publiziert bei: AWMF online
Das Portal der wissenschaftlichen Medizin

S3-Leitlinie
Maßnahmen zur Prävention und Kontrolle der SARS-CoV-2-Übertragung in Schulen | Lebende Leitlinie

Evidenzgrundlage

AWMF-Registernummer 027-076
Kurzfassung Version 2.0, September 2022

Inhalt

Direkte Evidenz

Cochrane Review zur Wirksamkeit von Maßnahmen zur Kontrolle und Reduktion der Übertragung von SARS-CoV-2 an Schulen

Tabelle 1. Übersicht über inkludierte Studien

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
Main Studies										
Blanchard 2022	Screening study	Prospective cohort study	Staff and students in secondary schools	Staff and students in secondary schools	"before the advent of the Delta variant"	Canada	Surveillance measures * Testing of high-school students and staff by RADT (nasal) and PCR (nasal and gargle)	No comparison	Screening outcomes *Rapid Antigen Detection Testing and PCR positivity Unintended consequences *Number of school days saved	Québec Ministry of Health and Social Services
Budzyn 2021	Main study - Approach 2	Difference-in-difference study	Staff and students in K-12 schools	Students K-12 schools	Not reported	USA	Measures making contacts safer: * Individual protection (i.e. face mask requirement for all students; no specification of mask type)	Measure vs. no measure	Transmission-related outcomes * Cases - Number or proportion of cases Follow-up: 2 months (July 1 -	Center for Disease Control (CDC), USA

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
									September 4 2021)	
Donovan 2022	Main study - Approach 3	Controlled time series study (analysis 1 and 2); Controlled interrupted time series study (analysis 3)	Staff and students in K-12 schools	Staff and students in K-12 schools	B.1.617.2 (Delta)	USA	Measures making contacts safer * Individual protection: face masks (i.e.(1) full (universal mask requirement for all students and staff members); 2) partial (masks required in certain settings [e.g., in classrooms but not in gym or music class], among certain populations [e.g., only certain grades, only students or staff members, or only unvaccinated persons], or if specific criteria [e.g., physical distancing ≥6 feet]) could not be met); and 3) none (masks not required in the school setting)); mask type not specified	Least intense vs. more intense measure No measure vs. measure	Transmission-related outcomes * Cases: Number or proportion of cases Follow-up: 2 months (August 23–October 16, 2021)	Center for Disease Control (CDC), USA
Edward 2021	Screening study	Prospective cohort study	Staff and students in K-8 schools	Staff and students in K-8 schools	Not reported	USA	Surveillance measures: * Surveillance (i.e. symptom screening at home; symptom screening for temperature upon arrival to school)	Measure vs. no measure	Screening outcomes *Real world diagnostic performance; PCR test	Walder Foundation's Chicago Coronavirus Assessment Network

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
									positivity Follow-up: 2 months (January - March 2021)	(Chicago CAN) Initiative
Goldenfeld 2022	Screening study	Prospective cohort study	Staff and students in secondary schools	Staff and students in secondary schools	"before SARS-CoV-2 variants of concern (either Alpha, Delta and Omicron) were detected"	Israel	Surveillance measures: * PCR test		Sreening outcomes *Rapid Antigen Detection Testing and PCR positivity Unintended consequences *Days of absence Follow-up: 6 months (November 2020 - April 2021)	Sheba Medical Center, Ramat Gan, Israel,
Hoehl 2021	Screening study	Prospective cohort study	Teachers (school setting unclear)	Teachers (school setting unclear)	Not reported	Germany	Surveillance measures: * At-home self-testing of teachers with a SARS-CoV-2 rapid 2 antigen test every 48 hours	Least intense vs. more intense measure	Screening outcomes: Rapid Antigen Detection Testing Follow-up: 7 weeks (n.r.)	Not reported

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
Hughes 2022	Main study - Approach 3	Propensity score matched event study	Staff and students in K-12 schools	Staff and students in K-12 schools	B.1.617.2 (Delta)	USA	Measures making contacts safer * Individual protection: face masks (school mask requirement; mask type not specified)	Measure vs. no measure	Transmission-related outcomes * Cases: Number or proportion of cases Follow-up: 2 months (August 1–October 2, 2021)	Two co-authors were funded by the Texas Health Resources Clinical Scholars Program
Jehn 2021	Main study - Approach 3	Controlled cohort study	Staff and students in K-12 schools	Staff and students in K-12 schools	B.1.617.2 (Delta)	USA	Measures making contacts safer * Individual protection: face masks (all persons, regardless of vaccination status, were required to wear a mask indoors in school; mask type not specified)	Measure vs. no measure	Transmission-related outcomes * Cases: Number or proportion of cases * Cases: Risk of infection Follow-up: 1.5 months (July 15–August 31, 2021)	Center for Disease Control (CDC), USA
Lessler 2021_Publication	Main study –	Controlled cohort study	Staff and students in K-12 schools	Adults aged 18+ years who live with a school-	Not reported	USA	Measures reducing contact: * Social interaction: Cancelling extra curricular	Least intense vs. more intense	Transmission-related outcomes * Cases: Risk	Johns Hopkins University Discovery Award, Johns

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
	Approach 3			attending child; students (K-12 schools)			activities * Services: Closed playground and cafeteria; Hybrid versus face to face teaching Measures making contacts safer: *Individual protection: face masks (mask requirement for students and/or teachers; mask type not spcified) * Individual protection: physical distancing * Physical environment: Desk shields * Physical environment: Not sharing equipment Surveillance measures: * Screening Multicomponent measures: * Combination of measures making contacts safer, measures reducing contacts and surveillance	measure Singel vs. multiple measures	of infection Follow-up: 1 month, respectively (24 November 2020 to 23 December 2020 and 11 January 2021 to 10 February 2021)	Hopkins University COVID-19 Modeling and Policy Hub Award, Department of Health and Human Services
Liu 2021	Main study - Approach 1	Controlled time series study	Staff and students in K-12 schools	Staff and students in K-12 schools	Not reported	USA	Measures reducing contacts: * Services: In-person, remote or hybrid teaching	Least intense vs. more intense measure	Transmission-related outcomes * Cases: Epidemic progression	Not reported

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
									Follow-up: 2 months (August 10 to October 14, 2020)	
Oster 2021	Main study - Approach 2	Event study	Staff and students (school setting unclear)	Staff and students (school setting unclear)	Not reported	USA	Measures reducing contacts: * Measures reducing contacts (i.e. social interactions (reducing number of students per class)) Measures making contacts safer: * Making contacts safer (i.e. individual protection (mask mandate), physical environment (ventilation), vaccination)	Least intense vs. more intense measure	Transmission-related outcomes * Cases: Number or proportion of cases Follow-up: 6 months (October 2020 - April 2021)	Not reported
Reinbold 2021	Main study – Aproach 1	Synthetic control study	Staff and students in K-12 schools	General population	Not reported	USA	Measures reducing contacts: * Services: In-person (more than 50% of students , remote (more than 50% of students) or hybrid teaching (more than 50% of students)	Least intense vs. more intense measure	Transmission-related outcomes * Cases: Number or proportion of cases * Deaths: Number or proportion of deaths	Not reported

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
									* Healthcare utilization outcomes: Number or proportion of hospital admissions Follow-up: 3 weeks (August 24, 2020 - September 13, 2020)	
Schechter-Perkins 2022	Screening study	Prospective cohort study	Staff and students in K-12 schools	Students (K-12 schools)	B.1.617.2 (Delta)	USA	Surveillance measures: * Test to stay intervention using RADT testing	No comparison	Unintended consequences: Number of absences avoided and cases caused due to the measure Follow-up: 13 weeks (September - December 2021)	Massachusetts Executive Office of Health and Human Services
van den Berg 2021	Main study -	Controlled time series study	Staff and students in K-12 schools	Staff and students in K-12 schools;	Not reported	USA	Measures making contacts safer * Individual protection:	Least intense vs. more	Transmission-related outcomes: * Cases: Risk	no financial support for the research, authorship,

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
	Approach 3			general population			physical distancing (6 vs. 12 feet)	intense measure	of infection Follow-up: 16 weeks (September 24, 2020 - January 27, 2021)	and/or publication
Young 2021	Main study - Approach 1	Cluster-randomised trial	Staff and students in secondary schools	Staff and students in secondary schools	B.1.617.2 (Delta)	UK	Surveillance measures: * Daily testing of close contacts (i.e. daily lateral flow device (LFD) testing for 7 days with LFD-negative contacts remaining at school)	Least intense vs. more intense measure	Transmission-related outcomes: * Number or proportion of cases Follow-up: 7 weeks (March 18 - May 4, 2021)	UK Government Department of Health and Social Care
Supporting Studies										
Akaishi 2021	Supporting study - Approach 3	Prospective cohort study	Students aged 0-18 years who had a history of recent contact with COVID-19 patients.	Students (0-18 years)		Japan	Measures making contacts safer: * Individual protection (i.e. hand hygiene, face masks, physical distancing (at least 2 meters)) * Physical environment (i.e. ventilation (several minutes after every 30 min))	Least intense vs. more intense measure	Transmission-related outcomes: number of positive tests	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
Boutzoukas 2022	Supporting study - Approach 3	Prospective cohort study	Staff and students (school setting unclear)	Not specified		USA	Measures making contacts safer: * Individual protection (i.e. face masks)	Least intense vs. more intense measure	Transmission-related outcomes * Cases: Number or proportion of cases	
Boutzoukas 2022b	Supporting study - Approach 3	Prospective cohort study	Staff and students in K-12 schools	Students (5 years - 18 years)		USA	Measures making contacts safer: * Physical distancing (at least 2 meters) Measures reducing opportunity for contacts * Modification of social activities (participation in physical education)	Measure vs no measure	Transmission-related outcomes * Cases: Number or proportion of cases Unintended consequences *Social and institutional consequence (i.e. Days of in-school education saved)	
Campbell 2022	Supporting study - Approach 3	Prospective cohort study	Staff and students in K-12 schools	Not specified		USA	Measures making contacts safer: * Individual protection (i.e. face masks)	Least intense vs. more intense measure	Transmission-related outcomes *Test positivity	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
									Unintended consequences *Social and institutional consequence (i.e. Days of in-school education saved)	
Coma 2022	Supporting study - Approach 3 (controlled cohort study or propensity score matching or case control study)	Retrospective cohort study	Students in primary schools	Students (3 - 11 years)		Spain	Measures making contacts safer: * Individual protection (i.e. face masks)	Measure vs. no measure	Transmission-related outcomes *Cases: Number or proportion of cases	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
Dawson 2021	Supporting study - Approach 3 (controlled cohort study or propensity score matching or case control study)	Prospective cohort study	Staff and students in K-12 schools	Staff and students in K-12 schools		USA	Surveillance measures: * Contact tracing of positive cases * Quarantine of positive cases and their contacts	Least intense vs. more intense measure	Transmission-related outcomes: secondary transmission	
Doron 2021	Supporting study - Approach 3	Prospective cohort study	Staff and students in K-12 schools	Staff and students in K-12 schools		USA	Surveillance measures: * Weekly SARS-CoV-2 screening of asymptomatic children and adolescents using home-collected saliva samples	Measure vs. no measure	Transmission-related outcomes *Cases: Number or proportion of cases Unintended consequences: number of	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
									school days missed; cost of intervention	
Doyle 2021	Supporting study - Approach 3	Prospective cohort study	Staff and students in K-12 schools	Students (5-17 years)		USA	Multicomponent measures: * Measures making contacts safer: Individual protection (i.e. face masks) * Measures reducing opportunity for contacts: Services (i.e. hybrid teaching)	Least intense vs. more intense measure	Transmission-related outcomes *Cases: Number or proportion of cases	
Farina 2021	Supporting study - Approach 3	Prospective cohort study	Students (school setting unclear)	Students (13-14 years)		Italy	Surveillance measures: * One group each week underwent screening (i.e. a molecular or antigen swab test), yielding one test per student per month	Least intense vs. more intense measure	Transmission-related outcomes *Cases: Number or proportion of cases	
Gettings 2021_masks	Supporting study - Approach 3	Case control study	Staff and students in K-5 schools	Students (grades K-5)		USA	Multicomponent measures: * Making contacts safer: Individual protection (i.e. face masks), physical environment (i.e. ventilation, distancing of desks (more than 6 feet), barriers on students' desks, handwashing facilities)	Least intense vs. more intense measure	Transmission-related outcomes *Cases: Number or proportion of cases	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
Harris-McCoy 2021	Supporting study - Approach 3	Case control study	Students and staff and wider community (school setting unclear)	Unclear		USA	* Measures reducing contacts: Social interactions (i.e. reduction of group size; bubbles); services (i.e. hybrid teaching) * Surveillance: Screening Surveillance measures: * Test to stay strategy for contacts of positive students	Measure vs. no measure	Transmission-related outcomes *secondary transmission Unintended consequences *Social and institutional consequence (i.e. number of school days lost)	
Hershow 2021	Supporting study - Approach 3	Prospective cohort study	Students and staff and wider community (school setting unclear)	Staff, and students (5–18 years)		USA	Multicomponent measures: * Making contacts safer: Individual protection (i.e. face masks), physical environment (i.e. distancing of desks (more than 6 feet)) * Measures reducing contacts: Social	No comparison	Transmission-related outcomes *Number or proportion of cases	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
							interactions (i.e. reduction of group size; bubbles); services (i.e. restriction of extracurricular activities, large group gatherings, modification of lunch breaks), response			
Jani 2021	Supporting study - Approach 3	Prospective cohort study	Students and staff (school setting unclear)	Unclear		USA	Multicomponent measures: * Making contacts safer: Individual protection (i.e. face masks), physical environment (i.e. ventilation, distancing of desks (more than 6 feet), cleaning) * Measures reducing contacts: Social interactions (i.e. reduction of group size; bubbles); services (i.e. modification of large group gatherings, cancellation of extracurricular activities), response * Surveillance	No comparison	Transmission-related outcomes * Cases: Number or proportion of cases	
Jurkutat 2022	Supporting study - Approach 3	Prospective cohort study	Students in primary and secondary schools	Students in primary and secondary schools		Germany	Multicomponent measures: * Measures making contacts safer: vaccination * Measures reducing contacts: services (i.e.	Least intense vs. more intense measure	Transmission-related outcomes *seroprevalence of cases	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
							hybrid teaching), response * Surveillance (i.e. testing)			
Juutinen 2022	Supporting study - Approach 3	Prospective cohort study	Students aged 10-12 (school setting unclear)	Students aged 10-12 (school setting unclear)		Finland	Measures making contacts safer: * Individual protection (i.e. face masks)	Measure vs. no measure	Unintended consequences* Cost per person screened per week for all districts	
Lee 2021	Supporting study - Approach 3	Case control study	Students and staff (school setting unclear)	Unclear		USA	Surveillance measures: * Pool testing and consequent individual testing	Least intense vs. more intense measure	Transmission-related outcomes *secondary attack rate	
Nelson 2021	Supporting study - Approach 3	Prospective cohort study	Staff and students in K-12 schools	Staff and students in K-12 schools		USA	Measures making contacts safer: * Individual protection (i.e. face masks)	Measure vs. no measure	Transmission-related outcomes *secondary attack rate	
Rice 2020	Supporting study - Approach 3	Observational/microcosting	Staff and students in K-12 schools	Staff and students in K-12 schools		USA	Measures making contacts safer: * Making contacts safer: Individual protection (i.e. face masks, hand hygiene, respiratory etiquette, physical distancing), physical environment (i.e. disinfection, cleaning)	Measure vs. no measure	Unintended consequences * Costs associated with implementing the critical CDC-recommende	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
									d mitigation strategies	
Rubin 2021	Supporting study - Approach 3	Prospective cohort study	School staff (school setting unclear)	Staff (17 to 65+ years)		USA	Measures making contacts safer: * Vaccination	Measure vs. no measure	Transmission-related outcomes: * Cases: Number or proportion of cases	
Sasser 2021	Supporting study - Approach 3	Retrospective survey	Athletic directors representing high school athletes with or without SARS-CoV- 2.	Students (14 to 17 years)		USA	Measures making contacts safer: * Individual protection (i.e. face masks)	Measure vs. no measure	Transmission-related outcomes * Cases: Number or proportion of cases	
Sombetzki 2021	Supporting study - Approach 3	Prospective cohort study	Students and staff (school setting unclear)	Unclear		Germany	Multicomponent measures: * Making contacts safer: individual protection (i.e. face masks, physical distancing) * Surveillance: testing	Least intense vs. more intense measure	Transmission-related outcomes *incidence; secondary attack rate	
Somekh 2021	Supporting study - Approach 3 (controlled cohor	Prospective cohort study	Students, staff, and wider community (school setting unclear)	Unclear		Israel	Measures reducing contacts: * Social interactions (i.e. gradual school reopening)	Least intense vs. more intense measure	Transmission-related outcomes *incidence	

