Wales COVID-19 Evidence Centre (WC19EC) Rapid Review

The effectiveness of infection prevention and control measures applied in education and childcare settings for children: a summary and critical appraisal

Report number – RR00011 (August 2021)

Rapid Review Details

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TOPLINE SUMMARY

Background / Aim of Rapid Review

The role played by children and educational settings in the community transmission of COVID-19 has been a constant concern throughout the pandemic. A range of infection prevention and control (IPAC) measures to reduce the spread of COVID-19 has been introduced in schools and education settings worldwide. Investigating the effectiveness of these measures to determine which measures should remain in place as restrictions are eased is critical for informing Welsh Government infection control strategies.

This review was conducted in a short time frame to inform the upcoming Welsh Government 'Local COVID-19 Infection Control Decision Framework' which is due to be published at the start of the Autumn 2021 term. **The aim of this review** was to identify, appraise and synthesise the evidence from **secondary research evaluating** the **effectiveness of IPAC measures applied in education and childcare settings**.

Rapid Review Methods

A preliminary literature search of COVID-19 specific and generic resources of robust secondary (existing reviews) or tertiary (reviews of reviews) research was conducted in June 2021. This identified two well conducted and relevant rapid reviews: a National Collaborating Centre for Methods and Tools (NCCMT) Living Rapid Review of both existing reviews and primary studies, the latest update due for publication August 2021; and a Cochrane Rapid Review due to be completed in late Summer (2021; *personal communication*). A decision was made, in collaboration with relevant stakeholders, that these reviews would provide the best available summary of the latest evidence. This report provides a summary and appraisal of the most recent NCCMT Living Rapid Review report while the Cochrane Rapid Review is ongoing.

The NCCMT review aimed to answer the question: What is the specific role of daycare settings and schools in COVID-19 transmission? To answer this question, it addresses four key outcomes, one of which is **the impact of IPAC measures on COVID-19 transmission within schools/daycares** (including number of cases, cases per population, and secondary attack rates).

The NCCMT review is based on strict selection criteria to ensure that only the most robust and up-to-date evidence is included. The criteria were further revised for the recent update to focus on the most **relevant studies to the current context**.

Key Findings

Extent of the evidence base

- For the evaluation of IPAC on COVID-19 transmission, there were **three syntheses** and **six primary studies** (one cluster randomised controlled trial and five observational studies).
- Most studies were based in USA, many as preprints.

Recency of the evidence base

- The NCCMT version (update 17) included evidence available up to July 22, 2021.

Evidence of Effectiveness

- The **risk of transmission** from children to children and children to adults in **primary school and daycare settings is low, when IPAC measures are in place** and adhered to (moderate confidence; may change with new data).
- The risk of transmission within **secondary schools is more variable**, with both adherence to IPAC measures in place in the school setting and reducing activities outside of the school settings being critical in this age group (moderate confidence; may change with new data).
- There is **wide variability in the combination of measures** implemented which limits the ability to evaluate the impact of specific IPAC measures.
- **Multi-component approaches** can significantly reduce the risk of COVID-19 transmission in schools.
- The use of face coverings is associated with a reduced case numbers in secondary schools, whilst the evidence for primary schools is mixed (low confidence; may change with new data).
- Maintaining **at least 1 metre distance** (especially amongst staff), **restricting entry** to the school to others, **cancelling extracurricular activities**, **outdoor instruction**, and **daily symptom screening** are associated with reduced number of cases within schools (low confidence; may change with new data).
- The findings were **inconsistent regarding improved ventilation,** and **class size** (low confidence; may change with new data). There was some indication that **hybrid or part-time in-person learning could *increase*** cases compared to full-time in-person learning.
- Data continue to emerge on the impact of new **variants of concern** on transmission and effectiveness of IPAC measures, and in **hard-to-reach populations** and for **specialist education settings.**

Policy Implications

- IPAC strategies that incorporate a **multi-component approach** and in line with the local pandemic landscape, should be considered.
- There are **limited data** on the impact of either staff or student **vaccinations** in mitigating risk of transmission in education and childcare settings, and what IPAC measures may be relaxed or removed with high vaccination coverage.

Strength of Evidence

The overall certainty of the evidence is **low** and findings may change as new data become available.

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1. BACKGROUND

This Rapid Review is being conducted as part of the Wales COVID-19 Evidence Centre Work Programme. The topic was identified by the Technical Advisory Group (TAG) Children and Young People (CYP) Subgroup as a high priority for the review.

1.1 Purpose of this review

As of August 2021, there has been a cumulative total of over 200 million confirmed cases of COVID-19 and over 4 million deaths attributed to the virus worldwide (World Health Organization, 2021). The role played by children and educational settings in the community transmission of COVID-19 has been a constant concern throughout the pandemic. Several countries, including Wales, closed schools and other educational institutions for several months as part of their control measures to contain the spread of COVID-19. Following the reopening of schools and educational settings, a range of infection prevention and control (IPAC) measures and strategies to reduce the risk of COVID-19 transmission has been introduced at these settings. These include the use of face coverings, hand-washing and respiratory hygiene, reducing contacts and maintaining physical distancing, enhanced cleaning, appropriate ventilation, and self-isolation (Welsh Government, 2021). These mitigation measures have altered school children's learning environment and the way that they interact.

The evidence around the prevention of COVID-19 infection is continually evolving as we learn more about the virus, and so measures implemented in schools need to be based on the latest and most reliable evidence available. There is, therefore, a need to investigate the effectiveness of IPAC measures currently applied in education and school settings to determine which measures should remain in place as restrictions are eased around the country.

At the start of the 2021 autumn term, the **Welsh Government will publish 'The Local COVID-19 Infection Control Decision Framework'** for educational settings. This will enable educational settings to adapt some of the IPAC interventions to reflect the level of risk identified locally. This summary and critical appraisal aims to identify, appraise and synthesize the evidence from high quality secondary research evaluating the effectiveness of IPAC measures applied in education and childcare settings **to inform the upcoming Welsh Government 'Local COVID-19 Infection Control Decision Framework'**.

2. RESULTS

Overall, we identified two rapid reviews and eight ongoing reviews relevant to our research question. For this report, **we included findings from only one rapid review (National Collaborating Centre for Methods and Tools 2021**) because it is a living review updated regularly and includes the most recent evidence, which is likely to be more relevant to our current position within the pandemic. Similarly, we have focused on only one of the eight ongoing reviews – a protocol for a Cochrane review (Krishnaratne et al., 2021), because we anticipate that this review will be produced to a high standard using robust and rigorous methodology. Both reviews are summarised in Tables 1 and 2 respectively. A summary of the other reviews not included in this report's findings can be found in Appendix 1.

The review by the (Canadian) National Collaborating Centre for Methods and Tools (NCCMT) sought to explore the specific role of daycare and school settings in COVID-19 transmission. This living rapid review contains both primary studies and reviews. Our search identified *update 16* of the review, published in June 2021. However, after making contact with the reviews authors, we were made aware that an update was due to be published in early August 2021. This report provides a summary and critical appraisal of the latest version; update17, **published on 12 August 2021**.

