Revisión de la evidencia sobre el impacto del cierre de centros educativos en la evolución de la pandemia por COVID-19

Review of the evidence on the impact of school closures throught the evolution of the COVID-19 pandemic

Informe de evaluación de tecnologías sanitarias

INFORMES, ESTUDIOS E INVESTIGACIÓN

MINISTERIO DE SANIDAD

Red Española de Agencias de Evaluación de Tecnologías y Prestaciones del Sistema Nacional de Salud

Generalitat de Catalunya

Salut/ Agència de Qualitat i Avaluació Sanitàries de Catalunya

Revisión de la evidencia sobre el impacto del cierre de centros educativos en la evolución de la pandemia por COVID-19

Review of the evidence on the impact of school closures through the evolution of the COVID-19 pandemic

Informe de evaluación de tecnologías sanitarias

INFORMES, ESTUDIOS E INVESTIGACIÓN

Revisión de la evidencia sobre el impacto del cierre de centros educativos en la evolución de la pandemia por COVID-19 / Vivanco-Hidalgo RM, Gallastegui – Calvache E, Rodés M. Ministerio de Sanidad. 2021.—95 p; 24 cm.— (Colección: Informes, estudios e investigación / Ministerio de Sanidad. Informes de Evaluación de Tecnologías Sanitarias)

1. COVID-19 2. Centros docentes

I. España. Ministerio de Sanidad II. Cataluña. Departament de Salut. Generalitat de Catalunya
III. Agència de Qualitat i Avaluació Sanitàries de Catalunya

Para citar este informe:
Vivanco Hidalgo RM, Gallastegui-Calvache E, Rodés M. Revisión de la evidencia sobre el impacto del cierre de centros educativos en la evolución de la pandemia por COVID-19. Madrid: Ministerio de Sanidad. Barcelona: Agència de Qualitat i Avaluació Sanitàries de Catalunya; 2021. (Colección: Informes, estudios e investigación / Ministerio de Sanidad. Informes de Evaluación de Tecnologías Sanitarias).

Editan:
Ministerio de Sanidad
Agència de Qualitat i Avaluació Sanitàries de Catalunya. Departament de Salut. Generalitat de Catalunya.

Corrección y maquetación: Área de comunicación de la Agència de Qualitat i Avaluació Sanitàries de Catalunya
Diseño: Ministerio de Sanidad
Nipo: 133-22-078-0.

Agradecimientos:
Queremos agradecer al equipo de la Fundación Epistemonikos su colaboración y ayuda para el desarrollo de este informe.

Financiación:
Este estudio se ha desarrollado en el marco de la Línea de trabajo COVID-19 dentro del Plan Anual de la Red Española de Agencias de Evaluación de Tecnologías Sanitarias y Prestaciones del Sistema Nacional de Salud, financiada por el Ministerio de Sanidad

Revisión de la evidencia sobre el impacto del cierre de centros educativos en la evolución de la pandemia por COVID-19

Review of the evidence on the impact of School closures through the evolution of the COVID-19 pandemic

Informes de evaluación de tecnologías sanitarias

INFORMES, ESTUDIOS E INVESTIGACIÓN

MINISTERIO DE SANIDAD
Red Española de Agencias de Evaluación de Tecnologías y Prestaciones del Sistema Nacional de Salud
Generalitat de Catalunya
Salut/ Agència de Qualitat i Avaluació Sanitàries de Catalunya

Información preliminar

Autoría

Rosa María Vivanco-Hidalgo. Licenciada en Medicina y Cirugía. Agència de Qualitat i Avaluació Sanitàries de Catalunya (AQuAS), Departament de Salut, Generalitat de Catalunya.

Edurne Gallastegui Calvache. Licenciada en Biología y Doctora por el programa de Biomedicina (Universitat Pompeu Fabra). Agència de Qualitat i Avaluació Sanitàries de Catalunya (AQuAS), Departament de Salut, Generalitat de Catalunya.

Marina Rodés. Agència de Qualitat i Avaluació Sanitàries de Catalunya (AQuAS), Departament de Salut, Generalitat de Catalunya.

Coordinación

Rosa María Vivanco-Hidalgo. Licenciada en Medicina y Cirugía. Agència de Qualitat i Avaluació Sanitàries de Catalunya (AQuAS), Departament de Salut, Generalitat de Catalunya.

Declaración de conflictos de interés

Las autoras del informe declaran no tener conflictos de interés a través del documento de declaración de interés de la Red Española de Agencias de Evaluación de Tecnologías Sanitarias y Prestaciones del SNS (RedETS).

Este informe se ha realizado en el marco de la Red Española de Agencias de Evaluación de Tecnologías Sanitarias y Prestaciones del Sistema Nacional de Salud (RedETS), financiada por el Ministerio de Sanidad.

Para la realización del informe se ha utilizado una plantilla de informe de respuesta rápida que se ha elaborado de forma consensuada por las agencias/unidades que forman parte de la RedETS, para proporcionar información sobre la evidencia disponible de las medidas no farmacológicas llevadas a cabo en diferentes niveles decisionales para hacer frente a la pandemia por COVID-19, que se basa en la estructura de los documentos realizados por las agencias de RedETS durante la pandemia COVID-19 y en otros documentos como la guía de revisión rápida de Cochrane Response y de "Evidencia Viva" https://community.cochrane.org/sites/default/files/uploads/inline-files/Transform/201912_LSR_Revised_Guidance.pdf

ÍNDICE

Resumen

Intervención a evaluar: Cierre de escuelas

Calidad de la evidencia: moderada-baja

Resultados clave:

- Resultados contradictorios del efecto del cierre de escuelas en el control de la evolución de la pandemia en la primera ola. Evidencia indirecta a través de los resultados del impacto en la reapertura de los centros educativos, sin implicar aumento del número de casos en aquellas regiones donde la incidencia estaba controlada.
- Resultados negativos en la salud mental de los/as menores, pero sin estudios que muestren su impacto a largo plazo.

Conclusión final: El efecto concreto del cierre de escuelas no ha podido determinarse en la primera ola debido a la implementación solapada de otras intervenciones no farmacológicas, del importante riesgo de sesgo de la mayoría de los estudios publicados y de los resultados contradictorios. Los estudios realizados en regiones/localizaciones con baja incidencia de casos donde se realizó una apertura controlada de los centros educativos, se observó que no implicaba un aumento en el número de casos en la comunidad. Teniendo en cuenta que el cierre de los centros educativos ha supuesto un impacto negativo en la salud mental de una población vulnerable como es la infancia y la adolescencia y que la reapertura de los centros educativos durante la pandemia (de forma controlada) no se ha considerado el responsable principal del aumento de casos en la comunidad, y de acuerdo con las recomendaciones de ECDC y OMS-UNESCO, el cierre de escuelas debería considerarse como la última medida a implementar para controlar la pandemia por COVID-19 y tener en cuenta factores como la situación epidemiológica y el impacto de otras INF antes de poner en marcha el cierre de escuelas.

English abstract

Intervention to evaluate: School closures

Quality of the evidence: Moderate-low

Key results:

- Contradictory results of the effect of school closures on the control of the evolution of the pandemic in the first wave. Indirect evidence through the results of the impact on the reopening of schools, without implying an increase in the number of cases in those regions where the incidence was controlled.
- Negative results on the mental health of minors, but without studies that show its long-term impact.

Conclusion: The concrete effect of school closure could not be determined in the first wave due to the overlapping implementation of other non-pharmacological interventions, the significant risk of bias in most of the published studies and the contradictory results. In the studies conducted in regions/locations with low incidence of cases, where a controlled opening of educational centers was carried out, it was observed that it did not imply an increase in the number of cases in the community. Considering that the closure of schools has had a negative impact on the mental health of a vulnerable population, such as children and teenagers, and that the reopening of schools during the pandemic (in a controlled manner) has not been considered to be the main responsible for the increase of cases in the community, and in accordance with ECDC and WHO-UNESCO recommendations, school closures should be considered as the last measure to be implemented to control the COVID-19 pandemic. Other factors, such as the epidemiological situation and the impact of other NPIs, have to be taken into account before implementing school closures.

Resum en català

Intervenció a avaluar: Tancament d'escoles

Qualitat de l'evidència: moderada-baixa

Resultats clau:

- Resultats contradictoris de l'efecte del tancament d'escoles en el control de l'evolució de la pandèmia a la primera onada. Evidència indirecta a través dels resultats de l'impacte a la reobertura dels centres educatius, sense implicar augment del nombre de casos en aquelles regions on la incidència estava controlada.
- Resultats negatius en la salut mental dels menors, però sense estudis que mostrin el seu impacte a llarg termini.

Conclusió final: L'efecte concret del tancament d'escoles no s'ha pogut determinar a la primera onada a causa de la implementació solapada d'altres intervencions no farmacològiques, de l'important risc de biaix de la majoria dels estudis publicats i dels resultats contradictoris. Els estudis realitzats a regions/localitzacions amb baixa incidència de casos on es va realitzar una obertura controlada dels centres educatius, es va observar que no implicava un augment en el nombre de casos a la comunitat. Tenint en compte que el tancament dels centres educatius ha suposat un impacte negatiu a la salut mental d'una població vulnerable com és la infància i l'adolescència i que la reobertura dels centres educatius durant la pandèmia (de forma controlada) no s'ha considerat el responsable principal de l'augment de casos a la comunitat, i d'acord amb les recomanacions d'ECDC i OMS-UNESCO, el tancament d'escoles s'hauria de considerar com la darrera mesura a implementar per controlar la pandèmia per COVID-19 i tenir en compte factors com la situació epidemiològica i l'impacte d'altres INF abans de posar en marxa el tancament d'escoles.

1. Introducción

1.1 Breve descripción de la situación de la pandemia por COVID-19

La enfermedad provocada por el Coronavirus 2019, comúnmente denominada COVID-19 por sus siglas en inglés, es una enfermedad transmisible de afección preferentemente respiratoria, producida por un nuevo coronavirus denominado SARS-CoV-2 (1). Desde el 11 de marzo de 2020, tras su debut en Wuhan (China), y la posterior declaración de pandemia por parte de la Organización Mundial de la Salud (OMS), hasta el 28 de octubre de 2021, han sido comunicados mundialmente, más de 240 millones de casos y casi 5 millones de muertes. En España, estos datos se corresponden con 5 millones de casos comunicados y 87.289 fallecimientos (2). Mientras tanto, internacionalmente, las estrategias para contener/mitigar la propagación del COVID-19 han sido revisadas y sugeridas por la OMS a través de su Grupo de Asesoría Científico-Técnica sobre Riesgos Infecciosos (STAG-IH), sobre la base de evaluaciones dinámicas efectuadas a partir de la evolución de la información sobre las sucesivas oleadas a nivel mundial (3).

El déficit general de conocimiento inicial sobre las características del virus y su mecanismo de transmisión y la ausencia de intervenciones preventivas (vacunas) y terapéuticas específicas obligó a los gobiernos europeos a poner en marcha un amplio y variado conjunto de medidas o intervenciones preventivas de carácter general y no farmacológicas para controlar la expansión de la epidemia, reducir las consecuencias sobre las personas, y preservar la capacidad de respuesta de los sistemas sanitarios (4). Estas intervenciones no farmacológicas (INF) son actuaciones de salud pública para contener o mitigar la transmisión comunitaria del virus SARS-CoV-2, al reducir y enlentecer la difusión de los contagios. Las INF son de elección para hacer frente a las pandemias cuando la población no tiene capacidad inmunitaria (o se reduce a pequeños contingentes de población), y no se dispone o no se tiene acceso a vacunas o a tratamientos efectivos (5, 6). Incluyen el distanciamiento social, la prohibición de actividades que requieran grandes concentraciones, cierre de centros educativos y sociales, confinamientos domiciliarios (salvo para trabajadores esenciales), aislamiento de individuos sintomáticos y de sus contactos identificados; así como el bloqueo a gran escala de la movilidad de la población mediante toques de queda y cierres territoriales. El objetivo de las INF es reducir la incidencia de casos, su impacto en el sistema sanitario y reducir la mortalidad.

Paralelamente a la implantación de INF por parte de los gobiernos, las personas en los países afectados también incorporaron, individualmente, medidas de protección recomendadas basadas en fuentes de información científicas y/o gubernamentales; incluyendo la higiene de manos, uso de mascarillas, distanciamiento entre personas, evitación de reuniones y viajes.

Como informan las experiencias internacionales analizadas hasta el momento (7-23), las INF utilizadas para mitigar la propagación del virus han sido complejas y dinámicas, integrando intervenciones sanitarias, con diferentes intervenciones no sanitarias; para ajustarlas a las peculiaridades epidemiológicas, sociales y económicas del contexto en el que se aplican. A pesar de las diferencias en la implementación de las INF entre países; en general, la mayoría siguió un patrón similar; suspendiendo, en primer lugar, los eventos con gran número de participantes, seguido de los centros educativos y, posteriormente, los servicios no esenciales como bares y restaurantes. Finalmente, se prohibieron las reuniones, se establecieron toques de queda; o se obligó a los ciudadanos a quedarse en casa. Si bien en la mayoría de los países europeos estas políticas se aplicaron a toda la nación, Italia y España comenzaron a aplicar estas medidas a nivel local en las llamadas "zonas rojas" en las que comenzó la propagación y/o tenían mayores tasas de contagios (10).

Se han realizado estudios con diferentes diseños con el objetivo de evaluar el impacto de estas INF en el control de la evolución de la pandemia. Si bien algunos de estos estudios se han centrado en un solo país o incluso en una ciudad , un número apreciable han integrado y comparado intervenciones y resultados en diferentes países, agrupando las INF en categorías amplias ; lo que, si bien facilita la realización de estudios transnacionales, limita la especificidad de la evaluación para valorar las INF de mayor efectividad y menor coste (4, 12, 24-28).

A pesar de que se va disponiendo de pruebas científicas crecientes e informes de evaluación de tecnologías sanitarias que sugieren que las INF implantadas gubernamentalmente para reducir el contacto social han logrado frenar la transmisión de COVID-19 (29, 30); la aplicación conjunta de intervenciones y la limitada validez de los diseños utilizados por los estudios disponibles, impiden estimar consistentemente los efectos conjuntos de las INF; diferenciarlos individualmente; y determinar la magnitud de la contribución adicional de los cambios voluntarios en las conductas de las personas (22). Un mayor conocimiento sobre estos aspectos permitiría diseñar mejor, tanto las políticas restrictivas de las dinámicas sociales, como las estrategias de información y de emisión de recomendaciones para la población. El mejor conocimiento sobre la efectividad de las INF permitiría seleccionar

e implementar, con menor incertidumbre, las IFN más apropiadas para combatir la transmisión y las consecuencias sanitarias, sociales y económicas provocadas por la pandemia.

A lo largo de 2020-2021, la pandemia por COVID-19 se está caracterizando por dinámicas de diferente signo, con oleadas sucesivas provocadas por diferentes y rápidas mutaciones del virus; implantación de INF con diferencias en temporalidad e intensidad; disponibilidad creciente de medidas de protección individuales y protocolos terapéuticos; cambios en los liderazgos políticos y en las actitudes de la población; disponibilidad de vacunas frente a COVID-19 y tasas crecientes de cobertura vacunal. Estos dos últimos acontecimientos favorables podrían, sin embargo, actuar como factores modificadores de la efectividad de las INF, al favorecer la relajación de las políticas gubernamentales y de las conductas de protección de la población (31).

Ante este escenario dinámico e incierto, en el que la mayor responsabilidad en España recae, actualmente, sobre los gobiernos autonómicos del Estado español, el Ministerio de Sanidad ha encargado a la Red Española de Agencias de Evaluación de Tecnologías Sanitarias y Prestaciones del Sistema Nacional de Salud (RedETS) la realización de una serie de informes rápidos de evaluación del efecto de las INF aplicadas para hacer frente a la pandemia por COVID-19. Conocer si estas intervenciones han tenido algún efecto, y estimar su impacto, contribuirá a seleccionar, en el futuro, las intervenciones más apropiadas para mantener el control.

1.2 Descripción y características técnicas de la tecnología a estudio

Las INF pueden clasificarse, según su finalidad y escalado, en intervenciones de contención, mitigación o supresión (6, 32). Las intervenciones de contención son las que se implementan cuando se identifican los primeros casos para interrumpir la transmisión de la enfermedad y prevenir su expansión. Generalmente, incluyen medidas de identificación de casos y rastreos de contactos. Las intervenciones de mitigación se emplean una vez que aumentan los casos y se hace más difícil mantener la trazabilidad de todos los contactos y su interrelación. Estas intervenciones tienen por objeto reducir o aplanar el pico epidémico, para proteger la capacidad de respuesta de los servicios sanitarios; incluyendo actuaciones tales como el distanciamiento social, aislamiento de casos, cuarentena para contactos, aislamiento de personas de alto riesgo. La supresión tiene por objeto detener la difusión epidémica, mediante la reducción, por debajo de 1, del número efectivo de reproducción (Rt). Un valor de Rt superior a 1 implica un crecimiento de las infecciones; tanto mayor, cuanto más se aleje de este valor (4). Las intervenciones de supresión combinan diferentes medidas poblacionales que implican cierres de establecimientos colectivos, de territorios, y de protección y distanciamiento individual.

Al inicio de la pandemia, entre las primeras INF que se tomaron, se encontraba el cierre de centros educativos. Dada la menor tasa de infección y complicaciones detectadas en la población infantil y adolescente por aquel entonces y los efectos perjudiciales en la educación, salud mental y calidad de vida de este grupo poblacional, se cuestionó que el cierre de escuelas fuese una de las primeras medidas a considerar de cara a nuevas olas (33, 34).

Por lo tanto, este informe evaluará el impacto del cierre (total o parcial) de centros educativos (guardería, escuelas de primaria, secundaria, universidades, otros centros educativos) tanto en países europeos como no europeos en el control de la pandemia.

1.3 ¿Qué se espera de la medida?

El cierre parcial o total de cualquier tipo de espacio educativo tiene por objeto reducir las interacciones sociales y contener/enlentecer la transmisión de la infección por COVID-19 en la población. En función de la situación epidemiológica del país en el momento en que se toman este tipo de medidas, el impacto de las mismas puede tener un efecto diferente.

Por otra parte, es importante reconocer la dificultad que el efecto individualizado de esta u otras medidas no farmacológicas de salud pública pueda tener en la evolución de la pandemia, al implantarse simultánea y conjuntamente con otras intervenciones; con variaciones territoriales en la temporalidad e intensidad de aplicación.

2. Objetivos y alcance del informe

Los objetivos del presente informe, son:

1. Identificar, evaluar críticamente y sintetizar la evidencia científica disponible sobre la efectividad del cierre (parcial o total) de centros educativos sobre la evolución de la pandemia por COVID-19 en la población
2. Identificar, evaluar críticamente y sintetizar la evidencia científica disponible sobre las consecuencias de la intervención en la población infantil y adolescente (salud mental y calidad de vida)

Alcance: Este informe no contempla el análisis de la evidencia de transmisibilidad dentro de los centros educativos o las medidas tomadas en los centros educativos para mitigar la transmisión ni la evaluación del impacto de las alternativas telemáticas puestas en marcha como alternativas a la educación presencial.

