Taylor & Francis
Taylor & Francis Group

Expert Review of Pharmacoeconomics & Outcomes Research

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/ierp20

Organizational measures aiming to combat COVID-19 in the Russian Federation: the first experience

Vladimir Reshetnikov , Oleg Mitrokhin , Nataliya Shepetovskaya , Elena Belova & Mihajlo Jakovljevic

To cite this article: Vladimir Reshetnikov , Oleg Mitrokhin , Nataliya Shepetovskaya , Elena Belova & Mihajlo Jakovljevic (2020) Organizational measures aiming to combat COVID-19 in the Russian Federation: the first experience, Expert Review of Pharmacoeconomics & Outcomes Research, 20:6, 571-576, DOI: 10.1080/14737167.2020.1823221

To link to this article: https://doi.org/10.1080/14737167.2020.1823221

EXPERT REVIEW OF PHARMACOECONOMICS & OUTCOMES RESEARCH
2020, VOL. 20, NO. 6, 571–577
https://doi.org/10.1080/14737167.2020.1823221

Taylor & Francis
Taylor & Francis Group

REVIEW

Organizational measures aiming to combat COVID-19 in the Russian Federation: the first experience

Vladimir Reshetnikov [a], Oleg Mitrokhin [b], Nataliya Shepetovskaya [a], Elena Belova [b] and Mihajlo Jakovljevic [a,c,d]

[a]N.A. Semashko Department of Public Health and Healthcare, I M Sechenov First Moscow State Medical University (Sechenov University), Moscow, Russian Federation; [b]Department of General Hygiene, I. M. Sechenov First Moscow State Medical University (Sechenov University), Moscow, Russia; [c]Hosei Daigaku - Institute of Comparative Economic Studies – ICES, Chiyoda-ku, Japan; [d]Global Health, Economics and Policy, University of Kragujevac, Serbia

ABSTRACT

Background: Coronavirus infection (COVID-19) spreading took place in the Russian Federation in recent 10 months. Russia has a reliable and effective governmental public health infrastructure that worked at an advanced level to control the situation since the first day of receiving reports about pneumonia ofunknown etiology cases in December 2019 and the registration of the first COVID-19 cases in Wuhan, China, in January 2020. Several measures were applied (administrative, organizational, technical, sanitary, and hygiene), nevertheless, creating an adequate response to the COVID-19 pandemic was 15 a challenge for the Russian national public health authorities.

Areas covered: We used official information of the Ministry of Health of the Russian Federation, Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor), the Russian Federation Government, and Moscow Government, and the official World Health Organization (WHO); the analysis was conducted between 1 December 2019 and 31 March 2020.

Expert opinion: Rospotrebnadzor implemented a set of measures which comprised of three stages:

1. Stage 1 Preventive and sanitary measures;
2. Stage 2 Organizational and technical measures;
3. Stage 3 Organizational and preventive measures.

ARTICLE HISTORY
Received 26 May 2020
Accepted 10 September 2020

KEYWORDS
Administration; COVID-19; crisis management; prevention; Russia

1. Background

1.1. Russia considered several measures to manage the situation from the beginning of receiving information about pneumonia of unknown etiology in China. Russia shares land borders with China and has the chance to turn to a severe pandemic spread source. Since the coronavirus disease (COVID-19) outbreak, a series of comprehensive measures (administrative, organizational, technical, sanitary, and hygiene) have been carried out by the Russian Federation. Those measures included stopping the cross-border passenger traffic with China, which gave a chance for a temporary containing of the spread of the pandemic COVID-19 from its primary outbreak. Those measures gave some time for adequate management of the situation, mobilizing the human and the financial resources, and enhancing the readiness of the health facilities to cope with the challenges of the outbreak (Figure 1).

1.2. Russia is the only country that has a government service responsible for the sanitary and epidemiological welfare of the population (Rospotrebnadzor); approximately 100,000 professional staff are fully employed in this service in all the Russian regions to fulfill all its goals, the structure of this service includes supervisory bodies with a staff of epidemiologists, centers for laboratory research, anti-plague institutions, and research institutes.

1.3. There are sanitary quarantine centers (SQC) at all the Russian airports, railway stations, and pedestrian crossings, where epidemiologists work around the clock and carry out actions to prevent the spread of infectious diseases in the Russian Federation. SQC became the first and most important key to prevent the spread of COVID-19 in Russia. In January 2020, after the first reports about pneumonia of unknown etiology in China, Russia started to consider a plan for placing passengers with high temperatures on self-isolation (Figure 2).

