

## ABSTRACT

Vaccination Back in the USSR: A Historical Analysis of Soviet Vaccination Programs

and Their Effects

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Vaccines are a hotly debated topic in many communities around the world, including those in Eastern Europe. Additionally, Eastern Europe has experienced outbreaks of various infectious diseases, such as measles, in recent years. This thesis aims to investigate the forces behind these phenomena, as well as explore the potential connections between Soviet history, Eastern European culture, current disease outbreaks, and modern-day vaccine hesitancy. Modern outbreaks and vaccine hesitancy in Eastern Europe are connected and influenced by historical Soviet vaccination practices. As such, it is necessary to conduct a historical overview and analysis of Soviet vaccination campaigns, rhetoric, and governmental policy in order to better understand how and why these circumstances developed. In particular, this thesis will examine three vaccination campaigns (smallpox, polio, and measles) that took place across three different periods of Soviet history and connect historical events with their contemporary consequences. In doing so, the epidemiologic situation in Eastern Europe will be elucidated through an exploration of historical, cultural, and political factors.

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VACCINATION BACK IN THE USSR: A HISTORICAL ANALYSIS OF SOVIET  
VACCINATION PROGRAMS AND THEIR EFFECTS

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## TABLE OF CONTENTS

Acknowledgements . . . . .	ii
Introduction: To Vaccinate or Not to Vaccinate . . . . .	1
Chapter One: Smallpox and the Soviets . . . . .	7
Chapter Two: Paralytic Polio and Crippling Ideology . . . . .	28
Chapter Three: Measles, Mumps, and Healthcare Bumps . . . . .	47
Chapter Four: The Influence of Natural Medicine . . . . .	69
Conclusion: A Comprehensive View of Soviet Vaccination . . . . .	79
Appendices . . . . .	83
Appendix A: Documents Pertaining to Russian and Global Smallpox Vaccination	84
Appendix B: The Value of the Healthy Body in Soviet Imagery . . . . .	87
Appendix C: Online Russian Skepticism of Vaccines . . . . .	89
Appendix D: Soviet Propaganda Against Folk Medicine . . . . .	91
Bibliography . . . . .	94

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## INTRODUCTION

### To Vaccinate or Not to Vaccinate

During the preliminary stages of research for this project, I took a short break by searching “pro-vaccination memes” online in Russian (мемы про вакцинацию, мему pro vakčinačiju). The majority of the memes, similarly to their English counterparts, expressed emotions such as frustration, disbelief, and derision towards anti-vaxxers. Retrospectively, I find that, in particular, two of these memes illustrate the current situation in Eastern Europe uncannily well.



Figure 1: A Russian Pro-Vaccination Meme

The first, from an article exploring why many Russians are not vaccinating their children, features a doctor speaking with her patient.<sup>1</sup>

The doctor asks, “Does it hurt much?” to which the woman responds, “yes, very much.” The doctor then declares, “well then, are you going to give your child the vaccine or do I need to slap you again?”

**УЧЕННЫЕ: ВЕКАМИ ИЩУТ ЛЕКАРСТВО  
ОТ ЗАБОЛЕВАНИЙ  
РОДИТЕЛИ: НЕ ПРИВИВАЮТ  
СВОИХ ДЕТЕЙ  
УЧЕННЫЕ:**



Figure 2: Another Russian Pro-Vaccination Meme

The second meme comes from a brief article discussing the 2019 measles epidemics and reads as follows:<sup>2</sup>

Scientists: search for a cure for diseases for centuries

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<sup>1</sup> Никитина, Елена. “Почему Россияне Не Прививают Детей. Как Живут Антипрививочники и Из-За Чего Они Не Любят Вакцины.” MediaLeaks, February 22, 2019. <https://medialeaks.ru/2202anl-antiprivivochniki/>.

<sup>2</sup> “В США - Самая Крупная Эпидемия Кори За 25 Лет. Американцы Не Унывают и Делают Мемы.” Яндекс Дзен | Платформа для авторов, издателей и брендов, April 25, 2019. <https://zen.yandex.ru/media/breakingmash/v-ssha--samaia-krupnaia-epidemiia-kori-za-25-let-amerikancy-ne-unyvaiut-i-delaiut-memy-5cc1b448a7763100b2db056e>.

Parents: do not give their children vaccines

On a deeper level, these two memes provide insight into the beliefs and movements surrounding vaccines in Eastern Europe. These memes demonstrate that the relationship between anti-vaxxers and medical workers or healthcare officials is often strained, if not entirely broken. They also show that many anti-vaxxers are subject to ridicule and criticism for refusing to vaccinate their children. For the meme makers, this derision is warranted as anti-vaxxers threaten collective immunity and scientific progress, while for the vaccine hesitant, this derision is cruel and persecutory, as they only want their children to be safe from the perceived danger of vaccines.

Additionally, these memes express many of the turbulent emotions surrounding vaccination. With its comedic twist and punchline of violence, the first meme expresses frustration, derision, and the desire to force cooperation from anti-vaccination parents. The second meme expresses disbelief and confusion at the perceived stubbornness and irrationality of anti-vaxxers. Yet the reality of the matter is, these anti-vaccination attitudes continue to persist and gain traction in Eastern Europe.

UNICEF recognizes that Eastern Europe is a region with high vaccine hesitancy and falling doctor support for immunization.<sup>3</sup> A survey by the Wellcome Trust found that 17% of Eastern Europeans disagreed that vaccines were safe.<sup>4,5</sup> The 2018 Gallup World

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<sup>3</sup> “Immunization.” UNICEF Europe and Central Asia. Accessed March 7, 2020. <https://www.unicef.org/eca/health/immunization>.

<sup>4</sup> Khan, Imran. “Vaccine Hesitancy Threatens Global Health.” Healthcare business news, trends & developments, August 22, 2019. <https://healthcare-in-europe.com/en/news/vaccine-hesitancy-threatens-global-health.html>.

<sup>5</sup> “How Much Does the World Trust Medical Experts and Vaccines?” Wellcome, June 19, 2019. [https://wellcome.ac.uk/press-release/how-much-does-world-trust-medical-experts-and-vaccines?mod=article\\_inline](https://wellcome.ac.uk/press-release/how-much-does-world-trust-medical-experts-and-vaccines?mod=article_inline).

Poll shows that, among countries in the Former Soviet Union, the median percent of people who think that vaccines are safe hovers around 53%.<sup>6</sup> In the EU, countries either from the former Soviet Union or from behind the Iron Curtain also display high vaccine hesitancy; out of all the EU countries, people from Bulgaria, Poland, and Slovakia are the least likely to agree that vaccines are important for children.<sup>7</sup> These anti-vaccination sentiments are also far reaching, expanding to overseas communities of Eastern Europeans in cities like Vancouver, where General Practitioners have noted a hesitancy or resistance to vaccinate from these ethnic groups.<sup>8</sup>

These anti-vaccination sentiments are beginning to take their toll. Eastern Europe has become a hotbed for measles outbreaks, with Ukraine leading the pack. In 2019 alone, over 56,000 and 3,500 cases of measles were reported in Ukraine and Russia, respectively.<sup>9</sup> In Central Asia and the Caucasus region, outbreaks of polio crop up periodically.<sup>10</sup> The status of vaccination and infectious disease eradication appears grim in Eastern Europe, with health officials scrambling to mitigate damage before the situation spirals completely out of control.

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<sup>6</sup> Pesce, Nicole Lyn. "This Is the Most Anti-Vaxxer Country in the World." MarketWatch. MarketWatch, June 19, 2019. <https://www.marketwatch.com/story/this-is-the-most-anti-vaxxer-country-in-the-world-2019-06-19>.

<sup>7</sup> Larson, H., de Figueiredo, A., Karafillakis, E., Rawal, M. "State of Vaccine Confidence in the EU 2018." *European Commission*, 2018 p. 16

<sup>8</sup> Watts, Kelsey. "Why Some People in the Eastern European Community Are Hesitant to Vaccinate." KPTV.com, February 22, 2019. [https://www.kptv.com/news/why-some-people-in-the-eastern-european-community-are-hesitant/article\\_f584b8ea-3710-11e9-838e-cf1f3f0c17f4.html](https://www.kptv.com/news/why-some-people-in-the-eastern-european-community-are-hesitant/article_f584b8ea-3710-11e9-838e-cf1f3f0c17f4.html).

<sup>9</sup> "Measles – Global Situation." World Health Organization. World Health Organization, December 3, 2019. [https://www.who.int/csr/don/26-november-2019-measles-global\\_situation/en/](https://www.who.int/csr/don/26-november-2019-measles-global_situation/en/).

<sup>10</sup> "Polio in Central Asia and the North Caucasus Federal Region of the Russian Federation." *World Health Organization*, World Health Organization, 1 Dec. 2010, [https://www.who.int/csr/don/2010\\_11\\_13/en/](https://www.who.int/csr/don/2010_11_13/en/).

The vaccination landscape in Eastern Europe and Central Asia, however, was not always so bleak. The Soviet Union highly valued prophylactic health measures and embraced vaccines as early as the 1920s and championed crucially successful vaccine campaigns against Polio in the early 60s. As we will see, the USSR was also instrumental in the movement for the global eradication of polio and global measles prevention. Additionally, prominent Soviet virologists often collaborated with American virologists and were at the cutting edge of vaccine discovery.

How, then, did the Soviet Union transform from a state with nearly universal vaccination into today's vaccine-hesitant former Soviet republics? How have various political ideologies from various periods in Russian and Soviet history affected how the average citizen views vaccination? In order to answer these questions, one must understand and analyze the historical relationship between the people of Eastern Europe, the Soviet government, modern governments, various political ideologies, the biological sciences, and vaccination. By examining various healthcare policies instituted throughout periods of both Soviet, Russian, and Eastern European history, one can uncover the ideologies that governed public health policies. In turn, one can then analyze how these ideologies impact public opinion and cultural attitudes towards vaccination and the healthcare systems behind it.

To this end, this thesis will focus on the political and healthcare responses to three diseases from the 20<sup>th</sup> century: smallpox, polio, and measles, and how these responses were shaped by ideology. In an endeavor to answer the question of how these regimes approached a deadly infectious disease and vaccination, the first chapter will provide a historical overview of Tsarist Russia's and the Soviet Union's responses to smallpox, as

well as their justifications for the healthcare measures taken. The second chapter will similarly survey the Soviet Union's approach to eradicating polio, the impetus behind the government's drastic polio eradication measures, as well as factors contributing to recent polio outbreaks in the region. The third chapter will discuss the attitudes and circumstances which led to the current measles outbreaks in Eastern Europe and what historical attitudes and policies may have contributed to the current situation. Additionally, the fourth chapter will examine the role of traditional medicine and how it serves often as a medical replacement for vaccinations in many Eastern Europeans' consciousness. It will also assess how historical and political campaigns and ideologies created an environment in which anti-modern medicine and pro-traditional medicine attitudes could flourish.

Vaccines are becoming more contested worldwide, especially in Eastern Europe and Central Asia due to a myriad of factors. Because of this trend, many outbreaks of previously or almost eradicated diseases are exploding, threatening public health and tens of thousands of lives. Additionally, vaccine hesitant societies or communities with lower rates vaccination are at even greater risk in the face of novel diseases such as COVID-19. As such, it is important to understand the origins of the anti-vaccination mentality and subculture; what historical, cultural, and political factors have influenced the rise of anti-vaccination? Once we understand these factors, we become better equipped to address underlying issues and attempt to connect and communicate with those who are vaccine hesitant.

## CHAPTER 1

### Smallpox and the Soviets

The aim of this first chapter is to trace the basic history of smallpox through pre-revolutionary Russia and the Soviet Union. It will examine the healthcare systems, programs, and politics associated with smallpox prevention, as well as their consequences.

Smallpox emerged early in human history in Egypt, with one of the earliest cases recorded in the 11th-century BCE.<sup>11</sup> It was caused by the variola virus, of which there are two variations: major and minor. Smallpox's incubation period was directly followed by its prodrome stage, when symptoms such as high fever, headache, chills, severe abdominal pain, vomiting, and malaise began to show. This fever was followed by the eruptive stage, which was characterized by the development of lesions and vesicles all over a victim's body, which would then scab and crust off if the patient survived. Overall, smallpox had a mortality rate of 30% among the unvaccinated, and malignant and hemorrhagic forms of the disease were almost always fatal.<sup>12</sup> In addition to its high mortality rate, smallpox was highly contagious due to its airborne method of transmission; it is estimated that 300 million humans were infected with the virus before

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<sup>11</sup> Shchelkunov, S. N., S. S. Marennikova, and R. W. Moyer. *Orthopoxviruses Pathogenic for Humans*. (New York: Springer, 2011), p. 2.

<sup>12</sup> "Clinical Disease | Smallpox | CDC." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention. Accessed September 26, 2019. <https://www.cdc.gov/smallpox/clinicians/clinical-disease.html>.

its eradication.<sup>13, 14</sup> Even if the disease did not kill, the patient would be left with a host of sequelae: scarring, pockmarks, blindness, encephalitis, and infertility, to name a few. As a result, smallpox was widely and rightly feared.

Though variolation methods were devised to curtail the spread or severity of smallpox, the process of inoculation still carried great risk. Because smallpox inoculation required lymph from a mildly infected human host who survived the disease, sources were difficult to find, resulting in limited inoculation. Additionally, there were only a select number of practitioners skilled enough to carry out the process. As a result, smallpox remained endemic, epidemic, and deadly. In Russia, smallpox epidemics claimed numerous victims in late 1760s.<sup>15</sup> After Countess Sheremeteva, who was close to the Grand Duke Paul, died from smallpox, Catherine the Great sought a medical solution.<sup>16</sup>

This solution was found in Dr. Thomas Dimsdale, who, based on the successes of a local inoculation house, had written and published the first treatise on smallpox inoculation. He was whisked to St. Petersburg in 1768, where he performed several trial inoculations using infectious material from a peasant child. After the trials' success, Dr. Dimsdale extracted the pustule material from one of the suitable trial candidates and

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<sup>13</sup> "Smallpox Virus." Baylor College of Medicine. Accessed September 26, 2019. <https://www.bcm.edu/departments/molecular-virology-and-microbiology/emerging-infections-and-biodefense/smallpox-virus>.

<sup>14</sup> Henderson, Donald A. "The Eradication of Smallpox – An Overview of the Past, Present, and Future." *Vaccine* 29 (December 30, 2011): D8. <https://doi.org/10.1016/j.vaccine.2011.06.080>.

<sup>15</sup> Griffiths, John. "Doctor Thomas Dimsdale, and Smallpox in Russia." *Bristol Medico-Chirurgical Journal* vol. 1, issue 99 (January, 1984): 14. PMID: [6367898](https://pubmed.ncbi.nlm.nih.gov/6367898/)

<sup>16</sup> Alexander, John T. "Catherine the Great and Public Health." *Journal of the History of Medicine and Allied Sciences* XXXVI, no. 2 (April 1, 1981): 200. <https://doi.org/10.1093/jhmas/xxxvi.2.185>.

successfully inoculated Catherine the Great against smallpox. Her son, Paul I, was inoculated not long after. Dr. Dimsdale remained in St. Petersburg for four months afterward, during which time he inoculated around 150 members of the nobility. In total, he was awarded £13,000 pounds (the modern equivalent of \$3,000,000), a £500 annuity, and was conferred many titles of honor, such as Baron of the Empire and Body Physician to the Empress.<sup>17</sup>

Interestingly, the inoculation process did not stop with the nobility. Dr. Dimsdale, with Catherine's sponsorship, established variolation clinics in Moscow, St. Petersburg, and even provincial towns.<sup>18</sup> Through the combined efforts of both Russian and international physicians, an estimated 20,000 individuals were inoculated within the next decade.<sup>19</sup> On her part, Catherine's sponsorship and push for variolation was deliberate and politically shrewd, as her writings reveal her understanding that healthcare is intricately tied to the economy and well-being of the state.<sup>20</sup> A stable economy and healthy workforce were beneficial for Catherine, as it solidified her power and authority as Empress to the Russian nobility and her own subjects while also bolstering Russia's position on a continental scale. Thus, it made sense for her to prioritize a relatively lower-maintenance and lower cost project like smallpox variolation.

Soon after, Edward Jenner successfully demonstrated in 1796 that a smallpox vaccine derived from human cowpox was effective in conferring protection and

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<sup>17</sup> Griffiths, John. "Doctor Thomas Dimsdale", 16

<sup>18</sup> Alexander, John T. "Catherine the Great and Public Health." 201.

<sup>19</sup> Gubert, V. O.; *Ospa i ospoprivivanie* (n. 60), p. 254.

<sup>20</sup> Maikov, P. M.; *Ivan Ivanovich Betskoi: opyt ego biografii* (St. Petersburg, 1904), p. 119-137

immunity to disease.<sup>21</sup> The introduction and development of a smallpox vaccine opened up the possibility of one-day conferring immunity to the general population. Scientists, both abroad and in Russia, continued their research, accomplishing many scientific and logistical developments that served as stepping-stones towards this goal. In 1860s Russia, a vaccination method of harvesting virus-containing lymph from live farm animals supplanted Jenner's original arm-to-arm vaccination method. The strain utilized for the vaccine also switched from cowpox to vaccinia (a combination of variola and cowpox) strain during the 19th century.<sup>22</sup> While there were no strict global or even national regulations on smallpox vaccines during the 19th century, there was a solid base of scientific research, convention, and procedures that could be utilized moving forward.

The Free Economic Society (VEO, Вольное Экономическое Общество, Vol'noe Èkonomičeskoe Obščestvo), established by Catherine the Great in 1765, relied on such procedures in their response to recurring smallpox plagues in the late 1700s and early 1800s. The VEO acted as the primary establishment combating smallpox, and by 1804, they were operating in nineteen Russian provinces. The organization had successfully inoculated 64,027 individuals while also offering preventative education about smallpox.<sup>23</sup> Then, from 1827 to 1847, the VEO's petition for a regular allowance from provincial taxes was granted by the Tsar. The Tsar granted the VEO permission to

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<sup>21</sup> Riedel, Stefan. "Edward Jenner and the History of Smallpox and Vaccination." *Baylor University Medical Center Proceedings* 18, no. 1 (2005): 21–25. <https://doi.org/10.1080/08998280.2005.11928028>.

<sup>22</sup> "History of Smallpox | Smallpox | CDC." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention. Accessed September 27, 2019. <https://www.cdc.gov/smallpox/history/history.html>.

<sup>23</sup> Gorn, E.; "Kratkii ocherk deiatel'nosti imperatorskago vol'nago ekonomicheskago obshchestva po ospoprivivaniiu," TVEO 1 (1896): 17-18; K. G Vasil'ev and A. E. Segal, *Istoriia epidemii v Rossii* (Moscow, 1960), 282.

expand their smallpox vaccination campaign by providing supplies to more remote areas of Russia. Unfortunately, in 1856, funding for the VEO was entirely curtailed, and reformative smallpox laws in 1865 placed central authority in Russia's national Medical Council.<sup>24</sup> Under this arrangement, the VEO maintained its research and vaccination distribution responsibilities while also supplying and cooperating with zemstvos.

The zemstvos (земство, *pl.* земства [zemstva]), local governing bodies established in 1861, were responsible for organizing and overseeing public healthcare projects and demonstrate the highly decentralized nature of healthcare in pre-revolutionary Russia. The nobility played a crucial role in zemstvo medicine by establishing rural hospitals and donating land and finances; about 5% of a zemstvo's medical budget came from donations and charity. From the 1850s onwards, zemstvos became responsible for smallpox vaccination programs, as the majority of smallpox vaccinations in this period occurred through these local institutions in conjunction with the VEO.<sup>25</sup> The VEO supplied vaccinations, produced from the lymph of human donors, to various zemstvos, though scarcity was always an issue. As the century marched onwards, improvements were made to the system. The VEO developed a retro-vaccination method, utilizing calf lymph that was safer and could be transported more easily and effectively.<sup>26</sup> Zemstvos shifted from a circuit system where physicians would

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<sup>24</sup> Pratt, Joan Klobe. "The Free Economic Society and the Battle against Smallpox: A 'Public Sphere' in Action." *The Russian Review* 61, no. 4 (2002): 560–78. <https://doi.org/10.1111/1467-9434.00250>.