3. Metodología

Para alcanzar los objetivos propuestos, se propuso realizar una revisión de alcance (scoping review) de la literatura científica disponible sobre efectividad del cierre (total o parcial) de los centros educativos sobre la evolución de la pandemia por COVID-19 en la población y sus posibles consecuencias en la población infantil y juvenil con el fin de mapear la evidencia correspondiente y detectar lagunas de conocimiento.

Finalmente, ante la disponibilidad de revisiones sistemáticas de calidad y tratar de sintetizar la evidencia disponible, se ha optado por seguir una metodología de síntesis amplia, incorporando elementos de evaluación de la calidad

3.1 Criterios para considerar los documentos y estudios a incluir

Para el presente informe, se han incluido revisiones sistemáticas, estudios primarios (sin restringir por diseño) y documentos de organismos oficiales como OMS-UNESCO y ECDC.

La formulación de la pregunta de interés se ha realizado a través del formato PICO de la siguiente manera.

PICO	
Población	*Población general (se considera toda la población general como susceptible)* *Población infantil y adolescente (objetivo 2)*
Intervención/exposición (medida no farmacológica)	*Cierre (total o parcial) de centros educativos:* *Guarderías* *Escuelas de primaria* *Escuelas de secundaria* *Universidades* *Otros centros educativos*
Comparador	*Ninguna intervención(no cierre de escuelas) .*
Resultado(s)	*Efectos sobre el control de la pandemia: incidencia de infección a los 7/14 días; incidencia hospitalización a los 7/14 días; incidencia hospitalización en UCI a los 7/14 días; tasas de mortalidad a los 7/14 días* *• Posibles efectos nocivos de la intervención: salud mental y calidad de vida en población infantil y juvenil (objetivo 2)*

3.2 Fuentes de información y estrategias de búsqueda para identificar documentos y estudios

Nuestra principal fuente de búsqueda ha sido la base de datos Epistemonikos (https://www.epistemonikos.org), una base de datos completa de revisiones sistemáticas y otros tipos de evidencia, mantenida mediante la selección de múltiples fuentes de información para identificar revisiones sistemáticas y sus estudios primarios ya incluidos en bases de datos como: Cochrane Base de datos de revisiones sistemáticas, Pubmed / MEDLINE, EMBASE, CINAHL, PsycINFO, LILACS, DARE, base de datos HTA, base de datos Campbell, base de datos JBI de revisiones sistemáticas e informes de implementación, biblioteca de pruebas del Centro EPPI (35).

Se ha realizado una búsqueda adicional en PubMed para identificar ensayos aleatorios / estudios primarios no incluidos en las revisiones sistemáticas.

Se han consultado los registros ClinicalTrials.gov, clinical Trials Registry Platform (ICTRP) y PROSPERO para detectar estudios en marcha.

En el Apéndice 1 se muestra la estrategia de búsqueda.

3.3 Selección de estudios, recogida de datos, síntesis de resultados y análisis

3.3.1 Uso de la plataforma L.OVE (Living OVerview of Evidence)

Los resultados de la búsqueda de literatura se incorporan automáticamente a la plataforma L · OVE (recuperación automatizada a través de COVID-19 Evidence https://app.iloveevidence.com/loves/5e6fdb9669c00e4ac072701d?utm=epdb_en) (36), que se alimenta de Epistemonikos, donde los títulos y resúmenes han sido evaluados de forma independiente por dos técnicos en función de los criterios de inclusión.

Se han obtenido los informes completos de todos los que parezcan cumplir con los criterios de inclusión o requieran un análisis adicional para decidir sobre su inclusión.

Se ha diseñado una figura donde se describe el diagrama de flujo PRISMA adaptado donde se han registrado las razones para excluir los estudios en cualquier etapa de la búsqueda y el proceso de selección.

Las referencias bibliográficas finales han sido importadas al gestor de referencias Mendeley.

Se ha llevado a cabo una extracción de datos y una evaluación de la calidad metodológica/riesgo de sesgo a partir de los estudios seleccionados para el informe por un/a revisor/a.

Evaluación de calidad metodológica/riesgo de sesgo de las revisiones sistemáticas incluidas: dos autores de la revisión han evaluado de forma independiente el riesgo de sesgo de los estudios utilizando la herramienta AMSTAR2 (37).

Recopilación y presentación de datos de riesgo de sesgo de los estudios primarios contenidos en las revisiones sistemáticas incluidas: para los estudios primarios relevantes contenidos en cada revisión sistemática incluida, hemos extraído las evaluaciones que se presentan. Y hemos presentado los resultados de las evaluaciones en resúmenes narrativos y tabulados.

Recopilación y presentación de datos de riesgo de sesgo de los estudios primarios no contenidos en las revisiones sistemáticas incluidas: para aquellos estudios primarios no incluidos en las revisiones sistemáticas, se propuso utilizar la herramienta Robins-I (38) (estudios observacionales de cohortes) y para evaluar la relevancia y credibilidad de los estudios de modelización, el cuestionario ISPOR (39).

Recopilación y presentación de datos sobre las características descriptivas de las revisiones sistemáticas incluidas (y sus estudios primarios): para cada revisión sistemática (y estudios primarios relevantes), se han extraído las siguientes características descriptivas:

- Información básica sobre revisiones sistemáticas: título; autores; año de publicación; última fecha evaluada como actualizada; número de estudios y participantes incluidos en la revisión sistemática.
- Información básica sobre estudios primarios (por ejemplo, autores; año de publicación; diseño del estudio; país de publicación).
- Estrategias de búsqueda de revisiones sistemáticas (por ejemplo, número de bases de datos buscadas; nombres de las bases de datos buscadas; rangos de fechas de las bases de datos buscadas; fecha de la última actualización de la búsqueda).
- Población (s) de revisión sistemática (por ejemplo, características de los participantes).
- Intervenciones descritas en la revisión sistemática:
    - Tipo de intervención: si el cierre de escuelas ha sido total o parcial
    - Tipo de centro educativo
    - Periodo de cierre (año, mes inicio y año, mes finalización)
    - Situación epidemiológica en el momento de la intervención
    - Si se realizó la intervención de interés acompañada de otras intervenciones no farmacológicas
- Comparadores que se describen en las revisiones sistemáticas
- Resultados primarios y secundarios (los de interés para el presente informe descritos en el apartado 3.1).
- Información adicional (por ejemplo, comentarios del autor de la descripción general, limitaciones de la revisión sistemática y calidad metodológica / riesgo de sesgo).

Se ha realizado una síntesis narrativa y tabulada de las medidas de resultados, previamente explicitadas de acuerdo con la Guía para la elaboración y adaptación de informes rápidos de evaluación de tecnología sanitaria (ETS) desarrollada en la Red Española de Agencias de ETS y Prestaciones del SNS (40), la colaboración Cochrane (41); que será organizada siguiendo las directrices de la declaración PRISMA para *scoping reviews* (42).

Como limitaciones a este abordaje metodológico, es posible que no se incluyan en el análisis estudios relevantes por no estar publicados (sesgo de publicación) o porque las revistas en las que fueron publicados no estén indexadas en las bases de datos electrónicas empleadas.

4. Resultados

Del total de las revisiones sistemáticas identificadas a través de la plataforma L.OVE (n=64), finalmente 4 cumplían los criterios de inclusión.

Posteriormente, se hizo una búsqueda en Pubmed (ver Annexo 1) para detectar estudios primarios publicados con fecha posterior a la revisión sistemática más actualizada (43), cuyo período de inclusión finalizaba el 07/01/2021. De los 9 estudios detectados, se desestimaron todos en la fase de cribado por título y resumen por no cumplir con los criterios de inclusión.

El diagrama de selección se muestra en el Anexo 2.

A partir de estas revisiones sistemáticas, se ha realizado una matriz de evidencia (Anexo 4) para determinar los estudios primarios que dan respuesta a la pregunta de investigación y de los cuales se ha extraído la información de las tablas de resultado. Por otra parte, se ha extraído la información de 1 estudio primario (44) de una revisión sistemática que, aunque no cumplía los criterios de inclusión (45), ha servido para detectar estudios primarios.

El total de estudios primarios que daban respuesta a la pregunta de investigación ha sido 54.

Para el presente informe no se han incluido estudios de modelización. Los estudios de modelización se publicaron al inicio de la pandemia por la falta de datos de la vida real y por la necesidad de mostrar proyecciones para ayudar a la toma de decisiones ante un escenario de incerteza, pero estudios posteriores mostraron que muchos de estos modelos tenían importantes limitaciones (46). De los estudios primarios incluidos, ninguno de ellos se trataba de estudios de modelización, ya que, por una parte, era un criterio de exclusión en la mayoría de revisiones sistemáticas y, por otro, dada la evolución de la pandemia y la disponibilidad de datos, se ha priorizado la inclusión de aquellos estudios observacionales con datos reales.

Las características de las revisiones sistemáticas se presentan en la Tabla 5.1 y las de los estudios primarios en la Tabla 5.2 (Anexo 5).

De los estudios primarios, 25 de ellos daban respuesta al resultado primario incidencia (nuevos casos), 1 hacía referencia a las hospitalizaciones, 15 a mortalidad y 17 daban resultados sobre parámetros relacionadas con la evolución de la pandemia como la Rt. En 4 estudios se describían datos sobre la salud mental de los menores.

4.1 Calidad de las revisiones sistemáticas

De las 4 revisiones sistemáticas, 2 presentaban una calidad alta (43, 47) (ver resultados AMSTAR-2 en Apéndice 3).

4.2 Calidad de los estudios primarios

De aquellos estudios primarios incluidos en las revisiones sistemáticas que cumplían los criterios de inclusión, se ha utilizado la evaluación del riesgo de sesgo realizada por los propios autores (ver Tabla 5.2 del Anexo 5). La mayoría de los estudios presentaban un riesgo de sesgo alto-moderado.

Se realizó una estimación del riesgo de sesgo tras lectura crítica del único estudio no incluido en las revisiones sistemáticas que cumplían los criterios de inclusión (44). En este estudio se realizó un estudio transversal para describir los síntomas relacionados con la salud mental de niños y adolescentes en Wuhan y se considera que presenta un riesgo de sesgo moderado.

4.3 Efectos del cierre de escuelas en el control de la pandemia por COVID-19

La Tabla 5.4.1 muestra los resultados de los estudios para control de la pandemia, centrados la mayoría en la primera ola, con resultados heterogéneos y contradictorios sobre el impacto del cierre de escuelas en el control de la evolución de la pandemia. En la mayoría de estudios se ha detectado el término “cierre de escuelas” sin diferenciar el efecto individualizado del tipo de escuela.

4.4 Efectos del cierre de escuelas en la salud mental de los menores

La Tabla 5.4.2 muestra los resultados del efecto del cierre de escuelas en la salud mental. La mayoría de estudios muestran efectos negativos, en forma de aumento de síntomas de estrés, ansiedad y depresión, pero con la limitación de su efecto a largo plazo.

En los estudios incluidos no se encontraban resultados sobre calidad de vida.

4.5 Recomendaciones de informes publicados por organismos internacionales

Tanto la OMS, UNESCO como ECDC han publicado informes a lo largo de la pandemia sobre las INF a poner en marcha, incluyendo el cierre de escuelas.

La OMS ha desarrollado una herramienta para informar a países de todas las recomendaciones realizadas desde el inicio de la pandemia(48). Dentro de esta herramienta se han detectado los siguientes documentos que mencionan el cierre de escuelas:

- El 7 de marzo de 2020 se publican las consideraciones relacionadas con las INF a tener en cuenta en función de la situación epidemiológica, incluyendo el cierre de escuelas.
- El 14 de abril de 2020, la OMS informa del impacto negativo en la salud y en las oportunidades de los niños y niñas al mantener las escuelas cerradas durante largo tiempo.
- El 10 de mayo de 2020 se publican las consideraciones sobre cuándo cerrar y reabrir las escuelas

En cuanto a UNESCO, en el Apéndice 2 se detalla la **cronología del cierre de escuelas** desde el inicio de la pandemia(49).

Sobre ECDC, se han publicado informes de evaluación del riesgo desde enero de 2020. Se han seleccionado 6 informes (junto a una infografía) donde se hace mención explícita al cierre de escuelas como INF:

- En el informe del 2 de marzo de 2020 se recomendaba la implementación de medidas de distanciamiento social (INF), como el cierre de escuelas, con el objetivo de cortar la cadena de transmisión a los países de la Unión Europea (UE)/Área Económica Europea (EEA) al considerar que se encontraba en una situación epidemiológica correspondiente a escenario 1 (muchos nuevos casos, pero con transmisión local limitada) que rápidamente podría evolucionar a escenario 2 (número creciente de nuevos casos y generalizados con transmisión localizada de persona a persona, es decir, más de dos generaciones de casos fuera de grupos esporádicos con vínculos epidemiológicos conocidos) (50). Durante los siguientes informes de evaluación del riesgo, las recomendaciones sobre INF fueron incrementando hasta el confinamiento territorial.
- En junio de 2020, se publicaron guías para que los países realizaran la revisión de las INF (incluido el cierre de escuelas) para controlar la pandemia (51).
- El 11 de junio de 2020, tras la reapertura de centros educativos en varios países europeos, se publicó un informe de evaluación de riesgo en el que se describía que el cierre de escuelas tenía una efectividad cuestionable y que se tuvieran en cuenta los efectos negativos (52).
- El 6 de agosto del 2020, se publica una infografía y el correspondiente informe donde se describe que el cierre de las escuelas debe ser el último recurso para controlar la pandemia y que si se toman las medidas adecuadas, las escuelas no suponen un gran riesgo de infección y es poco probable que impulse la transmisión en la comunidad (53).
- En el informe del 8 de julio de 2021 (54), se describe que el consenso general sigue siendo que la decisión de cerrar las escuelas para controlar la pandemia de COVID-19 debe utilizarse como último recurso.
- El último informe del riesgo del 30 de septiembre 2021 describe que dependiendo de la situación epidemiológica local y de cobertura de vacunación contra COVID-19, aún serán necesarias INF (sin especificar el cierre de escuelas) desde ahora hasta finales de noviembre de 2021 para controlar la circulación y el impacto de la variante Delta. Además añade que dado el riesgo continuo de transmisión entre los niños no vacunados, se requieren altos niveles de prevención y preparación en el sistema educativo, sin mencionar su cierre (55).

4.6 Estudio en marcha

Tras consultar el registro de revisiones sistemáticas PROSPERO, se han detectado los siguientes protocolos en marcha:

Relacionado con el cierre de escuelas:

Berit Lange, Jördis Ott, Sudip Jung Karki. 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 2021 CRD42021231866 Disponible en:

https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42021231866

Se ha detectado un protocolo sobre el impacto de la reapertura de los centros educativos en la incidencia en la comunidad:

Luis Carlos Lopes-Junior, Priscila Carminati Siqueira, Ethel Leonor Noia Maciel. School reopening and risks accelerating the COVID-19 pandemic: a systematic review and meta-analysis of the observational studies. PROSPERO 2021 CRD42021265283 Disponible en:

https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42021265283

Se ha detectado un protocolo sobre el impacto del cierre de escuelas en la salud de menores durante la pandemia, en esta ocasión, en Pubmed:

Hu D, Zhang H, Sun Y, Li Y. The effects of the measures against COVID-19 pandemic on physical activity among school-aged children and adolescents (6–17 years) in 2020: A protocol for systematic review. PLoS One [Internet]. 2021 Jul 1 [cited 2021 Oct 7];16(7):e0255520. Disponible en:

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0255520

5. Discusión

Durante los meses de marzo y mayo del 2020, tras la declaración de la pandemia por parte de la OMS, alrededor de 200 países en todo el mundo cerraron los centros educativos, lo que supuso el cierre de aproximadamente el 90% de los centros a nivel mundial, durante una media de 60 días (56), como medida para controlar la evolución de la pandemia, junto a otras INF. Los cierres de centros educativos (principalmente escuelas) se han realizado en diferentes contextos geográficos (a nivel nacional, regional, local) o han sido reactivos a la detección de casos. Este cierre ha sido total o parcial en algunas situaciones (56).

Una vez que la incidencia empezó a disminuir, en algunos países se procedió a la apertura de las escuelas, con medidas de mitigación en los centros, y manteniendo otras INF (57).

En España, las comunidades autónomas anunciaron a mediados de marzo del 2020 el cierre temporal de las escuelas a causa de la emergencia sanitaria causada por el coronavirus. Además, ha sido uno de los pocos países que logró mantener los colegios abiertos durante el curso escolar 2020/2021, y solo se retrasó puntualmente la reapertura de los centros escolares de todos los niveles educativos.

A la fecha de finalización del informe, un año y medio después del inicio de la pandemia de COVID-19, alrededor de 60 millones de alumnos siguen afectados por el cierre parcial o total de las escuelas. En este periodo, España es de los países que menos tiempo ha tenido cerrados los centros, con un total de 15 semanas, mientras que en América Latina los colegios han tenido el periodo de cierre más largo del mundo (ver Anexo 2 "Cronología del cierre de escuelas durante la pandemia por COVID-19").

Sin embargo, el cierre de los centros educativos ha supuesto consecuencias negativas en el bienestar y educación de los niños y niñas y adolescentes, lo que puede suponer un impacto a largo plazo en sus oportunidades y en su salud. Además, el cierre ha exacerbado las desigualdades, lo que ha supuesto un impacto mayor en aquellos colectivos socioeconómicamente más vulnerables (49).

Efectos del cierre de escuelas en el control de la pandemia por COVID-19

Aquellos estudios con riesgo de sesgo bajo también mostraron efectos contradictorios de la medida, con algunos mostrando que el cierre de escuelas pudo estar relacionado con el descenso de la transmisión, pero otros, que no hubo efecto (ver Tabla 5.4.1).

Dada la dificultad para obtener resultados robustos sobre el impacto del cierre de escuelas en la primera ola, una aproximación indirecta para obtener evidencia podría ser el análisis del impacto de la reapertura de los centros educativos (aunque no ha sido el objetivo principal del presente informe). En la revisión sistemática de Walsh et al. (43) se incluyeron estudios sobre el impacto de la reapertura, analizados de forma separada de aquellos estudios que estimaban el impacto del cierre de escuelas en la pandemia. Aquellos estudios que tuvieron un riesgo de sesgo menor mostraron en la mayoría de casos que tras la reapertura no hubo un aumento de la incidencia o que en el caso de haberlo habido, se produjo en aquellos estados donde la incidencia ya estaba elevada de base (58-60).