2. Milestone events

2.1. The first report in Russia was published on 31st of December 2019 on the official website of the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor); it included information about 27 cases of pneumonia of unknown etiology in China and asked the citizens planning to travel to take this information in consideration. Rospotrebnadzor again published an announcement on the 9th of January 2020 about the registration of 57 new cases, among them 15 with the new COVID-19.

2.2. Russia took steps to contain the situation of the possibility of the spread of COVID-19 regarding the increase in the number of flights (related to the celebration of the Chinese

CONTACT Mihajlo Jakovljevic sidartagothama@gmail.com Japan, Institute of Comparative Economics, Hosei University, Tokyo 194-0298, Japan

Article highlights

- Rospotrebnadzor has temporarily prevented the import of the pandemic COVID-19 from the primary outbreak in China. This effort provided a time window to organize preventive measures.
- The analysis of all the anti-epidemic, administrative, and organizational measures exposed several bottleneck inefficiencies that need to be solved.

New Year on the 25th of January and on the weekend days 24th till the 30th of January). The first official document giving orders to close the Russo-Chinese border was signed and published on the 30th of January. Publishing this took less than 30 days after the first official announcement about the first report of pneumonia of unknown etiology.

2.3. On the 24th of January 2020 due to the situation in other countries, Rospotrebnadzor adopted several measures to prevent the spread of COVID-19 [1–4]. In the 31st of January 2020, Rospotrebnadzor took different actions to minimize the spread of infection: transporting those Chinese citizens who have Russian residency documents directly from the airport to their place of residence (14 days of self-isolation), or putting them under medical supervision (14 days of quarantine) [5]. Rospotrebnadzor took several measures: mandatory laboratory testing, isolation of people arriving from areas

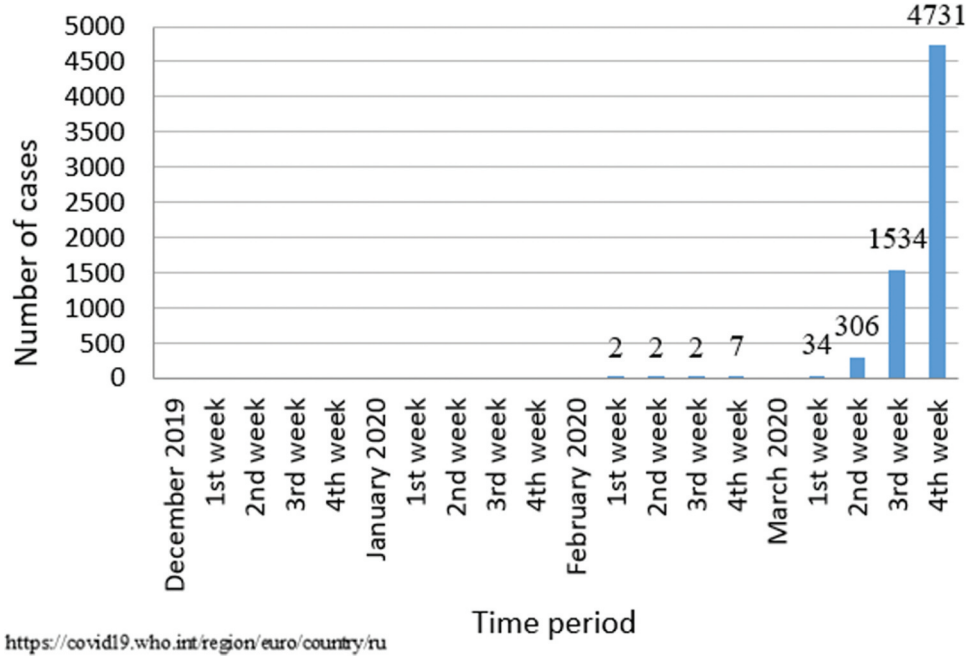

Figure 1. Confirmed cases of COVID-19 in the Russian Federation.

