

ДИСКУССИОННЫЕ СТАТЬИ, ЛЕКЦИИ, НОВЫЕ ТРЕНДЫ  
МЕДИЦИНСКОЙ НАУКИ  
DISCUSSION PAPERS, LECTURES, NEW TRENDS IN MEDICAL SCIENCE

COMPARISON OF ATTITUDE OF INDIAN AND RUSSIAN PARENTS  
TO CHILDREN'S VACCINATION

Novikova E.A.<sup>1</sup>,  
Maniyan Girija Manu Krishna<sup>2</sup>,  
Ajitha Sureshkumar Aaromal<sup>2</sup>,  
Suprasannan Abhiramy<sup>2</sup>,  
Vanyarkina A.S.<sup>1</sup>,  
Moskaleva E.V.<sup>1</sup>,  
Petrova A.G.<sup>1</sup>,  
Rychkova L.V.<sup>1</sup>

<sup>1</sup> Scientific Centre for Family Health  
and Human Reproduction Problems  
(Timiryazeva str. 16, Irkutsk 664003,  
Russian Federation)

<sup>2</sup> Irkutsk State Medical University  
(Krasnogo Vosstaniya str. 1, Irkutsk  
664003, Russian Federation)

Corresponding author:  
Evgenia A. Novikova,  
e-mail: europe411@mail.ru

ABSTRACT

**Background.** The vaccine preventable diseases outbreaks have become more frequent in recent decades and the lack of global vaccine awareness has been increasing and deteriorating vaccine compliance.

**The aim.** To assess the attitude towards vaccination of parents from India and Russia.

**Methods.** 1620 parents from Russia (Irkutsk city) and 214 parents from India (Kerala state) took part in the international cross-sectional multicenter study via survey method.

**Results.** Parents from both countries showed good adherence to vaccination, only 1 % of Indians and 2 % of Russians did not vaccinate their children. More than 90 % of Russians took information from pediatricians compared with other sources with a prevalence of pediatricians working in the public health system 91.7 % (95% CI: 90.2–92.9), whereas only 50 % of Indians were informed about vaccination from pediatricians ( $p < 0.0001$ ). The main source of vaccine information for Indian parents was Internet (52.8 %; 95% CI: 46.1–59.3) and mass-media (83.6 %; 95% CI: 78.1–87.9), whereas Russians resorted to this source much less (0.3 %; 95% CI: 0.1–0.7 for Internet; and 4.3 %; 95% CI: 3.4–5.4 for mass-media;  $p < 0.0001$ ). Interestingly, while the vast majority of Russians received information about vaccination from a pediatrician, 71.2 % (95% CI: 68.9–73.3) wanted to know more. Indians suffered from a lack of information too, but not as much (63.1 %; 95% CI: 56.4–69.3;  $p = 0.01$ ).

**Conclusion.** Despite of a good attitude to vaccination of parents from India and Russia the lack of vaccine information was registered.

**Key words:** vaccination, children, vaccine preventable diseases, vaccine awareness, vaccine knowledge, vaccine hesitancy, vaccination refusal

Received: 10.06.2022

Accepted: 15.09.2022

Published: 08.12.2022

**For citation:** Novikova E.A., Maniyan Girija Manu Krishna, Ajitha Sureshkumar Aaromal, Suprasannan Abhiramy, Vanyarkina A.S., Moskaleva E.V., Petrova A.G., Rychkova L.V. Comparison of attitude of Indian and Russian parents to children's vaccination. *Acta biomedica scientifica*. 2022; 7(5-1): 12-18. doi: 10.29413/ABS.2022-7.5-1.2

## ОТНОШЕНИЕ РОДИТЕЛЕЙ ИЗ ИНДИИ И РОССИИ К ВАКЦИНАЦИИ ДЕТЕЙ

Новикова Е.А.<sup>1</sup>,  
Кришна М.<sup>2</sup>,  
Сурешкумар А.<sup>2</sup>,  
Супрасаннан А.<sup>2</sup>,  
Ваняркина А.С.<sup>1</sup>,  
Москалева Е.В.<sup>1</sup>,  
Петрова А.Г.<sup>1</sup>,  
Рычкова Л.В.<sup>1</sup>

