

**CRISIS MANAGEMENT AND DISASTER RESPONSE  
CENTRE OF EXCELLENCE**

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# COVID-19

## **The Case of China and recommendations for the Republic of Bulgaria**

### **PART 1**

**(14-20 March 2020)**

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## 1. Background

In December 2019 pneumonia cases of unknown origin recorded in Wuhan, China raised concern among health officials. On December 31, an alert was issued by the Wuhan Municipal Health Commission, a rapid response team was sent to Wuhan by the Chinese Center for Disease Control and Prevention (China CDC), and a notification was made to the World Health Organisation (WHO). Wuhan's Huanan Seafood Wholesale Market was shut down and disinfected after an epidemiological investigation implicated it as a source of the disease<sup>1</sup>. Consequently, an active case finding was initiated and pursued (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020)

The onset of infection exhibits in December 2019. In early January 2020, the causative pathogen of the pneumonia was identified as a novel coronavirus, and genomic characterisation and test method development was initiated (Ibid). The peak onset of symptoms occurred in February, since when the onset of the illness is declining. New cases are reportedly now *imported*<sup>2</sup> by returning nationals in a situation of global pandemic. Since 16 Mar 2020, the WHO is presenting regional figures rather than national ones<sup>3</sup>.

Some development in R&D related to COVID-19, still requiring further analysis, has illuminated sensitivity of the virus to ultraviolet rays and heat, lipid solvents can be killed by heating for 30 minutes at 56 °C; lipid solvents (National Health Commission of the People's Republic of China 2020). The incubation period is commonly set at 1–14 days

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<sup>1</sup> Bats have been potentially identified as the source of COVID-19 virus, but the intermediate host(s) has not yet been found (WHO-China Joint Commission on Coronavirus Disease 2020).

<sup>2</sup> Data from World Meters (<https://www.worldometers.info/coronavirus/#countries>) for 17 Mar 2020 supports this statement showing: 1 new case, Macao SAR [source]; 20 out of 21 new cases reported today are travelers from abroad [source]; 21 new cases, 13 new deaths (12 in Hubei), and 930 new discharges occurred in China on March 16, as reported by the National Health Commission (NHC) of China [source]

<sup>3</sup> WHO Situation Report 57: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200317-sitrep-57-covid-19.pdf?sfvrsn=a26922f2\\_4](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200317-sitrep-57-covid-19.pdf?sfvrsn=a26922f2_4)

and generally in the range of 3–7 days. The main source of infection is COVID-19 patients, but asymptomatic individuals infected with the virus may also infect others. The main modes of transmission are via droplets and direct contact. The possibility of aerosol transmission exists in relatively closed settings with exposure to high concentrations of aerosol for a long period of time. Other transmission routes need further investigation. Main elements of general response include hand washing, travel restrictions, and importantly - social distancing, self-imposed quarantine and officially imposed home quarantine, and legal implications (introduced during the crisis) which enforce restrictions.

The World Health Organisation (WHO) leads efforts aimed at the containment and mitigation of COVID-19 issuing guidance and protocols (Appendix 1), and coordinating communication.

WHO risks assessment for China, despite decreasing number of newly infected and increasing number of cured patients is still very high ([Situation Report 56](#), Table 1).

COVID-19 has gradually spread internationally with Europe currently experiencing an increase in disease transmission (([Situation Report 56](#), Figure 1 below).

**Table 1. Countries, territories or areas with reported laboratory-confirmed COVID-19 cases and deaths. Data as of 16 March 2020\***

Reporting Country/ Territory/Area <sup>†</sup>	Total confirmed cases <sup>‡</sup>	Total confirmed new cases <sup>1</sup>	Total deaths	Total new deaths <sup>1</sup>	Transmission classification <sup>5</sup>	Days since last reported case
<b>Western Pacific Region</b>						
China	81077	29	3218	14	Local Transmission	0
Republic of Korea	8236	74	75	0	Local transmission	0
Japan	814	34	24	2	Local transmission	0
Malaysia	553	315	0	0	Local transmission	0
Australia	298	0	5	0	Local transmission	1
Singapore	243	31	0	0	Local transmission	0
Philippines	140	0	12	0	Local transmission	1
Viet Nam	57	4	0	0	Local transmission	0
Brunei Darussalam	50	10	0	0	Local transmission	0
Cambodia	12	0	0	0	Local transmission	1
New Zealand	6	0	0	0	Local transmission	2
Mongolia	1	0	0	0	Imported cases only	6
<b>Territories**</b>						

Table1: Source: WHO Situation Report 56: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200316-sitrep-56-covid-19.pdf?sfvrsn=9fda7db2\\_6](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200316-sitrep-56-covid-19.pdf?sfvrsn=9fda7db2_6)

**Figure 1. Countries, territories or areas with reported confirmed cases of COVID-19, 16 March 2020**

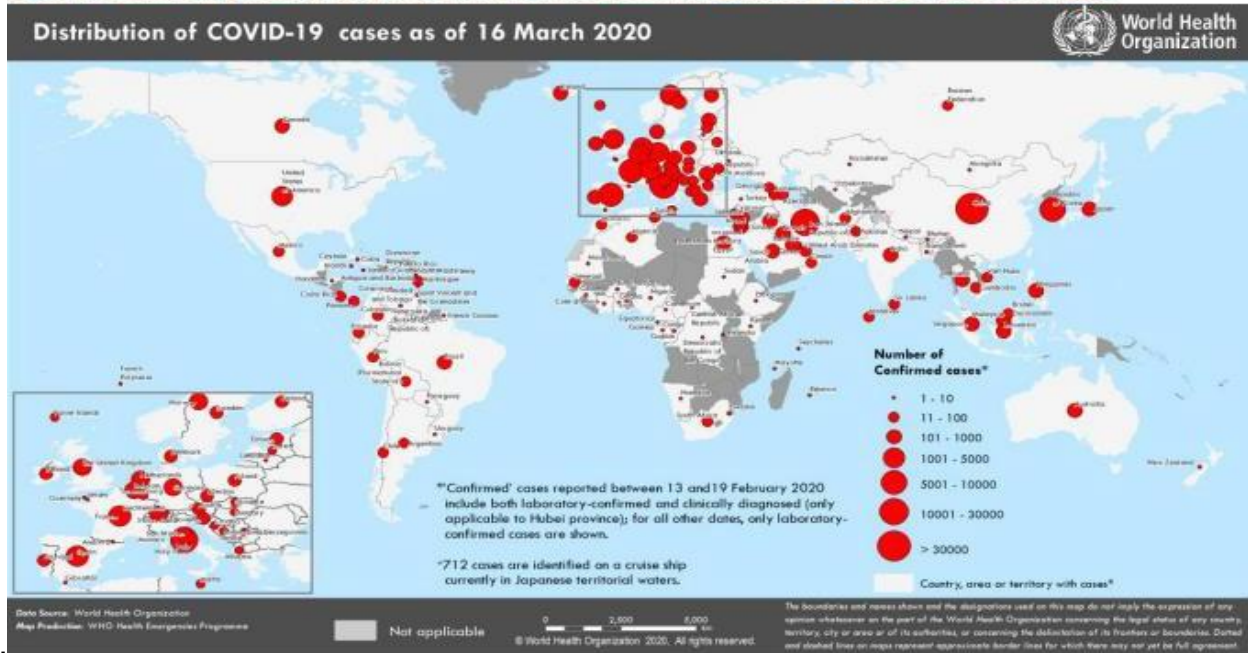


Figure 1: Source: WHO Situation Report 56: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200316-sitrep-56-covid-19.pdf?sfvrsn=9fda7db2\\_6](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200316-sitrep-56-covid-19.pdf?sfvrsn=9fda7db2_6)

## 2. Characteristics of COVID-19

a. Etiologic and Epidemiological Characteristics: Researching (continuous and systematic) the characteristics of the virus would enable addressing crucial unknowns regarding clinical severity, extent of transmission and infection, treatment options, thus accelerating the development of diagnostics, therapeutics and vaccines, and respectively - the development and implementation of effective control strategies. In light of the emergency character of the situation, China introduced changes in relevant normative framework. Importantly, for subsequent actions, on January 20, China’s “National Infectious Diseases Law” was amended to classify the 2019-novel coronavirus diseases (COVID-19) a Class B notifiable disease and its “Frontier Health and Quarantine Law” was amended to support the COVID-19 outbreak response effort.

### b. Case Definition and surveillance

i. Transmission: Robust and systematic information gathering on cases enables the early identification and consequent isolation and care for patients, including providing optimised care for infected patients Main type of transmission, as per China CDC report (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020) is human-to-human (close contact – droplets) and surface-to-human (infected surfaces):

- a) Community transmission – one community, different clusters with limited relation;
  - b) Local transmission - locations where the source of infection is within the reporting location;
  - c) Imported cases - locations where cases have been acquired outside the location of reporting;
  - d) Interrupted transmission - locations where interruption of transmission has been demonstrated (details to be determined)
- i. Types of cases: What is important to note here is the lag between the time patients fall ill (exhibit some sort of symptoms) and the time they actually are diagnosed and reported. In China, although confirmed cases peaked around end January 23–27, diagnosis of infection by nucleic acid testing of throat swabs only spiked around beginning February. (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020).

<p><b>Box 1. Interim case definitions for the purpose of the FFX protocol</b></p> <p><b>Suspected case</b></p> <p>A. A patient with severe acute respiratory infection (fever, cough and requiring admission to hospital), <b>AND</b> with no other etiology that fully explains the clinical presentation, <b>AND</b> a history of travel to or residence in China during the 14 days prior to symptom onset,</p> <p><b>OR</b></p> <p>B. A patient with any acute respiratory illness <b>AND</b> at least one of the following during the 14 days prior to symptom onset:</p> <ul style="list-style-type: none"> <li>• contact with a confirmed or probable case of COVID-19 infection, <b>OR</b></li> <li>• worked in or attended a health-care facility where patients with confirmed or probable COVID-19 were being treated.</li> </ul>
<p><b>Probable case</b></p> <p>A suspected case for whom testing for COVID-19 is inconclusive or who tested positive using a pan-coronavirus assay, and without laboratory evidence of other respiratory pathogens.</p>
<p><b>Confirmed case</b></p> <p>A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.</p> <p><b>Further classification of confirmed case</b></p> <p><b>A. Primary case (or index case):</b> an individual who tests positive for COVID-19 and has the earliest onset date in a particular setting, for example, household, school, hospital, etc. Cases with onset dates less than 24 hours from the onset date of the primary case are considered to be “co-primary” cases.</p> <p><b>B. Secondary case:</b> a contact who becomes a case with positive test result 24 hours or more after the latest positive test date of the primary and/or co-primary case; or with onset of symptoms 24 hours or more after the latest onset date of the primary and/or co-primary case.</p> <p><b>C. Imported case:</b> a case with a history of travel from an affected area in the 14 days before disease onset.</p>

