PART 4

03

Impacts of COVID-19 Epidemics and State Policies on the Interactions of Economic and Health Systems: The Cases of the UK and Russia During 2020

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-
Crisis and Fragility:
Economic Impact of COVID-19
and Policy Responses

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1. Introduction

The COVID-19 pandemic in 2020 was a 'black swan' event for most countries in that it had a low probability but substantial negative impacts.[1] Contrary to the expectations of governments and their advisors in Europe and North America that COVID-19 would be contained in Asia or other regions, like SARS and MERS, it spread rapidly from China to the rest of the world. The epidemics within countries caused almost universal unexpected problems in their complex systems of politics (instability, unpopularity of leaders), society (psycho-social stress, greater poverty), economy (collapses of production and trade, unemployment), social care (high mortality rates of elderly residents of care homes), and health (wide-spread infections, strains on medical care). The shocks to health systems generated by epidemics required the adoption of emergency policies, notably lockdowns, designed to return health indicators to stability states, but these efforts had major negative impacts on economies and societies.

This paper is focused on how COVID-19 has affected and changed the interactions between health and economic systems. Until 2020 the

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1. The phrase 'black swan' was popularized by Taleb (2008). It refers to an event occurring that was considered to be impossible within the 'normal' conceptual/ideological framework of elites, which then undermines the system of thought that denied its existence.

predominant understanding of the causality in this relationship had been that economies strongly influence health systems for better or worse through their varying provision of finance, labor and material resources (Davis 2020a). For example, the Global Financial Crisis (GFC) of 2008-2010 had major negative impacts on the population's health through falling living standards and on medical systems through cuts in real health spending. However, COVID-19 epidemics have reversed this causality, with illness and public health policies causing severe disruption to economies. This change has stimulated a 'paradigm shift' in the understanding of the health-economy relationships from prevailing 'normal science', as explained by Kuhn (1972) in his book concerning revolutions in scientific thought.[2]

Although it is clear that the COVID-19 epidemics have had negative impacts on economies, the transmission mechanism has not been clear. This paper considers whether the negative influences on economies have been primarily due to developments in morbidity and mortality related to COVID-19, to reactions by citizens out of fear of infection (e.g. reductions in dining out), or to state policies directed at controlling epidemics, notably lockdowns and constraints on international trade and travel. Evaluations also are made of the effectiveness of more specific anti-epidemic policies of governments, both in reducing infections and in enabling economies to return to 'new normal' states.

This latter task involves assessments of the dynamics of complex systems and the readiness and resilience health systems related to both First and Second Waves of the COVID-19 epidemics in 2020. This paper applies to the study of COVID-19 epidemics ideas concerning complex systems and their interactions, which were developed in the OECD's New Approaches to Economic Challenges program to explain the causes and consequences of the GFC (OECD 2019, 2020; Davis 2020b). A complex system is made up of interconnected subsystems, which make different contributions that usually help overall performance. However, an adverse shock in one subsystem (e.g. shortage of medicine in the supply system) can cascade into others with negative effects (e.g. disruption of hospital treatment). A complex system can be closely linked with other ones, sometimes in a hierarchical manner (e.g. health within the economy). If the partner

2. Kuhn (1972) explained that prevailing paradigms of science do not change abruptly, but are undermined as inconsistencies accumulate until finally it is recognized that 'normal science' is inadequate and must be changed, resulting in a scientific revolution.

complex systems are operating normally and achieving their objectives, then the inter-connections generate synergies. However, the failures in one complex system caused by internal or exogenous shocks can adversely affect its partners through the process of contagion and can generate challenges beyond the normal capabilities of system controllers.[3]

The readiness of a health system to confront a severe external shock is determined by initial conditions (e.g. path dependence), accuracy of risk assessments, the quality of its control mechanisms (e.g. government decision making), preparatory measures (e.g. inventories of supplies), and pre-shock policies (e.g. re-organization of hospitals).[4] Resilience of a health system measures its capacity to respond appropriately to negative shocks that disrupt its functioning and to return to a normal state despite the adverse conditions. Important determinants of resilience are features of the health system, understanding the nature of the shock, effective feedback and control mechanisms, and availability of resources to support corrective actions (OECD, 2019).

In order to give the analysis better focus, the cases of two countries are studied: UK and Russia. Both have been adversely affected by COVID-19 epidemics, have national health services (NHS) that provide medical care to the whole population free of direct charge and of compulsory individual insurance contributions, and have market economies of roughly similar sizes. Major differences are that the UK has an open decentralized economy and liberal democracy, whereas Russia has a state capitalist economy and an authoritarian democratic political system. The case studies are related to past research of the author (Davis 1989, 1990, 2001, 2020ab).

3. OECD (2019) reported that the International Risk Governance Center concluded with respect to the GFC that 'external shocks to interconnected systems, or unsustainable stresses, may cause uncontrolled feedback and cascading effects, extreme events, and unwanted side-effects'. During the GFC intensifying performance problems in the subsystems of 'sub-prime property' and 'derivative' products spread by contagion throughout the financial system, paralyzing even its healthy operations, and then cascaded into the real sphere of the economy and the interconnected political, society and health complex systems.

