

RESILIENCE AND RISK PERCEPTION DURING THE COVID-19 PANDEMIC: COMPARISON OF ADOLESCENTS AND ADULTS

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Abstract

Introduction: The adaptation to the effects of the recent pandemic caused by SARS-CoV-19 is essential for each age group of the society. In this situation, resilience and risk perception have privileged roles, thus their connection has already been examined in previous studies. Although other researches had discussed the effect of age, there are no publications yet focusing on the comparison of adolescents and adults, except within a families. *Aims:* Our study objective was to examine resilience and risk perception of Hungarian teenagers and adults during the COVID-19 pandemic and to compare the effect of age on these psychological concepts. *Methods:* Two anonymous online questionnaires were used to collect data between March 2020 and June 2020. In this study, the Connor-Davidson Resilience Scale (CD-RISC) 10-item and the questionnaire of risk perception were evaluated. *Results:* Adults' scores were significantly higher on the resilience research ($p = 0,000$). Comparing by age groups showed adolescents' resilience scores were significantly lower than that of the adults between the age of 35 and 54 ($p = 0,004$), and 55-64 ($p = 0,000$). Grown-ups' risk perception scores were also significantly higher during both questionnaires ($p = 0,000$; $p = 0,001$). Based on the comparison of age groups, teenagers' risk perception scores were significantly lower than adults' scores between the age of 35-54 ($p = 0,002$; $p = 0,012$), 55-64 ($p = 0,002$; $p = 0,000$) and 65-99 ($p = 0,000$; $p = 0,0025$). *Discussion:* The study presents that adults are more resilient and have higher risk perception than adolescents. More precisely, 16-20 years old teenagers are less resilient than adults between the age 35-54 and 55-64, furthermore have lower risk perception than adults between the age 35-54, 55-64 and 65-89. These results draw attention the nexus of age, resilience and risk perception.

Keywords: Resilience ▪ Risk perception ▪ COVID-19

INTRODUCTION

The recent COVID-19 global pandemic caused several restrictions since its appearance in 2019. Because of these restrictions many people lost their jobs or had to start working at home. The 'switching into the online world' has an effect on the members of the education system as well. Living in this current situation comes with many challenges, resilience and risk perception play key-roles in the adaptation of every generation and age-group.

„Anything that causes stress endangers life, unless it is met by adequate adaptive responses; conversely, anything that endangers life causes stress and

adaptive responses” (Selye, 1950 p. 1383). Therefore anything that enhances the intensity of life causes temporarily increased stress, furthermore the adaptation and stress-resistance at a certain level are the preconditions of life (Selye, 1950; 1976).

The resilience

At first, the concept of resilience appeared in the field of material sciences as the ability of an object to regain its original condition after collision with another object – this can be observed when a tennis player hits the ball (Szokolszky & Komlósi, 2015). Later, the conception began to be applied to other disciplines, including psychology. The first psychological study defined resilience as a personality trait (Block & Block, 1980).

In the past 40 years, it has been approached and defined in several ways, and as a complex phenomenon and system-concept there is no integrated definition within psychology yet (Szabó, 2017). However, a common intersection of many formulations is that resilience is a combination of biological, psychological, and social variables that facilitate flexible adaptation and recovery to stressful or difficult living conditions (Kövesdi, 2018; Herrman et al., 2011). This paper was created using the conceptual framework of 3 studies. (1) Masten (2014) writes about resilience as „*the capacity of a dynamic system to adapt successfully to disturbances that threaten system function, viability, or development*”. (2) According to Szokolszky and Komlósi (2015), the most common definition of resilience is the ability of flexible resistance that ensures functional survival after shock. (3) In addition to this conception it includes factors that promote successful adaptation, enable adaptive forms of coping and reduce the negative effects of stress despite of traumatic or threatening living conditions (Markó et al., 2019). Although much of the literature focuses on the aspect of successful adaptation to stress, it is important to emphasize that resilience denote the ability to return to normal functioning after stress as well (Norris, Stevens, Pfefferbaum, Wyche & Pfefferbaum, 2008).