2.1 Review summary

2.1.1 Overview

The National Collaborating Centre for Methods and Tools Living Rapid Review (NCCMT LRR 2021) sought to explore the specific role of daycare and school settings in COVID-19 transmission. The population of interest was children and adolescents aged one to 18 years. The review is based on evidence available up to July 22, 2021.

Three syntheses and six primary studies (one cluster randomised controlled trial, two prevalence studies, one quasi-experimental study, one cross-sectional study, and one cohort study) evaluating the impact of IPAC measures on COVID-19 transmission within schools/daycares, were included in this review. Of the six primary studies included, five were conducted in the USA while one was conducted in the UK. The **UK study, a cluster randomised controlled trial,** was conducted in secondary schools and colleges in England. Two primary studies were pre-prints and one study was not peer-reviewed. Unfortunately, no information about which countries the included studies were conducted in was provided in the data extraction tables of the included syntheses, so we cannot comment on generalisability.

Quality assessment of included evidence was conducted using the relevant critical appraisal tools as indicated by the study design. The syntheses included two pre-prints which were graded as moderate and low quality respectively using the AMSTAR 1 quality appraisal tool. The remaining synthesis was graded as low quality. The primary studies were assessed using the relevant Joanna Briggs Institute (JBI) tool for the study design type. Two studies were judged to be of high quality, three of moderate quality, and one of low quality. The overall certainty of the evidence relating to the impact of IPAC measures on COVID-19 transmission within schools/daycares was judged to be low based on the GRADE approach. The authors explained that this meant that the **findings are likely to change as more evidence accumulates**.

2.1.2 Key findings

Findings from the NCCMT review indicate that community incidence is consistently associated with cases in school settings. **When IPAC measures are in place** and adhered to, the **risk of transmission** from children to children and children to adults in primary school and daycare settings **is low**. Findings may change as new data become available. The risk of transmission within secondary schools is more variable, with findings suggesting that adherence to IPAC measures in place in the school setting and reducing activities outside of the school settings is critical in this age group.

Evidence identified suggests that a **multicomponent approach**, implementing multiple physical distancing and hygiene measures can significantly reduce the risk of COVID-19 transmission in schools. This might include de-densification measures (classroom distancing, staggered arrival times, cancellation of certain indoor activities), hygiene measures (handwashing, respiratory etiquette, cleaning, ventilation, and face coverings for certain age groups), and rapid testing and isolation of symptomatic cases. However, due to wide variability in policies and combinations of measures implemented, the **ability to evaluate the impact of specific IPAC measures or make best practice recommendations, was limited**.

Mixed findings were found for face coverings in primary school, with lower risk of transmission associated with wearing **face coverings in secondary schools**. Various physical distancing measures were pooled in a meta-analysis and found to be associated with a reduced risk of transmission (OR: 0.26, 95% CI=0.18, 0.37). Emerging evidence suggests that maintaining at least **1 metre of distance** (especially amongst staff), **restricting entry** to the school to others (e.g. no parents or caregivers allowed into school), **cancelling extracurricular** activities, outdoor instruction, and **daily symptom screening** reduce the number of cases within schools.

Evidence on class size appears to be mixed. **Increased class size** (no definition or number of students provided) was associated with **higher risk of transmission** in the meta-analysis (OR: 1.26, 95% CI=1.21, 1.30), contradicting findings from included single studies. However, these reviews included studies from early in the pandemic, and there is little overlap between studies included in the included syntheses. **Inconsistent findings** were found for the association between improved **ventilation** and the risk of COVID-19 transmission in schools.

Surprisingly, **hybrid or part-time in-person learning appeared to increase** the risk of student cases compared to full-time in-person learning. Evidence from US schools suggested that higher in-person student density is consistently associated with lower student case rates. A possible explanation for this trend suggested by the study authors is the greater likelihood of students from lower density schools to engage in more extracurricular activities out of school, thereby interacting with other groups.

2.1.3 Critical appraisal of NCCMT LRR

The NCCMT living review used rapid review methodology. This approach is utilised to address urgent and emerging health issues deemed to be of high priority, such as the COVID-19 pandemic. This approach accelerates the process of a traditional systematic

review by streamlining or modifying specific methods to produce evidence for stakeholders (Garritty et al., 2020). However, there are no recognised critical appraisal tools for assessing rapid review methodology, but as the process is closely aligned to systematic review methods, we chose to use the AMSTAR 2 tool to appraise the quality of the NCCMT rapid review. AMSTAR 2 is a validated critical appraisal tool for assessing the quality of systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. It is important to note that since this appraisal tool is designed for use on systematic reviews, it may not be entirely suitable for assessing rapid reviews.

This LRR utilises a pragmatic approach that evolves in line with the pandemic landscape, whilst maintaining a robust methodology. The NCCMT has so far produced a total of 17 updates of this LRR, and the inclusion/exclusion criteria have often been amended in order to ensure their included evidence is most relevant to the current situation in terms of restrictions and case numbers. In this latest update, to refine the focus of this rapid review update and given the substantial body of evidence, the review authors excluded data collected prior to January 2021 and applied strict exclusion criteria. The application of strict exclusion criteria may indicate the omission of some evidence, but ensures that only the **most robust and up-to-date evidence was included**, thereby, making it more useful to decision makers. Data collected prior to this date are likely to have been collected during or following the first wave lockdown when there would have been limited understanding of COVID-19, and access to testing and availability of PPE would have been limited. The LRR justified this date limit as prior to January 2021 vaccines were not available and variants of concern (VoCs) were not prevalent in many countries. Due to the rapid nature of this review, the review authors included **only recent, high quality syntheses** where available. Where no syntheses were identified, primary studies were then included. English language, peer-reviewed sources and sources published ahead of print before peer-review were included.

The search strategy for this rapid review was exhaustive and included searches of a wide range of bibliographic databases and websites. The LRR authors provided the search strategies for most of the resources searched. Among the sources were international resources and specific sources from Canada. On critical appraisal of the search strategy domain, we determined that a “partial Yes” response was the most suitable judgement for this domain. This was mainly because the LRR did not provide information about the use of alternative methods to identify relevant studies such as checking reference lists, consulting content experts in the field, or searching trial or study registries. AMSTAR 2 requires that a comprehensive literature search strategy should accomplish all these requirements. However, given that this is a rapid review, the literature search can be considered comprehensive.

The LRR did not provide information about the study selection process so we are unable to ascertain if this was conducted in duplicate. Studies that had been excluded and justification for this were provided in Appendix 2. In addition, the authors justified the narrative syntheses due to methodological variation and outcomes of included studies.

It is unclear if data extraction was consistently checked by a second reviewer, but information on components of data extracted was given. In addition, the authors decided to approach the considerable overlap of included studies in the identified syntheses by conducting a new synthesis rather than reporting the overlapping results in order to present succinct and clear data.