4. Davis (2001, 2020ab) define health systems as being comprised of the following subsystems: households, medical care, medical supply, medical industry, biomedical R&D, medical foreign trade, residential social care, and central health management.

2. Readiness of the UK and Russia Health Systems for COVID-19 Epidemics

The assessments of the readiness of the health systems of the UK and Russia are based on detailed evaluations of historical developments during 2008-2019 presented in Davis (2020a) and of sixteen categories of readiness in Davis (2020b). The two subsections below briefly review tightening resource constraints on the health systems and increasing shortages, discuss national health management systems and policies, and summarize findings concerning other categories of readiness. The periods of readiness prior to the First Wave are shown in Figures 1a and 1b.

a. Readiness of the UK Health System in 2020 for the COVID-19 Epidemic

The GFC caused the UK to experience a short recession that was followed by a decade of low positive growth and austerity policies that limited the growth of real health spending to an average of 1.3% a year (0.6% per capita). Central government financial support of local public health services was cut severely (Lawrence et al., 2020). The rising demand for medical care of the ageing UK population combined with the slow growth of spending on the national health service (NHS) to generate increasing shortages of labour, facilities (e.g. intensive care units), medical equipment, medicines and other supplies. According to Smyth (2019, November 25):

> *Staff shortages have become the most pressing problem facing the NHS, with hospital bosses saying that even with extra cash they cannot find the doctors and nurses to spend it on. About one in ten NHS posts is vacant and a lack of nurses is the biggest problem…*

By 2020 the NHS had deficits of 43,000 nurses and 10,000 doctors. Deficits of treatment capacities in hospitals were intensified by 'bed blocking' by older patients (5-6% of the total bed stock in 2020), who could not be discharged after treatment because of inadequate social care arrangements. Bottlenecks in the production of medical services occurred regularly due to shortages of facilities and specialist medical personnel.

The UK government had incomplete control over the broadly defined health system (e.g. private medical industry) and there was fragmented management in the national health service (NHS) because of devolution

of powers to the four 'nations' (England, Scotland, Wales, Northern Ireland), decentralization of decision making to quasi-autonomous hospital trusts and outpatient doctors, and growing involvement of private sector units (e.g. in the supply system). Health had a relatively low national priority in public spending in 2020 and with respect to intra-NHS priorities, non-communicable illnesses were much more important than infectious diseases. Public health was weak because of deficiencies in the responsible organization, Public Health England (PHE) and reduced funding of local government. The government's epidemic contingency planning had focused on influenza, the probability of an epidemic was assessed as low, and the stockpiling of necessary medical supplies had been neglected. The possibility of an epidemic causing a major shock to the economy had not been considered.

Although the UK had low provision of medical personnel by OECD standards and chronic shortages, the quality of medical staff was high. Few medical facilities had been designed to deal with a serious epidemic of infectious disease. The UK had low provisions of hospital beds, ICUs and medical capital equipment. In 2018 the number per million of MRI machines in the UK was 7.2, whereas in Germany it was 35.1. The country had only 5,000 ventilators and barely sufficient supplies of medicines, medical goods and PPE to support normal activities. However, health administrators and senior medical personnel had high competence and experience in dealing with shortages, rationing and pressure. Medical industry and biomedical R&D institutes were not prepared for an epidemic, but they had very good mobilization potential. Mass testing and contact tracing capabilities were severely deficient. Davis (2020b, Table 4) rates the UK's overall readiness for the COVID-19 First Wave as Substandard.

b. Readiness of the Russia Health System in 2020 for the COVID-19 Epidemic

The Russian economy experienced recessions during 2009-2010 (GFC) and 2014-2016 (low energy prices and sanctions) (Davis 2016). Russia lowered the priority of health, which resulted in the deceleration of growth of spending on the NHS to 3.2% a year during 2008-2019 and a decline in health share of GDP from 4.2% to 3.2% (Davis 2020a, Tables 8ab). The rising demand for medical care due to population ageing combined with slow growth of inputs to the NHS to generate increasing shortages of all types (Davis 2020a, Table 10). Sidorenko (2019) reported:

> *According to the Ministry of Health, polyclinics on their own have a deficit more than 25 thousand doctors…However, the Ministry of*

Labor told Izvestiya that only one thousand relevant jobseekers are registered on the labor exchange…

The increased intensity of shortages generated bottlenecks in the production of medical services in polyclinics and hospitals, more queuing and longer waiting lists.