Study ID	Study categorization	Study design	Population in which measure is implemented	Population in which outcome is assessed	SARS-CoV-2 variant	Country	School measure	Comparison	Outcome(s)	Notes - funding source as reported in the study
	t study or propensity score matching or case control study)									
Ulyte 2021	Supporting study - Approach 2	Difference-in-difference study	Students (school setting unclear)	Students (7-17 years)		Switzerland	Multicomponent measures: * Making contacts safer: individual protection (i.e. face masks)	Least intense vs. more intense measure	Transmission-related outcomes *seropositivity	
Verlenden 2021	Supporting study - Approach 3	Cross-sectional study	Students in primary schools	Students (5-12 years)		USA	Measures reducing contacts: * Social interactions (i.e. gradual school reopening)	Least intense vs. more intense measure	Unintended consequences *Health-related consequences (i.e. Mental health and well being)	
Watson 2021	Supporting study - Approach 3	Cross-sectional study	Students in secondary schools	Students in secondary schools		USA	Measures making contacts safer: * Individual protection (i.e. face masks)	Measure vs. no measure	Transmission-related outcomes *Number or proportion of cases	

Tabelle 2. Zusammenfassung der Ergebnisse (Summary of Findings) / Maßnahmen um Kontakte reduzieren

Reducing number of students: Services (hybrid teaching)				
Outcome	**Number of studies**	**Summary of findings**	**Certainty of evidence**	**Summary effect size**
Measures reducing number of students - Services: Hybrid teaching				
Transmission-related outcomes - Cases: Number or proportion of cases				
Comparator category: Least intense measure				
Transmission-related outcomes - Cases: Number or proportion of cases	1 Approach 1 study (Reinbold 2021)	One study found beneficial results on the number of cases in the general population when comparing remote to hybrid teaching. This resulted in 0.89 fewer new daily cases per 100,000 people.	**Moderate** ⊕⊕⊕◯	beneficial ▲
Transmission-related outcomes - Cases: Number or proportion of cases	1 Approach 2 study (Oster 2021)	One study found mixed results for reducing the number of students by up to 50%. Results showed that student rates of COVID-19 were significantly associated with higher student in person densities of 50-79% and 80%+ in three states (Florida, Massachussetts, and New York). Staff rates of COVID-19 were mostly not significantly associated with student density, although significant associations were observed for a small decrease with an 80%+ student density in Massachussets (-5.979(3.555)) and a small increase at 50-79% density in New York (1.970(1.010)).	**Moderate** ⊕⊕⊕◯	Florida *Students*: harmful ▼ *Staff*: beneficial ▲ Massachussetts *Students*: beneficial ▲ *Staff*: beneficial ▲ New York *Students*: harmful ▼ *Staff*: beneficial ▲
Comparator category: No measure				
Transmission-related outcomes - Cases: Number or proportion of cases	1 Approach 1 study (Reinbold 2021)	One study found beneficial results on the number of cases in the general population when comparing hybrid to in-person teaching. This resulted in 8.51 fewer new daily cases per 100,000 people (32% reduction).	**Moderate** ⊕⊕⊕◯	beneficial ▲
Transmission-related outcomes - Cases: Number or proportion of cases	1 Approach 1 study (Reinbold 2021)	One study found beneficial results on the number of cases in the general population when comparing remote to in-person teaching. This resulted in 10.13 fewer new daily cases per 100,000 people.	**Moderate** ⊕⊕⊕◯	beneficial ▲
Transmission-related outcomes - Cases: Epidemic progression				

Comparator category: Least intense measure				
Transmission-related outcomes - Cases: Epidemic progression	1 Approach 1 study (Liu 2021)	One study found a beneficial effect on cumulative case growtih rates when comparing remote with hybrid learning. Cumulative case growth rates were lower for remote learning (OR 0.963, 95% CI 0.960-0.965) compared to hybrid learning.	**Low** ⊕⊕◯◯	beneficial ▲
Comparator category: No measure				
Transmission-related outcomes - Cases: Epidemic progression	1 Approach 1 study (Liu 2021)	One study found a harmful effect on cumulative case growtih rates when comparing byrid learning with in-person learning. Cumulative case growth rates were higher for hybrid learning (OR 0.986, 95% CI 0.984-0.988) compared to in-person learning.	**Low** ⊕⊕◯◯	harmful ▼
Transmission-related outcomes - Cases: Risk of infection				
Comparator category: Least intense measure				
Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (Lessler 2021)	One study found a beneficial effect in favor of remote learning versus hybrid schooling. Findings showed that the odds ratios of adults having a positive test were significantly higher when reporting a child in their household attends part-time schooling, compared to remote learning. An increase in odds of having a recent positive SARS-CoV-2 test were observed when reporting a child in their household attends part-time schooling (aOR 1.09, 95% CI 1.03 to 1.14), compared to remote learning. The effect varied with the number of co-interventions in place in schools.	**Very low** ⊕◯◯◯	beneficial ▲
Comparator category: No measure				
Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (Lessler 2021)	One study found a beneficial effect in favor of remote learning versus in person schooling. Findings showed that the odds ratios of adults having a positive test were significantly higher when reporting a child in their household attends full time schooling, compared to remote learning. An increase in odds of having a recent positive SARS-CoV-2 test were observed when reporting a child in their household attends full time schooling (aOR 1.30; 95% CI, 1.24 to 1.35), compared to remote learning. The effect varied with the number of co-interventions in place in schools.	**Very low** ⊕◯◯◯	beneficial ▲
Transmission-related outcomes - Deaths: Number and proportion of death				
Comparator category: Least intense measure				
Transmission-related outcomes - Deaths: Number and proportion of death	1 Approach 1 study (Reinbold 2021)	One study found no effect on the number of deaths in the general population when comparing hybrid with remote teaching. Effect estimates span around the null effect from -0.08 to 0.12 (regression coefficient).	**Moderate** ⊕⊕⊕◯	null ◀▶

Comparator category: No measure				
Transmission-related outcomes - Deaths: Number and proportion of death	1 Approach 1 study (Reinbold 2021)	One study found no effect on the number of deaths in the general population when comparing hybrid with in-person teaching. Effect estimates ranged between -0.34 to 0.03 (regression coefficient).	**Moderate** ⊕⊕⊕◯	null ◀▶
Transmission-related outcomes - Deaths: Number and proportion of death	1 Approach 1 study (Reinbold 2021)	One study found no effect on the number of deaths in the general population when comparing remote with in-person teaching. Effect estimates span around the null effect from -0.33 to 0.28 (regression coefficient).	**Moderate** ⊕⊕⊕◯	null ◀▶
Transmission-related outcomes - Hospitalisation: Number or proportion of hospital admissions				
Comparator category: Least intense measure				
Transmission-related outcomes - Hospitalisation: Number or proportion of hospital admissions	1 Approach 1 study (Reinbold 2021)	One study found a beneficial effect on the number of hospital admissions in the general population when comparing hybrid with remote teaching. Effect estimates (regression coefficients) ranged between -0.38 and 0.42.	**Moderate** ⊕⊕⊕◯	beneficial ▲
Comparator category: No measure				
Transmission-related outcomes - Hospitalisation: Number or proportion of hospital admissions	1 Approach 1 study (Reinbold 2021)	One study found a beneficial effect on the number of hospital admissions in the general population when comparing hybrid with in-person teaching. Effect estimates (regression coefficients) ranged between 0.28 and 1.94.	**Moderate** ⊕⊕⊕◯	beneficial ▲
Transmission-related outcomes - Hospitalisation: Number or proportion of hospital admissions	1 Approach 1 study (Reinbold 2021)	One study found a beneficial effect on the number of hospital admissions in the general population when comparing remote with in-person teaching. Effect estimates (regression coefficients) ranged between 0.64 and 3.07.	**Moderate** ⊕⊕⊕◯	beneficial ▲
Measures reducing contacts - Services: Closed playground and cafeteria				
Comparator category: No measure				
Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (Lessler 2021)	One study found a harmful effect of closing playgrounds and cafeterias versus keeping them open. In household members, an increase in odds of having a recent positive SARS-CoV-2 test were observed for closing playgrounds (aOR, 1.01; 95% CI, 0.92 to 1.10) and closing cafeterias (aOR, 1.03; 95% CI, 0.95 to 1.11).	**Very low** ⊕◯◯◯	harmful ▼
Measures reducing contacts - Services: Keeping the same teacher				
Comparator category: No measure				

Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (Lessler 2021)	One study found no effect in favor of keeping the same teacher. When keeping the same teacher within one class, a null effect was observed for the risk of having a recent positive SARS-CoV-2 test in household members (odds of having a recent positive SARS-CoV-2 test (aOR, 1.00; 95% CI, 0.93 to 1.08))	**Very low** ⊕◯◯◯	null ◀▶
Measures reducing contacts - Social interactions: Cancellation of extracurricular activities				
Comparator category: No measure				
Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (Lessler 2021)	One study found a beneficial effect in favor of cancelling extracurricular activities compared to keeping them running. In household members, a decrease in odds of having a recent positive SARS-CoV-2 test (aOR, 0.73; 95% CI, 0.68 to 0.79) was observed when extracurricular activities were cancelled.	**Very low** ⊕◯◯◯	beneficial ▲

Tabelle 3. Zusammenfassung der Ergebnisse (Summary of Findings) / Maßnahmen um Kontakte sicherer machen

Making contacts safer: Individual protection (i.e. masks)					
Outcome	**Number of studies**	**Summary of findings**	**Certainty of evidence**	**Summary effect size**	**Comparator**
Measures making contacts safer - Individual protection: Masks					
Outcome category: Transmission-related outcomes					
Comparator category: Least intense measure					
Approach 2 Studies					
Transmission-related outcomes - Cases: Number or proportion of cases	1 Approach 2 study (Oster 2021)	One study found varying effects were observed across populations when comparing schools with a staff mask mandate to those without. Staff mask mandates were associated with lower case rates in students (regression coefficient 0.383 (2.131), but higher case rates in staff (regression coefficient 2.395 (1.760). Analyses were adjusted for racial demographics and community case rates.	**Moderate** ⊕⊕⊕◯	Florida *Students*: beneficial ▲ *Staff*: harmful ▼	Least intense measure
Approach 3 Studies					
Transmission-related outcomes - Cases: Number or proportion of cases	2 Approach 3 Studies (Donovan 2022, Jehn 2021)	Two studies reported beneficial findings for the higher intensity student and staff mask mandates on the number or proportion of Covid-19 cases (Donovan, Jehn). One study differentiated according to the timing of implementation, finding that an early mask mandate for all individuals in the school was associated with a lower number of COVID-19 outbreaks in schools compared to a late mask mandate (16, 8.4% vs (62, 32.5%). Observed-to-expected ratios for school districts with partial mask policies were slightly higher than those in districts with full mask policies . A further study focused on mandate intensity, finding that partial mask mandates had higher observed to expected ratios among students and staff members than school districts with a full mask mandate (observed-to-expected ratio 1.52; 95% CI = 1.35–1.72). Both studies adjusted for socioeconomic status and Covid-19 prevalence.	**Moderate** ⊕⊕⊕◯	beneficial ▲ beneficial ▲	Least intense measure
Comparator category: No measure					
Approach 1 studies					
Transmission-related outcomes - Cases: Number or proportion of cases	1 Approach 1 study (Donovan 2022)	One study found that, when implementing a student or staff mask policy, beneficial effects were observed on COVID-19 incidence when compared to no mask mandate. COVID-19 incidences for student and staff members were higher than those in the community during the period with no mask policy	**Moderate** ⊕⊕⊕◯	beneficial ▲	No measure

		(891.8 per 100,000 vs 479.7 per 100,000). The controlled ITS study was not adjusted for confounders.			
Approach 2 Studies					
Transmission-related outcomes - Cases: Number or proportion of cases	1 Approach 2 study (Budzyn 2021)	One study found beneficial effects when implementing student mask mandates, with a lower average increase in cases for counties with a mandate, versus those without. An average increase of 16.32 cases was observed for counties with a mandate, versus 34.85 cases per 100,000 per day for counties without a school mask mandate (p<0.001). These lower daily case rates of Covid-19 were still associated with school mask mandates after controlling for covariates (β −1.31; 95% CI −1.51 to −1.11) (p<0.001). Analyses were adjusted for social vulnerability index score, percentage uninsured, and percentage living in poverty as well as community transmission rates.	**Moderate** ⊕⊕⊕◯	beneficial ▲	No measure
Approach 3 Studies					
Transmission-related outcomes - Cases: Number or proportion of cases	3 Approach 3 studies (Hughes 2022, Jehn 2021, Donovan 2022)	Three studies reported beneficial findings for mask mandates versus no mask mandates on the number or proportion of Covid-19 cases. These studies found that having a mandate in place for all individuals in the school was associated with a lower number of COVID-19 outbreaks in schools (Jehn) and lower case rates for staff and students (Hughes), compared to no mask mandate (. Moreover, mandates for either staff or students, or both, were associated with lower observed to expected ratios in staff and students (Donovan), compared to no mask mandate (2.10 [95% CI = 1.92–2.30]). All studies adjusted for socioeconomic status and Covid-19 prevalence.	**Moderate** ⊕⊕⊕◯	beneficial ▲ beneficial ▲ beneficial ▲	No measure
Approach 3 Studies					
Transmission-related outcomes - Cases: Risk of infection	2 Approach 3 studies (Jehn 2021, Lessler 2021)	One study evaluated the effectiveness of mitigation measures to improve distancing within schools, finding beneficial effects on the risk of SARS-CoV-2 infection in children and adults. A decrease in odds of having a recent positive SARS-CoV-2 test were observed for keeping the same students together (aOR, 0.93; 95% CI, 0.86 to 1.00), extra desk space (aOR, 0.96; 95% CI, 0.89 to 1.04), for reducing class size (aOR, 1.01; 95% CI, 0.94 to 1.09), and restricted entry (aOR, 0.88; 95% CI, 0.81 to 0.95). Analyses adjusted for poverty, access to broadband internet and county level confirmed incidence.	**Very low** ⊕◯◯◯	beneficial ▲ beneficial ▲ beneficial ▲	No measure
Measures making contacts safer - Individual protection: Not sharing equipment					
Outcome category: Transmission-related outcomes					
Comparator category: No measure					
Approach 3 Studies					

Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (Lessler 2021)	One study found that when implementing an intervention of not sharing supplies in schools, a decrease in odds of having a recent positive SARS-CoV-2 test was observed for the risk of SARS-CoV-2 infection for adults living with a school student (aOR, 0.92; 95% CI, 0.85 to 0.995). Analyses adjusted for poverty, access to broadband internet and county level confirmed incidence.	**Very low** ⊕◯◯◯	beneficial ▲	No measure
Measures making contacts safer - Individual protection: Physical distancing					
Outcome category: Transmission-related outcomes					
Comparator category: Least intense measure					
Approach 3 Studies					
Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (van den Berg 2021)	One study evaluated the effectiveness of ≥3 feet versus ≥6 feet of physical distancing policies in schools, finding mixed effects on the risk of SARS-CoV-2 infection in students and staff. Results showed that the risk of developing SARS-CoV-2 was lower for students (adjusted IRR, 0.904, 95% CI, 0.662-1.23), but higher for staff (adjusted IRR, 1.104, CI, 0.830- 1.468), when a more intense distancing policy was in place. Socioeconomic status and community incidence were adjusted for within the analyses.	**Low** ⊕⊕◯◯	Students: beneficial ▲ Staff: harmful ▼	Least intense measure
Comparator category: No measure					
Approach 3 Studies					
Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (Lessler 2021)	One study evaluated the effectiveness of mitigation measures to improve distancing within schools, finding beneficial effects on the risk of SARS-CoV-2 infection in children and adults. A decrease in odds of having a recent positive SARS-CoV-2 test were observed for keeping the same students together (aOR, 0.93; 95% CI, 0.86 to 1.00), extra desk space (aOR, 0.96; 95% CI, 0.89 to 1.04), for reducing class size (aOR, 1.01; 95% CI, 0.94 to 1.09), and restricted entry (aOR, 0.88; 95% CI, 0.81 to 0.95). Analyses adjusted for poverty, access to broadband internet and county level confirmed incidence.	**Very low** ⊕◯◯◯	beneficial ▲	No measure
Measures making contacts safer - Physical environment: Desk shields					
Outcome category: Transmission-related outcomes					
Comparator category: No measure					
Approach 3 Studies					
Transmission-related outcomes - Cases: Risk of infection	1 Approach 3 study (Lessler 2021)	One study found that when implementing an intervention of desk shields in schools, an increase in odds of adults living with a school student having a recent positive SARS-CoV-2 test was observed (aOR, 1.12; 95% CI, 1.04 to 1.22).	**Very low** ⊕◯◯◯	harmful ▼	No measure

		Analyses adjusted for poverty, access to broadband internet and county level confirmed incidence.			
Measures making contacts safer - Physical environment: Ventilation					
Outcome category: Transmission-related outcomes					
Comparator category: No measure					
Approach 2 Studies					
Transmission-related outcomes - Cases: Number or proportion of cases	1 Approach 2 study (Oster 2021)	One study examined associations between COVID-19 case rates and improving school ventilation, finding consistent beneficial effects across staff and students. Results showed that both staff and student rates of COVID-19 were slightly lower in schools in which ventilation was improved, compared to schools where no such improvements were made. In Florida, among students in schools in which ventilation was improved, case rates were lower (regression coefficient for improvement of ventilation: -2.691 (2.297)) and among staff in schools in which ventilation was improved, case rates were lower (regression coefficient for improvement of ventilation: -2.661 (2.445)). Analyses adjusted for racial demographics and community case rates. In New York, among students in schools in which ventilation was improved, case rates were lower (regression coefficient for improvement of ventilation: -1.915 (2.095)) and among staff in schools in which ventilation was improved, case rates were lower (regression coefficient for improvement of ventilation:-2.527 (2.466)).	**Moderate** ⊕⊕⊕◯	Florida Students: beneficial ▲ Staff: beneficial ▲ New York Students: beneficial ▲ Staff: beneficial ▲	No measure

Tabelle 4. Zusammenfassung der Ergebnisse (Summary of Findings) / Surveillance und Response

Study ID	Population	Frequency	Prevalence	Proportion detected	PPV	Tertiary cases (forward transmission)	Absences avoided
Rapid antigen testing							
Blanchard 2022	Symptomatic students	Symptom onset	5.10%	83.3% (95% CI 51.6-97.9)	100%		350070
Blanchard 2022	Symptomatic staff	Symptom onset	3.10%	50%	100%		
Blanchard 2022	Asymptomatic students	Weekly	0.30%	41.20%	87.50%		
Blanchard 2022	Asymptomatic staff	Weekly	0.00%	Not calculable**	Not calculable**		
Blanchard 2022	Asymptomatic students exposed to an in-school case	Weekly	0.90%	28.60%	40%		
Blanchard 2022	Asymptomatic staff exposed to an in-school case	Weekly	0.00%	28.60%	40%		
Hoehl 2021	Staff	Every two days	Not calculable**	Not calculable**	24.00%		
Goldenfeld 2022	Strategy 1: Students and staff without SARS-CoV-2 antibodies; Strategy 2: Asymptomatic students and staff exposed to an in-school case	Strategy 1: Every two weeks; Strategy 2: Daily for 10 days	4.10%	100%	100%		1390
Schechter-Perkins 2022	Students potentially exposed to an in-school case	Daily for 7 days	2.90%			516	325328
Quarantining of class cohort in which positive test is identified							
Edward 2021	lass cohorts with positively identified cas.es	Upon case identification	Not calculable**	Not calculable**	0%		

Tabelle 5. Zusammenfassung der Ergebnisse (Summary of Findings) / Maßnahmen mit mehreren Komponenten

Outcome	Number of studies	Summary of findings	Certainty of evidence	Summary effect size	Comparator
Multicomponent interventions					
Transmission-related outcomes					
Comparator category: Single-component measure vs. multi-component measures					
Transmission: Risk of infection	1 observational study (Lessler 2022)	**Lessler 2021:** One study found a positive effect in favor of implementing a higher, versus a lower, number of measures. Findings showed that the odds ratios of adults having a positive SARS-CoV-2 test result had a dose-response relationship with the number of mitigation measures reported to be in place in a school. Specifically, findings showed a decrease in odds of having a recent positive SARS-CoV-2 test 7% (aOR, 0.93; 95% CI, 0.92 to 0.94).	**Very low** ⊕◯◯◯	positive ▲	Single-component measure vs. multi-component measures

