
ANALYSIS OF PHYSICAL FITNESS INDICATORS' DYNAMICS OF FUTURE STATUTORY OFFICERS IN 2014-2018

Algirdas Muliarcikas*

**Mykolas Romeris University Faculty of Public Security, Department of State Border Protection
Putvinskio str. 70, LT-44211 Kaunas
Phone: (370 37) 303653
E- mail: a.muliarcikas@mruni.eu*

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Abstract. The article reviews the peculiarities of dynamics of testing indicators reflecting the initial physical preparation of future statutory officials. The results of the physical skills testing of students who started their studies of Combat Self-Defense and Combat Wrestling studies in 2014-2018 are analyzed. The article uses the results of randomly selected students' control exercises. They characterize students' speed endurance (100 m running); peculiarities of general aerobic capacity (2000m and 3000 m running), explosive strength (the standing long jump), abdominal press and arm muscle strength changes in retrospective. Based on the initial data on students' physical fitness testing, the tendencies of changes are defined. The statistically significant differences in the physical characteristics of the groups of students tested in different years are determined.

Keywords: students, future statutory officers, men and women, physical skills' testing, speed, endurance, strength, analysis of result dynamics.

INTRODUCTION

Citizens of the Republic of Lithuania wishing to become statutory officials must, among other things, also meet the special requirements for health and physical fitness¹. The level of applicants for internal service and general physical preparation of officials shall be determined in accordance with the description approved by the Minister of the Interior of the Republic of Lithuania². During the selection and training period, the State Border Guard Service School at the Ministry of the Interior of the Republic of Lithuania³ and the Lithuanian Police School perform similar physical fitness tests.⁴

¹ Lietuvos Respublikos vidaus tarnybos statuto pakeitimo įstatymas 2018 m. birželio 29 d. Nr. XIII-1381. [interactive] [accessed 2019-03-22] <<https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/fae39102834511e89188e16a6495e98c>>

² Lietuvos Respublikos vidaus reikalų ministro įsakymas 2019 m. sausio 15 d. Nr. 1V-55 „Dėl Lietuvos Respublikos vidaus tarnybos statuto įgyvendinimo“ [interactive] [accessed 2019-03-22] <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/8ae81cc2190111e9bd28d9a28a9e9ad9>

³ <https://www.ldb.lt/jaunimui/jdc/Documents/Fizinio%20pasirengimo%20normatyvai%20ir%20j%C5%B3%20v ykdymo%20tvarka.pdf>. [interactive] [accessed 2019-04-05]

⁴ <http://stokipolicija.lt/wp-content/uploads/attachments/Atrankos-i-LPM-taisykles-2016m.pdf> [interactive] [accessed 2019-04-27]

Students in Mykolas Romeris University Public Security Academy in Law and Police and Law and State Border Guard programs also carry out similar physical fitness control tests.⁵ The standards for these tests are based on the peculiarities of the physical preparedness of the country's population⁶.

Officials from other countries are also required to have an appropriate level of physical fitness. Latvian officials⁷ perform similar tests to Lithuanian officials: pulling on the crossbar, push-ups (arm bending and extending supporting the base), 100m, 10x10m and 3000m running, sit-ups (sit-lie down) (2 minutes).

In Poland⁸, the physical check-up of the police is made by proposing to the candidates to overcome the special obstacle section in 1 min. 41 seconds. In the obstacle zone, you have to overcome the moving obstacles, take the humps back and forth, throw the medicine ball, carry the 28 kg mannequin, perform sit-ups with the medicine ball and overcome the gym boxes. Border guards have to do slightly different tests⁹: the standing long jump, running according to the “envelope” area, throwing a medicine ball forward (men 3kg, women 2 kg), forward, side backward and forward hump falls.

Estonian officials¹⁰ perform other tests: 3000m running (either 500m swimming, or 6000m rowing on an ergometer, or 6km walking), exercises to assess arm and abdominal muscle strength. When assessing physical fitness, attention is paid to overweight and other circumstances (illnesses, etc.).

Tests of Slovak officials¹¹ are not different from ones of officials from other countries: men and women - 12 min running; 100 m swimming, sit-lie down in 2 min. Men are still making the standing long jump, 100 m or 4x10 m running and pulling on the crossbar, and women – 50 m running and hanging on the crossbar with arms bent.

⁵ https://stdb.mruni.eu/studiju_dalyko_aprasas.php?id=54445&l=lt [interactive] [accessed 2019-03-22]

⁶ Muliarčikas A., Volbekienė V., Šiupšinskas L. ir kt. *Lietuvos gyventojų fizinio pajėgumo testavimo ir fizinės būklės nustatymo metodika*. Vilnius: Lietuvos sporto informatizacijos centras, 2007, p.73

⁷ <https://likumi.lv/doc.php?id=257102> [interactive] [accessed 2019-05-02]

⁸ <https://www.rekrutacja-do-policji.pl/> [interactive] [accessed 2019-05-02]

⁹ <https://www.infor.pl/akt-prawny/DZU.2015.152.0001121,rozporzadzenie-ministra-spraw-wewnetrznych-i-administracji-w-sprawie-testu-sprawnosci-fizycznej-funkcjonariuszy-strazy-granicznej.html> [interactive] [accessed 2019-05-02].

¹⁰ <https://www.riigiteataja.ee/akt/118042013016> [interactive] [accessed 2019-05-02].

¹¹ <https://www.akademiapz.sk/hodnotenie-fyzickej-zdatnosti-psychologickeho-vysetrenia-new> [interactive] [accessed 2019-05-02]

The physical fitness assessment tests of statutory officials in Germany^{12, 13}, compared to Lithuania, also have some similarities and differences. In the federal states of Germany¹⁴, physical fitness of the police officers is assessed by different tests. All countries in this respect are similar in testing indices as arm, leg, abdominal muscle strength and overall endurance.