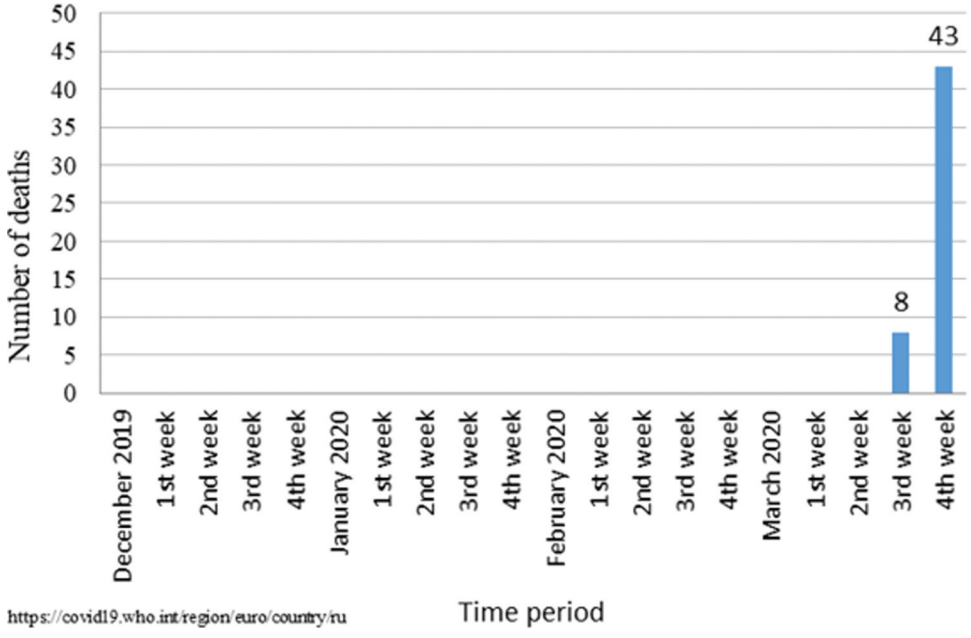

Figure 2. Confirmed deaths of COVID-19 in the Russian Federation.

affected by a new coronavirus infection, recommendations, and orders to re-profile the health facilities and preparing them to hospitalize patients with suspected COVID-19, recommendations for the proper medical observation of the isolated patients, disinfecting places with a massive concentration of people (public places), and approving an order instituting a high-alert status [6,7].

2.4. Thus, at the first stage of the COVID-19 management and prevention: ensuring the control on the Russo-Chinese borders, and temporarily limiting the movement on all the other borders; receiving citizens from the most COVID 19 affected countries was limited as much as possible [8]. After receiving confirmed information about the spread of infection in the European region and the US, the Russian government understood the increasing risks of the spread of infection in the territory of the Russian Federation. Hence, they implemented the second stage of the preventive and medical measures, which included preparing connections and health facilities for the possible spread of infection [9]. The COVID-19 morbidity bar chart presents the official data of the World Health Organization on the incidence of COVID-19 in the Russian Federation from December 2019 to March 2020. A noticeable increase in the incidence of morbidity can be observed starting from the first week of March 2020.

2.5. On the 19th of March 2020, the Ministry of Health of the Russian Federation (Minzdrav Rossii) ensured the organization of laboratory tests for the etiologic agents of community-acquired pneumonia agent (CAP); a temporary procedure approved for organizing the emergencies, including specialized emergency medical care to implement preventive measures and reduce the risks of the spread of coronavirus infection COVID-19 [10].

2.6. Furthermore, in connection with the changing situation of COVID-19 spread, an updated version of temporary guidelines was issued on the 27th of March 2020 [11]. Since the 29th of March 2020, the Ministry of Health of the Russian Federation (Minzdrav Rossii) started to organize practical training programs for those who aim to take part in the prevention and to help in reducing the risks of COVID-19 in Russia [12]. The COVID-19 lethality bar chart presents the official data of the World Health Organization on the number of COVID-19 deaths in the Russian Federation from December 2019 to March 2020. The first cases of death from COVID-19 were registered in the third week of March 2020.

2.7. Thus, after the second stage (the implementation of the preventive and medical measures), the Ministry of Health of the Russian Federation (Minzdrav Rossii) carried out its work and prepared a massive network of health facilities for the mass reception of patients with COVID-19. After that, Minzdrav Rossii started the third stage and the most important in counteracting the spread of COVID-19; At this stage, decision-making is carried out by the highest level of Russian authorities.

