SAGE Subgroup: The role of children in transmission
SAGE 26: 16 April 2020

Summary

1. SPI-M, with input from NERVTAG and SPI-B, has considered the role of children in transmission of COVID-19 through five angles:
    a. Clinical evidence on susceptibility, infectiousness and presentation, and the implications for transmission
    b. Transmission in schools and other institutional settings, including evidence on the impact of school closures and openings at different point of the epidemic
    c. Transmission within households, including evidence of susceptibility and infectivity
    d. Transmission outside of schools, other institutional settings, and households
    e. Wider impacts of current and possible interventions on children
2. **There is a consensus that evidence on the role of children in transmission of COVID-19 is unclear, with a number of gaps in understanding**:
    - Children can be infected with SARS-CoV-2 and typically present with milder symptoms of COVID-19 than adults
    - However, there is a significant lack of high-quality evidence on the relative susceptibility, estimated asymptomatic fraction and relative infectivity of children
    - There is limited information on the behaviour and contact patterns of children under the current interventions
    - The majority of existing studies focus on schools and school-age children, with a relative lack of evidence on early years providers and other institutions
    - There is a lack of information on current experiences for children and parents – for example, in terms of: variation in the extent and quality of home/distance learning; attendance by vulnerable children and changes on child protection / safeguarding services; impact on parental mental health etc. There is an evidence gap around the longer-term impacts for children, particularly around mental health and child development.

3. Recommendations to address this research gap include but are not limited to:
    - **Viral sampling and serological surveying of children**
      In the first instance, this should focus on schools with COVID-19 outbreaks prior to national closures (staff, children and households) – but large-scale community testing should also be undertaken
    - **Real-time contact surveying of children (at a larger scale)**
      This would require funding, access to an appropriate sample frame and support in addressing ethical and consent issues.
    - **Analysis of secondary attack rates in households**
      This is subject to testing of household members of confirmed cases. In the first instance, full household information should be curated from the First Few 100 (FF100)
    - **Increased real-time data collection on schools, children and teachers**
    - **Analysis of international approaches to school closures**

4. Serological surveys of children will be critical to assessing the role of children in transmission of COVID-19, but are not sufficient in themselves and will need to be considered alongside other sources of information. This is as mild infections may not be detectable due to low antibody responses (1); this is particularly significant here as children typically have less severe cases than adults.

5. A comprehensive assessment of the wider impacts of current and proposed interventions on children is outside the scope of this paper, and should be addressed through a longer-term programme of work. As many of these issues are being considered as part of ongoing and proposed workstreams at the Department for Education (DfE), there may be a more appropriate channel to integrate this work with advice to SAGE than through SPI-M, SPI-B and NERVTAG.

6. Children should not be seen as a single, homogeneous group but should be differentiated by age (as a minimum). The behaviour of children under the age of 5 will differ significantly from that of young adults, as will their experienced impacts of interventions and clinical response to COVID-19.

A. Clinical evidence of susceptibility, transmission and presentation

What does the existing evidence say?

7. Children can be infected with SARS-CoV-2, as confirmed though positive testing, but comprise a relatively low proportion of confirmed cases in the UK and internationally.

Most paediatric patients have been family-clustered cases or nosocomial, with few reported outbreaks in schools and nurseries (2).

8. There is some evidence to suggest that children are as susceptible to COVID-19 infection as adults, but this is not yet conclusive. A study in Shenzhen, China, swabbing contacts found that children were as likely to test positive as adults (3). However, a contact tracing study from Wuhan and Shanghai found lower susceptibility in children (4).

9. Existing studies have primarily focused on specific subsets of children, rather than the wider population. Moreover, clinical presentation of COVID-19 appears to be age-dependent, with milder and more variable symptoms observed in children, which may affect case detection in existing studies.

10. Children appear to present with cough and fever less often than adults. Particularly, young children appear to have enteric symptoms more frequently than older people. This is based on a variety of data from published papers (2,3,5) as well as initial analysis of CO-CIN participants, which includes a small number of children.