In early 2020 Russia had a centralized authoritarian political system, which had substantial influence over the health system, including medical industry and biomedical R&D. The Ministry of Health RF managed the NHS through an administrative hierarchy, owned its medical facilities, and employed its staff. Within the low priority NHS, the highest priority was awarded to non-communicable diseases. The government's pandemic contingency plan focused on influenza, so its anticipated responses and emergency stockpiles were inappropriate for a Corona virus epidemic. No special plans were made to protect economic activities. However, the centralized management of the NHS in Russia meant that the government had greater ability than did its counterpart in the UK to deal with an epidemic (Cordell and Gershkovich 2020, March 19):

Historically, the health system of the USSR and Russia was built on the basis of mobilization - it is militaristic, even, because governments were preparing for an emergency…

The NHS had large numbers of medical personnel and facilities, but there were shortages of specialist doctors and nurses. Hospitals had high numbers of beds, but low provision of ICUs. Few facilities were designed to deal with a serious epidemic of infectious disease. The NHS had adequate numbers of ventilators (40,000), but insufficient provision of CT scanners and dialysis machines. It had adequate stocks of some medicines and supplies, but serious shortages of others (e.g. PPE). There were substantial inequalities in the distribution of health resources between urban-rural areas and regions. Russia had a capable but somewhat backward medical industry and a good biomedical R&D subsystem, which could be mobilized. Russia's mass testing system was average, but contact tracing through the NHS was poor.

The government was positive about overall readiness, but many health professionals in Russia were pessimistic (Mishina 2020, April 4):

55% of doctors participating in the nationwide survey said that their

medical institutions are not ready to receive patients with coronavirus infections. 49% of more than 4,000 respondents noted low epidemiological preparations of hospitals, referring to the availability of uniforms and means of protection, and 35% of respondents said that there was insufficient availability of medicines…28% reported a shortage of staff…

An authoritative newspaper article concluded (Sokolov 2020, April 9): 'The medical system in Russia is not at all ready for the coronavirus – or any other pandemic.' Davis (2020b, Table 4) awards the readiness of the Russia health system a rating of Substandard.

3. Resilience of the UK and Russia in Responding to the First Wave of COVID-19 Epidemics: The Impacts of Health Policies on Economic Systems

a. The COVID-19 Pandemic and Its Impacts on World Health and Economies

COVID-19 spread more rapidly globally than it would have in the Cold War period because over the past several decades the international system opened up as a result of freer trade and capital flows, professional and tourist travel, migration and electronic information linkages.

Authoritative, but imperfect, Worldometer data show that the number of world cases of COVID-19 rose from 94 thousand on 2 March 2020 to 10.6 million on 30 June to 63.6 million on 30 November (Worldometer 2020, November 30).[5] The number of new cases per day rose to 687 thousand on

5. Worldometer data, based on national reporting, describe trends and provide comparisons between countries, but they have substantial deficiencies: lack of testing or diagnoses by doctors at the start of the epidemic, so substantial under-reporting of incidence and prevalence; variations in methodologies used to register COVID-19 cases and deaths of the disease; and both over-estimates and underestimates of mortality rates. National, WHO and Worldometer COVID-19 morbidity and mortality statistics should be considered to be best estimates within wide error bands.

3 December and total deaths to 1.5 million.

The usual policy responses of governments throughout the world to COVID-19 were to: (1) promote better public hygiene (e.g. social distancing); (2) quarantine infected people and attempt to trace and isolate their contacts; (3) impose regional or national lockdowns; and (4) restrict international travel. These measures constrained the growth of infections and eventually reduced disease incidence to 'new normal' magnitudes.

COVID-19 epidemics generated greater disruptions to economic systems than the GFC. The worsening conditions and performances in health and economic systems in turn caused intense strains in society (e.g. family and social life) and substantial excess deaths of the elderly in residential social care homes.

There were three adverse consequences for economies of the COVID-19 pandemic. First, the more risk-averse behaviors of consumers and businesses and the rigorous national lockdowns generated wide-ranging negative demand and supply shocks. This caused macroeconomic excess supply disequilibrium ('Keynesian unemployment') (Davis 2020ab). In October the IMF (2020, October) predicted global economic growth of -5.0% in 2020. The pandemic also caused microeconomic excess demand ('chronic shortage') disequilibrium and shortages in markets for medical goods (ventilators, medicines, PPE, testing kits) because of high demand and reduced supply. A third economic consequence of the pandemic was an unexpected disruption of international supply chains and 'just-in-time' logistics systems because of production declines and bans by countries of exports of medical products. This caused many governments to promote 'national resilience' through import substitution, self-sufficiency in manufacturing, and augmented strategic reserves of medical products.

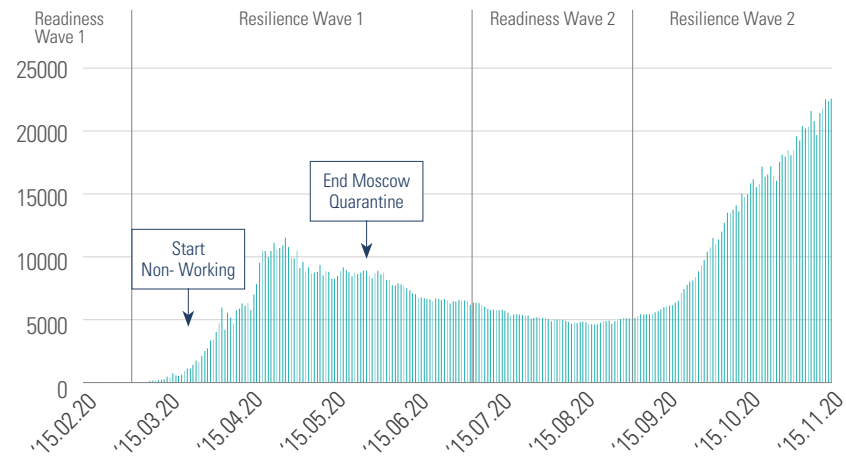
The histories of the national epidemics in the UK and Russia, using the indicator of daily cases, and periods of Readiness and Resilience related to the First Wave and the Second Wave are shown in Figures 1a and 1b. The numbers of cases shown for the First Wave are significant underestimates because both countries initially had limited testing. However, the trends can be viewed as reasonably accurate because of their correlations with hospital admissions and deaths.