<p><b>Box 2:</b> Chinese classification (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020)</p> <p><b>1. Confirmed cases</b></p> <ul style="list-style-type: none"> <li>- diagnosed based on positive viral nucleic acid test results on throat swab samples</li> </ul> <p><b>2. Suspected cases</b></p> <ul style="list-style-type: none"> <li>- Wuhan-related exposure - recently resided in or visited Wuhan</li> <li>- Close contact with someone who recently resided in or visited Wuhan.</li> <li>- Comorbid conditions - self-reported medical history*</li> </ul> <p><b>3. Clinically diagnosed**</b></p> <ul style="list-style-type: none"> <li>- diagnosed clinically based on symptoms and exposures. Clinically diagnosed cases were suspected cases with lung imaging features consistent with coronavirus pneumonia</li> </ul> <p><b>4. Asymptomatic***</b></p> <ul style="list-style-type: none"> <li>- diagnosed on positive viral nucleic acid test results but without COVID-19 symptoms (e.g., fever, dry cough). The date of positive viral nucleic acid test result is pointed as the onset date for asymptomatic cases.</li> </ul> <p>* As per the description of cases, Chinese <i>confirmed</i> and <i>clinically diagnosed</i> classification overlaps with WHO’s definition of <i>confirmed</i>.</p> <p>** As per <b>Figure 1</b> below most commonly recorded were: <i>cardiovascular disease, diabetes, chronic respiratory disease</i>, hypertension, and for cancer.</p> <p>***Asymptomatic infection has been reported, yet rare, with patients asymptomatic on the date of identification/report went on to develop disease. Not a major driver for transmission (WHO-China Joint Commission on Coronavirus Disease 2020)</p>
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<sup>4</sup> Box 1 source: The First Few X cases and contacts (FFX) investigation protocol for coronavirus disease 2019 (COVID-19): [https://www.who.int/publications-detail/the-first-few-x-\(ffx\)-cases-and-contact-investigation-protocol-for-2019-novel-coronavirus-\(2019-ncov\)-infection](https://www.who.int/publications-detail/the-first-few-x-(ffx)-cases-and-contact-investigation-protocol-for-2019-novel-coronavirus-(2019-ncov)-infection)

<sup>5</sup> Compiled based on (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020).

c. Symptomatic

Symptoms are categorised, based on their intensity, as *mild*, *severe*, or *critical*. *Mild* includes non-pneumonia and mild pneumonia cases. *Severe* include dyspnea, increase in respiratory frequency, decreased blood oxygen saturation, increased lung infiltrates >50% within 24–48 hours. *Critical* cases were those that exhibited respiratory failure, septic shock, and/or multiple organ dysfunction/failure (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020).

d. Demographics (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020)

Among confirmed cases in China, the majority were aged 30–79 years and considered mild. An overall case fatality rate of 2.3%. The COVID-19 spread outward from Hubei Province sometime after December 2019, and by February 11, 2020, 1,386 counties across all 31 provinces were affected. The epidemic curve of onset of symptoms peaked around January 23–26, then began to decline leading up to February 11.

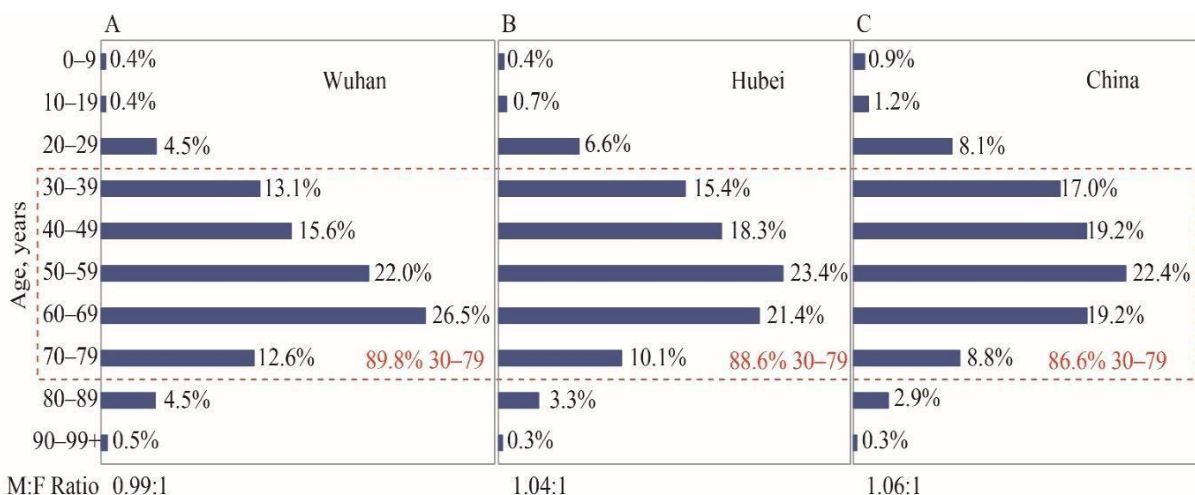


Figure 1 Source, including description: (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020).

*Description:* Age distribution and sex ratio of all confirmed COVID-19 cases in China through February 11, 2020. (A) patients diagnosed in the city of Wuhan only; (B) patients diagnosed in Hubei Province, which includes Wuhan as its capital city; and (C) patients diagnosed in China overall, including Hubei Province and all 30 other provincial-level administrative divisions (PLADs). Dashed red line highlights the proportion of patients in the 30–79 years age range. Sex ratio (i.e. male-to-female [M:F] ratio) is shown below each graph.

e. Timeline of cases



### Chart 7: Timeline of Events in Hubei

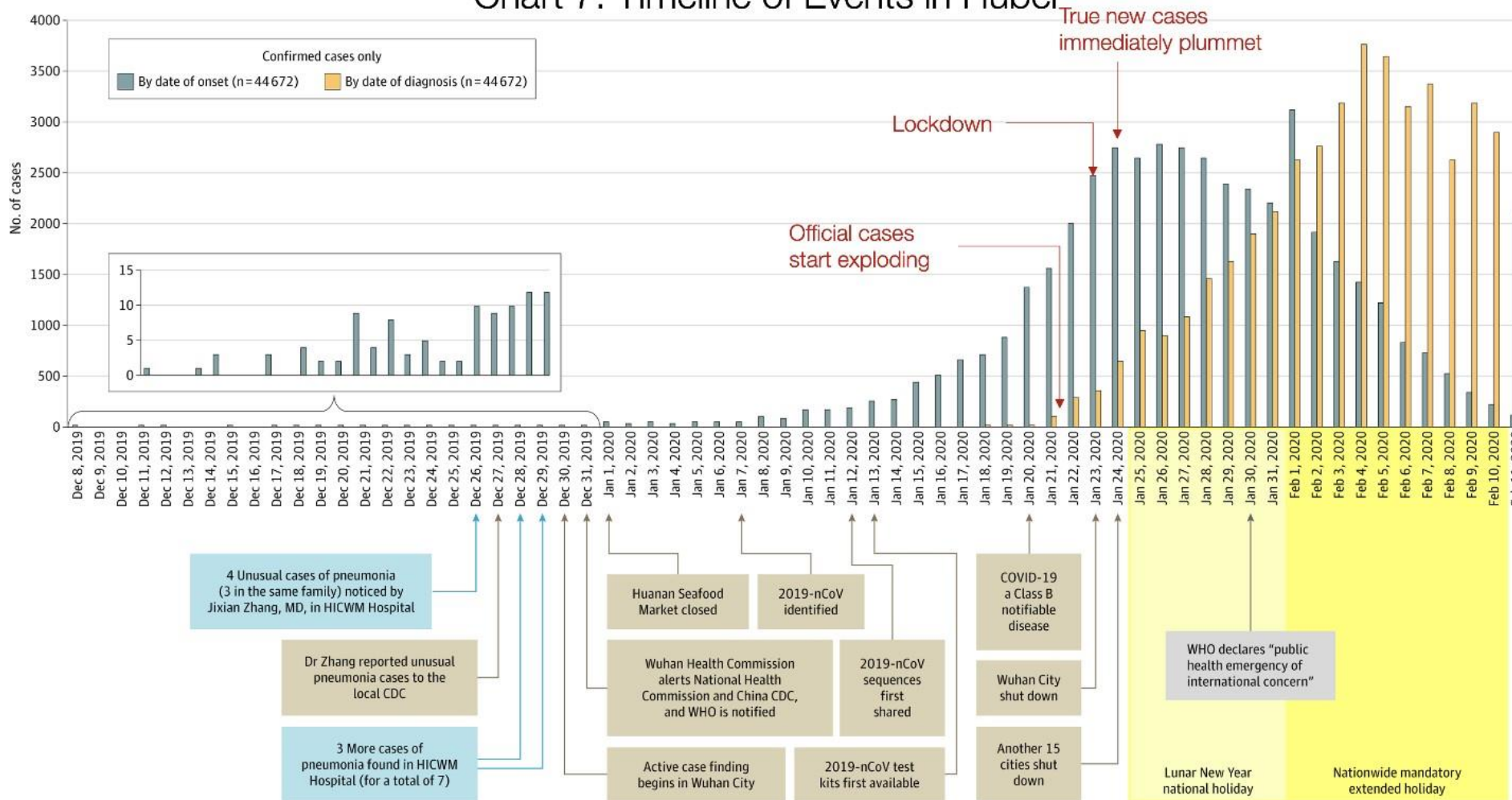


Figure 2

Source: Tomas Pueyo analysis over chart from the Journal of the American Medical Association, based on raw case data from the Chinese Center for Disease Control and Prevention

In Figure 2 (Pueyo 2020) the orange bars represent the daily official number of cases in China's Hubei province. The grey bars on the other hand, show the *true* daily coronavirus cases, i.e. when symptoms first exhibited in patients. The measure of quarantining and shutting Wuhan down did prove effective as cases started decreasing as a result. This chart will serve to inform an estimation on COVID-19 spread in the Republic of Bulgaria – onset of illness peak and de-escalation.



*Photo 1 - Medical workers in the intensive care unit of a designated hospital in Wuhan, China, original source - China Daily/Reuters via Washington Post, in Tomas Pueyo,*

- Response** (based on (WHO-China Joint Commission on Coronavirus Disease 2020): China performed an unmatched disease containment effort. The strategy underpinning this containment was initially a national approach that promoted universal temperature monitoring, masking, and hand washing. As the outbreak evolved, and knowledge was **gained, a science and risk-based approach was taken to tailor implementation. Specific containment measures were adjusted to the provincial, county and even community context, the capacity of the setting, and the nature of novel coronavirus transmission.** A major focus of the response is on case detection (type) and contact tracing (transmission). China has a four-tier response system for public health emergencies that determines what measures it will implement, with level I being

the most serious<sup>6</sup>. The biggest concern in a pandemic situation is the capacity of the healthcare system to tackle the emergency without getting overwhelmed in terms of both medical staff (qualified and skilled) and equipment (in this case ICU units).

A combination of public health measures is aimed at reducing human-to-human transmission including reducing secondary infections among close contacts and health care workers, preventing transmission amplification events (i.e. mass gatherings) through social distancing, and preventing further international spread (curbing travel and movement). In general, and depending on time, scope, and strictness of implementation such measure may include rapid identification, diagnosis and management of the cases, identification and follow up of the contacts, infection prevention and control in health care settings, implementation of health measures for travellers, awareness-raising in the population and risk communication. In all cases, risk assessment should precede any response measure to ensure its relevance and effectiveness.

1. **Risk assessment** (Direct quotations from (National Health Commission of the People's Republic of China 2020, 2-3) (emphases added)

- i. **Low-risk areas** - the strategy is to **“strictly prevent importation”** - strengthening tracking and management of people coming in from areas with severe outbreaks and high-risk areas and enhancing health monitoring and services. Monitoring, detection, and reporting of outpatients with fever, including timely epidemiological investigations and tracking and careful management of close contacts should be strengthened. **The government should provide guidance to both urban and rural communities, government agencies, enterprises, and public institutions to strictly implement community prevention and control measures, improve environmental hygiene, and promote disease prevention knowledge and skills to the general public.**
- ii. **Medium-risk areas** - the strategy is **“to prevent importation and stop local transmission”**. This includes the measures for low-risk areas, augmented with preparation for medical treatment, personnel, materials, and venues required for disease prevention and control efforts, and isolated medical observation and management of close contacts. School classrooms, building units, factory workplaces, and workplace offices will serve as the smallest units of regulation. Resources, such as personnel for prevention and control and tailored measures, can be identified and located based on a case-by-case review, epidemiological investigation, and epidemic situational analysis.
- iii. **High-risk areas** - the strategy is **“to stop local transmission, prevent exportation, and implement strict prevention and control measures”**. In addition to measures for medium-risk areas, this strategy involves stopping activities involving **gatherings of people and**

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<sup>6</sup>WHO Situation Report 56.