<sup>1</sup> ФГБНУ «Научный центр проблем здоровья семьи и репродукции человека» (664003, г. Иркутск, ул. Тимирязева, 16, Россия)

<sup>2</sup> ФГБОУ ВО «Иркутский государственный медицинский университет» Минздрава России (664003, г. Иркутск, ул. Красного Восстания, 1, Россия)

Автор, ответственный за переписку:  
Новикова Евгения Анатольевна,  
e-mail: europe411@mail.ru

## РЕЗЮМЕ

**Введение.** За последние десятилетия участились вспышки вакциноуправляемых заболеваний, при этом среди родителей наблюдается низкая осведомленность о пользе и действии вакцин, что ухудшает приверженность вакцинации.

**Цель исследования.** Оценить отношение родителей из Индии и России к вакцинации детей.

**Методы.** В международном перекрёстном многоцентровом исследовании методом опроса приняли участие 1620 родителей из России (г. Иркутск) и 214 родителей из Индии (штат Керала).

**Результаты.** Родители из обеих стран показали высокую приверженность вакцинации; только 1 % индийцев и 2 % россиян не прививали своих детей. Более чем 90 % родителей из России и лишь 50 % родителей из Индии получили необходимую информацию о вакцинации от врача-педиатра, работающего в государственной системе здравоохранения ( $p < 0,0001$ ). Основными источниками информации о вакцинах родителям из Индии служили интернет (52,8 %; 95%-й доверительный интервал (95% ДИ): 46,1–59,3) и СМИ (83,6 %; 95% ДИ: 78,1–87,9), тогда как россияне прибегали к этим ресурсам информации гораздо реже (интернет – 0,3 %; 95% ДИ: 0,1–0,7; СМИ – 4,3 %; 95% ДИ: 3,4–5,4;  $p < 0,0001$ ). Интересно, что в то время как подавляющее большинство россиян получали информацию о вакцинации от педиатра, 71,2 % (95% ДИ: 68,9–73,3) хотели знать больше. Индийцы тоже отметили недостаток информации по вопросам вакцинопрофилактики – 63,1 % (95% ДИ: 56,4–69,3;  $p = 0,01$ ).

**Выводы.** Несмотря на высокую приверженность вакцинации детей, большинство родителей из Индии и России хотели бы быть более осведомлёнными в вопросах вакцинопрофилактики.

**Ключевые слова:** вакцинация, дети, вакциноуправляемые заболевания, отношение к вакцинации, отказ от вакцинации

Статья поступила: 10.06.2022

Статья принята: 15.09.2022

Статья опубликована: 08.12.2022

**Для цитирования:** Новикова Е.А., Кришна М., Сурешкумар А., Супрасаннан А., Ваняркина А.С., Москалева Е.В., Петрова А.Г., Рычкова Л.В. Отношение родителей из Индии и России к вакцинации детей. *Acta biomedica scientifica*. 2022; 7(5-1): 12-18. doi: 10.29413/ABS.2022-7.5-1.2

## INTRODUCTION

The World Health Organization (WHO) calls specific immunoprophylaxis the best way to protect against infections. For example, before the invention of the smallpox vaccine by Edward Jenner in 1796, mortality in London varied at the level of 10–15 %. After the development of the vaccine, the UK managed to completely cope with the variola virus by 1934. The eradication of smallpox was officially declared by WHO in 1980 [1]. It is the first disease which was eradicated globally. Since the invention of the smallpox vaccine, the prevalence of vaccine preventable diseases rapidly decreased in the world. From 1990 to 2017, infant mortality from vaccine preventable infections decreased from 5.5 million to 1.8 million [2]. According to WHO, vaccination of the population prevents 4–5 million deaths every year from diseases like diphtheria, tetanus, pertussis, influenza and measles, and it could be increased by another 1.5 million if vaccination becomes truly global [3].