Quality assessment was conducted and verified by a second reviewer and any risk of bias was discussed in the interpretation of findings of the included sources. The LRR authors evaluated the quality of the included studies using specific critical appraisal tools for each

study design included in the analyses. They utilised the JBI checklists for primary studies and the AMSTAR 1 tool for syntheses. Although other checklists may be considered more in-depth or comprehensive, the JBI checklists are widely used in systematic reviews and seem to be appropriate taking into account the short timeframe for this rapid review. The quality assessments for each included study are available on request from the review authors.

The NCCMT LRR authors also used GRADE to provide a rating for the strength of certainty of each outcome considered. The authors acknowledged that the observational studies included provide low quality evidence and described which domains can further reduce or upgrade the quality of evidence using the GRADE approach.

The narrative synthesis outlines clearly identify which studies have been included for the summary of each outcome considered, and the overall certainty in the evidence. Authors also caution the reader to consider in their decision making that many emerging studies have not been peer reviewed. As this is an LRR, NCCMT author's outline what has changed in the latest version by providing a succinct, but informative summary for each outcome as well as outlining key points identified from the evidence. Finally, the LRR describes an overview of the evidence and outlines knowledge gaps identified.

Given the rapid nature of this living review, we believe the review methods followed a **robust and transparent process that closely matched those of a full systematic review**. The inclusion of **only the most recent evidence** is a useful way of dealing with large amounts of evidence and ensure policy makers have the most appropriate evidence on which to base their decisions. Given the rapidly evolving nature of COVID-19 evidence, the volume and the changing landscape of the pandemic, only including the most recently published sources will ensure the data included within them match most closely the COVID-19 environment at the present time. However, it may also risk excluding more robust evidence, but it is unlikely to have been undertaken in the same pandemic context that we find ourselves in now.

2.2. Ongoing review

The protocol for the ongoing rapid review was conducted by **Cochrane reviewers** (Krishnaratne et al., 2021). This protocol builds on a scoping review conducted in October 2020 which mapped the evidence of measures implemented in the school setting to safely reopen schools or keep them open during the SARS-CoV-2/COVID-19 pandemic. Authors were contacted to establish an anticipated publication date and we were advised it would be "late summer". The primary objective of this rapid review is to answer two key questions:

1) What are the implications of these measures for non-transmission-related outcomes (eg. healthcare utilisation, broader health outcomes, and economic, societal, and ecological outcomes)?
2) How are these measures implemented within the school setting?

This rapid review proposes to identify studies including teachers and staff, students aged between four and 18 years of age in any setting with the primary purpose of providing regular education. They will consider any organisational measures to reduce transmission of SARS-CoV-2 including policies to address the timing and organisation of school activities, policies addressing the behaviour of students and staff, structural and environmental measures, surveillance and outbreak response measures. Authors will look at transmission-related outcomes, healthcare utilisation and other health outcomes (such as physical, social and mental health).

Table 1. Included reviews

Citation	Study Details	Population & setting	Interventions	Outcomes	Results	Notes
National Collaborating Centre for Methods and Tools (2021) *Living Rapid Review Update 17: What is the specific role of daycares and schools in COVID-19 transmission?*	**Evidence type:** Living rapid review **Data collection dates:** Includes evidence available up to July 22, 2021	**Population:** Children and adolescents aged 1-18 **Setting:** Schools, daycares	Infection prevention and control measures (IPAC)	Impact of IPAC measures on COVID-19 transmission within schools and daycare settings	The risk of transmission from children to children and from children to adults was low in primary school and daycare settings when IPAC measures were applied and adhered to. The certainty of the evidence is moderate (GRADE). The risk of transmission was more variable within secondary school settings, suggesting that adherence to IPAC measures within the school setting and reducing activities outside of the school settings is critical in this age group. This trend appears to be consistent in the limited data to date collected in the presence of VoCs. There is emerging evidence that wearing face coverings, maintaining at least 3ft of distance (especially amongst staff), restricting entry to the school to others, cancelling extracurricular activities, outdoor instruction, and daily symptom screening reduce the number of cases within schools; inconsistent findings have been found for associations between ventilation, and class size. Physical distancing measures were associated with a reduced risk of transmission (OR: 0.26, 95% CI=0.18, 0.37). Hybrid or part-time in-person learning appears to be associated with higher incidence compared to full-time in-person. The certainty of the evidence is low (GRADE).	Data continue to emerge on the effects of VoCs relating to the impact of IPAC measures implemented in school and daycare settings, but it is still limited. It is possible findings may change as more information becomes available No studies captured the impact of measures on underserved populations. There is a scarcity of evidence to evaluate the effect of IPAC measures. The LRR included three syntheses and six single studies (one quasi-experimental, two prevalence, one cross-sectional, one cohort and one cluster RCT) Many of the included studies have not been peer-reviewed The evidence showed a high heterogeneity of IPAC measures which makes the evaluation of individual mitigations more challenging. This rapid review was produced to support Canadian public health decision makers with their response to the COVID-19 pandemic in Canada.

Table 2. Included Ongoing studies							
Reference	**Source type**	**question**	**Population**	**Intervention**	**Outcome**	**setting**	**Anticipated publication date**
Krishnaratne, S., Littlecott, H., Coenen, M., et al. (2021) *Measures implemented in the school setting to contain the COVID-19 pandemic: a rapid review.*	Protocol (RR)	What are the implications of These measures for non-transmission-related outcomes (e.g. healthcare utilization, broader health outcomes, and economic, societal, and ecological outcomes)? How are these measures implemented within the school setting?	Students aged between 4 and 18 years Teachers and other staff working within the school setting Individuals indirectly impacted by the school setting	Organizational measures to reduce transmission of SARS-CoV-2: policies addressing the timing and organization of school activities (e.g. cohorting, alternating physical presence, and staggered arrival/ departure, breaks, and extracurricular activities, blended learning, home schooling), as well as policies addressing the behaviour of students and/or school staff(e.g. face covering mandates, distancing regulations, and handwashing guidelines). Structural/environmental measures to reduce transmission of SARS- CoV-2: Altering the physical environment (e.g. enhanced cleaning and ventilation practices, adding physical barriers to help individuals avoid contact, and adaptations to transportation) Surveillance and response measures in relation to SARS-CoV-2 infections: strategies to screen and/or test individuals and/or groups (e.g. students or school staff with symptoms or elevated temperature, who have had contact with infected individuals, or who have had a positive test result must stay at home for a certain duration of time before returning to school) and subsequent actions(i.e. reactive dismissal of potentially infected individuals or groups)	Transmission-related outcomes Healthcare utilisation Other health outcomes (physical, social and mental health)	Schools (considered as any setting with the primary purpose to provide regular education)	End of summer 2021

3. DISCUSSION

3.1. Summary of findings

There is **emerging evidence suggesting the effectiveness of IPAC measures** at reducing the transmission of COVID-19 in schools and daycare settings. The evidence identified suggests that **multi-component** approaches combining several IPAC interventions are more effective in reducing the risk of COVID-19 transmission than single strategies. Emerging evidence indicates that **some single mitigation measures** such as face coverings and physical distancing (particularly in teachers/staff members), restricted entry, cancelling extracurricular activities, regular testing, daily symptoms screening and outdoor instruction may reduce COVID-19 transmission in schools. There is inconsistent evidence for the effect of ventilation, and class size. Finally, the evidence indicates that **hybrid or part-time in-person learning may *increase*** the risk of COVID-19 transmission.