**implementing regional traffic controls—with approval and in accordance with law and procedures.** Every county should conduct comprehensive screenings of patients with fever; admit and manage in a timely manner suspected cases, confirmed cases, and **asymptomatically-infected patients**; and isolate and place **close contacts under medical observation**. Disinfection shall be conducted in sites with community transmission or **clustered outbreaks** in urban residential areas or rural villages, and control measures shall be taken to restrict the gathering, entry, and exit of people from the above sites.

It is essential that dynamic research and analysis are continuously conducted to timely adjust risk levels and gradually reduce emergency levels or/and ultimately terminate emergency response upon confirmation of a steady decline in cases, i.e. effective control of the risk of epidemic spread.

2. **Measures** – adapted from (WHO-China Joint Commission on Coronavirus Disease 2020), (National Health Commission of the People’s Republic of China 2020) and (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020) including direct quotations. Emphases added.

Main focus: Precision, prevention and control tailored to specific areas and levels in accordance with the Law of the People's Republic of China on the Prevention and Treatment of Infectious Diseases and the Regulations on Emergency Response to Public Health Emergencies (China CDC Weekly 2020). **Epidemic risk level is therefore assessed for each county/district based on demographic and epidemiological situation.**

Organisation: CPC Central Committee and the State Council launched the national emergency response in China by declaring in December 2019 a public health emergency. A Central Leadership Group for Epidemic Response and the Joint Prevention and Control Mechanism of the State Council were established. General Secretary Xi Jinping personally directed and deployed the prevention and control work and requested that the prevention and control of the COVID-19 outbreak be the top priority of government at all levels. A formal investigation was initiated, which involved **a broad interagency coordination and support within delegated authority and responsibilities**, which proved beneficial in enabling efficient and effective (tailored) response while eliminating duplications, costly waste, overburdening, and facilitating communication. Specific entities in this cooperation effort included the city (Wuhan Municipal Health Commission and Wuhan CDC), provincial (Health Commission of Hubei Province and Hubei Provincial CDC), and national (National Health Commission and China CDC) authorities and resources.

The city where the virus reportedly originated – Wuhan - is the largest city in Central China, Hubei Province, with a population of over 11 million people<sup>7</sup>. By

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<sup>7</sup> Source: Worldometers at <https://www.worldometers.info/coronavirus/#countries>

means of isolating the virus and minimising the spread to other countries, a preventive measure, defined by WHO as "unprecedented in public health history"<sup>8</sup>, the city was gradually completely shut down and placed under a quarantine. Other cities followed suit.

By categorising COVID-19 as a **Class B notifiable disease**, Chinese law required all cases to be immediately reported to China's Infectious Disease Information System. Entry of each case into the system was performed by local epidemiologists and public health workers who **investigated and collected information on possible exposures**. All case records contain national identification numbers, and therefore, all cases have records in the system and no records are duplicated (The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team - China CDC 2020). **The existing information system coupled by qualified and skill personnel (administrative and medical) enabled systematic recording of vigorously collected data, which then informed subsequent medical analysis and conclusions.**

Three major phases can be defined in the management of COVID-19 spread in China. What follows is adapted or quoted from WHO-China Joint Commission on Coronavirus Disease 2020. Emphases added.

- i. **Phase 1.** The overall aim was to **control** the source of infection, **block** transmission and **prevent** further spread. The response mechanism was initiated with **multi-sectoral involvement in joint prevention and control measures**. Information on the epidemic was notified to WHO on 3 January, and whole genome sequences of the COVID-19 virus were shared with WHO on 10 January. Protocols for COVID-19 diagnosis and treatment, surveillance, epidemiological investigation, management of close contacts, and laboratory testing were formulated, and relevant surveillance activities and epidemiological investigations conducted. **Diagnostic testing kits were developed, and wildlife and live poultry markets were placed under strict supervision and control measures.**
- ii. **Phase 2.** The main strategy was to **reduce** the intensity of the epidemic and to **slow down the increase in cases**. In **Wuhan** and other priority areas of Hubei Province, the focus was on actively **treating patients, reducing deaths, and preventing exportations**. In other provinces, the focus was on preventing importations, curbing the spread of the disease and implementing joint prevention and control measures. Wuhan implemented strict traffic restrictions. The protocols for diagnosis, treatment and epidemic prevention and control were improved; case isolation and treatment were strengthened. Measures were taken to ensure that all cases were treated, and **close contacts were isolated and put under medical observation**. Information about the epidemic

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<sup>8</sup> Reuters. January 23, 2020 in Worldometers (<https://www.worldometers.info/coronavirus/#ref-12>)

and prevention and control measures was regularly released. **Public risk communications and health education were strengthened; allocation of medical supplies was coordinated**, new hospitals were built<sup>9</sup>, reserve beds were used and relevant premises were repurposed to ensure that all cases could be treated; efforts were made to maintain a stable supply of commodities and their prices to ensure the smooth operation of society.

- iii. **Phase 3.** The focus was on **reducing clusters of cases**<sup>10</sup>, thoroughly controlling the epidemic, and striking a balance between epidemic prevention and control, sustainable **economic and social development, the unified command, standardized guidance, and scientific evidence-based policy implementation. A risk-based prevention and control approach was adopted with differentiated prevention and control measures for different regions of the country and provinces.** Relevant measures were strengthened in the areas of epidemiological investigation, case management and epidemic prevention in high-risk public places. **New technologies were applied such as the use of big data and artificial intelligence (AI) to strengthen contact tracing and the management of priority populations.** Pre-school preparation was improved, and work resumed in phases. Normal social operations are being restored in a stepwise fashion; knowledge about disease prevention is being popularised to improve public health literacy and skills; and a **comprehensive programme of emergency scientific research is being carried out to develop diagnostics, therapeutics and vaccines, delineate the spectrum of the disease, and identify the source of the virus.**
3. A summary of main control measures implemented in China at the provincial and municipal levels within these three phases (Direct quotation (WHO-China Joint Commission on Coronavirus Disease 2020, 28).
    - i. **Monitoring and reporting:** COVID-19 included in the statutory reporting of infectious diseases early on and plans were formulated to strengthen diagnosis, monitoring, and reporting.
    - ii. **Strengthening ports of entry and quarantine:** Customs Department launched the emergency plan for public health emergencies at ports across the country and restarted the health declaration card system for entry and exit into cities as well as strict monitoring of the temperature of entry and exit passengers.
    - iii. **Treatment:** For severe or critical patients, the principle of "Four Concentrations" was implemented: i.e. concentrating patients, medical experts, resources and treatment into special centres. All cities and

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<sup>9</sup>As of Feb. 28, Wuhan had created 16 temporary hospitals, adding 13,000 beds, with 12,000 people treated so far. Overall, the number of Wuhan hospital beds have risen from 5,000 to 23,000. Source: Ibid.

<sup>10</sup>"Clustered cases - two or more cases with fever and/or respiratory symptoms in a small area such as in families, offices, schools, workplaces, and other gatherings within 14 days, in which there exists the possibility of human-to-human transmission or common exposure." (National Health Commission of the People's Republic of China 2020, 1-2)

districts transformed relevant hospitals, increased the number of designated hospitals, dispatched medical staff, and set up expert groups for consultation, so as to minimise mortality of severe patients. Medical resources from all over China have been mobilized to support the medical treatment of patients in Wuhan.

- iv. **Epidemiological investigation and close contact management** (see **Figure 3** below) Strong epidemiological investigations are being carried out for cases, clusters, and contacts to identify the source of infection and implement targeted control measures, such as contact tracing.
- v. **Social distancing:** Cancelled or suspended activities like sport events, cinema, theatre, and schools and colleges in all parts of China. Enterprises and institutions have staggered their return to work. Transportation Departments setup thousands of health and quarantine stations in national service areas, and in entrances and exits for passengers at stations. Hubei Province adopted the most stringent traffic control measures, such as suspension of urban public transport, including subway, ferry and long-distance passenger transport. Every citizen has to wear a mask in public. Home support mechanisms were established. As a consequence of all of these measures, public life is very reduced.
- vi. **Funding and material support:** Payment of health insurance was taken over by the state, as well as the work to improve accessibility and affordability of medical materials, provide personal protection materials, and ensure basic living materials for affected people.
- vii. **Emergency material support:** The government restored production and expanded production capacity, organised key enterprises that have already started to exceed current production capacity, supported local enterprises to expand imports, and used cross-border e-commerce platforms and enterprises to help import medical materials and improve the ability to guarantee supplies.

Fig. 2. Case investigation algorithm and summary of data-collection tools

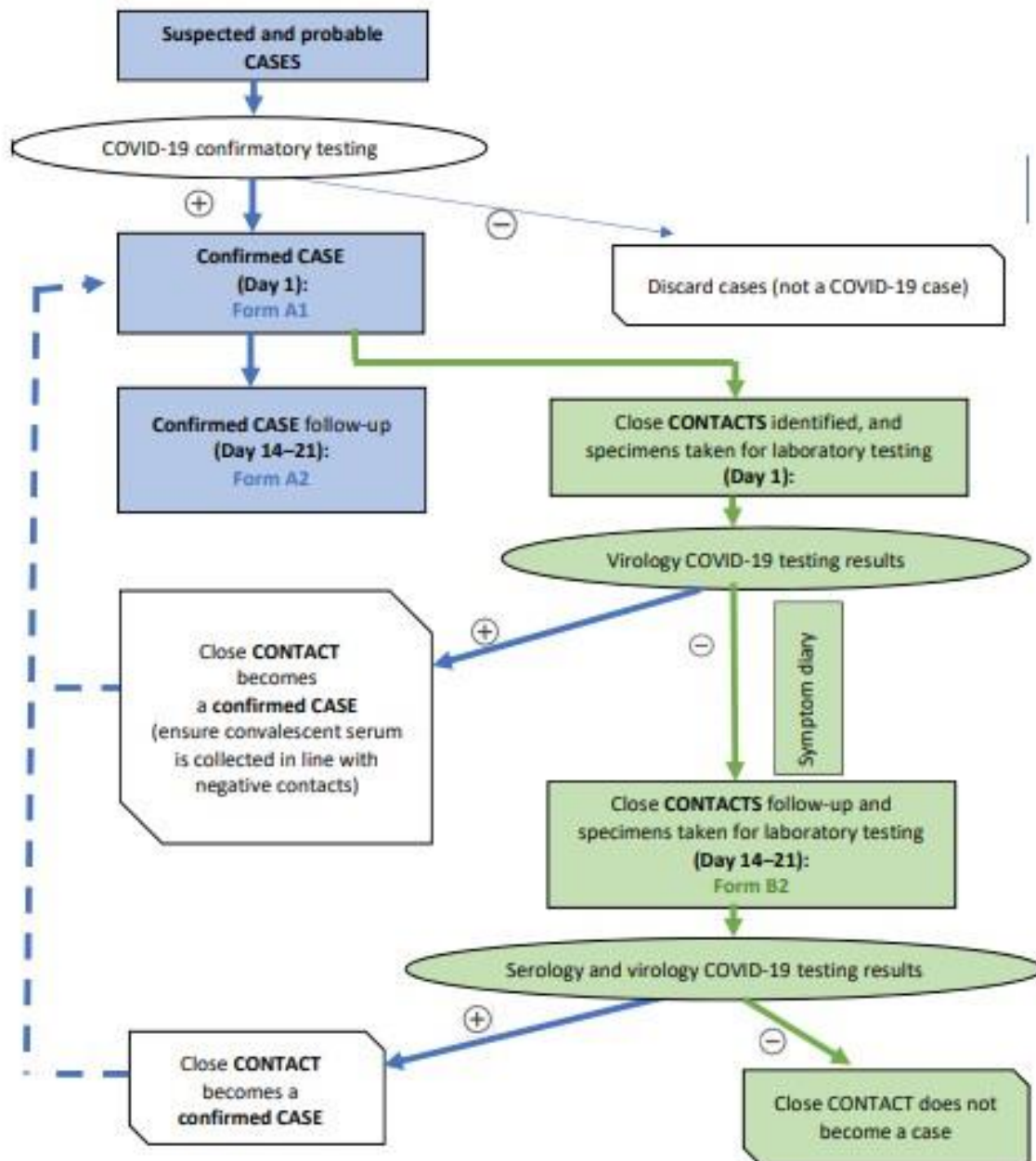


Figure 3 - Source: WHO: The First Few X cases and contacts (FFX) investigation protocol for coronavirus disease 2019 (COVID-19)

4. Risk information: Providing in a transparent and systematic manner accurate, verified and up-to-date information to ensure public awareness, prevent panic and fight misinformation / disinformation.