However, in recent years vaccine preventable disease outbreaks have become more frequent. For example, more than 17 thousand measles cases among children were reported worldwide by the beginning of 2022, compared to around 9 thousand during the first two months of 2021 [4]. This can be related to vaccine hesitancy or vaccination refusal. The main reason that supports the anti-vaccination movement is the lack of awareness, i. e. lack of understanding of vaccination meaning and the resulting fear of side effects. Therefore, in connection with the current trend of non-vaccination, it is necessary to monitor the attitude towards vaccination.

Research group of the Laboratory of Infectology and Immunoprophylaxis in Pediatrics of the Scientific Centre for Family Health and Human Reproduction Problems (Irkutsk, Russia) has been investigating attitude and knowledge of parents and physicians to preventive vaccination since 2018 [5–7]. A comparison study for Russian and Indian parents has become another step since India and Russia, and Irkutsk region in particular, have established research and educational relations. Global data shows low awareness and knowledge about vaccination among people from these countries. The Wellcome Global Monitor project surveying over 140 000 people from over 140 countries reports 92 % people in the world thinking that it is important for children to be vaccinated whereas for Indians this number is bigger – 98 %, and for Russians it's much lower compared with global data and Indians – 77 % (Fig. 1).

Other similar researches have been done before for each of the countries [8–15], but there was no comparison between those. Collected data will allow to assess the attitude towards vaccination in India and Russia, and to make recommendations for improving compliance vaccine.

## METHODS

1620 parents from Russia (Irkutsk city) and 214 parents from India (Kerala state) took part in the international cross-sectional multicenter study. Data were collected from November 2018 to July 2020. The study protocol, questionnaire form and informed consent were approved by the eth-

### Share that agrees that vaccines are important for children to have, 2018

The share of people who responded that they "strongly agree" or "somewhat agree" with the statement 'Vaccines are important for children to have'.