11. The relative infectivity of mild and asymptomatic cases is unknown. It may be that the severity of symptoms might correlate to antibody levels, so if children experience milder infections then they might be less likely to develop protective immunity or lead to shorter duration of immunity, but this is speculative for COVID-19 at this point.

What are the main gaps in our evidence base?

12. There is a lack of high-quality evidence on the susceptibility of children to COVID-19, the asymptomatic fraction and subclinical infectiousness by age, and differences in clinical presentation across age.

Proposals to address this

13. There are some ongoing and proposed testing initiatives focusing on children. The flusurvey.org has been adapted to measure COVID-19 symptoms in the community and is conducting self-swabbing of participants, which may include children. “What’s the story[1]” is a study to do serum testing of children. The Avon Longitudinal Study of Parents and Children (ALSPAC) will include development of an antibody test for household members, including children. To address susceptibility, studies involving

[1] https://trials.ovg.ox.ac.uk/trials/what-is-story

testing should include children independently of their past or present symptoms, so that a denominator may be obtained.

14. Large-scale community testing is needed to better understand and monitor the prevalence of and susceptibility to COVID-19 in children. Clinical presentation of infected children and the asymptomatic fraction, and the extent of subclinical infectiousness also needs investigating. Increased community testing will allow monitoring of age-specific attack rates and relative risk over time, enabling more accurate inference of adherence to social distancing measures across age and the current transmission matrix. Again, recruitment to this testing should not depend on symptoms, and should ensure representation of a children of different ages.

15. Current data collections and analyses focus primarily on hospital and ICU cases. As children are less likely to develop severe disease, and are usually cared for at home unless severely ill, data on alternative pathways such as GP out-of-hours services and NHS 111 should be analysed by age groups. A representative sample could be tested for SARS-CoV-2 and COVID-19 to determine current and past prevalence rates.

16. In the absence of robust clinical evidence on the susceptibility and transmissibility of the virus in children, proposals examining the indirect and proxy impacts (as discussed in the following sections) will be critical.

B. Transmission in schools and other institutional settings

What does the existing evidence say?

17. Existing evidence on the impact of school closures is inconclusive. In the 2009 influenza pandemic, the school summer holiday interrupted transmission to such an extent that the UK epidemic was split into two waves, with the second coming after their reopening in the Autumn. However, it is not clear how applicable this is to COVID-19 given influenza immunity in the older population and vulnerable groups, a longer interval between symptom onset in primary and secondary cases, and uncertainties around the relative susceptibility and infectiousness of children to COVID-19.

18. Over 100 countries have implemented school closures in response to COVID-19, but there is variation in the speed and extent of closures. Some countries, such as Singapore, kept schools open for longer, whilst others implemented partial closures or are planning to re-open schools in the near future (e.g. Denmark).

19. The impact of school closures as a result of COVID-19 has been modelled with varying assumptions of infectiousness and symptomatic fractions in children (6,7,8,9). This finds that the impact of school closures heavily depends on the relative infectiousness of children. If children are less susceptible to COVID-19 and/or less infectious, then children account for a smaller component of community-wide R_0 and thus the inferred impact of closures is reduced.

20. There is limited evidence on the impact of more creative control measures, such as partial (e.g. 3-day openings, selected year groups) or alternating closures (e.g. attendance of school based on an alternating schedule). An unpublished study on the SMART study of influenza transmission in US schools estimated that the relative risk of influenza B infection for kindergarten children attending school on a half-day basis was approx. 20% compared to full-day students, with school and social networks of contacts identified as one explanatory factor. This study focuses on a specific age-group and does not control for other factors such as lifestyle outside of school, so should be taken as indicative evidence only. As this study focuses on influenza B, it may not be fully applicable to SARS-CoV-2 transmission, but it is the closest proxy available at this time.