The overall certainty of the evidence identified by the NCCMT LRR is low and based on findings from observational studies and one cluster RCT as well as the inclusion of a high number of pre-prints and non-peer reviewed publications. Most evidence is from the USA.

3.2 Areas of uncertainty

- Most available evidence is from the USA which **may limit the applicability of their findings to the Welsh context**. However, evidence from other countries is now emerging
- Many of the emerging studies included in the NCCMT LRR are preprints or have not been peer-reviewed. Caution should therefore be applied when interpreting the evidence contained in this report
- It is **unclear what effect the COVID-19 vaccine rollout will have on IPAC measures** implemented within schools, particularly with regards to compliance. As more of the Welsh population becomes fully vaccinated, opinions about COVID-19 may change, and this may affect compliance. In addition, the recent alert level zero changes (fully vaccinated people and under 18s not required to isolate when identified as a close contact of someone with coronavirus) along with other reduced IPAC measures, may also have an impact on IPAC measures implemented within schools. No evidence is available that takes these considerations into account
- The secondary sources identified in our search do not examine the impact of IPAC measures on **other outcomes** such as children's hospitalisation rates, school days lost, mental health and wellbeing, and pre-school child development, or outcomes relating to consistency in implementation
- There is limited evidence related to **new VoCs** or the impact of IPAC measures on underserved or **hard-to-reach populations**
- There is limited evidence on the effects of **individual IPAC measures** (such as risk assessments, respiratory hygiene or handwashing) because most studies have observed multicomponent approaches.
- No evidence was identified for **specialist education settings** which will have their own specific considerations with regard to IPAC measures

3.3 Implications for policy and practice

COVID-19 has changed the evidence landscape and bought about a need for policy makers to deliver evidence-based decisions in an unprecedented timeframe. Therefore it has been necessary for researchers to adapt the methodology to meet this need.

Given the robust nature of the NCCMT LRR, we consider this the best available evidence on which to base upcoming IPAC guidelines in Welsh schools. It would be appropriate to consider future updates and consider adapting IPAC guidelines in line with the changing evidence identified by this LRR.

It is likely the ongoing Cochrane rapid review (Krishnaratne et al., 2021) will add to the evidence base when it is published and is likely to include evidence relevant to aspects of our questions we were unable to find evidence for.

It is likely the **evidence base** on the effectiveness of IPAC measures within education and childcare settings will **continue to evolve**.

Strategies based on a **multi-component approach** are most effective at reducing the spread of COVID-19 transmission in schools. These strategies might combine IPAC measures such as the use of face coverings, physical distancing and increased ventilation. The IPAC measures with more relevant evidence about its effect reducing COVID-19 transmission are using face coverings and physical distancing measures (particularly by teachers and staff members).

The available evidence needs to be used and **interpreted with caution** as it is emerging and derived mostly from pre-prints and non-peer reviewed studies. Most of the evidence is from the USA, and the findings may not be generalisable to the Welsh context due to socio-economic, political and cultural differences.

In light of poor quality evidence, **further well-designed higher quality studies**, especially from the UK or European countries, are needed to better understand the effect of IPAC measures in schools and daycare settings. In addition, further research is required to examine the effect of IPAC measures on outcomes such as mental health and wellbeing, hospitalisation rates and child development, and other populations such as the underserved or hard-to-reach groups.

Finally, with the emergence of new VoCs, increased vaccination coverage, and easing of restrictions, further research will be required to investigate the impact of IPAC measures in reducing the risk of transmission within the current and emerging pandemic context.

3.4 Limitations of the available evidence

- The available evidence is mainly based on non-peer reviewed observational studies with no control group, and therefore unable to establish causality. However, more robust study designs such as RCTs are now being identified in pre-print servers
- The available evidence does not examine the impact of IPAC measures on children's hospitalisation rates, school days lost, mental health and wellbeing, and pre-school child development, or outcomes relating to consistency in implementation
- The impact of IPAC measures on underserved or hard-to-reach populations was not covered by the identified evidence
- Direct comparison of effectiveness between individual IPAC measures is not often performed because most form part of a multicomponent approach

- Most of the evidence is from the USA which could have implications for generalisability to the Welsh context
- The identified evidence was available up to 22 July 2021. Findings may change as more recent evidence becomes available
- Evidence on the effect of IPAC measures on the new VoCs is limited, although this is now emerging
- The available evidence does not report the effect that COVID-19 vaccination or easing of restrictions may have on the level of compliance with IPAC measures and how this may modify their effectiveness.

3.5 Strengths and limitations of this rapid review

Included sources in this rapid review were identified through an extensive preliminary scoping search conducted on the 5 July 2021. Several additional meta-browsers were also searched on the 19 July 2021 to update the search and reduce the risk of missing any relevant systematic or rapid reviews published more recently. Full text screening was peer reviewed by two independent researchers. The data extraction was performed by one researcher and two independent researchers carried out consistency checking.

The quality assessment of the included rapid reviews was undertaken using AMSTAR 2, a specific and validated tool to assess the quality of systematic reviews. Quality assessment was conducted by one reviewer and consistency checked by a second reviewer. Authors of identified records (including protocols for relevant systematic reviews) were contacted to obtain information or progress reports about their publications and other relevant references.

Rapid review methods were used in this review of reviews. Although we have made efforts to capture all relevant publications and reduce the risk of bias, it is possible that additional eligible publications may have been missed or we may have introduced some biases in this review. Title and abstract screening was conducted by a single reviewer, and no consistency checking was carried out at this stage. We chose to include only the most recent sources that synthesise the evidence base, which means it is likely we have missed important studies. This approach was used to ensure our work could be completed in a short timeframe, but still be robust and of value to policy makers. The AMSTAR 2 tool was used to assess the quality of our included rapid reviews. This checklist, although validated, was designed specifically to assess the methodological quality of systematic reviews, and as such may not be the most suitable for appraising rapid reviews.

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5. RAPID REVIEW METHODS

5.1 Literature search strategy

We searched for secondary sources to answer the review question “how effective are the infection prevention and control measures being applied in education and childcare settings for children?” Secondary sources had to report the effectiveness of interventions and be published in English language.