<sup>25</sup> *Ibid.*, p. 568

<sup>26</sup> *Ibid.*, p. 569

make ‘rounds’ throughout a province to administer vaccines, to a stationary system where physicians would administer vaccines from a centrally located clinic.<sup>27</sup>

Still, these improvements were insufficient to curb another smallpox epidemic in the early 1870s. Despite the best efforts of the VEO and zemstvo medical staff, many Russians remained unvaccinated, while many of those vaccinated had lost immunity over the years. Consequently, many zemstvos and the zemstvo physicians championed preventative healthcare and advocated more aggressive preventive health policies, such as compulsory inoculation, to the tsarist government.<sup>28</sup> They also argued for a second vaccination to re-establish immunity, public involvement in smallpox prevention, and the need to eliminate poverty based on theory of social hygiene, which is the belief that “conditions of poverty and starvation are the best breeding ground for the development of a whole series of terrible diseases which destroy primarily the bodies of children.”<sup>29</sup>

During the devastating smallpox epidemic of the 1870s, some of these issues were addressed by zemstvos and the VEO, as evidenced by the decreased incidence of smallpox cases. Generally, the number of smallpox cases waxed and waned cyclically, but during this time, the overall incidence decreased between cycles. To illustrate, between 1893 and 1898, smallpox incidence in European Russia was 7.4 for every 10,000 people. By 1913, that number had fallen to 4.4 cases per 10,000. While imperfect, pre-revolutionary efforts at curbing and controlling smallpox were effective.

At the time of the October Revolution in 1917, Soviet Russia faced this situation regarding smallpox: while preventative measures had improved, smallpox was still a

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<sup>27</sup> Krug, Peter, F. “The Debate Over the Delivery of Health Care in Rural Russia: The Moscow Zemstvo, 1864-1878.” *The John Hopkins University Press* 50, no. 2 (Summer, 1976) p. 226-241

<sup>28</sup> Pratt, Joan Klobe. “The Free Economic Society...” p. 571

<sup>29</sup> *Ibid.*, p. 572

constant, looming threat. The Soviet government realized this, and Council of People's Commissars (Совет Народных Комиссаров, Совнарком, CNK [Sovet Narodnykh Komissarov, Sovnarkom, SNK]) issued a decree instating compulsory smallpox vaccination of the entire population on April 10, 1919.<sup>30, 31</sup> This decree was reissued in 1924, with the addendum of required vaccination of newborns and revaccination of teenagers.<sup>32</sup> These decrees resulted from several different factors. In the aftermath of The Great War (World War I), there was a resurgence of smallpox in the Soviet Union (namely, Russia).<sup>33</sup> Based on the figures cited that there were around 200,000 deaths attributable to smallpox from 1910-1914, it is reasonable to estimate an outbreak of similar magnitude occurring in post-revolution and post-World War I society.<sup>34</sup> The Soviet government realized the importance of combating contagious diseases and curbing epidemics in order to maintain a healthy, productive labor force and achieve socialist ideals.

Additionally, early key figures such as Lenin advocated for and emphasized the importance of effective public health policy. Lenin held public health and preventive health programs in extremely high importance, writing in 1920 that, "All of our determination and all of our experience of the Civil War we must apply to combat

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<sup>30</sup> Kravchenko, A. T., Saltykov, R. A. "The Development of Live Vaccines in the Soviet Union. (Review) Live bacterial Vaccines." *Zhurnal Mikrobiologi, Epidemiologi, i Immunobiologi* 3, no. 44. (1967) 1-9

<sup>31</sup> See Appendix A

<sup>32</sup> Fenner, Frank, Donald Ainslie. Henderson, and Isao Arita. *Smallpox and Its Eradication*. Geneva: World Health Organization, 1988, p. 326.

<sup>33</sup> Plotkin, Stanley A., Walter A. Orenstein, and Paul A. Offit. *Vaccines*. Philadelphia: Saunders / Elsevier, 2008. <https://www.ncbi.nlm.nih.gov/books/NBK7293/>

<sup>34</sup> Plotkin, Stanley A., Walter A. Orenstein, Paul A. Offit, and Kathryn M. Edwards. *Plotkins Vaccines*. Philadelphia, PA: Elsevier, 2018, p. 1001-1030. <https://doi.org/10.1016/B978-0-323-35761-6.00054-7>

epidemics.<sup>35</sup> Nikolai Aleksandrovich Semashko, a prominent statesman who was deeply involved in public health affairs and served as the head of the People's Commissariat for Public Health from 1918 to 1930, agreed with Lenin and regarded vaccination and prophylaxis as two critical tasks of the organization and the Soviet Union.<sup>36</sup> Thus, even during its early years, the administration of the Soviet Union regarded public health programs and preventative medical care as a high priority because of the ramifications of infectious epidemics.

However, Soviet authorities regarded vaccination programs and other prophylactic programs as essential for more than just their positive social and public health results. Officials and politicians also utilized these various programs, including smallpox vaccination, as a form of political assertion. If the Soviet government could reign smallpox under control, it would support their claims of supremacy over both the former tsarist government and capitalist western countries.

Records on exact methods and numbers for mandatory smallpox vaccination in the 1920s and 30s are sparse. Epidemiologist O. V. Baroian explains that few records were kept concerning infectious disease during this time period in order to prevent such data from being used as capitalist propaganda.<sup>37</sup>

Despite sparsity of records on methods and figures, one can piece together some facts about the campaign. Soviet scientists N. F. Gamaleya and M. A. Morozov were critical in vaccine development, production, and vaccination organization. From 1912 to

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<sup>35</sup> Lenin's Essays, Vol. 40, 1920 <http://uaio.ru/vil/40.htm>

<sup>36</sup> Starks, Tricia A. "Propagandizing the Healthy, Bolshevik Life in the Early USSR." *American Journal of Public Health* 107, no. 11 (2017): 1719. <https://doi.org/10.2105/ajph.2017.304049>.

<sup>37</sup> Baroian, *The Results of a Half Century Fight Against Infections in the USSR*, *Vestnik Rossiiskii Akademii Meditsinskikh Nauk SSSR*, 3 no. 22 (Moscow, 1967) p. 42.

the late 1920s, N. F. Gamaleya served as director of the Jenner Smallpox Vaccination Institute in St. Petersburg, where he developed a method of producing and storing smallpox vaccine that was 15-20 times more effective than the *detrit* (ground smallpox lymph scab preserved in glycerin) method previously used.<sup>38,39</sup> Similarly, M. A. Morozov developed two novel strains of smallpox vaccine, conducted control programs for vaccination, and utilized Pasteur sterilization techniques in vaccine production.<sup>40</sup> These improvements in the safety, efficacy, and shelf life of smallpox vaccines enabled a more rapid vaccine production and a farther shipping radius from production centers. This improved production, in turn, enabled a more widespread and efficient vaccination campaign with decreased risk to recipients.

The Tashkent and White Tashkent strains, created by Morozov, and the Gamaleya IEM (Institute of Epidemiology and Microbiology) strain were all used prominently during this period.<sup>41</sup> As previously stated, the improvements in these strains addressed several logistical and safety issues. They also helped to standardize which smallpox strains were used during vaccination on a nation-wide scale and level. The vaccine was administered through the “scarification” technique, in which a series of two crosshatches

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<sup>38</sup> Kravchenko, A. T., Saltykov, R. A. “The Development of Live Vaccines” p. 1

<sup>39</sup> Информационные ресурсы - Архивы Санкт-Петербурга. Accessed September 28, 2019. <https://spbarchives.ru/infres/-/archive/cgantd/R-183>.

<sup>40</sup> “Имена Воронежа: Морозов Михаил Акимович.” Воронеж Медия. Accessed April 20, 2020. [http://www.voronezh-media.ru/names\\_out.php?id=142&page=6&rzd2=names](http://www.voronezh-media.ru/names_out.php?id=142&page=6&rzd2=names).

<sup>41</sup> Shchelkunov, S. N., S. S. Marennikova, and R. W. Moyer. *Orthopoxviruses Pathogenic for Humans*. New York: Springer, 2011. p. 68

for vaccination and three for re-vaccination are incised on the skin in order to sub-dermally introduce vaccine introduction.<sup>42</sup>

Most sources report that the compulsory smallpox vaccination campaign was highly successful and eliminated smallpox between 1936 to 1938.<sup>43</sup> One source from 1977, looking retroactively at the campaign, estimates the Soviet Union had approximately 186,000 registered smallpox cases in 1919, the year the first decree for mandatory smallpox vaccination was issued. By 1925, just a year after the second mandatory decree, the number of cases had fallen to 25,000. Four years later in 1929, the registered number of cases was only 6,100. In accordance with other sources, this report cites 1936 as the year of smallpox elimination in the USSR.<sup>44</sup>

Such a successful campaign, one that had effectively eliminated an ancient and horrific disease, made a deep impression on Soviet consciousness. Officials and politicians utilized the campaign's success as a note of political propaganda and control. The early success of smallpox vaccination was lauded by Soviet scientists as evidence for the State's greatness and benevolence in the direct aftermath of the program and in the decades that followed. Take, for example, statements from A. T. Kravchenko and R. A. Saltykov's report on Soviet live vaccine development:

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<sup>42</sup> *Ibid.*, p. 78. Wright, Louis T. "Intradermal Vaccination Against Smallpox." *JAMA: The Journal of the American Medical Association* 71, no. 8 (1918): 654. <https://doi.org/10.1001/jama.1918.26020340006011a>.

<sup>43</sup> *Ibid.*, p. 386; Kravchenko, A. T., Saltykov, R. A. "The Development of Live Vaccines" p. 1; Shchelkunova, G. A., and S. N. Shchelkunov. "40 Years without Smallpox." *Acta Naturae* 9, no. 4 (January 2017): 4. <https://doi.org/10.32607/20758251-2017-9-4-4-12>.

<sup>44</sup> Zhukovsky, A.M. "Successes in Soviet Medical Virology" *Issues of Virology* no. 5 (Moscow, 1977) p. 517-528

“Following the Great October Socialist Revolution, the young Soviet republic was compelled to devote particular attention to the eradication of widespread infectious diseases, including smallpox.<sup>45</sup>”

The structure of this statement portrays the Soviet republic as a concerned, active, and benevolent entity which put upon itself the task of protecting its citizens from disease. Microbiologist and epidemiologist Baroian states it even more directly, writing “No one can deny that these achievements (the controlling of infectious diseases, including poliomyelitis, diphtheria and others) were, first of all, the direct result of the State system.<sup>46</sup>” Dr. Steven L. Hoch interprets this rhetoric, as well as the actual vaccination campaign, as an act by the State to attain its citizens’ “loyalty and legitimization by conducting such campaigns.<sup>47</sup>”

The praise from Soviet scientists and officials for the Soviet Union’s proactiveness and elimination of smallpox was often contrasted with the purported failure and negligence of the pre-revolutionary government. Thirty years after the eradication of smallpox in the Soviet Union, epidemiological and public health researchers weave intricate narrative threads about the vaccination programs mandated by the early Soviet government. In 1968, Baroian remarked that:

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<sup>45</sup> Kravchenko, A. T., Saltykov, R. A. “The Development of Live Vaccines” p. 1

<sup>46</sup> Baroian, O . V., “Results in Controlling Communicable Diseases in the USSR”, Central Institute for Advanced Medical Training, USSR Ministry of Public Health and the World Health Organization Inter-Regional Traveling Seminar of National Health Planning, Report 26 (Moscow, 1969).

<sup>47</sup> Hoch, Steven L. “The Social Consequences of Soviet Immunization Policies, 1945-1980”. The National Council for Eurasian and East European Research, University of Iowa. 1997 p. 6

“pre-revolutionary Russia represented quite a favourable breeding ground for many highly contagious human diseases with a considerable level of mortality... The unending epidemics of natural smallpox, cholera, plague, intestinal infections, exanthematous fever and recurrent typhus, malaria and many other diseases did tremendous harm to the health of the people of Russia.<sup>48</sup>”

Propagandists also emphasized the lack of a central health agency in Imperial Russia.<sup>49</sup> The implication behind this statement is that pre-revolutionary, tsarist Russia was dirty and diseased because it was indifferent to its people’s health plights and lacked a centralized, state-run healthcare system.

However, as we have seen, pre-revolutionary Russia was not as wholly filthy and disease-ridden as Baroian would have us think. Despite being restrained by a more limited understanding of hygiene and epidemiology than the Soviets, prior Russian governments and organizations addressed health epidemics, often with great success. Even as far back as Catherine the Great, vaccination was extended to the lower classes, and through the VEO and localized zemstvos, early vaccination programs were put in place. While flawed, these programs were effective in curbing outbreaks and providing measures of disease prevention.

In fact, the philosophy driving vaccination and healthcare programs of local zemstvos in pre-revolutionary Russia were quite akin to Soviet healthcare and medical

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<sup>48</sup> Baroian, O. V. “Results of Half a Century.” (Moscow, 1968)

<sup>49</sup> Hoch, Steven L. “The Social Consequences.” 1997 p. 2

ideology. Incredibly popular among zemstvo physicians was the philosophy of social hygiene, which stated that one's economic situation played a key, if not the most essential, role in determining health outcomes.<sup>50</sup> This philosophy influenced many zemstvos to undertake prophylactic healthcare and vaccination campaigns, and it is encapsulated by Zemstvo physician V. O. Portugalov's statement that "conditions of poverty and starvation are the best breeding ground for the development of a whole series of terrible diseases... Measles, smallpox, and scarlet fever..."<sup>51</sup> The Soviet healthcare system adapted and expanded upon these ideas, and social hygienics came to implicate healthcare as both a social and political outcome. Illness, it was believed, was a result of capitalist conditions and could be eradicated as capitalism was eliminated.<sup>52</sup>

Despite these similarities, what was important to the early Soviet government was the establishment of their superiority over the pre-revolutionary rule. Indeed, from the Soviet perspective, the local, decentralized organization of pre-revolutionary Russia was inherently flawed and inefficient, especially since zemstvos had to operate within imperialist and aristocratic systems. It would make logical sense, according to Soviet social hygiene theory, that slovenliness and a failure to subdue disease would arise from such a system. In the Soviet consciousness, the mandatory smallpox vaccination campaign stands in stark contrast to this picture of pre-revolutionary Russia. Because of the power, efficiency, and benevolence of the centralized State, smallpox was eradicated, and Soviet citizens protected.

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<sup>50</sup> Krug, Peter, F. "The Debate Over the Delivery of Health Care". (Summer, 1976) p. 239

<sup>51</sup> *Ibid.*, p. 235

<sup>52</sup> Susan Gross Solomon, "Social Hygiene and Soviet Public Health, 1921-1930," Solomon and Hutchinson, *Health and Society*, (Bloomington, Indiana, 1990) p. 175-199.

However, the Soviet battle against smallpox did not stop with its own citizens. In 1958, Deputy Minister of Health of the USSR and delegate to the Health Assembly Professor Viktor Zhdanov proposed a report about the feasibility smallpox eradication to the WHO, emboldened by the experience of the smallpox in the Soviet Union and the State's ability to eradicate the disease by 1936.<sup>53</sup> His proposal came only a year after the USSR's reentry into the WHO, but Zhdanov convinced several other WHO delegate states to support the eradication program. The next year, in 1959, there was a unanimous vote in favor of the program, and the USSR pledged to donate 25 million doses of smallpox vaccine to the cause.<sup>54</sup> A separate account for global smallpox eradication funds was created and an international standard for the smallpox vaccine established.<sup>55</sup>

The original plan drafted at the 12th WHO Assembly in 1959 had proposed a 5-year timetable for smallpox eradication, half as short as the 10-year timeframe Zhdanov had originally proposed. The proposal to eliminate smallpox entailed three phases: 1) necessary preparation of the vaccine during the first two years; 2) vaccination of populations in which smallpox was endemic in the year following adequate vaccine production; and 3) complete smallpox eradication via additional vaccination and revaccination within the next two years.<sup>56</sup> By 1966, smallpox had been effectively eradicated from China and Southeast Asia. Unfortunately, despite the USSR's continued interest and advocacy for the program, global progress of smallpox vaccination and

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<sup>53</sup> Fenner, Frank, Donald Ainslie, Henderson, and Isao Arita. *Smallpox and Its Eradication*. Geneva: World Health Organization, 1988, p. 266.

<sup>54</sup> *Bugs, Drugs and Smoke: Stories from Public Health*. World Health Organization, (Geneva, 2011) p. 7

<sup>55</sup> Fenner, Frank, Donald Ainslie, Henderson, and Isao Arita. *Smallpox and Its Eradication*. Geneva: World Health Organization, 1988, p. 268.

<sup>56</sup> *Ibid.*, p. 367

eradication had lagged for several reasons, including a shortage of the vaccine, the prioritization of malaria control over smallpox eradication by most countries, and a dearth of data concerning global smallpox incidence. Economically, the program had also struggled; to illustrate, a paltry 2.4 million was allocated to the smallpox eradication campaign that year.<sup>57</sup>

However, the U.S. demonstrated a renewed interest in eliminating smallpox globally, resulting in an influx of overall support, cooperation, and resources for the campaign. Their renewed interest led to a period of international cooperation, particularly between the two leading superpowers. Laboratories in Canada, the U.S., the Netherlands, Czechoslovakia, and the USSR all collaborated on vaccine production and smallpox research.<sup>58</sup> With the U.S. providing vaccines for Western and Central Africa and the USSR providing vaccines for Afghanistan and South Asia, there was enough to administer to the 220 million individuals who required vaccination.<sup>59</sup>

The intensified smallpox vaccination campaign began in 1967, with a target of 80% mass vaccination per country in order to halt smallpox spread. The flexibility of the program was crucial to its success, as different techniques were utilized in different countries and regions. Broadly, mass vaccinations were carried out through either the assembly point method, in which people came to the health workers, or the house-to-house method, in which health workers visited the people.<sup>60</sup> Additionally, a new method

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<sup>57</sup> *Bugs, Drugs and Smoke: Stories from Public Health*. World Health Organization, (Geneva, 2011) p. 8

<sup>58</sup> *Ibid.*, p. 482

<sup>59</sup> Fenner, Frank, Donald Ainslie, Henderson, and Isao Arita. *Smallpox and Its Eradication*. Geneva: World Health Organization, 1988, p. 413

<sup>60</sup> *Ibid.*, p. 484-489

of administering the vaccine through a bifurcated needle or jet injector was used, which allowed for quicker administration of the vaccine.<sup>61</sup> During mass vaccination campaigns, surveillance-containment measures were also taken. When an outbreak or epidemic was identified, the people living in close proximity and in a ‘ring’ around the outbreak were vaccinated in order to halt smallpox’s spread. This prevention method was particularly crucial in densely populated areas and particularly effective during the vaccination of remote, rural areas.<sup>62</sup>

Ultimately, international cooperation and donations, especially that between the USSR and U.S., adaptable and varied programs suited to the cultural and regional demands, and international research collaboration allowed for the ultimate eradication of smallpox. In May 1980, the WHO officially announced the global eradication of smallpox.<sup>63, 64</sup>

A fascinating and intricate piece of the global eradication story is, of course, the role of international cooperation, particularly between the U.S. and USSR, without which eradication would not have been possible. However, it would be naive to say that the push by Zhdanov and the Soviets for international cooperation around the project of global smallpox eradication was out of purely selfless concern for the diseased.

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<sup>61</sup> Shchelkunov, S. N., S. S. Marennikova, and R. W. Moyer. *Orthopoxviruses Pathogenic for Humans*. (New York: Springer, 2011), p. 78.

<sup>62</sup> Henderson, D.A. “Lessons Learned from Smallpox Eradication and Severe Acute Respiratory Syndrome Outbreak: Part 1: The Use of Surveillance in the Eradication of Smallpox and Poliomyelitis.” *Infectious Disease Surveillance*, n.d., 499–523. <https://doi.org/10.1002/9780470692097.ch39>.

<sup>63</sup> *Bugs, Drugs and Smoke: Stories from Public Health*. World Health Organization, (Geneva, 2011) p. 18

<sup>64</sup> See Appendix A

Many countries were anxious for solidarity upon the USSR's return to the WHO after their departure in 1950, as noted by Dr. Henderson (a key leader in global smallpox eradication).<sup>65</sup> The USSR was able to use this proposal to extend a proverbial torch of unity in a symbolic way, as global smallpox eradication was only feasible with the donations and manpower of the U.S.. The Soviet representatives subtly appealed to this nature of international cooperation, aware of how this would reflect positively on themselves; Zhdanov, in the opening of his report to the WHO, quoted Thomas Jefferson's optimism about the eradication of smallpox.<sup>66</sup> The proposal of the smallpox eradication program, which Zhdanov and many others believed feasible, proved to be an ideal way to demonstrate initiatory leadership and foster solidarity by inviting other countries, including the U.S., to join forces in combating a common evil.