Thus, in order to properly perform the functions matching the standards for statutory officials, their physical fitness compared to most citizens should be at a much higher level. Physical preparation of officials is significantly dependent on their lifestyle - physically active or passive. More physically passive officials have higher body fat, BMI and relatively lower strength, flexibility and overall endurance.¹⁵ It is very important for police officers to develop the endurance and strength peculiarities through aerobic exercise¹⁶ and weight lifting exercises, but in order to properly resist the attackers, to successfully detain them, the preparation process should be both versatile and specialized¹⁷. Physical preparation, its adequacy to the functions of officers is a significant factor influencing the quality of their activities, their health and the ability to preserve life^{18, 19}. Regardless of the fact that officials are tested in stages to determine the suitability of physical fitness, they often suffer from injuries²⁰ due to physical resistance of public offenders more. According to studies conducted in the USA^{21 22}, it was found that the physical fitness of a large number of investigated officials was worse than that of ordinary citizens. Police officers have a higher risk of cardiovascular diseases compared to ordinary

¹² <http://sporttest-polizei.de/bundeslaender/bundespolizei/> [interactive] [accessed 2018-02-19]

¹³ <http://sporttest-polizei.de/bundeslaender/> [interactive] [accessed 2018-02-19]

¹⁴ *Supra note 13*

¹⁵ Volanti J.M., Ma C.C., Fekedulegn D. et al. Associations Between Body Fat Percentage and Fitness among Police Officers: A Statewide Study. *Safety and Health at Work*. 2017, 8 (1): 36-41.

¹⁶ Thompson P.D., Buchner D.; Piña I. L. et al. Exercise and Physical Activity in the Prevention and Treatment of Atherosclerotic Cardiovascular Disease. *Circulation*. 2003, 107:3109-3116. [interactive] [accessed 2019-04-04] <<https://www.ahajournals.org/doi/pdf/10.1161/01.CIR.0000075572.40158.77>>

¹⁷ <https://www.policeone.com/police-products/fitness-health-wellness/articles/508738-The-11-components-of-proper-police-fitness/> [interactive] [accessed 2018-03-11]

¹⁸ Lagestad P. Physical Skills and Work Performance in Policing. *International Journal of Police Science and Management*. 2012, 14 (1): 58-70.

¹⁹ Lagestad P., van den Tillaar, R. A Comparison of Training and Physical Performance of Police Students at the Start and the End of Three-Year Police Education. *Journal of Strength and Conditioning Research*. 2014, 28 (5): 1394-1400.

²⁰ Fortenbery J. *An Exploratory Study on Physical Fitness Policies Among Police Departments in North Carolina*. Dissertation of Doctor of Philosophy. Nova Southeastern University, 2016.

²¹ Kales, S. N., Tsismenakis, A. J., Zhang, C. & Soteriades, E. S. Blood Pressure in Firefighters, Police Officers, and Other Emergency Responders. *American Journal of Hypertension*. 2009, 22 (1): 11-20.

²² Quigley A. Fit for Duty? The Need for Physical Fitness Programs for Law Enforcement Officers. *The Police Chief*. Retrieved 2008 [interactive] [accessed 2019-05-01]. <www.policechiefmagazine.org>.

citizens²³. This situation makes it necessary to draw attention to the reasons why officials experience injuries, to find out whether their physical fitness is adequate. The situation that arises presupposes the need to look for ways to improve, maintain and evaluate physical fitness and health.²⁴

The aim of the article was to review the peculiarities of dynamics of physical skills' indicators of future statutory officers of Mykolas Romeris University, Public Security Academy during 2014-2018.

Research methods. The article analyzed the data of initial testing of physical abilities of students selected randomly who studied at the Law and Police Activities, Law and State Border Protection and Police Activities Study Programs. 142 men and 180 women who started their studies in Self-Defense and Combat Wrestling programmes participated in the survey conducted in 2014-2018.

For the assessment of students' physical abilities, the control method and the following tests were used: 100m run for speed endurance; endurance - 3000m running for men and 2000m for women; explosive strength – the standing long jump; abdominal press muscle strength - sit-ups for 30 s for women and hanging on the crossbar with leg lift to the crossbar for 30 s for men, arm muscle strength – push-ups for women, and pull-ups to the crossbar -for men. The listed exercises are included in the curriculum content of Combat Self-Defense and Combat Wrestling Subjects of Statutory Officials as control tests used to assess the physical fitness of students and statutory officials²⁵. Mathematical statistics method was used to process and evaluate the data received, and analytical methods to discuss the results of the study.

RESEARCH RESULTS

The results of the overall physical fitness tests of the men who participated in the study changed with different vectors. Some results were relatively decreased; other results appeared to be in the direction of improvement (Table 1). The average scores of 100m running results for students in 2014-2018 were statistically significant. A slight downward trend in

²³ Wright B. R., Barbosa-Leiker C. Hoekstra T. Law Enforcement Officer Versus Non-Law Enforcement Officer Status as a longitudinal Predictor of Traditional and Emerging Cardiovascular Risk Factors. *Journal of Occupational Medicine*. 2011, 53 (7): 730-734.

²⁴ Lagestad P., *supra note 18*.

²⁵ Lietuvos Respublikos vidaus reikalų ministro įsakymas 2019 m. sausio 14 d. Nr. 1V-45 Dėl Lietuvos Respublikos vidaus reikalų ministro 2016 m. vasario 1 d. Įsakymo nr. 1V-72 „Dėl priėmimo į Vidaus tarnybą, vidaus tarnybos sistemos pareigūnų rengimo ir kvalifikacijos tobulinimo tvarkos aprašo patvirtinimo“ pakeitimo. [interactive] [accessed 2019-04-30] < <https://www.e-tar.lt/portal/lt/legalActSearchr> >

performance was observed in 2016. The situation with the results of pull ups to the crossbar and the standing long jump was noticed to be similar.