Figure 1.

Daily Test-Confirmed Cases of COVID-19 in the UK and Russia: 15 February – 16 November 2020

Figure 1a: Daily Test-Confirmed Cases of Covid-19 in the UK

Figure 1b: Daily Test-Confirmed Cases of Covid-19 in Russia



Notes: (1) The figures show number of confirmed cases by day. In both countries testing improved over time, so actual cases in March-April would have been substantially higher than shown. Despite this, it is clear that a Second Wave started at the end of the summer, for well-known reasons. (2) The author obtained the statistics from the 'source code' pages of the relevant Worldometer figures, which contain separate blocks of comma delimited data for 'days' and 'daily cases'. These were disaggregated into cells in rows of Excel tables and then were used to generate the cluster column charts.

Sources: Worldometer 2020 and online information about timing of lockdowns in the UK and Russia.

b. The COVID-19 Epidemic in the UK: Resilience of the Health System During the First Wave and Impacts on the Economy

(1) Resilience of the UK Health System During the First Wave

The initial cases of COVID-19 in the UK were diagnosed in February and the epidemic developed as shown in Figure 1a.[6] During the First Wave the number of daily cases rose to a peak of 5,618 on 1 May, but then declined to 353 on 6 July (Worldometer 2020; Davis 2020b, Table 5). Deaths from COVID-19 increased to 40,340 on 29 June.

Evaluations were made in Davis (2020b, Appendix B) of resilience in the UK health system in 16 categories. This section discusses government management and policies during the First Wave and then summarizes findings about the other categories.

The Conservative government had a strong parliamentary position in March and therefore was able to act decisively with respect to anti-epidemic policies. However, it faced constant criticism of its public health policies (e.g. national lockdowns, testing and contact tracing) from the opposition Labour Party and the Scottish National Party. The latter differentiated its 'national' anti-epidemic policies from those of the UK (England), in part to promote its nationalist political goals concerning Scotland. The central government continued to have weak control over the whole health system because of the private ownership of most institutions (e.g. medical industry) and the fragmentation of the NHS. The national priority of health was raised, a £5 billion supplemental allocation was made to the NHS and the Chancellor promised a 'soft budget constraint' (Neville 2020, March 11):[7]

Whether it's research for a vaccine, recruiting thousands of returning

6. During the First Wave of the epidemics in the UK there were no accurate measurements of incidence and prevalence of COVID-19. Table 5 and Figure 6a in Davis (2020b) show numbers of cases verified by tests. These are substantial underestimates and perhaps account for only 20% of true cases. However, the upward and downward movements during March-June reflect reality because that can be correlated with statistics measuring hospital admissions, treatment in ICUs and deaths. In the UK early measurements of COVID-19 deaths were inaccurate because there were risk-averse and inadequate diagnoses by doctors of people dying at home or in residential care homes and probably were over-estimates due to that reasons and features of the methodology: deaths measured people with a positive test who died over the next month, irrespective of proximate cause.
7. The concept of the soft budget constraint is explained in Davis (1989, 2020a). During the COVID-19 epidemics health systems discovered that the physical acquisition goods (e.g. PPE, testing kits) was more important than having a high priority and almost limitless budgets because of global excess demand and competition between countries for scarce supplies.

staff, or supporting our brilliant doctors and nurses, whether it's millions of pounds or billions of pounds, whatever it needs, whatever it costs, we stand behind our NHS.

The internal priorities of the NHS changed radically (Davis 2020b, Table 2), with that of treatment of COVID-19 cases becoming the highest and lower priorities being given to other illnesses and medical activities. In formulating anti-epidemic policies, the government tried to follow the advice of its scientific advisors, although their recommendations were at times not acceptable for political or economic reasons.[8] Early policies were to: improve public health behaviour of citizens; mobilize the NHS, medical industry, and biomedical R&D; and increase testing.