Tabelle 6. Übersicht über inkludierte Studien

Study ID	Study design and method	Setting	Population	Intervention	Outcomes
Alonso 2021	**Quantitative (quasi-experimental) study** **Descritption:** **Interrupted time series study on ventilation protocols before and during the pandemic**	Country: Spain School type studied: Preschool and primary school	Population targeted by intervention: Students and Teachers Population in which outcomes is assessed: Directly affected (Students)	**Making contacts safer - Ventilation** Description: Mandatory manual airing at all times	**Environmental** Outcome 1: Thermal comfort Outcome 2: Indoor air quality
Borch 2020	**Quantitative (observational) study** **Descritption:** **Regression analysis of cross-sectional survey data on hand washing and dermatitis prevalence**	Country: Denmark School type studied: Pre-school and primary school	Population targeted by intervention: Students Population in which outcome is assessed: Directly affected (Students - through surveyed parents)	**Making contacts safer - Hygiene** Description: Regulations introducing frequent hand washing and use of hand sanitizer	**Physical health / health behaviour** Outcome: incidence of irritant contact dermatitis in children
Cohen 2020	**Quantitative (modelling) study** **Descritption:** **Agent-based model of COVID-19 transmission and interventions**	Country: modelled after King County, Washington, USA School type studied: Elementary, middle and high school	Population targeted by intervention: Students and teachers Population in which outcomes is assessed: Directly affected (Students)	**Multicomponent** Description: Mask usage, Physical distancing and hand hygiene; Screening; Quarantine	**Educational** Outcome: Percentage of in-person school days lost due to scheduled distance learning, symptomatic screening or quarantine
Curtius 2021	**Quantitative (quasi-experimental) study** **Descritption:** **Installation and assessment of air purifiers in a class room**	Country: Germany School type studied: High school	Population targeted by intervention: Students and teachers Population in which outcomes is assessed:	**Making contacts safer - Air purifiers** Description: Three or four air purifiers were operated in a classroom simultaneously	**Educational** Outcome 1: Noise level perceived as disturbing Outcome 2: Temperature and air circulation perceived as disturbing

			Directly affected (Students and teachers)		**Environmental** Outcome: Particulate matter in classroom
Doron 2021	**Quantitative (observational) study** **Descritption:** **Prospective observational study using online surveys**	Country: USA School type studied: Public school district with 1 preschool, 7 elementary schools, 1 middle school and 1 high school	Population targeted by intervention: Students and district staff Population in which outcomes is assessed: Directly affected (Children; educators/staff) and indirectly (families/caregivers)	**Surveillance and response - Screening** Description: Weekly pooled asymptomatic PCR screening	**Psychosocial** Outcome: Comfort with in-person learning **Equity/equality** Outcome: Stigma related to COVID-19 positivity **Socioeconomic** Outcome: Burden of quarantine
Fontenelle-Tereshchuk 2021	**Qualitative study** **Descritption:** **Case study with interviews and thematic analysis**	Country: Canada School type studied: Elementary school	Population targeted by intervention: Students Population in which outcomes is assessed: Directly affected (Students - through surveyed parents)	**Making contacts safer - Distancing** Description: Social distancing of 2m **Reducing contacts** Description: Hybrid learning in groups, some in-class some online **Surveillance and response - Quarantine** Description: 14-day isolation when showing symptoms	**Psychosocial** Outcome: Mental Health of children **Educational** Outcome 1: academic loss Outcome 2: Learning continuity
Gill 2020a	**Mixed-method study (just qualitative component considered)** **Descritption:** **Cross-sectional study with stakeholder interviews**	Country: USA School type studied: Primary and secondary schools	Population targeted by intervention: Students and teachers Population in which outcomes is assessed: Directly affected (Students - through surveyed parents, teachers etc)	**Making contacts safer - Mask wearing** Description: Mandatory mask use in school	**Educational** Outcome: Effective teaching and learning

Gill 2020b	**Quantitative (modelling) study** **Descritption:** **Agent based model of COVID-19 transmission and interventions**	Country: model based on data from Pennsylvania, USA School type studied: Elementary, middle and high school	Population targeted by intervention: Students and teachers Population in which outcomes is assessed: Directly affected (Students)	**Surveillance and response - Quarantine** Description: Quarantine for infected person and shutdown of school building	**Educational** Outcome: Number of days a student can attend school
Hortigüela-Alcalá 2021	**Qualitative study** **Descritption:** **Reflective journals and discussion groups with thematic analysis**	Country: Spain School type studied: Primary, secondary and tertiary education	Population targeted by intervention: Students and teachers Population in which outcomes is assessed: Directly affected (Teachers)	**Making contacts safer - Mask wearing** Description: Mask use during class **Making contacts safer - Distancing** Description: mandatory social distance during PE class **Making contacts safer - Hygiene** Description: single use material and hand washing	**Educational** Outcome 1: Reconfiguration of the aims of the subject (PE) Outcome 2: Teaching constraints
Li 2020	**Quantitative (observational) study** **Descritption:** **Cross-sectional survey with multivariable regressional analysis**	Country: China School type studied: Primary, secondary and tertiary education	Population targeted by intervention: Teachers Population in which outcomes is assessed: Directly affected (Teachers)	**Making contacts safer - Mask wearing** Description: Mask wearing in public places and school	**Psychosocial** Outcome: Level of anxiety
Lorenc 2021	**Qualitative study** **Descritption:** **Semi-structures interviews were analysed through a framework method**	Country: England School type studied: Secondary schools	Population targeted by intervention: Students Population in which outcomes is assessed: Directly affected (Students,	**Making contacts safer - Distancing** Description: 2m distancing between students and teacher **Reduced contacts** Description: groups of	**Educational** Outcome 1: Behavioural issues and reduced range of lessons Outcome 2: Impaired learning and pastoral care **Psychosocial**

			school staff) and Indirectly (Families)	students prevented from mixing with other 'bubbles' **Surveillance and response - Screening** Description: asymptomatic testing	Outcome: Stigma related to COVID-19 positivity
Marchant 2020	**Qualitative study** **Descritption:** **Cross sectional online survey analyed with thematic synthesis**	Country: Wales, UK School type studied: Primary school	Population targeted by intervention: Students and teachers Population in which outcomes is assessed: Directly affected (Students, teachers)	**Making contacts safer - Hygiene** Description: enhanced cleaning and hygiene practices **Making contacts safer - Distancing** Description: Social distancing and staff isolation **Reduced contacts** Description: Smaller class sizes	**Educational** Outcome 1: educational benefit from better student - teacher ratio Outcome 2: Less time for student support by teachers **Psychosocial** Outcome: Staff wellbeing
Phillips 2021	**Quantitative (modelling) study** **Descritption:** **Agent based model of COVID-19 transmission ans interventions**	Country: based on demographics from Canada School type studied: Childcare and primary school	Population targeted by intervention: Students and teachers Population in which outcomes is assessed: Directly affected (Students)	**Surveillance and response - Quarantine** Description: 14 days classroom closure after case detection **Reduced contacts** Description: Shortened school days to decrease time of contact	**Educational** Outcome: Missed students-days
Ruba 2020	**Quantitative (quasi-experimental) study** **Descritption:** **Experimental, lab based study on emotional**	Country: USA School type studied: Children aged 7-13 yrs in a after school program	Population targeted by intervention: Students and teachers Population in which	**Making contacts safer - Mask wearing** Description: Mask mandates in school and public places	**Psychosocial** Outcome: impact on childrens social interactions

	inferences from facial configurations		outcomes is assessed: Directly affected (Students)		
Saad 2020	**Quantitative (Modelling) study** **Descritption:** **Model based on Coronavirus Simulation Matlab program on virus transmission**	Country: not specified, model created in the USA School type studied: not specified, "school of 500 people"	Population targeted by intervention: Students Population in which outcomes is assessed: Indirectly affectd (Family of students; Society)	**Surveillance and response - Screening** Description: daily random testing of a percentage of students	**Socioeconomic** Outcome 1: cost of hospitalization of some infected students Outcome 2: loss of parental income
Schwarz 2021	**Quantitative (observational) study** **Descritption:** **Cross-sectional online survey analysed through statistical tests**	Country: Germany School type studied: Pre-school, Primary and secondary schools	Population targeted by intervention: Students Population in which outcomes is assessed: Directly affected (Students - through surveyed parents, teachers or doctors)	**Making contacts safer - Mask wearing** Description: mask use on the way to school; in school outside the classroom; at school in class; in stores	**Physical health / health behaviour** Outcome: various health outcomes, e.g. headaches, skin reactions, tiredness **Psychosocial** Outcome: school anxiety **Educational** Outcome: learing difficulties
Simonsen 2020	**Quantitative (observational) study** **Descritption:** **Cross-sectional online survey with statistical analysis**	Country: Denmark School type studied: Primary school	Population targeted by intervention: Students Population in which outcomes is assessed: Directly affected (Students - through surveyed parents)	**Making contacts safer - Hygiene** Description: frequent hand washing (every 2h; upon arrival; before and after meals or toilet visits)	**Physical health / health behaviour** Outcome: incidence of hand eczema
Steffens 2021	**Quantitative (modelling) study** **Descritption:** **Simulated classroom with air purifiers, calculations on noise level**	Country: Germany School type studied: modelled classroom without further specification of school type	Population targeted by intervention: Students and teacher Population in which outcomes is assessed: Directly affected (Students, teachers)	**Making contacts safer - Air purifiers** Description: strategic positioning of one air purifier	**Educational** Outcome: intelligibility of teachers **Environmental** Outcome: burden of noise level

Methodik Direkte Evidenz

1) Identifikation von Evidenz für den Hintergrund der Leitlinie

a) systematische Übersichtsarbeiten

Sichtung des Grundstocks systematischer Übersichtsarbeiten, die im Rahmen der Recherchen der Arbeitsgruppe EBPH der LMU München für einen Cochrane Scoping Review und einen Cochrane Rapid Review zu Schulmaßnahmen in der SARS-CoV-2 Pandemie idenfitiziert wurden.
Darüber hinaus wurden die systematischen Reviews, welche im Rahmen des Snowballings Screenings des o.g. Projekts identifiziert wurden, gesichtet und bzgl ihrer Relevanz für die Leitlinie geprüft.

Aus diesem Pool an Evidenz wurden für die Leitlinienerstellung systematische Reviews eingeschlossen, die eine Übersicht i) zum Transmissionsgeschehen bei Kindern und Jugendliche sowie ii) Transmission im Schul-Setting und iii) zu Symptomen, klinischem Verlauf und Epidemiologie von SARS-CoV-2 Infektionen bei Kindern geben.

Ergänzend erfolgte am 18.02.2022 und 23.06.2022 die zielgerichtete Sichtung von systematischer Übersichtsarbeiten, “Overviews” und Evidenzsynthesen der WHO COVID-19 Datenbank mit der Suche *tw:((tw:(school*)) OR (tw:(child*))) AND type_of_study:("systematic_reviews" OR "policy_brief" OR "overview")* zur Identifikation weiterer relevanter systematischer Übersichtsarbeiten für i), ii) und iii).

b) internationale Leitlinien für Schulmaßnahmen

Internationale Leitlinien wurden im Rahmen der Arbeit an zwei Cochrane Reviews zu Schulmaßnahmen der AG EBPH der LMU Münche identifiziert. Weitere Leitlinien wurden von Kolleg*innen der McMaster University, Kanada, bereitgestellt.

Aus dem Pool internationaler Leitlinien wurden die für die vorliegende Leitlinie relevanten Leitlinien identifiziert.

2) Identifikation von Evidenz für die Schlüsselfragen

Direkte Evidenz für die Schlüsselfragen der Leitlinie wurde einerseits über die Arbeit an einem Cochrane Review zu Schulmaßnahmen in der SARS-CoV-2 Pandemie von der Arbeitsgruppe EBPH der LMU München bereitgestellt.

Ergänzend wurden systematische Reviews, die den PICO-Kategorien der Schlüsselfrage entsprechen, aus folgenden Quellen identifiziert und bereitgestellt:

- Zielgerichtete Sichtung der Übersicht systematischen Übersichtsarbeiten, welche im Rahmen der beiden Cochrane Reviews der Arbeitsgruppe identifiziert wurden
- Zielgerichtete Sichtung von systematischer Übersichtsarbeiten, “Overviews” und Evidenzsynthesen der WHO COVID-19 Datenbank mit der Suche *tw:((tw:(school*)) OR (tw:(child*))) AND type_of_study:("systematic_reviews" OR "policy_brief" OR "overview")* am 5.1.2021
- Vorwärts Snowballing relevanter Reviews in google scholar (wo kapazitär möglich)
- Rückwärts Snowballing relevater Reviews und Leitlinien (manuell, wo kapazitär möglich)

Stand des Dokuments: 23.06.2022
Datum der Suchen: Datenbanksuche: 18.02.2022; Snowballing Suche: 23.06.2022
Mitarbeitende: Hannah Littlecott, Shari Krishnaratne, Lisa Pfadenhauer
Kontakt: Lisa Pfadenhauer, pfadenhauer@ibe.med.uni-muenchen.de

Indirekte Evidenz

AWMF S3-Leitlinie Schulmaßnahmen & COVID-19
Evidenzpaket indirekte Evidenz

Stand 05.07.2022

Über dieses Dokument

Sehr geehrte Kolleginnen und Kollegen,

mit den beigefügten Studien möchten wir Ihnen die Arbeit bei der Überarbeitung der Leitlinie erleichtern. Neben der direkten Evidenz, die wir Ihnen separat zur Verfügung stellen, finden Sie hier weiterführende, indirekte Evidenz. Auf den nächsten Seiten haben wir systematische Übersichtsarbeiten, Primärstudien und zum Teil Leitlinien bereitgestellt, die für die Schlüsselfragen relevant sind. Zudem finden Sie unter der neuen indirekten Evidenz, auch die Literatur aus den Evidenzbündeln vom Januar und September 2021.