Review question: “How effective are the infection prevention and control measures being applied in education and childcare settings for children?"	
Participants:	Children (0-18 years old) attending pre-school, primary & secondary school settings and paid carers and school/teaching staff resident in OECD countries similar to Wales (excluding Australia and New Zealand)
Intervention / exposure	COVID-19 Infection prevention and control (IPAC) measures
Comparison	School closures or no intervention
Outcomes	Transmission, hospitalisation, consistency in implementation, school days lost (due to measures rather than an illness), mental health & wellbeing (children and teachers/carers), pre-school child development

A systematic literature search for evidence was conducted on the 5 July 2021 and updated on the 19 July 2021 to identify any additional sources that may have been missed through the initial search. A list of resources searched can be found below:

Date	**Resource**
05/07/2021	Cochrane COVID Review Bank https://COVIDreviews.cochrane.org/search/site
05/07/2021	VA-ESP https://www.COVID19reviews.org/index.cfm
05/07/2021	L*OVE – COVID-19 https://app.iloveevidence.com/loves/5e6fdb9669c00e4ac072701d?population=5e7fce7e3d05156b5f5e032a&classification=systematic-review
05/07/2021	Collabovid https://www.collabovid.org/
05/07/2021	LitCOVID https://www.ncbi.nlm.nih.gov/research/coronavirus/
19/07/2021	Trip Database https://labs2020.tripdatabase.com/
05/07/2021	Cochrane Database of Systematic Reviews (CDSR) https://www.cochranelibrary.com/cdsr/reviews
05/07/2021	Campbell Collaboration https://www.campbellcollaboration.org/better-evidence.html
05/07/2021	JBI (via OVID)
19/07/2021	Epistemonikos https://www.epistemonikos.org/en/advanced_search
05/07/2021	PROSPERO https://www.crd.york.ac.uk/prospero/
05/07/2021	Medline via Proquest https://pubmed.ncbi.nlm.nih.gov/
05/07/2021	Health Technology Wales- Coronavirus (COVID-19) Evidence reviews and research

	https://www.healthtechnology.wales/COVID-19/
05/07/2021	Public Health England (PHE) COVID-19 Rapid Reviews https://phelibrary.koha-ptfs.co.uk/COVID19rapidreviews/#Table
19/07/2021	NICE resources for COVID reviews and NICE Evidence
05/07/2021	Healthcare Improvement Scotland – COVID-19: Evidence for Scotland http://www.healthcareimprovementscotland.org/our_work/coronavirus_COVID-19/evidence_for_scotland.aspx
05/07/2021	Ireland, HSE Library, COVID-19 Summaries of Evidence https://hselibrary.ie/COVID19-evidence-summaries/
05/07/2021	Canadian Agency for Drugs and Technologies in Health (CADTH) https://www.cadth.ca/node/8
05/07/2021	Health Information and Quality Authority (HIQA) https://www.higa.ie/
05/07/2021	Centers for Disease Control and Prevention (CDC)https://www.cdc.gov/
05/07/2021	NCCMT Repository of Public Health Evidence Syntheses https://www.nccmt.ca/COVID-19/COVID-19-evidence-reviews
05/07/2021	Google Advanced Search https://www.google.co.uk/advanced_search

An information specialist devised and conducted the searches using the concepts: coronavirus and pre-school, primary and secondary educational settings. The searches combined free text words and descriptors when available. The references of the included studies were also searched for additional sources. The search strategy used for Medline is available in Appendix 2.

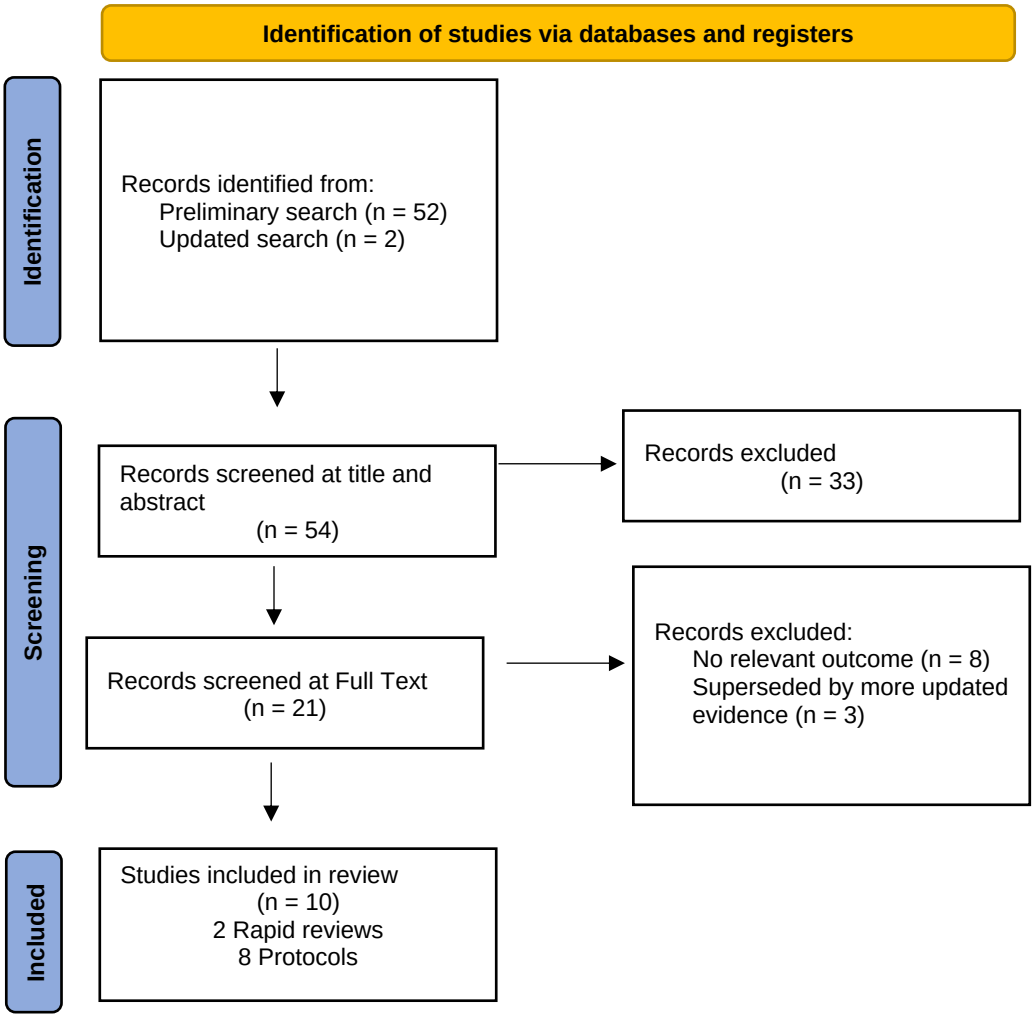
The searches yielded a total of 54 records, including two identified by the updated search. Records were imported into an Endnote database without duplicates.

5.2 Study selection process

One reviewer conducted the title and abstract screening of studies for a preliminary scoping search. Nineteen sources met the inclusion criteria and were included in the full text screening, along with two additional sources identified by the updated search. Two reviewers screened at full text. Where relevant, we only included secondary sources that were most recent, to reflect the evolving nature of the pandemic. Three sources were superseded by more recent evidence.