### 3. Conclusions

COVID-19 epidemic spread very quickly taking only 30 days to expand from Hubei to the rest of Mainland China. China followed protocols and procedures developed by WHO and rapidly developed testing tools and additional preventive measures. Furthermore, the country managed to apply total isolation and to ensure the understanding and compliance of its population. China had already in place a well-developed system of emergency situation laws, guidance, procedures, and command and control which enabled the country to swiftly re-organise its standard routines to handling an emergency situation.

In the past week, reportedly eighteen provinces across China have lowered their coronavirus emergency response level, nevertheless, the country is reporting new COVID-19 cases of people returning from abroad<sup>11</sup>. The efforts of Chinese scientists and public health experts apart from remarkably quick, have also been highly successful at isolating the causative virus, establishing diagnostic tools, and determined key transmission parameters such as the route of spread and incubation period. **China's approach can be summarised as highly effective coordination and communication between institutions at all levels, coupled by a science-based, risk-informed and phased approach and timely, transparent and focused public information, which ensured public support and respect for measures.** Solidarity among provinces and cities has also been remarkable. This whole-of-government and society and people-centred approach has proven its utility in flattening the curve of infection in China.

China is cautious of a possible rebound to COVID-19<sup>12</sup> and is therefore preparing to apply “even more tailored and sustainable approaches that are anchored in very rapid case detection, instant activation of key containment activities, direct oversight by top leadership, and broad community engagement.” (WHO-China Joint Commission on Coronavirus Disease 2020, 18)

China's experience strongly points to the efficacy and effectiveness of a differentiated risk-based containment strategy to manage “the outbreak in areas with no cases vs. sporadic cases vs. clusters of cases vs. community-level transmission” (WHO-China Joint Commission on Coronavirus Disease 2020, 19) and such a strategy would ensure a sustainable approach while minimizing the socio-economic impact (Ibid).

### 4. Estimations, assumptions and Recommendations for Bulgaria

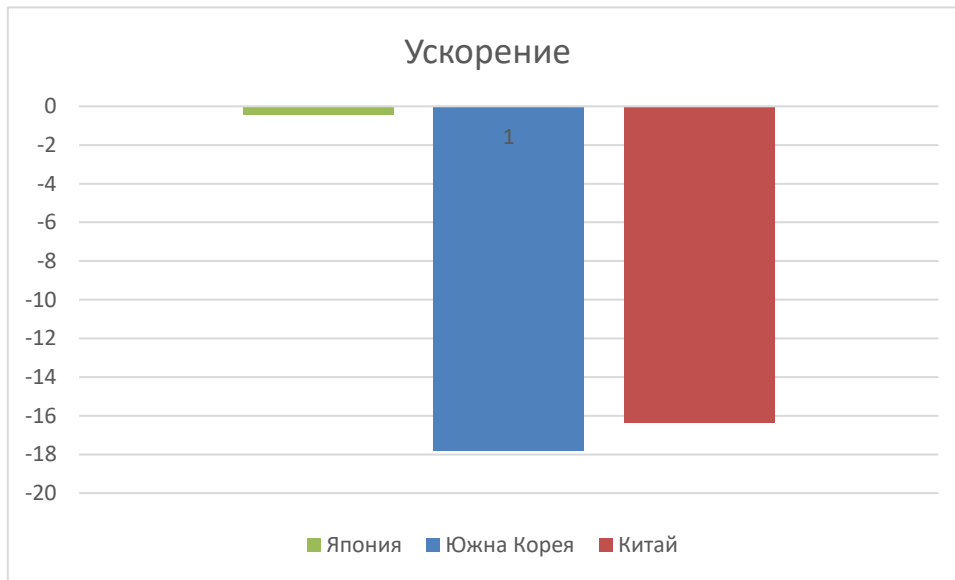
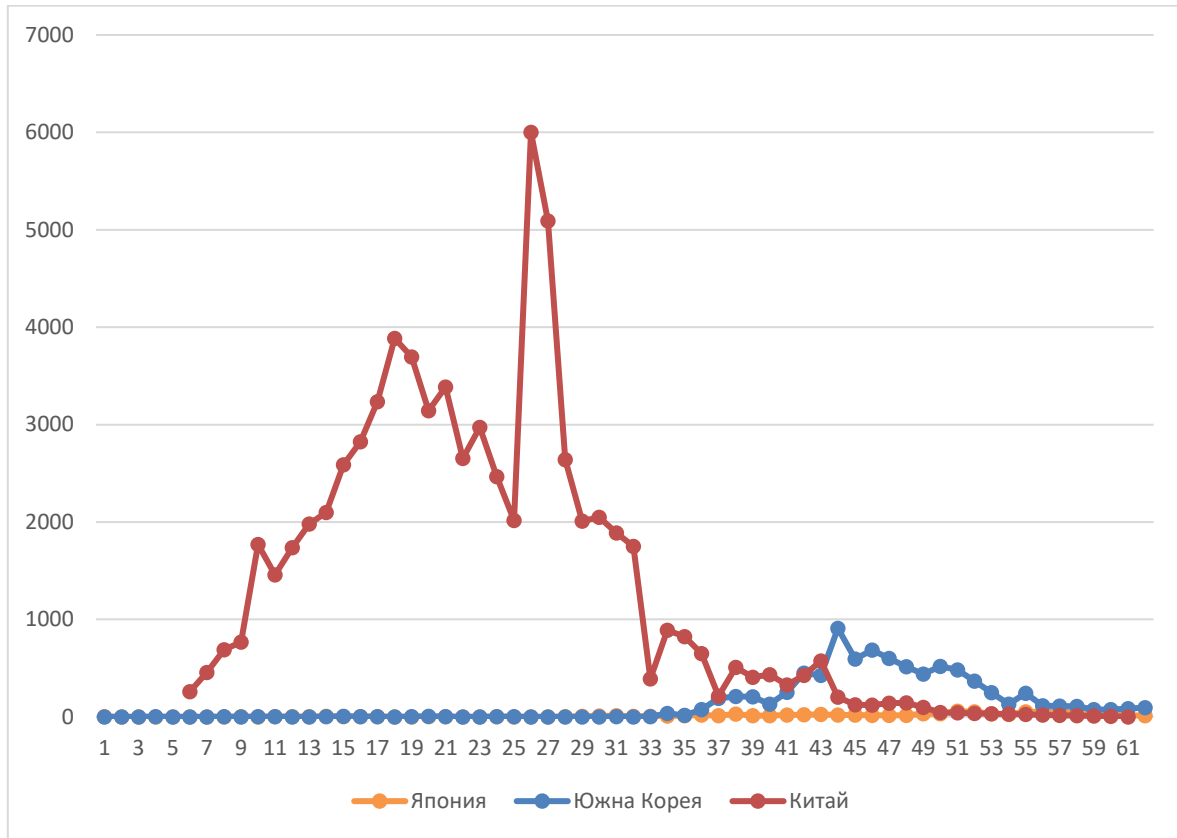
The Chinese approach and, respectfully measures in response to COVID-19 are essentially characterized by enhanced control on monitoring, immediate detection, diagnosis and isolation, tracing of clusters (investigating close contacts) and quarantine besides a high level of understanding and acceptance by the population of the undertakings measures (WHO-China Joint Committee on Coronavirus Disease 2020). The success of such rigorous measures depends to a large extent on the speed of decision-making (leadership and political processes), the quality of implementation (implementation and support by the public) and the strength and viability of the public health system.

China's main strategy of risk-mitigation requires high levels of coordination and alignment with crisis response procedures. As the number of infected reaches its peak, the efforts goes to the next phase - mitigation. Increasing of social distance is needed at this phase. As sooner the measure is implemented and massively supported by the population, the less time it will take to identify cases, which will, respectively, lead to a reduction in the number of infected persons. (Pueyo 2020). Based on the development trajectory of COVID-19 in China (Figure 2) and using the model proposed by Pueyo (Pueyo 2020), we can identify three main areas that will help us to make a relative prognosis for the evolution of COVID-19 Bulgaria.

- size, scale and distribution / availability of people, technical (ie equipment) and financial resources and available infrastructure (ie specialized institutional and regulatory framework);
- political system, and
- collective consciousness.