Das methodische Vorgehen unserer Suchen ist am Ende des Dokuments dargestellt. Wir möchten darauf hinweisen, dass die Suchen nach systematischen Übersichtsarbeiten systematisch und umfassend waren, einzelne Primärstudien jedoch aus einer nicht-systematischen Suche stammen.

Für Rückfragen stehen wir gerne zur Verfügung.

Herzliche Grüße,
Ester Orban und Lydia Stuhrmann

Universitätsklinikum Hamburg-Eppendorf
Zentrum für Psychosoziale Medizin
Klinik für Kinder- und Jugendpsychiatrie, -psychotherapie und -psychosomatik
Forschungssektion "Child Public Health"

Schlüsselfragenspezifische Evidenzbündel

Für jede Schlüsselfrage wurde indirekte Evidenz gesucht und identifiziert.

1. Reduktion der Schüler*innenzahl / Kohortierung

(gesucht am 11/05/2022, 25/05/2022)

(Systematische) Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Silverberg et al., 2022	Child transmission of SARS-CoV-2: a systematic review and meta-analysis (Link)	02/04/2022	Systematic review. "Children transmit COVID-19 at a lower rate to children than to adults. Household adults are at highest risk of transmission from an infected child, more so than adults or children in other settings."
Greenhalgh et al., 2021	Rapid evidence review to inform safe return to campus in the context of coronavirus disease 2019 (COVID-19) (Link)	20/10/2021	Rapid review. Evidence from a wide range of primary studies supports six measures, amongst which: "Space people out by physical distancing (but there is no "safe" distance because transmission risk varies with factors such as ventilation, activity levels and crowding), reducing class size (including offering blended learning), and cohorting (students remain in small groups with no cross-mixing)"

Leitlinien und Empfehlungen			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Centers for Disease Control and Prevention, 2022	Operational Guidance for K-12 Schools and Early Care and Education Programs to Support Safe In-Person Learning (Link)	05/08/2021 Updated 27/05/2022	"In areas with a high COVID-19 Community Levels, this can be used to limit the number of people who come in contact with each other."

Studien aus dem Evidenzbündel September 2021

Primärstudien			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Loenenbach et	SARS-CoV-2 variant B.1.1.7 susceptibility and	27/05/2021	"We investigated three SARS-CoV-2 variant B.1.1.7 childcare centre and

al, 2021	infectiousness of children and adults deduced from investigations of childcare centre outbreaks, Germany, 2021. (Link)		related household outbreaks.“
Nguyen et al, 2021	Impact of visitation and cohorting policies to shield residents from covid-19 spread in care homes: an agent-based model. (Link)	07/07/2021	Study examining the impact of visitation and cohorting policies as well as the care home population size upon the spread of COVID-19 and the risk of outbreak occurrence in this setting.

Leitlinie			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
CDC, 2021	Guidance for COVID-19 Prevention in K-12 Schools (Link)	05/08/2021	The CDC recommends cohorting- among other measures- when physical distancing cannot be maintained

2. Tragen eines Mund-Nasen-Schutzes

(gesucht am 05/05/2022, 09/05/2022, 10/06/2022)

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Zhao et al., 2022	Nonpharmaceutical interventions to prevent viral respiratory infection in community settings: an umbrella review (Link)	30/05/2022	Umbrella review including 24 studies consisting of 11 systematic reviews and meta-analyses, 12 systematic reviews without meta-analyses and one standalone meta-analysis. "Evidence for the use of hand hygiene or facemasks is the strongest; therefore, the most reasonable suggestion is to use hand hygiene and facemasks in the community setting."
Talic et al., 2021	Effectiveness of public health measures in reducing the incidence of covid-19, SARS-CoV-2 transmission, and covid-19 mortality: systematic review and meta-analysis (Link)	18/11/2021	SR and meta-analysis on the evidence on the effectiveness of different public health measures (including masks) in reducing the incidence of covid-19, SARS-CoV-2 transmission, and covid-19 mortality.
Engeroff et al., 2021	The Impact of Ubiquitous Face Masks and Filtering Face Piece Application During Rest, Work and Exercise on Gas Exchange, Pulmonary Function and Physical Performance: A Systematic Review with Meta-analysis (Link)	11/12/2021	SR and meta-analysis examining the the impact of the surgical mask and filtering face piece type 2 or N95 respirator application on gas exchange, carbon dioxide partial pressure, carbon dioxide exhalation and oxygen uptake, pulmonary function and physical performance.
Bakhit et al., 2021	Downsides of face masks and possible mitigation strategies: a systematic review and meta-analysis (Link)	22/02/2021 (previously included at preprint stage)	SR and meta-analysis aiming to "identify, appraise and synthesise studies evaluating the downsides of wearing face masks in any setting. We also discuss potential strategies to mitigate these downsides."

Weitere Reviews			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Chou, et al., 2021	Update Alert 7: Masks for Prevention of Respiratory Virus Infections, Including SARS-CoV-2, in Health Care	29/03/2022	„ In summary, new evidence slightly strengthened the evidence of benefit of masks versus no masks in community settings to low–moderate,

	and Community Settings (Link)		with no change in insufficient strength of evidence for N95 versus surgical masks in health care settings. A final update is planned for 6 months.“
Chou, et al., 2020	Masks for Prevention of Respiratory Virus Infections, Including SARS-CoV-2, in Health Care and Community Settings : A Living Rapid Review (Link)	24/06/2021	„Evidence on mask effectiveness for respiratory infection prevention is stronger in health care than community settings. N95 respirators might reduce SARS-CoV-1 risk versus surgical masks in health care settings, but applicability to SARSCoV-2 is uncertain.“

Primärstudien			
Motallebi et al., 2022	Modeling COVID-19 Mortality Across 44 Countries: Face Covering May Reduce Deaths (Link)	04/2022	„In a retrospective cohort study, changes in COVID-19–related daily mortality rate per million population from February 15 to May 31, 2020 were compared between 27 countries with and 17 countries without face mask mandates in nearly 1 billion (911,446,220 total) people. This study’s significant results show that face mask mandates were associated with lower COVID-19 deaths rates than the rates in countries without mandates.“
Marchant et al., 2022	COVID-19 mitigation measures in primary schools and association with infection and school staff wellbeing: An observational survey linked with routine data in Wales, UK (Link)	28/02/2022	“Our findings suggest that reducing non-household direct contacts lowers infection rates. There was no evidence that face coverings, two metre social distancing or stopping children mixing was associated with lower odds of COVID-19 or cold infection rates in the school”

Leitlinien und Empfehlungen			
WHO, 2022	Infection prevention and control in the context of coronavirus disease (COVID-19): A living guideline Updated Chapter: Mask use,	25/04/2022	This document provides users with the latest evidence-informed recommendations for IPC in health care and community settings. It has two parts. Part 1 presents IPC

	Part 1: Health care settings (Link)		recommendations in the context of health care settings, while Part 2 presents these recommendations in community settings.
WHO, 2022	Infection prevention and control in the context of coronavirus disease (COVID-19): A living guideline (Link)	07/03/2022	"In this edition, new information includes **updated mask recommendations for children in community settings** including updated age specific recommendations, statements for children with disabilities and those at high risk for complications related to COVID-19 infection. Updated implementation considerations for mask use in school settings are also included."
WHO, 2021	WHO recommendations on mask use by health workers, in light of the Omicron variant of concern: WHO interim guidelines, 22 December 2021 (Link)	22/12/2022	This document provides updated interim recommendations on the use of masks by health workers providing care to patients with suspected or confirmed COVID-19, in light of the rapid spread of the Omicron variant of concern of SARS-CoV-2

Studien aus dem Evidenzbündel September 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Kim et al. (preprint)	Comparative Efficacy of N95, Surgical, Medical, and Non-Medical Facemasks in Protection of Respiratory Virus Infection: A Living Systematic Review and Network Meta-Analysis (Link)	n.a. (Preprint)	"Our study confirmed that the use of facemasks provides protection against respiratory viral infections in general; however, the efficacies may vary according to the type of facemask used."
Ford et al, 2021	Mask use in community settings in the context of COVID-19: A systematic review of ecological data (Link)	18/07/2021	"The studies summarized by this review suggest that community mask policies may reduce the population-level burden of SARS-CoV-2. "

Montero-Vilchez et al., 2021	Skin adverse events related to personal protective equipment: a systematic review and meta-analysis. (Link)	02/06/2021	Systematic review on skin adverse event due to PPE
Shaw et al, 2021	The impact of face masks on performance and physiological outcomes during exercise: a systematic review and meta-analysis. (Link)	26/04/2021	"A systematic review and meta-analysis was conducted on the impact of wearing a mask during exercise. Face masks can be worn during exercise with no influences on performance and minimal impacts on physiological variables."
Ayouni et al., 2021	Effective public health measures to mitigate the spread of COVID-19: a systematic review. (Link)	29/05/2021	This systematic review evaluates the implemented public health interventions to control the spread of the outbreak of COVID-19
Mendez-Brito et al, 2021	Systematic review of empirical studies comparing the effectiveness of non-pharmaceutical interventions against COVID-19. (Link)	20/06/2021	This systematic review investigated the effectiveness of a range of NPI.

Primärstudien			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Abaluck et al., 2021	The Impact of Community Masking on COVID-19: A Cluster-Randomized Trial in Bangladesh (Link)	08/09/2021	Large cluster- RCT (n=342,126 adults) assessing the impact of mask wearing in rural Bangladesh (Studie gefunden über nicht-systematische Suche)

Studien aus dem Evidenzbündel Januar 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**

Chu et al (Schuenemann Review), 2020	Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis (Link)	3/5/2020	largest systematic review and meta-analysis to date drawing exclusively on SARS and MERS studies to investigate the optimum distance for avoiding person-to-person virus transmission and to assess the use of face masks and eye protection to prevent transmission of viruses
Li et al, 2020	Face masks to prevent transmission of COVID-19: A systematic review and meta-analysis (Link)	10/10/2020	systematic review and meta-analysis to evaluate the effectiveness of masks to prevent SARS-CoV-2 transmission in health care workers and non-HCW, meta-analysis of 6 studies; evidence from cohort and case control studies

Weitere Reviews			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Rohde, 2020	Effectiveness of face masks worn in community settings at reducing the transmission of SARS-CoV-2: A rapid review (Link)	27/8/2020	"aim of this review was to synthesise direct evidence on the effectiveness of wearing face masks at reducing the transmission of SARS-CoV-2 in community settings."
Bakhit, 2020	Downsides of face masks and possible mitigation strategies: a systematic review and meta-analysis (Link)	18/5/2020	SR seeking to "identify, appraise, and synthesise studies evaluating the downsides of wearing facemasks in any setting."

Leitlinien und Empfehlungen			
WHO, 2020	Advice on the use of masks for children (Link)		

3. Schulwege, ÖPNV

(gesucht am 27/05/2022, 31/05/2022)

(Systematische) Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Heinrich et al., 2021	SARS-CoV-2 Infektionen während Reisen mit Bahn und Bus. Ein systematisches Review epidemiologischer Studien (Link)	08/09/2021	"Es gibt verschiedene Hinweise dafür, dass Reisen mit der Bahn mit einem deutlich niedrigeren Infektionsrisiko verbunden ist im Vergleich zum Ansteckungsrisiko im häuslichen Umfeld. Wegen fehlender Beobachtungsdaten wird man das Infektionsrisiko bei Fernreisen mit Bus und bei Nutzung des öffentlichen Personennahverkehrs […] modellhaft abschätzen müssen."
Sun et al., 2022	Effectiveness of different types and levels of social distancing measures: a scoping review of global evidence from earlier stage of COVID-19 pandemic. (Link)	11/04/2022	Scoping review including a range of parameters relating to effectiveness of social distancing measures during the COVID- 19 pandemic. "There was no evidence for a separate effect of public transport restriction."

Studien aus dem Evidenzbündel September 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Mendez-Brito et al, 2021	Systematic review of empirical studies comparing the effectiveness of non-pharmaceutical interventions against COVID-19. (Link)	20/06/2021	This systematic review investigated the effectiveness of a range of NPI. "There was no evidence on the effectiveness of public transport closure,... ."