On 23 March the central government imposed a nationwide lockdown and adopted the effective slogan: *Stay at Home - Protect the NHS – Save Lives.* It adopted a 'nudge approach' approach to compliance, rather than a coercive one. *Public Health England (PHE)* demonstrated weaknesses in organising and expanding testing and in providing advice concerning medical PPE. Local government public health personnel and GP practices played negligible roles in contact tracing. In May the central government established *NHS Test and Trace* and the *Joint Biosecurity Centre.* Overall, the resilience of central health management merited a mark of *Substandard.*

Davis (2020b) provides the following summary of resilience in the different categories. The UK achieved several successes in its fight against COVID-19: adequate government leadership from mid-March with science-based policies; a generally well-observed lockdown; effective mobilization of medical personnel and equipment in the NHS, medical industry and biomedical R&D; reorganization of NHS hospitals, use of private medical care facilities, and emergency construction of *Nightingale* hospitals; effective treatment of acutely ill under-60 years COVID-19 patients in hospitals; re-organization of testing and increases in its volume to a modest level; and innovative work on COVID-19 diagnostic tests and candidates for vaccines. The main failures were: tardiness of the government in imposing a national lockdown; weak control over the total, mostly private, health system; inadequate central management of the NHS because of its excessive

8. The main UK organizations were: UK Government Chief Scientific Advisor, Chief Medical Officer NHS England, SAGE (Scientific Advisory Group for Emergencies), and New and Emerging Respiratory Virus Threats Advisory Group (*Nervtag*)

fragmentation; uneven care of elderly COVID-19 patients; weaknesses in *PHE* related to PPE advice, testing, organizing laboratories, and contact tracing; poor organization and performance of the medical supply system; inadequate provision of PPE to NHS and social care workers; initial failure of mass testing for COVID-19; and poor performance of the NHS medical supply system. Overall, the positive contributions of some categories did not fully balance out negative ones, so Davis (2020b) awarded a rating of *Substandard.*

(2) The Impacts of the COVID-19 Epidemic on the Economy: Illnesses and Deaths versus Public Health Policies

No detailed studies have been carried out yet of the relative importance of the impacts on the UK economy of COVID-19 illness and deaths versus public health policies.[9] This subsection provides preliminary comments on this issue.

The UK has an ageing population of 66 million and there were around 5 visits to GPs per year in 2019, so the number of doctor visits (a proxy for the number of cases of illness) was 330 million, or 6.3 million per week. During the initial seven weeks of the First Wave, the number of COVID-19 cases detected was 120,067, whereas the expected number of GP visits (general illness) would have been 44.1 million. The total number of deaths in the UK in 2018 was 616,014, or 11,846 per week. During the initial seven weeks of epidemic in the UK the number of COVID-19 deaths was 12,661, whereas the expected number of total UK deaths was 82,922 (7 x 11,846). These calculations show that although the epidemic generated significant numbers of illnesses and deaths, these were not large relative to normal levels. It therefore is unlikely that the epidemic on its own had a significant direct negative impact on the economy through sickness absence rates and premature deaths of members of the labor force.

In contrast, risk-avoidance behaviours of consumers and workers and government public health policies had substantial adverse impacts. This was due to drops in demand for public transport, the services of the hospitality sector, and overseas travel. The national lockdown plus restrictions on domestic and international travel devastated the economy and threatened

9. The author has written about the economic costs of morbidity and mortality of the economically active, as well as cost-benefit and cost-effectiveness studies. In 2004 he produced a report on these issues related to the USSR for the World Health Organisation, European Office for Investment in Health and Development.

substantial unemployment. The government's anti-crisis policies prevented the worst possible outcomes. Still, the predicted GDP annual growth of the UK economy in 2020 deteriorated from a positive 1.4% in January (IMF 2020, January) to -9.8 in October (IMF 2020, October).

c. Resilience of Russia During the First Wave of the COVID-19 Epidemics and Impacts on the Economy

(1) Resilience of the Russia Health System During the First Wave of the COVID-19 Epidemic

The epidemic started somewhat later in Russia than in European countries because of its lesser involvement in international interactions. By late March infections from foreign countries had spread to Moscow (87% of early cases) and then were transmitted to other regions. The number of daily cases rose to a peak of 11,656 on 11 May (total cases 221,3440) and then declined to 6,693 on 30 June (by 43% from its peak) (see Figure 1b). The official number of COVID-19 deaths in Russia, which is approximately 50% below what would be calculated using WHO methodology, rose to 9,166 on 29 June. This paper treats 30 June as the end of the First Wave in Russia, as in the UK.[10]

Evaluations of resilience in the Russia health system in 16 categories are presented in Davis (2020b, Table 8). This section discusses government management of the health system (category 1) and then summarizes findings about the other categories.

Although Russia had a Presidential political system with strong central control, much decision-making power concerning the COVID-19 epidemic was delegated to the Prime Minister, the Ministry of Health RF, other central bodies, and governors of regions. The authorities avoided portraying the epidemic as a major crisis, and did not have opposition parties criticizing every public health policy decision. Nevertheless, over time public opinion became more critical of the government because of the adverse health situation, the lockdowns, and deteriorating economic performance.

10. Although the number of daily cases in Russia (Figure 1b) remained substantially higher than those in the UK (Figure 1a) after 30 June, over the following two months infection rates continued to decline and the government adopted more relaxed public health policies, demobilized the NHS, and started to prepare for a Second Wave. Developments in Russia in the Readiness period of July-August are discussed in Section 4.

The priority of the health sector was raised at the national level. Substantial additional finance was provided to the NHS from the National Wealth Fund to purchase deficit items from domestic and foreign suppliers and to provide extra payments to medical personnel engaged in front-line treatment of COVID-19 patients. Within the NHS, COVID-19 and cancer treatment programmes were given highest priorities.