Ten sources met the inclusion criteria for this rapid review of reviews (two rapid reviews and eight protocols). For this report, we have included findings from only the NCCMT rapid review because it is a living review updated regularly and includes the most recent evidence which can be deemed more relevant to our current position within the pandemic. We therefore concluded it superseded all other identified published sources. Similarly, we have focussed on only one of the eight ongoing reviews - a protocol for a Cochrane review (Krishnaratne et al., 2021), because we anticipate that this review will be produced using a robust and rigorous methodology.

5.3 Study selection flow chart



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

5.4 Data extraction

One researcher performed the data extraction and two independent researchers carried out consistency checking. The following information was extracted when reported:

- Citation
- Study details (evidence type, data collection dates)
- Population and setting
- Intervention details
- Outcomes
- Study results

A comments column was added to report key information that was not captured above and to record any limitations of the included secondary sources.

5.5 Quality appraisal

The checklist AMSTAR 2 (Shea et al., 2017) was used to evaluate the quality of the included LRR. One reviewer conducted the quality appraisal of the included LRR and a second reviewer performed a consistency check.

5.6 Synthesis

A narrative synthesis was undertaken to present the findings. Data from the included LRR is summarised and presented in Table 1.

6. ADDITIONAL INFORMATION

6.1 Information available on request

Reasons for exclusions at full text screening, quality appraisal of included studies and full search strategy.

6.2 Conflicts of interest

The authors declare they have no conflicts of interest to report.

6.3 Acknowledgements

The authors thank stakeholders from Welsh Government for their contribiutions to the stakeholder meetings and to specifying the review questions: Dyfan Evans, Kelly Murphy, Zakhyia Begum. The authors would like to thank the NCCMT team and PHE for their collaboration and for sharing information and results from their respective rapid reviews. We would like to thank as well the core team of the WC19-EC for organising the meeting with the NCCMT and PHE.

6.4 Abbreviations

Acronym	Full Description
AMSTAR	A MeaSurement Tool to Assess systematic Reviews
CDC	Centers for Disease Control and Prevention
COVID-19	Coronavirus disease 2019
CYP	Children and Young People
GRADE	Grading of Recommendations, Assessment, Development and Evaluations
H1N1	Haemagglutinin type 1 and neuraminidase type 1
IPAC	Infection Prevention and Control
JBI	Joanna Briggs Institute
LRR	Living Rapid Review
LSR	Living systematic review
MERS	Middle East respiratory syndrome
NCCMT	National Collaborating Centre for Methods and Tools
NPIs	Non-pharmaceutical Interventions
OECD	Organisation for Economic Co-operation and Development
PHE	Public Health England
PPE	Personal Protective Equipment
RCT	Randomised Controlled Trial
RES	Rapid Evidence Summary
RoR	Review of Reviews
RR	Rapid Review
RT-PCR	Reverse transcription polymerase chain reaction
SARS	Severe acute respiratory syndrome
SARs-COV-2	Severe acute respiratory syndrome coronavirus 2
SR	Systematic Review
TAG	Technical Advisory Group
UK	United Kingdom
USA	United States of America

VoCs	Variants of concern
WC19-EC	Wales COVID-19 Evidence Centre
WHO	World Health Organization

6.5 Appendix 1 – Non Included reviews

Non Included Published Reviews						
Citation	**Study Details**	**Population & setting**	**Interventions**	**Outcomes**	**Results**	**Notes**
Public Health England (2021) Transmission of COVID-19 in school settings and interventions to reduce transmission: A rapid review (update 2)	**Evidence type:** Rapid review **Data collection dates:** search up to 1 February 2021)	**Population:** Children aged 4-18 years, teachers, teaching assistants, school nurses, early years practitioners working in a school-attached service and other school settings workforce **Setting:** Schools; defined as: • Mainstream provision • Day attendance • Primary • Secondary • Reception, preschool and nurseries that are attached to a school • Sixth form college • State and private funded day-attendance schools	School attendance Impact of infection prevention and control measures, including physical distancing measures, testing, reduced attendance, etc.	SARS-CoV-2 infection rate in students and staff Transmission of COVID-19 within school settings COVID-19 outbreaks in schools	Evidence from 17 studies (12 preprints, 1 report) – of which 15 were modelling studies, suggests that implementing a combination of interventions including testing, isolation of cases and cohorting (no mixing outside classrooms and/or reduced class sizes) in addition to other mitigations (physical distancing, face coverings, increased ventilation) might reduce the likelihood and size of outbreaks within schools. **Modelling evidence** Ten out of the 15 modelling studies assessed the effectiveness of a mix of interventions such as reduced class size (including rota between in-person and remote instruction) combined with different testing strategies, non-pharmaceutical interventions (mainly face coverings, physical distancing and hand washing) and staff vaccination. The remaining studies focused on attendance level and/or cohorting strategies, testing and/or self-isolation strategies, and ventilation. Most of the studies were conducted in North American or European settings, including 2 from the UK. Overall, each individual intervention contributed to a reduction of COVID-19 within school settings although to varying degrees. Direct comparison of effectiveness between interventions was not possible due to the heterogeneity between	Evidence on effectiveness was mainly based on non-peer reviewed modelling studies (most of them preprints). Modelling studies are limited by their design and uncertainties of COVID-19 transmission in children and the emergence of new variants. Evidence from non-modelling studies assessed risk of transmission indirectly Risk of bias was not assessed in modelling studies.

					studies. However, in two studies (both pre-prints) regular testing appeared to be the more effective strategy for reducing secondary transmission when compared to not testing or no symptom screening and teacher vaccination or full class isolation as a result of a positive case respectively. Reducing class size also resulted in reduced school transmission, and one of the most effective strategies was a rota-system of alternative in-person and remote teaching. It was not possible to assess the effectiveness of face coverings and physical distancing, as these two measures were generally considered together as a package of non-pharmaceutical measures in combination with other measures. Both measures were found to be unlikely to control transmission within schools if implemented alone, except in times of low community transmission. There is consistent evidence that combinations of interventions are required to achieve low transmission within school settings. In particular combinations of testing, isolation of cases and cohorting/reduced class size are effective in reducing school transmission. **Semi-experimental and observational evidence** Two non-modelling studies were identified. These studies did not directly assess risk of transmission or infection rates, but assessed aerosol concentration and number of contacts respectively, which were considered as indicators of risk of transmission. The findings from one low quality semi-experimental study examining the role of air purifiers in reducing the aerosol concentration of classrooms suggested that air purifiers reduced	There was important heterogeneity between studies in relation to settings and scenarios implemented, meaning generalisability of findings was often unclear Observational evidence and results from modelling studies suggest that transmission within school settings increase with community prevalence Rapid review authors did not identify the type of school setting involved with each study

					the concentration of particles in the air compared to a classroom without purifiers. The second study assessed changes in contact patterns in primary schools in England when schools partially reopened in June 2020 with mitigation measures in place. Compared to before lockdown, daily contacts in primary school students (years 1,6,10 and 12) had been reduced by 53-62%, and by more than 60% between staff. Reduced class size, physical distancing with visual indicators, and staggered break times and school start times were the most common measures in place. The results of this study do not allow for an assessment of effectiveness of the intervention. Two studies (one case-control and one cross-sectional) reported a potential association between face covering use and reduced infection prevalence.	