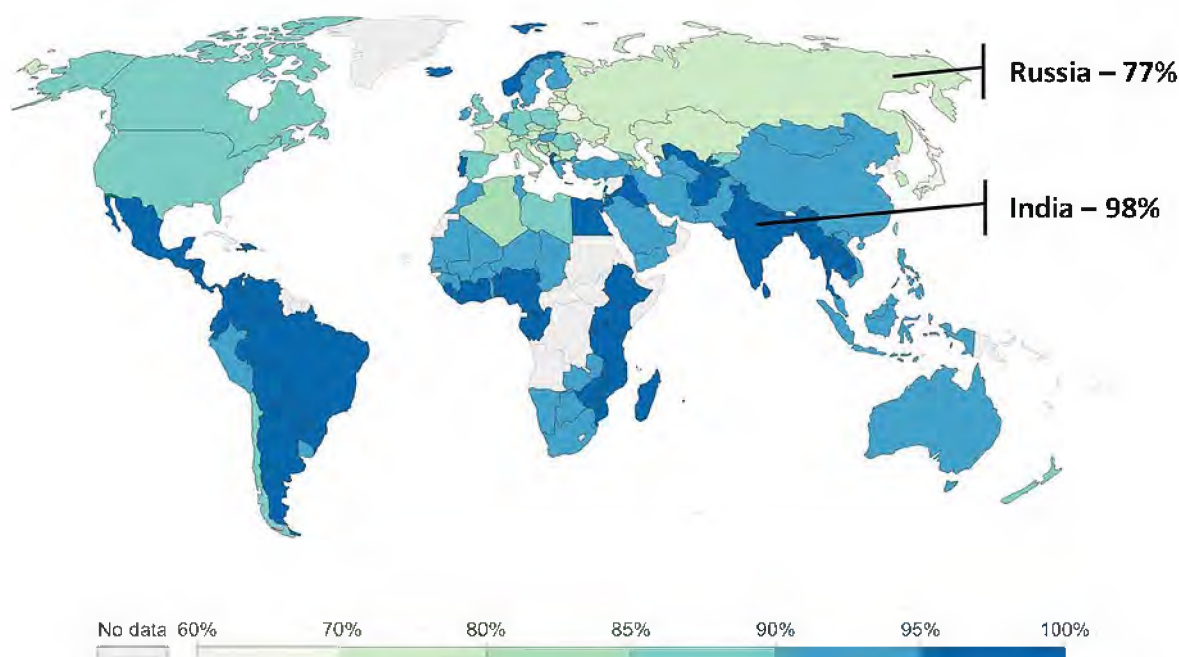


FIG. 1.

The opinion of people around the world that it is important for children to be vaccinated (The Wellcome Global Monitor, 2018) [2]

ics committee of the Scientific Centre for Family Health and Human Reproduction Problems (Irkutsk, Russia). Qualitative data were compared using the  $\chi^2$  test and reported as absolute values and percentages. 95 % confidence interval (95% CI) for a proportion was calculated using the website for statistical computation "VassarStats" [16]. Differences were considered statistically significant at  $p < 0.05$ .

## RESULTS AND DISCUSSION

Portrait of a respondent from Russia: a female (70.6 %; 95% CI: 68.4–72.8), 21–40 years old, with university education (52.7 %; 95% CI: 54.9–59.7), having one (53.5 %; 95% CI: 51.0–55.9) or two children (36.7 %; 95% CI: 34.3–39.1) (Table 1). Women prevailed among Indian parents

**TABLE 1**  
**CHARACTERISTICS OF INDIAN AND RUSSIAN PARTICIPANTS**

Variables	Indian parents (n = 214)			Russian parents (n = 1620)			p (by $\chi^2$ )
	n	%	95% CI	n	%	95% CI	
<i>Your level of education</i>							
School	17	7.9	5–12.3	213	17.8	11.6–14.9	0.09
College	65	30.4	24.6–36.8	479	29.5	27.4–31.8	
University	132	61.7	55–67.9	928	52.7	54.9–59.7	
<i>Your gender</i>							
Male	68	31.8	25.9–38.9	475	29.3	27.1–31.5	0.5071
Female	146	68.2	61.7–74	1145	70.6	68.4–72.8	
<i>Your age</i>							
Younger than 20 y. o.	3	1.4	0.5–4.0	97	6.0	4.8–7.2	< 0.0001 <sup>†</sup>
21–30 y. o.	85	39.7	33.4–46.4	672	41.5	39.1–43.9	
31–40 y. o.	86	40.2	33.8–46.8	695	42.9	40.5–45.3	
Older than 40 y. o.	40	18.7	14.0–24.4	156	9.6	8.2–11	
<i>How many children do you have?</i>							
One	141	65.9	59.3–71.9	835	53.5	51.0–55.9	0.0072 <sup>†</sup>
Two	56	26.2	20.7–32.4	573	36.7	34.3–39.1	
Three	15	7	4.2–11.2	141	9.0	7.7–10.6	
Four and more	2	0.9	0.2–3.3	13*	0.8	0.5–1.4	
<i>Describe your financial situation</i>							
Poverty	1	0.5	0.08–2	20	1.2	0.8–1.8	< 0.0001 <sup>†</sup>
Lower than the middle class	7	3.3	1.5–6.6	208	12.8	11.3–14.5	
The middle class	143	66.8	60.2–72.7	1098	67.7	65.3–70.1	
Higher than the middle class	47	22	16.9–27.9	262	16.1	14.4–18.0	
Wealth	16	7.5	4.6–11.8	32	1.98	1.4–2.7	
<i>Describe your attitude towards vaccinations</i>							
I vaccinate my child	211	99	96–100	1588	98	97.2–98.5	0.8065
I don't vaccinate my child	3	1	0.5–4.0	32	1.98	1.4–2.7	
<i>Where do you get information about vaccinations?</i>							
From a pediatrician working in a private clinic	109	50.9	44.2–57.5	15	0.9	0.5–1.5	< 0.0001 <sup>†</sup>
From a pediatrician working in the public health system	101	47.2	40.6–53.8	1486	91.7	90.2–92.9	
From friends/relatives with a medical background	129	60.3	53.6–66.6	11	0.7	0.3–1.2	
From friends and relatives without medical background	18	8.4	5.3–12.9	179	11.1	9.6–12.6	
From mass-media (television, radio, newspapers and magazines)	179	83.6	78.1–87.9	70	4.3	3.4–5.4	
From Internet (social network)	113	52.8	46.1–59.3	5	0.3	0.1–0.7	
From flyers and disks	2	0.9	0.02–3.3	89	5.5	4.4–6.7	
<i>Parents want to know more about vaccination</i>							
Yes	135	63.1	56.4–69.3	1153	71.2	68.9–73.3	0.0187 <sup>†</sup>
No	79	36.9	30.5–43.8	467	28.8	26.7–31.1	