The central government obtained advice from a variety of scientific committees. In March it ordered random temperature tests, restricted exports of medical PPE, gave citizens stronger advice to not travel abroad, urged the elderly to self-isolate, and made efforts to import ventilators, PPE, medicines and COVID-19 tests. Russia banned flights to and from Europe on 11 March and closed its border to foreigners on 23 March. Energetic efforts were made by the government to support the development of COVID-19 tests and vaccines, the movement to mass testing, the supplemental training of medical staff, and the mobilization of the medical industry to produce needed products. On 30 March the President announced a national 'non-working week' with pay. Moscow City and other regions introduced rigorous lockdowns that were administered in an authoritarian manner. The lockdown measures were relaxed in May and ended on 9 June.

The overall assessment of resilience in the Russian health system is as follows. Russia both achieved successes and experienced failures in its fight against COVID-19. The successes included: early isolation of elderly citizens; rigorously enforced lockdowns; coherent and hierarchical control of the NHS by the Ministry of Health RF; effective mobilization of medical personnel and equipment in the NHS; rapid reorganization (re-profiling) of polyclinics and hospitals and construction of new hospitals for COVID-19 patients; effective hospital treatment of COVID-19 patients; adequate protection of state residential care homes; early development of COVID-19 tests and rapid expansion of mass testing; mobilization of domestic industry to produce medical products; and apparently effective research on a vaccine (Sputnik V). The main failures were: tardiness of the national and regional governments in imposing lockdowns; severe shortages of PPE, medicines, medical supplies, and medical equipment (e.g. kidney dialysis machines); and failure to develop a local-based contact tracing system. On balance, the modestly funded Russia health system was reasonably effective in dealing with the unexpected COVID-19 epidemic and is awarded an overall rating of *Average* in Davis (2020b).

(2) The Impacts of the COVID-19 Epidemic on the Economy: Illnesses and Deaths versus Public Health Policies

During the initial seven weeks of the epidemic from 9 March, 47,121 cases of COVID-19 were registered. According to official statistics, the expected numbers of new cases of illnesses in Russia over this period would have been: all categories 15.4 million; respiratory 6.9 million; cardiovascular 619,000; and cancer 229,000. This suggests that COVID-19 would not have been viewed by the Russian leadership as a likely cause of economic disruption through illnesses of employees. With respect to mortality, in 2018 Russia had a population of 147 million and it experienced 1,828,900 deaths, or 35,171 deaths per week. Official deaths from COVID-19 during the initial seven weeks of the epidemic totaled 4,731 deaths, whereas the normal number of deaths would have been 246,198 (7 weeks x 35,171). Consideration of this evidence indicates that the morbidity and mortality related to COVID-19 did not have significant direct negative effects on the economy.

However, individual risk-averse behaviours of consumers and workers and public health policies, notably lockdowns, had significant adverse impacts on the economy through declines in public transportation, use of hospitality facilities, and travel. However, Russia had a smaller service sector than the UK and the country kept industrial manufacturing, construction, energy extraction and agriculture functioning throughout the First Wave. As a result, the economic downturn was less pronounced than that in the UK. The predicted GDP growth for 2020 deteriorated from 1.9% in January (IMF 2020, January) to -4.8% in October (IMF 2020, October).

4. Readiness and Resilience Related to Second Waves of COVID-19 Epidemics in the UK and Russia

The First Waves of the national epidemics ended around 30 June and daily cases remained either absolutely low (UK) or relatively low (Russia) during July-August. These two months comprise a new period of Readiness. Infections rates began to accelerate again in both countries in late August and

the months September-November became the initial phase of the Second Waves (see Figures 1a and 1b), which again challenged the resilience of the health systems. This section provides preliminary assessments of readiness and resilience related to the Second Wave.

a. Readiness for the Second Wave in the UK and Russia: July-August 2020

Epidemiologists in the UK and Russia predicted that there would be substantial second waves interlinked with influenza in the autumn. Governments and health systems responded to these warnings by making efforts to improve readiness. Both countries marginally enhanced their health management, maintained a high priority for health, and developed prudent anti-epidemic plans that were focussed on COVID-19, but also included influenza containment measures. The high priority of COVID-19 within the NHS was reduced and those of neglected illnesses, such as cancer and cardiovascular, were raised. Resources were reallocated from COVID-related medical activities back to normal ones.

Doctors and middle medical personnel in the two countries had developed significantly higher skills in diagnosing and treating COVID-19 by July than they had in March, so they were better prepared for future outbreaks. Many who had been working on the 'front-line' were re-deployed to their former duties. Efforts were made to provide recuperation time and psychological support to medical staff who had experienced intense professional stress.[11] However, inherited shortages of medical personnel (e.g. specialist ICU nurses) could not be corrected in the short term. Retired doctors and MMP(middle medical personnel) exited again from the workforce and medical students returned to universities. Readiness in the UK concerning personnel was undermined by the continuing departure of MMP from the EU due to impending Brexit and by difficulties in recruiting replacements in a period of global excess demand for skilled medical professionals.

