

## CORRESPONDENCE

### Research letter

## The Risk of Asymptomatic and Symptomatic COVID-19 Infection Among Schoolteachers and Day-Care Workers Compared to Hospital and Nursing-Home Staff

The German Federal Ministry of Health’s Coronavirus Vaccination Ordinance, issued in December 2020, classifies the elderly, persons at risk of severe COVID-19, and medical/nursing personnel caring for these vulnerable groups as very high or high priority for vaccination (1). On 24 February 2021, the ordinance was amended to give high priority to teachers in elementary schools and day-care workers, putting them in the same category as medical and nursing staff. We investigated the risks of infection and disease for teachers compared with the other population and occupational groups that are accorded priority by the Coronavirus Vaccination Ordinance in terms of the following four goals of vaccination (2):

- Prevention of severe COVID-19 (hospitalization) and death
- Protection of persons with particularly high work-related exposure to SARS-CoV-2 (occupational indication)
- Prevention of transmission and protection of segments of the population with a high proportion of vulnerable persons or a high potential for outbreaks
- Maintenance of governmental functions and public services

### Material and methods

Our investigation was based on registry data from the Robert Koch Institute (RKI) (3), the most recent data on occupational

TABLE 1

**Cases of COVID-19 (09. 10. 2020 to 08. 01. 2021) occurring in facilities with special relevance for the transmission of infectious diseases and reported to the Robert Koch Institute (RKI)—in relation to the size of the respective groups in the whole population of Germany \*1**

	Size of group in Germany *2	SARS-CoV-2 reports (3)		Hospital admissions (3)		Deaths (3)	
	n	n	n per 100 000	n	% *3	n	% *3
<b>§ 23 IfSG hospital</b>							
Patients, hospital only	n.d.	3732	n.d.	3090	82.8	539	14.4
Personnel, hospital only	1 170 000	12 775	1091.9	328	2.6	10	0.1
<b>§ 36 IfSG nursing care</b>							
Nursing home residents	818 000	29 535	3610.6	3951	13.4	4131	14.0
Personnel, inpatient care	796 500	13 155	1651.6	231	1.8	31	0.2
<b>§ 33 IfSG day care and school</b>							
Children in day care	3 700 000	2791	75.4	29	1	0	0
Day-care workers	785 670	3648	464.3	52	1.4	3	0.1
Students in general and occupational schools	10 900 000	13 225	121.3	139	1.1	1	0
Teachers in general and occupational schools	828 406	3442	415.5	49	1.4	1	0

\*1 Statement from RKI: When interpreting these data, it should be noted that they represent only a certain portion of the cases of COVID-19 and are not representative of COVID-19 cases as a whole.

\*2 Data from the Federal Statistical Office (www.destatis.de)

\*3 Based on reports

IfSG: *Infektionsschutzgesetz* (German Infection Protection Act)

TABLE 2

**Contact persons of index cases in schools in Frankfurt am Main (4) and Rhineland-Palatinate (5): numbers tested and numbers with positive result for SARS-CoV-2**

City/state	Investigation period	Group investigated	Contact persons tested	Positive test result (n)	Positive test result (%)
Frankfurt am Main	August–November 2020 weeks 35–45	Adults	601	6	1.0
		Children	2389	51	2.1
Rhineland-Palatinate	August–December 2020 weeks 33–53	Adults and children	14 594	196	1.34

groups from the Federal Statistical Office ([www.destatis.de](http://www.destatis.de)), and studies on contacts in Germany in the fall of 2020 (4, 5).

## Results

As of 8 January 2021, 1 866 887 cases of SARS-CoV-2 infection had been reported in Germany, with 38 795 deaths (2.1%). In the last few weeks of 2020 the rate of admission to hospital was just under 10% (3).

Table 1 shows, for the period from the amendment of the registration software on 9 October 2020 to 8 January 2021, the numbers of persons in the different occupational groups together with the data published by the RKI on cases reported among the staff of the various facilities and among those they cared for. This was a time when children were attending schools and day-care facilities (under COVID-19 precautions) in all of Germany's federal states—until the new lockdown shortly before Christmas 2020 (3).

The SARS-CoV-2 infection rates among medical and nursing staff were 1092 and 1652 per 100 000 respectively; 1.8% of those working in inpatient nursing care and 2.6% of those involved in medical care were admitted to hospital, and 0.1–0.2% died. Approximately 14% of hospital patients and nursing home residents with COVID-19 died. In the same period, the rates of SARS-CoV-2 infection among day-care workers and teachers were 464 and 415, respectively, per 100 000; 1.4% of them were admitted to hospital, and four persons (< 0.1%) died. As for day-care children and school students, 75 and 121 cases of infection, respectively, were reported; 1% of these necessitated hospital treatment, and one school student died.

Between the end of the summer vacation 2020 and the beginning of the new lockdown in December—a period when schools and day-care centers were operating normally and infection rates were sometimes high, with incidence of > 300/100 000 in the general population—around 3000 contact persons were tested in schools in Frankfurt am Main. These targeted tests revealed that 1% of school employees and 2.1% of school students were positive for SARS-CoV-2 (4). A survey of schools in the state of Rheinland-Palatinate covering a period up to the end of December 2020 showed that only one in six registrations of an index case was followed by transmission of infection to others. Among the index persons, teachers were three times more likely than children to transmit the virus. The teachers caused more secondary cases than the children—often due to contacts among teachers (5) (Table 2).

## Discussion and conclusion

Far more cases of SARS-CoV-2 infection, severe illness requiring hospital admission, and death were reported in the staff of medical and nursing facilities than in teachers and day-care center staff. Although there would have been more cases of COVID-19 in schools and day-care facilities if they had continued to operate normally, the described difference between hospitals/nursing homes and day-care centers/schools seems robust, justifying interpretation on this basis. The patients and residents cared for by medical and nursing personnel have a far higher risk

of severe COVID-19 and death than do children in day care and at school. The RKI data thus support the prioritization of medical and nursing occupations to date.

The importance of teachers and childcare workers for society is undisputed. The Coronavirus Vaccination Ordinance already accords them the same priority as persons with special status in governmental and other organizations, so in our opinion there is no scientific justification for raising their vaccination priority.

As long as vaccines remain in short supply but our goal is effective, optimal protection for the entire population, prioritization of groups that are not at particularly high risk has to be viewed critically, especially with regard to the ethical principles of equity and solidarity (2).

## Limitations

The RKI registry data depend on the testing strategy and the number of tests performed. Teachers and day-care workers are tested very frequently, so they are unlikely to be underrepresented. The RKI data on staff and residents/children in the settings concerned are incomplete, because not all reports include data on care or employment in particular institutions. However, there is no indication of notably low documentation and reporting for those employed in day-care facilities and schools compared with other occupational groups

### Ursel Heudorf, René Gottschalk

Multiresistant Pathogens Network Rhein-Main, c/o Public Health Office Frankfurt am Main (Heudorf, Gottschalk)  
mre-rhein-main@stadt-frankfurt.de

### Conflict of interest statement

The authors declare that no conflict of interest exists.

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