Efectos del cierre de escuelas en la salud mental y física de niños/as y adolescentes

La educación debe buscar brindar una educación integral, tratando de ayudar al desarrollo físico, emocional, intelectual, familiar, social y moral. El cierre de las escuelas ha supuesto un riesgo potencial para el desarrollo emocional, físico e intelectual en los/as niños/as y adolescentes, pero los estudios incluidos no han valorado su efecto a largo plazo.

Aspectos relacionados con el cierre de escuelas a tener en cuenta para determinar su impacto en el control de la pandemia

Inicialmente, la estrategia del cierre de escuelas se basó en la evidencia previa de la pandemia por gripe, donde por ejemplo la revisión sistemática realizada en Reino Unido en 2014 (61) concluía que un cierre de escuelas precoz podía reducir la transmisión comunitaria de la gripe, ya que la población infantil es un grupo vulnerable a la morbilidad y desempeña un papel importante en la propagación de la infección (62).

Sin embargo, durante la primera ola, los datos disponibles para COVID-19 indicaban que los niños (menores de 18 años) y los adolescentes (10-19 años) eran menos susceptibles que los adultos mayores, no parecían impulsar significativamente la transmisión y eran una pequeña fracción del total de casos de COVID-19 (63).

Como en toda intervención compleja, existen algunos aspectos a tener en cuenta a la hora de tomar la decisión de cerrar escuelas. Aunque no ha sido el objetivo principal de la presente revisión y tras la lectura de las conclusiones de la mayoría de revisiones sistemáticas incluidas, se mencionan a continuación los aspectos a tener en cuenta para valorar el cierre de escuelas como medida para el control de la pandemia por COVID-19, como son las posibles dinámicas de transmisibilidad entre la población infantil o de la población infantil a la adulta, la transmisibilidad entre niños/as y adolescentes y el impacto de los contagios en escuelas como impulsores de la transmisión en la población. También hay que tener en cuenta la situación epidemiológica en la que se encuentre esa región y las medidas tomadas en los centros educativos para prevenir, detectar y controlar los contagios a la hora de valorar su cierre/apertura.

Propuestas de organismos como la OMS- UNESCO y ECDC

Aunque al inicio de la pandemia se incluía el cierre de escuelas como una de las primeras medidas a llevar a cabo, a medida que la pandemia fue evolucionando y se fue obteniendo mayor evidencia, estas recomendaciones fueron variando hasta considerar el cierre de las escuelas como una de las últimas medidas a llevar a cabo para controlar/ mitigar el efecto de la pandemia, tanto para la ECDC, como para la OMS y UNESCO.

Según el documento de consideraciones publicado por la OMS y consensuado con UNICEF (64), la decisión de cerrar, cerrar parcialmente o reabrir escuelas debe estar guiada por un enfoque basado en el riesgo para maximizar el beneficio educativo y de salud para los estudiantes, maestros, personal y la comunidad en general, y ayudar a prevenir un nuevo brote de COVID-19 en la comunidad. Los factores a considerar en una evaluación general de riesgos para la salud incluyen factores epidemiológicos, el sistema de salud y las capacidades de salud pública, la participación de la comunidad y la capacidad del gobierno para mantener el apoyo social y económico a los más vulnerables. En un marco para la reapertura de escuelas, los socios destacaron seis dimensiones clave a considerar al planificar: política, financiamiento, operaciones seguras, aprendizaje, llegar a los más marginados y al bienestar / protección. Las autoridades nacionales pueden facilitar un enfoque basado en el riesgo a nivel local ofreciendo procedimientos operativos estándar o listas de verificación para escuelas, según la epidemiología y las condiciones locales. Los tomadores de decisiones deben considerar lo siguiente al decidir si abrir o cerrar escuelas:

- Conocimiento actual sobre la transmisión y la gravedad del COVID-19 en los niños
- Situación local y epidemiología de COVID-19 donde se ubican las escuelas
- Entorno escolar y capacidad para mantener las medidas de prevención y control de COVID-19

Los factores adicionales a considerar al decidir cómo o cuándo cerrar o reabrir parcialmente las escuelas incluyen evaluar qué daño podría ocurrir debido al cierre de la escuela (por ejemplo, riesgo de no regresar a la escuela, mayor disparidad en el nivel educativo, acceso limitado a las comidas, violencia agravada por incertidumbres económicas, etc.), y la necesidad de mantener las escuelas al menos parcialmente abiertas para los niños cuyos cuidadores son 'trabajadores clave' para el país.

También para ECDC (54), si bien el cierre de escuelas es una medida de último recurso, puede contribuir a una reducción en la transmisión del SARS-CoV-2, pero son por sí mismos insuficientes para prevenir la transmisión comunitaria de COVID-19 en ausencia de otras INF y la expansión de la cobertura de vacunación.

5.1 Limitaciones de los estudios publicados

Una de las principales limitaciones ha sido la falta de concreción en la definición de la intervención (cierre de escuelas). Ha faltado información sobre en qué momento de la evolución de la pandemia se puso en marcha, durante cuánto tiempo, qué INF se aplicaron al mismo tiempo, si fue parcial o total, en qué contexto (nacional, regional, local o reactivo a casos detectados) y el grado de implementación. En algunos estudios, el cierre de escuelas (o centros educativos) constaba como parte del "lockdown" por lo que se estudió de forma agregada con otras medidas sin poder extraer los datos sobre el impacto de la medida de forma individual (este tipo de estudios se excluyeron en el análisis del presente informe).

Otra limitación ha sido la heterogeneidad del diseño y análisis estadístico empleado. La mayoría de estudios han sido ecológicos (unidad de análisis corresponde a nivel nacional o regional). Se han utilizado modelos de regresión, aproximación Bayesiana, se han usado comparadores sintéticos, se han hecho análisis pre-post, series temporales y aproximaciones a través del uso de inteligencia artificial, por lo que hace difícil la comparación de los resultados entre los estudios.

Por otra parte, la mayoría de estudios en los cuales se han basado las revisiones sistemáticas presentan un riesgo de sesgo moderado o elevado, por lo que se dificulta la interpretación de los resultados (es decir, el efecto observado podría ser por otros factores).

No se ha encontrado información sobre el impacto específico de cierres educativos de otra índole como academias o autoescuelas.

5.2 Limitaciones de los estudios publicados

La decisión de poner en marcha INF y de retirarlas ha supuesto un reto para todos los países a la hora de controlar la pandemia, con gran heterogeneidad y variabilidad en su aplicación, por lo que aprender sobre el impacto de estas medidas es sumamente importante tanto para informar de decisiones futuras como para construir predicciones de cómo evolucionará la pandemia.

Existen varios métodos en epidemiología que estiman el impacto de las intervenciones, pero la mayoría son métodos que analizan una única intervención, en un único lugar en un determinado periodo temporal.

En el presente informe, la mayoría de estudios detectados han puesto de manifiesto las dificultades para obtener conclusiones robustas a partir de ellos, ya sea por el tipo de diseño como por la disponibilidad y calidad de datos para los análisis, como la dificultad de estimar el efecto de una única INF a partir de situaciones donde se ponían en marcha varias intervenciones a la vez y de forma heterogénea.

Para responder a la pregunta de cuál es el efecto de esta INF en el control de la pandemia no se pueden realizar ensayos aleatorizados, por lo que para tomar decisiones nos tendremos que basar en los resultados de estudios realizados con datos de la población (estudios observacionales).

El diseño de este tipo de estudios, sin embargo, podría emular el ensayo que hipotéticamente se tendría que hacer para responder a la pregunta. Es lo que se llama la "emulación del ensayo diana" *(o target-trial emulation) (65)* y se ha utilizado para, a través de estudios observacionales, tomar decisiones que han influido, por ejemplo, a la hora de implementar programas de vacunas, ya que se obtuvieron resultados en situaciones en las que los ensayos clínicos no acabaron de dar respuesta (66). La adaptación de este tipo de diseños a la evaluación de estas intervenciones (y otras políticas) es lo que algunos autores han llamado *"policy trial emulation"* : la idea principal es construir "target trials" para cada "cohorte tratada" (es decir, lugares donde se implementa la misma intervención al mismo tiempo) y después agregarlas y se han utilizado para valorar el impacto del confinamiento en algunas regiones de Estados Unidos (67).

Además, la calidad y disponibilidad de datos es fundamental para poner en marcha este tipo de estudios, por lo que iniciativas como el desarrollo del lago de datos en salud que se ha propuesto (68), junto con el conocimiento y experiencia en estudios observacionales complejos como los descritos en el anterior párrafo, será fundamental para llevar a cabo este tipo de estudios.

6. Conclusiones

La evidencia del impacto de las INF en conjunto ha quedado demostrada para el control de la evolución de la pandemia por COVID-19, pero el efecto concreto del cierre de escuelas no ha podido determinarse en la primera ola debido a la implementación solapada de otras INF y del importante riesgo de sesgo de la mayoría de los estudios publicados y de los resultados contradictorios.

Sin embargo, a lo largo de la evolución de la pandemia, los estudios realizados en regiones/localizaciones con baja incidencia de casos donde se realizó una apertura controlada de los centros educativos, se observó que no implicaba un aumento en el número de casos en la comunidad.

Teniendo en cuenta que el cierre de los centros educativos ha supuesto un impacto negativo en la salud mental de una población vulnerable como es la infancia y la adolescencia y que la reapertura de los centros educativos durante la pandemia (de forma controlada) no se ha considerado el responsable principal del aumento de casos en la comunidad, junto a la experiencia exitosa de países, donde se mantuvieron abiertas las escuelas mientras se procedía a implementar otras INF durante toda la pandemia por COVID-19, y de acuerdo con las recomendaciones de ECDC y OMS-UNESCO, el cierre de escuelas debería considerarse como la última medida a implementar para controlar la pandemia por COVID-19 y tener en cuenta factores como la situación epidemiológica y el impacto de otras INF antes de poner en marcha el cierre de escuelas.

7. Actualización

Debido a que el cierre parcial o total de escuelas se sigue aplicando en diversos países de forma heterogénea, la campaña de vacunación con una cobertura desigual y la irrupción de nuevas variantes del virus pueden afectar la evolución de la pandemia, es esperable que se publique nueva evidencia. Con el fin de mantener una actualización adecuada, se utilizará la plataforma de evidencia COVID-19 https://app.iloveevidence.com/loves/5e6fdb9669c00e4ac072701d?utm=epdb_en , donde se ha creado una alerta específica y dispone de sistemas que incorporan de forma inmediata nuevos estudios publicados relacionados con la intervención descrita. Siempre que se identifiquen nueva evidencia relevante para la revisión, extraeremos los datos y evaluaremos el riesgo de sesgo, según corresponda. Esperaremos hasta que la evidencia acumulada cambie uno o más de los siguientes componentes de la revisión antes de incorporarla y volver a publicar la revisión:

- Los hallazgos de uno o más resultados de interés
- La credibilidad de uno o más resultados
- Nuevos entornos, poblaciones, intervenciones, comparaciones o resultados estudiados

8.Bibliografía

1. World Health Organization. Q&As on COVID-19 and related health topics: WHO; 2022 [Disponible en: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub.]
2. World Health Organization. WHO Coronavirus (COVID-19) dashboard with vaccination data Geneve: WHO; 2022 [03-02-2022]. [Disponible en: https://covid19.who.int.]
3. World Health Organization. Strategic and Technical Advisory Group for Infectious Hazards (STAG-IH) Geneve: WHO; 2021 [Disponible en: https://www.who.int/groups/strategic-and-technical-advisory-group-for-infectious-hazards.]
4. Flaxman S, Mishra S, Gandy A, Unwin HJT, Mellan TA, Coupland H, et al. Estimating the effects of non-pharmaceutical interventions on COVID-19 in Europe. Nature. 2020;584(7820):257-61.
5. Centers for Disease Control and Prevention. Nonpharmaceutical interventions (NPIs): Centers for Disease Control and Prevention; 2020 [actualizado 27-04-2020.]
6. European Centre for Disease Prevention and Control. COVID-19. Situation updates Stockholm: ECDC; 2022 [Disponible en: https://www.ecdc.europa.eu/en/covid-19.]
7. Furuse Y, Sando E, Tsuchiya N, Miyahara R, Yasuda I, Ko YK, et al. Clusters of coronavirus disease in communities, Japan, January-April 2020. Emerg Infect Dis. 2020;26(9):2176-9.
8. Guner R, Hasanoglu I, Aktas F. COVID-19: Prevention and control measures in community. Turk J Med Sci. 2020;50(SI-1):571-7.
9. Bo Y, Guo C, Lin C, Zeng Y, Li HB, Zhang Y, et al. Effectiveness of non-pharmaceutical interventions on COVID-19 transmission in 190 countries from 23 January to 13 April 2020. Int J Infect Dis. 2021;102:247-53.
10. Post RAJ, Regis M, Zhan Z, van den Heuvel ER. How did governmental interventions affect the spread of COVID-19 in European countries? BMC Public Health. 2021;21(1):411.
11. Liu Y, Morgenstern C, Kelly J, Lowe R, Group CC-W, Jit M. The impact of non-pharmaceutical interventions on SARS-CoV-2 transmission across 130 countries and territories. BMC Med. 2021;19(1):40.
12. Teslya A, Pham TM, Godijk NG, Kretzschmar ME, Bootsma MCJ, Rozhnova G. Impact of self-imposed prevention measures and short-term government-imposed social distancing on mitigating and delaying a COVID-19 epidemic: A modelling study. PLoS Med. 2020;17(7):e1003166.
13. Kim S, Ko Y, Kim YJ, Jung E. The impact of social distancing and public behavior changes on COVID-19 transmission dynamics in the Republic of Korea. PLoS One. 2020;15(9):e0238684.
14. Brauner JM, Mindermann S, Sharma M, Johnston D, Salvatier J, Gavenciak T, et al. Inferring the effectiveness of government interventions against COVID-19. Science. 2021;371(6531).
15. Pung R, Chiew CJ, Young BE, Chin S, Chen MIC, Clapham HE, et al. Investigation of three clusters of COVID-19 in Singapore: implications for surveillance and response measures. The Lancet. 2020;395(10229):1039-46.
16. Perra N. Non-pharmaceutical interventions during the COVID-19 pandemic: A review. Phys Rep. 2021;913:1-52.
17. Islam N, Sharp SJ, Chowell G, Shabnam S, Kawachi I, Lacey B, et al. Physical distancing interventions and incidence of coronavirus disease 2019: natural experiment in 149 countries. BMJ. 2020;370:m2743.
18. Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schünemann HJ, 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. The Lancet. 2020;395(10242):1973-87.

19. Hayward AC, Beale S, Johnson AM, Fragaszy EB, Flu Watch G. Public activities preceding the onset of acute respiratory infection syndromes in adults in England - implications for the use of social distancing to control pandemic respiratory infections. Wellcome Open Res. 2020;5:54.

20. Haug N, Geyrhofer L, Londei A, Dervic E, Desvars-Larrive A, Loreto V, et al. Ranking the effectiveness of worldwide COVID-19 government interventions. Nat Hum Behav. 2020;4(12):1303-12.

21. Kim EA. Social distancing and public health guidelines at workplaces in Korea: responses to Coronavirus Disease-19. Saf Health Work. 2020;11(3):275-83.

22. Courtemanche C, Garuccio J, Le A, Pinkston J, Yelowitz A. Strong social distancing measures in the United States reduced The COVID-19 growth rate. Health Aff (Millwood). 2020;39(7):1237-46.

23. Kaur S, Bherwani H, Gulia S, Vijay R, Kumar R. Understanding COVID-19 transmission, health impacts and mitigation: timely social distancing is the key. Environ Dev Sustain. 2020;23(5):1-17.

24. Prem K, Liu Y, Russell TW, Kucharski AJ, Eggo RM, Davies N, et al. The effect of control strategies to reduce social mixing on outcomes of the COVID-19 epidemic in Wuhan, China: a modelling study. Lancet Public Health. 2020;5(5):e261-e70.

25. Kraemer MUG, Yang CH, Gutierrez B, Wu CH, Klein B, Pigott DM, et al. The effect of human mobility and control measures on the COVID-19 epidemic in China. Science. 2020;368(6490):493-7.

26. Hsiang S, Allen D, Annan-Phan S, Bell K, Bolliger I, Chong T, et al. The effect of large-scale anti-contagion policies on the COVID-19 pandemic. Nature. 2020;584(7820):262-7.

27. Dehning J, Zierenberg J, Spitzner FP, Wibral M, Neto JP, Wilczek M, et al. Inferring change points in the spread of COVID-19 reveals the effectiveness of interventions. Science. 2020;369(6500).

28. Gatto M, Bertuzzo E, Mari L, Miccoli S, Carraro L, Casagrandi R, et al. Spread and dynamics of the COVID-19 epidemic in Italy: Effects of emergency containment measures. Proc Natl Acad Sci U S A. 2020;117(19):10484-91.

29. Chernozhukov V, Kasahara H, Schrimpf P. Causal impact of masks, policies, behavior on early covid-19 pandemic in the U.S. J Econom. 2021;220(1):23-62.

30. Instituto de Efectividad Clínica y Sanitária. Instituto de efectividad clínica y sanitaria Montevideo: IECS; 2022 [Disponible en: https://www.iecs.org.ar.]

31. Ma H, Hu J, Tian J, Zhou X, Li H, Laws MT, et al. A single-center, retrospective study of COVID-19 features in children: a descriptive investigation. BMC Med. 2020;18(1):123.

32. World Health Organization. Overview of public health and social measures in the context of COVID-19. Interim guidance. Geneve; 2020 18-05-2020. Contract No.: May.

33. European Centre for Disease and Control. COVID-19 in children and the role of school settings in COVID-19 transmission Stockholm: ECDC; 2020 [31-]. [Disponible en: https://www.ecdc.europa.eu/en/publications-data/threat-assessment-emergence-and-impact-sars-cov-2-delta-variant.]

34. World Health Organization. Schooling during the COVID-19. Recommendations from the European Technical Advisory Group for schooling during COVID-19. Geneva: WHO; 2021.

35. Rada G, Perez D, Araya-Quintanilla F, Avila C, Bravo-Soto G, Bravo-Jeria R, et al. Epistemonikos: A comprehensive database of systematic reviews for health decision-making. BMC Med Res Methodol. 2020;20(1):286.

36. Rada G, Verdugo-Paiva F, Avila C, Morel-Marambio M, Bravo-Jeria R, Pesce F, et al. Evidence synthesis relevant to COVID-19: a protocol for multiple systematic reviews and overviews of systematic reviews. Medwave. 2020;20(3):e7868.

37. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: A critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017;358:j4008.

38. Sterne JA, Hernan MA, Reeves BC, Savovic J, Berkman ND, Viswanathan M, et al. ROBINS-I: A tool for assessing risk of bias in non-randomised studies of interventions. BMJ. 2016;355:i4919.

39. Jaime Caro J, Eddy DM, Kan H, Kaltz C, Patel B, Eldessouki R, et al. Questionnaire to assess relevance and credibility of modeling studies for informing health care decision making: an ISPOR-AMCP-NPC Good Practice Task Force report. Value Health. 2014;17(2):174-82.