By rejoining the WHO and by rousing support for smallpox eradication, the USSR would also be able to reestablish its presence in the international science and health community, and in turn, further legitimize its status as a world power. For example, a 1968 publication in the *Journal of Microbiology, Epidemiology, and Immunobiology* proclaims that the Soviet EM-63 smallpox strain, with its high viability and low reactivity, "was equal to the best forms of this preparation made in other countries".<sup>67</sup> These thoughts clearly demonstrate the mindset and belief in Soviet excellence, especially in the field of virology. It is natural to see the expansion of such a belief into the active role of a global leader in public health and disease prevention.

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<sup>65</sup> Henderson, D.A. "Lessons Learned from Smallpox Eradication" p. 500

<sup>66</sup> Fenner, Frank, Donald Ainslie, Henderson, and Isao Arita. *Smallpox and Its Eradication*. Geneva: World Health Organization, 1988, p. 267

<sup>67</sup> Kravchenko, A. T., Saltykov, R. A. "The Development of Live Vaccines" p. 2

Global smallpox eradication would also benefit the Soviets at home. While smallpox had been endemically eradicated in the Soviet Union, outbreaks cropped up in Central Asia due to cases imported from Afghanistan and South Asia, with 537 cases reported from 1950 to 1957.<sup>68</sup> Surveillance and revaccination of these populations in order to prevent the further spread of smallpox required considerable resources, and if global eradication could be achieved, then the government would be free of this particular healthcare burden. Additionally, offering to mass produce the smallpox vaccine and smallpox virology knowledge to the WHO prompted a reciprocal exchange of knowledge and resources. By reintegrating back into the WHO as an active, contributing member through the smallpox eradication proposal, the USSR was also able to access research and methods about successful vaccination programs and vaccines against diseases such as polio and measles.<sup>69</sup> This acquired knowledge could be applied within the USSR to combat devastating diseases and prevent future epidemics.

Perhaps the grimmest reason for the USSR's push for global smallpox eradication was the desire to develop a global environment susceptible to a biological smallpox weapon. The Soviet government maintained a bioweapons research and testing facility, Aralsk-7, which existed on an island in the Aral sea since 1954.<sup>70</sup> Furthermore, it is documented that the Soviets were testing smallpox at the time concurrent with the smallpox eradication program; in 1971, about 400g of smallpox used in field testing

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<sup>68</sup> Fenner, Frank, Donald Ainslie, Henderson, and Isao Arita. *Smallpox and Its Eradication*. Geneva: World Health Organization, 1988, p. 366

<sup>69</sup> Hoch, Steven L. "The Social Consequences of Soviet Immunization Policies, 1945-1980" p. 5

<sup>70</sup> Zelicoff AP. An epidemiological analysis of the 1971 smallpox outbreak in Aralsk, Kazakhstan. Quoted in: Tucker JB, Zilinskas RA. "The 1971 Smallpox Epidemic in Aralsk, Kazakhstan, and the Soviet Biological Warfare Program." Monterey, Calif: Monterey Institute of International Studies, Center for Nonproliferation Studies. Occasional Paper No. 9.

resulted in a smallpox outbreak with 6 casualties. Once the disease was identified, a massive public health response was mounted to prevent the spread of smallpox. In less than 2 weeks, approximately 50,000 residents of Aralsk were vaccinated.<sup>71</sup> It is unclear whether the desire to develop smallpox as a bioweapon arose opportunistically, as eradication was pursued, or whether eradication was pursued as a means of ensuring a global environment more suitable for a smallpox bioweapon. (If smallpox were eradicated and vaccination no longer made mandatory, collective immunological memory for smallpox would decline, creating a situation ripe for devastation if the virus were to be reintroduced.) Regardless, the fact remains that the USSR capitalized on the opportunity to weaponize smallpox in spite of its goal of global eradication.

However, the eradication of smallpox first from the Soviet Union and then globally are ultimately incredible accomplishments worthy of recognition. During the nation's earliest years, the Soviet Union's smallpox vaccination efforts were shaped by the ideology of social hygiene, as well as the belief in prophylactic healthcare policies to protect the population. Early Soviet vaccination efforts were also driven, in part, by the government's need to establish legitimacy and power in the eyes of both its citizens and foreign governments. Due to these driving ideologies, the rhetoric surrounding the Soviet Union's actions often characterized the State as a benevolent figure who decided what was best for citizens (or the common person) and advocated for them. In this way, smallpox vaccination became associated with the presence of a benevolent but authoritarian state just as much as with positive health outcomes.

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<sup>71</sup> Dembek, Zygmunt F., Julie A. Pavlin, and Mark G. Kortepeter (2007), "Epidemiology of Biowarfare and Bioterrorism"; Chapter 3 of: Dembek, Zygmunt F. (2007), *Medical Aspects of Biological Warfare*, (Series: Textbooks of Military Medicine), Washington, DC: The Borden Institute, pp 51-52.

Under this veneer, there were darker aspects of smallpox vaccination. The most obvious was the duplicitous development of bioweapons. Tactics used to ensure vaccination were often coercive or dubious. Denouncement or condemnation of pre-revolutionary health efforts in order to legitimize Soviet rule could have disastrous consequences for individuals associated with those efforts. Additionally, mandatory vaccines during the domestic campaign were often given without consent.<sup>72</sup>

While the Soviet government directly contrasted their regime with that of pre-revolutionary Russia, lauding their own response to smallpox and decrying that of the Tsars, they do share some similarities. The theory of social hygiene espoused during early Soviet smallpox vaccination has its roots in the philosophies held by zemstvo physicians. Catherine the Great's concern for the economy and stability of the state and her own rule led her to advocate for variolation, a philosophy not entirely dissimilar to that of the Soviet government.

However, there are also differences in motivating factors for and methods of smallpox vaccination. The Soviet Union tended to take a much more centralized, state-controlled approach than pre-revolutionary Russia and was able to extend their efforts onto a global scale. On a global scale, the Soviet Union was able to assert their presence as a biological, economical, and political powerhouse by influencing global health policies.

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<sup>72</sup> Hoch, Steven L. "The Social Consequences of Soviet Immunization Policies, 1945-1980". 1997 p. 9

In the end, the tactics used by the Soviet Union reflect their commitment to the belief in the superiority of a Soviet, communist state. Though in some ways, the Soviet ideology and motivating factors for smallpox vaccination are similar to that of their political predecessors, the strategies they employed were often authoritarian and brooked little to no room for dissent, disagreement, or opposition. Though these strategies were effective in ending a horrific disease, their controlling characteristics, when associated with public health campaigns, helped cause in the populace an association between vaccination and authoritarianism, as well as resentment and mistrust towards the government. Ultimately, these factors contribute to the backlash to vaccines that is now seen decades later. As a result, the Soviet legacy with smallpox presents a fascinating mix of positives and negatives, which result in interesting implications for modern day Russia.

## CHAPTER 2

### Paralytic Polio and Crippling Ideology

In 2010, numerous polio outbreaks were reported throughout Central Asia, in Uzbekistan, Kazakhstan, Turkmenistan, and above all, Tajikistan, prompting swift revaccination campaigns.<sup>73</sup> In the same year, Russia experienced an ongoing poliomyelitis outbreak with 14 new cases of polio. While eight of the cases were individual importation cases, the remaining six were clustered in the North Caucasus region and part of a larger regional outbreak.<sup>74</sup> Polio, which was declared eliminated in Russia in 1997, had returned. How had polio managed to strike Russia, a country which had played a pivotal role in eliminating endemic polio on a nearly global level? To answer this question, it is necessary to examine the historical relationship between polio and the Soviet government.

To understand this relationship, one must first understand polio. Poliomyelitis is comprised of three major strain groups: types 1, 2, and 3, of which type 1 is the most virulent.<sup>75</sup> It belongs to a viral class called enterovirus, as polio is transmitted through the

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<sup>73</sup> Yakovenko, M. L., et al. “The 2010 Outbreak of Poliomyelitis in Tajikistan ...” *Eurosurveillance*, 2014, [https://www.researchgate.net/publication/260429865\\_The\\_2010\\_outbreak\\_of\\_poliomyelitis\\_in\\_Tajikistan\\_Epidemiology\\_and\\_lessons\\_learned](https://www.researchgate.net/publication/260429865_The_2010_outbreak_of_poliomyelitis_in_Tajikistan_Epidemiology_and_lessons_learned).

<sup>74</sup> “Polio in Central Asia and the North Caucasus Federal Region of the Russian Federation.” *World Health Organization*, World Health Organization, 1 Dec. 2010, [https://www.who.int/csr/don/2010\\_11\\_13/en/](https://www.who.int/csr/don/2010_11_13/en/).

<sup>75</sup> Nathanson, N., and O. M. Kew. “From Emergence to Eradication: The Epidemiology of Poliomyelitis Deconstructed.” *American Journal of Epidemiology*, vol. 172, no. 11, 2010, pp. 1213–1229., doi:10.1093/aje/kwq320.

gastrointestinal tract and typically causes mild symptoms.<sup>76</sup> For polio, this holds true, as only about 1 in 150 cases result in polio paralysis.<sup>77</sup> However, paralytic cases arise when the virus invades the central nervous system, causing neuronal degradation through immunity-mediated destruction of infected axons.<sup>78</sup> In spinal poliomyelitis, flaccid paralysis of the limbs occurs, while the much more severe bulbar poliomyelitis affects the brain stem and results in respiratory paralysis and often death.<sup>79</sup> To make matters worse, poliovirus disproportionately affects infants and children.

While this devastating disease is ancient in origin, with evidence of its existence dating back to the ancient Egyptians, it did not arise as a healthcare crisis until the 20<sup>th</sup> century with increased incidence and cases of infantile and child paralysis.<sup>80</sup> In an ironic twist, the increased number of paralysis cases in countries such as the U.S., Norway, and Russia is hypothesized to originate from improved hygiene. Improved hygienic standards increased the age of primary polio infections, so that individuals were first exposed as young children rather than infants. Typically, infants exposed to poliomyelitis still carried serum antibodies from maternal breast milk and were thus able to mount an active immune response. However, as the age of primary infection increased in the

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<sup>76</sup> “Genus: Enterovirus.” *International Committee on Taxonomy of Viruses (ICTV)*, [https://talk.ictvonline.org/ictv-reports/ictv\\_online\\_report/positive-sense-rna-viruses/picornavirales/w/picornaviridae/681/genus-enterovirus](https://talk.ictvonline.org/ictv-reports/ictv_online_report/positive-sense-rna-viruses/picornavirales/w/picornaviridae/681/genus-enterovirus).

<sup>77</sup> Nathanson, Neal, and John R. Martin. “The Epidemiology Of Poliomyelitis: Enigmas Surrounding Its Appearance, Epidemicity, And Disappearance.” *American Journal of Epidemiology*, vol. 110, no. 6, 1979, pp. 672–692., doi:10.1093/oxfordjournals.aje.a112848.

<sup>78</sup> “Factsheet about Enteroviruses.” *European Centre for Disease Prevention and Control*, 9 Nov. 2017, <https://www.ecdc.europa.eu/en/enteroviruses/facts>.

<sup>79</sup> Mehndiratta, Man Mohan, et al. “Poliomyelitis.” *The Neurohospitalist*, vol. 4, no. 4, 2014, pp. 223–229., doi:10.1177/1941874414533352.

<sup>80</sup> Nathanson, N., and O. M. Kew. “From Emergence to Eradication: The Epidemiology of Poliomyelitis Deconstructed.” *American Journal of Epidemiology*, vol. 172, no. 11, 2010, pp. 1214., doi:10.1093/aje/kwq320.

aforementioned countries, children exposed to polio now lacked serum antibodies acquired from breastmilk and were more susceptible to CNS attack and paralysis.<sup>81</sup> This may explain the increased incidence of polio paralysis in the 20<sup>th</sup> century.

This hypothesis helps explain the increased incidence of polio in the Soviet Union. In the early 20<sup>th</sup> century, the Soviet Union had the lowest incidence of polio in Europe, but by 1930, this was no longer true as polio began to spread at alarming rates.<sup>82</sup> This pattern fits within the purview of the hygienic theory, as the increased incidence of polio coincides with hygiene prophylactic programs and propaganda.

For these reasons, the incidence of polio skyrocketed in western countries in the post-World War II era. Before the late 20<sup>th</sup> century, clinical polio cases were rare, either insolated or the result of smaller outbreaks. However, its incidence increased during the early 20<sup>th</sup> century until ultimately, polio cases peaked in the 1950s as epidemics went rampant. In Russia, polio paralytic incidence was only 0.54 per 100,000 in 1929, but by 1957 this number had exploded to a whopping 9.4 cases per 100,000.<sup>83</sup> In the U.S., a similar story played out from 1950-1954, with polio outbreaks paralyzing an estimated 14.6 per 100,000, or about 22,000 U.S. citizens each year.<sup>84</sup>

The increased incidence of paralytic poliomyelitis, with its highly visible and devastating effects, led to the race for a polio vaccine in America. Through financial

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<sup>81</sup> *Ibid.*, pp. 1214-1215

<sup>82</sup> Oshinsky, David M. *Polio: an American Story*. Norwalk, CT: The Easton Press, 2005. pp. 251

<sup>83</sup> Horstmann, Dorothy. "The Sabin Live Poliovirus Vaccination Trials in the USSR < 1959." *The Yale Journal of Biology and Medicine* 64, (1991) pp. 499-512

<sup>84</sup> Trevelyan, Barry, Matthew Smallman-Raynor, and Andrew D. Cliff. "The Spatial Dynamics of Poliomyelitis in the United States: From Epidemic Emergence to Vaccine-Induced Retreat, 1910–1971." *Annals of the Association of American Geographers* 95, no. 2 (2005): 269–93. <https://doi.org/10.1111/j.1467-8306.2005.00460.x>.

backing from the National Foundation for Infantile Paralysis, Jonas Salk announced on March 26, 1953 that he had developed a safe and effective killed-virus polio vaccine.<sup>85</sup> This vaccine, known as the inactivated polio vaccine (IVP), was produced using formaldehyde to kill three strains of poliovirus, one of each subtype. Wide scale trials began in 1954, and the vaccine was approved for use in 1955, resulting in the drastic decrease of polio incidence.<sup>86</sup> The national celebration was short lived, however, as paralytic polio cases in vaccinated children were reported only two weeks after they had received immunization. Over 200 paralytic polio cases were reported and traced back to a faulty vaccine batch produced by Cutter Laboratories in Berkeley, California.<sup>87</sup>

This incidence confirmed what many scientists already believed: that Salk's killed vaccine posed unnecessary risk, especially with its use of the highly virulent Mahoney type I strain, and would not be as effective as a live, attenuated virus. Albert Sabin was born in 1906 in an area of the Russian Empire that is now modern-day Poland. In 1921, he and his family moved to the United States, where he studied medicine and rose to prominence in the field of infectious diseases. He was the most vocal opponent against using Salk's killed vaccine and instead advocated for the development and use of a live, attenuated vaccine. By 1956, Sabin had developed and tested a trivalent oral polio vaccine (OPV).<sup>88</sup> In contrast to Salk's IPV vaccine, Sabin's OPV consisted of three poliovirus strains mutated via passage through nonhuman cells into strains of lesser

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<sup>85</sup> Oshinsky, David M. *Polio: an American Story*. Norwalk, CT: The Easton Press, 2005. pp. 172

<sup>86</sup> *Ibid.*, pp. 188, 216

<sup>87</sup> *Ibid.*, pp. 237

<sup>88</sup> Baicus, Anda. "History of polio vaccination." *World Journal of Virology* 1, no. 4 (2012). pp. 108-114

virulence. Sabin believed that his vaccine would induce immunity in a greater percentage of vaccinees and pose decreased risk.

To prove this, Sabin needed a testing ground. Unfortunately, there were no longer opportunities in the U.S. While Sabin was able to run trials with human volunteers from federal prisons, there was really no interest from the U.S. government nor the general public for his vaccine.<sup>89</sup> Despite the Cutter incident, the government and laboratories continued to use and produce IPV, and most young, at-risk children were already vaccinated with Salk's vaccine at this point. Where then, would Sabin be able to test his new OPV?

The answer came from behind the Iron Curtain. By the time Dr. Sabin was searching for a viable option to test his polio vaccine, polio epidemics had spread to every state in the USSR and the government seemed powerless against the disease. The Poliomyelitis Research Institute was established in 1955 in response to the increased incidence of paralytic polio, which had risen to 9.4 cases per 100,000 despite (or, as we know, because of) improved hygiene.<sup>90</sup> However, these efforts were not enough to prevent the spread of polio. Due to limited resources, the Soviet government had primarily focused on prophylactic and hygienic rather than vaccination measures to prevent disease, and as a result, lacked internal solutions.

The USSR needed access to a cure because polio was crippling the State's authority by crippling children. Both the concept and the reality of the healthy worker were crucial to the ideology and success of the Soviet Union; a young, healthy workforce

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<sup>89</sup> Oshinsky, David M. *Polio: an American Story*. Norwalk, CT: The Easton Press, 2005. pp. 246

<sup>90</sup> Horstmann, Dorothy. "The Sabin Live Poliovirus Vaccination Trials in the USSR < 1959." *The Yale Journal of Biology and Medicine* 64, (1991) pp. 501

was necessary to accomplish many of the state's labor-intensive goals. The centrality of this necessity is especially evident in both propaganda posters lauding sports and exercise and prophylactic healthcare measures.<sup>91</sup> Polio, by crippling young Soviet children, thus undermined the goals of the state by disabling a substantial portion of the workforce and subverted the Soviet idea of social hygiene, which stated that disease would disappear within a perfect communist state. Combined with the prior decades of famine, deportation, genocide, and other Stalinist culling tactics, keeping the population robust and healthy was more important than ever.<sup>92</sup>

As a result, the USSR was very willing to cooperate with other nations in an effort to obtain effective vaccines, and due to Stalin's death in 1953 and the subsequent thawing of Cold War relations, international cooperation became a more viable option. To this end, the Soviet Union rejoined the WHO in 1958 as a gesture of 'collaborative effort,' which when translated meant that through WHO membership, they could gain access to international (specifically western) knowledge of vaccines.<sup>93</sup>

Soviet health and government officials then had to decide on a vaccine to use. Salk's vaccine was considered expensive, erratic, and difficult to disseminate and administer. However, his vaccine had undergone widescale trials in America that had yielded decent results.<sup>94</sup> Sabin's vaccine was largely untested and lacked the nationwide

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<sup>91</sup> See Appendix B, also: "Советские Плакаты 'Спорт.'" Кино СССР. Accessed October 19, 2019. <https://kino-ussr.ru/2194-sovetskie-plakaty-sport.html>.

<sup>92</sup>Vargha, Dora, Christine Holmberg, Stuart S. Blume, and Paul Robert Greenough. *The Politics of Vaccination: a Global History*. Manchester: Manchester University Press., 2017. p. 79

<sup>93</sup> Hoch, Steven L. "The Social Consequences of Soviet Immunization Policies, 1945-1980". The National Council for Eurasian and East European Research, University of Iowa. 1997 p. 5

<sup>94</sup> *Ibid.*, pp. 251

trial credentials of Salk's. However, in the end, it came down to old-fashioned diplomacy. Chumakov invited both Salk and Sabin to tour the Moscow lab facilities and discuss vaccine production and testing. Salk, who had less incentive to go, declined because of family reasons. In contrast, Sabin was eager to please and not only traveled to Moscow, but also provided polio strains to use for vaccine production.<sup>95</sup>

After meeting with Sabin, Chumakov also concluded that the OPV was a more compatible option for his vision of Soviet polio vaccination. The vaccines could then be incorporated into dragées, small bite sized confections, containing either mono- or trivalent doses of Sabin's polio vaccine. These dragées were produced at the Moscow "marat" confectionery factory in a process developed by the workers, where candies were spun in a large drum and the vaccine was dripped onto the candies. In this manner, 200 tons (approximately 200,000,000 doses) were produced. Sabin and his laboratory evaluated the candy and found it had retained its potency and was up to standard.<sup>96</sup> The dragées were incredibly stable and could be stored for three months below 0°C, a month at 4°C, or for 3-5 days at room temperature, making this form incredibly thermostable.<sup>97</sup> In contrast, Salk's vaccine was not as thermostable and thus required a 'cold chain' in order to effectively transport the virus.<sup>98</sup> The IPV also required the use of sterile needles,

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<sup>95</sup> Oshinsky, David M. *Polio: an American Story*. Norwalk, CT: The Easton Press, 2005. pp. 252t

<sup>96</sup> "Candy Coated Medicine Is Developed in a Moscow Confectionery Factory: WNYC: New York Public Radio, Podcasts, Live Streaming Radio, News." WNYC. Accessed October 19, 2019. <https://www.wnyc.org/story/a-moscow-confectionery-factory-manufactures-candy-coated-medicine/>.