Table 1. Results of men's overall physical fitness testing

Year	100 m run(s)	3km run(min.)	Leg explosive strength (cm)	Arm muscle strength endurance (times)	Abdominal muscle strength (times)
2014	13,4±0,6	13:01±0,48	250,5±11,3	12,6±4,2	11,9±2,8
2015	13,4±0,6	13:16±0,37	245,5±16,5	11±5,3	9,8±3,1
2016	13,7±0,6	13:53±0,36	249±14,8	10,4±4,2	10,4±3,6
2017	13,5±0,8+	13:53±0,51	250,1±20,8	12,1±4,2	10,8±2,7
2018	13,4±0,5	14:00±0,49	249,1±12,5	10,6±3,6	11,7±3,7

A decrease in abdominal muscle strength endurance, as well as other physical skills test results, was observed in 2015-2016. With respect to the results of other tests, the average of the results of this test in 2015 is statistically significantly lower ($p < 0.05$; Fig. 1) than the results in 2014 and 2018.

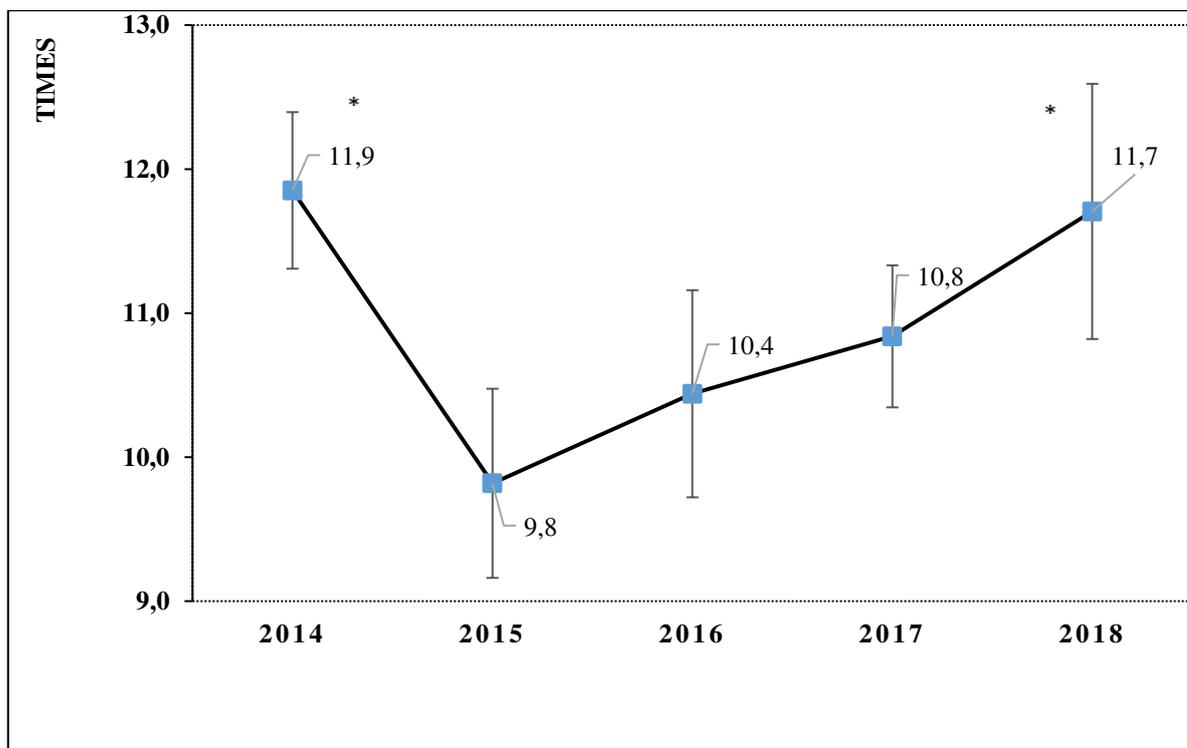


Figure 1. Results of men's hanging on the crossbar with leg lift control exercise (* $P < 0,05$)

In retrospect, the averages of the students' overall endurance (3000m running) test results changed in the direction of sequential increase (Figure 2).

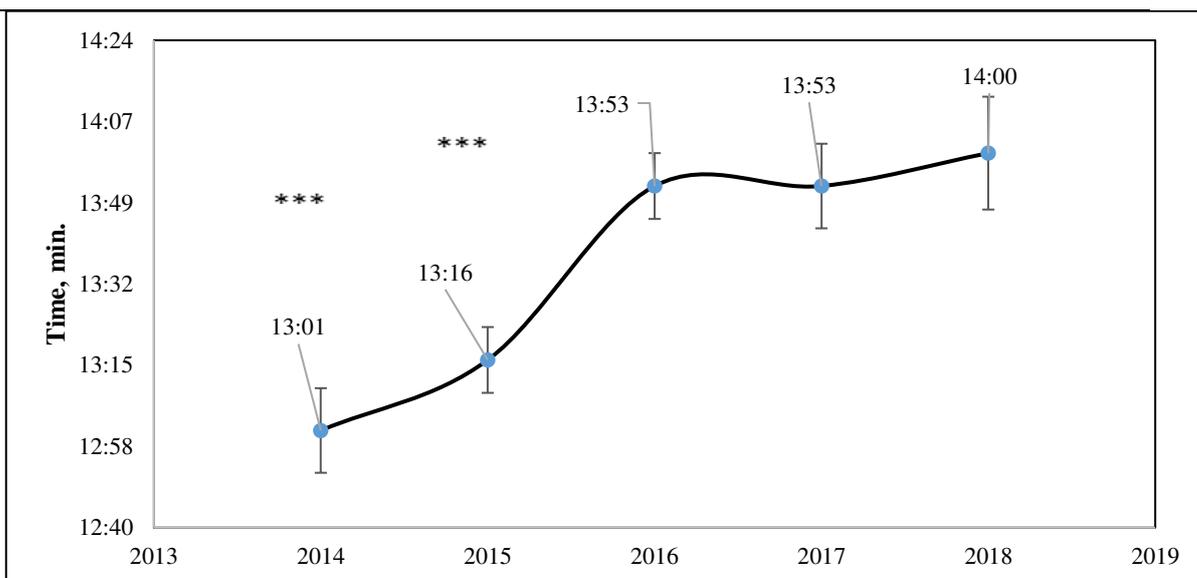


Figure 2. Results of men's 3km running exercise (**P<0,001)