**Note.** \* – data for 1562 respondents; <sup>†</sup> – difference is significant ( $p < 0.05$ ); 95% CI – 95 % confidence interval; y. o. – years old.



as well (68.2 %; 95% CI: 61.7–74), being older (> 40 years old) and younger (< 20 years old) compared with Russians ( $p < 0.0001$ ), having graduated from university as well (61.7 %; 95% CI: 55–67.9) and having one child more often (65.9 %; 95% CI: 59.3–71.9 for Indians and 53.5 %; 95% CI: 51.0–55.9 for Russians;  $p = 0.0072$ ). Financial situation of Indians was better than that one of Russians ( $p < 0.0001$ ): answers “lower than the middle class” appeared more often in Russian responses (12.8 %; 95% CI: 11.3–14.5 vs 3.3 %; 95% CI: 1.5–6.6 in Indians) while “wealthy” was more common for Indians (7.5 %; 95% CI: 4.6–11.8 vs 1.98 %; 95% CI: 1.4–2.7).

The attitude towards children vaccination of parents from both India and Russia was extremely positive (Table 1). Only 1 % of Indians and 2 % of Russians did not vaccinate their children. Our data coincide with the global – 90–94 % (Fig. 1).

More than 90 % of Russian parents took information from pediatricians compared with other sources with a prevalence of pediatricians working in the public health system 91.7 % (95% CI: 90.2–92.9), whereas only 50 % of Indians were informed about vaccination from pediatricians ( $p < 0.0001$ ). The main source of information about vaccination for Indian parents was the social media with the Internet (52.8 %; 95% CI: 46.1–59.3) and mass-media with television, radio, newspapers and magazines specifically (83.6 %; 95% CI: 78.1–87.9). Russians resorted to this source less often, in less than 5 % of cases ( $p < 0.0001$ ). Other sources about vaccination for parents are presented in the Table 1. Perhaps this is due to the fact that vaccination is free in Russia, and it has governmental support, so the main source of such information is pediatric outpatient department. In India not all vaccines necessarily are free and healthcare specialists' consultations are not easily available, so parents had to address to other sources such as Internet and mass media, which surprisingly didn't reduce compliance towards vaccination as other studies showed [17]. This in turn may be because Indian parents use trusted sources of vaccine information such as websites of the WHO, Centers for Disease Control and Prevention, Vaxopedia, etc.

Interestingly, while the vast majority of Russians received information about vaccination from a pediatrician, 71.2 % (95% CI: 68.9–73.3) wanted to know more. Indians experienced lack of information too, but not as much (63.1 %; 95% CI: 56.4–69.3;  $p = 0.01$ ). Results can be explained by a high workload of the pediatric outpatient departments in Russia and lack of time for giving proper consultation and answering parents' questions. Since the pediatric outpatient department in Russia is overloaded, sharing reliable information about vaccination via mass media and Internet may be considered. Thus, recently it was shown that 76 % of Russians ( $n = 208$ ) think that vaccines should be more discussed in mass media in a positive light [15]. But at the same time sources of information in Internet and mass media may be unreliable and be the reason why parents have negative attitude and do not want to vaccinate their children [12]. The most reliable source of vaccine information in Russia is the website of the Union of Pediatricians of Rus-

sia [18], which should be recommended for pediatricians and parents as well.