The risk perception and its relation with resilience

Another important concept can be closely related to resilience: risk perception, since the decisions are appreciably influenced by how the individual perceives and evaluates risks (Pikó, 2012). Risk can be divided into two components: firstly, the perceived severity of loss, and secondly, the perceived probability of negative outcomes (Van der Pligt, 1996). The latter is referred as perceived vulnerability in the protection motivational theory of health behavior by Rogers (1983). Similarly, the terms of risk perception and perceived threat can be reconciled in the literature.

Higher risk perception is associated with lower risk taking behavior (Mills et al., 2008), moreover, higher risk perception is interconnected with higher amount of preventive measures (Aerts et al., 2020). This is supported by a study which found that the more threatened a person feels, the more motivated they are to comply with preventive precautions (Zanin et al., 2020).

Another research pointed out that higher risk perception can be associated with higher resilience (Paton & Johnston, 2001). However, it is important to note that the age of the individual also plays an important role in risk perception: Gardner and Steinberg (2005) found in their study with adolescents, young adults and adults that risk-making decisions and risk-taking decrease with age.

Studies in connection with COVID-19

SARS-CoV-2, or coronavirus, which began to spread rapidly in 2019, has become a global stressor in the life of mankind. A systematic review and meta-analysis study showed that the coronavirus epidemic has an impact on the mental health of individuals and communities in the entire population of societies (Salari et al., 2020). According to Serafini et al. (2020), the pandemic has caused a number of psychological problems including stress, anxiety, depression and frustration. As a result of mass infections, all ages are affected by the global epidemic. This is also supported by researches that examined different age groups instead of the whole age group. Chen, Sung, and Fen (2020) found that the pandemic and the restrictions have a complex negative influence on the mental health of young people. Bruine de Bruin (2020) writes in his study that risk perception during the epidemic in American adults increases with age. Studies on the coronavirus have also been carried out in Hungary: a 2019 and a 2020 research showed that the measure of subsisting crises depends on different coping methods, skills and mental health; furthermore, higher levels of stress measured by parents are associated with lower well-being for both parent and child within a family (Szabó, Máth & Sztancsik, 2019; Csikós et al., 2020). In their research, Kövesdi et al. (2020) report that resilient functioning depends on age, life situation, and other non-personal factors; and that in the case of parent-child pairs, parents received demonstrably higher resilience values than their children. However, no studies have been performed on whether there are differences between adolescents and adults who do not belong to the same families.

AIMS

Our study objective was to examine resilience and risk perception of Hungarian teenagers and adults during the COVID-19 pandemic, thus to compare the effect of age on these psychological concepts. Based on previous studies, we claim that (1) the resilience value of adults is higher than that of adolescents, and that (2) the risk perception value of adolescents is lower than that of adults.

METHODS

Presentation of the test sample

The study population consists of adolescents aged 16 to 20 years and adults aged between 21 and 99 years. The subjects took part in two parallel studies of the Károli Gáspár Református University, with the aim of exploring the psychological effects of the coronavirus epidemic among adolescents and adults in Hungary.

This research underwent multiple screening. In the case of adults, the criteria for inclusion in the sample used were as follows: to be persons living in Hungary, being a member of the above-mentioned age group, have at least a general certificate of education in terms of tuition, and considering their own financial situation as average or better than others'. Subsequently, taking into account the male-female ratio in adolescents, the final sample contained nearly the same number of adults as adolescents, and was formed by random sampling.

In the case of the adolescents, the criterion to be included in the study was that being a student of any Hungarian secondary school in the 2019/2020 school year in addition to being in the age group described above.

For both adolescents and adults, an access-based sampling procedure was used primarily, as subjects were sought primarily on the basis of acquaintance. In addition, the "snowball" sampling procedure was appeared as well, as the applicants were asked for further recruitment in several cases, and random sampling also played a role in the formation of the final sample (Szokolszky, 2006).

A total of 313 adults and 309 adolescents were included in the sample. The study included 378 women (60.8%), 183 of whom were adolescents (48.4%) and 244 men (39.2%), 126 of whom (51.6%) were between the ages of 16 and 20. The average age of the subjects was 30.9 years (the youngest was 15 at the beginning of the study, the oldest was 83). For more accurate examinations 5 age groups were formed, thus groups from 16-20; 21-34; 35-54; 55-64; 65-99 of age. The detailed distribution of age groups is shown in Table 1.