Both countries improved their readiness in: medical facilities (e.g. newly constructed COVID hospitals, more ICUs), medical capital equipment (e.g. higher numbers of ventilators), the organisation of supply, provision of

11. Morris & Barnes (2020, October 24) reported that a study by the COVID Trauma Response Working Group, based on a survey of 1,200 health care workers from across the UK between May and July, found that nearly 60% of them met the clinical criteria for a diagnoses for anxiety, depression or post-traumatic stress disorder.

medical products (notably PPE), and capabilities in testing. Despite efforts to build up inventories of medicines, inadequacies remained because of insufficient domestic production and continued difficulties in acquiring goods in excess demand international markets.[12]

Two categories of readiness in both the UK and Russia exhibited deficiencies in summer 2020: reducing the hidden components of morbidity icebergs and lowering backlogs of untreated reported illness. According to Blakely (2020, October 2):

> *A quarter of a million people who would normally have been urgently referred by their GP to a cancer specialist are missing from the diagnostic pipeline…Millions more have missed routine screening appointments or are waiting for diagnostic tests and treatment.*

Although the medical systems attempted to return to normal work conditions and to encourage people with symptoms of cancer and cardiovascular disease to report them to doctors, progress was slowed in August by growing fears of potential patients about the Second Wave. Only modest progress was achieved at reducing waiting lists and waiting times.

There was much higher readiness to support the fight against COVID-19 in domestic medical industries and biomedical R&D institutions. Both countries increased the swab testing of patients, medical and social care staff, and members of the public by the end of August: 400,000 tests per day in Russia and 131,000 (Pillar 1 and 2) in the UK. However, the UK laboratory system had tight capacity constraints and could not expand the processing of tests to keep up with their receipts of samples from tests. Contact tracing related to positive tests remained substandard.

The readiness of the national health services to treat COVID-19 patients in August was significantly higher than it had been in February. During July-August, protection of the elderly in residential social care homes was strengthened. Overall, both countries achieved a rating of *Average* for Readiness for the Second Wave, because their health systems had improved, but each had weaknesses (Ball 2020, August 26; Davis, 2020b).

12. According to Lay and Smyth (2020, October 24) a UK government minister revealed in Parliament that millions of doses of painkillers, sedatives and antibiotics normally held in the Essential Medicines Buffer Stock and the COVID-19 Supportive Medicines Stockpile had been used up and not replaced by October 2020.

b. Resilience During the Second Wave in the UK and Russia: September-October 2020

The Second Waves of the COVID-19 epidemics in the UK and Russia can be measured by the respective increases in daily confirmed new cases from 1,406 and 4,993 on 31 August to 8,414 and 8,135 on 28 September to 12,330 and 26,338 on 30 November (Figures 1ab in this chapter and Table 5 in Davis 2020b). Their onsets were earlier and their intensities were greater than anticipated. Contributing factors were insufficiently cautious populations taking summer vacations abroad, resuming work, engaging in more social and family interactions, and returning to schools and universities.

Health management structures in the UK remained unchanged, but in August the government merged *NHS Test and Trace,* the *Joint Biosecurity Centre*, and components of *PHE* to form a new *National Institute of Health Protection.* Russia in mid-October established a Security Council RF *Interagency Commission on a National System of Protection Against New Infections,* headed by former President/Prime Minister Medvedev (Kamenskii 2020).

As the second wave developed in the UK, the four governments imposed increasingly tough restrictions (e.g. a 'national' two-week lockdown in Wales, regional Tier 2 and 3 restrictions in England). Political divisions over public health policy intensified in the UK with the 'nations' squabbling with each other and Labour Party leaders in northern England refusing to accept the central (Conservative Party) government's regionally-differentiated restrictions, despite high local infection rates. Due to worrying predictions concerning illnesses and hospital admissions, the UK government was forced to introduce on 5 November a one month lockdown in England. The Russian government was strongly committed to avoiding harsh lockdowns, but it introduced new containment policies, such as strongly encouraging self-isolation by pregnant women and the elderly and requiring more employees to work from home.

By late September both countries resumed partial mobilisation of medical personnel and medical facilities for the fight against COVID-19. Efforts were made to compartmentalize hospitals, so treatments of patients with cancer and other serious illnesses could continue in parallel with care of those ill with COVID-19. By late October use was being made of some of the reserve COVID-specialised hospitals (e.g. *Nightingales* in UK,

Kommunarka in Russia), but their functioning was severely hampered by shortages of qualified intensive care medical personnel.

Medical supply systems functioned better in the initial phase of the Second Wave. However, excess demand intensified in global markets for medical products because most affluent countries experienced starts of their second waves at roughly the same time. Domestic stocks of medical capital equipment (e.g. ventilators) were high, so the increasing demands could be met by re-allocations of national assets, However, supply problems developed related to medicines (e.g. *Remdesivir,* Smyth 2020, October 1), medical supplies and influenza vaccines. Both countries were able to provide PPE to most medical and social care personnel out of their augmented stocks, but acute shortages developed again in rural areas and remote regions of Russia.