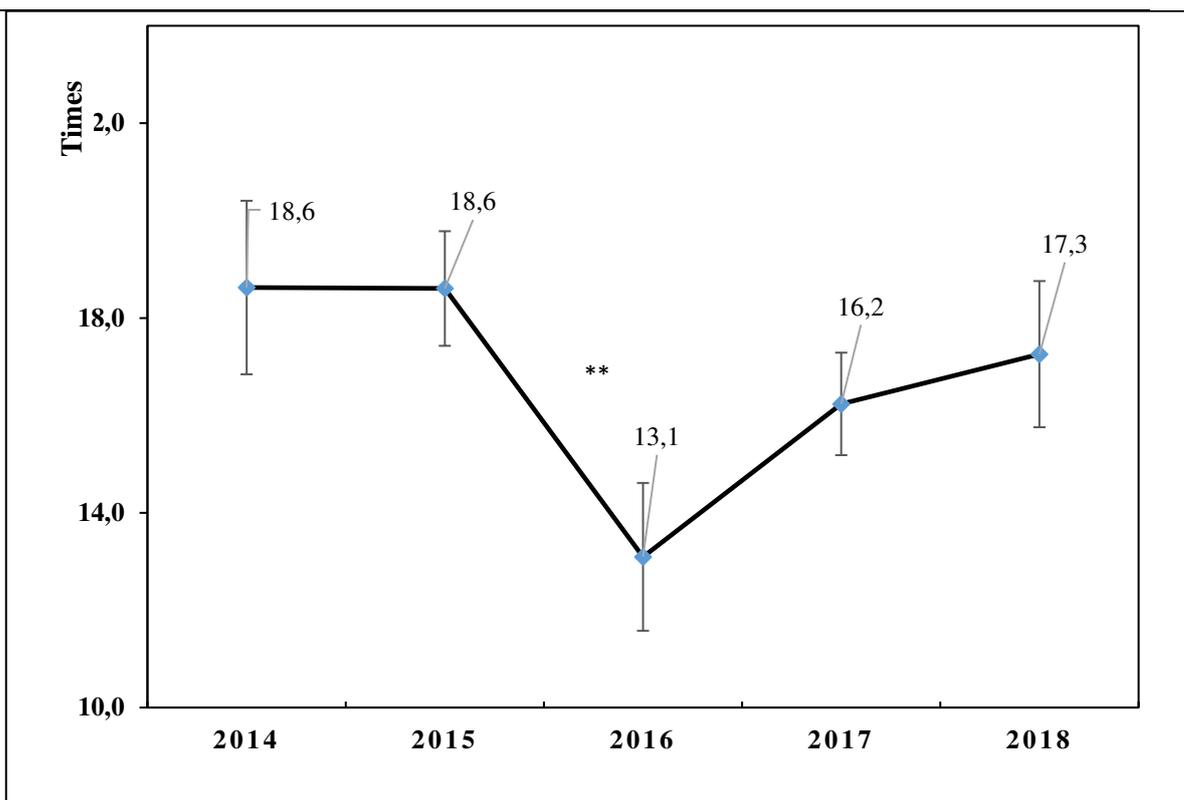
The averages of the 2014 and 2015 test results (distance run in shorter time) were statistically significantly different from the results of 2016, 2017 and 2018.

Trends in the outcomes of testing women's physical abilities were slightly different from those of men (Table 2).

Table 2. Results of women's overall physical fitness testing

Year	100 m run(s)	2km run(min.)	Leg explosive strength (cm)	Arm muscle strength endurance (times)	Abdominal muscle strength (times)
2014	16,0±1,1	10:32±0,50	200,4±15,8	18,6±7,1	23,5±5,2
2015	16,2±0,8	10:33±0,31	196,8±9,34	18,6±7,7	25,1±2,6
2016	17,0±1,1	11:06±0,55	191,0±15,6	13,1±8,6	26,7±3,2
2017	16,6±1,1	11:02±1,00	1935±15,4	16,2±7,5	25,3±3,6
2018	16,7±1,1	11:13±1,20	192,9±15,7	17,3±8,9	25,5±2,6

Gradual decline in mean muscular strength results (Figure 3). Compared to 2014 and 2015, on average, women students who studied in 2016 performed push-ups the least times.



3. Pav. Figure 1. Results of women's push-up control exercise (**P<0,01).

Decrease in the 100m running results of women students was noticed.