Non Included Ongoing Reviews							
Reference	**Source type**	**question**	**Population**	**Intervention**	**Outcome**	**setting**	**Anticipated publication date**
Lange, B., Ott, J. and Jung Karki, S. (2021) 'Evidence synthesis gaps in understanding disease burden of children, transmission parameters in schools and households and effects of measures implemented in schools during the COVID-19 pandemic - a rapid systematic review of systematic reviews', *PROSPERO CRD42021231866.*	Protocol (RoR)	What evidence synthesis is available on disease burden of COVID-19 in children, their role and the role of schools in transmission, effect of measures implemented in schools and in the population to reduce transmission of SARS-CoV-2 infections in the population and in schools	Children < 18 years of age	Measures in schools to reduce spread of SARS-CoV-2 in schools and in the population (including school closures)	(in relation to schools only) Transmission of SARS-CoV-2 in schools and the population Adverse effects of school closures in children and the population on health outcomes Other effects of schools closures in children and the population on health outcomes	School and households	March 2021 Review authors contacted 09/07/21, awaiting response
Little, T., Reinhard, D., White, S. K-12 non-pharmacological responses to influenza-like and Coronavirus illness and outbreaks in US schools - A systematic review. PROSPERO 2021 CRD42021247217	Protocol (SR)	1) What non-pharmacological interventions or preventive strategies are K-12 schools employing regarding influenza-like and Coronavirus illnesses? 2) How effective are non-pharmacological interventions or preventive strategies in K-12 schools?	Schools serving K-12	Non-pharmaceutical interventions (NPIs) alone or in conjunction with other control measures used for influenza-like and Coronaviruses	absenteeism rate of spread bacteria on hands or surfaces number of new cases Cost effectiveness estimates	Schools serving K-12	31 August 2021
Pena, J., Gonzalez, C.,Cuadrado, C. and Rada, G. (2020) 'School practices to promote social distancing for COVID-19: a living systematic review protocol', *PROSPERO CRD42020180701*.	Protocol (LSR)	Are school social distancing interventions effective in reducing infection rates and transmission during COVID-19 outbreaks?	School populations at the national, regional or local level during COVID-19 outbreaks	school practices to promote social distancing during COVID-19 outbreaks (distance regulation, reducing the rate of mixing/contact, limiting use of common areas, reducing time at school, partial closure, total closure)	All-cause mortality Household and community contact rate Infection rate Transmissibility of virus (R number) Peak epidemic Critical care bed requirement	schools	May 2020 Review authors contacted 09/07/21, awaiting response

Non Included Ongoing Reviews							
Reference	**Source type**	**question**	**Population**	**Intervention**	**Outcome**	**setting**	**Anticipated publication date**
					Surge capacity Coronavirus mortality		
Silverberg, J., Goldberg, J. and Weissman, A. (2020) 'How effective are school-based interventions to reduce the transmission of respiratory infections, including COVID-19, in a school setting?'. *PROSPERO CRD42020204563*	Protocol (SR)	How effective are school-based interventions in reducing the transmission of respiratory infections, including COVID-19, in a school setting?	Children aged 4-18 years, daycare and school teachers, teaching assistants, school nurses, staff working in schools for children with special needs	School-based interventions to reduce the transmission of respiratory infections, including COVID-19, in the school setting, including: the re-opening of schools, limited school closures, early closures, school social distancing measures, and infection control interventions within the school-setting	Transmission of pulmonary infections including SARS-CoV-2 within school settings, respiratory disease outbreaks in schools	School setting	September 2020 Review authors contacted 09/07/21, awaiting response
Chatterji, M., Kitamura, K., Muenig , P., Willson, G. E., De Leon, R. and Allegrante, J. P. (2020). 'The relative effectiveness of multilevel interventions in reducing risks of transmission of lethal viruses in Grade K-12 school communities and school linked populations: a systematic review and best-evidence synthesis' PROSPERO 2020 CRD42020201930	Protocol (SR)	What is the relative efficacy of multilevel interventions, as currently recommended by two influential international public health organizations (specifically, WHO and CDC), in reducing risks of lethal virus transmission in K-12 communities and school-linked populations (students, teachers/staff, leaders, parents and others in contact chain)?	Grade K-12 school and associated multi-age communities (teachers, staff, leaders, students, parents and others in contact chains) in international regions/societies susceptible to virus infections (i.e., COVID-19, MERS, Ebola, Swine Flu/H1N1, and SARS)	Interventions that match recommendations of two organizations, WHO of the United Nations and CDC in the US to combat risks of infections, will be classified into four (4) clusters by the following levels: 1. Local/state/national level policy interventions (e.g., quarantine policy for travellers), 2. Institutional interventions (e.g., health education campaigns, spatial distances in classroom seating setups, rotated scheduling or small group/cohorting strategy, or use of physical barriers), 3. Household/family level interventions (e.g., physical distancing of families, family hygiene or sanitation practices and norms), 4. Individual level behavioral and protective measures (e.g., hand washing, hand sanitizer use, protective face coverings or glove-wearing).	Infection spread and virus transmission rates (e.g., incidence proportion (attack rates), secondary attack rate, incidence rates, point prevalence rates)	Not given	August 2020 Review authors contacted 09/07/21, awaiting response

Non Included Ongoing Reviews							
Reference	**Source type**	**question**	**Population**	**Intervention**	**Outcome**	**setting**	**Anticipated publication date**
Medeiros, G., Nunes, A. C. F., Azevedo, K. P. M., et al. (2020) 'The Control and Prevention of COVID-19 Transmission in Children: A Protocol for Systematic Review and Meta-analysis', Medicine (Baltimore), 99(31), pp.	SR	what evidence is available in the literature that addresses the participation of children and adolescents, as asymptomatic carriers, in the control and prevention of COVID-19 transmission?	Children and adolescents (≤19 years)[13] infected with SARS-CoV-2 were confirmed by the RT-PCR or serology method to identify previous infection and WHO diagnostic criteria	SARS-CoV-2 infection will be considered, as well as the control and prevention of COVID-19 transmission in children and adolescents	mean proportion or 95% confidence interval of: incidence and mortality due to COVID-19 disease; early comorbidities (diabetes, hypertension, and); complications (acute respiratory distress syndrome, acute kidney injury, and so on); the results of the course of the disease (hospitalization, discharge, deaths, and so on); descriptions and data on the participation of the child population in the transmission dynamics of COVID-19; clinical and immunological characteristics of COVID-19 in the infant population; demographic data (age, sex, race, country, and so on) and clinical symptoms (fever, cough, etc.)	Not given	March 2021 Review authors contacted 09/07/21, awaiting response
Jansen, D., Vervoort, H., Dratva, J., et al. (2021) Effects of COVID-19 containment policies on mental and physical health outcomes among children and adolescents: a systematic review PROSPERO 2021 CRD42021242064	Protocol (SR)	What is the effect of COVID-19 containment policies on mental and physical health outcomes of children and adolescents? 1. What is the effect of COVID-19 containment policies on the physical health (lifestyle, weight, and sleep) of children and adolescents (< 18 years of age)? 2. What is the effect of COVID-19 containment policies on the mental health (anxiety, depression, sleep problems) of children and adolescents (< 18 years of age)?	Children and adolescents < 18 years of age across the globe.	all COVID-19 containment policies and measures that potentially impact children and adolescents, including: • Maximum number of children/adolescents allowed to gather • Closing of schools/day care • Limited access to school in case of COVID-related symptoms • Isolation (voluntary and/or mandatory) • Closing of sports, social occasions and entertainment options for children and adolescents • Restriction in elective/planned care • Restrictions in urgent care (care for diseases)	Physical and mental health of children and adolescents (primary outcome).	Not given	June 2021