Table 1. The detailed distribution of age groups

Age groups	Quantity (of subjects)	Percentage (%)
16 – 20 years old	309	49,7
21 – 34 years old	100	16,1
35 – 54 years old	133	21,4
55 – 64 years old	42	6,8
65 – 99 years old	38	6,1
Total:	622	100,0

Among adults, 107 individuals (34.2%) had general certificate of education as the highest level of education, and 206 individuals (65.8%) had at least one college or university degree.

Psychometric devices

For the first wave of the research, a questionnaire package consisting of different psychometric devices and questionnaires was compiled. The questionnaire package was completed in 8 major areas. The first consists of questions about the sociodemographic characteristics of the filler. Here we asked about gender, age, marital status, highest level of education, current activity, livelihood income in the pre-epidemic period, permanent residence and religion.

The second unit included characteristics related to general health. The questions in this section (apart from the last one, i.e. the question “Have you been vaccinated against influenza”) come from the nationally representative survey of Hungarostudy in 2002 (Rózsa et al., 2003). In the questionnaire, respondents were required to subjectively assess their health status, the number of hospitalizations they had gone through during their lifetime on a 5-point Likert scale, and to sign whether they had been treated or had a chronic illness in the past six months.

The third part included questions about risk perception, personal effectiveness, and prevention activities. Issues related to risk perception and prevention activity from previous research (e.g., SARS, H1N1 surveys; Lau et al., 2003; Brug et al., 2004; De Zwart et al., 2009; Vartti et al., 2009; Voeten et al., 2009) have been transferred. The first set of questions asks about the severity of 10 diseases (including COVID-19), while the second set of questions inquires about the likelihood that the respondent will get the infection. In addition, we asked subjects how likely they got coronavirus infection in the past and the next 2 and 4 months.

In the fourth block, we assessed individuals’ knowledge of the coronavirus. This simple set of questions revealed general knowledge. The 10 main questions

concerned main symptoms, mode of transmission, asymptomatic infection, incubation period, denomination of disease, who can become infected, weathering role, coronavirus viability in air and on different surfaces, safety distance, vaccination time.

Issues related to the coronavirus epidemic were also included in the fifth section. Here we inquired where the subjects gather their knowledge from, what preventive activities they know, how much they agree with the restrictive measures; and an abbreviated 6-item version of the Impact of Events Questionnaire (IES-6) was included here (Horowitz et al., 1979; Thoresen et al., 2010; Kocsis-Bogár et al., 2012). During the completing of IES-6, respondents had to judge on a 5-point Likert scale how often the statements made of the items were characteristic of them over the past week (not at all – 1; always – 5).

In the sixth section, the focus was on personality traits and emotions, and the subjects were required to complete the Big Five Inventory (BFI), the Connor-Davidson Resilience Scale (CD-RISC), the Patient Health Questionnaire (PHQ-15), the Depression Anxiety and Stress Scale (DASS) and the Public Health Surveillance Well-Being Scale (PHS-WB). For BFI, a 10-item version of the test was used (John & Srivastava, 1999). When completing the BFI, respondents had to rate on a 5-point Likert scale how characteristic the statements were of them (1 – strongly disagree; strongly agree – 5). The 10-item version of the Connor-Davidson Resilience Scale is a psychometric device designed to measure successful coping with stress, in which respondents must rate on a 5-point Likert scale how true the statements are about them (not true at all – 0; almost always true – 4) (Connor & Davidson, 2003; Járαι et al., 2015). The Patient Health Questionnaire included the most common somatic symptoms in the DSM-IV, and subjects were asked to mark on a 3-point Likert scale how much they had been disturbed by the listed symptoms over the past 2 weeks (not at all disturbed – 0; very disturbed – 2) (Kroenke et al., 2002). The questionnaire we used contained 19 items instead of the original 15, as we supplemented it with 4 COVID symptoms (fever, sore throat, cough, and runny nose), but these were not included in the total score. The Depression, Anxiety, and Stress Scale (DASS) assesses three negative emotional states: depression, anxiety, and stress (Lovibond & Lovibond, 1995; Barth, 2015). In our research we used an abbreviated, 21-item version of the questionnaire. For each statement, subjects were required to indicate on a 4-point Likert scale how typical the statements listed had been of them in the past week (not characteristic of me at all – 0; very characteristic of me, or very often characteristic of me – 3). In this section, we also used the Public Health Surveillance Well-Being Scale (Bann et al., 2012). PHS-WB is a scale that measures physical, social, and mental well-being, which also assesses people's overall health awareness, health behaviors, health risk factors, and disease behaviors. In this study, during the first half of the questionnaire respondents had to rate on a 5-point Likert scale how much they agreed with the statements