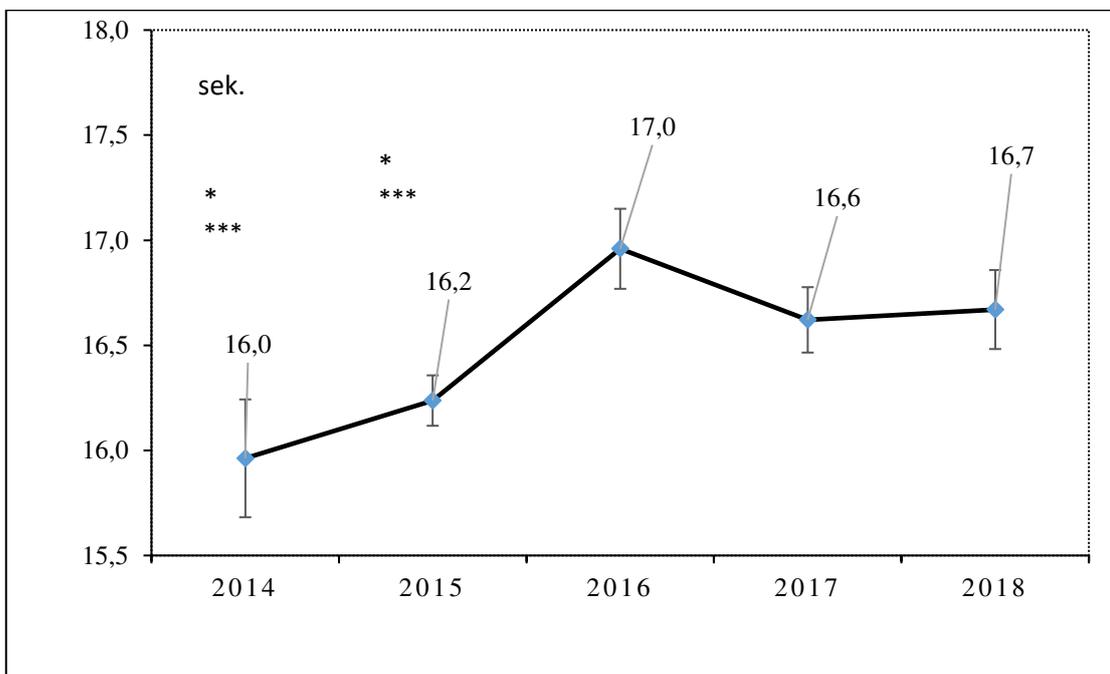


Figure 4. Results of women's 100 m running exercise (*p<0,05; ***p<0,001).

The worst speed (Fig. 4) physical abilities were demonstrated by women tested in 2016. Their results were significantly worse ($p < 0.001$) than those shown by women tested in 2014 and 2015. The results for 2014, 2015 were higher ($p < 0.05$; shorter running time) than those of 2017 and 2018.

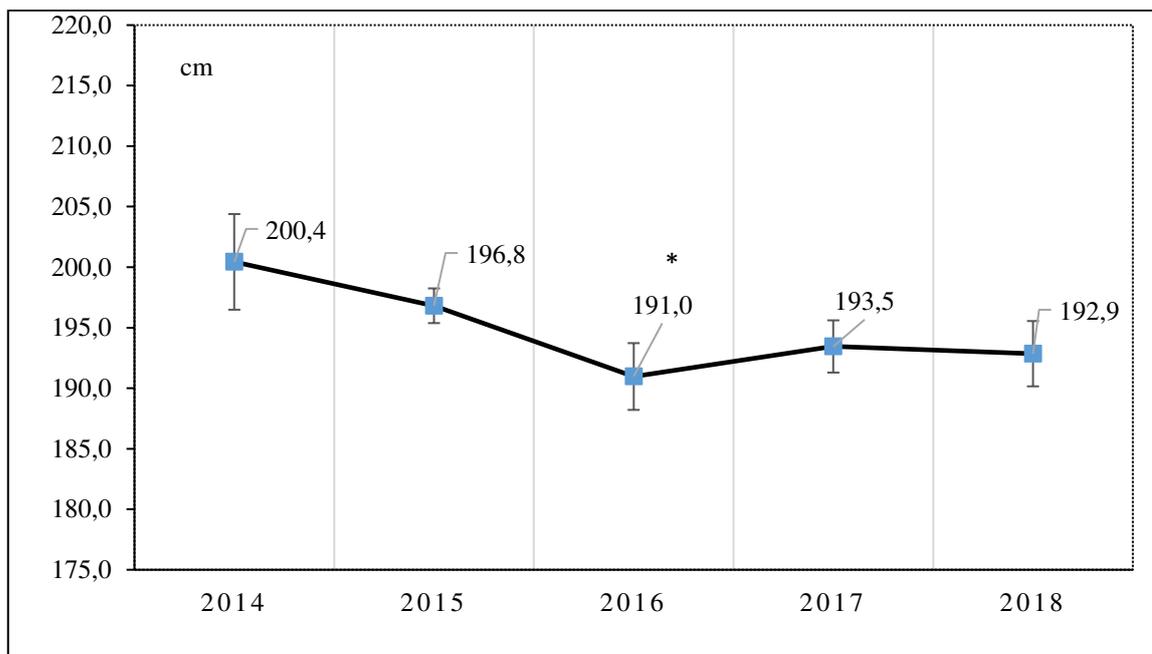


Figure 5. Results of women's standing long jump exercise (* $P < 0,05$)

Average results of women's standing long jump exercise in 2016 was statistically significantly lower than those performed in 2014 and 2015 ($p < 0.05$).

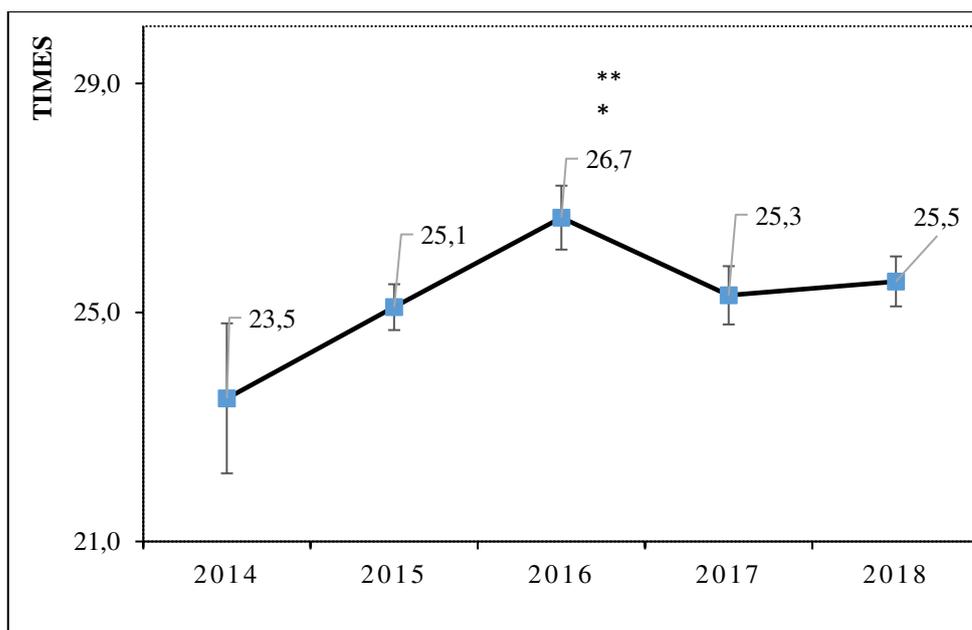


Figure 6. Results of women's sit-up control exercise (* $P < 0,05$; ** $P < 0,01$)