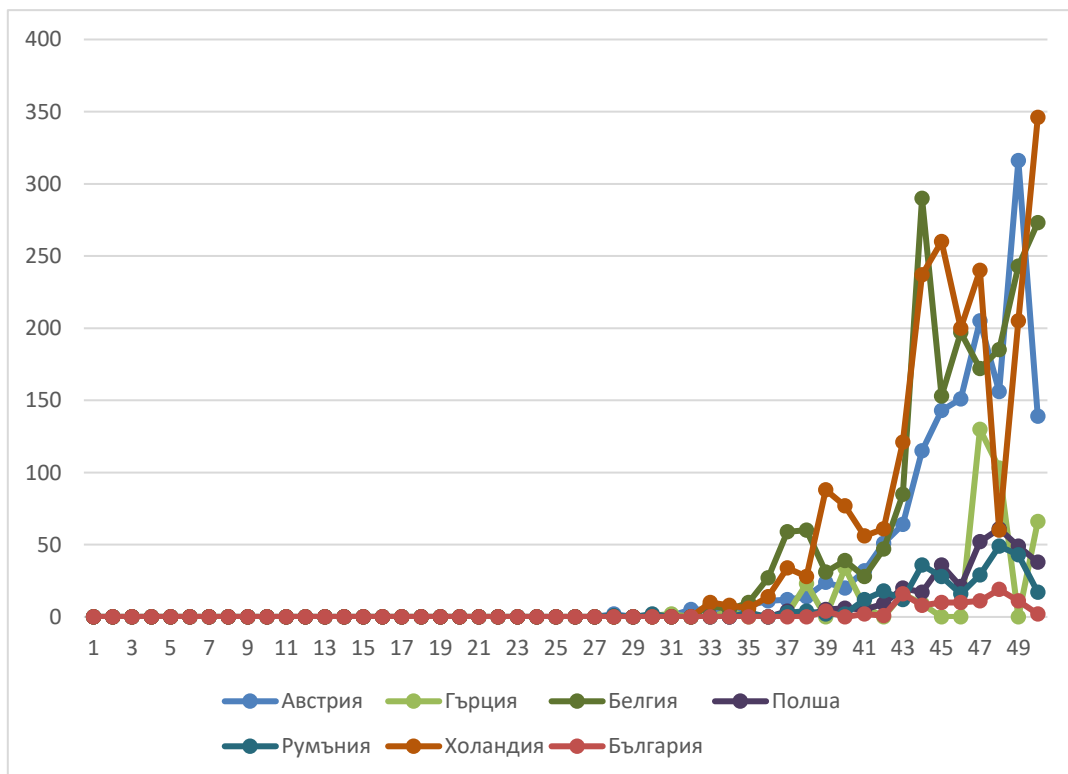
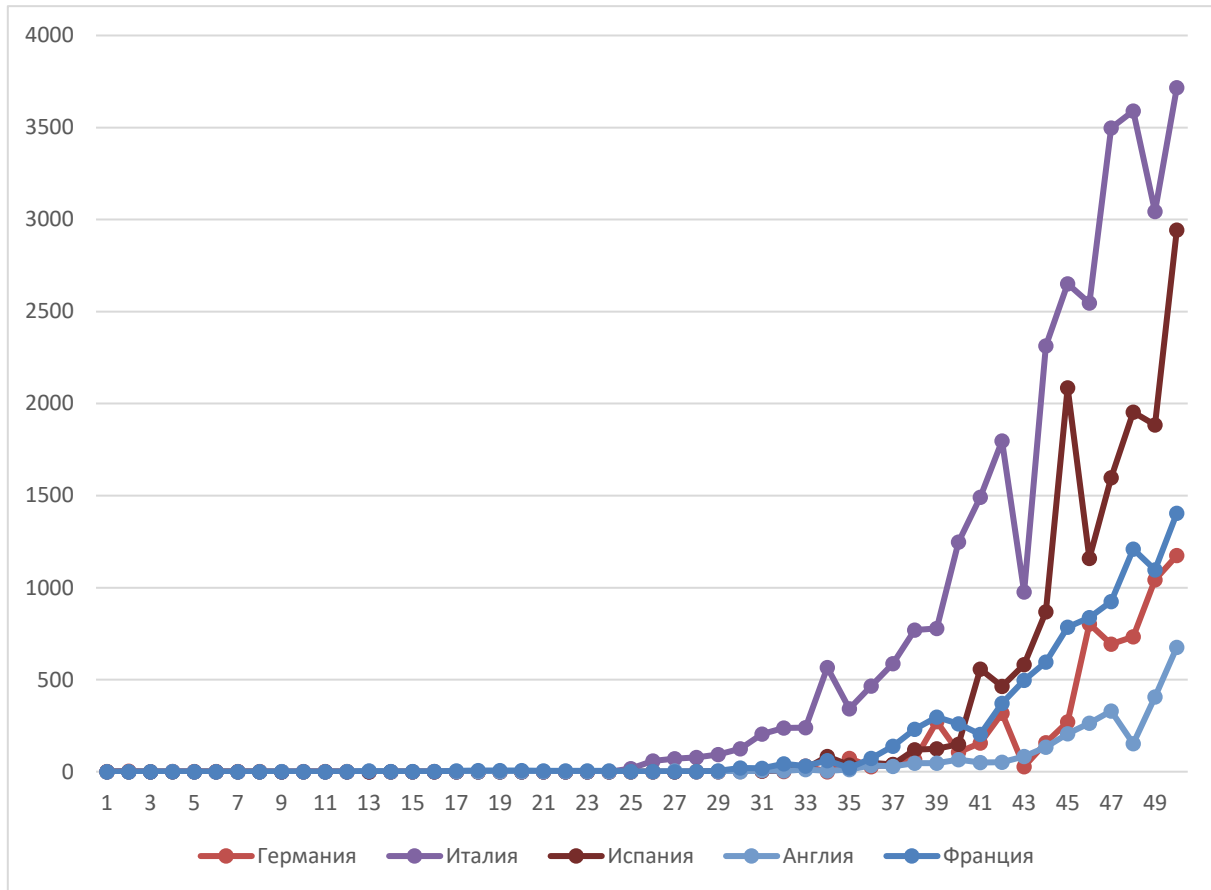
In the case of China, the disease occurs in the period 1-15 December 2019. In January, China isolated the pathogen and began testing. In February, the peak of the infection was observed, and in the middle of March`2020 - slow and steady de-escalation and control of the infection. Most cases at this stage are mainly infected persons who entered in China from other countries.

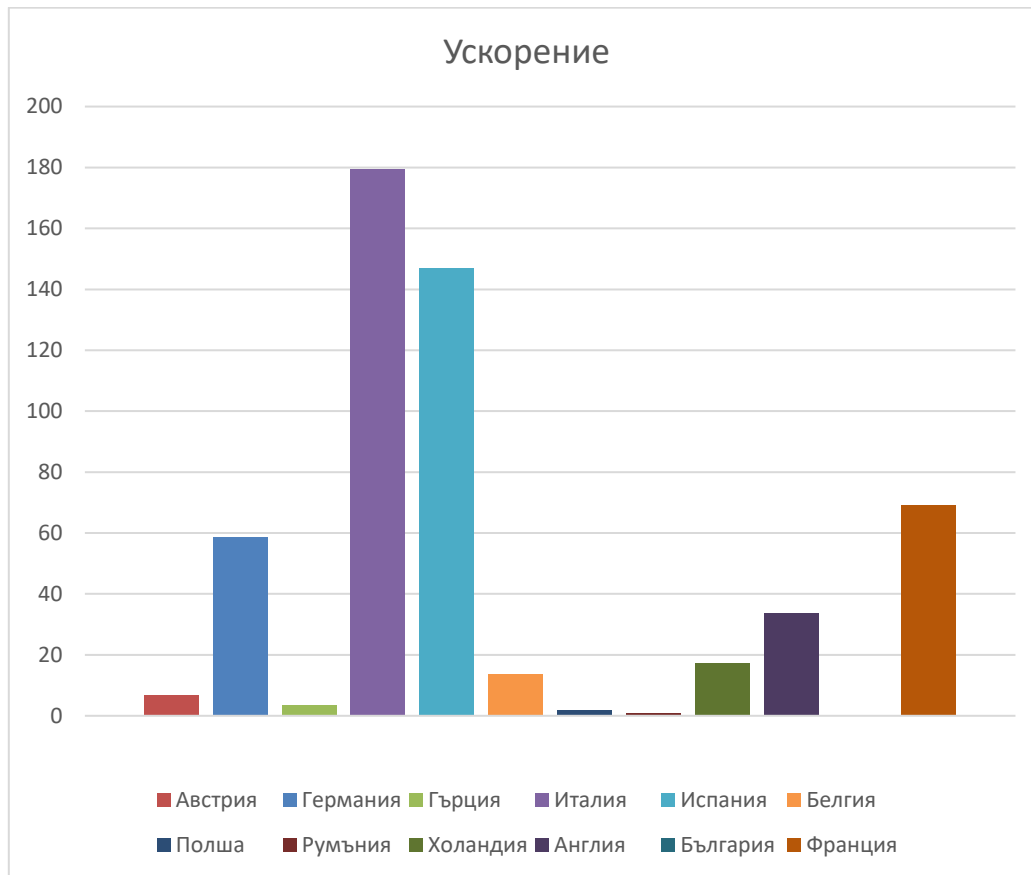
The situation is peculiar in countries such as South Korea and most notably Japan and Taiwan, located close to China and where the virus was a bit detained to inflict same damages as numbers are decreasing presently. What seems a question at the moment is whether will be a second wave and when and in fact whether the full scale will be announced, including those who have had it in mild form without medical assistance. Also of interest is whether the virus has been cured or mildly recovered, or has developed immunity.



Charts 1 and 2 show the rate of infection increase in certain countries, compared to the statistics of officially diseased by day, and chart 3 shows the acceleration of the number of infected in those countries. Graph 3 is particularly indicative of the type of virus spread function. The high values for Italy, France, Spain correspond to the geometric progression of the disease. For Bulgaria, the progression is still arithmetic, which gives sense that the situation in the country is under control and the measures adopted are working properly. It is evident that the potential peak of morbidity has not been reached across Europe,

including Bulgaria. At present, there is no way to analyze data on the actual number of COVID-19 patients, since in some cases the disease elapses with little or no symptoms.





Characteristically to all European countries is that taken measures gain result to a greater or lesser extent depending on types of measure and the timing of implementation. This is clearly evident from the dynamics of the charts and the lack of a clear, constant positive or negative trend. This shows the potential of the pandemic in the absence of management and control measures. It should be noted that the low morbidity of some measures is also responsible for the high morbidity characteristic of COVID-19.

In its first analysis report to the MoD, CMDR COE identified three possible approaches to crisis response, namely:

1. Diminish the causative agent - finding a vaccine and/or cure to deal with the virus. At the moment such have not yet been developed;
2. Adopt measures to detain the spread of the infection. It has a very negative economic effect.
3. Focusing on the treatment and monitoring of affected individuals and related individuals and lack of restrictive measures to stop the spread of the infection. The ultimate goal is to build natural immunity.

Using the experience of China, most countries have chosen option 2 as more humane and providing time to mobilize resources to deal with the crisis.

As stated in the first report, the characteristic for all countries is the highly negative economic effect. The process is self-accelerating and proactive government action is needed to deal with it. What is alarming is the fact that much of society does not

understand the gravity of the crisis. In addition to adhering to the imposed measures for all, a large percentage of people have decided to self-isolate and stop work for 10-14 days - the time during which the virus is cured. They think that after that time the peak will be gone and the danger will almost never exist.

It relies on a financial reserve. In this way, supply chains are interrupted and entire production is stopped. In many cases, these are areas and services with low risk of illness and lack of clusters. It is necessary to implement a series of measures to preserve the production and employment of people in crisis. In this context, high priority is the use of strategic communication to make it clear to the population that the pandemic can last a considerable time - from a few months to a year. The messages transmitted so far have reached people and they demonstrate conscious and responsible behavior. Now it is necessary to find the exact time when they will be able to return as close to a normal lifestyle as possible, while respecting both the measures and restrictions adopted.

An important indicator of this factor is the death rate in Germany in relation to the large number of sick people (13,744 cases versus 42 deaths). One of the reasons probably is that, a month before the measures and the state of emergency were announced, they stayed in their homes and an organization was set up to supply them with the necessary life-sustaining products.

Industry and business require to be assisted in order to maintain production capacity in active mode. This must also happen by shifting towards meeting the needs of the internal market.

In addition to analyzing the spread dynamics of COVID-19, CMDR COE analyzes the sources for increasing the resilience of society in a crisis. To do this, it uses a mathematical model that takes into account the correlations between the parameters of the functions.

The model is based on the PIMESII concept of analysis, which takes into account the main factors: politics, economy, army, society, infrastructure, information, industry.

The impact of sustainability in the short, medium and long term is examined.