given (I disagree at all – 1; strongly agree – 5). Then they had to rate 4 emotional states on a 5-point scale based on how often they felt those over the past 30 days (two endpoints on the scale: never – always). In the third part, subjects had to indicate how generally they were satisfied with the given characteristics on a 10-point scale, where endpoint 1 represented total dissatisfaction and endpoint 10 represented total satisfaction. In the last part of the scale, a value between 0 and 30 had to be given for the approximate number of days in the last 30 days the responder felt very healthy and energetic.

In the seventh unit, we examined the effects of quarantine and restrictions. This section included general questions that helped us exploring what the subjects did under the restrictions. For this we used the Lubben Social Network Scale. This scale measures social commitment on a subjective, self-assessing basis (Lubben, 1988). In our study we used the abbreviated version, which contains a total of 6 items – along which respondents had to evaluate their social relationships using the given answer options. Additionally in this block, respondents had to answer questions about working conditions and how to deal with quarantine (also based on the answer options provided). The purpose of these questions is to present possible reactions to restriction of free movement and isolation. For the scale of coping with limitations, the questions were compiled by the leaders of the research.

The eighth, i.e. last part, included open-ended questions where respondents could send messages to the world, share positive and negative life experiences, and evaluate the questionnaire package.

For the second wave of the research, we used a shorter questionnaire package which based on that we used during the first data collection. The questionnaires used were completed in 5 major areas.

The first unit included questions on risk perception, personal effectiveness and prevention activities. The second block contained questions about individuals' knowledge of the coronavirus. These units are fully equal to the same parts of the first questionnaire package.

The third part included questionnaires on personality traits and emotions: the PHQ-15; the Depression Anxiety and Stress Scale; the PHS-WB; and the Young Schema Questionnaire. In the case of DASS, the change was that only 9 of the 21 items were left in the questionnaire package. The Young Schema Questionnaire (YSQ-S3) is used to measure cognitive patterns identified by Young that hinder the satisfaction of basic needs (Young & Brown, 1994; Unoka et al., 2004). The questionnaire contains 37 items along which subjects had to rate on a 6-point Likert scale how characteristic they feel about the given statements of them (1 – not at all typical; 6 – perfectly typical).

The fourth unit included questions exploring the effects of quarantine and restrictions. A significant change from the first survey was that while the Lubben Social Network Scale was not used, the new questionnaire package was expanded

with the Work-Family Conflict Questionnaire (Blanch & Aluja, 2009). For this measure, respondents were asked to indicate on a 7-point Likert scale for 8 items the extent to which they agreed with the statement.

The last unit of the second questionnaire package included open-ended questions that differed from the block used in the first survey in that it was supplemented with questions on the cause and triggers of coronavirus infections.

Method

Data was collected from subjects at three different times between March and June 2020 – with online questionnaires for the first and second surveys, and a telephone interview between the two occasions. The telephone conversations were based on semi-structured interview questions compiled by research leaders. The main purpose of the interview was to maintain contact in order to keep as many subjects as possible in the research. The information obtained this way was not used in this paper.

Method – The questionnaires

In each case, we contacted the subjects through online platforms: we contacted acquaintances, schools (who then provided the contact details of their applicants) via e-mail, and recruited participants on social media sites. Due to the situation caused by the virus, it was only possible to fill in the questionnaires online. Written information about the purpose of the study was given during the inquiries and before starting to complete the questionnaires as well. Also before the questionnaire, we provided an option to indicate that the respondent consents to participate in the research – or, if the student has not yet reached the age of 18, to mark the option is intended to replace parental consent.

Method – The interview

As in the case of the questionnaire surveys, due to the curfew restriction all participants were scheduled for a telephone interview online (via email or other platforms) or by telephone. In all cases, the interviews took place in a relaxed environment, and each was preceded by a brief information about the purpose of the research, as well as on anonymity and confidentiality of the data. Written notes were made during the discussions, which we later recorded through an online interface created for the research.