Primärstudien			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Francetic et al,	Corona and Coffee on your commute: A spatial analysis	10/03/2021	This study proposes a spatial analysis of the association between commuting

2021	of COVID-19 mortality and commuting flows in England in 2020. (Link)		flows and COVID-19 mortality in England, using a range of publicly available area-level data.
Edwards et al (preprint)	Reducing COVID-19 Airborne Transmission Risks on Public Transportation Buses: An Empirical Study on Aerosol Dispersion and Control (Link)	01/03/2021 (Preprint)	This study captures the dispersion patterns using 28 networked particle counters, as well as quantifies the effectiveness of using on-board fans, opening of various windows, use of face coverings or masks, and the use of the transit bus HVAC system.
Zhou et al, 2021	Virus Transmission Risk in Urban Rail Systems: Microscopic Simulation-Based Analysis of Spatio-Temporal Characteristics (Link)	06/05/2021	Using actual data from a subway system, a case study explores the impact of different factors on transmission risk, including mask-wearing, ventilation rates, infectiousness levels of disease, and carrier rates.

Studien aus dem Evidenzbündel Januar 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Chu et al	Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis (Link)	3/5/2020	"systematic review and meta-analysis to investigate the optimum distance for avoiding person-to-person virus transmission and to assess the use of face masks and eye protection to prevent transmission of viruses"
Zhen et al., 2020	Transmission of respiratory viruses when using public ground transport: A rapid review to inform public health recommendations during the COVID-19 pandemic (Link)	03/2020	This study aimed at assessing transmission of COVID-19 when using public transport. Included studies suggest an increased risk of viral transmission with public transportation use that may be reduced with improved ventilation.

Liu et al., 2020	Cluster infections play important roles in the rapid evolution of COVID-19 transmission: A systematic review (Link)	15/6/2020	This review aims at summarising the major types of SARS-CoV-2 cluster infections worldwide through a comprehensive systematic review. "The major types of cluster infections were families, community transmission, nosocomial infection, gatherings, transportation, shopping malls, conferences, tourists, religious organisations, workers, prisons, offices, and nursing homes."
Noakes et al., 2020	Transmission and Control of SARS-CoV-2 on Public Transport (Link)	16/5/2020	This paper collates evidence on transmission and control of COVID-19 in public transport.

4. Musikunterricht

(gesucht am 02/06/2022)

Nicht-systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
The National Collaborating Centre for Methods and Tools	Rapid Review: What is known about the risk of transmission of COVID-19 during musical activities such as singing or playing a wind instrument, and how can these risks be mitigated? Link	03/02/2021	"This rapid review was produced to support public health decision makers' response to the coronavirus disease 2019 (COVID-19) pandemic.This review seeks to identify, appraise, and summarize emerging research evidence to support evidence-informed decision making."

Primärstudien, u.a.			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Kuehn, 2021	COVID-19 Precautions Help Make Music That's Beautiful and Safe (Link)	14/10/2021	„Based on SARS-CoV-2 transmission patterns in the schools, the trio concluded that the chance of contracting COVID-19 during rehearsal with the recommended mitigations in place is about 1 in 2 million compared with about 1 in 270 000 without the precautions."
Public Health Ontario, 2021	Singing and Playing Wind Instruments – Environmental Scan Related to COVID-19 (Link)	01/08/2021	„the purpose of this document is to provide an updated evidence review on the topic of singing and playing wind instruments as well as provide additional information from other jurisdictions on reducing the risk of transmission during these activities"

Studien aus dem Evidenzbündel September 2021

Nicht-systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Vance et al., 2021	COVID-19: Impact on the Musician and Returning to Singing; A Literature Review (Link)	14/01/2021	A literature review on the risk of COVID-19 transmission through singing and playing wind and brass instruments and on suggestions of ways to reduce possible transmissions

			while singing / playing an instrument

Primärstudien			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Mürbe et al., 2021	Aerosol emission in professional singing of classical music (Link)	21/07/2021	Emission rates of aerosols emitted by professional singers were measured with a laser particle counter under cleanroom conditions
Walker, 2021	Professional Notes: Studying the Coronavirus to Help Teachers and Musicians Worldwide (Link)	01/07/2021	Professional notes on research conducted to create optimal risk-mitigation strategies that were implemented in the fall 2020 semester at the Voxman Music Building on the University of Iowa campus in Iowa City
Schwalje & Hoffman, 2020	Wind Instrument Aerosol in Covid Era - COVID-19 and horns, trumpets, trombones, euphoniums, tubas, recorders, flutes, oboes, clarinets, saxophones and bassoons (Link)	10/06/2020	Comment on current uncertainties in COVID-19 risk assessment for the wind instrumentalist
Hedworth et al., 2021	Mitigation strategies for airborne disease transmission in orchestras using computational fluid dynamics (Link)	23/06/2021	A study that uses transient, second-order accurate computational fluid dynamics (CFD) simulations and quantitative microbial risk assessment to estimate aerosol concentrations and the associated risk for airborne disease transmission and assess strategies to mitigate exposure in two distinct concert venues
McCarthy et al., 2021	Aerosol and droplet generation from performing with woodwind and brass instruments (Link)	15/07/2021	Measurements of aerosol and droplet concentrations generated when playing woodwind and brass instruments are reported and compared with breathing, speaking, and singing
Becher et al., 2021	The spread of breathing air from wind instruments and singers using schlieren techniques (Link)	14/06/2021	“The playing of professional woodwind and brass instrument players, as well as professional classical trained singers were investigated to estimate the spread distances of the breathing air”

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation)**	**Zusammenfassung**
Chu et al, 2020	Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis (Link)	3/5/2020	"systematic review and meta-analysis to investigate the optimum distance for avoiding person-to-person virus transmission and to assess the use of face masks and eye protection to prevent transmission of viruses"
Lo Moro et al, 2020	Reopening Schools during the COVID-19 Pandemic: Overview and Rapid Systematic Review of Guidelines and Recommendations on Preventive Measures and the Management of Cases (Link)	20/10/2020	"This overview aimed to describe the main measures planned for the 2020–2021 academic year within the WHO European Region" based on a rapid systematic review and review of guidelines from the European region

Nicht-systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation)**	**Zusammenfassung**
Mürbe et al, 2020	Beurteilung der Ansteckungsgefahr mit SARS-CoV-2-Viren beim Singen (Link)	n.r., veröffentlicht 05/2020	Narrative Übersicht über Aerosolverbreitung und Transmission beim Singen inklusive Handlungsempfehlungen, von der Klinik für Audiologie und Phonometrie & Institut für Hygiene und Umweltmedizin der Charité
Dhar, Sujan & Manjula Das, 2020	Music in the time of COVID-19 (Link)	n.r., published in 10/2020	"Mini-Review" summarizing the currently available information on musical performances and assessing the possible impact on transmission
Naunheim et al., 2020	Safer Singing During the SARS-CoV-2 Pandemic: What We Know and What We Don't (Link)	n.r., published in 07/2020	Narrative review on the role of Singing in the transmission of COVID-19

Leitlinien und Empfehlungen			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Firle et al.	Musizieren während der SARS-CoV-2-Pandemie Empfehlungen der Deutschen Gesellschaft für Musikphysiologie und Musikermedizin (DGfMM) zum Infektionsschutz beim Musizieren (Link)	n.r., letzte Aktualisierung Juli 2020	Leilinie der Dt. Gesellschaft für Musikphysiologie und Musikermedizin
Spahn et al.	Risikoeinschätzung einer Coronavirus-Infektion im Bereich Musik (Link)	n.r., letzte Aktualisierung Dezember 2020	Risikoeinschätzung und Handlungleitsätze zum Musizieren, basierend auf eigenen Untersuchungen, Literaturstudium und Expertenmeinungen

Ministerium für Bildung Rheinland-Pfalz	Leitfaden für musikpraktisches Arbeiten in Schulen (Link)	n.r.	Handlungsempfehlungen der Regierung des Landes Rheinland-Pfalz zum musikpraktischen Arbeiten in Schulen

Primärstudien			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Echternach et al.	Impulse dispersion of aerosols during singing and speaking (Link)	n/a, 16/10/2020	Studie zur Aerosolausbreitung bei professionellen Sänger:innen
Mürbe et al.	Aerosol emission of child voices during speaking, singing and shouting (Link)	n/a (posted 18/9/2020, published 10/2/2021)	Preprint: Studie zur Aerosolausbreitung bei Kindern
Spahn et al.	Airflow and air velocity measurements while playing wind instruments, with respect to risk assessment of a SARS-CoV-2 infection (Link)	n/a (posted 23/12/2020, published 19/5/2021)	Preprint: Studie zur Aerosolausbreitung beim Spielen verschiedener Instrumente

5. Sportunterricht

(gesucht 02/06/2022)

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Asín-Izquierdo et al., 2022	The Physiological Effects of Face Masks During Exercise Worn Due to COVID-19: A Systematic Review (Link)	04/05/2022	"The usage of masks by a healthy adult population during the performance of physical exercise has shown minimal effects with regard to physiological, cardiorespiratory, and perceived responses. Some symptoms can be dyspnea, effort perceived, or discomfort, among others."
Engeroff et al., 2021	The Impact of Ubiquitous Face Masks and Filtering Face Piece Application During Rest, Work and Exercise on Gas Exchange, Pulmonary Function and Physical Performance: A Systematic Review with Meta-analysis (Link)	11/12/2021	SR and meta-analysis examining the the impact of the surgical mask and filtering face piece type 2 or N95 respirator application on gas exchange, carbon dioxide partial pressure, carbon dioxide exhalation and oxygen uptake, pulmonary function and physical performance.

Studien aus dem Evidenzbündel September 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Shaw et al., 2021	The impact of face masks on performance and physiological outcomes during exercise: a systematic review and meta-analysis (Link)	26/04/2021	A systematic review and meta-analysis on the performance and impacts on physiological variables when face masks are worn during exercise

Primärstudien			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Cilhoroz & DeRuisseau, 2021	Safety protocols in an exercise facility result in no detectable SARS-CoV-2 spread: A case study (Link)	21/07/ 2021	A case study on the impact of safety protocols on the spread of COVID-19 at an exercise facility

Studien aus dem Evidenzbündel Januar 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Chu et al, 2020	Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis (Link)	3/5/2020	"systematic review and meta-analysis to investigate the optimum distance for avoiding person-to-person virus transmission and to assess the use of face masks and eye protection to prevent transmission of viruses"
Lo Moro et al, 2020	Reopening Schools during the COVID-19 Pandemic: Overview and Rapid Systematic Review of Guidelines and Recommendations on Preventive Measures and the Management of Cases (Link)	20/10/2020	"This overview aimed to describe the main measures planned for the 2020–2021 academic year within the WHO European Region" based on a rapid systematic review and review of guidelines from the European region

Leitlinien und Empfehlungen			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Scottish government	Coronavirus (COVID-19) Advisory Sub-Group on Education and Children's Issues: advisory note on physical education, music and drama in schools (Link)	n/a, letzte Aktualisierung September 2020	Handlungsempfehlungen der Schottischen Regierung zu Sportunterricht in Schulen

DAKJ/Simon et. al	Maßnahmen zur Aufrechterhaltung eines Regelbetriebs und zur Prävention von SARS-CoV-2-Ausbrüchen in Einrichtungen der Kindertagesbetreuung oder Schulen unter Bedingungen der Pandemie und Kozirkulation weiterer Erreger von Atemwegserkrankungen (Link)	n/a	Handlungsempfehungen der Deutschen Akademie für Kinder und Jugendmedizin zum Betrieb von Schulen und Kitas

6. Anwesenheitsregelungen bei Erkältungssymptomen / Verdachtsfälle

(gesucht am 11/05/2022)

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Bolia et al., 2021	Gastrointestinal Manifestations of Pediatric Coronavirus Disease and Their Relationship with a Severe Clinical Course: A Systematic Review and Meta-analysis (Link)	17/05/2021	„Diarrhea, nausea/vomiting or abdominal pain are present in nearly one-fifth of all children with COVID-19. The presence of diarrhea portends a severe clinical course.“

Weitere Reviews			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Sansotta et al., 2022	Gastrointestinal coronavirus disease 2019 manifestations in childhood (Link)	23/02/2022	„Gastrointestinal symptoms can be the earliest presenting finding of COVID-19, may anticipate respiratory symptoms or may manifest later during the disease course.“

Leitlinien, Empfehlungen			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Centers for Disease Control and Prevention, 2022	Operational Guidance for K-12 Schools and Early Care and Education Programs to Support Safe In-Person Learning (Link)	05/08/2021 Updated 27/05/2022	“People with symptoms of infectious diseases, including COVID-19, influenza, respiratory syncytial virus (RSV), and gastrointestinal infections should stay home and get tested for COVID-19.”