40. Puñal-Riobóo J, Baños Álvarez E, Varela Lema L, Castillo Muñoz M, Atienza Merino G, Ubago Pérez R, et al. Guía para la elaboración y adaptación de informes rápidos de evaluación de tecnologías sanitarias. Santiago de Compostela, Madrid: Agencia Gallega para la Gestión del Conocimientoto en Salud (Avalia-T); Ministerio de Sanidad, Servicios Sociales e Igualdad; 2016.

41. Higgins JP, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, et al. Cochrane handbook for systematic reviews of interventions: John Wiley & Sons; 2019.

42. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. Ann Intern Med. 2018;169(7):467-73.

43. Walsh S, Chowdhury A, Braithwaite V, Russell S, Birch JM, Ward JL, et al. Do school closures and school reopenings affect community transmission of COVID-19? A systematic review of observational studies. BMJ Open. 2021;11(8):e053371.

44. Xue Q, Zhou Y, Zhu K, Liu Q, Zhang J, Song R. Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei province, China. JAMA Pediatrics. 2020;9(1):143-55.

45. Araujo LA, Veloso CF, Souza MC, Azevedo JMC, Tarro G. The potential impact of the COVID-19 pandemic on child growth and development: a systematic review. J Pediatr (Rio J). 2021;97(4):369-77.

46. Childs ML, Kain MP, Harris MJ, Kirk D, Couper L, Nova N, et al. The impact of long-term non-pharmaceutical interventions on COVID-19 epidemic dynamics and control: the value and limitations of early models. Proc Biol Sci. 2021;288(1957):20210811.

47. Ayouni I, Maatoug J, Dhouib W, Zammit N, Fredj SB, Ghammam R, et al. Effective public health measures to mitigate the spread of COVID-19: a systematic review. BMC Public Health. 2021;21(1):1015.

48. World Health Organization. Timeline of WHO's response to COVID-19 Geneve: WHO; 2022 [Disponible en: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline.]

49. UNESCO, UNICEF, World Bank. What have we learnt? Overview of findings from a survey of ministries of education on national responses to COVID-19. Paris, New York, Florence, Washington DC: United Nations Educational, Scientific and Cultural Organization; United Nations Children's Fund; UNICEF Office of Research; International Bank for Reconstruction and Development / The World Bank; 2020.

50. European Centre for Disease Prevention and Control. Rapid risk assessment: Novel coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – sixth update Stockholm: ECDC; 2020 [actualizado 12-03-2020. Disponible en: https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-novel-coronavirus-disease-2019-covid-19-pandemic-increased.]

51. European Centre for Disease Prevention and Control. Conducting in-action and after-action reviews of the public health response to COVID-19 Stockholm: ECDC; 2020 [actualizado 04-06-2021. Disponible en: https://www.ecdc.europa.eu/en/publications-data/conducting-action-and-after-action-reviews-public-health-response-covid-19.]

52. European Centre for Disease Prevention and Control. Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – tenth update Stockholm: ECDC; 2020 [actualizado 11-06-2020. Disponible en: https://www.ecdc.europa.eu/sites/default/files/documents/RRA-COVID19-update10-2020-06-11.pdf.]

53. European Centre for Disease Prevention and Control. Infographic: COVID-19 in children and the role of schools Stockholm: ECDC; 2020 [actualizado 06-08-2020. Disponible en: https://www.ecdc.europa.eu/en/publications-data/infographic-covid-19-children-and-role-schools.]

54. European Centre for Disease Prevention and Control. COVID-19 in children and the role of school settings in transmission - second update Stockholm: ECDC; 2021 [actualizado 08-06-2021. Disponible en: https://www.ecdc.europa.eu/en/publications-data/children-and-school-settings-covid-19-transmission.

55. European Centre for Disease Prevention and Control. Assessing SARS-CoV-2 circulation, variants of concern, non-pharmaceutical interventions and vaccine rollout in the EU/EEA, 16th update: ECDC; 2021 [actualizado 30-09-2021. Disponible en: https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-assessing-sars-cov-2-circulation-variants-concern.]

56. United Nations Educational SaCO. Education: From disruption to recovery: UNESCO; 2022 [Disponible en: https://en.unesco.org/covid19/educationresponse.]

57. UNESCO, UNICEF, World Bank, WFP, UNHCR. Supplement to Framework for reopening schools: emerging lessons from country experiences in managing the process of reopening schools. 2020.

58. Garchitorena A, Gruson H, Cazelles B, Roche B. Quantifying the efficiency of non-pharmaceutical interventions against SARS-COV-2 transmission in Europe. medRxiv. 2020:2020.08.17.20174821-2020.08.17.

59. Harris Engy Ziedan Susan Hassig DN, Cohodes S, Denteh A, Goldhaber D, Hansen M, Imberman S, et al. The effects of school reopenings on COVID-19 hospitalizations. 2021.

60. Isphording IE, Lipfert M, Pestel N. School re-openings after summer breaks in Germany did not increase SARS-CoV-2 Cases. Ssrn. 2020(13790).

61. Paterson E. Impact of School Closures on an Influenza Pandemic Scientific Evidence Base Review Title: Impact of School Closures on an Influenza Pandemic Scientific Evidence Base Review Author: PH-HPER-ID&BP 10200 Commissioned by the Department of Health and produced. 2014.

62. Jackson C, Mangtani P, Hawker J, Olowokure B, Vynnycky E. The effects of school closures on influenza outbreaks and pandemics: systematic review of simulation studies. PLoS One. 2014;9(5):e97297.

63. Zhang J, Litvinova M, Liang Y, Wang Y, Wang W, Zhao S, et al. Changes in contact patterns shape the dynamics of the COVID-19 outbreak in China. Science. 2020;368(6498):1481-6.

64. World Health Organization. Considerations for school-related public health measures in the context of COVID-19: annex to considerations in adjusting public health and social measures in the context of COVID-19, 10 May 2020. Geneva: WHO; 2020 2020. Contract No.: WHO/2019-nCoV/Adjusting_PH_measures/Schools/2020.1.

65. Hernan MA. Methods of public health research - Strengthening causal inference from observational data. N Engl J Med. 2021;385(15):1345-8.

66. Barda N, Dagan N, Ben-Shlomo Y, Kepten E, Waxman J, Ohana R, et al. Safety of the BNT162b2 mRNA Covid-19 Vaccine in a Nationwide Setting. N Engl J Med. 2021;385(12):1078-90.

67. Ben-Michael E, Feller A, Stuart EA. A Trial Emulation Approach for Policy Evaluations with Group-level Longitudinal Data. Epidemiology. 2021;32(4):533-40.

68. Gobierno de España. Componente 18. Renovación y ampliación de las capacidades del Sistema Nacional de Salud. 2021.

9. Apéndices

Apéndice 1. Estrategia de búsqueda

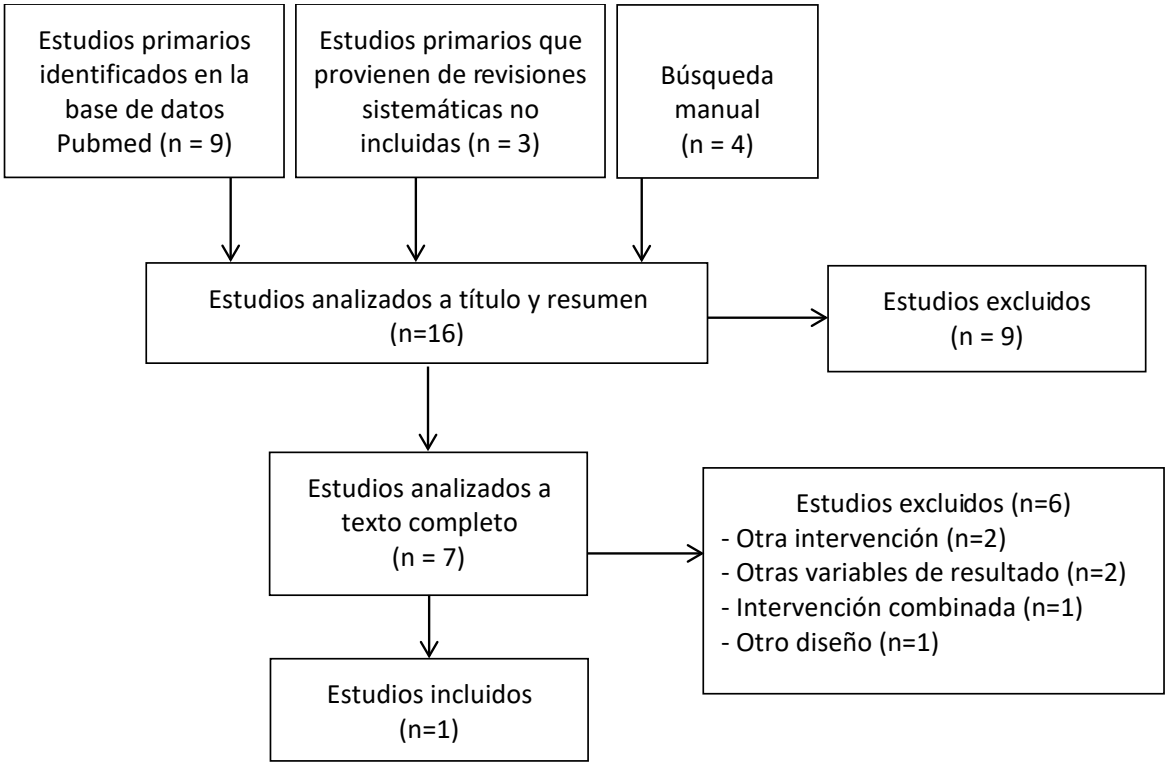
Epistemonikos:

(((school* OR "high-school" OR "high-schools" OR "k-12" OR "k12" OR k12* OR (educational* AND (facilit* OR institution*))) AND (closure* OR closing* OR closed* OR lockdown* OR shut))) AND (coronavir* OR coronovirus* OR betacoronavir* OR "beta-coronavirus" OR "beta-coronaviruses" OR "corona virus" OR "virus corona" OR "corono virus" OR "virus corono" OR hcov* OR covid* OR "2019-ncov" OR cv19* OR "cv-19" OR "cv 19" OR "n-cov" OR ncov* OR (wuhan* AND (virus OR viruses OR viral)) OR "2019-ncov-related" OR "cv-19-related" OR "n-cov-related" OR sars* OR sari OR "severe acute respiratory syndrome" OR antisars* OR "anti-sars-cov-2" OR "anti-sars-cov2" OR "anti-sarscov-2" OR "anti-sarscov-2" OR "post-COVID-19" OR "Not-of-COVID-19" OR "corona patients" OR "article-covid-19" OR "post-covid-19" OR "post-covid" OR "with-covid-19" OR "pre-covid" OR "pre-covid-19" OR "with-covid" OR "anti-covid-19" OR "n-covid" OR "no-covid")

Medline. PUBMED:

((((((2019-nCoV[Title/Abstract] OR 2019nCoV[Title/Abstract] OR COVID-19[Title/Abstract] OR covid19[Title/Abstract] OR "corona virus disease 2019"[Title/Abstract] OR SARS-CoV-2[Title/Abstract] OR severe acute respiratory syndrome coronavirus 2[Title/Abstract] OR "sars coronavirus 2"[Title/Abstract] OR "severe acute respiratory syndrome cov 2"[Title/Abstract]) OR (("outbreak"[Title/Abstract] OR "wuhan"[All Fields]) AND ("coronavirus"[Title/Abstract] OR "corona virus"[Title/Abstract] OR COVID* [Title/Abstract] OR "coronavirus"[MeSH Terms])) OR ("covid 19"[Supplementary Concept] OR "severe acute respiratory syndrome coronavirus 2"[Supplementary Concept]) OR ("coronavirus"[MeSH Terms] OR "coronavirus infections"[MeSH Terms]) AND ("2019/12"[Date - Publication] : "3000"[Date - Publication])) AND ((school[Title/Abstract]) OR (high-school[Title/Abstract]) OR (k12[Title/Abstract]) OR ("educational"[Title/Abstract])))) AND (("2021/01/07"[Date - Entry] : "3000"[Date - Entry])) AND ((multicenterstudy[Filter] OR observationalstudy[Filter]) AND (fft[Filter]) AND (english[Filter])) AND (("lockdown"[Title/Abstract]) OR (closing[Title/Abstract]) OR (closure[Title/Abstract])) AND ((multicenterstudy[Filter] OR observationalstudy[Filter]) AND (fft[Filter]) AND (english[Filter]))))

Diagrama de flujo de los estudios primarios seleccionados (PRISMA)



Apéndice 2. Herramienta AMSTAR 2

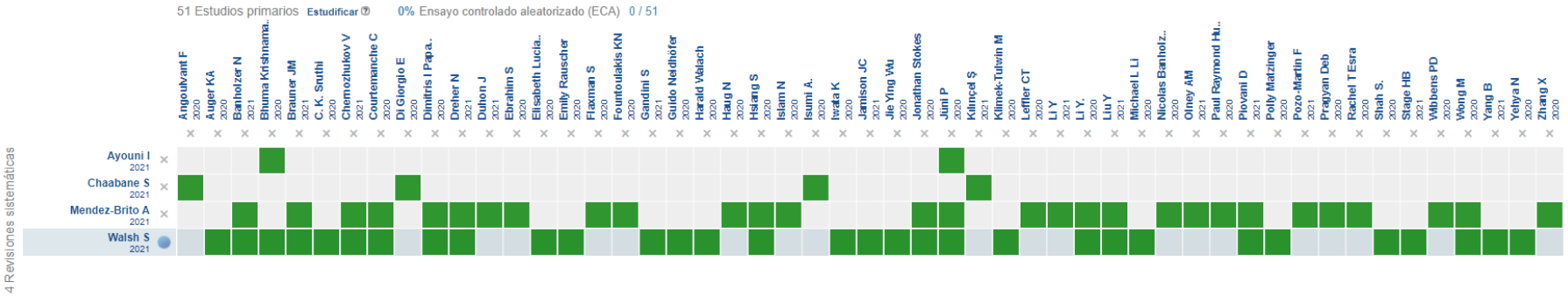
Número de pregunta	Pregunta	Respuesta	¿Es una debilidad?
1	¿Las preguntas de investigación y los criterios de inclusión para la revisión incluyen los componentes PICO?		
2	¿El reporte de la revisión contiene una declaración explícita de que los métodos de la revisión fueron establecidos con anterioridad a su realización y justifica cualquier desviación significativa del protocolo?		
3	¿Los autores de la revisión explicaron su decisión sobre los diseños de estudio a incluir en la revisión?		
4	¿Los autores de la revisión usaron una estrategia de búsqueda bibliográfica exhaustiva?		
5	¿Los autores de la revisión realizaron la selección de estudios por duplicado?		
6	¿Los autores de la revisión realizaron la extracción de datos por duplicado?		
7	¿Los autores de la revisión proporcionaron una lista de estudios excluidos y justificaron las exclusiones?		
8	¿Los autores de la revisión describieron los estudios incluidos con suficiente detalle?		
9	¿Los autores de la revisión usaron una técnica satisfactoria para evaluar el riesgo de sesgo de los estudios individuales incluidos en la revisión?		
10	¿Los autores de la revisión reportaron las fuentes de financiación de los estudios incluidos en la revisión?		
11	Si se realizó un meta-análisis, ¿los autores de la revisión usaron métodos apropiados para la combinación estadística de resultados?		
12	Si se realizó un meta-análisis, ¿los autores de la revisión evaluaron el impacto potencial del riesgo de sesgo en estudios individuales sobre los resultados del meta-análisis u otra síntesis de evidencia?		
13	¿Los autores de la revisión consideraron el riesgo de sesgo de los estudios individuales al interpretar / discutir los resultados de la revisión?		
14	¿Los autores de la revisión proporcionaron una explicación satisfactoria y discutieron cualquier heterogeneidad observada en los resultados de la revisión?		
15	Si se realizó síntesis cuantitativa ¿los autores de la revisión llevaron a cabo una adecuada investigación del sesgo de publicación (sesgo de estudio pequeño) y discutieron su probable impacto en los resultados de la revisión?		
16	¿Los autores de la revisión informaron de cualquier fuente potencial de conflicto de intereses, incluyendo cualquier financiamiento recibido para llevar a cabo la revisión?		
En verde, las preguntas críticas			

Nivel de confianza	Justificación
ALTA	**Ninguna debilidad crítica y hasta una no crítica**: la RS proporciona un resumen exacto y completo de los resultados de los estudios disponibles.
MEDIA	**Ninguna debilidad crítica y más de una debilidad no crítica** (aunque si son muchas podría justificarse una baja confanza): la RS tiene debilidades, pero no hay defectos críticos, pudiendo proporcionar un resumen preciso de los resultados de los estudios disponibles.
BAJA	**Hasta una debilidad crítica**, con o sin puntos débiles no críticos: la RS puede no proporcionar un resumen exacto y completo de los estudios disponibles
CRÍTICAMENTE BAJA	**Más de una debilidad crítica,** con o sin debilidades no críticos: la RS no es confiable

Resultados sobre la calidad de las revisiones sistemáticas seleccionadas

Número de pregunta	Ayouni et al.	Chaabane et al.	Méndez-Brito et al.	Walsh et al.
1	Sí	Sí	Sí	Sí
2	Sí	Sí	No	Sí
3	Sí parcial	Sí	Sí	Sí parcial
4	Sí	Sí	Sí parcial	Sí
5	Sí	Sí	Sí parcial	Sí
6	Sí	Sí	Sí parcial	Sí
7	Sí parcial	Sí parcial	Sí parcial	Sí
8	Sí	Sí	Sí	Sí
9	Sí	No	Sí	Sí
10	No	No	No	No
11	NA	NA	NA	NA
12	NA	NA	NA	NA
13	Sí	No	Sí	Sí
14	Sí parcial	Sí parcial	Sí	Sí
15	NA	NA	NA	NA
16	Sí	Sí	Sí	Sí
Valoración final de la confianza del estudio	Alta	Críticamente baja	Baja	Alta

Apéndice 3. Matriz de evidencia con las revisiones sistemáticas y los estudios primarios seleccionados



Apéndice 4. Tablas

Tabla descriptiva de las revisiones sistemáticas

Autor	Título	Año de publicación	Número de estudios	Número de participantes totales incluidos en la RS	Número de bases de datos utilizadas	Bases de datos utilizadas	Rango de fechas de la búsqueda		Otros
							Inicio	Final	
Ayouni et al	Effective public health measures to mitigate the spread of COVID-19: a systematic review.	2021	18	NE	3	PubMed, Science Direct and MedRxiv		Up to March 16, 2021	
Chaabane et al	The Impact of COVID-19 School Closure on Child and Adolescent Health: A Rapid Systematic Review.	2021	10	245+871.543+745 (number of participants not especified in one of the included studies)	3	PubMed, Embase and Google Scholar	January 1, 2020	September 2, 2020	
Mendez-Brito et al	Systematic review of empirical studies comparing the effectiveness of non-pharmaceutical interventions against COVID-19.	2021	34	NE	3	Embase, Medline and MedRxiv	January 1, 2020	March 4, 2021	
Walsh et al	Do school closures and school reopenings affect community transmission of COVID-19? A systematic review of observational studies.	2021	40	NE	10	PubMed, Web of Science, Scopus, CINAHL, WHO Global COVID-19 Research Database (incluyendo MedRxiv y SSRN), ERIC, British Education Index and the Australian Education Index		Up to October 12, 2020 and actualizado on January 7, 2021	We excluded prospective modelling studies and studies in which the assessed outcome was exclusively transmission within the school environment rather than the wider community.