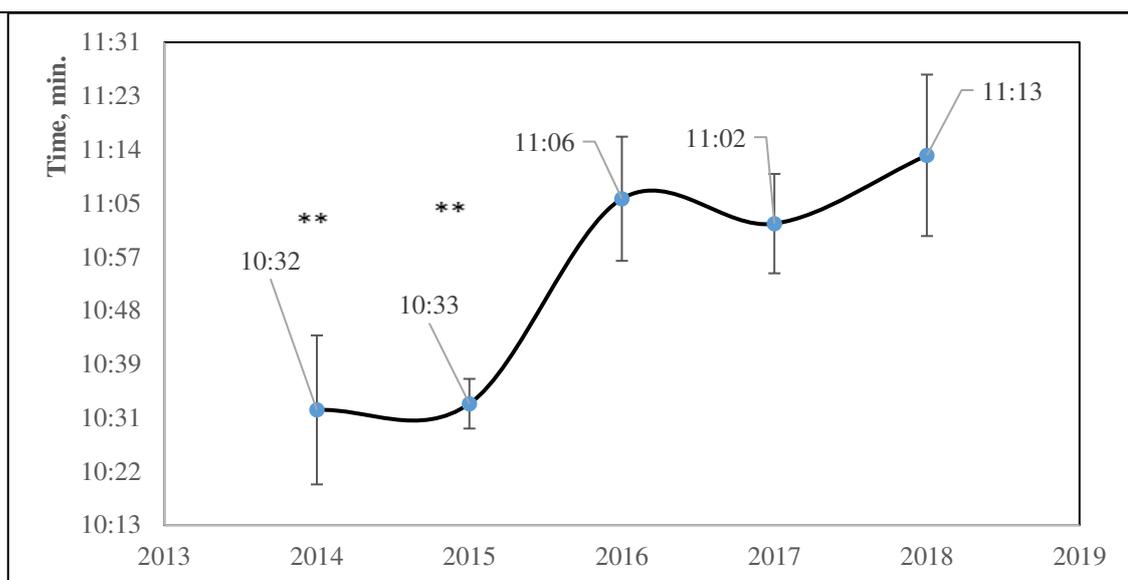


Figure 7. Results of women's 2km running exercise (**P<0,01).

Contrary to what has been discussed above, it is possible to evaluate the test results that characterize the stamina of the abdominal muscular strength of women (Fig. 6). Most of the repetitions of sit-up exercise for 30 seconds were performed by women tested in 2016. They achieved statistically significantly better results than women tested in 2014 ($p < 0.01$); 2015 ($p < 0.05$). Women also achieved lower results in this test in 2017 and 2018, but no statistically significant difference was recorded.

The results of the 2000m run, reflecting general stamina development, have gradually deteriorated since 2016 (Figure 7). In 2014 and 2015, the averages of the results achieved by the groups studied differ statistically significantly from the results of 2016-2018.

After reviewing the test data, according to the number of students completing the test requirements in the first test (Table 3), there were visible decreasing “waves” of certain physical abilities of the investigated men identified.

From 2015 until 2018 the visible wave of deterioration of hand muscle strength indicators was noticed, i.e. a number of students have failed to meet the minimum requirements for first-time testing. The majority of such students compared to 2014 studied in 2015 ($p < 0.05$), slightly less than in 2016 ($p < 0.05$). In subsequent years, their number has become even smaller and no statistically significant difference between the numbers of students has been identified.

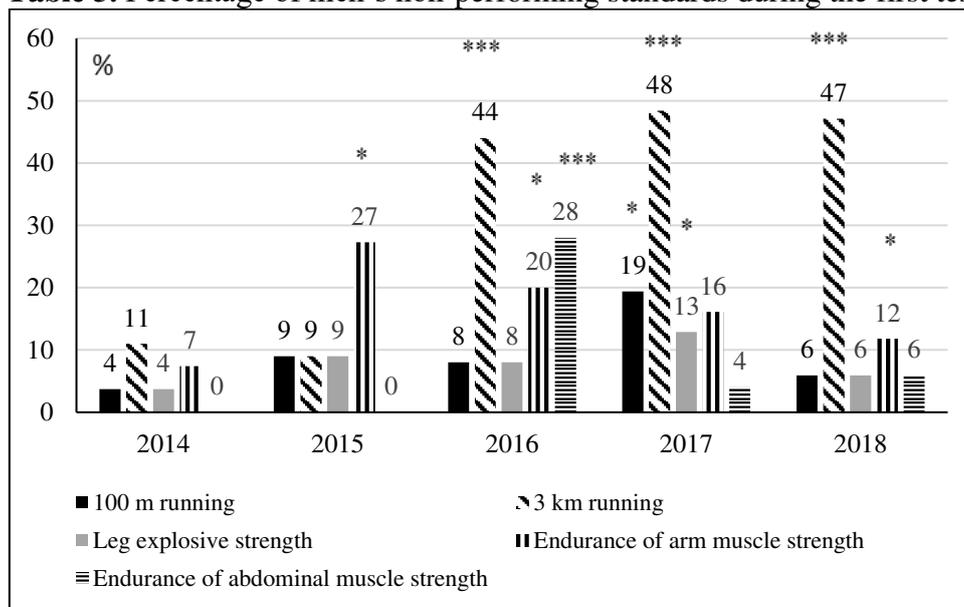
A significant number of students did not fulfill the minimum abdominal muscle strength endurance requirements at first testing in 2016 ($p < 0.001$).