Another possible reason may be the lack of knowledge about vaccination among pediatricians themselves. According to our previous research, only 56 % of pediatricians considered their knowledge about vaccination as adequate [7]. Doctors received vaccine information mainly via professional medical literature (82.6 %), at conferences and congresses (63 %), and via professional Internet sources (51.6 %) [5]. Low awareness is one of the most frequent reasons of negative attitude towards vaccination. Studies show that the main cause of vaccine refusal among doctors is an opinion that vaccines are dangerous [9], which is the most common myth of the anti-vaccine movement and is explained by lack of valid information [10]. Providing physicians with detailed, evidence-based, up-to-date vaccine information will help parents to make a right decision without doubts and to increase adherence to immunization. It will also reduce cases of medical dissonance, when doctors begin to speak out against vaccinations, without giving a clear reasoned answer why they are against this.

Our results correspond to the data of colleagues from India. Thapar et al. in the cross-sectional study of vaccine hesitancy among mothers of under-five children in Coastal South India showed low hesitation about vaccination (3.4 %), and the most common reason for their refusal was uncertainty about the vaccine safety [13]. Indian mothers chose government clinics for immunization of their children (60.5 %) and took information regarding vaccines mostly from doctors (46 %). Such similarities between studies might be explained by the same geographic localization of responders, because Kerala is located on the southwestern coast of India. Degarage et al. presenting the results of the bigger cross-sectional survey ( $n = 1599$ ) also reported low vaccine refusal among Indian parents (5.2 %), especially among parents who were not convinced of the benefits of routine vaccination, as well as among parents with a low level of education [11]. Rising of awareness of the vaccination benefits could help to increase the rate of full childhood vaccination both in India and Russia.

## CONCLUSION

Our screening study showed good adherence to vaccination. The majority of Russian parents vaccinate their children, and they want to know more about vaccination, even though they get vaccination knowledge from pediatricians. Almost all Indian parents vaccinate their children too, and the main source of information is mass media, not healthcare specialists. Perhaps this is due to the fact that vaccination is free in Russia and it has governmental support, so the main source of such information is pediatric outpatient department. In India not all vaccines are necessarily free and healthcare specialists' consultation are not easily available, therefore for making a right decision about vaccination Indians use trustworthy and verified

sources information in mass media. Since the pediatric outpatient department in Russia is overloaded, sharing information about vaccination via mass media may be considered. Upgrading healthcare specialists' knowledge about immunization has to be considered as another effective measure. These measures taken together will help to increase parental awareness and compliance towards vaccination, and prevent future outbreaks.

### Acknowledgments

We thank the Clinic of Scientific Centre of Family Health and Human Reproduction Problems for the assistance.

### Conflict of interest

The authors declare no potential conflicts of interest.