RESULTS

In this study, the Connor-Davidson Resilience Scale (CD-RISC) 10-item and the questionnaire of risk perception were evaluated using the SPSS 25 program. Descriptive statistics of the studied variables are shown in Table 3; the results of the statistical procedures used for normality analysis, standard deviation homogeneity and group comparison are shown in Table 4.

In the CD-RISC adolescents' scored an average of 28.55 points (standard deviation 4,762), with a minimum of 13 and a maximum of 40 points, while adults' scored an average of 29.85 points (std. dev. 4,562), with a minimum of 16 and a maximum of 40 points. Normality was impaired in both groups ($p = 0.000$; $p = 0.002$), but the variables were in a homogeneous distribution ($p = 0.334$), therefore the Mann-Whitney test was used, which showed a significant difference in resilience between adolescents and adults ($p = 0.000$). Subsequently, a comparison by age group was performed using the Kruskal-Wallis ($p = 0.001$) and the Mann-Whitney U test. Based on the results showed adolescents' scores were significantly lower than that of the adults between the ages of 35 and 54 ($p = 0,004$) and 55-64 ($p = 0,000$). The results of the pairwise comparison of the resilience test are shown in Table 5.

Before presenting the results of risk perception, it is important to briefly describe how the concept is calculated. In order to examine risk perception, we used the theoretical framework of the protection motivation theory of health behavior, according to which perceived risk can be derived from two components, perceived severity and vulnerability (Rogers, 1983). The calculation of the risk perception is shown in Table 2. Dividing the severity value by two was necessary because this scale was rated by the respondents on a 10-point Likert scale.

Table 2. The basic components of the risk perception model

Severity	How severe they consider the disease
Perceived vulnerability	Probability of getting any of the infections and illnesses in the next 1 year
Perceived risk	$\sqrt{\frac{\text{Severity}}{2} \times \text{Vulnerability}}$

In the first survey adolescents scored an average of 3.05 (std. dev. 0.762), while adults had an average of 3.24 (std. dev. 0.770) points. The minimum was 1 and the maximum was 5 for both groups. Since normality was significantly impaired in both groups ($p = 0.000$; $p = 0.000$) but the variables were homogeneous in distribution ($p = 0.577$), the Mann-Whitney test was used, which indicated a significant difference between the two groups ($p = 0.000$). To refine the results, Kruskal-Wallis ($p = 0.000$) and Mann-Whitney U tests were used. The results

of the pairwise comparison showed that the adolescents' scored significantly lower than the adults in the age range 35-54 ($p = 0.002$), 55-64 ($p = 0.002$) and 65-99 ($p = 0.000$).

In the second survey adolescents' average score was 2,557 (std. dev. 0.827), adults had an average of 2.838 (std. dev. 0.869) points. For both groups, the minimum was 0.71 and the maximum was 5. As normality was impaired in both groups ($p = 0.005$; $p = 0.000$), but the variables' homogeneity was not significantly impaired ($p = 0.063$), the Mann-Whitney test was used – which indicated a significant difference between the values of the two groups ($p = 0.001$). As before, the Kruskal-Wallis ($p = 0.001$) and the Mann-Whitney U tests were used for comparison by age group. Based on the results showed, the adolescents – similarly to the first survey – scored significantly lower than adults between the age of 35-54 ($p = 0.012$), 55-64 ($p = 0.000$) and 65-99 ($p = 0.0025$). The results of pairwise comparisons of risk perception are presented in Table 5.

Table 3. Descriptive statistics of the studied variables

		Mean	Standard Deviation	Median	Minimum	Maximum
Resilience	Adolescents	28.55	4.762	28	13	40
	Adults	29.85	4.562	30	16	40
Perceived risk (1. survey)	Adolescents	3.05	0.762	3.16	1	5
	Adults	3.24	0.770	3.24	1	5
Perceived risk (2. survey)	Adolescents	2.5569	0.82699	2.6458	0.71	5.00
	Adults	2.8381	0.86862	2.7386	0.71	5.00

Table 4. The results of the statistical procedures used for normality analysis, standard deviation homogeneity and group comparison