6.6 Appendix 2 – Medline search (Proquest)

Set#	Searched for	Results
S1	ti((School* OR "pre school" OR preschool* OR child* OR K12 OR college OR education* OR creche OR kindergarten* OR "early years") AND (COVID* OR corona* OR sars*) AND (((Control* OR preventi* OR IPAC OR "Public health" OR mitigate* OR health) AND (measur* OR intervention* OR strateg* OR practic*)) OR mask* OR cover* OR Communicat* OR information* OR "risk assessment" OR test* OR contact OR trac* OR isolate* OR buble OR distanc* OR hygien* OR handwash* OR handsanitiser* OR clean* OR decontaminat* OR disinfect* OR ventilation* OR outdoor* OR PPE OR transport*))	457°
S2	(MESH.EXACT("Systematic Reviews as Topic"))	6323
S3	DTYPE(systematic review)	164395
S4	TI,SU((Systematic or Cochrane or umbrella or scoping or rapid or integrative or collaborative or qualitative or quantitative or "mixed methods") Near/3 (overview or answer or map or review or meta*))	190193
S5	TI,SU(review Near/2 reviews)	619725
S6	MESH.EXACT.EXPLODE("Meta-Analysis as Topic")	22742
S7	DTYPE(Meta-Analysis)	139273
S8	TI,SU(meta-analys* or metaanalys* or metanaly* or met analy*)	155506
S9	TI,SU((technology near/2 (assessment* or overview*)) OR HTA[*1])	95484
S10	(MESH.EXACT("Technology Assessment, Biomedical"))	10331
S11	jn(Cochrane or "technology assessment")	20322
S12	(MESH.EXACT("Critical Pathways"))	7220
S13	(MESH.EXACT.EXPLODE("Clinical Protocols"))	177278
S14	(MESH.EXACT.EXPLODE("consensus"))	16021
S15	(MESH.EXACT.EXPLODE("Consensus Development Conferences as Topic"))	2950
S16	(MESH.EXACT.EXPLODE("Guidelines as Topic"))	170821
S17	DTYPE(Guideline)	41318
S18	(MESH.EXACT("Health Planning Guidelines"))	4140
S19	DTYPE(Consensus)	12385
S20	TI,SU(position statement* or policy statement* or practice parameter* or best practice*)	16298
S21	TI,SU(standards or guideline or guidelines or consensus*)	1023321
S22	TI,SU((critical or clinical or practice) Near/2 (path or paths or pathway or pathways or protocol*))	40463

S23	TI,SU(care Near/2 (standard or path or paths or pathway or pathways or map or maps or plan or plans))	14600
S24	TI,SU(algorithm* Near/2 (screening or examination or test or tested or testing or assessment* or diagnosis or diagnoses or diagnosed or diagnosing))	7267
S25	TI,SU(algorithm* Near/2 (pharmacotherap* or chemotherap* or chemotreatment* or therap* or treatment* or intervention*))	5417
S26	MESH.EXACT("Economics")	461579
S27	MESH.EXACT.EXPLODE("Costs and Cost Analysis")	248071
S28	MESH.EXACT("Economics, Nursing")	4005
S29	MESH.EXACT("Economics, Medical")	9146
S30	MESH.EXACT("Economics, Pharmaceutical")	3009
S31	MESH.EXACT.EXPLODE("Economics, Hospital")	25253
S32	MESH.EXACT("Economics, Dental")	1919
S33	MESH.EXACT.EXPLODE("Fees and Charges")	33345
S34	MESH.EXACT.EXPLODE("Budgets")	13869
S35	TI,SU(Budget* OR economic* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic* or pharmaco-economic* or expenditure or expenditures or expense or expenses or financial or finance or finances or financed)	651098
S36	TI,SU(value Near/2 (money or monetary))	453
S37	MESH.EXACT.EXPLODE("models, economic")	15736
S38	(TI,SU(economic model*))	15638
S39	MESH.EXACT.EXPLODE("markov chains")	15169
S40	TI,SU(markov)	18304
S41	MESH.EXACT("monte carlo method")	29971
S42	(TI,SU(monte carlo))	37482
S43	MESH.EXACT("Decision Theory")	952
S44	(TI,SU((decision* Near/2 (tree* or analy* or model*))))	19366
S45	S44 OR S43 OR S42 OR S41 OR S40 OR S39 OR S38 OR S37 OR S36 OR S35 OR S34 OR S33 OR S32 OR S31 OR S30 OR S29 OR S28 OR S27 OR S26 OR S25 OR S24 OR S23 OR S22 OR S21 OR S20 OR S19 OR S18 OR S17 OR S16 OR S15 OR S14 OR S13 OR S12 OR S11 OR S10 OR S9 OR S8 OR S7 OR S6 OR S5 OR S4 OR S3 OR S2	2621812
S46	DTYPE(Editorial OR letter OR Comment)	1983204
S47	MESH.EXACT.EXPLODE("Animals") NOT MESH.EXACT("Humans")	4872105
S48	S47 OR S46	6784182
S49	S45 NOT S48	2329287*
S50	S49 AND S1	58°

7. ABOUT THE WALES COVID-19 EVIDENCE CENTRE (WC19EC)

The WC19EC integrates with worldwide efforts to synthesise and mobilise knowledge from research.

We operate with a core team as part of Health and Care Research Wales, are hosted in the Wales Centre for Primary and Emergency Care Research (PRIME), and are led by Professor Adrian Edwards of Cardiff University.

The core team of the centre works closely with collaborating partners in Health Technology Wales, Wales Centre for Evidence-Based Care, Specialist Unit for Review Evidence centre, SAIL Databank, Bangor Institute for Health and Medical Research/ Health and Care Economics Cymru, and the Public Health Wales Observatory.

Together we aim to provide around 50 reviews per year, answering the priority questions for policy and practice in Wales as we meet the demands of the pandemic and its impacts.

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Website:
https://healthandcareresearchwales.org/about-research-community/wales-COVID-19-evidence-centre