## REFERENCES

1. Our World in Data. *Eradication of diseases*. URL: <https://ourworldindata.org/eradication-of-diseases> [date of access: 08.06.2022].
2. Our World in Data. *Vaccination*. URL: <https://ourworldindata.org/vaccination> [date of access: 08.06.2022].
3. World Health Organization. *Immunization*. URL: <https://www.who.int/news-room/facts-in-pictures/detail/immunization> [date of access: 08.06.2022].
4. World Health Organization. *UNICEF and WHO warn of perfect storm of conditions for measles outbreaks, affecting children*. URL: <https://www.who.int/news/item/27-04-2022-unicef-and-who-warn-of--perfect-storm--of-conditions-for-measles-outbreaks--affecting-children> [date of access: 08.06.2022].
5. Vanyarkina AS, Petrova AG, Pokrovskaya SA, Bakhmat YA, Vekesser OA. Modern view of physicians about vaccine prevention: Survey results. *Jurnal infektologii*. 2019; 11(151): 31-32. (In Russ.).
6. Vanyarkina AS, Petrova AG, Bayanova TA, Kazantseva ED, Krivolapova OA, Bugun OV, et al. Preventive vaccination in children: Parents' knowledge or physician's competence. *Pacific Medical Journal*. 2019; 3: 23-28. (In Russ.). doi: 10.34215/1609-1175-2019-4-23-28
7. Petrova AG, Bayanova TA, Vanyarkina AS, Rychkova LV. Views of the physicians of different specialties on the vaccination: Concerns and expectations. *Jurnal infektologii*. 2020; 12(2): 104-112. (In Russ.). doi: 10.22625/2072-6732-2020-12-2-104-112
8. Di Pietro ML, Poscia A, Teleman AA, Maged D, Ricciardi W. Vaccine hesitancy: parental, professional and public responsibility. *Ann Ist Super Sanita*. 2017; 53(2): 157-162. doi: 10.4415/ANN\_17\_02\_13
9. Budnikova EA, Kharit SM, Fridman IV. Attitude of medical workers to vaccine prevention. *Medicine of Extreme Situations*. 2019; 21(4): 492. (In Russ.).
10. Girina AA, Petrovski FI, Zaplatnikov AL. Pediatricians adherence to immunoprophylaxis of infectious diseases: Current state of the problem. *Russian Journal of Woman and Child Health*. 2020; 3(4): 290-294. (In Russ.). doi: 10.32364/2618-8430-2020-3-4-290-294
11. Degarege A, Krupp K, Srinivas V, Ibrahimou B, Madhivanan P. Structural equation modeling to detect correlates of childhood vaccination: A moderated mediation analysis. *PLoS One*. 2020; 15(10): e0240749. doi: 10.1371/journal.pone.0240749
12. Tretyakova OS, Beloborodova AB, Grechka PS. Comparative analysis of childhood vaccination and attitude of parents to vaccinal prevention, depending on place of residence. *International Research Journal*. 2020; 1-1(91): 69-72. (In Russ.). doi: 10.23670/IRJ.2020.91.1.014
13. Thapar R, Kumar N, Surendran P, Shahdiya A, Mahendran V, Ramesh R, et al. Vaccine hesitancy among mothers of under-five children in Coastal South India: A facility-based cross-sectional study. *F1000Res*. 2021; 10: 186. doi: 10.12688/f1000research.28293.2
14. Wagner AL, Shotwell AR, Boulton ML, Carlson BF, Mathew JL. Demographics of vaccine hesitancy in Chandigarh, India. *Front Med (Lausanne)*. 2021; 7: 585579. doi: 10.3389/fmed.2020.585579
15. Arakhova MA, Trusova AS. The attitude of the population of the Russian Federation to vaccination. *Innovation Science*. 2022; 5(1): 100-104. (In Russ.).
16. *VassarStats: Website for statistical computation*. URL: <http://vassarstats.net> [date of access: 15.07.2022].
17. Jones AM, Omer SB, Bednarczyk RA, Halsey NA, Moulton LH, Salmon DA. Parents' source of vaccine information and impact on vaccine attitudes, beliefs, and non-medical exemptions. *Adv Prev Med*. 2012; 2012: 932741. doi: 10.1155/2012/932741
18. The Union of Pediatricians of Russia. URL: <https://www.pediatr-russia.ru/en/about-union-en> [date of access: 15.07.2022].