At the time of the first test, the minimum number of minimum jump rates failed to meet the 2017 target. ($p < 0.05$).

The statistically significant majority ($p < 0.05$) of the 100m student running test at the time of the first test did not complete in 2017 - there is a tendency of dependence between speed and explosive strength.

During the first 3000 m run, almost half of the tested men (Table 3) in 2016-2018 did not meet the standards, unlike ($p < 0.001$) men tested in 2014-2015.

Table 3. Percentage of men's non-performing standards during the first test



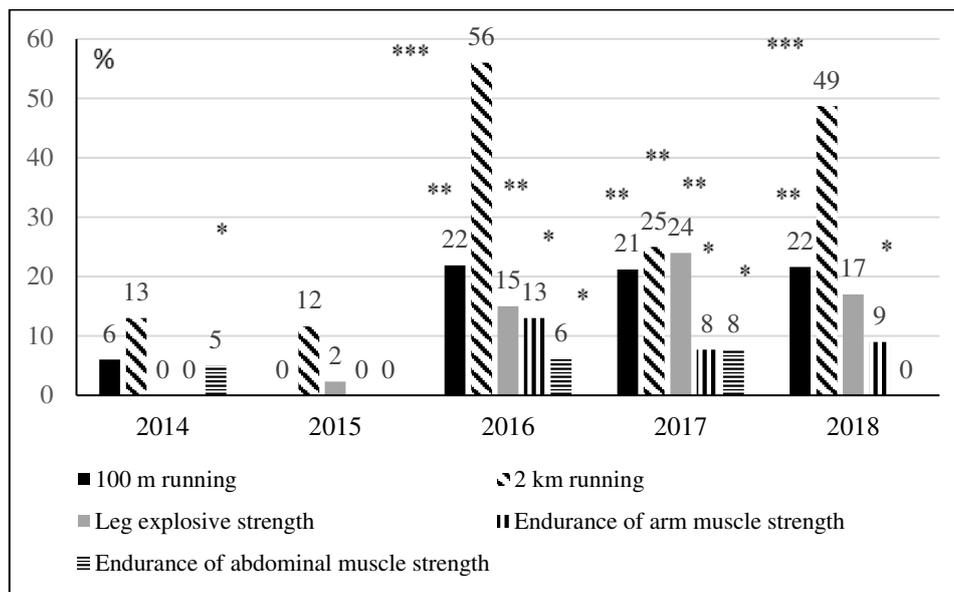
*($P < 0,05$); **($P < 0,01$); ***($P < 0,001$)

The preparation of the women to perform the sit-up exercise was different in different years (Table 4) More women did not pass the normative test during the first test in 2014, 2016 and 2017 ($p < 0.05$) than in 2015 and 2018.

In accordance with the normative requirements, the push-up exercise was performed by tested women in 2014 and 2015. The significantly higher ($p < 0.05$) number of women tested in 2016-2018 was unable to do so.

Similarly, they performed the long jump test (Table 4). Statistically significantly more women failed to perform this test as required in 2016 - 2018 ($p < 0.01$) than in 2014-2015 during the initial testing. Due to the influence of leg explosive power on the speed ability, a very similar dynamics can be noticed in the 100 m running test. Significantly more women ($p < 0.01$) in 2016-2018 than in previous years were not well prepared for this test.

Table 4. Percentage of women's non-performing standards during the first test



*(P<0,05); **(P<0,01); ***(P<0,001)

A special change in the development of women's aerobic endurance has been observed since 2016. More than half or half of the women tested failed (<0.001) to perform the 2000m running test standard during first test in 2016 and 2018 (Table 4). Such women comprised 25% (p <0.01) in 2017, and slightly over 10% of all tested women in 2014-2015.

DISCUSSION OF RESEARCH RESULTS

Summarizing the results and dynamics of students' overall physical fitness for 2014-2018, it can be stated that no significant changes were observed during these years. The consistent deterioration of the overall endurance indicators of women and men should be emphasized as a more significant circumstance. This negative trend in the near future may lead to more significant undesirable consequences for our country's officials in direct In foreign countries, with the increase in the proportion of statutory officials in health problems, researchers are actively looking for optimal pathways and ways to address the problematic situation.^{26, 27}

²⁶ Kales, S. *supra* note 21.

²⁷ Leischik R., Foshag P., Strauß et. all. Aerobic Capacity, Physical Activity and Metabolic Risk Factors in Firefighters Compared with Police Officers and Sedentary Clerks. *PLOS ONE*. 2015, 10(8): e0136224. [interactive] [accessed 2019-03-22] <<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0133113#sec019>>

In most cases, the recommended activity is physical exercises that are adequate to the level of preparation and suitable for the function of the professionals.^{28, 29, 30}

During the analyzed period, the mean values of the students' average scores are not lower than those of our country's specialized school students and statutory officials during their regular testing.^{31, 32} This suggests that the physical fitness of the subjects, based on the average of test results, is fully in line with the requirements for future statutory officials. The standards of physical preparation testing of students studying at the Public Security Academy of Mykolas Romeris University were prepared in accordance with the standards of physical testing recommended for Lithuanian residents. They were divided into appropriate age periods for women and men, based on the results of multi-annual physical testing of large-scale Lithuanian population³³. The average of the results of the various tests of students, compared to the residents of 30-34 years, corresponds to the level of "Good" (men's 3 km running; the 2 km running exercise and sit-up exercise for women). Compared to the proposed standards for 18-year-olds³⁴, the average of men's long-distance results would be seen as "Good" and for women - between "Highly satisfactory" and "Good". The result of the sit-up test for women in 2014-2018 was between the categories "Unsatisfactory" (23 times) and "Satisfactory" (27 times). Compared to the ratings given in the statutory tables of officials^{35, 36}, our students, taking their lowest scores, were as follows: 3 out of 3, men scored 29, and women - 25 points. The lowest requirement for physical training for statutory officers³⁷ is to collect 31 points out of 3 tests.