Tabla descriptiva de los estudios primarios y riesgo de sesgo

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Angoulvant et al	COVID-19 pandemic: Impact caused by school closure and national lockdown on pediatric visits and admissions for viral and non-viral infections, a time series analysis	2020	Quasi-experimental time series analysis	France	**Risk of bias assessment**: low-level evidence **Limitations**: 1. We cannot exclude a change in clinical management such as avoidance of ear, nose, and throat examination because of COVID-19 fear, which could have influenced diagnosis coding. 2. We did not collect data regarding severity and so we cannot exclude that reduction in presentations was associated with children presenting later in their illness.
Auger et al	Association between statewide school closure and COVID-19 incidence and mortality in the US	2020	Observational study. Population-based time series analysis	USA	**Risk of bias assessment**: Moderate **Limitations**: 1. Many states enacted additional nonpharmaceutical interventions concurrently with or shortly after school closure, making it impossible to fully isolate potential effects of school closure. 2. Analyses were conducted at the state level. The analyses did not account for resident travel leading to viral spread between states. Some states had more restrictive policies locally. 3. Inadequate testing has impeded COVID-19 diagnosis. 4. The completeness and accuracy of the Johns Hopkins University database with respect to COVID-19 incidence and mortality has not been established. This data source aggregates publicly available data and accuracy may vary state to state.
Banholzer et al (a)	Estimating the impact of non-pharmaceutical interventions on documented infections with COVID-19: A cross-country analysis	2020	Retrospective observational cross-country analysis. Semi-mechanistic Bayesian hierarchical model	USA, Canada, Australia, Norway, Switzerland and EU-15 countries	**Risk of bias assessment**: Moderate **Limitations**: 1. Modeling assumptions do not allow for (random) variation in the effect of NPIs across countries and assume a fixed effect. 2. Any approach of explaining changes in the observed number of cases solely by specific NPIs makes the implicit assumption that these changes were not the result of some other factors. 3. It is challenging to distinguish between the effects of single NPIs due to their concurring introduction in many countries. 4. Analysis is limited by the type of data utilized to define the outcomes. Using the number of reported cases as outcome implies that reporting practices may have an influence on the results. 5. It is not considered in our analysis that the number of susceptible people in the population decreases as the number of people that were already infected increases over time. 6. The analysis is limited by the need to classify NPIs in a comparable manner across countries and to determine dates when NPIs were exactly implemented. There is always some subjectivity in making corresponding decisions.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Banholzer et al (b)	Estimating the effects of non- pharmaceutical interventions on the number of new infections with COVID-19 during the first epidemic wave	2021	Observational study. Semi-mechanistic Bayesian hierarchical model	15 UE-countries, USA, Canada, Australia, Norway and Switzerland	**Risk of bias rating**: 14/18 **Limitations**: 1. Our modeling assumptions do not allow for (random) variation in the effect of NPIs across countries and assume a fixed effect. 2. Any approach of explaining changes in the observed number of cases solely by specific NPIs makes the implicit assumption that these changes were not the result of some other factors. 3. It is challenging to distinguish between the effects of single NPIs due to their concurring introduction in many countries. 4. Our analysis is limited by the type of data utilized to define the outcomes. Using the number of reported cases as outcome implies that reporting practices may have an influence on the results. 5. It is not considered in our analysis that the number of susceptible people in the population decreases as the number of people that were already infected increases over time. 6. Our analysis is limited by the need to classify NPIs in a comparable manner across countries and to determine dates when NPIs were exactly implemented.
Brauner et al (a)	Inferring the effectiveness of government interventions against COVID- 19	2020	Observational retrospective study. Bayesian hierarchical model	34 european countries and 7 non-european countries	**Risk of bias rating**: 15/18 **Limitations**: 1. NPI effectiveness may depend on the context of implementation, such as the presence of other NPIs, country demographics, and specific implementation details. Our results thus need to be interpreted as indicating the effectiveness in the contexts in which the NPI was implemented in our data. 2. Rt may have been reduced by unobserved NPIs or voluntary behavior changes such as mask-wearing. 3. Our results cannot be used without qualification to predict the effect of lifting NPIs. 4. We do not have data on some promising interventions, such as testing, tracing, and case isolation.
Brauner et al (b)	The effectiveness and perceived burden of nonpharmaceutical interventions against COVID-19 transmission: a modelling study with 41 countries	2020	Retrospective observational study. Bayesian hierarchical model	34 European and 7 non-European countries	**Risk of bias assessment**: Moderate **Limitations**: 1. NPI effectiveness may depend on the context of implementation, such as the presence of other NPIs and country-specific factors. 2. R may have been reduced by unobserved NPIs or spontaneous behaviour changes. 3. Our results cannot be used without qualification to predict the effect of lifting NPIs. 4. While we included more NPIs than most previous work, several promising NPIs were excluded.
Chernozhukov et al	Causal impact of masks, policies, behavior on early COVID-19 pandemic in the U.S.	2021	Observational study. Regression model	USA	**Risk of bias assessment**: Moderate **Limitations**: NE

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Courtemanche et al	Strong social distancing measures in the United States reduced the COVID-19 growth rate	2020	Observational study. Fixed effects regression	USA	**Risk of bias assessment**: Moderate **Limitations**: 1. we would like to be able to control more precisely for access to testing. Available data allowed us to control for the number of tests performed at only the state, rather than county, level. 2. we might ideally want to estimate a richer econometric model. 3. As is typical of observational data analyses, we could not rule out all possible threats to causal inference.
Deb et al	The effect of containment measures on the COVID-19 pandemic	2020	Observational study	Worldwide (129 countries)	Risk of bias rating: 15/18 Limitations: NE
Di Giorgio et al	The interplay between mothers' and children behavioral and psychological factors during COVID-19: An Italian study	2020	Survey	Italy	**Risk of bias assessment**: low-level evidence **Limitations**: 1. Our small sample size could have decreased our statistical power, limiting the signifcance of some of the statistical comparisons conducted. 2. Our sample is mainly composed of mothers who were seeking information on research-related websites and social media groups. 3. The absence of error rate correction, due to the exploratory nature of this study. Four, the research focused on mothers, as they are probably the primary caregivers for children within the age group considered here. 4. The present research, as other recent studies on the COVID-19 pandemic, used retrospective questions to compare the current situation to a baseline before the outbreak.
Dreher et al (a)	Policy interventions, social distancing, and SARS-CoV-2 transmission in the United States: a retrospective state-level analysis	2021	Observational retrospective analysis. Multivariable models	USA	**Risk of bias rating**: 12/18 **Limitations**: 1. our state-level analysis may miss variation atthe county level. Certain counties may have benefitedfrom more localized control due to social distancingmeasures implemented before state-wide mandates.Similarly, county-level variation in COVID-19 cases,resulting deaths, population density, and other demo-graphic factors were not accounted for. 2. Different NPIs were sometimes enacted simulta-neously or soon after one another. The effects of less extreme measures may be masked due to interdepen-dence with other policies, or artificially enhanced due tochronological association with more extreme initiatives. 3. Though rates of testing have been noted to varywidely between states and serve as a potentially con-founding variable, the model used to calculate Rt values analyzed here corrects for state-wide differences in testing.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Dreher et al (b)	Impact of policy interventions and social distancing on SARS-CoV-2 transmission in the United States	2020	Observational study. 1. Univariate linear regression of NPI implementation and average Rt after the 500th case. 2. Cox proportional hazards regression of the association between NPI implementation and time for cases to double from 500th to 1000th case. 3. Cox proportional hazards regression of the association between NPI implementation and time for deaths to double from 50 to 100.	USA	**Risk of bias assessment**: Serious **Limitations**: 1. Our state-level analysis may miss variation at the county level. 2. Our mobility results are further limited by potential flaws in Google's publicly available phone data that this study relies on for mobility analyses. 3. Though rates of testing have been noted to vary widely between states and serve as a potentially confounding variable, the model used to calculate Rt values analyzed here corrects for these state-wide differences in testing.
Duhon et al	The impact of non-pharmaceutical interventions, demographic, social, and climatic factors on the initial growth rate of COVID- 19: a cross-country study	2021	Observational study. Multiple regression model	Worldwide (unclear number of territories)	**Risk of bias rating**: 11/18 **Limitations**: The major shortcoming is given by the assumption of a constant growth rate, whereas it has been widely acknowledged that the growth rate of COVID-19 changes over time, which could be affected by various epidemiological, social, economic, and NPI factors, resulting in a change of the growth rate over time for different countries.
Ebrahim et al	Reduction of COVID-19 incidence and nonpharmacologic interventions: analysis using a US county-level policy data set	2020	Observational study	USA	**Risk of bias rating**: 12/18 **Limitations**: 1. Our data collection, while rigorous, is affected by a number of factors both inherent to the study and external that could skew outcomes. Even though data collectors were well trained and used standardized methods, the estimated date of policy changes could be highly variable, particularly for counties with limited or conflicting information available online. 2.Tthe Hikma Health data set comprises 2 timepoints for 2 of the 7 NPI policies originally assessed. 3. Our analysis identifies correlations in the data set without any implication of causality.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Esra et al	Evaluating the impact of non- pharmaceutical interventions for SARS-CoV-2 on a global scale	2020	Observational study. Bayesian model framework	Worldwide (26 countries and 34 US states)	**Risk of bias rating**: 14/18 **Limitations**: 1. Our metric of comparison, the time varying Rt based on reported cases, is sensitive to country level differences in testing coverage and strategies. 2. This study was limited by the epidemiological complexity of ascertaining the impacts of individual COVID-19 NPIs implemented thus far.
Flaxman et al	Estimating the effects of non-pharmaceutical interventions on COVID-19 in Europe	2020	Observational study. Bayesian mechanistic model	Europe, 11 countries	**Risk of bias rating**: 15/18 **Limitations**: 1. Early deaths attributable to COVID-19 may have been missed. 2. There is variation in the reporting of deaths by country and over time. 3. Reporting delays are expected and can be both systematic and random in nature.
Fountoulakis et al	Factors determining different death rates because of the COVID-19 outbreak among countries	2020	Observational study. Person correlation coefficient and Forward Stepwise Linear Regression Analysis (FSLRA)	Europe, 40 countries	**Risk of bias rating**: 14/18 **Limitations**: The data utilized in the current paper are at the population/country level. They are heterogenous in the sense that there are different ways of registering and reporting deaths because of COVID-19 and different ways of practically implementing measures and to different extent.
Gandini et al	No evidence of association between schools and SARS-CoV-2 second wave in Italy	2020	Observational study. Artificial intelligence model to disentangle the effect of individual NPIs on Rt. R estimated exclusively from incidence data.	Italy	**Risk of bias assessment**: Serious **Limitations**: 1. Authors could not consider the different precautions related to the reopening of schools taken by some countries, such as physical distancing within classrooms and masking procedures. 2. Authors did not consider the impact of school holidays and the effect of reopening different school levels. 3. Authors analyze the impact of given NPIs by comparing Rt from two arbitrarily drawn periods before and after the implementation of the given NPI.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Garchitorena et al	Quantifying the efficiency of non-pharmaceutical interventions against SARS-COV-2 transmission in Europe	2020	Observational study. Used incidence data, supplemented by a capture-recapture method using mortality data to infer undiagnosed cases. Compared this with a counterfactual age-structured Susceptible-Exposed-Infectious-Removed (SEIR) model coupled with Monte Carlo Markov Chain	32 European countries	**Risk of bias assessment**: Moderate **Limitations**: 1. We used an age-structured model where each age class has the same susceptibility to the virus, and we assume that detected and non-detected cases have the same transmissibility capacity because non-detected cases can be both asymptomatic and symptomatic cases. 2. Although our mathematical model allowed us to accurately quantify PHR efficiency, responses were comprised of 24 different NPIs that frequently overlapped over space and time. 3. We use a comprehensive database on NPI implementation compiled by the ECDC from country reports, but other interventions that could impact epidemic progression, such as travel restrictions, were not available in this dataset.
Haug et al	Ranking the effectiveness of worldwide COVID-19 government interventions	2020	Observational study. Modelling approach combining four computational techniques merging statistical, inference and artificial intelligence tools and validated with two external datasets	Worldwide (79 territories, 56 countries)	**Risk of bias rating**: 15/18 **Limitations**: NE
Hsiang et al	The effect of large-scale anti-contagion policies on the COVID-19 pandemic	2020	Observational study. Reduced-form econometric (regression) analysis	Italy, France, USA	**Risk of bias assessment**: Moderate **Limitations**: 1. Available data of interest. 2. The analysis does not account for interactions between populations in nearby localities
Hunter et al	Impact of non-pharmaceutical interventions against COVID-19 in Europe: a quasi-experimental study	2020	Quasi-experimental study	Europe, 30 countries	**Risk of bias rating**: 17/18 **Limitations**: Many interventions were implemented in different ways and at different points in the local epidemic. . Because of this variety in how interventions were implemented and described, the results for the potential of stay at home advisories especially may be underestimated. All models are simplifications of the complex nature of reality; our modelling was unable capture many subtle variations in how control measures were implemented. We acknowledge that lack of direct observation of these variations may have biased our results.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Islam et al	Physical distancing interventions and incidence of coronavirus disease 2019: natural experiment in 149 countries	2020	Observational study. Natural experiment using interrupted time series analysis	Worldwide (149 countries)	**Risk of bias rating**: 14/18 **Limitations**: 1. we relied solely on the Oxford covid-19 Government Response Tracker, which tracks the measures taken by governments around the world to tackle the covid-19 pandemic. 2. Our study design did not allow us to assess the optimum time for implementation of these physical distancing interventions; nor were we able to define the optimum time for lifting of these restrictions. 3. We did not include restrictions on international travel as this measure, although an important element of a viral containment strategy, is not strictly a physical distancing measure. 4. In addition to physical distancing measures, countries have implemented a wide range of other interventions that might be equally or more effective. We were unable to examine the deployment of such measures in this study owing to lack of valid and robust data in most of the countries. 5. We attempted to collect data on covid-19 testing rates by country, but we could only identify data for 112 countries from a variety of sources, and the validity of these data might be questionable. 6. Ideally, we would also have examined death rates, but at this stage of the pandemic, the numbers of deaths in countries are lower, especially for those only recently experiencing the epidemic and for those that have successfully minimised the numbers of deaths. 7. Our inability to examine within country heterogeneity in the implementation of these policy interventions, which is particularly relevant for large countries such as Brazil, Russia, and the US.
Isumi et al	Do suicide rates in children and adolescents change during school closure in Japan? The acute effect of the first wave of COVID-19 pandemic on child and adolescent mental health	2020	Observational study. Descriptive study. Poisson regression	Japan	**Risk of bias assessment**: low-level evidence **Limitations**: 1. It should be noted that this is a preliminary finding on the acute effect of the first wave of the COVID-19 pandemic on suicides among children and adolescents during the school closure. Data on suicide among children for a longer time span should be collected and examined in future research when available. 2. We did not investigate suicidality, such as suicide attempts or suicidal thoughts among children and adolescents, due to a lack of data on periodical monitoring of children and adolescents' suicidality, including hospitalization rates for suicide attempts. 3. Motives of suicide are not available in this publicly available aggregated data. Therefore, suicides that occurred during the school closure could be influenced by other factors that are not directly related to the COVID-19 crisis, such as prior trauma, personality and temperament, and prior suicide attempts
Iwata et al	Was school closure effective in mitigating coronavirus disease 2019 (COVID-19)? time series analysis using Bayesian inference	2020	Observational study. Time series analysis using Bayesian inference	Japan	**Risk of bias assessment**: Serious **Limitations**: 1. The local linear trendmodel might not be an appropriate model for the current epidemicof COVID-19 in Japan. 2. The estimated α value using data by the time of interventioneffectiveness might not be accurately predicting the α value afterward, i.e., the α value after March 18. 3. Our estimations resulted in rather wide confidence intervals, and the results shouldbe interpreted cautiously. 4. School closures in other forms might be useful in mitigating the epidemic, such as ones including infants and small children, or university students. 5. School closures combined with other measures such as traffic limitations or even city lockdown might be useful.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Jamison et al	Comparing the impact on COVID-19 mortality of self-imposed behavior change and of government regulations across 13 countries	2020	Observational study. Linear multivariate regression analysis	13 European countries	**Risk of bias assessment**: Moderate **Limitations**: Without randomization or other exogenous variation in thetreatments, evidently, we cannot fully ascertain a causal link betweenthe NPIs and the resulting changes in death rates.
Juni et al	Impact of climate and public health interventions on the COVID-19 pandemic: a prospective cohort study	2020	Observational study. Prospective cohort study. Weighted random-effects regression analysis	Worldwide (144 countries)	**Risk of bias assessment**: Serious **Limitations**: 1. Because of considerable differences in testing practices between different geopolitical areas, actual rates of COVID-19 could not be reliably estimated. 2. we assumed that SARS-CoV-2 testing strategies did not vary during the follow-up period. 3. only 38 geopolitical areas had implemented public health interventions by the cut-off date of Mar. 11, 2020, and the implementation of interventions was clustered. 4. There was variation in measures of social distancing reported by different geopolitical areas and the derived average association will not shed light on the specific components of social distancing. 5. We analyzed only when restrictions of mass gathering were instituted, irrespective of the size of mass gatherings that were restricted. 6. We were unable to quantify compliance of the population with social distancing and restrictions of mass gatherings. 7. Data on latitude, temperature and humidity were collected for the capital of each geopolitical area, which may not have accurately represented area-wide climate patterns.
Kilinçel et al	Factors affecting the anxiety levels of adolescents in home-quarantine during COVID-19 pandemic in Turkey	2020	Cross-sectional self-report questionnaire	Turkey	**Risk of bias assessment**: low-level evidence **Limitations**: 1. Mental health assessment was based on self-report reports instead of clinician interviews. This may lead to higher reporting rates of psychiatric symptoms. 2. The social and economic conditions of families were not evaluated in our study.
Klimek-Tulwin et al	Early school closures can reduce the first-wave of the COVID-19 pandemic development	2020	Observational study. Wilcoxon signed rank test to determinethe significance of differences between pairs of incidence rates from different time points	15 European countries, Argentina, Brazil and Japan	**Risk of bias assessment**: Critical **Limitations**: 1. The total number of cases and the number of new cases may be underestimated due to the unstructured reporting by different countries. 2. Frequent asymptomatic or minimally symptomatic courses of the disease result in some patients never being tested for COVID-19. 3. Significant differences in a number of tests performed for SARS-Cov-2 among different countries influence the number of confirmed cases.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Krishnamachari et al	Effects of Government Mandated Social Distancing Measures on Cumulative Incidence of COVID-19 in the United States and its Most Populated Cities	2020	Observational study. Negative binomial regression	USA	**Risk of bias assessment**: Serious **Limitations**: 1. The biggest issue is the use of aggregate data from a variety of external sources. 2. Another potential limitation was our use of binary variables using median values as cutoffs for analysis. There are several ways data can be analyzed, and it is possible that there is a superior approach to analyzing social distancing variables.
Leffler et al	Association of country-wide coronavirus mortality with demographics, testing, lockdowns, and public wearing of masks	2020	Observational study. Multivariable analysis.	Worldwide (200 countries)	**Risk of bias rating**: 14/18 **Limitations**: 1. The ultimate source of mortality data is often from governments which may not have the resources to provide a full accounting of their public health crises, or an interest in doing so. 2. We acknowledge that country-wide analyses are subject to the ecologic fallacy. There is potential for confounding at the ecologic level, and information bias at both the individual and ecologic levels. 3. Multiple studies of coronavirus morbidity and mortality have treated countries as the unit of analysis. 4. We modeled the growth of the pandemic as an exponential curve (which is linear with time on a logarithmic scale) because infectious diseases are often modeled as obeying exponential processes early in their course. We recognize that all mathematical models are merely idealizations of more complicated dynamics.
Li et al (a)	The temporal association of introducing and lifting non-pharmaceutical interventions with the time-varying reproduction number (R) of SARS-CoV-2: a modelling study across 131 countries	2021	Observational study. Pooled countries using log-linear regression	Worldwide (131 countries)	**Risk of bias assessment**: Moderate **Limitations**: 1. Our analysis was based on data on control policy rather than on actual population behaviour. 2. Some NPIs (eg, school closure and public events ban) were often introduced earlier than other NPIs (eg, requirements to stay at home). 3. Our data on R and NPIs were at the national level, whereas both R and NPIs could vary among different parts of a country. 4. We acknowledged the potentially high heterogeneity across different countries in terms of both NPIs and COVID-19 case ascertainment. 5. Individual awareness and personal hygiene have been changing over time since the pandemic started, which could contribute greatly to the change in transmission of SARS-CoV-2. 6 . We did not consider the role of underlying seasonality or meteoro-logical factors (eg, temperature and humidity) in SARS-CoV-2 trans mission. 7. We only assessed the effect of introducing and lifting NPIs for the first 28 days after introduction and relaxation, and the findings should not be generalised to beyond 28 days. 8. Although our study could essentially be regarded as a natural experiment study, our findings do not necessarily imply causation.
Li et al (b)	The impact of policy measures on human mobility, COVID-19 cases, and mortality in the US: a spatiotem-poral perspective	2021	Spatiotemporal perspective observational study. Regression-based event study technique	USA	**Risk of bias rating**: 13/18 **Limitations**: NE