<sup>97</sup> Chumakov, M P. "Mass Immunization with Live Poliovirus Vaccine in the Soviet Union." *Bulletin World Health Organization* 1, no. 5187 (April 1960): 81. <https://doi.org/10.1136/bmj.1.5187.1729>.

<sup>98</sup> Shin, Woo-Jin, Daiki Hara, Francisca Gbormittah, Hana Chang, Byeong S. Chang, and Jae U. Jung. "Development of Thermostable Lyophilized Sabin Inactivated Poliovirus Vaccine." *MBio* 9, no. 6 (2018). <https://doi.org/10.1128/mbio.02287-18>.

which would add to costs and slow the vaccination process.<sup>99</sup> It was also faster and easier to administer this oral form to children as opposed to a subcutaneous injection. Lastly, the OPV ensured that poliovirus passed directly through the alimentary canal, providing immunological resistance at the portal of viral entry.

From both diplomatic and public health perspectives, Chumakov determined that Sabin's OPV would be utilized for mass field vaccination trials throughout the USSR. Work began 1958 as vaccines were produced at three main laboratories in the USSR: at Shipok in Bulgaria, Sokolinaya Gora, and Vnukovo, of which the latter two are in Moscow.<sup>100</sup> Chumakov proposed that the most effective method of vaccination would be mass, simultaneous immunization of the susceptible population in an entire district, city, or region. In this manner, they would prevent further spread of outbreaks and minimize the risk of vaccine associated paralytic poliomyelitis by preventing repeated passages of the virus through an individual's alimentary tract.<sup>101</sup>

In 1959, vaccination began in Lithuania, Estonia, Georgia, Azerbaijan, Moldavia, Uzbek, Tadjik, Kirgiz, and Turkmenia.<sup>102</sup> The campaign process carried out typically as follows: before the actual vaccination began, Dr. Chumakov and staff members would address local physicians and educate them on the program's intricacies and requirements. At the same, mass sanitary propaganda was aired to the local population in the form of radio, television, newspapers, lectures, leaflets, etc.<sup>103</sup> Then, teams comprised of two

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<sup>99</sup> Carleton, Heather A. "Putting Together the Pieces of Polio: How Dorothy Horstmann Helped Solve the Puzzle." *Yale Journal of Biology and Medicine*, no. 84 (2011). pp. 88

<sup>100</sup> Horstmann, Dorothy. "The Sabin Live Poliovirus" pp. 501-502

<sup>101</sup> Chumakov, M P. "Mass Immunization..." pp. 80

<sup>102</sup> *Ibid.*, pp. 81

<sup>103</sup> *Ibid.*, pp. 83

nurses and an assistant physician (*feldscher*) were sent out daily with iced vaccines and dragées to immunize certain populations. Some teams went from door to door while others set up in a single location, such as a school or factory, and let the patients come to them; all teams were supervised and overseen by a local physician. Documentation of vaccinees' names, addresses, ages, as well as the type and date of vaccine administered was meticulously recorded and passed onto local pediatricians. The majority of vaccinees were under the age of 20, though in some regions individuals up to 55 were vaccinated. In this manner, approximately 8,380,000 individuals in these regions received OPV by October of 1959.<sup>104</sup>

The results were closely monitored, stool samples collected, and any potential cases of acute flaccid paralysis were referred and closely examined to determine the possibility of vaccine caused paralysis. From the trials, it was determined that no more than 3 in 100,000 vaccinations resulted in paralytic polio, which Chumakov noted was not of current practical importance but could require future re-examination.<sup>105</sup> There was a sharp decline in polio incidence and an absence of the typical seasonal summer spike of cases in these regions.<sup>106</sup>

A case which further supported the success of the program was that of Tashkent, Uzbekistan, where a polio outbreak occurred in June 1959, affecting mainly children under 4. The vaccination campaign began in July under Dr. Chuamkov's direction, beginning with an emergency propaganda campaign broadcast to the whole city. The

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<sup>104</sup> Horstmann, Dorothy. "The Sabin Live Poliovirus" pp. 503

<sup>105</sup> Chumakov, pp. 83

<sup>106</sup> Horstmann, Dorothy. "The Sabin Live Poliovirus" pp. 507

actual vaccination, carried out by over 2,000 physicians, began on July 19 and lasted until August 12. Families were instructed to remain at home until a vaccination team could come and administer the vaccine in a liquid form, which was preferred for younger children and infants who could not ingest the dragées. On July 19 alone, 182,000 children were vaccinated, and by August, over 400,000 children total (almost the entire population in Tashkent under 15) had been vaccinated. Reported participation was nearly 100% and secondary doses were administered six weeks after the initial vaccination. The epidemic, which afflicted about 400 children, fell off sharply after the mass vaccination campaign and lasted only about two and a half months.<sup>107</sup>

When presented with the data and a recommendation from the Board of the USSR Ministry of Public Health, Sergei Kurashov, the Minister of Health, issued an order on December 16, 1959, which provided for the mass immunization of citizens aged two months to 29 years.<sup>108</sup> Chumakov and his colleagues set to work immediately; they had an enormous task before them. The Institute for Poliomyelitis Research in Moscow, in conjunction with the Marat confectionary factory, produced and distributed over 260,000,000 doses of live vaccine that were used to vaccinate an estimated 77,478,872 persons throughout the USSR.<sup>109</sup> To put this in perspective, 77 million persons accounted for about 35% of the USSR's population at the time. Of these 77.5 million vaccinees, 3 million were vaccinated using Salk's IPV; the rest received Sabin's OPV. Approximately 92% (72 million) of vaccinees were under 20 years old, the highest risk age demographic

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<sup>107</sup> Horstmann, Dorothy. "The Sabin Live Poliovirus" pp. 508

<sup>108</sup> Chumakov, pp. 79

<sup>109</sup> *Ibid.*, pp. 81

for polio. Various immunization schedules were used from region to region, depending on the local conditions. Lastly, Chumakov and his colleagues found that in regions where Sabin's OPV was administered, there was no seasonal summer spike of poliomyelitis incidence; in contrast, the few regions that had used Salk's IPV still demonstrated a small seasonal spike<sup>110</sup>. The USSR began to export live vaccine to other countries like Hungary, Czechoslovakia, Bulgaria, Japan, China, and Vietnam, sending over 42 million doses in total.<sup>111</sup> On all accounts, the mass Soviet vaccination campaigns against polio had proven to be an overwhelming success.

However, the U.S. and many other Western countries were wary of these results. If Sabin's OPV was to be used in other countries or on a larger, international scale, how could this data be trusted? The Soviets, infamous for propaganda, could not always be taken at their word. After some deliberation, WHO acquiesced to requests to send an outside scientist to authenticate the Soviet Union's results.

They selected Dr. Dorothy Horstmann, an epidemiologist from Yale whose own polio research was essential in vaccine development, for the job. She traveled to the USSR in the fall of 1959, where spent six weeks observing trials, methods, and results. Personal notes and correspondence indicate that Dr. Horstmann was well aware of the limitations of such a brief visit amidst such intense activity, writing that "precise data from many areas is lacking and work on the laboratory specimens has fallen behind.

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<sup>110</sup> *Ibid.*, pp. 87

<sup>111</sup> *Ibid.*, pp. 82

Although more data will be ready by January, it will take much longer than that to sift out all the aspects [of the program].<sup>112</sup>”

Despite these limitations, Dr. Horstmann provided a meticulously detailed report. She detailed the methods of vaccine production, methods used by the Soviets during immunization, the status of follow-up surveillance, and statistics related to vaccination efficacy. She reported on these categories by republic, which included Estonia, Uzbekistan (specifically, Tashkent), Latvia, Belorus, and Moldavia. She also detailed ongoing programs in the Moscow region, as well as the contributions of virologists such as Dr. Smorodintsev and Dr. Chumakov and the staffing, status, and equipment of their laboratories.

Her overall report was very favorable, writing that “the evidence seems conclusive that these strains are safe, both to those vaccinated and to their communities. Surveillance of cases is good, and it seems very unlikely that paralytic cases of poliomyelitis would have been missed.<sup>113</sup>” She also downplayed comments and concerns she had voiced in personal notes, writing in her report that “in view of the enormous amount of laboratory work to be completed in a year of many vaccination programs, it is understandable that final results are slow in coming.<sup>114</sup>” With the limited time and statistics available to her, it is fair to say that Dorothy served as impartial of a judge as possible. She understood the ramifications of her report and, based on the data and her observations, deemed Sabin’s OPV safe and efficacious.

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<sup>112</sup> Horstmann, Dorothy. “Casual Notes: Report from Dr. Horstmann in Moscow.” *Yale University Archives*. October 3, 1959.

<sup>113</sup> Horstmann, Dorothy. “The Sabin Live Poliovirus” pp. 511

<sup>114</sup> Horstmann, Dorothy. “The Sabin Live Poliovirus” pp. 512

One ramification of Dr. Horstmann's report to the WHO was that the Sabin vaccine was approved for use by the WHO on an international scale.<sup>115</sup> As previously stated, the Soviet Union exported millions of doses of vaccine to countries with which it had strong political ties, such as Bulgaria, Hungary, and East Germany. Of particular note is the Soviet Union's donation of OPV to Romania, which enabled the entire population under 30 to receive polio vaccination from 1961 to 1962.<sup>116</sup> The USSR also donated approximately 1.3 million doses of OPV in both lozenge and liquid form to aid with Cuba's national immunization campaign in 1962.<sup>117</sup> Because the Soviet Union already possessed the requisite facilities, trained workers, and strains, they were able to produce and distribute polio vaccine to other countries in a humanitarian gesture with political subtext.

In 1988, the Global Polio Eradication Initiative (GPEI) was launched with a resolution of the World Health Assembly (WHA). By this point in time, Europe and the Americas had made substantial strides in interrupting wild polio transmission and preventing epidemics.<sup>118</sup> However, the dissolution of the USSR in 1991 caused both political instability and a breakdown in the healthcare systems in Eastern Europe. In Russia and the former Soviet Republics, outbreaks continued and were often linked to civil unrest and military conflict. Outbreaks in Chechnya occurred in 1995, with 154

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<sup>115</sup>"Poliomyelitis." World Health Organization. World Health Organization, October 2, 2019. <https://www.who.int/biologicals/areas/vaccines/poliomyelitis/en/>.

<sup>116</sup>Baicus, A. "History of Polio Vaccination." *World Journal of Virology*, no. 1 (2012). pp. 111.

<sup>117</sup>Chaple, Enrique Beldarraín. "Poliomyelitis and Its Elimination in Cuba: An Historical Overview. Author Reply." MEDICC review. U.S. National Library of Medicine, October 2013. <https://www.ncbi.nlm.nih.gov/pubmed/24392511>.

<sup>118</sup>Aylward, Bruce, Tangermann, Rudolf. "The Global Polio Eradication Initiative: Lessons Learned and Prospects for Success." *Vaccine*. Elsevier, April 6, 2012. pp. D80 <https://www.sciencedirect.com/science/article/pii/S0264410X11015994>.

reported cases, while Tajikistan experienced periodic outbreaks in the mid-90s due to cases transmitted from India. Uzbekistan also experienced outbreak in the mid-90s from an isolated poliovirus indigenous to the former Soviet Union.<sup>119</sup> These outbreaks and increased polio incidence can mainly be attributed to the collapse of the Soviet Union and thus, the lack of a central, authoritative state power to administer and oversee vaccination, as well as general political and civil unrest.

However, through extensive vaccination campaigns supported by the WHO, UNICEF, WHA, the CDC, Rotary International, and various national governments, the incidence of polio on a global scale plummeted. Reported annual global polio cases dropped from 35,000 in 1988 to fewer than 1,000 in 2001.<sup>120</sup> Worldwide elimination of wild polio type 2 transmission marked an incredible achievement of the global fight against polio, with the last recorded case of wild type 2 transmission occurring in India in 1999.<sup>121</sup> And on October 24, 2019, WHO announced that wild polio type 3 has been

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<sup>119</sup> Oblapenko, G., and R. W. Sutter. "Status of Poliomyelitis Eradication in Europe and the Central Asian Republics of the Former Soviet Union." *Journal of Infectious Diseases* 175, no. Supplement 1 (January 1997). [https://doi.org/10.1093/infdis/175.supplement\\_1.s76](https://doi.org/10.1093/infdis/175.supplement_1.s76).

<sup>120</sup> Nathanson, N., and O. M. Kew. "From Emergence to Eradication: The Epidemiology of Poliomyelitis Deconstructed." *American Journal of Epidemiology* 172, no. 11 (2010): pp. 1220–21. <https://doi.org/10.1093/aje/kwq320>.

<sup>121</sup> Centers for Disease Control and Prevention (CDC), "Apparent global interruption of wild poliovirus type 2 transmission." *Morbidity and Mortality Weekly Report* 50, no. 12 (2001): pp. 222-224

eradicated.<sup>122</sup> The European region was declared polio-free in 2002, and by 2005, polio remained endemic in only four countries: Nigeria, Afghanistan, Pakistan, and India.<sup>123, 124</sup>

Unfortunately, celebration at the turn of the century was premature. Eliminating polio from these four endemic countries posed a difficult, complex task that continues to frustrate health workers today. Poor oversight, lack of engagement with community leaders, and overall weak health infrastructure in these countries led to inadequate supplementary and follow-up immunizations. In regions with endemic poverty and poor sanitation, the high prevalence of diarrhea and non-polio enteroviruses greatly decreased the ability of Sabin's OPV to induce immunological memory, thus decreasing the vaccine's efficiency. Underserved groups of nomads and other migratory populations, under-vaccinated and difficult to track, also contributed to the spread of polio in these countries. Some communities in these countries were distrustful of the vaccine and believed it caused infertility, while other communities were ravaged by conflict and instability.<sup>125</sup> All of these factors prevented total eradication of polio by preventing adequate vaccination and protection which could interrupt transmission.

Moreover, the presence of endemic polio within these countries posed a global threat, as the disease could spread across borders and precipitate outbreaks in polio-free nations. The 2010 polio outbreaks in Russia and Tajikistan illustrate this threat well.

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<sup>122</sup> "Two out of Three Wild Poliovirus Strains Eradicated." World Health Organization. World Health Organization. Accessed October 26, 2019. <https://www.who.int/news-room/feature-stories/detail/two-out-of-three-wild-poliovirus-strains-eradicated>.

<sup>123</sup> "Polio in Tajikistan – Update." World Health Organization. World Health Organization, December 2, 2010. [https://www.who.int/csr/don/2010\\_07\\_23/en/](https://www.who.int/csr/don/2010_07_23/en/).

<sup>124</sup> Aylward, Bruce, Tangermann, Rudolf. "The Global Polio Eradication Initiative..." Vaccine. Elsevier, April 6, 2012. pp. D81

<sup>125</sup> *Ibid.*, pp. D82

Though Russia and Tajikistan were declared polio-free in 1996 and 1997, respectively, both countries experienced polio outbreaks in 2010, with 14-15 cases reported in Russia and 458-463 in Tajikistan.<sup>126, 127</sup> The outbreak was traced back to a single importation case of wild polio type 1 strain that originated in northern India and subsequently spread to Tajikistan, the center of the central Asiatic outbreak.<sup>128</sup> From there, the virus spread to Kazakhstan, Turkmenistan, Uzbekistan, and Russia.

In Russia, at least ten of these paralytic polio cases were traced back to the strain which caused the Tajikistan outbreak. Upon retrospective epidemiological analysis of the outbreak, researchers concluded that the outbreak in Tajikistan was the result of insufficient population immunity due to low immunization rates, rather than a failure of the vaccine itself.<sup>129</sup> At the time of the outbreak, six of the total paralytic polio cases in Russia occurred in the Northern Caucasus region (three in Dagestan and three in Chechnya), and by the conclusion of the outbreak, that number of recorded cases in the Northern Caucasus had risen to eleven total (seven in Dagestan and four in Chechnya).<sup>130</sup> This region was particularly susceptible to the importation and outbreaks of polio due to instability caused by military conflict and terrorism. Thus, despite reported vaccination

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<sup>126</sup> “Polio-Free Countries.” GPEI. Accessed October 26, 2019. <http://polioeradication.org/where-we-work/polio-free-countries/>.

<sup>127</sup> Global Polio Eradication Initiative: annual report 2010, Global Polio Eradication Initiative: annual report 2010 § (2011), pp. 5. [http://polioeradication.org/wp-content/uploads/2016/07/GPEI\\_AR2010\\_EN.pdf](http://polioeradication.org/wp-content/uploads/2016/07/GPEI_AR2010_EN.pdf)

<sup>128</sup> Yakovenko, M L, A P Gmyl, O E Ivanova, T P Eremeeva, A P Ivanov, M A Prostova, O Y Baykova, et al. “The 2010 Outbreak of Poliomyelitis in Tajikistan: Epidemiology and Lessons Learnt.” *Eurosurveillance* 19, no. 7 (2014), pp. 9. <https://doi.org/10.2807/1560-7917.es2014.19.7.20706>.

<sup>129</sup> *Ibid.*, pp. 11

<sup>130</sup> *Ibid.*, pp. 9

rates of 98% in Russia, it became clear that there was still potential risk for outbreaks, as well as segments of the population which remained unprotected.<sup>131</sup>

In response to these outbreaks, four rounds of national immunization days (NIDs) with OPV were held in Tajikistan; Uzbekistan, Turkmenistan, and Kyrgyzstan concordantly held 1-3 NIDs in order to bolster children's immunization status and prevent further spread of outbreaks.<sup>132</sup> Over 2.4 million donations of OPV came from Germany and were supplemented with doses from WHO and UNICEF, and further NIDs were scheduled for 2014. Since then, central Asia and Russia have remained polio-free.<sup>133</sup>

To return to the original question: what caused these polio outbreaks, and how can they be traced historically and politically back to the Soviet Union's involvement with polio? Polio vaccination in the USSR, as with smallpox vaccination, was intricately interwoven with Soviet ideology, state authority, and economics. As previously stated, polio undermined Soviet authority and communist ideology. If social hygiene theory were correct, as the communist state developed towards perfection and focused on prophylaxis, disease would slowly disappear. Polio ran in the face of this narrative, brazenly crippling children, who were essential to the healthy workforce which was at the

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<sup>131</sup> Russian Federation: WHO and UNICEF estimates of immunization coverage; 2018 revision. (2018), pp. 6. [https://www.who.int/immunization/monitoring\\_surveillance/data/rus.pdf](https://www.who.int/immunization/monitoring_surveillance/data/rus.pdf)

<sup>132</sup> "Polio in Tajikistan – Update." World Health Organization. World Health Organization, December 2, 2010. [https://www.who.int/csr/don/2010\\_07\\_23/en/](https://www.who.int/csr/don/2010_07_23/en/).

<sup>133</sup> "Tajikistan Moves Quickly to Prevent a Polio Outbreak." World Health Organization. World Health Organization, March 31, 2014. <http://www.euro.who.int/en/countries/tajikistan/news/news/2014/03/tajikistan-moves-quickly-to-prevent-a-polio-outbreak>.

core of Soviet ideology; if polio had not been eradicated, scientists calculated that the USSR would have lost 3.9 billion rubles due to the paralysis of children.<sup>134</sup>

Defeating polio allowed the Soviet government not only to strike down a threat to their ideology, but also to foster a political image both domestically and internationally. If the government could eradicate polio using its authoritarian, centralized methods, the Soviets could prove the efficacy of their governing system to their citizens and other countries. A successful campaign provided evidence for the picture of a benevolent government that cared for its citizens and achieved great things through a centralized State system and the cooperation of its people. Similarly, the Soviet government could, on an international level, tout its success with polio immunization as a strength of its political system. During the immunization campaigns, propaganda was widely disseminated through radio, television, and newspapers in order to ensure citizens' cooperation, with great success. Civil resistance was not an option, as babies and young children could not object, and their parents would not either, unless they wished to be portrayed as enemies of the state and public good. Despite Stalin's death 1953, the fear, authoritarian lessons, and rhetoric of the State above all else had become embedded in Soviet cultural consciousness.

With the fall of the Soviet Union, this overarching political and cultural narrative was disrupted. Former economic and ideological arguments for immunization were rendered moot in the absence of Soviet and communist ideology, and the structures for effective and widespread immunization campaigns had collapsed. The government no longer held the same level of centralized power and authority to extract compliance from

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<sup>134</sup> Hoch, Steven L. "The Social Consequences of Soviet Immunization Policies, 1945-1980". The National Council for Eurasian and East European Research, University of Iowa. 1997 pp. 12

its citizens. For some citizens, there was a distrust of the government and by extension, distrust of vaccines and vaccination policies, which were so heavily connected and associated with an authoritarian regime.

