Statement of the ad hoc commission on SARS-CoV-2 of the Society for Virology (*Gesellschaft für Virologie*): SARS-CoV-2 prevention measures at the start of school after the summer holidays;
August 6, 2020

In recent weeks there has been an increase in new SARS-CoV-2 infections in Germany. As the holidays are coming to an end in some federal states, there is increasing concern about the decision to open schools. According to current knowledge, infections with SARS-CoV-2 are mild in the vast majority of children, with significantly lower rates of hospitalization, complications and deaths than in adults.

We support any measure aimed at keeping schools and educational institutions open during the coming winter season. Both the relief for working parents and the well-being of the children are indispensably linked to a functioning school system. However, school operation must be linked to pragmatic concepts which can eliminate or at least significantly reduce the risk of infection spreading at schools. For effective suppression of the spread of the virus in society as a whole, it remains a fundamental prerequisite to keep the virus circulation in schools low. At the same time, effective control of new infections in the school environment, i.e. the private environment of pupils and teachers, is the best prevention for the introduction of the virus into schools.

We warn against the idea that children do not play a role in the pandemic and in transmission. Such ideas are not in line with scientific knowledge. A lack of prevention and control measures could lead to outbreaks in a short period of time, which could then force renewed school closures. Underestimating the transmission risks in schools would be counterproductive for child welfare and economic recovery.

Infection rates among children and their role in the pandemic have not yet been fully clarified by scientific studies. Recent scientific publications and observational studies in some countries indicate that the initial assumptions of a minimal role of children must be questioned. The majority of the early studies were conducted under the (exceptional) conditions of far-reaching contact-reducing regulations (so-called "lockdown") with school closures, or in the period of low basic incidence immediately after the lockdown in Germany. As a basis for decision-making, therefore, these studies have only limited information value for the situation in Germany as it can be expected in the near future. Under certain circumstances, it is possible that children may account for a non-negligible proportion of infections with SARS-CoV-2. In the meantime, the percentage share of children in the total number of new infections in Germany is of a magnitude corresponding to the share of children in the total population.[1]
The known incidence of SARS-CoV-2 infection only indicates the actual infection rate in the population with a delay. Control measures against dynamic infection are generally subject to a latency. We therefore tend to adopt a cautious attitude when interpreting the scientific data. Cases in children may have been overlooked in the initial phase of the epidemic, as tests were mainly carried out because of symptoms and the symptoms are generally less pronounced in children. In the meantime, it has become apparent that the viral load in children does not differ (or not to a clinically relevant extent) from the viral load of adults with regard to the detectable RNA concentrations in swabs.[2-5] Although evidence of the significance of viral load measurement for the detection of infectious viral material is now

available,[6-8] interpretation of the data on the actual transmission frequency in children compared to adults is still difficult. Results from some carefully conducted household studies showed that children were infected about as often as adults.[9,10] The frequency of transmission from children remains unclear. A new comprehensive observational study from Italy suggests that children are more likely to be infected, which the authors attribute to their more intensive contact behaviour.[11] A study by Zhang et al. showed that, despite higher assumed contact rates, children had about the same frequency of infection as adults, which suggests that children are less susceptible to infection.[10] A modelling study from Israel estimates, using statistical reconstructions of likely transmission patterns, that children are about half as susceptible to infection as adults.[12] While these studies are based on household observations, there is little data from actual school situations. In a recent study from South Korea, a similar frequency of transmission as in adults was found for students in the secondary school age range (10-19 years), even though in most cases there were few or no symptoms.[13] A study from Australia examined 12 children and 15 adults who had participated in school and daycare during their infectious phase (counted from day 2 before the onset of symptoms). In 633 contacts tested in the laboratory, 18 follow-up transmissions were found. This number is not to be regarded as low, because when each individual primary case became known, an immediate home quarantine of the entire class/group was carried out and the entire facility was immediately closed for about two days, and the schools were only in attendance for half of the study period anyway.[14] Examples of actual SARS-CoV-2 clusters in schools in Israel and Australia underpin the given risk of outbreaks in the educational sector, especially with an increased overall infection rate in the population.[15,16]

One of the important new findings on SARS-CoV-2 that needs to be considered when opening schools is the newly-recognized possibility of airborne transmission, i.e. transmission through the air, especially indoors where there is insufficient air circulation.[17] The more people in an enclosed space and the longer the time spent there, the greater the risk of transmission.

In relation to the opening of schools in autumn, this means that additional measures should be taken to minimize transmission risks in schools. These include, for example, reducing class sizes depending on the number of new infections, making full use of spatial resources and finding pragmatic solutions for improved air exchange in public buildings such as schools. The implementation of technical measures to ensure adequate indoor air exchange is not within the competence of virologists. To this end, the integration of technical expertise is urgently required.

From a virological point of view, fixed small groups including teaching staff should be defined with regard to the class structure, with the lowest possible mixing of groups in everyday school life. Teaching units could be distributed as widely as possible per small group over different times of day and days of the week. Digital solutions with a mix of face-to-face teaching and homework units could offer further possibilities to relieve problems with spatial constraints.

Should there be a critical increase in new infections towards the end of the year while educational institutions are operating normally, an extension of the Christmas holidays should be discussed in order to avoid operating in the periods of highest infection activity. In particular, an extension into the new year seems to make sense, especially since a further increase in the risk of infection is likely to occur over Christmas due to holiday-related travel and family celebrations.

In the meantime, the evidence for the protective effect of consistent and correct use of common masks has increased.[18, 19] In view of the real risk of transmission between pupils who do not (yet) have any symptoms of the disease at the time of infectivity, from a purely virological point of view, we therefore advocate consistently wearing masks for all school years, including during lessons. This should be accompanied by an age-appropriate introduction of the children to the necessity and scope of preventive measures. Of course, consistent hand hygiene should be maintained, even if transmission by surfaces was probably initially overestimated and airborne transmission underestimated. Here, the recommendations of the first half of the year should be revised. Measures in the areas of droplet, aerosol and contact transmission are not interchangeable.

Pupils with an acute respiratory infection should also be examined in the laboratory for mild symptoms, if possible, because they play an indispensable role as indicators of transmission clusters in the early detection of school breakouts. They should stay away from school until the test results are available. Laboratory diagnostics could be carried out by general practitioners or specially established test centers. Particularly low-threshold testing should be ensured for teaching staff. The organisational objective in testing pupils and especially teaching staff should be to provide the results within 24 hours after taking the sample.

Pupils and teachers with positive test results are indicator cases for transmission clusters. For the treatment of transmission clusters, a general and immediate short-term quarantine could be considered. Immediate isolation of clusters has proven successful in Japan in the containment of the first wave.[20,21] It is also provided for by the recommendations of the RKI, but its implementation in practice is often delayed by the desire for preliminary diagnostic clarification of the extent of cluster transmission. To prevent major school outbreaks, however, at least an immediate short-term quarantine of the entire social association is necessary. At the end of a short-term quarantine, the members of the cluster could be tested to show that they are infection-free, and that further quarantine would no longer be necessary. It is important to create continuous, non-overlapping social groups (usually single classes) in the school system. The necessity of a short quarantine in case of evidence of an infection in a class group should be known throughout the school and implemented by the respective school management in immediate coordination with the responsible health authority.

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