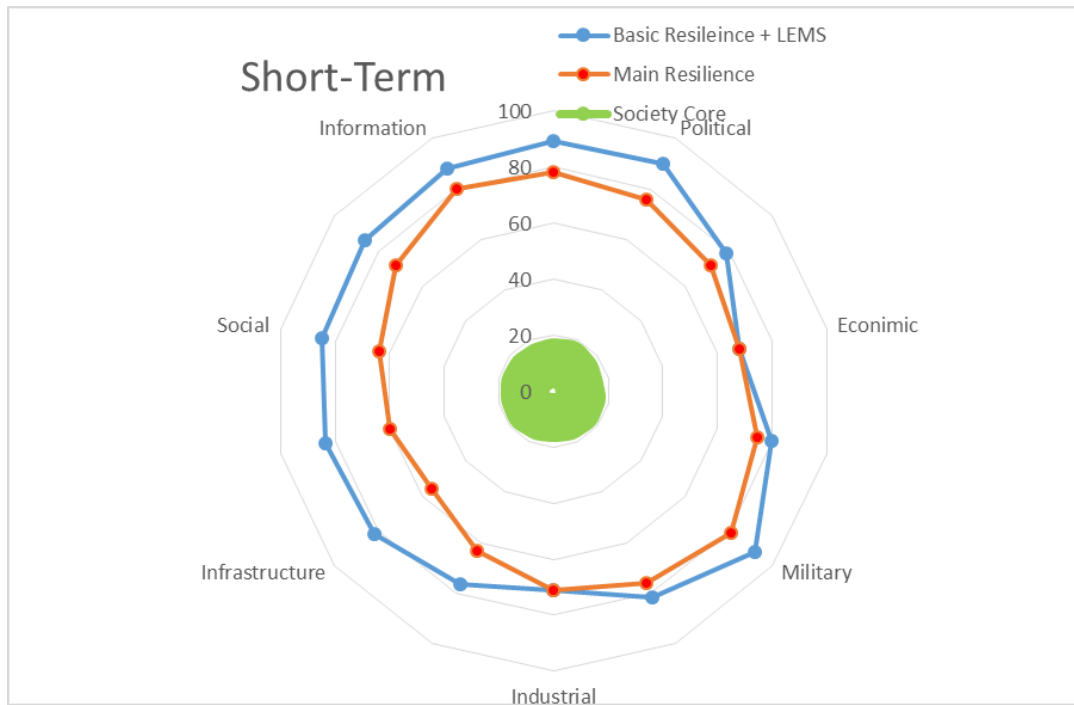
Currently, the potential for additional use of the system's capabilities is being discovered in all sources. Excessive use of any of them leads to negative effects in the medium and / or long term.

This is the case with industry. This domain is currently under considerable pressure and is likely to intensify in the coming months. A large number of analysts consider the virus crisis to be a trigger for a global economic crisis. It can be seen that the direct use of industry reserves to increase the resilience of society in this case will have an additional negative effect. According to the model applied, a positive result would be obtained by engaging the industry and the business in general in the process of generating a response to the crisis and subsequent recovery with financial support from the state. This positive trend is also maintained in the medium term. In the long term there is a minimal decline.

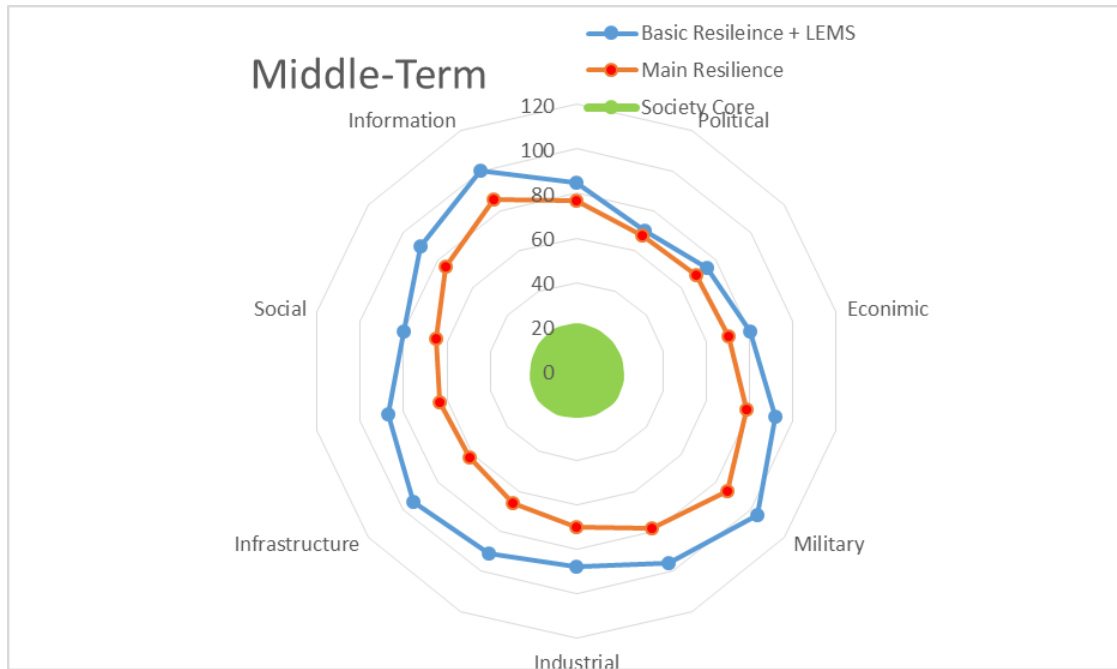
Reserve is monitored in the domain infrastructure, army, and information. Domain policy and society are neutral due to the fact that they do not directly influence the development

of the crisis, both of which are passive and consolidated. The same areas will be activated dynamically when trend reduction or crisis management is in progress.

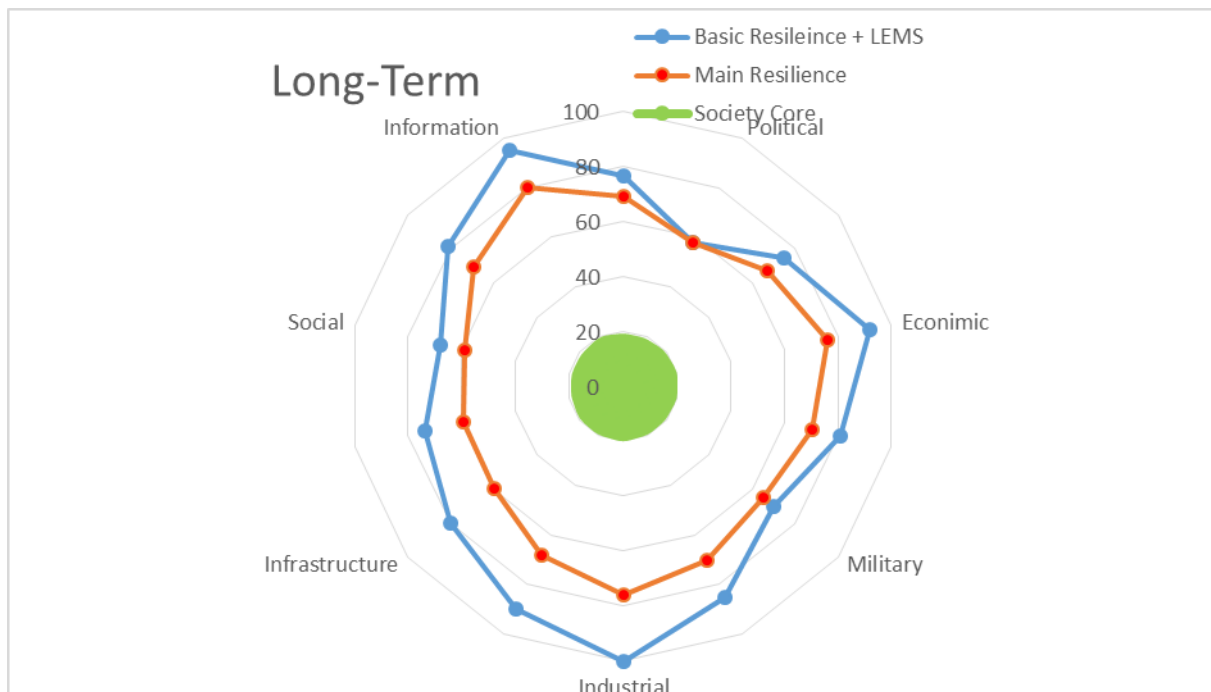
The charts show that the use of the economic potential to respond directly to the crisis will affect many other domains. In the medium term, the industry will recover and only then will there be a "rebound" on other domains.



In the specific development of the crisis, the negative impact on production in the country is due to several factors: isolation of the workforce, reduction of purchasing motivation, external factors, interruption of supply, refusal of orders. This significantly disrupts the planned balance in the economy at the micro and macro levels. Using the reserves of both domains to combat the effects of the crisis, other than supporting the recovery of the two domains, will further exhaust them.



As can be seen in the medium term, a partial recovery will follow, which will however be associated with losses of social benefits. This will have a negative impact on domestic policy.




It is clear that in the long run a new cycle is starting. After the restoration of the two domains (to a different extent), the rest of the domains will start developing in the other.

The preliminary analysis for the development of the COVID19 coronavirus crisis in the territory of the Republic of Bulgaria is based on the experience and analyzes made of the spread of the virus in China, Japan, South Korea, France, Germany, Spain and Italy, as



well as the Spanish flu pandemic, which originated at the beginning of the last century.

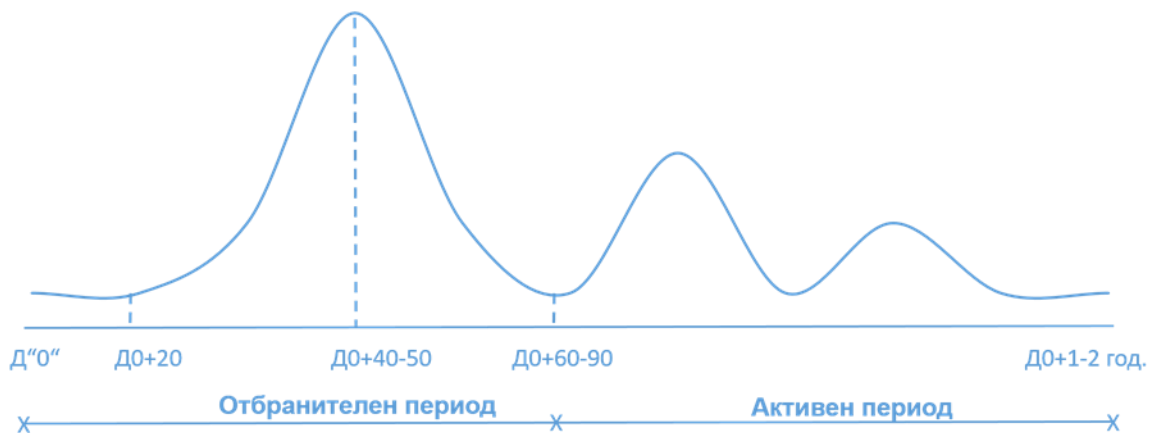
<b>Nº</b>	<b>CHARACTERISTIC</b>	<b>SARS-CoV</b>	<b>SARS-CoV-2</b>
1.	Name	SARS(severe acute respiratory syndrome).	Severe acute respiratory syndrome coronavirus
	Outbreak (when, where)	At the end of 2002, Wuhan, China Spreads out in Hong Kong in February 2003	2019, Wuhan, China
	<b>CRISIS</b>	<b>EPIDEMIC</b>	<b>PANDEMIC</b>
	Distribution, Mortality	<ul style="list-style-type: none"> <li>- In 8 months, 8,098 cases from 26 countries have been reported.</li> <li>- - DEATH - 774 (9%) from 17 countries</li> </ul>	<ul style="list-style-type: none"> <li>- - 10,000 cases in China in the first month of its appearance only.</li> <li>- - Preliminary data indicate that it is less fatal than SARS-CoV.</li> <li>- - 2-10% mortality. Italy is 10%. On average below 4%</li> <li>- - Some patients can infect 10-40 people they are in contact with.</li> <li>- - The greater the difficulty of limiting its distribution.</li> <li>- - Sick to date (03/18/2020) - 204,043</li> <li>- - Mortality: 8,232 (4%)</li> <li>- - Healed: 82,866</li> <li>- - 173 countries</li> </ul>
	Caused Disease	SARS	COVID-19.
	Origin	Originates from Asian Civet Cats 	Genetically closely related to the SARS virus
	Transmission	Air droplets when people sneeze, cough or exhale	Air droplets when people sneeze, cough or exhale
	Incubation period and symptoms	<ul style="list-style-type: none"> <li>- The incubation period is 1 to 10 days.</li> <li>- - In the beginning - chills, fever, muscle aches, headaches.</li> <li>- After 2-4 days (sometimes after 7) dry cough and shortness of breath develop</li> <li>- - There is no sore throat and cough is no phlegm</li> </ul>	<ul style="list-style-type: none"> <li>- The time from contact with a patient and the onset of symptoms is currently estimated at 2 to 14 days.</li> <li>- Symptoms include fever, fatigue and dry cough, shortness of breath, respiratory distress.</li> <li>- X-rays show signs in both lungs. Patients' condition at admission is stable in most cases.</li> <li>- - Blood tests show low levels of white blood cells</li> <li>- - People with pre-existing chronic conditions appear to be more prone to severe disease.</li> </ul>
	Treatment, restriction	<ul style="list-style-type: none"> <li>- The distribution of SARS has been stopped due to the introduction of quarantine and international cooperation;</li> <li>- - Fortunately, doctors and scientists manage to destroy the SARS virus by isolating and quarantining the infected until the virus is completely wiped out of their body so that</li> </ul>	There is no specific treatment