Matters were even more dire in regions like central Asia and the Northern Caucasus. The former region was somewhat removed geographically and politically from Russia and thus, to a greater degree lacked the structure and resources to address and maintain polio vaccination. Regions like Dagestan and Chechnya were plagued by war, rebellions, and strife that prevented prophylactic healthcare and medical surveillance. Because of this, these regions were particularly susceptible to outbreaks and spread from the proximal geographical region of India, where polio remained endemic. Ultimately, the outbreaks of polio in Russia and related republics are indicative of the history of authoritarian methods and rationalizations for vaccination. In order to prevent such outbreaks from occurring again, polio should be eliminated on a global scale and new justifications for vaccination, as well as the continued improvement of healthcare infrastructure, must be developed.

## CHAPTER 3

### Measles, Mumps, and Public Healthcare Bumps

When university student Daniel Grigorenko broke out with a fever and a rash all over his body, he suspected that it could be measles.<sup>135</sup> His doctor confirmed that Daniel had contracted measles, despite being vaccinated ten years prior, most likely from his younger sister who had also contracted the disease. As of April 2019, Daniel and his sister were only a small part of a much larger epidemic: over 800 Russians had contracted measles in the first few months of 2019 alone.<sup>136</sup> This figure is indicative of Russia's and Eastern Europe's worsening battle with measles. In 2018, there were a total of 2,256 reported cases of measles in Russia and an astonishing 53,218 cases in Ukraine, accounting for almost 66.4% of reported measles cases in the European region.<sup>137</sup> The sheer volume of cases represents a 13.5 fold increase in measles incidence for Russia.<sup>138</sup> In 2019, the number of reported cases continues to grow, with 56,802 reported in Ukraine and 3,521 in Russia.<sup>139</sup> These figures point to the incredible and potentially fatal threat that measles poses for vulnerable groups and its immense strain on public health infrastructure.

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<sup>135</sup> Фохт, Елизавета. “Корь в России: При Чем Тут Антипрививочники?” BBC News Русская служба. BBC, April 26, 2019. <https://www.bbc.com/russian/institutional-48042494>.

<sup>136</sup> *Ibid.*

<sup>137</sup> “Measles – European Region.” World Health Organization. World Health Organization, September 10, 2019. <https://www.who.int/csr/don/06-may-2019-measles-euro/en/>.

<sup>138</sup> The Moscow Times. “Measles Cases Jump 13-Fold in Russia in 2018.” The Moscow Times. The Moscow Times, December 3, 2019. <https://www.themoscowtimes.com/2018/08/24/measles-cases-jump-13-fold-russia-2018-a62659>.

<sup>139</sup> “Measles – Global Situation.” World Health Organization. World Health Organization, December 3, 2019. [https://www.who.int/csr/don/26-november-2019-measles-global\\_situation/en/](https://www.who.int/csr/don/26-november-2019-measles-global_situation/en/).

There are several factors that, when combined, make measles a deadly cocktail of a disease. The first is that is an incredibly communicable disease that spreads quickly and easily in the form of droplets produced when infected individuals sneeze or cough. The virus can then remain in the air for up to two hours after initial droplet dispersion, and 75% of those not immunized against the disease will become infected when initially exposed to viral measles particles.<sup>140,141</sup> Measles is also communicable for a period of anywhere from 8-10 days, beginning four days before the onset of any specific symptoms.<sup>142</sup> Due to these factors, about 95% of a community must be vaccinated in order to achieve herd immunity.<sup>143</sup>

Because the disease is highly communicable and easily contractible, it has the potential to affect an enormous number of individuals and can quickly affect vulnerable populations. Children, in particular, are particularly vulnerable to measles due to the complications that can arise. These complications include ear infections, diarrhea, respiratory issues like bronchitis or pneumonia, and acute encephalitis. The latter occurs in about every 1 in 1,000 cases and can result in severe brain damage. Ultimately, up to 3 in 1,000 may die from complications from measles.<sup>144</sup>

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<sup>140</sup> Wood, Matt. "Measles Is Still a Very Dangerous Disease." UChicago Medicine. UChicago Medicine, February 10, 2019. <https://www.uchicagomedicine.org/forefront/pediatrics-articles/2019/february/measles-is-still-a-very-dangerous-disease>.

<sup>141</sup> "Transmission of Measles." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, February 5, 2018. <https://www.cdc.gov/measles/transmission.html>.

<sup>142</sup> "Measles." Mayo Clinic. Mayo Foundation for Medical Education and Research, May 24, 2019. <https://www.mayoclinic.org/diseases-conditions/measles/symptoms-causes/syc-20374857>.

<sup>143</sup> Wood, Matt. "Measles Is Still a Very Dangerous Disease." UChicago Medicine. UChicago Medicine, February 10, 2019.

<sup>144</sup> "Measles." Mayo Clinic. Mayo Foundation for Medical Education and Research, May 24, 2019.

The last component of measles that makes it so dangerous is the disease's ability to compromise a person's immune memory. Studies show that the virus can incapacitate an individual's immune system for 2 to 3 years by disabling immune memory.<sup>145</sup> Though lymphocyte counts recover relatively quickly after the disappearance of the measles rash, the affected individual can remain immunosuppressed for up to 3 years after the infection. This happens because the virus reduces antibody diversity by as much as 73% because it can infect and kill naïve B cells, long lived plasma cells, and up to 70% of memory cells; in particular, memory cells are infected due to their expression of CD150 and SLAMF1 receptors. As these cells coordinate immune responses, particularly anamnestic immune responses, depletion of these cell populations effectively performs a 'memory wipe' on a person's immune system, rendering them unable to defend against previously contracted diseases.<sup>146, 147</sup> This in turn leads to increased morbidity and mortality. As a result, the main question health officials pose remains how to address this epidemic in order to protect those at risk and prevent mortality. In order to find a solution to this issue, it is first necessary to understand the history and causes of the measles epidemic in order to develop combative strategies.

Measles, known as 'the child's plague' due to its high infection rate among the young, was greatly and rightly feared in tsarist Russia. During this period, the mortality

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<sup>145</sup> Mina, M. J., et al. "Long-Term Measles-Induced Immunomodulation Increases Overall Childhood Infectious Disease Mortality." *Science*, vol. 348, no. 6235, July 2015, pp. 694–699., doi:10.1126/science.aaa3662.

<sup>146</sup> Vaughn, Emily. "Measles Virus May Wipe Out Immune Protection For Other Diseases." *NPR*, NPR, 31 Oct. 2019, <https://www.npr.org/sections/health-shots/2019/10/31/775081827/measles-virus-may-wipe-out-immune-protection-for-other-diseases>.

<sup>147</sup> Petrova, Velislava N., et al. "Incomplete Genetic Reconstitution of B Cell Pools Contributes to Prolonged Immunosuppression after Measles." *Science Immunology*, vol. 4, no. 41, 2019, doi:10.1126/sciimmunol.aay6125.

of children under five in children's hospitals ranged from 29 to as high as 67% due to measles.<sup>148</sup> In large cities like Moscow before 1928, the incidence of measles was estimated to be anywhere from 580 to 1067 per 100,000 annually, while its morbidity was estimated to be 77 per 100,000.<sup>149, 150</sup> The mortality rate of measles reached up to 40% for infants under 1 year and up to 20% for children between 1 and 3 years.<sup>151, 152</sup> These trends continued well into the early 20th century with grave mortality and acute severity, as demonstrated by over 750 records from a Leningrad hospital, which reported that 58% of cases as severe, 40% as moderate, and only 2% as mild. In addition, 98% of these reported cases demonstrating complications such as pneumonia, laryngitis, and ear infections.<sup>153</sup> From the 40s to 60s, an estimated 1.5 to 2 million children were affected annually and large measles epidemics broke out in Russia every one to two years, leaving

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<sup>148</sup> Филькенштейн, Ю.А. Корь и её иммуно-серопротекция: монография Ю.А. Филькенштейн. - М.-Л. Биомедгиз, 1935.-75с

<sup>149</sup> Burgasov, P. N., Andzaparidze, O. G., Popov, V. F., "The Status of Measles after Five Years of Mass Vaccination in the USSR." *Bulleting of the World Health Organization*, vol. 49, no. 1 1973. pp. 572

<sup>150</sup> Цвиркун Ольга Валентиновна, ЭПИДЕМИЧЕСКИЙ ПРОЦЕСС КОРИ В РАЗЛИЧНЫЕ ПЕРИОДЫ ВАКЦИНОПРОФИЛАКТИКИ, ФБУН Московский научно-исследовательский институт эпидемиологии и микробиологии им. Г.Н. Габричевского Роспотребнадзора. 2014. С. 31

<sup>151</sup> Лещинский, Д.В. Смертность от кори в С-Петербурге за 18 лет (1871- 1888):статистические материалы к эпидемиологии С-Петербурга / Д.В. Лещинский. – СПб,1890.-92с., 65л. Табл

<sup>152</sup> Попов, В.Ф. Оценка реактогенности и антигенной активности живой коревой вакцины «Ленинград-16.» в различных регионах / В.Ф. Попов, Т.Н. Юнасова, Л.В. Повалихина // Материалы международной конференции «Идеи Пастера в борьбе с инфекциями». – С-Пб., - 1995. - С. 23

<sup>153</sup> Цвиркун Ольга Валентиновна, ЭПИДЕМИЧЕСКИЙ ПРОЦЕСС КОРИ В РАЗЛИЧНЫЕ ПЕРИОДЫ ВАКЦИНОПРОФИЛАКТИКИ, ФБУН Московский научно-исследовательский институт эпидемиологии и микробиологии им. Г.Н. Габричевского Роспотребнадзора. 2014. С. 31

the estimated annual burden of healthcare costs due to the disease at about 77 million rubles.<sup>154, 155</sup>

The extreme contagiousness, frequent epidemics, and severity of measles marked it as an important target for Soviet epidemiologists, immunologists, and microbiologists.<sup>156</sup> As previously discussed, diseases that disproportionately affected children and were severely debilitating were particularly problematic for the Soviets. This type of disease both reduced societal productivity and undermined the doctrine of social hygiene. Additionally, Stalin's death in 1953 triggered the post-Stalin thaw, whose effects extended into the sciences. Biologists and immunologists were freer to conduct research, and on both a national and global scale, great advancements were being made in vaccination. The effects of this thaw are evident in the collaborative development of the previously discussed polio vaccine.

The combined factors discussed above help explain the rationale for producing a measles vaccine, as well as the circumstances that made the endeavor feasible. From 1959 to 1962, Anatoly Aleksandrovich Smorodintsev and his colleagues developed and perfected a measles vaccine by culturing and testing various strains of the live virus.<sup>157</sup> Perhaps the two most important strains were developed by Smorodintsev's lab at the

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<sup>154</sup> Burgasov, P. N., Andzaparidze, O. G., Popov, V. F., "The Status of Measles after Five Years of Mass Vaccination in the USSR." *Bulleting of the World Health Organization*, vol. 49, no. 1 1973. p. 571

<sup>155</sup> *Ibid.*, pp. 32

<sup>156</sup> Chumakov, M. P., et al. "Investigation and Application of the USSR AMS Live Measles Vaccine From the ESC Strain for Mass Vaccination Against Measles." *Journal of Hygiene, Epidemiology, Microbiology and Immunology* vol. 14, no. 1, 1970. pp.1

<sup>157</sup>Peradze, T. V., Smorodintsev, A. A. "Epidemiology and Specific Prophylaxis of Measles." [https://www-jstor-org.ezproxy.baylor.edu/stable/pdf/4453062.pdf?ab\\_segments=0%252Fbasic\\_SYC-4929%252Ftest&refreqid=excelsior%3Ab09977281ed3a493c573f7207272b675](https://www-jstor-org.ezproxy.baylor.edu/stable/pdf/4453062.pdf?ab_segments=0%252Fbasic_SYC-4929%252Ftest&refreqid=excelsior%3Ab09977281ed3a493c573f7207272b675)

Leningrad Pasteur Institute: Leningrad-4 and Leningrad-16, which would be utilized in mass measles vaccination field trials.<sup>158</sup> The Leningrad-4 (L-4) strain, isolated first, was developed by initial isolation in human kidney tissue culture then by passage through guinea pig kidney tissue culture. The Leningrad-16 (l-16) strain, in contrast, was isolated by 16 direct passages through guinea pig kidney tissue culture.<sup>159, 160</sup> There are other, lesser known strains also which were developed after Smorodintsev's strains, such as the USSR-58 and ESC strains. Zhdanov's group developed the USSR-58 strain in the early 60s.<sup>161</sup> In contrast, Chumakov's group developed the latter strain in the late 60s at the Institute for Poliomyelitis and Encephalitis, boasting that this strain was faster and easier to produce than the Smorodintsev L-4 and L-16 strains.<sup>162</sup>

Trials with the L-4 vaccine combined with gamma globulin began in 1959 under Smorodintsev's supervision.<sup>163</sup> Smorodintsev's group found for administering the L-4+IG vaccine to children drastically reduced measles morbidity; one year after immunization, vaccinated children had a morbidity of only 5.0% compared to 78.0% in

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<sup>158</sup> Ibid. pp. 487.

<sup>159</sup> *Report of Immunology Delegation: Visit to the USSR under US-USSR Exchange Agreement 1962-1963*. Washington, D.C.: U.S. Dept. of Health, Education, and Welfare, Public Health Service, Division of International Health, 1963. pp. 60.

<sup>160</sup> Note: These strains will be abbreviated to L-4+/-IG and L-16+/-IG to indicate the status of gamma globulin injection with the vaccine. E.g. L-4+IG indicates Leningrad-4 plus gamma globulin, while L-16-IG indicates Leningrad-16 without gamma globulin.

<sup>161</sup> Zhdanov, V. M., Dossier, E. M., Fadeeva, L. L. "Production and Control of Measles Vaccine in the U.S.S.R." *American Journal of Diseases of Children*, vol. 103, 1962. pp. 332.

<sup>162</sup> Chumakov, M. P., et al. "Experimental study of a live measles vaccine of the ESC strain, prepared from primary lamb kidney cultures (LKC)." *Archives roumaines de pathologie experimentales et de microbiologie*, vol. 28, no. 2, 1969.

<sup>163</sup> Note: Gamma globulin is administered with the vaccine to provide temporary passive immunity to the virus in order to reduce reactogenicity to the vaccine while minimizing any sacrifice of immunogenicity.

unvaccinated children.<sup>164</sup> Zhadnov's group conducted similar trials with their attenuated USSR-58 strain and found positive antibody titers, indicating immunity, in approximately 80% of children vaccinated with three doses of the strain. About 20% of children experienced pyrogenic reactivity.<sup>165</sup> These were smaller scale, controlled trials that gave both researchers and officials confidence to begin more widespread trials and mass vaccination campaigns. Upscaled trials began as early as 1960, as Smorodintsev conducted a trial in which he administered both L-4+IG and L-16-IG vaccines to 30,000 children with 40-60% displaying mild febrile reaction and 0.2% displaying sporadic convulsions.<sup>166</sup>

This trial expanded into mass vaccination trials from 1962-1964, where L-4+IG vaccine was administered to 1 million children, and L-16-IG was administered to 500,000 children.<sup>167</sup> Children aged 1-8 years were vaccinated in cities such as Leningrad, Sverdlovsk, Odessa, Kiev, Baku, Frunze, and Kishinev.<sup>168</sup> These cities cover a wide geographic range, allowing for easier and wider distribution of the vaccine after production. While febrile reactions were observed in up to 60% of vaccination cases, no cases of encephalitis were reported, and data demonstrated that the vaccine did not cause allergic reactions. Observations over the course of the next five years demonstrated a 10

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<sup>164</sup> Smorodintsev, A. A., et. al. "Experience with Live Rubella Virus Vaccine Combined with Live Vaccines against Measles and Mumps." *Bulletin of the World Health Organization*, vol 42, 1970.

<sup>165</sup> Zhdanov, V. M., Dossier, E. M., Fadeeva, L. L. "Production and Control of Measles Vaccine in the U.S.S.R." *American Journal of Diseases of Children*, vol. 103, 1962. pp. 333-4.

<sup>166</sup> Boychuk, L. M., et. al. "Experience in the U.S.S.R. in the Prevention of Measles by Use of Live Vaccine." *Industrial Medicine and Surgery*, vol. 34, 1965.

<sup>167</sup> *Ibid.*, pp. 45.

<sup>168</sup> Peradze, T. V., Smorodintsev, A. A. "Epidemiology and Specific Prophylaxis of Measles." *Reviews of Infectious Diseases*, vol. 5, no. 3, 1983. pp. 487.

to 20-fold decrease in measles morbidity as over 90% of children aged 1-4 who were vaccinated demonstrated immunity. Additionally, in cities where mass vaccinations took place, data comparing 12,895 vaccinated children to 17,176 unvaccinated children in schools where measles outbreaks occurred demonstrated the vaccines' protective effects. Lastly, data from these mass vaccination trials demonstrated that immunologic protection and memory lasted for at least 3 years in 54.3% of vaccinees, pointing to potential need for revaccination or booster shots.<sup>169</sup>

Other controlled trials were still ongoing during this time with the hopes of developing and determining better or improved vaccines for measles immunization. Though L-4+IG and L-16-IG strains had been used rather effectively during early mass vaccination trails, data indicated that a very high threshold, upwards of 90-95%, of at-risk groups needed to be immunized in order to prevent epidemics.<sup>170, 171</sup> For virologists and epidemiologists, this threshold indicated that developing a measles vaccine with even higher levels of immunogenicity was imperative because it was such a highly contagious disease. Additionally, Smorodintsev's Leningrad strains still demonstrated rates of mild reactogenicity that were still rather high, up to 60% as previously stated.

As a result, Bolotovskij and his colleagues at the Central Institute of Epidemiology compared the effectiveness of only live measles vaccines in 617 children and of a combination of live and killed vaccines in 199 children,. They actually found the Schwarz vaccine to be the most ideal of the strains they tested, as it was immunogenic

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<sup>169</sup> Smorodintsev, A. A., et. al. "Prevention of Measles by Use of Live Vaccines in the U.S.S.R." *Archiv fur die gesamte Virusforschung*, vol. 16, 1965.

<sup>170</sup> Boychuk, L. M., et. al. "Experience in the U.S.S.R. in the Prevention of Measles by Use of Live Vaccine." pp. 49

<sup>171</sup> Peradze, T. V., Smorodintsev, A. A. "Epidemiology and Specific Prophylaxis of Measles." pp. 489.

enough to meet their threshold without being highly reactogenic. Smorodintsev's L-4+IG strain actually fared quite poorly, both when administered alone and in combination with a killed vaccine. While the Leningrad strain caused fewer adverse reactions than other strains, the trade-off was that it provoked poor antibody and immunogenic response. However, noting that this data seemed to conflict with previous studies by the WHO, Bolotvskij's group reasoned that the results were most likely due to poor quality of the particular batch of the Leningrad strain used.<sup>172, 173</sup>

Evidence to support this reasoning surfaced when Smorodintsev's group published data which reaffirmed the effectiveness of the L-16 strain, which decreased measles morbidity 15-fold when 90% or more of children were vaccinated. Smorodintsev also proposed that the L-16 strain was a prime target for a combination vaccine with the mumps vaccine. The mumps vaccine was found to be very safe, with no adverse reactions noted in 100,000 child vaccines from 1955-1959, as well as highly immunogenic, protecting approximately 90% of children vaccinated. However, its drawback was that it could not be co-administered with gamma globulin. This made a combination vaccine of L-16 and attenuated mumps vaccine plausible, as the L-16 strain performed well without gamma globulin, and Smorodintsev predicted that few if any alterations would be necessary for combined vaccine production.<sup>174</sup>

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<sup>172</sup> Bolotovskij, V. M., et. al. "Comparative Studies of Measles Vaccines in a Controlled Trial in the U.S.S.R." *Bulletin of the World Health Organization*, vol. 34, 1966.

<sup>173</sup> World Health Organization. "Measles Vaccines: Report of a WHO Scientific Group." *World Health Organization Technical Report Series*, no. 263, 1963.

<sup>174</sup> Smorodintsev, A. A., et. al. "Prevention of Measles by Use of Live Vaccines in the U.S.S.R." *Archiv fur die gesamte Virusforschung*, vol. 16, 1965.

Despite the poor performance of the Leningrad strains in Bolotivskij's trial, there were other trials as well as mass vaccination campaigns that vouched for the strains' effectiveness. Additionally, the potential for a combined measles-mumps vaccine meant that the L-16 strain, in particular, could be of even greater utility in the future. Lastly, it is feasible to presume that facilities like Leningrad Pasteur Institute were already well-equipped to produce that specific strain and vaccine type.