Studien aus dem Evidenzbündel September 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Singhavi et al, 2021	SARS-Cov2: a meta-analysis of symptom distribution by continent in 7310 adult COVID-19 infected patients.	09/06/2021	Die Häufigkeit von Symptomen variiert abhängig vom Kontinent

	(Link)		
Akobeng et al, 2020	Gastrointestinal manifestations of COVID-19 in children: a systematic review and meta-analysis (Link)	18/08/2020 Online issue publication: 07/6/2021	"Diarrhoea was the most commonly reported gastrointestinal symptom followed by vomiting and abdominal pain" in children.

Leitlinie			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Centers for Disease Control and Prevention, 2021	Guidance for COVID-19 Prevention in K-12 Schools (Link)	05/08/2021	One paragraph (paragraph 7) about Staying Home When Sick and Getting Tested

Studien aus dem Evidenzbündel Januar 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Viner et al, 2020	Systematic review of reviews of symptoms and signs of COVID-19 in children and adolescents (Link)	9/10/2020	systematic review of reviews of the prevalence of symptoms and signs of COVID-19 in those aged under 20 years.
Viner et al, 2020	Susceptibility to SARS-CoV-2 Infection Among Children and Adolescents Compared With Adults A Systematic Review and Meta-analysis (Link)	28/7/2020	systematic review aiming to "systematically review the susceptibility to and transmission of SARS-CoV-2 among children and adolescents compared with adults"
Struyf, 2020	Signs and symptoms to determine if a patient presenting in primary care or hospital outpatient settings has COVID-19 disease (Link)	27/04/2020	Cochrane SR zu klinischen Symptomen von COVID-19

7. Quarantäne von Kontaktpersonen

(gesucht am 11/05/2022)

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Pizzarro et al., 2022	Workplace interventions to reduce the risk of SARS-CoV-2 infection outside of healthcare settings (Link)	06/05/2022	Siehe auch Primärstudie von Young et al., 2021
Kosasih et al., 2021	The Effectiveness of Quarantine Interventions on the Spread of Corona Virus 2019: A Systematic Review (Link)	07/12/2021	"Seven quarantine intervention programs were demonstrated to prevent and reduce the spread of COVID-19."
Ravindra et al., 2022	Asymptomatic infection and transmission of COVID-19 among clusters: systematic review and meta-analysis (Link)	09/12/2021 (online)	"Children, especially those of school age (i.e. <18 years), need to be monitored carefully and follow mitigation strategies (e.g. social distancing, hand hygiene, wearing face masks) to prevent asymptomatic community transmission of COVID-19"
Vandepitte et al., 2022	Cost-Effectiveness of COVID-19 Policy Measures: A Systematic Review (Link)	29/01/2022	"Overall, testing/screening, social distancing, personal protective equipment, quarantine/isolation, and hygienic measures were found to be cost-effective. Furthermore, the most optimal choice and combination of strategies depended on the reproduction number and context."

Primärstudien			
Young et al., 2021	Daily testing for contacts of individuals with SARS-CoV-2 infection and attendance and SARS-CoV-2 transmission in English secondary schools and colleges: an open-label, cluster-randomised trial (Link)	14/09/2021	Infection rates in school-based contacts were low, with very few school contacts testing positive. Daily contact testing should be considered for implementation as a safe alternative to home isolation following school-based exposures.

Leitlinien und Empfehlungen			
Autor, Jahr	**Titel**	**Datum**	**Zusammenfassung**

		Publikation	
Centers for Disease Control and Prevention, 2022	Operational Guidance for K-12 Schools and Early Care and Education Programs to Support Safe In-Person Learning (Link)	05/08/2021 Updated 27/05/2022	"Although universal case investigation and contact tracing are not routinely recommended for health departments as part of COVID-19 response, they can be useful strategies in response to a school or ECE outbreak."
Centers for Disease Control and Prevention, 2022	Responding to COVID-19 Cases in K-12 Schools: Resources for School Administrators (Link)	Updated 09/06/2022	This step-by-step process is intended to serve as a guide for a school administrator's response to a COVID-19 case in their school or at a school event.

Studien aus dem Evidenzbündel September 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Ayouni et al., 2021	Effective public health measures to mitigate the spread of COVID-19: a systematic review. (Link)	29/05/2021	"A systematic review that evaluates the implemented public health interventions to control the spread of the outbreak of COVID-19."
Regmi et Lwin, 2021	Factors associated with the Implementation of non-pharmaceutical interventions for reducing coronavirus disease 2019 (COVID-19): A systematic review. (Link)	17/04/2021	"Evidence suggests that non-pharmaceutical interventions for reducing COVID-19 appear to be more effective when used as a combination of multiple measures (social distancing, isolation and quarantine, and workplace distancing); a number of major enablers and barriers that impact the effectiveness of these interventions have been identified [Review of observational studies mainly of low quality]"
Wei et al, 2021	Comprehensive estimation for the length and dispersion of COVID-19 incubation period: a systematic review and meta-analysis (Link)	18/08/2021	"A 14-day quarantine period is sufficient to trace and identify symptomatic infections."
Cardwell et al, 2021	A rapid review of measures to support people in isolation or quarantine during the Covid-19 pandemic and the	14/05/2021	"This rapid review aimed to identify measures available to support those in isolation or quarantine during the coronavirus disease 2019 (Covid-19) pandemic, and determine their

	effectiveness of such measures. (Link)		effectiveness in improving adherence to these recommendations and or reducing transmission."
Panda et al, 2021	Psychological and Behavioral Impact of Lockdown and Quarantine Measures for COVID-19 Pandemic on Children, Adolescents and Caregivers: A Systematic Review and Meta-Analysis. (Link)	29/01/2021	"Anxiety, depression, irritability, boredom, inattention and fear of COVID-19 are predominant new-onset psychological problems in children during the COVID-19 pandemic"
Cavicchioli et al, 2021	What Will Be the Impact of the Covid-19 Quarantine on Psychological Distress? Considerations Based on a Systematic Review of Pandemic Outbreaks (Link)	19/01/2021	Impact of quarantine on mental health; Systematic review including 21 studies
Mendez-Brito et al, 2021	Systematic review of empirical studies comparing the effectiveness of non-pharmaceutical interventions against COVID-19. (Link)	20/06/2021	This systematic review investigated the effectiveness of a range of NPI.

Studien aus dem Evidenzbündel Januar 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**

Nussbaumer-Streit et al., 2020	Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review (Link)	23/6/2020	Study assessed effects of quarantine (alone or in combination with other measures) of individuals who had contact with confirmed or suspected cases of COVID-19, who travelled from countries with a declared outbreak, or who live in regions with high disease transmission. Findings consistently indicate that quarantine is important in reducing incidence and mortality during the COVID-19 pandemic, although there is uncertainty over the magnitude of the effect. Early implementation of quarantine and combining quarantine with other public health measures is important to ensure effectiveness.
Webster et al., 2020	How to improve adherence with quarantine: rapid review of the evidence (Link)	30/1/2020	"We conducted a rapid review to identify factors associated with adherence to quarantine during infectious disease outbreaks."
Panda et al, 2020	Psychological and Behavioral Impact of Lockdown and Quarantine Measures for COVID-19 Pandemic on Children, Adolescents and Caregivers: A Systematic Review and Meta-Analysis (Link)	15/8/2020	SR on psychological problems of children and care.taker during COVID-19
Imran et al., 2020	Psychological burden of quarantine in children and adolescents: A rapid systematic review and proposed solutions. (Link)	n/a (article published Jul-Aug 2020)	"This rapid review takes into account the impact of quarantine on mental health of children and adolescents, and proposes measures to improve psychological outcomes of isolation."
Fong et al., 2020	Child and Family Outcomes Following Pandemics: A Systematic Review and Recommendations on COVID-19 Policies. (Link)	15/4/ 2020	"The objectives were to evaluate the quality of existing studies on this topic, determine what is known about mental health outcomes and needs of children and families, and provide recommendations for how COVID-19 policies can best support children and families."

8./9. Lüften und Luftreinigung

(gesucht 10/05/2022, 17/05/2022)

Systematische Übersichtsarbeit			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Thornton et al., 2022	The impact of heating, ventilation, and air conditioning design features on the transmission of viruses, including the 2019 novel coronavirus: A systematic review of ultraviolet radiation (Link)	08/04/2022	A systematic review of the scientific literature examining the effectiveness of HVAC design features in reducing virus transmission. Results for ultraviolet (UV) radiation are reported in this article.

Nicht-systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Franceschini & Neves, 2021	A critical review on occupant behaviour modelling for building performance simulation of naturally ventilated school buildings and potential changes due to the COVID-19 pandemic (Link)	06/01/2022	This review summarised a behavioural parameter occupant behaviour as an important factor in naturally ventilated school buildings and how it has been affected by the COVID-19 pandemic (especially related to window operation and natural ventilation), relevant for decision-making.
Bueno de Mesquita et al., 2021	Control of airborne infectious disease in buildings: Evidence and research priorities (Link)	24/11/2021	This (non-systematic) review included (natural) ventilation strategies in indoor environments.
Birmili et al., 2021	Lüftungskonzepte in Schulen zur Prävention einer Übertragung hochinfektiöser Viren (SARSCoV-2) über Aerosole in der Raumluft (Link)	05/11/2021	This German (non-systematic) review article focused specifically on ventilation strategies in schools.
Piscitelli et al., 2022	The role of outdoor and indoor air quality in the spread of SARS-CoV-2: Overview and recommendations by the research group on COVID-19 and particulate matter	24/02/2022	This article provides a (non-systematic) overview on the role of outdoor and indoor air quality in the spread of SARS-CoV-2, including a small section on ventilation.

	(RESCOP commission) (Link)		
Izadyar & Miller, 2022	Ventilation strategies and design impacts on indoor airborne transmission: A review (Link)	29/04/2022	"This review paper aims to critically investigate ventilation impacts on particle spread and identify efficient ventilation strategies in controlling aerosol distribution in clinical and non-clinical environments." "The literature review emphasizes the importance of ventilation systems' design and demonstrates all strategies (i.e., mechanical ventilation) could efficiently remove particles if appropriately designed."
Ding et al., 2022	Ventilation regimes of school classrooms against airborne transmission of infectious respiratory droplets: A review (Link)	21/10/2021	This review aimed to "to identify the existing ventilation strategies of school classrooms, to assess their adequacy of minimizing infectious aerosols, and to seek further improvement."

Primärstudien			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Villers et al., 2022	SARS-CoV-2 aerosol transmission in schools: the effectiveness of different interventions (Link)	23/05/2022	This study evaluated the effect of interventions (natural ventilation, face masks, HEPA filtration and their combinations) on the concentration of virus particles in a classroom of 160 m3 containing one infectious individual.
Hendrawati, 2021	Natural Ventilation Performance for Schools During a Pandemic and the Post-Pandemic COVID 19 (Link)	30/10/2021	"The study aims to find out and identify the performance of natural ventilation as an element that determines indoor air circulation against the spread of the covid 19 viruses, comfortable air velocity in a room and user capacity."
Gil-Baez et al., 2021	Natural ventilation in classrooms for healthy schools in the COVID era in Mediterranean climate (Link)	21/09/2021	This study analysed "the design parameters of the buildings and the indoor air quality in a representative sample of schools in the Mediterranean climate." A range of parameters were evaluated to identify adequate natural ventilation strategies.

