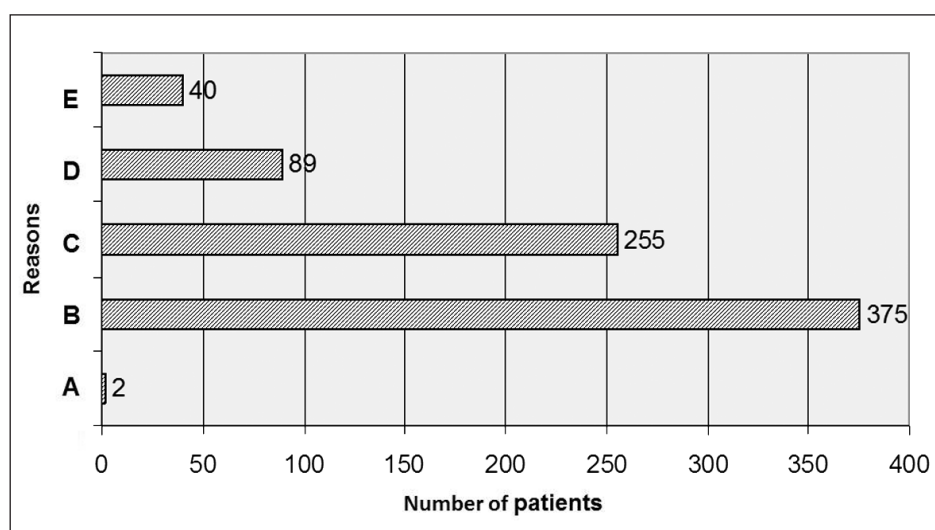
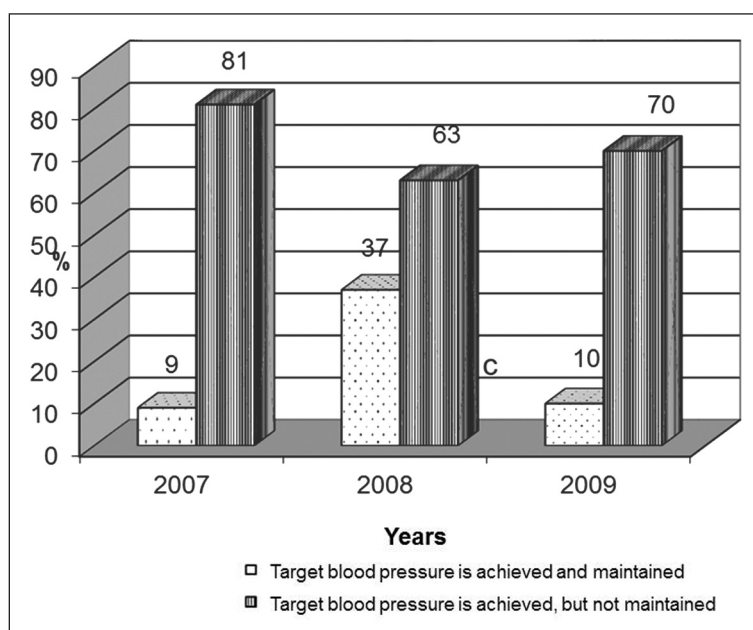
Antihypertensive therapy, including combination treatment, was required at a high rate. In 2007, 914 out of 1,000 patients with HTN required pharmacotherapy. Among the 630 patients,

beta-blockers were prescribed for 571 persons, angiotensin-converting-enzyme inhibitors or angiotensin II receptor blockers — for 611 persons, dihydropyridine calcium antagonists — for 630 persons, non-dihydropyridine calcium antagonists — for 140 people, and thiazide or loop diuretics — for 625 persons. Only 12 patients received incorrect recommendations for antihypertensive pharmacotherapy. The indicator “Patients with refractory HTN or suspected secondary HTN consulted by a specialist” was successfully implemented in all patients based on the medical records regarding consultations of patients with refractory HTN. Thus, 98 % of patients received consultations in 2009, while 100 % were counseled in 2010.

**Indicator “Achievement and maintaining of target BP ”**

This indicator was confirmed by a medical record regarding target BP level (BP < 140/90 mm Hg) and maintenance of the target BP level during a year. There was an improvement in the quality of physician’s work in 2008. In 2007, the target BP level was achieved and maintained during a year only in 9.4 % of patients (94 of 1,000 patients with HTN). The target BP level was achieved in 464 out of 879 patients with HTN during the previous year, but at follow-up the maintenance was incomplete. Among 879 patients the following reasons were identified: A — absent BP measurement during the previous year (in 2 patients); B — target BP level was not registered (in 375 patients); C — target BP was achieved but repeated visits were lacking (in 255 patients); D — target BP was achieved but inter-visit intervals did not comply with the NR (in 89 patients); E — BP elevation was registered target level was achieved (in 40 patients) (Fig. 5).

Potential reasons for inadequate follow-up of HTN persons were analyzed. Proper quality of physicians’ work was observed in 2008: the target BP level during the year was maintained in 3 % of patients (Fig. 6). The reasons included absence of repeated visits (in 34 % of patients) and noncompliance of inter-visit intervals with National Guidelines (in 4.5 % of patients). In 2009, the target BP level was maintained during the year in 10 %. The reasons were the absence of repeated appointments or inadequate inter-visit intervals.