21. A rapid literature review has shown that whilst school closures do appear to reduce the number of contacts that children have outside the home, such contacts remain common. As discussed in section D, there is an evidence gap in understanding the changing behaviour and contact patterns of children under the current interventions.

22. Existing studies also focus primarily on school-age children, with relatively fewer studies on early-years providers and other institutional settings, such as young offender institutes.

What are the main gaps in our evidence base?

23. Assessments of the predicted impact of school closures are based on underlying assumptions on susceptibility, asymptomatic fractions and infectiousness of children – as well as contact patterns of children during school closures. As set out in sections A and B, these remain uncertainties in the evidence base.

24. There is limited evidence on the impact of school closures as a result of COVID-19, both in the UK and internationally. This is because closures have generally been implemented concurrently with other interventions and behavioural changes, and it is difficult to disentangle the individual impacts of these.

25. Existing studies and modelling focus on schools and school-age children, with a relative lack of evidence on early-years providers and other institutional settings. An understanding of the full age spectrum from new-borns to teenagers would be ideal. We will further engage with DfE to understand evidence on these providers and shape any research commissions required.

26. The impact of schools-based interventions is not solely dependent on the role of children in transmission. Any consideration of future measures should also account for the increased risk of adult to adult transmission in school settings, such as teacher-pupil / teacher-teacher / parent-parent contacts. A clearer understanding of the relative importance of these transmission patterns will help to inform options for relaxation and what additional adjustments may be needed (eg. staggered drop-off at school gates).

27. Approximately 2% of children are still attending schools under the current interventions. More information is needed on the social networks of these children, their key worker parents and households – particularly where they are children of healthcare workers.

Proposals to address this

28. The impact of school closures can be assessed through a comparison of epidemic trajectories in countries with different school closure timings and policies, and may provide insight into the relative infectiousness of children.

29. Although there are existing studies estimating the impact of closures on R_t internationally (10), further research to explore alternative methods and close analysis of epidemic trajectories before and after interventions in selected countries with specific policies (e.g. Sweden, Denmark) would be useful. This could be further expanded to consider school re-openings (or selective measures) as other countries start relaxing their measures.

30. Comparative studies within the UK – for example, considering schools with different numbers of children of key workers in attendance – may also be helpful.

31. School-wide serological surveys should be conducted, focusing on schools with suspected COVID-19 outbreaks prior to the national implementation of school-closures. This group could be compared to schools closing as a precaution due to staff members testing positive for COVID-19. Testing should include staff, students

and, ideally, members of their households. Additional data collection on contacts and pooling of schools in an area would provide further evidence on mixing.

32. Children of key workers, in particular those of healthcare workers, may be at higher risk of infection due to increased contact networks through their parents and their attendance at school. Testing these children and members of their households, and sequencing of infections (to determine directionality), may offer insights into contacts between households and schools, and potentially provide insight into the secondary community spread from nosocomial infections.

33. To support analysis of transmission through schools, the impact of closures and viability of partial opening strategies, it would be helpful to increase the scope of routine data collections from schools. In particular, collection of data on: staff absences; the absence reason (suspected/confirmed COVID-19, household isolation, shielding, not required in school); pooling of schools and catchment areas under the current interventions would be useful.

34. Wider and more creative exploration of selective and partial school openings should be pursued, taking into account the issues and concerns raised elsewhere in this paper (for example: half-day or part-week closures, two weeks on followed by two weeks off, alternative cohorts etc). SPI-B have previously noted the need for any relaxation to be accompanied by clear guidance on infection control.

35. It may also be worth considering what other interventions, beyond schools, may have an impact on children's contact patterns and transmission.

C. Transmission in households

What does the existing evidence say?

36. Under current lockdown measures, the likelihood of infection for an individual will be strongly influenced by the infection status of other household members. Studies from Shenzhen and Guangzhou found that household contacts were at higher risk of infection than other close contacts of a case (eg. those in the same classroom) (3, 11)[2]. This is consistent with a study in Vo, which found that most new infections detected after the lockdown of the town were infected in the community prior to the lockdown or from asymptomatic infections in the same household (12).