### Information about the authors

**Evgenia A. Novikova** – Research Officer at the Laboratory of Infectology and Immunoprophylaxis in Pediatrics, Scientific Centre for Family Health and Human Reproduction Problems, e-mail: europe411@mail.ru, <https://orcid.org/0000-0002-9353-7928>

**Maniyana Girija Manu Krishna** – Student, Irkutsk State Medical University, e-mail: manumedic27@gmail.com, <https://orcid.org/0000-0002-4843-6538>

**Ajitha Sureshkumar Aaromal** – Student, Irkutsk State Medical University, e-mail: aaromalas@gmail.com, <https://orcid.org/0000-0002-8655-1780>

**Suprasannan Abhiramy** – Student, Irkutsk State Medical University, e-mail: abhiramyroses@gmail.com, <https://orcid.org/0000-0001-5343-3019>

**Anastasiya S. Vanyarkina** – Cand. Sc. (Med.), Research Officer at the Laboratory of Infectology and Immunoprophylaxis in Pediatrics, Scientific Centre for Family Health and Human Reproduction Problems, e-mail: nasty-191@yandex.ru, <https://orcid.org/0000-0001-8434-1600>

**Ekaterina V. Moskaleva** – Cand. Sc. (Med.), Research Officer at the Laboratory of Infectology and Immunoprophylaxis in Pediatrics, Scientific Centre for Family Health and Human Reproduction Problems, e-mail: mkatena@mail.ru, <https://orcid.org/0000-0003-4196-0713>

**Alla G. Petrova** – Dr. Sc. (Med.), Professor, Head of the Laboratory of Infectology and Immunoprophylaxis in Pediatrics, Scientific Centre for Family Health and Human Reproduction Problems, e-mail: rudial75@gmail.com, <https://orcid.org/0000-0002-7965-8061>

**Lyubov V. Rychkova** – Dr. Sc. (Med.), Professor, Corresponding Member of RAS, Director, Scientific Centre for Family Health and Human Reproduction Problems, e-mail: iphr@sbamsr.irk.ru, <https://orcid.org/0000-0001-5292-0907>

#### Сведения об авторах

**Новикова Евгения Анатольевна** – научный сотрудник лаборатории инфектологии и иммунопрофилактики в педиатрии, ФГБНУ «Научный центр проблем здоровья семьи и репродукции человека», e-mail: eugor411@mail.ru, <https://orcid.org/0000-0002-9353-7928>

**Кришина Ману** – студент, ФГБОУ ВО «Иркутский государственный медицинский университет» Минздрава России, e-mail: manumedic27@gmail.com, <https://orcid.org/0000-0002-4843-6538>

**Сурешкумар Ааромал** – студент, ФГБОУ ВО «Иркутский государственный медицинский университет» Минздрава России, e-mail: aaromalas@gmail.com, <https://orcid.org/0000-0002-8655-1780>

**Супрасаннан Абхирами** – студент, ФГБОУ ВО «Иркутский государственный медицинский университет» Минздрава России, e-mail: abhiramyroses@gmail.com, <https://orcid.org/0000-0001-5343-3019>

**Ваняркина Анастасия Сергеевна** – кандидат медицинских наук, научный сотрудник лаборатории инфектологии и иммунопрофилактики в педиатрии, ФГБНУ «Научный центр проблем здоровья семьи и репродукции человека», e-mail: nasty-191@yandex.ru, <https://orcid.org/0000-0001-8434-1600>

**Москалева Екатерина Владимировна** – кандидат медицинских наук, научный сотрудник лаборатории инфектологии и иммунопрофилактики в педиатрии, ФГБНУ «Научный центр проблем здоровья семьи и репродукции человека», e-mail: mkatena@mail.ru, <https://orcid.org/0000-0003-4196-0713>

**Петрова Алла Германовна** – доктор медицинских наук, профессор, заведующая лабораторией инфектологии и иммунопрофилактики в педиатрии, ФГБНУ «Научный центр проблем здоровья семьи и репродукции человека», e-mail: rudial75@gmail.com, <https://orcid.org/0000-0002-7965-8061>

**Рычкова Любовь Владимировна** – доктор медицинских наук, профессор, член-корреспондент РАН, директор, ФГБНУ «Научный центр проблем здоровья семьи и репродукции человека», e-mail: iphr@sbamsr.irk.ru, <https://orcid.org/0000-0001-5292-0907>

Статья опубликована в рамках V Всероссийской научно-практической конференции молодых учёных с международным участием «Фундаментальные и прикладные аспекты в медицине и биологии».