3. Public health response

3.1. On the 5th of March 2020, because of the high level of COVID-19 detection in the Russian capital Moscow, the City Government of Moscow introduced high-alert mode and adopted a set of measures:

(1) Citizens have to inform the responsible authorities about the last visit to one of the COVID-19 affected countries;
(2) Mandatory self-isolation (14 days starting from the date of arrival from one of the COVID-19 affected countries);
(3) Priority home care for Febrile respiratory illness (FRI) patients;
(4) Mandatory isolation for all citizens above 65 years of age, and citizens suffering from chronic diseases;
(5) Mandatory social distance (citizens must maintain 1.5 meters between each other);
(6) A ban on leaving the place of residence [13].

3.2. The following measures have been taken by the National Government of the Russian Federation to prevent the spread of COVID-19 in the regions of the Russian Federation:

(1) The introduction of a temporary restriction on the entry of foreign citizens arriving from the People's Republic of China, the Islamic Republic of Iran, the Republic of Korea, and the Republic of Belarus [14–18];
(2) Inclusion of coronavirus infection (2019-nCoV) in the list of high-risk infectious diseases [19];
(3) Suspending the passage of foreigners through the Russian-Polish and Russian-Norwegian land borders [20];
(4) Using the Russian government's reserve fund to manufacture and buy equipment and products for the diagnosis, detection, prevention, and treatment of epidemic diseases; personal protective equipment; and pharmaceutical drugs [21,22].
(5) Russia started introducing restrictions on crossing the national border; these restrictions apply to car, railway, walking, river, and mixed border checkpoints on the border. Moreover, this restriction included the Russian-Belarusian border [23,24].
(6) Since the 30th of March 2020, all the borders of the Russian Federation were temporarily closed [25];

3.3. The Russian parliament approved a package of laws to control the situation: administrative penalties ($1,000 USD) for severe violations of quarantine rules. The package of laws included up to 5 years in prison and 25,000 USD dollars for causing the death of someone [26].

4. Conclusions

4.1. Russia has the unique massive government sanitary-epidemiological service in the world (Rospotrebnadzor) that functions effectively in dealing with COVID-19. This organization has temporarily prevented the import of the pandemic COVID-19 from the primary outbreak in China, which gave the chance to organize some preventive measures from the secondary outbreak in Eastern Europe. Rospotrebnadzor created a set of measures to prevent the spread of COVID-19, which comprises three stages: preventive and sanitary measures: preventing or restricting the spread of coronavirus infection

in Russia; organizational and technical measures: preparing connections and health facilities for the possible spread of infection; organizational and preventive measures: enforcement of self-isolation for citizens for more than 30 days, and social support measures.

4.2. An important pre-requisite for current national capacities to respond to a systemic public health challenge is rooted in historical legacy of Semashko health system [27]. Following the formal establishments of Bismarck in 1893 and Beveridge in 1911, this is the third major health system establishment of European descent [28]. Surprisingly it has managed to deliver the pioneering universal health coverage worldwide, for all of USSR citizens dating back in 1930 at the Eve of WWII [29]. It has featured several distinctive features that were common to all post-Soviet health systems. Although a set of reforms were undertaken in many of the Eastern European countries after the end of Cold War Era, roots of its patterns in health care spending and provision are clearly visible even today [30].

4.3. Why is this historical insight important for the understanding of a pandemic response in 2020? Namely because Semashko tradition has created heavy, curative-oriented health system leaning toward hospital-based health care. Therefore, its average physician density and numbers of hospital beds per 100,000 population remained for decades much higher in comparison to high-income OECD nations such as Japan [31]. Although this system generated financial losses and was not market-oriented, it created a sharp edge of capability for institutional response of a scale [32].

4.4. Additional important developments for understanding of large countries' ability to respond to similar challenges are related to the rise of the Emerging Markets since the late 1990s [33]. Russian economic recession effectively ended in 1998 [34]. China entered upward growth even earlier since 1989 while comparable development pathways in India and Brazil are well elaborated in seminal literature [35]. These four nations became known as the BRICs since Jim o'Neil coined acronym in 2001 [36]. Without reflecting to their inner heterogeneity all four nations exhibited strong upward growth in health and pharmaceutical expenditures over the past thirty years [37]. This has been documented either through purchase power parity, nominal, per capita, or national terms. Furthermore, joined participation of the BRICs and Low-and-Middle-Income countries (LMICs) in global health spending has almost doubled in recent decades [38]. Although such financing of medical care was in many countries far from the efficient and equitable, it has anyway significantly strengthened the institutional capacities of their health system beyond mega-cities and coastal or industrial urban cores [39].