		<p>they cannot transmit it to other people.</p> <ul style="list-style-type: none"> <li>- Thanks to international cooperation and quarantining of patients, the World Health Organization and the countries concerned have managed to cope with the crisis by July 2003.</li> </ul>	
	Features	<ul style="list-style-type: none"> <li>- Even as doctors begin to realize that it is an unknown virus, they continue to retain information locally.</li> <li>- China is acting very slowly. Initially, there is no information.</li> <li>- It is several months before China begins sharing information with WHO</li> <li>- No cases have been confirmed since 2004.</li> <li>- Unification of doctors from around the world helps to suppress the pandemic.</li> </ul>	<ul style="list-style-type: none"> <li>- Can be ill without symptoms.</li> <li>- Younger people are less vulnerable</li> <li>- China informed in a timely manner.</li> <li>- Risk factors for severe course include age over 65 years, underlying chronic illness, male sex, smoking;</li> </ul>

The preliminary analysis aims to highlight the key points in the development of the crisis, as well as important decisions to be made in going through its stages.

Bulgaria, like much of the rest of the world, was not prepared for a crisis of this nature, i.e. the resilience of society and the country as a whole was at a relatively low level, referring to countries that had similar problems in the past (China, Taiwan, Japan, South Korea).

Based mainly on developments in China, we can divide the crisis into two periods - defensive and active. The first period includes the time since the beginning of the crisis (assuming that this is the first case of a person infected in the country) and ends until the first wave of infection has passed (Figure 1). It can last up to 2-3 months. The name of this period is determined by the fact that the measures to be taken are more "defensive" in nature, providing time and opportunity for the state and people to prepare for more effective response to the infection.



The period is characterized by a contagion curve (Fig. 1). As a starting point we will take the day "D0", which is the first case of contagion in the country. As we said, after analyzing the situation in the above countries, we think that after an initial relatively quiet period (up to 20 days) the infection curve will jump sharply and in the next 20-30 days it is expected to peak (up to 40-50 days) from day "D0"). After this peak it is expected that the cases of infection will be reduced to a minimum within 20-30 days after the peak moment has passed (60-90 days from day "D0").

The end of the first phase of the crisis aims at preserving human health and preventing a sharp escalation of the number of sick, putting the health system at maximum strain and at large minimizing the peak. In this phase, it is vital to carry out the following basic measures and tasks:

1. The application of quarantine in the state in a volume that will allow its functioning. Depending on the degree of contagion, this may include declaring a state of emergency, as is the case in our country, or "martial law" - if the situation escalates (Spain and Italy).
2. Keeping the health of the medical staff, which includes timely provision of masks, protective clothing, goggles and disinfectants.
3. Provision of medicines (if discovered) for the treatment of sick persons.
4. Safeguarding the health of the elderly, which may include restricting their movement or providing a window for shopping.
5. Conducting an information campaign aimed at familiarizing the population with the overall situation and what is ahead of us to fully control the infection. It is important to prepare people mentally to face the challenges ahead and the time needed to overcome them.
6. Involvement of volunteers to assist the elderly.
7. Free provision of protective masks and clothing for the population, which will be obligatory upon "entering" the second stage of the crisis.

The crucial issue here is the time that the state economically can afford to stay in Period 1. The conclusion is that restoration of public life is important, but this should begin after a careful assessment of the situation and analysis of the state capabilities.

The second period begins after the passage of the first wave of the infection and ends until it is finally overcome. Based on our experience, we assume that overcoming the infection is generally possible if 60-70% of the country's population is immune to the current coronavirus. This percentage includes both immunity built up after COVID19 and artificial immunity through the use of a vaccine (the first vaccines are expected to enter the market within 1-1.5 years of the onset of infection). In view of this, we believe that the period may last up to 1-2 years.

During this period, the country has to restore its resilience and a large part of the population, which at this stage must be prepared and provided with the necessary

protective equipment, can gradually return to the normal way of working. By way of derogation, schools, kindergartens, theaters, cinemas, stadiums may be the exception as places potentially dangerous for the creation of new outbreaks. Quarantine should be maintained, but with some alleviation. Protective equipment must remain mandatory for all.

Going face-to-face with the infection, a second and even a third wave can be expected as a result of the fact that the majority of the population has regained its previous contacts. The difference here is that the state as a whole is already better prepared and people are equipped and disciplined to meet what awaits them.

This prediction can be applied with some conditionality to other countries, after taking into account a number of factors: government, economy, responsibility and discipline of the population, experience from previous crises, time for reaction, etc.

Based on data on the development of COVID-19 in China, which can be predicted for possible development in Bulgaria, with the onset of the disease since early March (according to data on the first diagnosed COVID-19 disease), the peak of occurrence could be expected around mid-to-late April and de-escalation around mid-to-late May. Another important point that Pueyo makes (Fig. 2) based on his model is that the number of true infected but not yet diagnosed cases is significantly higher than the number of official cases (diagnosed). It is expected that most of these cases (not yet diagnosed) will show mild symptoms of the disease.

Using the example of China and the WHO recommendations, there are recommendations for measures to support Bulgaria's efforts to curb, mitigate and recover (economically and socially) from COVID-19.

With the limitations on the full applicability of the Chinese approach presented above, the following recommendations are presented - grouped as short to long term, with the latter marked L:

1. A common approach to a pandemic situation (a highly contagious disease situation - evidence-based (requiring well-organized data collection) and an adapted clinical approach - to specific areas, regions, cities - taking into account local specificities – i.e. Communication practices, relationships (social practices), social status, age, gender and religion;
2. Creation of rapid response teams (local / regional (national) with relevant responsibilities / tasks), including a list of medical experts to be on the teams and procedures for work:
  - a. L - Ensure the increase of the available medical staff as a whole and in particular of qualified infectious disease specialists (ie epidemiologists) and improvement of clinical diagnosis
  - b. L - Providing sufficient specialized equipment and qualified personnel - ambulances - teams trained to use specialized means of transport and equipment;
  - c. General instructions for dealing with patient (s) already diagnosed and / or contacted

on confirmed COVID-19 and their transportation.

3. Improving communication regarding risk (counteracting misinformation / lack of information) through the use of strategic communication experts to provide training:

a. creating mechanisms for timely transparent communication messages and materials;

b. clarifying the leadership role of a lead agency or ministry with regard to risk communication for an event of this nature and how communication will be coordinated between ministries and partners and at different levels of government (ie which agency speaks first on which issue, which specific topics and audiences will be best addressed through which agency / partner, how the communications will be aligned and what the population should be aware of);

c. a differentiated approach to communication habits.

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<sup>13</sup> For detailed description of the model see (Pueyo 2020). The model is more a conceptual basis than a rigorously confirmed method of calculation with a key message that actual number of cases is higher than confirmed (diagnosed) cases.

<sup>14</sup>WHO - National capacities review tool for a novel coronavirus (Jan 2020). Available at: <https://www.who.int/publications-detail/national-capacities-review-tool-for-a-novelcoronavirus>

An interesting fact is that communication messages and materials do not reach the age group of 16 to 22, who for the most part do not follow public broadcasts and news. The means of communication used are social networks, and the programs they watch are entertaining and in most cases action films or children's shows. In them, the main messages are transmitted by parents, who at this age are not a factor of credibility, but on the contrary receive the opposite effect. As the main message is that they are inviolable for the virus and gullibly accept that they can be infectious and dangerous to their older relatives, they accept the facts as favorable and that the danger is not great. Their environment is closed and the main stream of information comes from the friendly circle. The task is to find a direct path to their consciousness that leads them to think that they are the main carrier of the infection, since in many cases they continue to maintain social contacts outside the family environment, from which it can easily be transmitted to the people who care most about them.

4. Special attention to vulnerable groups - Roma community - Development and implementation of strategies for interaction with the Roma community, including through community leaders, religious leaders, health professionals, traditional healers and existing networks (eg women's organizations, community health volunteers , unions)

5. Development of a systematic protocol for cleaning and disinfection of potentially infected with COVID-19, including protocol / strategy for cleaning and disinfection of the environment. This focuses on the processing and disposal of bio-waste from activities related to COVID-19;

6. Psychological and psycho-social assistance - free telephone lines for contact with a specialist (psychologists) in settlements or in large cities (other than emergency line 112);

7. Promoting a home office and enabling parents, not just mothers, to carry out a home office or take leave to fridge for children who cannot attend kindergartens and schools - especially for children under 14;

8. Introducing legal changes - Include COVID-19 as a national disease to facilitate the effective protocol in case of emergence;

a. improving / creating a healthy infectious system with a clear delegation of responsibility at every stage of the spread of the infectious disease, especially in the early detection (data collection and recording), early reporting (case reporting, updating of reports and reporting of emergencies), early isolation, early treatment, epidemiological investigation, close contact monitoring, sample collection and laboratory tests, public education and risk communication;

b. infectious disease surveillance systems and public health infrastructure capable of catching outbreaks of the infection early and responding quickly, using world best practices;

c. minimizing the difference in the time at which patients become ill and the time at which they are actually diagnosed and reported;

d. standardization and management of direct contact;

e. Increasing the rate of case detection, isolation and early treatment.

9. An emergency measure to allow the use of a database retrieval and collection system that collects and classifies reliably and quickly processes and analyzes using artificial intelligence (AI) and machine learning (ML) technologies, referring information and action items to relevant stakeholders. It is intended to provide reliable information for close contacts and serves law enforcement agencies, country security agencies, national health agencies and municipalities. It is easily adaptable to research and analysis of information, crisis management and control at national level, such as epidemics of infection, similar to the current pandemic. . The system must be able to be deployed remotely in a secure public / private cloud. Make the Internet based system accessible to all users based on certain levels of access and protected against cyber attacks. In this context, it is necessary to amend various laws and regulations to clearly state when such a system may be used. (for example, the United Kingdom, France, Germany, Israel, which have similar systems and use geo-location data to detect criminal cases through mobile operators). In a pandemic emergency, such a system can be used as the fastest tool to detect persons who have been in contact with the infected.

10. Strengthening multi-sectoral, collaborative mechanisms to prevent and control the distribution curve - isolating entire cities, broadcasting critical information (eg promoting handwashing, masking and care seeking) through multiple channels and mobilizing multi-sector rapid response teams (point 2) to curb the epidemic.