		Normality (Kolmogorov-Smirnov)	Homogeneity of Variances (Levene Statics)	Mann-Whitney	Kruskal-Wallis
Resilience	Adolescents	$p = 0.000$	$p = 0.334$	$p = 0.000$	$p = 0.001$
	Adults	$p = 0.002$			
Perceived risk (1. survey)	Adolescents	$p = 0.000$	$p = 0.577$	$p = 0.000$	$p = 0.000$
	Adults	$p = 0.000$			
Perceived risk (2. survey)	Adolescents	$p = 0.005$	$p = 0.063$	$p = 0.001$	$p = 0.001$
	Adults	$p = 0.000$			

Table 5. The results of the pairwise comparison of the resilience and risk perception tests

Age groups	Resilience	Perceived risk (1. survey)	Perceived risk (2. survey)
0–20 21–34	$p = 0.173$	$p = 0.782$	$p = 0.225$
0–20 35–54	$p = 0.004$	$p = 0.002$	$p = 0.012$
0–20 55–64	$p = 0.000$	$p = 0.002$	$p = 0.000$
0–20 65–99	$p = 0.250$	$p = 0.000$	$p = 0.025$

DISCUSSION

The aims of this paper were examining resilience and risk perception of teenagers and adults during the COVID-19 pandemic. Results reported above showed it can be said that there are differences for both phenomena, and the previous assumptions have been fulfilled.

The results of CD-RISC showed significant differences between adults and adolescents, therefore adults proved to be more resilient. For in-depth analysis, we used age group comparison, based on which adolescents scored significantly less than that of the adults between the ages of 35 and 54 and 55–64.

In both the first and second surveys, there was a difference in the examination of risk perception. Based on the hypothesis tests, adults scored significantly higher in both surveys than adolescents. This suggests that adults are more risk perceptive than teenagers. As in the case of the resilience test, we performed a pairwise comparison for deeper analysis: the results of the first and second surveys showed that adolescents scored significantly less compared to the adults between the age of 35–54, 55–64, and 65–99.

These results are consistent with previous studies related to the topic of this research. As in the study by Kövesdi et al. (2020), adults proved to be more resilient in this research. The results of risk perception can be paralleled with the study by Gardner and Steinberg (2005), which highlighted that the age of an individual also plays a role in risk perception, as risk-making decisions and risk-taking decrease with age. The relationship between these two phenomena (resilience and risk perception) and the results of this paper are also supported by the research of Paton and Johnston (2001), according to that higher resilience can be related to higher risk perception. The results of the research, compared to previous studies, call attention to the fact that there is a relationship between age, resilience and risk perception. In addition, an important outcome is that

because adolescents are less resilient, it will be important to pay more attention to helping them recover in the future than in the case of adults.

Although all the hypotheses based on the literature have been met, the results of the post hoc tests raise more questions that require more research on what factors may caused the cases where there were no significant difference between age groups.

Limitations of the Study

One of the limitations of the research was the sampling procedure: the danger of the access-based sampling method is that there is a high chance of subjective sampling bias (Szokolszky, 2004). Although the data from the questionnaires are undoubtedly informative, the sample cannot be said to be representative, as the vast majority of the persons involved in the study live in cities with good financial conditions. Thus, adolescents and adults living in smaller settlements and / or in less good material conditions were excluded from the research, thus reducing the representativeness of the sample.

It is also considered a limitation of this paper that the phenomenon of perceived risk was examined only in the way calculated from the two components. The results of the research would have been more detailed if we included and examined separately the two components of the protection motivational theory of health behavior (Rogers, 1983).

Conclusion

The COVID-19 research we conducted was a longitudinal study, of which we only focused on the first and second surveys within this paper. We would like to continue the research, process the results of the third survey and compare them with the previous ones. Utilizing the large-item database, it may be interesting to conduct further research by incorporating further components of Rogers (1983) theory; and to examine how the population of Hungary mentally experienced the coronavirus epidemic, including other factors.

Even though these results fill a gap as no such studies have been performed by the time the dissertation is completed, it would be useful to examine the reasons why adolescents did not show significant differences with all age groups, and whether they are differences between the age groups of adults in terms of the phenomena studied.

There are planned expansions to the research underlying the study: although the longitudinal study ended after the third survey in December 2020, research leaders plan to expand the research with repeated data collection from one-year perspective. If this were to happen, we could create a unique and valuable

database that could even track the entire epidemic from the beginning to its end. A database like this could play an important role in future pandemic interventions, health behaviors, and many other aspects in the event of a new epidemic.

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