4.5. This Russian-perspective analysis of all the COVID19 anti-epidemic, administrative, and organizational measures revealed that several bottleneck inefficiencies. In other countries, ranging from Nigeria to Italy, similar health system vulnerabilities were exposed which require an effective solution in the medium term [40–44]. We proposed several measures aimed at ensuring the readiness of the administrative, sanitary, and anti-epidemic and for preparing the healthcare facilities for epidemics of infectious diseases: architectural-planning and construction-household solutions; modular medical equipment; organizing mobile diagnostic medical laboratories; the development of sanitary and hygienic recommendations for the self-isolation regime; medical and non-medical workforce reserve; reliability of information support in the media; international assistance to countries experiencing the most considerable difficulty in fighting the pandemic.

4.6. There are many opinions, mathematical calculations, and models trying to predict the development of COVID-19 such as the Chinese model proposed by Gu et al. [45]. The approach adopted by the governing authorities of the Russian Federation may be observed as complex case of strategic response to a serious public health challenge in a large nation. The epidemic process continues, and we believe that predicting the growth of the situation is a hard task, because of the existence of uncertainties that might influence the epidemic process in Russia.

5. Expert opinion

5.1. We believe that it is essential to provide several measures to ensure the implementation of useful administrative, organizational, technical, and sanitary-preventive aspects that can minimize the spread of mass epidemics and infectious diseases:

- It is important to re-consider architectural standards for building railways, airports, and shopping malls for the disinfection (free ventilation, water supply, sewage system, and low ceiling height), also it is important to separate the entrances, exits, and parking lots so they will function according to the profile of their activities; these premises can receive and sort patients in case of any epidemiological situation.
- Designing and building modular hospitals; they have expandable or collapsible features and can be moved anywhere (such disassembled hospitals should be in the federal reserve).
- To design and manufacture modular medical equipment, including medical furniture, transportation, and tools for biomaterials collection.
- Providing mobile diagnostic units; Russia already has an experience using such units while helping the national health organizations in West Africa against Ebola.
- Designing self-isolation guidelines and recommendations considering different issues like the organization of motor activity, diet, distance work or education, sleep, and rest. It is essential to pay particular attention to the psycho-hygienic and the physiological issues of the age category +65.
- To prepare a professional workforce (highly qualified medical and non-medical).
- Clear structuring, processing, and reliability of information support will allow getting rid of the incorrect information coming to citizens, preventing panic among the population, and eliminating the appearance of fake news.

- Organization of international assistance from the Russian Federation to the countries experiencing the most significant difficulties in combating COVID-19 (Serbia, USA, and Italy).

5.2. Starting from 1 December 2019 till 31 March 2020, the Russian Federation organized measures to prevent the spread of the coronavirus infection that contained three stages.

- Stage 1 (preventive and sanitary measures): preventing or restricting the spread of coronavirus infection in Russia;
- Stage 2 (organizational and technical measures): preparing connections and health facilities for the possible spread of infection.
- Stage 3 (Organizational and preventive measures): enforcement of self-isolation for citizens for more than 30 days and maintaining social support measures.

5.3. The analysis of all the anti-epidemic, administrative, and organizational measures exposed few vulnerabilities and bottleneck inefficiencies in Russia and other comparable countries that need to be solved:

- The lack of facilities at airports for the massive collection of biomaterial as well as an insufficient number of places at health centers and isolation rooms at airports;
- An insufficient number of equipment and medical furniture and biomaterial sampling tools particular ways of transporting the biomaterials to laboratories;
- An insufficient number of vehicles for the safe transportation of the biomaterials.
- An insufficient number of qualified health care professionals capable of working during an epidemic;
- Hygienic, epidemiological, and psycho-hygienic aspects of the self-isolation and social distance still not developed;
- An insufficient number of laboratories for early diagnosis or confirming diagnosis;
- An insufficient number of available hospital beds and specialized medical equipment for the reception of patients during a pandemic;
- The lack of legal regulation of violation of quarantine rules and self-isolation regime;
- An insufficient informational support for preventive measures and the appearance of fake news.

It is essential to mention that the extensive experience did not make sufficient conclusions from the previously observed epidemics: Atypical pneumonia 2003; Avian and swine Influenza 2008–2009, Ebola virus disease 2014–2026.