The resurgence of the epidemics inhibited risk-averse ill people from visiting outpatient medical facilities, so unreported illnesses in the morbidity icebergs increased. By October hospitals in heavily infected areas were forced to re-allocate resources in favour of COVID-19 activities in order to avoid reaching treatment capacity limits (Roberts 2020, October 18). This meant that diagnoses and treatments of normal serious illnesses were suspended again, so backlogs of untreated illness increased (Lay 2020, October 19; Campbell 2020, October 24).

The medical industries in both countries increased their production of necessary medical supplies, testing kits, and vaccines still involved in clinical trials (e.g. Oxford-AstraZeneca and Sputnik V). State and private R&D institutions continued research into new drugs, medical products and vaccines related to COVID-19.

Both countries continued to expand their testing of the population for COVID-19. From 1 September to 22 October the UK increased its number of tests carried out per 1,000 population from 2.5 to 4.0, while for Russia the increment was from 2.0 to 3.4. The UK experienced excess demand for public (Pillar 2) tests and bottlenecks in processing the swabs in laboratories (Bodkin 2020, September 14). The UK and Russia marginally improved their inadequate contact tracing, but these efforts were overwhelmed by the rapid growth of infections.

Hospitals in the UK and Russia initially operated within their capacities

concerning COVID-19 and normal patients, but by late October those in high infection experienced difficulties in coping with demands. The results of treatments of COVID-19 patients in hospitals were better than those in the past due to improvements in medicines, medical equipment (e.g. oxygenation, dialysis), and medical protocols. However, the problem of infection within hospitals remained unsolved. According to Donnelly (2020, October 10) in the Northwest of England 18% of new cases of COVID-19 were the result of infections contracted by patients and staff in hospitals.

Russia maintained tight public health controls over its state-owned residential social care homes. The UK imposed restrictions on visits to homes by outsiders and on the employment of part-time workers. Both countries improved the provision of PPE and increased the testing of care givers and patients. There were fewer outbreaks of infections in care homes than in the First Wave.

The resiliencies demonstrated in the UK and Russia health systems during the Second Wave in September-October were better in almost all categories than those during the First Wave. However, the greater than anticipated acceleration of the epidemics in both countries soon exhausted prepared reserves and pushed components of medical systems in high infection areas into severely challenging situations. National authorities usually were able to intervene to avoid acute overloads of medical systems in local areas by re-deploying assets. Taking into account performances in all categories, Davis (2020b) awards ratings for overall resilience of the two health systems in the initial phase of the Second Wave of *Average*.

5. Conclusions

Governments and analytical elites in the UK and Russia have understood the importance of health in society and its linkages with the economy, but until recently they had assumed a one-way causality: economic performance determines the resources for health services and influences the health of populations. The COVID-19 epidemics have demonstrated that health problems can cause major unanticipated disruptions to economies that are worse than those caused by the GFC. As a result, leaderships have been forced to deal with new unanticipated realities.

Over the past decade, the UK and Russia governments assumed that

the most important issues in health were related to infant care and adults suffering from non-communicable potentially fatal diseases (e.g. cancer, cardiovascular) and therefore allocated most health resources to related programmes. Furthermore, the prevailing opinion of elites was that the threat of a serious pandemic of influenza had a low probability and could be managed by their health systems. As a result, the two governments under-funded public health programs, allowed inventories of anti-epidemic equipment and capabilities in testing and contract tracing to deteriorate, and ignored potential impacts of epidemics on economies. These countries therefore had *Substandard* Readiness for their COVID-19 epidemics.

The two health systems demonstrated *Substandard* (UK) and *Average* (Russia) resilience during the First Wave, with good performances in some categories and substandard ones in others. For example, the UK central government discovered that its past health reforms involving devolution to its 'nations' and decentralization of decision-making to hospitals and GP practices left it with only weak powers when it needed to act decisively in the emergency caused by COVID-19.

The actual morbidity and mortality generated by COVID-19 epidemics had limited direct negative impacts on economies. Risk-averse behaviours of consumers and workers and public health policies of governments, especially lockdowns, caused the greatest economic problems because of their disruptions of the service sector (notably hospitality), public transportation and international travel. The service-dominated economy of the UK was more adversely affected than the Russian economic system with its high shares of heavy industry and agriculture and modest service sector.

The Second Waves of the COVID-19 epidemics were caused by the incautious behavior of subsets of the citizens of the two countries, who did not observe clearly communicated public health rules. As infections accelerated, the UK and Russia governments imposed increasing restrictions on their populations. They tried to avoid the strict national lockdowns of the First Wave, which were shown to be blunt instruments that reduced infections, but also undermined economies, caused psycho-social stress in the population, and contributed to the neglect of other important medical problems, such as cancer. However, the UK was forced to introduce a less stringent national lockdown in early November. One lesson from the

experiences of these two countries is that until the people of UK and Russia learn how to behave more responsibly in a period of a global infectious disease pandemic they will suffer adverse health consequences, and not even energetic and properly designed interventions of governments will prevent substantial illnesses and deaths of individuals and members of their families.

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