Thus, when the USSR began its main mass vaccination campaign in all of its republics in the second half of 1967, Leningrad-16 was the vaccine of choice. Children, ranging from ten months to eight years old, were inoculated with the strain, and 7,585 blood samples were taken to establish immunity based on the presence of antibodies in serum. In total, 13.5 million individuals were vaccinated throughout the USSR. Reported cases of measles were also tracked over the next five years, and epidemiologists saw that vaccination drastically decreased the incidence and morbidity of measles. In the decade before the L-16 vaccine was introduced, the average incidence of measles was 827.1 per 100,000 people and rose as high as 1,067.4 per 100,000 in 1957. They had also historically observed peaks in measles incidence every 2-3 years, but after vaccination, this trend was broken as incidence plummeted to 217.7 per 100,000 by 1969.<sup>175</sup> Epidemiologists noted that this figure represented a statistically significant decrease of about 2.9 to 4.3 times fewer cases of measles in children under age 5. Interestingly, incidence rates were higher in rural areas than urban areas, perhaps due to the fact that

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<sup>175</sup> Burgasov, P. N., et. al. "The Status of Measles After Five Years of Mass Vaccination in the U.S.S.R." *Bulletin of the World Health Organization*, vol. 49, 1973. pp. 571-2

better infrastructure was in place in urban areas, allowing for more efficient record-keeping and vaccination.<sup>176</sup>

Five years later in 1972, the mass vaccination campaigns utilizing the L-16 would be declared a success. However, in the period between 1967 and 1972, there were other virologists who continued to optimize and explore other strain types. At the USSR AMS Institute of Poliomyelitis and Viral Encephalitis, Chumakov and his colleagues developed a measles vaccine derived from the ECS strain and tested it in both controlled trials and wide scale mass vaccination. First, they conducted trials in Tashkent and Moscow from 1967 to 1968, where they vaccinated 4086 and 8139 children, respectively. Febrile rates were very low, at only 5.6%, and no CNS complications were noted. During subsequent controlled trials, they vaccinated 10,968 children with the L-16 strain and 33,247 children with the ECS strain and found the ECS strain favorable, as it only induced a pyrogenic reaction in 5.7% of vaccines compared to 40% with the L-16 strain.<sup>177</sup>

Chumakov's group then had to answer the question of how immunogenic the ECS strain was compared to L-16. To do this, they analyzed the serum of 2,931 children who were initially seronegative, meaning that they demonstrated no antibodies for measles. Three weeks after vaccination, 98.1% of these children possessed measles antibody titers that indicated high immunogenicity.<sup>178</sup> The group also found that they were able to reduce measles incidence on a statistically significant level after vaccinating 76-85% of the children, signifying that the ECS vaccine allowed them a greater margin of safety

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<sup>176</sup> *Ibid.*, pp. 573

<sup>177</sup> Chumakov, M. P., et. al. "Investigation and Application of the USSR AMS Live Measles Vaccine from the ESC Strain for Mass Vaccination Against Measles." *Journal of Hygiene, Epidemiology, microbiology and Immunology*, vol. 14, no. 1, 1970. p. 10-11

<sup>178</sup> *Ibid.*, pp. 12

than the L-16 vaccine, which required a 90-95% vaccination rate for herd immunity.<sup>179,</sup>

<sup>180</sup> Due to these findings, Chumakov's group was given permission to distribute over 12.8 million doses of the ECS vaccine prior to 1969 and was instructed to prepare an additional 12 million doses for distribution in 1969.<sup>181</sup>

In 1965, the USSR's goal pertaining to measles elimination was to vaccinate all children aged 1-8 years old by 1969.<sup>182</sup> While substantial progress was made towards meeting this goal, its lofty nature meant that it was ultimately not feasible. By 1970, the goal remained to vaccinate all children aged 1-8 years old, with the additional suggestion of monitoring on a monthly or quarterly basis children at around 1 and children who were previously unvaccinated.<sup>183</sup> These goals were necessary, because even though measles incidence had greatly decreased (from an average 827.1 cases per 100,000 people before 1969 to 217.7 cases per 100,000 from 1969 to 1972), these numbers still amounted to an average of 500,000 cases per year.<sup>184</sup>

Despite efforts to meet these goals, vaccine coverage did not substantially increase, and medical contraindication prevented many children from being vaccinated. Thus, from 1971 to 1986 the average annual incidence of measles remained in fairly

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<sup>179</sup> *Ibid.*, pp. 14

<sup>180</sup> Peradze, T. V., Smorodintsev, A. A. "Epidemiology and Specific Prophylaxis of Measles." *Reviews of Infectious Diseases*, vol. 5, no. 3, 1983. pp. 489

<sup>181</sup> Chumakov, M. P., et. al. "Investigation and Application of the USSR AMS Live Measles Vaccine from the ESC Strain for Mass Vaccination Against Measles." pp. 14

<sup>182</sup> Boychuk, L. M., et. al. "Experience in the U.S.S.R. in the Prevention of Measles by Use of Live Vaccine." *Industrial Medicine and Surgery*, vol. 34, 1965. pp. 49-50

<sup>183</sup> Chumakov, M. P., et. al. "Investigation and Application of the USSR AMS Live Measles Vaccine from the ESC Strain for Mass Vaccination Against Measles." pp. 15

<sup>184</sup> Hoch, Steven L. "The Social Consequences of Soviet Immunization Policies, 1945-1980". The National Council for Eurasian and East European Research, University of Iowa. 1997 pp. 10

constant range, anywhere from 118 to 297 cases per 100,000.<sup>185</sup> As a result, a second dose of measles-containing vaccine was made mandatory in 1986. Additionally, routine surveillance for measles cases was implemented that same year, requiring cases to be reported and allowing for better post-identification control through vaccination of the surrounding community.<sup>186</sup>

In 1990, measles vaccine coverage was only at 74%, much below the threshold of 90% required for full herd immunity and protection. Doctors and epidemiologists proposed that perhaps the lower figure was due in part to both physicians' and parents' aversion to concomitant inoculation, as they wished to avoid administering multiple vaccines at once, and the measles vaccine was one of many in the schedule of shots.<sup>187</sup> Ironically, Smorodintsev had proposed, in as early as 1965, a vaccine that combined both the L-16 measles strain with a mumps strain.<sup>188</sup> In 1970, he tested different combined vaccines on 355 children aged 1-7 in Leningrad; none of the children experienced severely adverse post-vaccination symptoms, and all developed specific antibodies within 30 days of immunization. From this, Smorodintsev determined that the rubella L-6, measles L-16, and mumps L-3 strains could be combined into one vaccine.<sup>189</sup> However, by the time of his publication, millions of children had already been vaccinated against

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<sup>185</sup> Onishchenko, G. "Progress Toward Measles Elimination in the Russian Federation, 2003-2009." *The Journal of Infectious Diseases*, vol. 204, 2011. pp. 371

<sup>186</sup> *Ibid.*, pp. 369

<sup>187</sup> Tulchinsky, T. H., Varavikova, E. A. "Addressing the Epidemiologic Transition in the Former Soviet Union: Strategies for Health System and Public Health Reform in Russia." *American Journal of Public Health*, vol. 86, no. 3, 1996. pp. 316

<sup>188</sup> Smorodintsev, A. A., et. al. "Prevention of Measles by Use of Live Vaccines in the U.S.S.R." pp. 292

<sup>189</sup> Smorodintsev, A. A., et. al. "Experience with Live Rubella Virus Vaccine Combined with Live Vaccines against Measles and Mumps." *Bulletin of the World Health Organization*, vol 42, 1970. pp. 283

measles, and it would be costly to change production procedures in the USSR's institutes, which were already optimized to produce certain strains and dosages of the L-16 vaccine. Perhaps for these reasons, a combined MMR vaccine was never widely used in the USSR, all the way up to the fall of the Soviet Union.<sup>190</sup>

The fall of the Soviet Union brought with it a collapse in the healthcare system. Due to the tumultuous times, many infectious diseases reemerged, unchecked by prophylactic healthcare or an established surveillance system.<sup>191</sup> Once the government stabilized, efforts and resources were once again available to combat the resurgence of measles. Use of combined vaccines, increased measles vaccine coverage in clinics, and improved surveillance for when individual cases occurred allowed the Russian Federation to achieve its goal of protecting 95% of 1-year-olds with their first measles vaccine dose by 2002.<sup>192</sup> Russia made even greater strides towards measles elimination with their National Program for Measles Elimination in Russia, which ran from 2003-2009. One of the campaign's crucial goals—vaccinate those with unknown status and those over 18 who had not previously been immunized against measles—was met in 2008. By 2009, progress was evident and encouraging: incidence was at an all-time low of only 0.77 cases per 100,000 individuals. And of those cases, 82-89% were isolated cases that did not result in outbreaks. The majority of cases were also imported from neighboring countries like Ukraine, meaning that the number of imported measles cases increased

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<sup>190</sup> Tulchinsky, T. H., Varavikova, E. A. "Addressing the Epidemiologic Transition in the Former Soviet Union: Strategies for Health System and Public Health Reform in Russia." *American Journal of Public Health*, vol. 86, no. 3, 1996. pp. 316

<sup>191</sup> *Ibid.*, pp. 315

<sup>192</sup> Onishchenko, G. "Progress Toward Measles Elimination in the Russian Federation, 2003-2009." *The Journal of Infectious Diseases*, vol. 204, 2011. pp. 369

greatly during this time.<sup>193</sup> All in all, when the campaign ended in 2009, it was very successful in accomplishing its goals.

The question then, is if this campaign was so successful in the early 2000's, what explains the recent uptick in measles cases and outbreaks? As previously stated, the incidence of measles in the former USSR has skyrocketed during the past several years, increasing by over 40 times in some states like Ukraine.<sup>194</sup> In 2019 to date, Ukraine has reported 56,986 cases, Russia 3,643, and Kyrgyzstan 2,238.<sup>195</sup>

The resurgence of measles is a result of a unique confluence of factors, the first of which is a decrease in vaccination rates due to the emergence of parental advocacy and anti-vaccination groups. Vaccination rates have been declining in Russia and Eastern Europe; one set of data that demonstrates this is from the Federal Center of Hygiene and Epidemiology, which determined that 48.7% of Russian children born in 2016 failed to follow the medically recommended vaccination schedule, resulting in incomplete vaccination or lack of vaccination altogether.<sup>196</sup>

A contributing factor to this decreased vaccination rate is the emergence and prominence of parental advocacy groups, many of which are cautious of or entirely against vaccination. Some are better classified as movements, such as “the Russian

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<sup>193</sup> *Ibid.*, pp. 366-369

<sup>194</sup> Курьшко, Диана. “Корь в Украине: в 43 Раза Больше Больных и При Чем Тут Цирк.” BBC Україна. BBC, January 10, 2018. <https://www.bbc.com/ukrainian/features-russian-42642426>.

<sup>195</sup> “Measles and Rubella Surveillance Data.” World Health Organization. World Health Organization, December 13, 2019. [https://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/active/measles\\_monthlydata/en/](https://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measles_monthlydata/en/).

<sup>196</sup> Gershkovich, Evan. “Russia Has a Vaccination Problem.” The Moscow Times. The Moscow Times, December 30, 2019. <https://www.themoscowtimes.com/2018/09/28/russia-has-a-vaccine-problem-a63017>.

Parents' Movement" (Родительское Движение, Roditel'skoe Dvizhenie), which is an umbrella term used to group more than 80 grassroots movements. These groups have developed over the course of years, with early development occurring in the late 90s and solidifying in the mid-2000s and focus on a variety of issues, not just vaccination.<sup>197, 198</sup> Others, like the Czech group Rozalio, founded in 2007, are entirely devoted to the cause of vaccination.<sup>199, 200</sup>

The common thread between these groups is that they serve as an avenue to articulate and define parenthood, a process which often intersects with the question of a child's health and vaccination. These groups also provide a space for women to feel in control of their status as mothers and their children's health. Often, rhetoric espoused by these groups and women create a clear dichotomy between irresponsible and responsible parents in the context of how mothers take care of their children. In the eyes of these groups, the former group is comprised of mothers who blindly vaccinate and are characterized as blindly obedient and uninformed. In contrast, responsible parents, typically those who are a part of parental advocacy groups, are viewed as wanting the best for their children because they do their own research and are informed.<sup>201</sup> When

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<sup>197</sup> НП Родительский Комитет, "Об Истории Родительского Движения России." Accessed December 30, 2019. <http://www.r-komitet.ru/parents/razdel/history>.

<sup>198</sup> Fábíán Katalin, and Korolczuk Elżbieta. *Rebellious Parents: Parental Movements in Central-Eastern Europe and Russia*. Bloomington: Indiana University Press, 2017. pp. 31

<sup>199</sup> "Shrnutí Článků o Očkování 23. Prosince - 29. Prosince 2019." Rozalio, o.s. Accessed December 30, 2019. <http://www.rozalio.cz/>.

<sup>200</sup> NOTE: While Czechoslovakia is not a post-Soviet nation, it was heavily influenced by Soviet authority and culture. As a result, Czechs and Slovaks are still responding to the impacts of authoritarian, communist regimes.

<sup>201</sup> Fábíán Katalin, and Korolczuk Elżbieta. *Rebellious Parents: Parental Movements in Central-Eastern Europe and Russia*. Bloomington: Indiana University Press, 2017. pp. 241

extended to the concept of vaccination, irresponsible parents blindly accept vaccines from a group of ‘elite or erudite experts’ linked to the state, while responsible parents resist mindless passivity by actively doing their own research, coming to unbiased conclusions, and making independent decisions. This can be seen in statements of women who choose not to vaccinate:

“I think it’s mainly because people just don’t want to treat themselves. All the care for their health they leave to the doctors, whom they trust and trust blindly” commented Alena, one woman interviewed by Dr. Jaroslava Hasmanová Marhanková.<sup>202</sup>

While this reasoning may seem incredibly backwards or alien, upon further inspection it becomes clear how this dichotomy of responsible vs. irresponsible parenting developed. For many Central and Eastern Europeans, such definitions of parenthood and motherhood are inseparably tied to concepts like personal autonomy and identity. When considering the contexts of parenthood, autonomy, and the state, it is evident that vaccination has typically fallen under a governmental sphere and can readily be seen as an extension of the state’s power and control over everyday life. As Dr. Olena Streylnik notes, in the Soviet Union, state authorities were intended to be the primary, active source of education and moral upbringing for children, which relegated parents to a more

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<sup>202</sup> Jaroslava Hasmanová Marhánková, Fábíán Katalin, and Korolczuk Elżbieta. *Rebellious Parents: Parental Movements in Central-Eastern Europe and Russia*. Bloomington: Indiana University Press, 2017. pp. 241

passive role.<sup>203</sup> Vaccination is a fantastic example of this, as the state mandated many different vaccinations such as smallpox, polio, and measles without any room for refusal, citing the health of children as the rationale behind such policies.

Of course, in this new era, these historical events are looked upon with suspicion, resentment, and mistrust. When interviewed by Dr. Hasmanová Marhánková, women made these very telling statements:

“A lot of people say, “I wouldn’t take the responsibility,” like for some of the issues of vaccination, birth, not to give their children antibiotics and so on... So I think that this is maybe the main problem, this excessive belief that someone will fix it for us.” -*Barbora*<sup>204</sup>

“If, God forbid there really is some kind of screw-up and it was because the child wasn’t vaccinated, then I am prepared to take all the consequences. But the state isn’t prepared. The state tells us what we have to do but doesn’t say what the state has to do. For me that is totally unacceptable.” -*Irena*<sup>205</sup>

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<sup>203</sup> Olena Stryelnik, Fábíán Katalin, and Korolczuk Elżbieta. *Rebellious Parents: Parental Movements in Central-Eastern Europe and Russia*. Bloomington: Indiana University Press, 2017. pp. 62

<sup>204</sup> Jaroslava Hasmanová Marhánková, Fábíán Katalin, and Korolczuk Elżbieta. *Rebellious Parents: Parental Movements in Central-Eastern Europe and Russia*. Bloomington: Indiana University Press, 2017. pp. 233

<sup>205</sup> *Ibid.*, pp. 234

“Here we lived for a time in a system that controlled everything. Maybe it’s a remnant of communism. Fear of those above you, fear to consult something with them, blind obedience to orders, and mainly fitting into those forms so you could get by, and fear of showing any kind of individuality” -*Darina*<sup>206</sup>

These interview statements demonstrate that for these women and many others like them, the state is not an entity to be trusted, but rather, to be resisted. As mothers, they should have the ultimate responsibility and decision over their children’s health, and believing or trusting in the state’s ability to make those decisions is naive and foolish. These women characterize themselves as willing to take responsibility for their actions in a way the state is not and doubt any collectivist benefits of vaccination. In this way, refusing vaccination becomes a form of individualistic self-expression and a means of resisting authority in the post-Soviet context.

To make matters worse, stigmatization by healthcare workers or government officials as ‘troublemakers’ only further reinforces these patients’ beliefs.<sup>207</sup> Further polarization between the anti-vaccination and pro-vaccination camps occurs, and many women share their negative stories or experiences online. In this way, information and

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<sup>206</sup> *Ibid.*, pp. 242

<sup>207</sup> Hrešanová, Ema, and Jaroslava Hasmanová Marhánková. 2008. “New Trends in the Czech Birthing System and Emerging Social Inequalities among Birthing Women.” *Sociologický časopis / Czech Sociological Review*, vol. 44, no. 1, pp. 83–112.

misinformation spread and more seeds of distrust are sown while vaccination rates continue to decline, posing a danger to the collective health of Eastern Europe.

In addition to these anti-vaccination and parental advocacy groups, failures or collapses in the healthcare system have greatly contributed to the rise of measles, particularly in countries like Ukraine. First, while the Ukrainian healthcare system appears phenomenal on paper—free, universal healthcare as well as 4.4 doctors and 7.8 hospital beds per 1,000 people—it is, in reality, anything but. Doctors are underpaid and corruption runs rampant, and as a result patients end up paying for practically every step of medical care, from soap to medications to time with the doctor.<sup>208</sup> This reality leads many people to eschew the medical system until it is far too late, and general confidence in the medical system or medical professionals has all but eroded.

Additionally, there is mistrust of the government and health ministry. The previous Ukrainian Minister of Healthcare, Ulana Suprun, was hated and seen as an extension of Western interference. She was never voted in by parliament, is from the U.S., and has instituted unpopular health care reforms; various politicians called for Suprun to be removed, and she polled as one of the most hated politicians in the country.<sup>209</sup> This illustrates the growing mistrust towards the government and animosity towards the West, which are shaping up to be problematic in the fight against measles, as people become less compliant and more distrustful of global and statewide campaigns for vaccination.

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<sup>208</sup> Mendel, Iuliia. “In Ukraine, Health Care Is Free (except When It's Not).” POLITICO. POLITICO, April 15, 2017. <https://www.politico.eu/article/ukraines-ailing-health-care-system-underfunded-corrupt-inaccessible/>.

<sup>209</sup> Hyde, Lily. “Measles Resurgence Haunts Ukraine Campaign.” POLITICO. POLITICO, March 31, 2019. <https://www.politico.eu/article/measles-resurgence-haunts-ukraine-campaign/>.

Lastly, the amount of political unrest in Eastern Ukraine may contribute to the measles outbreak. After 2014, when Crimea was annexed, the Russian government failed to order measles vaccines until late in 2015. As a result, in 2016, vaccination rates for the region fell to a meagre 42% of infants and 31% of 6-year old children vaccinated on schedule.<sup>210</sup> Additionally, conflict in Donbas lead to instability, and lack of power or refrigeration can seriously undermine the effectiveness of the measles vaccine, which needs to stay in a temperature range of -58°F to +46°F (-50°C to +8°C) to remain effective.<sup>211</sup>

Ultimately, these failures in the healthcare system lead to a mistrust of health officials and an erosion of confidence in the healthcare system. Many parents play by the rules of the corruption that is integrated into the system by bribing doctors or nurses to provide them with forged vaccination certificates.<sup>212</sup> Much of this mistrust also manifests online, as advocacy posts are inundated with negative comments claiming that the person has been bribed to post in support of measles, or that measles vaccination is entirely ineffective and a ruse by ‘Big Pharma’.<sup>213</sup> As a result, vaccination rates are lower than needed as suspicion remains; 9.6% of Ukrainian parents hold negative attitudes towards

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<sup>210</sup> Wadman, Meredith. “Measles Cases Have Tripled in Europe, Fueled by Ukrainian Outbreak.” *Science*, February 12, 2019. <https://www.sciencemag.org/news/2019/02/measles-cases-have-tripled-europe-fueled-ukrainian-outbreak>.