5.4. The problem of the emergence and the spread of the coronavirus infection throughout the Russian Federation territory revealed a number of directions, such as anti-epidemic, administrative, organizational, organizational and technical, medical, which in medium term are need to be revised in the direction of citizens' life and health risk assessment in a pandemic.

5.5. The analysis of the experience of the struggle with coronavirus infection using anti-epidemic, administrative, organizational, organizational and technical, medical measures like both in the Russian Federation and other countries will allow to revise and develop in the nearest years architectural planning, construction and household solutions, modular medical equipment, organization of mobile diagnostic medical laboratories, development of sanitary and hygienic recommendations for self-isolation mode, personnel reserve of medical and non-medical workers, reliability of information support in the media, international assistance to countries that are experiencing the most difficulty in fighting pandemic.

Funding

This paper was not funded.

Declaration of interest

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

Reviewers disclosure

Peer reviewers on this manuscript have no relevant financial relationships or otherwise to disclose.

Consent for publication

Written informed consent was obtained from all the participants prior to publication.

Ethics and consent

Since this Document was derived from official and anonymous aggregate datasets at the national level, ethical committee consideration was not applicable, in accordance with the Declaration of Helsinki and ICMJE rules.

ORCID

Vladimir Reshetnikov http://orcid.org/0000-0002-7853-7356
Oleg Mitrokhin http://orcid.org/0000-0002-6403-0423
Nataliya Shepetovskaya http://orcid.org/0000-0002-4800-9608
Elena Belova http://orcid.org/0000-0002-2134-6348
Mihajlo Jakovljevic http://orcid.org/0000-0002-9160-6846

References

Papers of special note have been highlighted as either of interest (•) or of considerable interest (••) to readers.

1. About cases of pneumonia in the People's Republic of China [Internet]. Moscow: Rospotrebnadzor; 2019 Dec 31 [cited 2020 Apr 13]. Available from: https://www.rospotrebnadzor.ru/about/info/news/news_details.php?ELEMENT_ID=13425
2. About cases of pneumonia in the People's Republic of China [Internet]. Moscow: Rospotrebnadzor; 2020 Jan 9 [cited 2020 Apr 13]. Available from: https://www.rospotrebnadzor.ru/about/info/news/news_details.php?ELEMENT_ID=13434
3. Orders of the government of Russia of 30.01.2020 No.140-r.
4. Decree of the chief state sanitary doctor of the Russian federation; 2020 Jan 24, No.2.
5. Decree of the chief state sanitary doctor of the Russian federation 31.01.2020 № 3.
6. Decree of the chief state sanitary doctor of the Russian federation 02.03.2020, No.5.
7. Decree of the chief state sanitary doctor of the Russian federation 13.03.2020, No.7.

•• **This reference provides guidelines on applying sanitary-hygienic and anti-epidemic measures in order to prevent the spread of COVID-19.**

8. Decree of the chief state sanitary doctor of the Russian federation 18.03.2020, No.7.
9. Temporary guidelines of the ministry of health of the Russian Federation. Prevention, diagnosis and treatment of new coronavirus infection (2019-ncov); 2020 Feb 03.
10. Order of the ministry of health of the Russian federation, 19.03.2020, 198n.
11. Temporary guidelines of the ministry of health of the Russian federation; 2020 Mar 27.
12. Order of the ministry of health of the Russian federation, 29.032020, No.248;

•• **This reference provides recommendations on the organization of preventive measures to combat the COVID-19 in the Russian Federation.**

13. Decree of the Mayor of Moscow, 05.03.2020, No.12-um;
14. Orders of the Government of Russia, 30.01.2020, No.140-r;

• **This act is published by the Russian Government to regulate crossing the national borders during the COVID-19 Pandemic.**