Studien aus dem Evidenzbündel September 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Hammond et al., 2021	Should homes and workplaces purchase portable air filters to reduce the transmission of SARS-CoV-2 and other respiratory infections? A systematic review (Link)	29/04/2021	A systematic review that includes studies between January and September 2020 and that investigated whether modern portable, commercially available air filters reduce the incidence of respiratory infections and/or remove bacteria and viruses from indoor air
Salman et al., 2021	A systematic review of building systems and technologies to mitigate the spread of airborne viruses (Link)	12/07/2021	A systematic review that summarizes building systems and technologies (natural ventilation, AI, sensors, plants) used to mitigate the spread of airborne viruses
Liu et al., 2021	Portable HEPA Purifiers to Eliminate Airborne SARS-CoV-2: A Systematic Review (Link)	08/06/2021	A systematic review that summarizes the current state of knowledge on portable high-efficiency particulate air (HEPA) purifiers' effectiveness in eliminating airborne SARS-CoV-2 from indoor environments

Weitere Reviews			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Goodwin et al., 2021	Which factors influence the extent of indoor transmission of SARSCoV-2? A rapid evidence review (Link)	03/04/2021	A rapid evidence review that identifies and integrates evidence from epidemiology, microbiology and fluid dynamics on the transmission of SARS-CoV-2 in indoor environments

Primärstudien			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Lee et al., 2021	Effect of air cleaner on reducing concentration of indoor-generated viruses with or without natural ventilation (Link)	23/06/2021	A study that devised a method to reduce the concentration of the viruses generated indoors more effectively, through an air cleaner with / without natural ventilation. A classroom of 25 students was

			considered as an indoor space
Pei et al., 2021	Human exposure to respiratory aerosols in a ventilated room: Effects of ventilation condition, emission mode, and social distancing (Link)	15/06/2021	"This study investigated transport of respiratory aerosols from an infector in a ventilated room based on the Eulerian-Eulerian multi-phase model using Computational Fluid Dynamics (CFD) simulations"
Deol et al., 2021	Estimating ventilation rates in rooms with varying occupancy levels: Relevance for reducing transmission risk of airborne pathogens (Link)	24/06/2021	An etiological study which estimates the absolute ventilation rate, which can be applied in rooms where occupancy levels vary
Vasella et al., 2021	From spontaneous to strategic natural window ventilation: Improving indoor air quality in Swiss schools (Link)	02/04/2021	An intervention study that aimed to improve air quality in schools during the heating season
Lindsley et al., 2021	Efficacy of Portable Air Cleaners and Masking for Reducing Indoor Exposure to Simulated Exhaled SARS-CoV-2 Aerosols - United States, 2021 (Link)	09/07/2021	A study that investigated the effectiveness of portable HEPA (high efficiency particulate air) air cleaners and universal masking at reducing exposure to exhaled aerosol particles
He et al., 2021	Airborne transmission of COVID-19 and mitigation using box fan air cleaners in a poorly ventilated classroom (Link)	11/05/2021	The additional benefit of a box fan air cleaner was evaluated in a classroom with a single horizontal unit ventilator

Studien aus dem Evidenzbündel Januar 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**

Chu et al, 2020	Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis (Link)	3/5/2020	large systematic review and meta-analysis including only SARS&MERS studies to investigate the optimum distance for avoiding person-to-person virus transmission and to assess the use of face masks and eye protection to prevent transmission of viruses;
Guo, 2020	Review and comparison of HVAC operation guidelines in different countries during the COVID-19 pandemic (Link)	n.r. (article submitted 10/7/2020)	non-systematic review of HVAC and ventilation guidelines for COVID-19 prevention

Weitere Reviews			
Autor, Jahr	**Titel**	**Datum Datenbank-suche (bzw Publikation**	**Zusammenfassung**
Morawska et al., 2020	How can airborne transmission of COVID-19 indoors be minimised? (Link)	27/5/2020	not a systematic review, detailed overview article
Li, 2007	Role of ventilation in airborne transmission of infectious agents in the built environment - a multidisciplinary systematic review (Link)	2005	somewhat dated systematic review that investigates minimum ventilation requirements to minimise the transmission of airborne infectious diseases in different indoor environments (some health, some offices and schools)
Hoover, 2020	Balancing incomplete COVID-19 evidence and local priorities: risk communication and stakeholder engagement strategies for school re-opening (Link)	n.r. (published 0110/2020)	In this mini-review, we discuss ventilation as a potentially valuable engineering control for educational institutions preparing to resume operations.

Mousavi, 2020	COVID-19 Outbreak and Hospital Air Quality: A Systematic Review of Evidence on Air Filtration and Recirculation (Link)	26/8/2020	SR that assesses air filtration and recirculation in healthcare facilities. Includes trials as well as current guidelines. Provides some theoretical background on air-flow mechanisms in building ventilation.
Nagraj, 2020	Interventions to reduce contaminated aerosols produced during dental procedures for preventing infectious diseases (Link)	17/9/2020	SR that assesses the effectiveness of methods used during dental treatment procedures to minimize aerosol production and reduce or neutralize contamination in aerosols
Noorimotlagh, 2021	A systematic review of possible airborne transmission of the COVID-19 virus (SARS-CoV-2) in the indoor air environment (Link)	10/12/2020	The SR was conducted to compile studies on airborne transmission of virus in indoor air. Therefore, some procedures are presented such as improving ventilation, especially in hospitals and crowded places, and observing the interpersonal distance of more than 2 m so that experts in indoor air quality consider them to improve the indoor air environments.

Leitlinien, Empfehlungen			
Umweltbundesamt, 2020	Stellungnahme Kommission Innenraumlufthygiene zu Luftreinigern (Link)	n/a, (veröffentlicht 16/11/2020)	
Umweltbundesamt, 2020	Das Risiko einer Übertragung von SARS-CoV-2 in Innenräumen lässt sich durch geeignete Lüftungsmaßnahmen reduzieren (Link)	n/a (veröffentlicht 12/8/2020)	
DGKH, 2020	Stellungnahme zum Einsatz von dezentralen Luftreinigern (Link)	n/a (veröffentlicht 25/9/2020)	

ECDC	Heating, ventilation and air-conditioning systems in the context of COVID-19: first update (Link)	n/a (published 11/11/2020)	"document provides guidance on heating, ventilation and air-conditioning (HVAC) systems in closed spaces in the context of the COVID-19 pandemic" and includes overview of policies/recommendations across the European countries

10. Testen

(gesucht am 03/06/2022)

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Chen at al., 2021	Diagnostic Accuracy of SARS-CoV-2 Antigen Tests for Community Transmission Screening: A Systematic Review and Meta-Analysis (Link)	30/10/2021	„Antigen tests might have higher sensitivity in detecting SARS-CoV-2 in symptomatic patients in the community and may be an effective tool to identify patients to be quarantined to prevent further SARS-CoV-2 transmission.“
Ma et al., 2021	Global Percentage of Asymptomatic SARS-CoV-2 Infections Among the Tested Population and Individuals With Confirmed COVID-19 Diagnosis: A Systematic Review and Meta-analysis (Link)	14/12/2021	“The high percentage of asymptomatic infections from this study highlights the potential transmission risk of asymptomatic infections in communities.”
Walsh et al., 2022	Effectiveness of rapid antigen testing for screening of asymptomatic individuals to limit the transmission of SARS-CoV-2: A rapid review (Link)	29/03/2022	“The aim of this study was to collate and synthesise empirical evidence on the effectiveness of rapid antigen testing for the screening (including serial testing) and surveillance of asymptomatic individuals to limit the transmission of SARS-CoV-2.”
Pizarro et al., 2022	Workplace interventions to reduce the risk of SARS-CoV-2 infection outside of healthcare settings (Link)	06/05/2022	Siehe auch Primärstudie von Young et al., 2021
Wang et al., 2021	Evaluation of the diagnostic accuracy of COVID-19 antigen tests: A systematic review and meta-analysis (Link)	11/2021	“Antigen tests have moderate sensitivity and high specificity for the detection of SARS-CoV-2. Antigen tests might have a higher sensitivity in detecting SARS-CoV-2 within 7 days after symptom onset. Based on our findings, antigen testing might be an effective method for identifying contagious individuals to block SARS-CoV-2 transmission.”
Caini et al., 2022	SARS-CoV-2 Circulation in the School Setting: A Systematic Review and	28/04/2022	Systematic review and meta-analysis of studies to investigate SARS-CoV-2 transmission in the school setting

	Meta-Analysis (Link)		

Primärstudien			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Delaugerre et al., 2022	Prevention of SARS-CoV-2 transmission during a large, live, indoor gathering (SPRING): a non-inferiority, randomised, controlled trial. (Link)	26/11/2021 (online)	"Participation in a large, indoor, live gathering without physical distancing was not associated with increased SARS-CoV-2–transmission risk, provided a comprehensive preventive intervention was implemented."
Young et al., 2021	Daily testing for contacts of individuals with SARS-CoV-2 infection and attendance and SARS-CoV-2 transmission in English secondary schools and colleges: an open-label, cluster-randomised trial (Link)	14/09/2021	Daily contact testing of school-based contacts was non-inferior to self-isolation for control of COVID-19 transmission, with similar rates of symptomatic infections among students and staff with both approaches. Infection rates in school-based contacts were low, with very few school contacts testing positive. Daily contact testing should be considered for implementation as a safe alternative to home isolation following school-based exposures.

Leitlinien und Empfehlungen			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
CDC, 2021	Testing strategies for SARS-CoV2 (Link)	Updated 05/05/2022	

Studien aus Evidenzbündel September 2021

Systematische Übersichtsarbeiten			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Mistry et al, 2021	A systematic review of the sensitivity and specificity of lateral flow devices in the detection of SARS-CoV-2. (Link)	18/08/2021	"This systematic review identified that the performance of lateral flow devices is heterogeneous and dependent on the manufacturer."

Fujita-Rohwerder et al, 2021	Diagnostic accuracy of rapid point-of-care tests for diagnosis of current SARS-CoV-2 infections in children: A systematic review and meta-analysis (Link)	01/09/2021 (Preprint)	"To systematically assess the diagnostic accuracy of rapid point-of-care tests for diagnosis of current SARS-CoV-2 infections in children under real-life conditions"
Kaur Dhillon et al, 2021	The accuracy of saliva versus nasopharyngeal and/or oropharyngeal samples for the detection of SARS-CoV-2 in children. A rapid systematic review and meta-analysis (Link)	26/06/2021 (Preprint)	"Saliva could potentially be considered an alternative sampling method for screening in children and to pick up those with high viral load."
Tsang et al, 2021	Diagnostic performance of different sampling approaches for SARS-CoV-2 RT-PCR testing: a systematic review and meta-analysis. (Link)	01/09/2021	"Our review suggests that, compared with the gold standard of nasopharyngeal swabs, pooled nasal and throat swabs offered the best diagnostic performance of the alternative sampling approaches for diagnosis of SARS-CoV-2 infection in ambulatory care."
Bruemmer et al., 2021	The accuracy of novel antigen rapid diagnostics for SARS-CoV-2: a living systematic review and meta-analysis. (Link)	19/06/2021 (Preprint)	An assessment of the clinical accuracy (sensitivity and specificity) of commercially available Ag-RDTs including; large systematic review and meta analysis including 133 studies
Yoon et al., 2021	Point-of-care testing for the detection of SARS-CoV-2: a systematic review and meta-analysis (Link)	01/2021	Point-of-care testing using molecular assays offer 94% sensitivity and very high specificity in the detection of SARS-CoV-2

Primärstudien			
Autor, Jahr	**Titel**	**Datum Publikation**	**Zusammenfassung**
Troy Ganz et al, 2021	Performance of the TaqMan COVID-19 Pooling Kit for detection of SARS-CoV-2 in Asymptomatic and Symptomatic populations at an Institution of Higher Education (Link)	21/05/2021 (Preprint)	"Pooled PCR testing up to five samples is a valid method for surveillance testing of students and staff in a university setting, especially when the prevalence is expected to be low."
Reichert et al, 2021	Pooled SARS-CoV-2 antigen tests in asymptomatic children and their caregivers: Screening for	24/07/2021	„Pooled SARS-CoV-2 AGs are an effective method to identify potentially contagious individuals prior admission, without adding additional

	SARS-CoV-2 in a pediatric emergency department. (Link)		strain to the child.“
Revollo et al., 2021	Same-day SARS-CoV-2 antigen test screening in an indoor mass-gathering live music event: a randomised controlled trial. (Link)	27/05/2021	Safety of a mass-gathering indoor event (a live concert) based on systematic same-day screening of attendees with Ag-RDTs, use of facial masks, and adequate air ventilation

Methodik Indirekte Evidenz

Identifikation von indirekter Evidenz für die Schlüsselfragen

Um die direkte Evidenz, die teilweise nicht für alle Schlüsselfragen sehr ausgiebig ist, zu ergänzen, wurde systematisch nach indirekter Evidenz gesucht.

Dies beinhaltete folgende Schritte:

- Formulierung alternativer PICO-Schlüsselfragen, v.a. Ersetzen der Population „Schülerinnen und Schüler/Lehrer*innen“ mit der Allgemeinbevölkerung und Erweiterung des Settings um nicht-schulische Bereiche
- die Suche von Studien wurde auf das Jahr 2021/2022 eingeschränkt, um Überschneidung mit dem vorigen Evidenzbündel zu vermeiden (mit Ausnahme der Empfehlung “Testen”, bzw. außer wenn anders dokumentiert)
- an die alternativen PICOs angepasste Suchen in der WHO COVID-19 Datenbank (Link) für alle Schlüsselfragen
- Durchsicht der McMaster Datenbank (Link)
- wo im Rahmen der Suche für eine spezifische Schlüsselfrage Evidenz identifiziert wurde, die für andere Schlüsselfragen relevant war, wurde diese entsprechend dokumentiert

Stand des Dokuments: 05.07.2022
Mitarbeitende: Ester Orban, Lydia Yao Stuhrmann
Beratend: Kerstin Sell, Lisa Pfadenhauer, Eva Rehfuess, Brigitte Strahwald

Kontakt: Ester Orban, e.orban@uke.de

Versionsnummer: **2.0**

Erstveröffentlichung: **02/2021**

Überarbeitung von: **09/2022**

Nächste Überprüfung geplant: **09/2023**