Retrospectively, comparing the mean values of this and the previous study results³⁸ (Table 5), no significant changes in the results of the tested physical properties were found. The graphs show a year-on-year change in the results of one or the other test results, after analyzing

²⁸ *Supra note*, 17

²⁹ *Supra note*, 20

³⁰ *Supra note*, 27

³¹ *Supra note*, 2.

³² *Supra note*, 4.

³³ *Supra note*, 6.

³⁴ *Supra note*, 6, p.12-14.

³⁵ *Supra note*, 2.

³⁶ *Supra note*, 4.

³⁷ *Supra note*, 2.

³⁸ Muliarčikas A. Būsimųjų statutinių pareigūnų fizinio parengtumo rodiklių dinamikos 2003-2012 m. analizė. *Visuomenės saugumas ir viešoji tvarka*. 2013, (10):121-138.

the variation by year. Its cause is still unclear. It is likely that one of the many factors is the gradually decreasing physical activity of adolescents^{39, 40}.

It is worth noting the fact that the contingent's general physical endurance is diminished. General endurance aerobic exercise exerts a positive influence not only on the cardiovascular system,⁴¹ but on other human functional systems.

Table 5. Averages of student's physical skills testing results

Test/year	Women			Test/year	Men		
	2003-2007	2008-2012	2014-2018		2003-2007	2008-2012	2014-2018
100 m (s)	16,3±0,3	16,9±0,2	16,5±0,2	100 m (s)	13,4±0,1	13,7±0,1	13,5±0,1
2000 m (s)	628,6±6,2	654,8±11,6	653,3±8,6	3000 m (s)	794,6±8,3	800±9,9	817,6±11,15
Long jump (cm)	192±3,8	190±2,8	195±1,7	Long jump (cm)	253±3,6	247±2,9	249±0,9
Sit-ups for 30 s (times)	25±1,2	26±1,1	25±0,5	Leg lift up to the crossbar for 30 s (times)	10,7±0,9	10,8±0,9	10,9±0,4
Push-ups (times)	12,7±1,6	11,7±1,5	16,8±1,1	Pull ups to the crossbar (times)	11,8±1,4	11±0,5	11,4±0,4

Simultaneously, this kind of workload also optimizes cognitive, thinking, problem-solving, communication and other skills⁴². It is obvious that all this is significant for statutory officials.

Attention is drawn to the fact that physical exercise of a specific nature has a positive effect on the health status of even those who are already suffering from peripheral vascular

³⁹ Zaborskis, A., Raskilas, A.. Lietuvos mokinių fizinio aktyvumo pokyčiai 1994–2010 metais. *Visuomenės sveikata*. 2011, 3(54): 78–86.

⁴⁰ Volbekienė V, Gričiūtė A., Gaižauskienė A. Lietuvos didžiųjų miestų 5—11 klasių moksleivių su sveikata susijęs fizinis aktyvumas. *Ugdymas kūno kultūra sportas*. 2007, 2 (65): 71-77.

⁴¹ Darren E.R, Crystal W.N., Shannon S.D. Health benefits of physical activity: the evidence. *Canadian Medical Association Journal*. 2006, 174 (6):801-809. [interactive] [accessed 2019-04-19]. <<http://www.cmaj.ca/content/174/6/801.full>>

⁴² Smith PJ, Blumenthal JA, Hoffman BM, et al. Aerobic exercise and neuro-cognitive performance: A meta-analytic review of randomized controlled trials. *Psychosomatic Medicine*. 2010,72(3):239–252. [interactive] [accessed 2018-05-19] <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2897704/>>

diseases^{43 44 45 46}. Thus, the gradual decrease of test results, reflecting the level of future stamina, aerobic capacity of future officials, makes us think about certain aspects of the perspective.

CONCLUSIONS

Statistically significant difference among the speed, arm and leg strength indices of men's groups (2014-2018) tested was not found. A slight but statistically significant decrease in abdominal force indicators was recorded in 2015. Indicators characterizing men's overall endurance have deteriorated significantly from 2016 to 2018.

A statistically significant deterioration was recorded for women in almost all of the tests (only the sit-up exercise improved) in 2016.

Women reached lower results in 2016-2018 than in 2014-2015 in 100m and 2000m running. The results of their abdominal press strength endurance tests and leg explosive strength tests were not statistically significant.

Statistically significantly more students did not meet the standards during the first test from 2016 as compared to the results of 2014 and 2015.

It can be stated that physical fitness (especially overall endurance) of those who started studying earlier than 2015-2017 is significantly better.

Although there is a downward trend in students' physical fitness, their current preparation is significantly higher than the minimum requirements for statutory officials.

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2. Bronas U.G., Treat-Jacobson D., Leon A.S. *Journal of Vascular Surgery*. 2011, 53 (6): 1557–1564.
3. Darren E.R., Crystal W.N., Shannon S.D. Health benefits of physical activity: the evidence. *Canadian Medical Association Journal*. 2006, 174 (6):801-809. [interactive] [accessed 2019-04-19]. <<http://www.cmaj.ca/content/174/6/801.full>>.

⁴³ Saskia P.A.N., Hendriks E.J.M., Prins M.H., et al. Optimizing supervised exercise therapy for patients with intermittent claudication. *Journal of Vascular Surgery*. 2010, 52, (5): 1226-1233.

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⁴⁵ Saxton J.M., Zwierska I., Blagojevic M., et al. Upper- versus lower-limb aerobic exercise training on health-related quality of life in patients with symptomatic peripheral arterial disease. *Journal of Vascular Surgery*. 2011, 53(5):1265-1273.

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Algirdas Muliarčikas*, Mykolas Romeris University, Faculty of Public security, Department of State Border Protection, Assoc.prof., dr., works as lecturer. Research interests: Human physical education and healthiness, circumstances of physical violence actions and its resort, correlation of physical training and personal security.