15. Orders of the government of Russia, 03.02.2020, No.194-p.
16. Orders of the government of Russia, 27.02.2020, No.446-p.
17. Orders of the government of Russia, 27.02.2020, No.448-p.
18. Orders of the government of Russia, 16.03.2020, No.635-p.
19. Orders of the government of Russia, 31.01.2020, No.66.
20. Orders of the government of Russia, 14.03.2020, No.622-p.
21. Orders of the government of Russia, 18.03.2020, No.294;
22. Orders of the government of Russia, 21.03.2020, No. 704-p.
23. Orders of the government of Russia, 21.03.2020, No.708-p.
24. Orders of the government of Russia, 25.03.2020, No.723-p.
25. Orders of the government of Russia, 27.03.2020, No.763-p.
26. Parlamentom prinyaty zakony po protivodejstviyu koronavirusu [Internet], Moscow: The state Duma, 2020 Mar 31 [cited 2020 Apr 13]. Available from: http://duma.gov.ru/news/48196/
27. Reshetnikov V, Arsentyev E, Bolevich S, et al. Analysis of the financing of Russian health care over the past 100 years. Int J Environ Res Public Health. 2019;16(10):1848.
28. Jakovljevic M, Fernandes PO, Teixeira JP, et al. Underlying differences in health spending within the world health organisation Europe Region—comparing EU15, EU post-2004, CIS, EU candidate, and CARINFONET countries. Int J Environ Res Public Health. 2019;16(17):3043.
29. Arsentyev EV, Reshetnikov VA. To the biography of NA Semashko: on the work of the first people's commissar of health in 1920–1925. Hist med. 2018;5:183.
30. Jakovljevic M, Camilleri C, Rancic N, et al. Cold war legacy in public and private health spending in Europe. Front Public Health. 06 August 2018;6. DOI:10.3389/fpubh.2018.00215
31. Jakovljevic MB, Nakazono S, Ogura S. Contemporary generic market in Japan–key conditions to successful evolution. Expert Rev Pharmacoecon Outcomes Res. 2014;14(2):181–194.
32. Jakovljevic M, Matter-Walstra K, Sugahara T, et al. Cost-effectiveness and resource allocation (CERA) 18 years of evolution: maturity of adulthood and promise beyond tomorrow. Cost Eff Resour Alloc. 2020;18:15.
33. Sornarajah M. The role of the BRICS in international law in a multipolar world. In The rise of the BRICS in the global political economy. Edward Elgar Publishing; 2014. p. 288–307. Available at https://www.elgaronline.com/view/edcoll/9781782545460/9781782545460.00024.xml
34. Kharas HJ, Pinto B, Ulatov S. An analysis of Russia's 1998 meltdown: fundamentals and market signals. Brookings Papers Econ Activity. 2001;(2001(1):1–68. .
35. Naughton B. China: economic transformation before and after 1989. In: In a conference, '1989: twenty years after'. Irvine: University of California; 2009 Nov. p. 6–7.
36. O'neill J. Building better global economic BRICs. Global Economics; 2001. No. 66. p. 1–16. [cited 2020 Jun 29]. Available from: http://www.elcorreo.eu.org/IMG/pdf/Building_Better_Global_Economic_Brics.pdf
37. Jakovljevic M, Potapchik E, Popovich L, et al. Evolving health expenditure landscape of the BRICS nations and projections to 2025. Health Econ. 2017;26(7):844–852.
38. Jakovljevic M, Getzen TE. Growth of global health spending share in low and middle income countries. Front Pharmacol. 2016 February 12. DOI:10.3389/fphar.2016.00021.
39. Jakovljevic M, Timofeyev Y, Ekkert NV, et al. The impact of health expenditures on public health in BRICS nations. J Sport Health Sci. 2019;8(6):516.
40. Verhofstadt G. The Union and COVID-19: is there a future after failure? EPC COMMENTARY 25/ 03/2020; 2020 [cited 2020 Jul 5]. Available from: http://aei.pitt.edu/102660/
41. Ozili PK (2020). Covid-19 pandemic and economic crisis: the Nigerian experience and structural causes. [cited 2020 Jul 16]. Available from: SSRN 3567419.
42. Ienca M, Vayena E. On the responsible use of digital data to tackle the COVID-19 pandemic. Nat Med. 2020;26(4):463–464.
43. Muscillo A, Pin P. Covid19: unless one gets everyone to act, policies may be ineffective or even backfire; 2020 [cited 2020 Jul 21]. Available from: arXiv:2003.14239 [physics.soc-ph].
44. Remuzzi A, Remuzzi G. COVID-19 and Italy: what next? Lancet. 2020 April 11–17;395(10231):1225–1228
45. GU C, Jiang W, Zhao T, et al.. Mathematical recommendations to fight against COVID-19; 2020. p. 1–13. [cited 2020 Jul 26]. Available from: SSRN 3551006.