[2] The Shenzhen study also found higher risk for those travelling with a case. The definition of close contact differed slightly in the two studies; details are provided in the references

37. Analysis of epidemiological data by households and inference of the secondary attack rates may therefore provide insights on the relative susceptibility and infectivity by age.

What are the main gaps in our evidence base?

38. There is currently a lack of high-quality epidemiological data stratified by households. Data on all household members/contacts and the testing/case status of each household member is required.

39. As existing household datasets are recruited on the basis of a confirmed and/or symptomatic case in the household, this may result in bias in the data which necessitates complex statistical handling. If large-scale community testing is carried out therefore (i.e. not based on a confirmed case and associated networks), capturing households as part of this will be invaluable. Contextual information on household composition (ages/relationships) and whether households contain members shielding or self-isolating within the home, environment (number of rooms/bedrooms) and key worker status will also be helpful.

40. Evidence of contacts within a household are limited, globally.

Proposals to address this

41. Availability of a suitable household dataset will allow inference of secondary attack rates in households of different sizes, and in households of similar sizes with children and without children.

42. The First Few 100 (FF100) dataset is currently being curated for household analysis. The dataset contains full household contacts, but not all members will have been swabbed and formally tested for COVID-19.

43. As mentioned earlier, ALSPAC will include development of an antibody test for household members.

44. Sequencing of infections may also indicate whether children are less likely to transmit COVID-19 and are more likely to "terminate" a chain of infections.

D. Transmission outside of schools, other institutional settings and households

What does the existing evidence say?

45. The spread of close-contact infections is ultimately dependent on the pattern of social interactions in a population. Social interactions have been measured in observational

studies that ask participants to report the number and age of the people they met face-to-face on a given day. Some studies have shown that children aged between 5 and 18 years old have the highest number of social contacts in a population (13,14) and relative and that the number of contacts reported by children is less variable than for adults (14) though a recent study suggests this pattern has changed for teenagers in recent years (15). The majority of children's contacts are at school, and out of term-time their number of contacts is lower (16).

46. Based on the assumption of relatively high contact rates in children, and with neutral assumptions about relative susceptibility and infectiousness, mathematical models predict that school-aged children usually experience the highest burden of infection and are major contributors to transmission during an outbreak. The cycle of the school year was known to drive measles epidemics in the pre-vaccination era, and the 2009 H1N1 influenza pandemic provided further epidemiological evidence for the importance of children in the transmission of respiratory infections, though this may have been enhanced by immunity in older adults. In 2009, the number of H1N1 cases grew most quickly in school-age children and the numbers of cases fell during the school summer holidays then picked up again when schools went back in September (16). Based on the 2009 influenza pandemic and predictions based on observed contact patterns, seasonal influenza vaccination for school-aged children is used to limit transmission to vulnerable and older people (17). Unfortunately, we do not know how applicable this is for COVID-19.

What are the main gaps in our evidence base?

47. There is limited information on the current behaviour and contact patterns of children, both overall or by age and for specific subgroups (e.g. vulnerable children). Existing contact surveys report on everyday life, and little is known about social contacts during this period, with only approx. 2% of children attending school. Children are also generally poorly represented in contact surveys, due to issues of consent and ethics for enrolling children, as well as a lack of interest and understanding. Alternative techniques might be needed to accurately capture children's contact patterns.

48. If adherence to the lockdown decreases (or increases) differentially by age, the resulting changes in transmission (and in incidence) may tell us more about transmission amongst children. We will be able to monitor this through changes in social contacts.

49. The importance of children's contact patterns in community transmissions is predicated on their infectiousness (6), and as set out earlier, there is limited robust evidence on this.

Proposals to address this

50. Existing contact surveys could be further analysed in depth to characterise children's contact patterns at times prior to the current pandemic, to establish a secure baseline for studies now.