<sup>211</sup> “Storage and Handling for the M-M-R®II Vaccine.” MerckVaccines.com. Accessed January 2, 2020. <https://www.merckvaccines.com/products/mmr/vaccine-storage-handling>.

<sup>212</sup> Добрынина, Светлана “В Екатеринбурге Родители Школьника Подделали Сертификат Прививок.” *Российская газета*. Российская газета, November 26, 2017. <https://rg.ru/2017/11/26/reg-urfo/v-ekaterinburge-roditeli-shkolnika-poddelali-sertifikat-privivok.html>.

<sup>213</sup> Kelland, Kate. “Measles and Mistrust in Ukraine Weaken World's Defenses.” *Reuters*. Thomson Reuters, November 4, 2019. <https://www.reuters.com/article/us-health-measles-ukraine-insight/measles-and-mistrust-in-ukraine-weaken-worlds-defences-idUSKBN1XE15T>.

vaccination, and Ukraine consistently holds a place in the top 10 countries with the most unvaccinated children.<sup>214</sup>

In terms of what can be done to combat these measles outbreaks, there are a few points that can quickly be addressed. The first is that the healthcare systems of countries like Ukraine must be re-evaluated and undergo drastic change. How exactly this would happen is beyond the scope of this paper, but there are other analysts and scholars who have written extensively on the topic.<sup>215</sup> Additionally, approaching the discussion of measles vaccination from a different angle is important when speaking with vaccine hesitant parents. For many, appealing to a collective good or herd immunity could actually turn them further away from vaccines, as it may chafe them as a particularly controlling, authoritative tactic. Openness, candor, and genuineness are clearly needed in this discussion, as distrust and suspicion run deep among the anti-vaccination or vaccine hesitant community. Ultimately, there are a myriad of social, historical, and political factors to consider when combatting this disease, and by understanding these factors we can then address them and successfully eliminate the measles threat.

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<sup>214</sup> Baklitskaya, Kate. “The Story of Measles-Hit Ukraine and Its Fake Vaccination Certificates.” euronews, April 13, 2019. <https://www.euronews.com/2019/04/12/the-story-of-measles-hit-ukraine-and-its-fake-vaccination-certificates>.

<sup>215</sup> NOTE: Reference: Romaniuk, Piotr, and Tetyana Semigina. “Ukrainian Health Care System and Its Chances for Successful Transition from Soviet Legacies.” *Globalization and Health* 14, no. 1 (2018). <https://doi.org/10.1186/s12992-018-0439-5>.

## CHAPTER 4

### The Influence of Natural Medicine

There are a number of groups for Russian mothers, hosted by sites such as Facebook and VKontakte, the Russian equivalent of Facebook. On any one of these groups, one can encounter posts decrying vaccines, with a slew of pugnacious comments sure to follow. Many who are a skeptic or hesitant point to the ‘negative effects’ of vaccines or the superiority of natural medicine.<sup>216</sup> In particular, attachment to and trust in natural or folk medicine is an aspect of Russian culture that, by its intersection with the medical field, impacts cultural views on vaccines.

As a result, within this chapter, I would like to explore Russian attitudes towards natural medicine. Firstly, what is the history of natural medicine in Russia, and in particular, what role did it play in the Soviet Union? Additionally, what roles do natural medicine and its relatives, such as homeopathy, play in the average Russian’s day-to-day life? How do they affect Russian attitudes towards vaccines? Is there pushback against natural medicine from healthcare officials or the government, and if so, how has the public reacted? These are some of the questions I wish to address within this chapter.

To start, Russian folk beliefs, especially those concerning medicine, can be traced back for centuries. Herbal medicine and remedies, in particular, have a rich, strong history in Russia. For example, the first pharmacy in Russia was opened in 1005 by a Greek monk. Russia also benefited from its geographical location, which allowed for the

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<sup>216</sup> See Appendix C.

exposure to and syncretism of herbal and folk traditions from regions like the Mediterranean, Europe, the Middle East, and China.<sup>217</sup> In pre-revolutionary Russia, folk medicine was often a necessity as the only person accessible in case of an emergency was a medicine man/witch doctor (знахарь).

Even after the revolution, folk medicine persisted, and in many cases, existed symbiotically with the Soviet government. The wide geographical spread of the Soviet Union also provided both researchers and common folk with access to a wide variety of flora, and as a result, various studies in the Soviet Union also approved research into traditionally used herbs and plants.<sup>218</sup> Pharmacies would often stock herbs and other natural remedies, such as mustard plaster casts or *mumiyo* on the shelves. Official medical magazines often published articles about home remedies for ailments that were particularly successful. For example, *The Medical Worker* medical magazine published the herbal concoction that cured a terminal uterine cancer patient who had previously been declared incurable.<sup>219</sup> Ultimately, herbal and folk traditions are woven into the cultural, political, and scientific history of Russia and the Soviet Union. As a result, the use of natural or folk medicine (*народная медицина*) is often a prominent aspect in Russian cultural memory.

These beliefs and practices concerning natural medicine survived the Bolshevik Revolution and persisted during Soviet times. Russian remedies were commonly known, espoused, and used by both the common citizen and the healthcare professional. For

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<sup>217</sup> Shikov, Alexander N., Olga N. Pozharitskaya, Valery G. Makarov, Hildebert Wagner, Rob Verpoorte, and Michael Heinrich. "Medicinal Plants of the Russian Pharmacopoeia; Their History and Applications." *Journal of Ethnopharmacology* 154, no. 3 (2014): 481–536. <https://doi.org/10.1016/j.jep.2014.04.007>.

<sup>218</sup> *Ibid.*, pp. 483

<sup>219</sup> Kourennoff, Paul Mark, and George Saint George. *Russian Folk Medicine*. London: Allen, 1970. pp. 6

example, many Russians during this time utilized cupping, known as *banki*, a process in which glass cups or jars are sealed onto the patient's back. This is done by swabbing alcohol-soaked cotton around the jar then igniting the cotton, which causes a vacuum to be formed so that the *banki* seals to the skin. When the jar is removed or popped off the skin, it leaves a welt behind that is purported to 'draw out' the illness. However, many viewed the application of *banki* as a delicate, potentially dangerous art, and as a result, those seeking treatment would often only go to someone who had experience in administering *banki*, which in Soviet Russia were healthcare professionals like nurses.<sup>220</sup>

The Soviet Union certainly fought against beliefs in traditional, folk, and natural medicine, particularly where it posed a threat to not only public health, but governmental control as well.<sup>221</sup> For example, the Soviet Union ran various campaigns in Central Asian republics like Kazakhstan decrying traditional and folk healers. In particular, authorities and health officials appealed to women in trying to undermine the authority of shamans and mullahs, citing examples of how practices in folk medicine negatively impacted pregnancy and childbirth. Similar campaigns against lay midwives were held in rural Russia.<sup>222</sup> With their attempts to erode cultural confidence in traditional and folk healers, the government hoped to supplant this trusted source of authority with their own influence in these communities. They were unsuccessful in achieving this goal, however,

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<sup>220</sup> Condee, Nancy. "Folk Medicine in Moscow: Russian Remedies." *The Wilson Quarterly* 12, no. 3 (1988): pp. 167-171

<sup>221</sup> See Appendix D.

<sup>222</sup> Michaels, Paula A. "Medical Propaganda and Cultural Revolution in Soviet Kazakhstan, 1928-41." *Russian Review*, 59 no. 2 (2000): pp. 168-170

as traditional healers persisted into the 40s and Kazakh women (regardless of ethnicity) were 23 times less likely to seek healthcare than their European counterparts.<sup>223</sup>

A key factor in the government's failure to quash natural medicine in central Asia and throughout the Soviet Union was the poor state of the healthcare system. Hospitals were often overcrowded, medications difficult to obtain, and quality of care covered an unpredictable range. While medical care was supposed to be free, under-the-table fees and bribes were common if not necessary to acquire significant care. In contrast, one might be able to find any manner of curative herb, root, or plant at an ordinary street-corner *apteka*.<sup>224</sup> When it came to daily, less-pressing ailments such as a cold, cough, or joint pain, the local pharmacy with its natural medical treatments was much more accessible, familiar, and reliable than the clinic or hospital.

The Soviet government unquestionably, by all intents and purposes, lost its battle against folk medicine by the 1980s. Policies like Gorbachev's 1985 *glasnost* (гласность), meant to allow for transparent bureaucracy and exchange of ideas, also dealt a blow to the credibility of the government. As writer and reported David Wedgwood Benn wrote in 1989, *glasnost* changed the political and social atmosphere of the Soviet Union, as people's "criticism [could] be levelled against many aspects of the system in general and not just at local shortcomings."<sup>225</sup> Health authorities, vaccination, the science behind it, so long associated with the authoritarian power of the government, were also called into

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<sup>223</sup> *Ibid.*, pp. 174

<sup>224</sup> Klose, Eliza K. "FOLK LIFE: Soviet Remedies." *The Washington Post*. WP Company, September 3, 1980. <https://www.washingtonpost.com/archive/lifestyle/1980/09/03/folk-life-soviet-remedies/59d0e7acc029-451b-ba41-8b91c37b3088/>.

<sup>225</sup> Benn, David Wedgwood. "Glasnost, Dialogue and East-West Relations." *International Affairs* 65, no. 2 (1989): 289–303. <https://doi.org/10.2307/2622073>.

question. One example of this publicly growing mistrust is a 1988 article published in *Pravda* (Правда), a premier Soviet newspaper read by millions, that claimed Russian-made diphtheria vaccines contained poison and openly questioned the safety and validity of vaccines.<sup>226</sup>

With the collapse of the Soviet Union and development of the modern Eastern European healthcare system, the issue of healthcare access has been exacerbated even further and the situation has worsened. In countries like Ukraine, healthcare is hailed as universal, but in reality, without the money for bribes, medications, and basic necessities, healthcare is nearly impossible to come by. Hospitals are understaffed and underfunded due to rampant corruption and governmental instability.<sup>227</sup> Doctors themselves are mistrusted, as many pocket bribe money and use it for themselves, while other doctors themselves do not believe in vaccination<sup>228</sup>. The inaccessibility and corruption of healthcare reflects poorly on vaccination and medicine in general. Thus, modern medicine is often categorized as unreliable, untrustworthy, and unaffordable in contrast to the ubiquity, affordability, and perceived reliability of natural medicine. When the system as a whole cannot be trusted, specific parts of the system (in this case, vaccination) are no longer trusted, and individuals are inclined to turn to other methods that are cheaper, more accessible, more familiar, and, in their minds, more reliable.

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<sup>226</sup> Kohn, George C. *Encyclopedia of Plague and Pestilence: from Ancient Times to the Present*. New York: Facts On File, 2008. pp. 330

<sup>227</sup> Prentice, Alessandra. "Ukraine Health System in Danger of Collapse as Reforms Stall." Reuters. Thomson Reuters, December 23, 2015. <https://www.reuters.com/article/us-ukraine-crisis-health/ukraine-health-system-in-danger-of-collapse-as-reforms-stall-idUSKBN0U60LN20151223?il=0>.

<sup>228</sup> Никитина, Елена. "Почему Россияне Не Прививают Детей. Как Живут Антипрививочники и Из-За Чего Они Не Любят Вакцины." MediaLeaks, February 22, 2019. <https://medialeaks.ru/2202anl-antiprivivochniki/>.

This trend can be seen in the rise of natural medicine and homeopathy in Russia. In particular, the rise of homeopathy provides an interesting case, as its proponents tend to hold strong anti-vaccination stances. Homeopathy itself is a pseudoscientific medical system developed in Germany over 200 years ago that operates on two basic principles: that ‘like cures like’ and ‘law of minimum dose’. The former asserts that diseases are cured by substances that cause the disease’s symptoms in healthy individuals, while the latter asserts that the lower the dose of medicine, the more effective it is.<sup>229</sup> In Russia, the effects of homeopathy can be seen in various areas. The Ministry of Health and Medical Industry has passed legislation legalizing homeopathic doctors, detailing the capacity in which they could practice and dispense medicine.<sup>230,231</sup> In 2016, the market for homeopathic medicine was worth 7.32 rubles (\$123 million) as Russian Pharmacies sold over 21 million packs of homeopathic medicines and remedies.<sup>232</sup>

The danger with the influence of homeopathy is that the pseudoscience claims that vaccination is dangerous because it causes the very diseases it purports to cure (the rule of ‘like cures like’ may perhaps play a role). Various websites and pages on sites like VKontakte are dedicated to homeopathy, and the discussions which appear often decry

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<sup>229</sup> “Homeopathy.” National Center for Complementary and Integrative Health. U.S. Department of Health and Human Services, July 10, 2019. <https://nccih.nih.gov/health/homeopathy>.

<sup>230</sup> “Другие материалы\_Нормативная документация\_Медицинское и Фармацевтическое Товароведение.” Скорая Помощь Фарм-Студенту - Другие материалы\_Нормативная документация\_Медицинское и фармацевтическое товароведение. Accessed February 18, 2020. <https://www.farmstudentu.ru/29-uchebnye-materialy/drugie-materialy/284-drugie-materialy-normativnaya-dokumentatsiya-meditsinskoe-i-farmatsevticheskoe-tovarovedenie#gallery62d17c1ea2-1>.

<sup>231</sup> Litvinova, Daria. “Russian Scientists Rally Against Rise of Homeopathic ‘Pseudo-Medicine’.” The Moscow Times. The Moscow Times, February 18, 2020. <https://www.themoscowtimes.com/2017/02/09/the-magic-potion-scientists-condemn-homeopathy-but-russians-are-not-convinced-a57088>.

<sup>232</sup> Ibid.

vaccines. For example, one site comments on how only homeopathic doctors truly understand and catch the consequences of vaccination, which include autism, cerebral palsy, leukemia, and multiple sclerosis.<sup>233</sup> Alexander Kotok, a prominent homeopath who has self-published articles and books on the subject, claims on various sites to have graduated from the I.M. Sechenov First Moscow Institute of Medicine, though no records of his degree exist.<sup>234</sup> He advertises to parents that, instead of being vaccinated, a child should be purposefully exposed to a disease, so that the child's immunity will be boosted and the child will be protected from disease.<sup>235</sup>

Due to the anti-vaccination stance and pseudoscientific nature of homeopathy, there has been pushback against the discipline. In 2017, Russia's Academy of Sciences petitioned the Russian Ministry of Health to abandon or outlaw homeopathic medicine in Russian state health clinics<sup>236</sup>. However, it is an uphill battle to change governmental and public opinion on homeopathy. In a survey of 1,200 individuals conducted by VTsIOM, 23% had said they used homeopathy before, with 2/3 of that number claiming the

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<sup>233</sup> "Гомеопатия и Негативные Последствия После Вакцинации - Клиника Им. Ганемана." Клиника классической гомеопатии им. С. Ганемана. Accessed February 18, 2020. <https://homeopat-classic.ru/gomeopatiya-i-privivki>.

<sup>234</sup> Kotok, Alexander. "Homeopathy and the Russian orthodox clergy: Russian homeopathy in search of allies in the second part of the 19th and beginning of the 20th centuries". *Medizin, Gesellschaft, und Geschichte*, vol. 16, 1997  
[https://www.researchgate.net/publication/11727030\\_Homeopathy\\_and\\_the\\_Russian\\_orthodox\\_clergy\\_Russian\\_homeopathy\\_in\\_search\\_of\\_allies\\_in\\_the\\_second\\_part\\_of\\_the\\_19th\\_and\\_beginning\\_of\\_the\\_20th\\_centuries](https://www.researchgate.net/publication/11727030_Homeopathy_and_the_Russian_orthodox_clergy_Russian_homeopathy_in_search_of_allies_in_the_second_part_of_the_19th_and_beginning_of_the_20th_centuries)

<sup>235</sup> "Гомеопат Александр Коток Призывает Не Делать Прививки и Бить Врачей." Блогер lameta на сайте SPLETNIK.RU 5 февраля 2019 | СПЛЕТНИК, April 24, 2019.  
[http://www.spletnik.ru/blogs/govoryat\\_chno/165944\\_gomeopat-aleksandr-kotok-prizyvaet-ne-delat-privivki-i-bit-vrachev](http://www.spletnik.ru/blogs/govoryat_chno/165944_gomeopat-aleksandr-kotok-prizyvaet-ne-delat-privivki-i-bit-vrachev).

<sup>236</sup> Назарова, Алина. "ВЦИОМ Узнал Мнение Россиян о Запрете Гомеопатии." /, February 14, 2017.  
<https://vz.ru/news/2017/2/14/857912.html>.

treatment to be effective. From that survey, it was also an even split (46%-46%) of those who opposed versus those who supported the ban.<sup>237</sup>

Similarly, natural medicine is so entrenched in Russian culture and everyday life that it will be difficult to shift trust from natural medicine to scientific, clinical medicine. Certain statistics demonstrate how ingrained natural medicine is in everyday Russian life. At Moscow's Gertsen Cancer Institute, doctors who informally surveyed patients as recently as 2006 discovered that 9 out of 10 had turned to folk remedies to help treat their cancer.<sup>238</sup> There are surveys show that 14% of Russians use Phyto-preparations (herbal treatments) regularly, and 44% use it from time to time.<sup>239</sup> As previously stated, the market for homeopathic and natural medicines is a business valued up to 7.32 million rubles. This mentality is summarized well by this Russian author:

“I just think that if a herbal remedy has 1,000 years of traditional use behind it, is definitely not harmful or puts anyone's health at any risk, and may be beneficial, then maybe we should be more open to using it.”<sup>240</sup>

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<sup>237</sup> The Moscow Times. “Russians Split on Proposed Homeopathy Ban.” The Moscow Times. The Moscow Times, February 18, 2020. <https://www.themoscowtimes.com/2017/02/14/russians-split-on-homeopathy-ban-proposals-a57138>.

<sup>238</sup> Rodriguez, Alex. “No Offense, Doctor, but You're Alternative Medicine in Russia.” *chicagotribune.com*, August 23, 2018. <https://www.chicagotribune.com/news/ct-xpm-2006-04-13-0604130134-story.html>.

<sup>239</sup> A.N. Shikov, O.N. Pozharitskaya, I.Yu. Kamenev, V.G. Makarov, “Arznei und Gewurzpflanzen in Russland.” *Zeitschrift fur Arznei & Gewurzpflanzen*, 16 (2011), pp. 135-137

<sup>240</sup> Mitelman, Inna. “The Traditional Russian Medicines of My Youth: Herbal Teachings from Grandma.” *Food*, May 27, 2019. <https://www.sbs.com.au/food/article/2019/05/27/traditional-russian-medicines-my-youth-herbal-teachings-grandma>.

The trust that Russians place in natural medicine is antithetical to their mistrust of clinical medicine and doctors. For example, when Svetlana Musatova was diagnosed with breast cancer at age 38, she sought out folk remedies rather than chemotherapy, explaining that “[she] deeply mistrusted doctors--after the age of 16, [she] never went to them.”<sup>241</sup> In a study on the prevalence of folk medicine in Eastern Europe, it was found that mistrust of doctors made it more likely for an individual to seek out a folk medicine when displaying fewer symptoms.<sup>242</sup> Yet the mistrust extends past doctors and to the government itself. As Dr. Artemy Okhotin, who is himself a doctor against vaccination, points out how, just as the Soviet Union quashed the right of believers to have a different point of view, so now does the government and many medical workers quash the right of anti-vaxxers to be wrong or hold a different point of view.<sup>243</sup> In many cases, it is a mistrust of authority, government, and medicine that turn individuals against vaccination.

Thus, one can see that traditional and alternative medicines like homeopathy serve as a familiar, comforting, and accessible alternative to modern, scientific medicine. Unfortunately, vaccines are considered to be a part of modern medicine advocated for and historically required by the government and medical workers. Due to this, mistrust in vaccines is high as it is seen as antithetical to traditional and alternative medicine. In order to try and combat this phenomena, the Russian Ministry of Health finalized a bill which banned public calls against vaccination in 2018, while scientific organizations

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<sup>241</sup> Rodriguez, Alex. “No Offense, Doctor, but You're Alternative Medicine in Russia.”

<sup>242</sup> Stickley, Andrew, et. al. “Prevalence and factors associated with the use of alternative (folk) medicine practitioners in 8 countries of the former Soviet Union.” *BMC Complementary and Alternative Medicine*, vol. 13 (2013): pp. 7

<sup>243</sup> Никитина, Елена. “Почему Россияне Не Прививают Детей. Как Живут Антипрививочники и Из-За Чего Они Не Любят Вакцины.”

have petitioned for homeopathy to be banned from clinical practices.<sup>244</sup> However, neither of these measures address the root, underlying cause of why many Russians embrace traditional medicine and reject facets of modern medicine like vaccines; in fact, the first method may exacerbate the issue by denying Russians the freedom to speak what they believe. In order to address this issue, traditional, folk, and alternative medicine cannot be seen as the enemy. Instead, ways of building and re-establishing trust in modern medicine, perhaps alongside more traditional practices, must be found.