**Figure 5. Reasons for non-optimal follow-up of patients with arterial hypertension (2007)****Figure 6. Achievement and maintenance of target blood pressure level**

### Discussion

The study performed in 2004–2010 on the basis of the software “Registry of HTN” demonstrated the potential for the analysis of physician’s work regarding the HTN management in the outpatient setting. We analysed medical records regarding BP increase, diagnostics, treatment. We also assessed the data regarding cardiovascular risk factors, target organ damage and comorbidities, as well as individual risk of CVCs, the need and adequacy of antihypertensive therapy and preventive measures. Proper quality of physician’s work was

found based on the data of “the Registry of HTN”. Thus, the percentage of HTN diagnostics according to the National Guidelines in 2007, 86 % in 2008, and 88 % in 2009. This fact can be explained by low adherence to the recommended visit schedule. However, the medical records concerning TOD and comorbidities and implementation of preventive measures are well-kept. In 2007 this indicator was determined in 82 %, in 2008 — in 99 %, and in 2010 — in 100 %. The assessment of the quality of non-pharmacological preventive measures lifestyle modification was recommended at the



ratio of 996 per 1,000 patients with HTN in 2007, in 98.4 % cases in 2008 (984 of 1,000 patients with HTN), in 99.5 % cases (995 per 1,000 patients with HTN) in 2009, and in 100 % in 2010 (1,000 per 1,000 patients with HTN). Total cardiovascular risk defines treatment strategy in a patient with HTN. Based on “the Registry of HTN” sufficient data for individual risk calculation was provided in 54 % in 2006. In 2007, sufficient data for total risk calculation was registered in 21 % of patients. In 2008, the proper quality regarding the fatal risk calculation according to the European SCORE scale was found in 94.1 % (941 out of 1,000 patients with HTN). Reasons for non-optimal management of hypertensive patients were analyzed: absence of repeated visits (in 3 %) and noncompliance of visit schedule (in 4.5 %) were the main reasons. Proper quality of physicians’ work was found in 2008, target BP level was maintained during the year in 37 %. Thus, health care delivery was different at various time periods. According to our data, further improvement of primary medical care regarding HTN management is required.

## Conclusions

1. Expert assessment of health care quality delivered to patients with HTN in accordance with the National Guidelines of the Russian Medical Society for HTN and the Russian Society of Cardiology broadens novel technologies in practical health care.

2. We tested the methodology that enables expert assessment of the quality of health care regarding HTN management. We conclude that this methodology provides an opportunity of large-scale implementation of “the Registry for HTN” in medical and preventive treatment facilities.

## Conflict of interest

The authors declare no conflict of interest.

## References

1. Evstifeeva SE, Oshchepkova EV, Gridnev VI, Dovgalevsky PYa. An innovative method of quality control of medical care in patients with arterial hypertension in primary health care system. *Zdravookhraneniye Rossiiskoy Federatsii = Health Care System of Russian Federation*. 2009;6:17–24. In Russian.

2. Prevention, diagnosis and treatment of hypertension. National Guidelines of the Russian Scientific Society of Cardiology (second revision). Moscow, 2004. 19 p. In Russian.

3. Schal’nova SA, Deyev AD. Factors influencing on mortality from cardiovascular diseases in the population in Russia. *Kardiovaskulyarnaya Terapiya i Profilaktika = Cardiovascular Therapy and Prevention*. 2005;4(1):4–6. In Russian.

4. Oganov RG, Maslennikova GYa. Successes and failures of cardiovascular prevention. *Kardiovaskulyarnaya Terapiya i Profilaktika = Cardiovascular Therapy and Prevention*. 2014;13(1):4–7. In Russian.

5. European guidelines on cardiovascular disease prevention in clinical practice. Third joint Task Force of European and other societies on cardiovascular disease prevention in clinical practice. *Eur Heart J*. 2003;24(17):1601–1619.

6. Kelly T, Yang W, Chen CS, Reynolds K, He J. Global burden of obesity in 2005 and projections to 2030. *Int J Obes*. 2008;32(9):1431–1437.

7. Salamatina LV, Zorina LS, Tokarev SA. Factor analysis and individual prognosis for the patients with first revealed arterial hypertension. *Russian Journal of Cardiology*. 2014;6(110):19–23. In Russian.

8. National clinical guidelines 2th ed. Moscow: Silicea-Polygraf; 2009. 291–328 p. In Russian.

9. Diagnostics and treatment of arterial hypertension. National Guidelines of Russian Federation (third revision). *Kardiovaskulyarnaya Terapiya i Profilaktika = Cardiovascular Therapy and Prevention* 2008; 7(6): Enc. 2. In Russian.

10. Diagnosis and treatment of arterial hypertension. National guidelines of Russian Medical Society of Arterial Hypertension and Russian Scientific Society of Cardiology. *Systemic Hypertensions*. 2010;3:5–26. In Russian.

11. Gridnev VI, Posnenkova OM, Kotelnikova EV, Kiselev AR, Dovgalevskiy PY. The Register of an Arterial Hypertension program — new approach to an assessment of quality of medical care to patients with an arterial hypertension. *Cardiovascular Therapy and Prevention*. 2005;4(1):90–91. In Russian.

12. Management of hypertension in adults in primary care. Published by the National Institute of Health and Clinical Excellence. June 2006.

13. Paskar NA. Indicators of quality of medical assistance for patients with arterial hypertension. *Arterial’naya Gipertenziya = Arterial Hypertension*. 2009;15(5):571–574. In Russian.

14. Oshchepkova EV, Lazareva NV, Balygin MM, Gridnev VI, Dovgalevsky PYa. Monitoring of activities on the prevention and treatment of arterial hypertension and its complications. *Zdravookhraneniye Rossiiskoy*

Federatsii = Health Care System of Russian Federation. 2011; 2:7–11. In Russian.

15. Shwartz VA, Gridnev VI, Kiselev AR, Posne-nkova OM. Clinical effectiveness of dynamic out-patient control technology over hypertensive patients based on computer system and mobile phone connection. *Saratov Scientific Journal of Medical Research*. 2009;5(3):358–362. In Russian.

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