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Li et al (c)	Forecasting COVID-19 and Analyzing the Effect of Government Interventions	2020	Observational study. Novel SEIR model ('DELPHI')	Worldwide (167 geopolitical areas)	**Risk of bias assessment**: Serious **Limitations**: 1. Some parameters are fixed to a constant value. 2. The DELPHI model does not explicitly model the effect of asymptotic undetected infections, who are unlikely to quarantine and thus would participate in the infection loop throughout their entire infectious period. 3. This analysis also assumes, in analyzing government interventions, that the same nominal policy could be compared across countries.
Liu et al	The impact of non-pharmaceutical interventions on SARS-CoV-2 transmission across 130 countries and territories	2021	Obervational study. Parsimonious linear fixed effects panel regression, using stepwise backwards variable selection	Worldwide (130 countries)	**Risk of bias assessment**: Moderate **Limitations**: 1. Besides the information bias in the NPIs database discussed above, the coding scheme may also introduce potential bias. 2. Compared to daily incidence, Rt estimates are much more suitable for cross-country comparisons and thus are used as the metric for COVID-19 transmission in this study. 3. Although we examined a wide range of NPIs, we did not include any potential interactions in the current model. 4. Although OxCGRT is one of the most comprehensive databases of COVID-19-related NPIs to our knowledge, it does not capture individual behaviour such as face-covering use in public spaces.
Matzinger et al	Strong impact of closing schools, closing bars and wearing masks during the Covid-19 pandemic: results from a simple and revealing analysis.	2020	Observational study. Plotting log2 of cases, hospitalisations and deaths against time, and segmented regression	USA	**Risk of bias assessment**: Moderate **Limitations**: NE
Neidhofer et al	The effectiveness of school closures and other pre-lockdown COVID-19 mitigation strategies in Argentina, Italy, and South Korea	2020	Observational study. Difference-in-differences comparison to a synthetic control unit	Argentina, Italy, South Korea	**Risk of bias assessment**: Serious **Limitations**: NE

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Olney et al	Estimating the effect of social distancing interventions on COVID-19 in the United States	2021	Observational study. Semimechanistic Bayesian hierarchical model	USA	**Risk of bias rating**: 13/18 **Limitations**: 1. The assumption that all interventions have the same implementation and effect in all states is a simplifying assumption with clear exceptions. 2. The assumptions that interventions are binary, instantaneous, and nonharmful are oversimplifications that do not account for time-varying compliance with interventions or unintended consequences. 3. The parameters of the model were estimated using reasonable, but still uncertain, assumptions about prior distributions. We have used the same assumptions as in the European model, but these assumptions may be contradicted by future empirical work.
Papadopoulos et al	The impact of lockdown measures on COVID-19: a worldwide comparison	2020	Comparative observational study. Univariate regression model	Worldwide (150 countries)	**Risk of bias assessment**: Serious **Limitations**: Making comparison between nations may be compromised by variation in testing policies, case reporting, definitions, uptake of policies and medical care, and there is no accounting for these factors here as the real population incidence and the accuracy with which it has been assessed is unknown in any country.
Piovani et al	Effect of early application of social distancing interventions on COVID-19 mortality over the first pandemic wave: an analysis of longitudinal data from 37 countries	2021	Observational study. Longitudinal analysis. Multivariable negative binomial regression with panel data	37 OECD Member Countries	**Risk of bias assessment**: Critical **Limitations**: Over the study period, countries have enacted multiple social distancing interventions. We cannot exclude that a portion of the predicted effect may have been related to other, concurrent, policies applied. When governments decide to act, this usually involves a number of health policy interventions, which are implemented over a small timeframe, thus, completely isolating the effect of each single intervention is deemed impossible.
Pozo-Martin et al	The impact of non-pharmaceutical interventions on COVID-19 epidemic growth in the 37 OECD member states	2021	Observational study. Longitudinal analysis using a multilevel modelling approach with both maximum likelihood and Bayesian estimation	OECD countries	**Risk of bias rating**: 16/18 **Limitations**: The analysis refects national level outcomes and policies based on available data. It does not explore the diferential impact of NPIs implemented regionally or locally within countries. The characterization of the intensity of the NPIs using a limited number of ordinal levels (as is done in the OxCCGRT and as we have done with the mask wearing requirements) might mask smaller variations in efect. To detect such variations, databases would have to use interval scales to distinguish NPI intensity. In addition, the compilation and inclusion of data on NPI enforcement and adherence could strengthen the results.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Rauscher et al	Lower State COVID-19 Deaths and Cases with Earlier School Closure in the U.S.	2020	Observational study. Regression analyses	USA	**Risk of bias assessment**: Serious **Limitations**: NE
Shah et al	Co3 effectiveness of government measures to reduce COVID-19 mortality across 5 different countries	2020	Observational study. Poisson regression	Australia, Belgium, Italy, UK, USA	**Risk of bias assessment**: Serious **Limitations**: NE
Shruthi et al	How Policies on Restaurants, Bars, Nightclubs, Masks, Schools, and Travel Influenced Swiss COVID-19 Reproduction Ratios	2020	Observational study. Mechanistic transmission models fitted to lab-confirmed cases, applying lag times from the literature.	Switzerland	**Risk of bias assessment**: Serious **Limitations**: NE
Stage et al	Shut and re-open: the role of schools in the spread of COVID-19 in Europe	2020	Observational study. Observed data compared against counterfactual unmitigated simulation using an epidemic model fitted by Approximate Bayesian Computation, with a Poisson Gaussian process regression model.	Denmark, Germany, Norway	**Risk of bias assessment**: Critical **Limitations**: 1. The presence (or lack) of signals in the data following school interventions is limited by the reliability of the available data. 2. Since the instantaneous growth rate relies on the derivative of splines, it is subject to increased error at the boundaries of the data. 3. The data have generally not made it possible to account for inevitable geographic variability, the age distribution of those studied, and their occupation. 4. Our analysis is restricted to countries with high monitoring and intervention efficacy, hence great care should be taken when translating our findings on the impact of school reopening to other nations.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Stokes et al	The relative effects of non-pharmaceutical interventions on early Covid-19 mortality: natural experiment in 130 countries	2020	Observational data. Multivariable linear regression	Worldwide (130 countries)	**Risk of bias assessment**: Moderate **Limitations**: 1. although we control for a range of potential confounders, there is a risk of unobserved time-varying confounding. 2. This study only examines the impact of nationally recorded policies, meaning subnational interventions were not captured. Furthermore, we were unable to measure compliance and regional variation in implementation, as well as voluntary changes in population behaviours. We were also unable to estimate longer-term effects due to limited statistical power and increased risk of bias due to reverse causality in later periods. 3. We are only able to examine a single, albeit important, outcome, mortality, due to comparable data availability and the necessity of a known lag period between intervention and outcome.
Walach et al	What association do political interventions, environmental and health variables have with the number of Covid-19 cases and deaths? A linear modeling approach	2020	Observational study First examined correlations between multiple individual variables and cases/deaths in non-parametric analysis.	34 European countries, Brazil, Canada, China, India, Iran, Japan and USA	**Risk of bias assessment**: Critical **Limitations**: in a population-based study we have to rely on the validity of the data provided by other sources, which may be of variable, even doubtful quality.
Wibbens et al	Which COVID policies are most effective? A Bayesian analysis of COVID-19 by jurisdiction	2020	Observational study. Bayesian analysis	40 territories: 17 countries and 23 US states	**Risk of bias rating**: 13/18 **Limitations**: 1. We need to make several assumptions as described in the Methods section about disease epidemiology and the impact of government policy. 2. Because this is an observational study, it is inherently limited because the findings may be biased by variables that are not included in the study.
Wong et al	Evaluation on different non-pharmaceutical interventions during COVID-19 pandemic: an analysis of 139 countries	2020	Observational study. Multivariable linear regression	Worldwide (139 countries)	**Risk of bias assessment**: Serious **Limitations**: One limitation of the study included the absence of control for some cofounders like personal hygienic measures, testing capability and the government's public health resources.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Wu et al	Changes in Reproductive Rate of SARS-CoV-2 Due to Non-pharmaceutical Interventions in 1,417 U.S. Counties	2020	Observational study. Model of R for each cluster applying a Bayesian mechanistic model	USA	**Risk of bias assessment**: Moderate **Limitations**: 1. Changes in Reproductive Rate of SARS-CoV-2 Due to Non-pharmaceutical Interventions in 1,417 U.S. Counties. 2. While the model explains the observed trends in fatalities well, the rapid escalation of the COVID-19 situation and quick succession in the implementation of NPIs in most counties within few days from another complicates the disentanglement of the effects of any individual NPI. 3. While the model explains the observed trends in fatalities well, the rapid escalation of the COVID-19 situation and quick succession in the implementation of NPIs in most counties within few days from another complicates the disentanglement of the effects of any individual NPI.
Xie et al	Mental Health Status Among Children in Home Confinement During the Coronavirus Disease 2019 Outbreak in Hubei Province, China	2020	Survey. Generalized linear regressions were applied for continuous variables and logistic regressions for binary variables.	China	**Risk of bias assessment**: Moderate **Limitations**: Our current study could not evaluate whether these outcomes will be long-lasting after the COVID-19 outbreak.
Yang et al	Effect of specific non-pharmaceutical intervention policies on SARS-CoV-2 transmission in the counties of the United States	2020	Observational study. Mechanistic transmission models fitted to lab-confirmed cases, applying lag times from the literature. Used generalised estimating equations with autoregression of confounders.	USA	**Risk of bias assessment**: Moderate **Limitations**: 1. There may be confounders or mediators that were unmeasured or not included in our model. 2. Large spatial and temporal variation in the accuracy of surveillance for confirmed cases or deaths could induce spurious changes in Reff that do not reflect true transmission. 3. Many counties reported limited numbers of cases and/or deaths and thus infection dynamics could not be reconstructed. 4. We assumed a stable distribution of delays between infection and the time of confirmation or death, though this could have varied over the course of the outbreak.

Autor	Título	Año de publicación	Diseño del estudio/Modelo	País o países de estudio	Información adicional: riesgo de sesgo y limitaciones del estudio
Yehya et al	Statewide interventions and Covid-19 mortality in the United States: an observational study	2020	Observational study. Multivariable negative binomial regression	USA	**Risk of bias assessment**: Serious **Limitations**: 1. Both of our exposures were measured at the state level, whereas local school districts also closed schools of their own accord before state orders. 2. Death rates were based on publicly available data derived from inconsistent testing using assays with imperfect test characteristics and uneven state-level reporting; thus, both exposure and outcome risk being misclassified. 3. We restricted analysis to the early weeks of COVID-19 because of concerns regarding accuracy of mortality data after May 1, 2020, as COVID-19 and social distancing continued to be politicized in the United States. Indeed, multiple states started reopening in the first weeks of May, and in some cases changed the method and timing of publicly reporting cases and deaths. 4. Because of data limitations, we were unable to adjust for potentially important confounders such as outbreaks in long-term care facilities.
Zeilinger et al	Onset of effects of non-pharmaceutical interventions on COVID-19 worldwide	2020	Observational study. Non-parametric machine learning model	Worldwide (176 countries)	**Risk of bias assessment**: Serious **Limitations**: 1. Confounding factors, e.g. environmental parameters like climate, which generally influence viral transmission and which vary between countries, cannot be ruled out to influence results. 2. The analysis is unable to distinguish between correlation and causation, which makes interpretation of effects difficult. 3. Data quality: confirmed cases are reported daily, but with varying reporting delays. Some countries have changed the case definition for COVID-19 during the outbreak (e.g. China), leading to artificial spikes in the time series of cumulative cases.

NE: Not specified
OECD: Organisation for Economic Co-operation and Development

Tabla descriptiva de los estudios primarios con el contenido de la pregunta de interés (población, intervención y comparador)