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<sup>244</sup> “Минздрав Дорабатывает Законопроект о Запрете На Публичные Призывы Против Вакцинации.” ТАСС. Accessed February 18, 2020. <https://tass.ru/obschestvo/5766153>.

## CONCLUSION

### A Comprehensive View of Soviet Vaccination

Through this work, we have surveyed a general overview of the history of vaccination as it pertains to the Soviet Union and, to a lesser extent, Eastern Europe, beginning with the pre-revolutionary period up to modern times. This survey's purpose was to better understand the underlying historical, cultural, and social currents that are shaping attitudes towards vaccines in modern Eastern Europe.

From the three vaccination campaigns studied, common threads emerge which, when unraveled, reveal the pattern of the fabric beneath. It becomes evident how, for both tsarist and Soviet governments, protecting the health of the populace played a key role in the establishment of authority, trust, and loyalty from citizens and in the prevention of riotous sentiment. The most feasible, efficient, and cheapest method of protecting citizens' health was through prophylactic health measures that targeted the spread of infectious diseases—in this case, smallpox, polio, and measles.

Propaganda that surrounded these three vaccination campaigns characterized the Soviet Union as a protective, benevolent entity that knew what was best for its citizens. Policy makers and propagandists often contrasted this image of the Soviet government with the tsars and pre-revolutionary government, as well as Western governments. They presented successful Soviet vaccination campaigns as evidence for the superiority of the communist way of life and Soviet efficiency.

Within the Soviet Union, the central government often encouraged immunologists to use republics other than Russia as initial testing grounds for mass

vaccination trials, as can particularly be seen with measles. Additionally, the Soviet Union played a crucial role in the global elimination of both smallpox and polio. Soviet officials and scientists utilized these global vaccination campaigns to spread their political influence, tailor their international image, and exactingly acquire scientific knowledge. For the most part, they were quite successful in achieving these goals.

These vaccination campaigns also expanded to global vaccination cooperation, particularly extensive collaboration between the USSR and the USA during the late 50s and early 60s. Without the extensive cooperation between individuals such as Drs. Sabin and Chumakov, polio eradication in the USSR and globally would not have been achieved as readily as it was, if at all. Both factions stood to gain much during this period, and the propaganda, speeches, and research publications during this time reflect the fascinating mutualistic dynamic that existed between the USA and the USSR.

Ultimately, Soviet vaccination efforts, both within the USSR and abroad, were largely successful. However, these Soviet successes were often achieved through authoritarian means; there was little room for questioning or resistance to vaccination, especially during initial mass vaccination trials. These methods, while effective during Soviet times, are now proving problematic in modern Eastern Europe. The anti-vaccination movement, first voiced during the era of glasnost, has grown out of the desire to resist and counter long-held Soviet ideologies and the authoritarian policies that arose from such ideologies. This resistance to not only vaccination, but the Soviet ideologies behind vaccination, is also a commonly held sentiment, as evidenced by its popularity and spread. Many mothers are hesitant to vaccinate due to the association of state power, scientific research, and vaccination. Those who are vaccine hesitant view vaccination as

an extension of their personal liberty to choose, free of state influence, and doubt the purported good intentions of physicians and the government.

Additionally, the collapse of many healthcare structures in Eastern Europe after the fall of the USSR has created further challenges to vaccination and herd immunity in the region. Shortages of doctors, continued military conflict, and lack of supplies contribute to events like measles outbreaks in eastern Ukraine. Corruption within the healthcare system, another remnant of Soviet times, also poses a challenge. For some citizens, this corruption allows for forgeries of vaccination records that can often be bought for a price, while for others, it means eroded trust in medical professionals and the healthcare system.

Ultimately, this picture of the history and current state of vaccination in the Soviet Union and Eastern Europe has proved to be incredibly complex and dynamic. Many unique and captivating stories exist that enable us to better understand how the current situation and attitudes came to be.

Further questions and directions remain to be explored. First, as previously mentioned, republics other than Russia, such as Kyrgyzstan, Ukraine, and the Baltic states, were often used as initial testing grounds for mass vaccination trials. This history reflects a hierarchy present within the Soviet Union and may even reflect historical ethnic and national prejudices. It would be interesting to explore how this dynamic may have affected vaccine trials, as well as modern attitudes towards vaccination in the Central Asian republics, Baltic States, or Ukraine.

Another briefly discussed thread that often emerged during research for this project was mistrust of organizations like ‘Big Pharma’ and the CDC. One might

investigate whether this mistrust is specifically a mistrust in Western authority, and if so, whether that mistrust has roots in propaganda from Soviet times.

Amidst current global events, it is particularly evident that cooperation from the general public is necessary to containing and addressing outbreaks and deadly diseases. Trust in the government, health agencies, and the public health system is a vital cornerstone to securing this cooperation. In countries like Russia or Ukraine where this trust is low, this could spell trouble in the form of misinformed or willfully noncompliant populations. In a worse-case scenario, the average citizen's trust in healthcare workers and government officials may worsen with regard to vaccination and medicine as the government attempts to exert further control over everyday life, as misinformation circulates, as conspiracy theories emerge, and as fear and uncertainty reign. Thus, now more than ever, it is critical to elucidate the origins of these sentiments and attitudes and to explore how to mend the distrust and suspicion of scientific authority and vaccination.

## APPENDICES

Appendix A:

Documents Pertaining to Russian and Global Smallpox Vaccination

Council of People's Commissars of the Russian Soviet Federative Socialist Republic

Decree

April 10, 1919

On Compulsory Smallpox Vaccination

In order to more successfully combat the smallpox epidemic and to improve the current state of smallpox vaccination, the Council of People's Commissars has decided:

1. To establish in the Republic mandatory smallpox vaccination on the following grounds:

The following groups are subject to mandatory smallpox vaccination:

- a. All newborns, before their first birthday
  - b. All applicants or entrants to educational institutions of all types, including shelters and boarding schools.
  - c. All applicants or entrants to the army or navy
  - d. Workers and employees in all trades and establishments
  - e. All entrants arriving in prisons or other places of detention.
2. To require the local Administrative Division of the Councils of Deputies, which is in charge of the registration of deaths and births, to deliver to the local Health Department lists of births and first-year deaths in a timely manner.
  3. To take, nationwide, facilities and funds from local Health Departments of Councils of Deputies for the organization of smallpox vaccination:

- a. For the maintenance of smallpox institutes and calf-houses and for the production of smallpox vaccine - half of the amount [of allocated funds]
  - b. For the organization of courses on smallpox vaccination - half the amount [of allocated funds]
4. That those who avoid compulsory smallpox vaccination or do not attend to the timely smallpox vaccination of their children or other minors in their care, as well as institutions responsible for the smallpox vaccination of the population, are liable to charges before the People's Court.
  5. To instruct the People's Commissariat of Health to develop urgently rules and instructions for the implementation of this present decree.

Signed:

Chairman of the Council of People's Commissars *V. Ulyanov (Lenin)*

People's commissar of Health *N. Semashko*

Manager of the Council of People's Commissars *V. Bonch-Bruевич*

Secretary *L. Fotieva*

Moscow, Kremlin

April 10, 1919

The Project signed by V.I. Lenin after approval of the Council of People's Commissars

Published in No. 79 Izvestia of the All-Russian Central Executive Committee of Soviets

on April 12, 1919<sup>245</sup>

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<sup>245</sup> Электронная Библиотека Исторических Документов, Российское Историческое Общество. 10 апреля. Декрет СНК об обязательном оспопрививании. Accessed January 31, 2020. <http://docs.historyrussia.org/ru/nodes/15560-10-aprelya-dekret-snk-ob-obyazatelnom-ospoprivi-vanii>.

5. Установить для населения обязательную трудовую повинность по даче<sup>1</sup> подвод и экипажей для транспортировки заразных больных, а также и медицинского персонала при его разъездах по делам службы; поручить Народному комиссариату внутренних дел по соглашению с Комиссариатом здравоохранения и в подлежащих случаях с Народным комиссариатом труда немедленное проведение этой повинности.

6. Предложить всем учреждениям о всех недоразумениях и затруднениях в осуществлении означенного декрета сообщать непосредственно в Народный комиссариат здравоохранения.

Председатель Совета Народных Комиссаров  
В. Ульянов (Ленин).

Управляющий делами Совета Народных Комиссаров  
В. Бонч-Бруевич<sup>2</sup>.

Секретарь Совета Народных Комиссаров Л. Фотиева.

Москва, Кремль.  
10 апреля 1919 г.

Проект декрета, внесенный народным комиссаром здравоохранения Н. А. Семашко, был утвержден на заседании СНК 10 апреля; Н. А. Семашко было поручено опубликовать «заметку в газетах о большом проценте смертности среди врачей, занятых на эпидемиях, превышающей в 3 раза смертность остальных заболеваемых».

32

10 апреля. Декрет СНК об обязательном оспопрививании.

Проект, с подписью В. И. Ленина после утверждения в СНК. ЦПА, ф. 2, оп. 1, ед. хр. 9218, л. 2.

Декрет:

Подлинник. ЦПА, там же, л. 1.

«Известия» № 79, 12 апреля; «Собрание Узаконений» № 18, ст. 199.

#### ДЕКРЕТ СОВЕТА НАРОДНЫХ КОМИССАРОВ ОБ ОБЯЗАТЕЛЬНОМ ОСПОПРИВИВАНИИ

В целях более успешной борьбы с эпидемией<sup>3</sup> оспы и для улучшения существующей ныне постановки оспопрививания Совет Народных Комиссаров постановил:

1. Установить в Республике обязательность оспопрививания на следующих<sup>4</sup> основаниях:

<sup>1</sup> В «Собрании Узаконений»: по подаче.

<sup>2</sup> В подлиннике подпись не заполнена.

<sup>3</sup> В подлиннике: эпидемиями.

<sup>4</sup> В «Известиях»: нижеследующих; исправлено по подлиннику и «Собранию Узаконений».

60

Обязательному оспопрививанию подлежат:

- 1) все вновь родившиеся до истечения первого года жизни,
- 2) все поступающие в учебные заведения всех типов, приюты и интернаты,
- 3) все поступающие и поступившие в армию и флот,
- 4) рабочие и служащие во всех предприятиях и учреждениях,
- 5) все поступающие в тюрьмы и другие места заключения.

2. Обязать местные административные отделы Советов рабочих<sup>1</sup> депутатов, ведущие регистрацию умерших и родившихся, доставлять в местные медико-санитарные отделы в установленные сроки списки родившихся и умерших на 1-м году жизни.

3. Принять на общегосударственные средства расходы местных медико-санитарных отделов Советов рабочих и крестьянских<sup>2</sup> депутатов по организации оспопрививания:

- 1) по содержанию оспопрививательных институтов и телятников и по производству самого оспопрививания — в половинном размере,
- 2) по организации курсов по оспопрививанию — в полном размере.

4. Лица, уклоняющиеся от обязательного оспопрививания, а равно и лица, не озаботившиеся своевременным производством обязательного оспопрививания своим несовершеннолетним детям или другим несовершеннолетним, находящимся на их попечении, а также учреждения, в ведении которых находятся подлежащие оспопрививанию группы населения, подлежат ответственности перед народным судом.

5. Поручить Народному комиссариату здравоохранения срочно выработать правила и инструкцию по проведению настоящего декрета.

Председатель Совета Народных Комиссаров  
В. Ульянов (Ленин).

Народный комиссар здравоохранения Н. Семашко<sup>3</sup>.

Управляющий делами Совета Народных Комиссаров  
В. Бонч-Бруевич.

Секретарь Совета Народных Комиссаров Л. Фотиева.

Москва, Кремль.  
10 апреля 1919 г.

Проект декрета, внесенный народным комиссаром здравоохранения Н. А. Семашко, был утвержден на заседании СНК 10 апреля.

<sup>1</sup> рабочих в «Собрании Узаконений» нет.

<sup>2</sup> рабочих и крестьянских в «Собрании Узаконений» нет.

<sup>3</sup> В подлиннике подписи народного комиссара здравоохранения и управляющего делами СНК не заполнены.

61

APPENDIX B

The Value of the Healthy Body in Soviet Imagery



Top Left: “All on skis!” Top Middle: “Railway workers! Join the locomotive society and practice sports!” Top Right: “Sunshine, air, and water: increase your strength for labor!” Middle Left: “All the world records should be ours! The Second All-Soviet Athletic sports day of the Soviet Trade Unions.” Direct Middle: “If you want to be like this—train!” Middle Right: “Work, build, don’t whine! A path to new life is shown to us! You may not be an athlete, but you must be athletic!” Lower Left: “Long live the Soviet Athletes!” Lower Middle: “Athletes! Fight for new achievements in sports!” Lower Right: “To new victories in labor and sports!”

Note how many of these propaganda posters heavily associate athletic activities and sports with labor and the glory of the state.<sup>246</sup>

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<sup>246</sup> “Советские Плакаты ‘Спорт.’” Кино СССР. Accessed March 31, 2020. <https://kino-ussr.ru/2194-sovetskie-plakaty-sport.html>.

APPENDIX C

Online Russian Skepticism of Vaccines

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 **Alyona Naumova** ▶ **Russian Moms Abroad** ⋮

Jan 21 at 6:56 PM • 

Right from the horse's mouth.





YOUTUBE.COM  
**Ex-pharma MERCK-exec Gives Explosive Speech On Vaccines Before CDC Advisory Committee**

 4 5 Comments

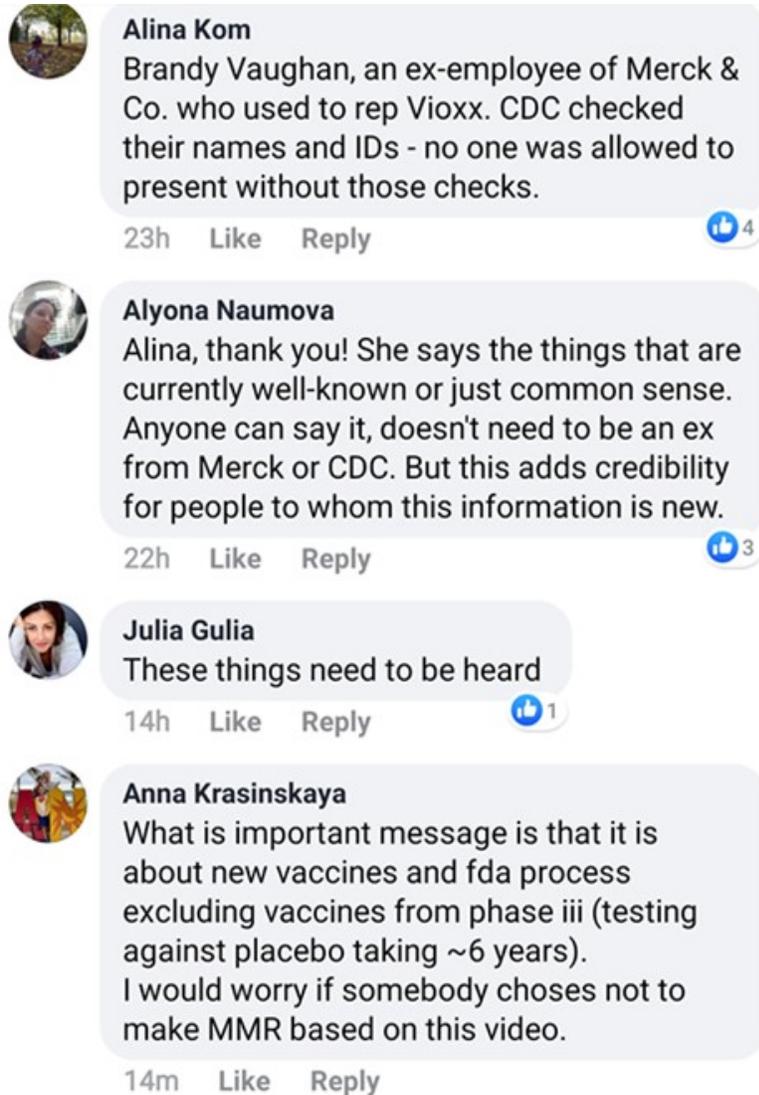
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 Like  Comment

---

 **Lena Cusimano**  
Can you provide some credentials, please.  
Maybe her name to start with.

1d Like Reply  1

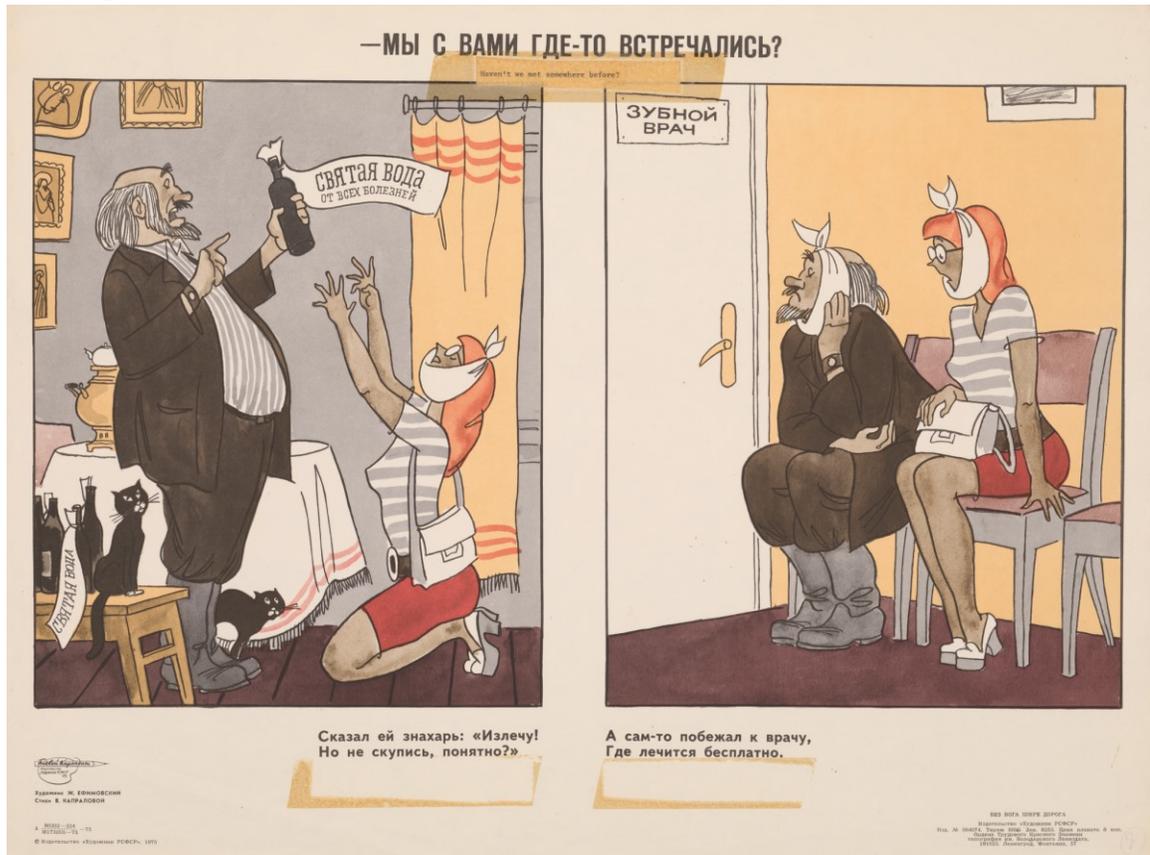


In this exchange, retrieved January 22, 2020, Russian mothers on a Facebook group discuss the posted video. In this video, a former employee of a large American pharmaceutical company discusses issues with vaccines and the vaccine schedule. Many similar threads, posts, and exchanges occur daily on social media sites like Facebook and VKontakte.

APPENDIX D:

Soviet Propaganda Against Folk Medicine

3



Top: Haven't we met somewhere before?

Left Image: Holy Water for All Ailments

Left Caption: The healer told her, "I will cure you, but don't be stingy, understand?"

Right Image: Dentist's Office

Right Caption: Then the healer ran to the doctor, where he was treated for free.



Top: The doctor makes miracles happen with the help of science.

Bottom: Everyone the healer lays his hands on, he sends to heaven!



Caption: Reason Against Religion

Image: Book reads “science.”

All poster images are courtesy of the Keston Center, a part of Baylor University Libraries' Special Collections.

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