11. L - Improving the education system and increasing investment in research and development;

12. Quarantining cities and creating buffer zones around cities to reduce the spread of contagion.

13. Fixing the prices of the most sought after products and dealing with speculation (masks, sanitary materials, essentials).

An effective response can be focused on advance (medium to long-term) preparation, preparation plans and sustainability, which will support not only the capacity of the health care system but also the entire capacity of the state to ensure the health and well-being of citizens.

In conclusion, it is important to note that the COVID19 crisis in Bulgaria should not be considered on its own because we are dependent on our neighbors, partners and almost every other country in the world. The advantage we have is the example of countries such as China, Japan and South Korea, which are at the end of Period 1 and are yet to decide on further action to address the problem.

## APPENDIX 1: World Health Organisation – a list of recommended references<sup>15</sup>

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WHO is providing complementary and systematic guidance on early investigations in a virus outbreak. Data collected from the protocols (**Figure 4**) can be used to refine recommendations for surveillance and case definitions, to characterise the key epidemiological transmission features of COVID-19, help understand spread, severity, spectrum of disease, impact on the community and to inform operational models for implementation of countermeasures such as case isolation, contact tracing and isolation<sup>16</sup>.

### EARLY INVESTIGATIONS PROTOCOLS<sup>17</sup>

#### 1. The First Few X (FFX) Cases and contact investigation protocol for COVID-19 infection

- [Access the investigation protocol](#)

[https://www.who.int/publications-detail/the-first-few-x-\(ffx\)-cases-and-contact-investigation-protocol-for-2019-novel-coronavirus-\(2019-ncov\)-infection](https://www.who.int/publications-detail/the-first-few-x-(ffx)-cases-and-contact-investigation-protocol-for-2019-novel-coronavirus-(2019-ncov)-infection)

#### 2. Household transmission investigation protocol for COVID-19 infection

[Access the investigation protocol](#)

[https://www.who.int/publications-detail/household-transmission-investigation-protocol-for-2019-novel-coronavirus-\(2019-ncov\)-infection](https://www.who.int/publications-detail/household-transmission-investigation-protocol-for-2019-novel-coronavirus-(2019-ncov)-infection)

#### 3. Protocol for assessment of potential risk factors for COVID-19 infection among health care workers in a health care setting

[Access the assessment protocol](#)

[https://www.who.int/publications-detail/protocol-for-assessment-of-potential-risk-factors-for-2019-novel-coronavirus-\(2019-ncov\)-infection-among-health-care-workers-in-a-health-care-setting](https://www.who.int/publications-detail/protocol-for-assessment-of-potential-risk-factors-for-2019-novel-coronavirus-(2019-ncov)-infection-among-health-care-workers-in-a-health-care-setting)

#### 4. Surface sampling of coronavirus disease COVID-19 virus: A practical “how to” protocol for health care and public health professionals

[Access the protocol](#)

[https://apps.who.int/iris/bitstream/handle/10665/331058/WHO-2019-nCoV-Environment\\_protocol-2020.1-eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/331058/WHO-2019-nCoV-Environment_protocol-2020.1-eng.pdf)

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<sup>15</sup> Source for all entries: World Health Organisation official website (<https://www.who.int/>). Hyperlinks provided to respective webpages.

<sup>16</sup> WHO - Situation report 56 ([https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200316-sitrep-56-covid-19.pdf?sfvrsn=9fda7db2\\_6](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200316-sitrep-56-covid-19.pdf?sfvrsn=9fda7db2_6))

<sup>17</sup> Available at: [https://www.who.int/docs/default-source/coronaviruse/200218-early-investigations-one-pager-v1-eng.pdf?sfvrsn=8aa0856\\_14](https://www.who.int/docs/default-source/coronaviruse/200218-early-investigations-one-pager-v1-eng.pdf?sfvrsn=8aa0856_14)



## 5. Global COVID-19 Clinical Characterization Case Record Form and new data platform for anonymized COVID-19 clinical data

[Access the Case Record Form](#)

[https://www.who.int/docs/default-source/coronaviruse/who-ncov-crf.pdf?sfvrsn=84766e69\\_2](https://www.who.int/docs/default-source/coronaviruse/who-ncov-crf.pdf?sfvrsn=84766e69_2)

### INSTRUCTIONS AND GUIDANCE<sup>18</sup>

#### 1. Global Surveillance for human infection with coronavirus disease (draft guidance)<sup>19</sup>

This document provides guidance to Member States on implementation of global surveillance of COVID-19. The objectives of this global surveillance are:

1. to monitor trends of the disease where human to human transmission occurs;
2. rapidly detect new cases in countries where the virus is not circulating;
3. provide epidemiological information to conduct risk assessments at the national, regional and global level; and
4. provide epidemiological information to guide preparedness and response measures.

[Access Revised case recording form -](#)

<https://apps.who.int/iris/bitstream/handle/10665/331234/WHO-2019-nCoV-SurveillanceCRF-2020.2-eng.pdf>

#### 2. Considerations for quarantine of individuals in the context of containment for coronavirus disease (COVID-19)

The purpose of this document is to offer guidance to Member States on quarantine measures for individuals in the context of COVID-19. It is intended for those responsible for establishing local or national policy for quarantine of individuals, and adherence to infection prevention and control measures.

- [Access the publication](#)

[https://www.who.int/publications-detail/considerations-for-quarantine-of-individuals-in-the-context-of-containment-for-coronavirus-disease-\(covid-19\)](https://www.who.int/publications-detail/considerations-for-quarantine-of-individuals-in-the-context-of-containment-for-coronavirus-disease-(covid-19))

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<sup>18</sup> Source for all entries: World Health Organisation official website (<https://www.who.int/>). Hyperlinks provided to respective webpages.

<sup>19</sup> Available at: [https://www.who.int/publications-detail/global-surveillance-for-human-infection-with-novel-coronavirus-\(2019-ncov\)](https://www.who.int/publications-detail/global-surveillance-for-human-infection-with-novel-coronavirus-(2019-ncov))

### **3. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected**

This document is intended for clinicians taking care of hospitalised adult and paediatric patients with severe acute respiratory infection (SARI) when nCoV infection is suspected. It is not meant to replace clinical judgment or specialist consultation but rather to strengthen clinical management of these patients and provide to up-to-date guidance. Best practices for SARI including IPC and optimized supportive care for severely ill patients are essential.

- [Access the document](#)

[https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected)

### **4. Home care for patients with suspected novel coronavirus (nCoV) infection presenting with mild symptoms and management of contacts**

WHO has developed this rapid advice note to meet the need for recommendations on the safe home care for patients with suspected novel coronavirus (2019-nCoV) infection presenting with mild symptoms and public health measures related to management of asymptomatic contacts.

- [Access the document](#)

[https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-\(ncov\)-infection-presenting-with-mild-symptoms-and-management-of-contacts](https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-(ncov)-infection-presenting-with-mild-symptoms-and-management-of-contacts)

**Online courses** - to improve the response to health emergencies – available at <https://openwho.org/channels/covid-19>

**Fig. 1. Complementarity of COVID-19 protocols currently available on the WHO website**

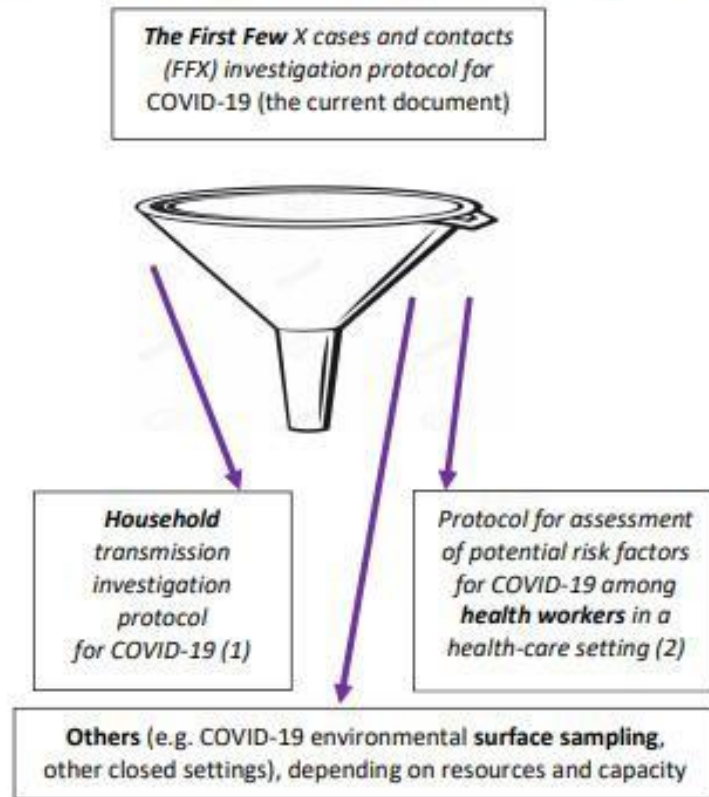


Figure 4: Source: WHO: *The First Few X cases and contacts (FFX) investigation protocol for coronavirus disease 2019 (COVID-19)*

## Appendix 2 – Knowledge Gaps and key questions to be answered to guide control strategies<sup>20</sup>

### Source of infection

- Animal origin and natural reservoir of the virus
- Human-animal interface of the original event
- Early cases whose exposure could not be identified

### The pathogenesis and virulence evolution of the virus

### Transmission dynamics

- Modes of Transmission:
  - Role of aerosol transmission in non-health care settings
  - Role of fecal-oral transmission
- Viral shedding in various periods of the clinical course in different biological samples (i.e. upper and lower respiratory tract, saliva, faeces, urine)
  - Before symptom onset and among asymptomatic cases
  - During the symptomatic period
  - After the symptomatic period / during clinical recovery

### Risk factors for infection

- Behavioral and socio-economic risk factors for infection in
  - Households / institutions
  - the Community
- Risk factors for asymptomatic infection
- Risk factors for nosocomial infection
  - among health care workers
  - among patients

### Surveillance and monitoring

- Monitoring community transmission through existing
  - ILI surveillance
  - SARI surveillance
- The outbreak trend and intervention dynamics
  - Basic reproduction numbers in various stages of the epidemic
  - The epidemic's relation to seasonality

### Laboratory and diagnostics

- Sensitivity and specificity of different nucleic acid (PCR, NAATs and rapid tests), antibody and antigen tests
- Post-infection antibody titers and the duration of protection
- Sero-prevalence among:

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<sup>20</sup> Source: WHO-China Joint Commission on Coronavirus Disease 2020 Report, pp. 36-37

- Health care workers
- General population
- Children

#### Clinical management of severe and critically ill patients

- Value of ECMO in the management of critically ill patients
- Best practice using mechanical ventilation in the management of critically ill patients
- Re-evaluation of the role of steroids in the management of severe and critically ill patients
- Identification of factors associated with successful clinical management and outcome
- Determination of the effectiveness of Traditional Chinese Medicines (TCM)
- Determination the effectiveness of additional investigational treatment options (e.g. intravenous immunoglobulin/IVIg, convalescent plasma)

#### Prevention and control measures

- Key epidemic indicators that inform evidence-based control strategy decision making and adjustments
- Effectiveness of infection prevention and control (IPC) measures in various health care settings
- Effectiveness of entry and exit screening
- Effectiveness of the public health control measures and their socio-economic impact
  - Restriction of movement
  - Social distancing
  - School and workplace closures
  - Wearing mask in general public
  - Mandatory quarantine
  - Voluntary quarantine with active surveillance