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Angoulvant et al	871,543 pediatric emergency department (PED) visits	School closure + lockdown 18 March 2020 to 19 April 2020. One week after the start of the lockdown	NE	School closure + lockdown 18 March 2020 to 19 April 2020. One week after the start of the lockdown	First epidemic wave	NE	Pre-post intervention change
Auger et al	Total population	NE	Primary and secondary schools	Study period: 13 March 2020 to 23 March 2020 Exposure period: 1 January 2020 to 29 April 2020 Lag period: 16 days (incidence), 26 days (mortality)	First epidemic wave	**For the model**: the following non–school-related nonpharmaceutical intervention covariates were considered: stayat-home or shelter-in-place order, nonessential business closure, restaurant and bar closure, and prohibition of gatherings withmore than 10 people **NPI enacted by the government**: closure of nonessential businesses, restaurants and bars, and prohibiting large gatherings. Recommendations for increased handwashing, cleaning, and wearing of masks evolved simultaneously.	Pooled multiple-area before-after comparison studies
Banholzer et al (a)	Total population	NE	Primary schools	Study period: n=100 cases until 15 April 2020 Exposure date: variable Lag period: 7 days	First epidemic wave	**For the model**: Border closure, event ban, gathering ban, venue closure, lockdown, work ban, day-of-the-week effects.	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Banholzer et al (b)	Total population	NE	Primary schools	NE	First epidemic wave	(1) School closing / (2) Border closures / (3) Public event bans / (4) Gathering bans / (5) Venue closing / (6) Lockdowns prohibiting public movements without valid reason / (7) Work bans on non-essential business activities	NE
Brauner et al (a)	Total population	NE	Schools and universities	For each country, the window of analysis starts on 22 January and ends either after the first lifting of an NPI or on 30 May 2020, whichever came first*	First epidemic wave	(1–3) Gatherings limited to 1000/100/10 people or less / (4–5) Some/ All but essential shops closed / (6–7) Schools or universities closed / (8) Stay-at-home orders with exemptions	Before-after studies
Brauner et al (b)	Total population	NE	Primary and secondary schools	Study period: 22 January 2020 to 30 May 2020 Exposure period: variable Incubation period: 6 days Infection to death: 22 days	First epidemic wave	**For the model**: Mass gathering bans, business closures, university closures, stay-at-home orders	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Chernozhukov et al	Total population	NE	Primary and secondary schools	Study period: 7 March 2020 to 3 June 2020 Exposure period: variable, but 80% of states closed within 2 days of 15 March 2020 Lag period: 14 days (incidence), 21 days (mortality)	First epidemic wave	**For the model**: Business closures, stay-at-home orders, hospitality closures, mask mandates, mobility data, national case/mortality trends	Pooled multiple-area before-after comparison studies
Courtemanche et al	Total population	NE	NE	Study period: 1 March 2020 to 27 April 2020 Exposure period: variable, generally mid-March Lag period: 10 and 20 days	First epidemic wave	**For the model**: stay-at-home orders, hospitality closure, limiting gathering size	Pooled multiple-area before-after comparison studies
Deb et al	Total population	NE	NE	Coverage begins from January 22, 2020. The data cut-off is June 16, 2020*	First epidemic wave	(1) School closing / (2) Workplace closing / (3) Public event cancellations / (4) Gathering restrictions / (5) Public transportation closures / (6) Stay-at-home orders / (7) Restrictions on internal movement / (8) International travel bans	Before-after studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Di Giorgio et al	245 mothers and their pre-school children aged between 2 and 5 years	Closure of schools, individual home confinement, and the related social restrictions from 1st to the 9th of April (after three weeks of confinement) compared to the week before the national lockdown	Total school closure	Survey must be responded from 1st to the 9th of April (after three weeks of confinement), and retrospectively to the week before the national lockdown*	First epidemic wave	Closure of schools, individual home confinement, and the related social restrictions from 1st to the 9th of April (after three weeks of confinement) compared to the week before the national lockdown	Compared to the week before the national lockdown
Dreher et al (a)	Total population	NE	NE	5-week period Jan 3−Feb 6, 2020*	First epidemic wave	(1) Stay-at-home orders / (2) Educational facilities closure / (3) Non-essential business closure / (4) Limitations on mass gatherings	Before-after studies
Dreher et al (b)	Total population	NE	NE	Study period: 500th case until 30 April 2020. Exposure period: variable	First epidemic wave	**For the model**: stay-at- home orders, mass gathering bans and business closures	Pooled multiple-area before-after comparison studies
Duhon et al	Total population	NE	NE	The data was collected on July 29, 2020*	First epidemic wave	(1) School closing / (2) Workplace closing / (3) Cancellation of public events / (4) Restrictions on gatherings / (5) Public transit closures / (6) Stay-at-home requirements / (7) Restrictions on internal movement / (8) International travel controls	Before-after studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Ebrahim et al	Total population	NE	NE	Data was collected from March to July 2020*	First epidemic wave	(1) Closure of nonessential workplaces / (2) Shelter-in-place/stay-at-home orders / (3) Enforcement of shelter-in-place or stay-at-home / (4) Size restrictions on public gatherings / (5) School closing / (6) Public transport closures / (7) Publicly available testing	Before-after studies
Esra et al	Total population	NE	Primary, secondary and tertiary educational institutions	Impact of NPIs from the start of the pandemic to 2 May 2020*	First epidemic wave	(1) Quarantine and isolation policies / (2) Limits on gatherings / (3) School closing (primary, secondary and tertiary educational institutions) / (4) Mask policies / (5) Household confinements (stay-at-home-orders, shelter-in-place orders and lockdowns)	Before-after studies
Flaxman et al	Total population	NE	NE	Up to and including 4 May 2020*	First epidemic wave	(1) Lockdown / (2) Cancel public events / (3) School closing / (4) Self-isolation / (5) Social distancing encouraged	Before-after studies
Fountoulakis et al	Total population	NE	NE	The national response was assessed on the basis of the time latency in days since the first death in Europe (in France on February 16) and since the first death in the specific country and the implementation of specific measures.*	First epidemic wave	(1) School closing / (2) Workplace closing / (3) Public events ban / (4) Gathering ban / (5) Public transport closure / (6) Lockdown implementation / (7) Domestic travel ban / (8) International travel ban	Before-after studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Gandini et al	Total population	NE	Early years, primary and secondary schools	Study period: 7 August 2020 to 2 December 2020 Exposure period: variable. School reopenings during September. Closures in October and Nobermber Lag: under investigation	Second wave	**For the model**: None specified	Within-area before-after comparison studies
Garchitorena et al	Total population	NE	Early years settings, primary schools and secondary schools	Study period: 1 February 2020 to 16 September 2020 Exposure period: variable Lag period: no lag applied	First epidemic wave	**For the model**: Stay-at- home orders, university closures, mass gathering bans, mask mandates, work-from-home orders, public space closures, business and retail closures	Pooled multiple-area before-after comparison studies
Haug et al	Total population	NE	NE	March–April 2020*	First epidemic wave	Different categories of NPIs in their hierarchical levels (42,151 measures)	Before-after studies
Hsiang et al	Total population	NE	NE	Study period: 25 February 2020 to 6 April 2020 Exposure date: varied by country Lag period: no lag applied	First epidemic wave	**For the model**: Other NPIs (travel ban and quarantine, work-from-home order, no social gatherings, social distancing rules, business and religious closures, home isolation), test regimes	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Hunter et al	Total population	Total closure	Primary, secondary and higher	Data up to 24th April are included*	First epidemic wave	(1) Mass gathering restrictions / (2) Initial business closure / (3) Educational facilities closed / (4) Non-essential services closed / (5) Stay-at-home order / (6) Travel severely limited - none European country	Before-after studies
Islam et al	Total population	NE	NE	Data between 1 January and 30 May 2020 or 30 days post-intervention, whichever occurred first*	First epidemic wave	(1) Closures of schools / (2) Workplace / (3) Public transport / (4) Restrictions on mass gatherings and public events / (5) Restrictions on movement (stay-at-home regulations and restrictions on movements within a country)	Before-after studies
Isumi et al	Children under 20 years	School closure between January 2018 and May 2020	NE	School closure from 2 March 2020 and continued until the end of May	First epidemic wave	Stay home and maintain social distancing	Comparison of total number of suicides per month between January 2018 and May 2020
Iwata et al	Total population	NE	Primary and secondary schools	Study period: 27 January 2020 to 31 March 2020 Exposure date: 29 February 2020 Lag period: 9 days	First epidemic wave	**For the model**: NE	Within-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Jamison et al	Total population	NE	NE	Study period: until 16 May 2020 Exposure period: variable Lag period: 18 days	First epidemic wave	**For the model**: Workplace closures, public event cancellations, restricting gathering sizes, closing public transport, stay-at- home orders, internal movement restrictions and international travel, mobility data, population >65 years, population density, number of acute care beds per population, starting date of epidemic, day of the epidemic	Pooled multiple-area before-after comparison studies
Juni et al	Total population	NE	NE	Study period: Until 28 March 2020 Exposure date: 11 March 2020 Lag period: 10 days	First epidemic wave	**For the model**: NE	Pooled multiple-area comparisons of interventions in place at a fixed time point
Kilinçel et al	745 adolescents aged between 12 and 18 years 13 different schools	School closure and home-quarantine	NE	Schools were closed on March 12, 2020	First epidemic wave	Home-quarantine	Cross-sectional study
Klimek-Tulwin y Tulwin et al	Total population	NE	NE	Study period: not specified Exposure period: variable	First epidemic wave	**For the model:** None	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Krishnamachari et al	Total population	NE	NE	Study period: not specified Exposure period: variable	First epidemic wave	**For the model**: City analysis: use of public transport for work, use of carpool for work, population density and % black City and State analyses: days from state-level emergency declaration to gathering size restrictions, non-essential business closures, stay-at-home orders, gathering restrictions, restaurant closures	Pooled multiple-area before-after comparison studies
Leffler et al	Total population	NE	NE	Coronavirus-related mortality by May 9, 2020*	First epidemic wave	(1) School closing / (2) Workplace closing / (3) Cancel public events / (4) estrictions on gatherings / (5) Close public transport / (6) Stay-at-home requirements / (7) Internal movement restrictions / (8) International travel restrictions / (9) Income support / (10) Public information campaigns / (11) Testing policy / (12) Contact tracing policy / (13) Public wearing of masks	Before-after studies
Li et al (a)	Total population	NE	NE	Study period: 1 January 2020 to 20 July 2020 Exposure period: variable	First epidemic wave	**For the model**: international travel bans, internal travel bans, stay-at-home requirements, public transport closures, mass gathering bans, public event bans, workplace closures)	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Li et al (b)	Total population	NE	NE	NE	NE	(1) School closing / (2) Workplace closures / (3) Public event cancellations / (4) Public information campaigns / (5) Public transport closures / (6) Stay-at-home orders / (7) International/national travel controls	Before-after studies
Li et al (c)	Total population	NE	NE	Study period: 1 January 2020 to 19 May 2020 Exposure period: variable	First epidemic wave	**For the study:** mass gatherings, travel and work activities **For the model**: NE	Pooled multiple-area before-after comparison studies
Liu et al	Total population	NE	NE	Study period: 1 January 2020 to 22 June 2020 Exposure period: variable Lag periods: 1, 5 and 10 days	First epidemic wave	**For the model**: workplace closure, cancellation of public events, gathering size restrictions, public transport closures, stay-at-home requirements, internal movement restrictions, international travel restrictions, income support for households, public information campaigns, testing policy and contact tracing policy	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Matzinger et al	Total population	NE	Primary and secondary schools	Study period: 6 March 2020 to 1 May 2020 Exposure date: 14 March 2020 (Georgia, Tennessee), 6 March 2020 (Mississippi) Lag period: under investigation	First epidemic wave	**For the model**: NE	Within-area before-after comparison studies
Neidhofer et al	Total population	NE	NE	Study period: not specified Exposure date: Italy 4 March 2020 Argentina 16 March 2020 South Korea not specified Lag period: analysis up to 18 days postschool closure	First epidemic wave	**For the model**: NE	Within-area before-after comparison studies
Olney et al	Total population	NE	Primary, secondary, and higher education	Data from February 29, 2020, up to April 25, 2020*	First epidemic wave	(1) Social distancing encouraged / (2) Schools or universities closing / (3) Public events (ban for more than 100 people)/ (4) Lockdown / (5) Self-isolating ill / (6) Sports (public event ban of more than 1000 people)	Before-after studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Papadopoulos et al	Total population	NE	NE	Study period: 1 January 2020 to 29 April 2020 Exposure period: variable Lag period: no lag applied	First epidemic wave	**For the model**: workplace closure, public event cancellations, gathering size restrictions, public transport closures, stay-at-home restrictions, internal travel restrictions, international travel restrictions, public information campaigns, testing systems and contact tracingsystems)	Pooled multiple-area before-after comparison studies
Piovani et al	Total population	NE	NE	Study period: 1 January 2020 to 30 June 2020 Exposure period: variable Lag period: 26 days	First epidemic wave	**NPI by the governments**: countries have enacted multiple social distancing interventions, including closing schools, workplaces, prohibiting large gatherings, but also increased healthcare funding, increased supply of ventilators, masks and protective equipments, deployment of healthcare professionals, or mobile phone apps for tracing Covid19 contacts.	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Pozo-Martin et al	Total population	NE	NE	From the date of the first confirmed case of COVID-19 until July 1, 2020*	First epidemic wave	(1) School closing requirements / (2) Workplace closing requirements / (3) Public events cancelling requirements / (4) Restrictions on gatherings / (5) Public transport restrictions / (6) Stay-at-home requirements / (7) Restrictions on internal travel / (8) International travel controls / (9) Public health information campaigns / (10) Mask wearing requirements / (11) Testing policy / (12) Contact tracing policy	Before-after studies
Rauscher et al	Total population	NE	NE	Study period: until 27 April 2020 Exposure period: state's 100th death until time of school closures Lag period: not specified	First epidemic wave	**For the model**: public school enrolment, stay-at-home order date, whether school closures were mandated or recommended	Pooled multiple-area before-after comparison studies
Shah et al	Total population	NE	NE	Study period: 1 February 2020 to 30 June 2020 Exposure period: variable Lag period: 6 weeks	NE	**For the model**: workplace closures, public event cancellations, restrictions on mass gatherings, public transport closure, stay-at-home orders, internal movement restrictions	Within-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Shruthi et al	Total population	NE	Secondary schools used as exposure date	Study period: 9 March 2020 to 13 September 2020	NE	**For the model**: Closures of hairdressers, bars, nightclubs, restaurants and retail. Travel restrictions. Mask mandates. Number of hotel rooms within the Canton. Results stratified by Cantons with and without mask mandates in place within secondary schools	Within-area before-after comparison studies
Stage et al	Total population	NE	Early years, primary and secondary schools	Study period: March–June 2020 Closure dates: Around 16 March 2020 Reopening dates: staggered, from late April to mid-May Lag period: under study	First epidemic wave	**For the model**: None specified but timing of other NPIs, and changes to testing capacity outlined within analysis	Within-area before-after comparison studies
Stokes et al	Total population	NE	NE	Exposure: time before first death; and first 14 days after first death Lag period: up to 24 days	NE	**For the model**: workplace closures, public event bans, gathering bans, public transport closures, stay-at-home orders, internal movement restrictions, international travel restrictions and public information campaigns.	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Walach et al	Total population	Total/partial school closure	NE	Study period: until 15 May 2020 Exposure period: cut-off 15 May 2020 Lag period: no lag applied	First epidemic wave	**For the model**: NE	Pooled multiple-area comparisons of interventions in place at a fixed time point
Wibbens et al	Total population	NE	NE	NE	NE	(1) Closing of schools / (2) Closing of workplaces / (3) Public event cancelling / (4) Gathering bans / (5) Public transport closure / (6) Shelter-in-place orders and home confinement / (7) Restrictions on internal movement / (8) Restrictions on international travel / (9) Public information campaigns / (10) Testing access / (11) Contact tracing	Before-after studies
Wong et al	Total population	NE	NE	Analysis period: 15 April 2020 to 30 April 2020 Exposure cut-off date: 31 March 2020 Lag period: 14 days	First epidemic wave	**For the model**: workplace closure, public event cancellation, restrictions on gathering size, public transport closure, stay-at-home orders, restrictions on internal movement and international travel, public information campaigns)	Pooled multiple-area comparisons of interventions in place at a fixed time point

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Wu et al	Total population	NE	NE	Study period: until 28 May 2020 Exposure period: variable	First epidemic wave	**For the model**: Stay-at-home orders, mass gathering bans, restaurant closures, hospitality and gym closures, federal guidelines, foreign travel ban	Pooled multiple-area before-after comparison studies
Xie et al	2330 students	Total	Primary schools (grades 2 through 6)	In Wuhan: from January 23, 2020 until April 8, 2020 In Huangshi: from January 24, 2020 until March 23, 2020	First epidemic wave	NE	Cross-sectional study
Yang et al	Total population	NE	Early years and "schools" (presumed primary and secondary)	Study period: 21 January 2020 to 5 June 2020 Exposure period: variable	First epidemic wave	**For the model**: school closures, leisure activity closure, stay-at-home orders, face mask mandates, daycare closures, nursing home visiting bans, medical service suspension)	Pooled multiple-area before-after comparison studies
Yehya et al	Total population	NE	Primary and secondary schools	Study period: 21 January 2020 to 29 April 2020 Exposure measure: time (days) between 10th COVID-19 death and school closure Lag (exposure to mortality): up to 28 days	First epidemic wave	**For the model**: NE	Pooled multiple-area before-after comparison studies

		Intervención					
Autor	Población	Tipo de cierre	Tipo de centro	Periodo de cierre	Situación epidemiológica	Otras intervenciones	Comparador
Zeilinger et al	Total population	NE	NE	Study period: until 17 August 2020 Exposure period: variable	NE	**For the model**: NPIs (mass gathering bans, social distancing rules, business closures, curfews, declaration of emergencies, border restrictions, lockdown).	Pooled multiple-area before-after comparison studies

Tabla descriptiva de los estudios primarios con los resultados

Resultados primarios para incidencia (nuevos casos, hospitalizaciones, muertes)

Incidencia de infección				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Auger et al	2020	Regression coefficient models estimating effect of school closures on changes to weekly incidence rates	Adjusted model: Incidence: 62% (95% CI 49% to 71%) relative reduction	School closures associated with reduced transmission: school closures were associated with decreases in the rate of growth of COVID-19 incidence and mortality
Banholzer et al (a)	2020	Relative reduction in new cases compared with cumulative incidence rate prior to NPI implementation	8% (95% CrI 0% to 23%)	School closures not associated with a change in transmission: school closures not statistically significantly associated with a reduction in the incidence rate
Banholzer et al (b)	2021	Reduction in the number of new infections (confirmed cases)	17%; 95% CrI−2% to 36%	Among the NPIs considered, bans of large gatherings were most effective, followed by venue and school closures, whereas stay-at-home orders and work-from-home orders were least effective.
Chernozhukov et al	2021	Regression coefficient estimating the change in weekly incidence rate, measured on the log scale	Incidence rate: 0.019 (SE 0.101)	School closures associated with a mixed effect on transmission: school closures not associated with a change in incidence rate
Courtemanche et al	2020	Regression coefficient estimating effect of school closures on the growth rate of cases (% change)	Applying a 10-day lag: 1.71% (95% CI −0.38% to 3.79%) Applying a 20-day lag: 0.17% (95% CI −1.60% to 1.94%)	School closures not associated with a change in transmission: school closures not statistically associated with the growth rate of confirmed cases
Deb et al	2020	Total infection and total confirmed cases	Graphical presentation of results	We find that containment measures have significantly reduced the number of infections and the number of deaths. Our results suggests that countries that have put in place stringent measures, may have reduced the number of confirmed cases and deaths by more than 90 percent relative to the underlying country-specific path in the absence of measures.

Incidencia de infección				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Duhon et al	2021	Case growth rate	Not significant results	No significant control of growth rates related to school closure
Ebrahim et al	2020	Case growth rate	Not significant results	No significant control of growth rates related to school closure
Hsiang et al	2020	Regression coefficient estimating effect of school closures on the continuous growth rate (log scale)	Italy: −0.11 (95% CI −0.25 to 0.03) France: −0.01 (95% CI −0.09 to 0.07) USA: 0.03 (95% CI −0.03 to 0.09)	School closures not associated with a change in transmission: school closures not statistically associated with the growth rate of confirmed cases
Hunter et al	2020	Incident risk ratio of NPIs on the number of cases	Cases Incident risk ratio after intervention (before intervention = 1) Educational facilities closed: 22-28 days 0,52 (0,35-0,78), 29-35 days 0,26 (0,16-0,42), >36 days 0,14 (0,08-0,25)	Relaxing stay-at-home orders and allowing reopening of non-essential businesses appeared to be the lowest risk measures to relax as part of plans to carefully lift COVID-19 lockdown measures.
Islam et al	2020	IRR (incidence rate ratio)	Combination of NPIs implemented: No additional difference in the association of incidence when (1) public transport closure is added to (2) school closures, (3) workplace closures, (4) restrictions on mass gatherings and (6) public events and (7) lockdowns. Sequence of interventions: no consistent pattern of association was found for a specific sequence. However, greater reduction in incidence was associated with early implementation of lockdown in comparison to later implementation (along with school and workplace closures).	Closure of public transport was not associated with any additional reduction in covid-19 incidence when the other four physical distancing interventions were in place. Data from 11 countries also suggested similar overall effectiveness when school closures, workplace closures, and restrictions on mass gatherings were in place. In terms of sequence of interventions, earlier implementation of lockdown was associated with a larger reduction in covid-19 incidence compared with a delayed implementation of lockdown after other physical distancing interventions were in place.
Iwata et al	2020	Time series analysis coefficient estimating effect of school closures on the change in daily incidence rate	0.08 (95% CI −0.36 to 0.65)	School closures not associated with a change in transmission: school closures not statistically associated with the incidence rate of new cases

Incidencia de infección				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Juni et al	2020	Regression coefficient estimating effect of school closures on changes to the incidence rate	Adjusted model: 0.77 (95% CI 0.63 to 0.93), p=0.009	School closures associated with reduced transmission: school closures were statistically significantly associated with a relative reduction in the incidence rate of COVID-19
Klimek-Tulwin et al	2020	Change in incidence rate on the 16th, 30th and 60th day post 100th cases between countries ranked by the cases/million population at school closure	16th day: r=0.647, p=0.004 30th day: r=0.657, p=0.002 60th day: r=0.510, p=0.031	School closures associated with reduced transmission: earlier school closures associated with lower incidence rates in the follow-up period
Krishnamachari et al	2020	Rate ratio of cumulative incidence between areas that below the median time from state-of-emergency declaration to closure and those above the median time, at days 14, 21, 28, 35 and 42 following the areas 50th case	US states: 14 days: 2.27 (95% CI 0.80, 1.70) p=0.42 21 days: 1.38 (95% CI 0.91, 2.10) p=0.13 28 days: 1.52 (95% CI 0.98 to 2.33), p=0.06 35 days: 1.59 (95% CI 1.03 to 2.44), p=0.04 42 days: 1.64 (95% CI 1.07 to 2.52), p=0.02 US 25 most populous cities: 14 days: 1.08 (95% CI 0.75 to 1.55), p=0.68 21 days: 1.22 (95% CI 0.81 to 1.83), p=0.34 28 days: 1.24 (95% CI 0.78 to 1.98), p=0.35 35 days: 1.24 (95% CI 0.75 to 2.05), p=0.40 42 days: 1.16 (95% CI 0.67 to 2.02), p=0.59	School closures associated with a mixed effect on transmission: school closures not statistically significantly associated with cumulative incidence rate in most analyses, but associated with a significant reduction in some analyses
Li et al (b)	2021	Case growth rate	Not significant for confirmed case growth rate at any measured time: (6) School closure	No significant control of growth rates related to school closure
Li et al (c)	2020	Reduced infection rates	17.3 (SD 6.6) percentage point reduction in infection rate	School closures associated with reduced transmission: school closures were associated with a reduction in the COVID-19 incidence rate

Incidencia de infección				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Matzinger et al	2020	Changes to the doubling time of the epidemic in each state, following school closures	Georgia: 7 days after school closures the doubling time slowed from 2.1 to 3.4 days Tennessee: 8 days after school closures the doubling time slowed from 2 to 4.2 days Mississippi: 10–14 days after school closures the doubling time slowed from 1.4 to 3.5 days	School closures associated with reduced transmission: school closures were associated with reductions in the doubling time of new COVID-19 cases, hospitalisations and deaths
Papadopoulos	2020	Regression coefficient estimating the effect of school closures, and timing of school closures relative to first death, on log total cases and log total deaths	Univariate analysis of school closure policy showed no statistically significant association with log total cases (−0.03 (95% CI −0.256 to 0.218) or log total deaths (−0.025 (95% CI −0.246 to 0.211), p=0.776) Univariate analysis of timing of school closure was significantly associated with reductions in outcomes, so was considered in multivariate analysis. Multivariate analysis showed found no statistically significant association with log total cases (coefficient −0.006, CIs not reported) or deaths (−0.012 (95% CI −0.024 to 0.00), p=0.050)	School closures not associated with a change in transmission: school closures not statistically significantly associated with a reduction in the total number of log cases or deaths
Pozo-Martin et al	2021	Growth rate	Average Marginal Effects of NPIs on the average daily growth rate in cumulative weekly confirmed COVID-19 cases: (3) School closing: require closing of only some levels or categories -1.12%, require closing of all levels -1.65%	Workplace closing requirements, school closing requirements and mask wearing requirements, as well as the volume of testing per unit of population also successfully reduced the average daily growth rate in the cumulative number of weekly confrmed cases of COVID19 during this period.
Rauscher et al	2020	Percentage point increase in the number of new cases and deaths for every day school closures were delayed (not clear over what period the outcome measure represents, assumed until end of study period on 27 April 2020	Each day a state delayed school closures was associated with 0.3% higher cases (p<0.01)	School closures associated with reduced transmission: school closures were associated with fewer cases and fewer deaths

Incidencia de infección				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Stage et al	2020	% reduction in growth rate of new cases (Germany only—in Denmark and Norway the graph is drawn without formal statistical analysis)	26%–65% reduction in growth rate of cases across the different states of Germany. No quantitative estimate for Norway or Denmark but authors report a 'clear drop' in new cases after school closures	School closures associated with reduced transmission: school closures associated with reductions in the growth rate of new cases
Wibbens et al	2020	Case growth rate	Large impact when fully implemented at their highest levels: (2) Workplace closing, (3) Restrictions on internal movement, (4) Stay-at-home requirements, (1) Public information campaigns, (5) School closings Most effective - median estimated effectiveness Δgp > 0.1: (5) Full school closings (C1–3; Δgp = 0.07, on top of C1–2)	Five of the policies have relatively large impact when fully implemented at their highest levels: Workplace closing, restrictions on internal movement, stay-at-home requirements, public information campaigns, and school closings. The largest marginal effect of school closing is at level 2 (closing of some categories, such as universities and/or high schools) while a level 3 policy (closing of all schools) provides and additional but lower marginal benefit.
Wong et al	2020	Regression coefficient estimating effect of school closures on the rate of increase in cumulative incidence	−0.53 (95% CI −1.00 to –0.06), p=0.027	School closures associated with reduced transmission: school closures were associated with a smaller rate of increase in cumulative incidence of COVID-19
Zeilinger et al	2020	Growth rate calculated as the ratio of cumulative cases from 1 day to the next, applying a 7-day moving mean to smooth out weekday effects	School closures associated with drop in predicted growth rate between 10 and 40 days after implementation, median drop 0.010 (not clear what this value equates to but relatively large compared with other NPIs)	School closures associated with reduced transmission: school closures associated with a reduction in growth rate of COVID-19 cases

Incidencia hospitalización				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Angoulvant et al	2020	Number of hospital admissions	Decrease -45% hospital admissions	A decrease of -45% in hospital admissions in the period from 1 January 2017 to 17 March 2020 and from 18 March 2020 to 19 April 2020

Mortalidad				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Auger et al	2020	Regression coefficient models estimating effect of school closures on changes to weekly mortality rates	Adjusted model: Mortality: 58% (95% CI 46% to 67%) relative reduction	School closures associated with reduced transmission: school closures were associated with decreases in the rate of growth of COVID-19 incidence and mortality
Chernozhukov et al	2020	Regression coefficient estimating the change in weekly mortality rate, measured on the log scale	Mortality rate: −0.234 (SE 0.112)	School closures associated with a mixed effect on transmission: school closures significantly associated with a reduction in mortality rate
Deb et al	2020	Mortality	Graphical presentation of results	We find that containment measures have significantly reduced the number of infections and the number of deaths. Our results suggests that countries that have put in place stringent measures, may have reduced the number of confirmed cases and deaths by more than 90 percent relative to the underlying country-specific path in the absence of measures.
Dreher et al (a)	2021	Case fatality rate	Not significant for case fatality rate	None of the included policies (stay-at-home orders, school closures,bans on mass gatherings, or closure of non-essential businesses) were associated with a decrease in casefatality rate (CFR).

Mortalidad				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Fountoulakis et al	2020	Death rate	School closure—days since first national death 0.07∗/0.56 School closure—days since first European death −0.08∗/−0.19 School closure–days since 10th national death 0.11∗/0.58	The current study suggests that the crucial factor for the different death rates because of COVID-19 outbreak was the fast implementation of public events ban. This does not necessarily mean that the other measures were useless, especially since most countries implemented all of them as a 'package'. However, it does imply that this is a possibility and focused research is needed to clarify it, and is in accord with a model of spreading where only a few superspreaders infect large numbers through prolonged exposure.
Jamison et al	2020	Percentage point change to the 5-day rolling average of COVID-19 mortality	−2.8 (95% CI −6.7 to 1.0), p=0.150	School closures not associated with transmission: school closures not statistically significantly associated with relative changes in the 5-day rolling average of COVID-19 mortality
Leffler et al	2020	Mortality	Low and high per-capita coronavirus mortality by May 9, 2020: Low mortality: 2.08 (0.65) High mortality: 1.84 (0.49) (p-value: 0.006)	In univariate analysis, scores for school closing, canceling public events, international travel controls, and index of containment and health were significantly associated with lower per-capita mortality (all $P < 0.05$)
Li (b) et al	2021	Death case growth rate	Not significant for confirmed death case growth rate at any measured time: (6) School closure	No significant death case growth rate related to school closure
Neidhofer et al	2020	% Reduction in deaths in the 18 days postschool closure, compared with synthetic control unit	Argentina: 63%–90% reduction, Italy: 21%–35% reduction, South Korea: 72%–96% reduction in daily average COVID-19 deaths over the 18 days following school closures, compared with the counterfactual	School closures associated with reduced transmission: school closures were associated with reductions in COVID-19 mortality
Piovani et al	2021	Regression coefficient estimating % change in cumulative mortality for every day school closures delayed	Every 1 day delay in school closures was associated with an increase of 4.37% (95% CI 1.58 to 7.17), p=0.002 in cumulative COVID-19 mortality over the study period	School closures associated with reduced transmission: earlier school closures associated with lower cumulative COVID-19 mortality

Mortalidad				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Rauscher et al	2020	Percentage point increase in the number of new cases and deaths for every day school closures were delayed (not clear over what period the outcome measure represents, assumed until end of study period on 27 April 2020	Each day a state delayed school closures was associated with 1.3% higher mortality (p<0.01)	School closures associated with reduced transmission: school closures were associated with fewer cases and fewer deaths
Shah et al	2020	Regression coefficient for effect of school closures on mortality	Italy 0.81 (95% CI 0.68 to 0.97) Reported only as 'no association' for other countries	School closures associated with mixed effect on transmission: in Italy, school closures were associate with a reduction in mortality. In the other four countries no aassociation was found between school closures and mortality
Stokes et al	2020	Regression coefficient estimating effect of school closure timeliness and stringency on the daily mortality rate per 1 000 000 population	0–24 days: −0.119 (95% CI −1.744 to 0.398) 14–38 days: −1.238 (95% CI −2.203 to –0.273) No observable trend by stringency of school closure measure (recommended vs partial closure vs full closure)	School closures associated with mixed effect on transmission: school closures not statistically significantly associated with a reduction in mortality from 0 to 24 days after the first death, but associated with a reduction in the 14–38 days after
Walach et al	2020	Regression coefficient estimating effect of school closures on the COVID-19 mortality rate	Cases: school closures not associated with cases in univariate analysis so not considered for modelling Mortality: 2.54 (95% 1.24 to 3.85), p<0.0001	School closures associated with increased transmission: school closures associated with an increase in COVID-19 mortality
Yehya et al	2020	Regression coefficient estimating increase in mortality at 28 days associated with each day school closures were delayed	5% (Mortality Rate Ratio 1.05, 95% CI 1.01 to 1.09)	School closures associated with reduced transmission: earlier school closures were associated with reductions in COVID-19 mortality at 28 days

Otros outcomes				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Brauner et al (a)	2020	Rt	39% (21%–55%)	Closing all educational institutions, limiting gatherings to 10 people or less, and closing face-to-face businesses each reduced transmission considerably. The additional effect of stay-at-home orders was comparatively small.
Brauner et al (b)	2020	% reduction in Rt with 95% Bayesian CrI	8.6% (95% CrI −13.3% to 30.5%)	School closures not associated with a change in transmission: school closures not statistically significantly associated with a reduction in Rt
Dreher et al (a)	2021	Rt	Association with average Rt for states implementing NPIs preceding the date of their 500th case compared to states without these policies the week following 500 cases: (2) Educational facilities closure ß = -0.17, 95% CI -0.30 to -0.05 From days 8 to 14 after the 500th case (Rt reduction compared to controls): (2) Educational facilities closure ß = -0.12, 95% CI -0.21 to -0.04	Our results suggest that mass gathering restric-tions or school closure alone may have a weaker effectin maintaining Rt<1. Careful monitoring of Rtvalues inthese states may be necessary to proactively identifyand control recurrent outbreaks
Dreher et al (b)	2020	Regression coefficients from the linear and cox proportional hazards regressions. The first analysis is stratified into the first 7 days after implementation, and the second 7 days	1. First week: −0.17 (95% CI −0.30 to –0.05). Second week: −0.12 (-0.21 to –0.04) 2. 0.63 (0.25 to 1.63) 3. Null effect but numbers not reported	School closures associated with a mixed effect on transmission: school closures associated with a statistically significant reduction in Rt, but no association with doubling time of cases or deaths
Ebrahim et al	2020	Rt	Not significant results	Reduction in Rt: not significant at school closure level
Esra et al	2020	Rt	Rt reduction: 12% (95% CI: 5-19%)	The implementation of NPIs have substantially reduced acceleration of COVID-19

Otros outcomes				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Flaxman et al	2020	Rt	Reduction in Rt: not significant	Reduction in Rt: not significant at school closure level
Gandini et al	2020	Plotting Rt over time with school reclosure timings noted Analysed the effect of reclosing schools on Rt, which was done proactively before national lockdown in two large provinces	Lombardy and Campania closed schools before the national school closures in November. In both cases, they find that Rt started to decline around 2 weeks before school closures, and the rate of decline did not change after school closures	School (re-) closures not associated with a change in transmission: reclosing schools not associated with a change in the rate of decline of R
Garchitorena et al	2020	Ratio of transmission rates with and without implementation of the NPI (assessed over the duration of the NPI being in place) Presented as a forest plot so the reported results here are estimated	EY settings: 9% reduction (95% CI 1% to 16%) Primary schools: 10% reduction (95% CI 2% to 18%) Secondary schools: 11% reduction (95% CI 3% to 19%)	School closures associated with reduced transmission: school closures statistically significantly associated with a reduction in COVID-19 transmission
Haug et al	2020	Rt	% Normalised score: Closure of educational institutions 73% (ΔRt −0.15 to −0.21)	Our results indicate that a suitable combination of NPIs is necessary to curb the spread of the virus.
Li et al (a)	2021	Ratio between R while NPI in place, and R on the last day of the previous time period. Reported at 7, 14 and 28 days (as well as visual representation of each individual day to demonstrate trend)	Day 7: 0.89 (95% CI 0.82 to 0.97) Day 14: 0.86 (95% CI 0.72 to 1.02) Day 28: 0.85 (95% CI 0.66 to 1.10)	School closures associated with reduced transmission: school closures associated with a reduction in Rt across the 28 days following closures
Liu et al	2021	'Strong' evidence for NPI effectiveness if statistically significant across multiple parsimonious models varying the follow-up period, the lag time and the classification of the NPI. 'Moderate' evidence if significant in some models; 'weak' if not Effect sizes from individual models are a regression coefficient on change in R	'Strong' evidence of effectiveness for school closures. Effect sizes in individual models between 0.0 and −0.1	School closures associated with reduced transmission: school closures associated with a statistically significant reduction in Rt across analyses

Otros outcomes				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Olney et al	2021	Rt	Rt mean relative reduction: (1) Schools or universities closure (23.7%)	Overall, school closures and lockdowns were the only interventions modeled that had a reliable impact on the time-varying reproduction number, and lockdown appears to have played a key role in reducing that number to below 1.0
Sruthi et al	2020	Changes to time-varying reproductive number R, estimated from data on new cases. Assumed to be in an infectious state for 14 days from diagnosis	Secondary school closures associated with an average reduction of Rt around 1.0	School closures associated with reduced transmission: secondary school closure was associated with a reduction in Rt
Wu et al	2020	Output from Bayesian mechanistic model in the format: learnt weight (95% CI) Estimating effect of school closures on R	School closures not statistically significantly associated with Rt in any of the clusters, or when data are aggregated without clustering No clusters: 0.047 (95% CI –0.118 to 0.212) Cluster 1: 0.081 (95% CI –0.246 to 0.408) Cluster 2: 0.060 (95% CI –0.209 to 0.329) Cluster 3: 0.112 (95% CI –0.292 to 0.516) Cluster 4: 0.098 (95% CI –0.194 to 0.390) Cluster 5: 0.038 (95% CI –0.134 to 0.210)	School closures not associated with transmission: school closures not statistically significantly associated with R
Yang et al	2020	% reduction in R	School closure associated with 37% reduction in R (95% CI 33% to 40%) Daycare closures associated with 31% reduction (26%–35%)	School closures associated with reduced transmission: school closures and early years settings closures statistically significantly associated with reductions in R

R: reproduction number
Rt: effective reproduction number (time)
R0: basic reproduction number

Resultados secundarios para salud mental en niños/as y adolescentes

Salud mental en población infantil				
Autor	Año	Variable de resultado	Resultados	Conclusiones del estudio
Di Giorgio et al	2020	Psychological well-being: i.e emotion regulation, self-regulation capacity. Executive functions measured with Psychological factors measured by the Behavior Rating Inventory of Executive Functions preschool version (BRIEF-P) and the Strengths and Difficulties Questionnaire-Parent version (SDQ-P)	BRIEF-P: children showed an increased score in the Inhibitory Self-Control Index (ISCI) (F1,241=7.43, p=0.007, n2p=0.03), with the proportion of children with self-control difficulties increased from 14.29% before the lockdown to 21.23% during the lockdown (X21 =12.6, p<0.001; odds ratio 6.67 [CI 1.98–35.04]). SDQ subscales: we observed an increase in emotion symptoms (EMO) (F1,241 = 6.57, p = 0.011,n2p = 0.03), conduct problems (COND) (F1,241 = 9.01, p=0.003, n2p=0.04), and hyperactivity/inattention (HYPER) issues (F1,241=31.56, p<0.0001, n2p=0.12) during the lockdown, regardless of the mother working situation.	Restrictive measures had negative effects children's behavioral and psychological levels, with some differences depending on the mothers working situation. Mothers reported an increasing level of emotional symptoms such as sadness and frustration, whereas they perceived their children as more undisciplined and hyperactive, with a worsening inhibitory self-control capacity.
Isumi et al	2020	Impact on suicide rates	We found no significant change in suicide rates during the school closure (incidence rate ratio (IRR) = 1.15, 95% confidence interval (CI): 0.81 to 1.64). We found the main effect of month, that is, suicides significantly increased suicides in May (IRR: 1.34, 95% CI: 1.01 to 1.78) compared to March, but the interaction terms of month and school closure were not significant (p> 0.1).	The first wave of the COVID-19 pandemic has not significantly affected suicide rates among children and adolescents during the school closure in Japan."
Kilinçel et al	2020	Risk of anxiety (State-Trait Anxiety Inventory-STAI) and loniless (UCLA loneliness scale)	STAI-S 43.17 ± 5.86 STAI-T 51.53 ± 5.19 UCLA 41.89 ± 9.81 n=745	Closure of schools and home-quarantine during pandemic causes anxiety and loneliness in young people
Xie et al	2020	Depression mesured with Children's Depression Inventory–ShortForm(CDI-S). Anxiety mesured with Screen for Child Anxiety Related Emotional Disorders	Atotal of 403 students (22.6%) and 337 students (18.9%) reported depressive and anxiety symptoms, respectively. Students in Wuhan had significantly higher CDI-S scores than those in Huangshi (β,0.092 [95% CI, 0.014-0.170]), with a greater risk of depressive symptoms (odds ratio, 1.426 [95% CI, 1.138-1.786]).	During the outbreak of COVID-19, the reduction of outdoor activities and social interaction may have been associated with an increase in children's anxiety and depressive symptoms.