51. There are a number of surveys underway to measure contact patterns during the lockdown, some of which include children. ALSPAC are surveying their second generation of participants about their contact patterns, along with developing an antibody test. Other real-time contact surveys are being implemented at the University of Lancaster aimed specifically at households (with and without children), and the University of Bristol aimed at University students. King's College London also have funding for qualitative research with parents and a one-off YouGov survey of 2,000 parents on their children's activities. This could be repeated if funding was made available.

52. LSHTM are conducting weekly polling of adults that has shown that contact numbers have reduced (18). Expanding this to include children, or asking the same questions through other routes, would provide valuable data. This would be subject to ethical considerations and access to existing child sampling frames. As such, any proposed surveying of children by DfE should ideally liaise with SPI-M/LSHTM and consider the inclusion of contact questions. Incorporating questions on contact patterns into national household surveys would also be helpful.

53. There may be non-response bias for surveys as children not adhering to social distancing may be the same groups and households who are less likely to respond to a survey. As a result, the use of incentives may need to be considered. An alternative route would be surveying children on their contacts and behaviours through teachers.

54. Evidence through contact surveys could also be supplemented through the increased use of big data analytics on children, such as Google location data, traffic cameras (measuring footfall and social distancing) and social media analysis. As these are "passive" sources, they may help to capture non-responding groups and mitigate against bias. Evidence from these sources, however, should be seen as indicative and not be considered a substitute for serological testing and contact surveys.

E. Wider impacts of current and possible interventions on children

55. It is critical to consider the wider social and developmental impacts of interventions on children – looking at the whole child and their experience, rather than solely on direct epidemiological impacts or issues in isolation. This needs to consider children as distinct clusters rather than one homogeneous group: both in terms of acknowledging differential in behaviour and impacts across age and other characteristics/areas, but also in terms of issues that may be specific to certain groups, such as vulnerable children and those with special educational needs and disabilities (SEND).

56. This will include, but are not limited to, the impact of interventions on the physical and mental health of children and parents, and consequences for the socialisation and development of children (particularly in early years). The medium and longer-term impact on educational attainment, health outcomes and productivity, as well as increasing educational and societal inequalities, is also critical.

57. For example, a cohort of children have experienced a shock to their education which will persist and affect their educational and work outcomes for the rest of their lives. Similarly, the current lockdown may lead to an increase in adverse childhood experiences (ACEs – for example: domestic violence, poor parental mental health, child neglect or abuse). ACEs associated with worse long-term health outcomes, and will likely exacerbate existing societal inequalities (eg. across deprivation).

58. Given the scope of issues and challenges that need to be considered, a comprehensive review of the evidence base and research questions is beyond this paper and the scope of this group. Many of these issues are also being considered as part of ongoing and proposed workstreams at DfE. An initial assessment of the wider impacts of school closures by SPI-B and DfE is provided in Annex A.

59. Broadly, there is a lack of information on current experiences for children and parents – for example, in terms of: variation in the extent and quality of home/distance learning; attendance by vulnerable children and changes on child protection / safeguarding services; impact on parental mental health etc. There is also an evidence gap around the longer-term impacts for children, particularly around mental health and child development.

60. Please note that there is some overlap in proposals between Annex A and the earlier sections, with a shared interest in understanding the current behaviour of children outside of school and improved data collections on schools, children and teachers.

We will liaise with DfE and SPI-B colleagues to ensure proposals are aligned and capture our combined interests.

61. Consideration of wider and long-term impacts should serve as a "reality check" of candidate interventions prior to detailed modelling – if a proposed intervention will be highly disruptive to children and parents, then it may not be worth pursuing. Any consideration of options for relaxing school closures should also bear in mind the practical challenges and implications for schools (eg. additional support or equipment needed, maintenance of childcare ratios whilst social distancing etc) and public perception.

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[1] Kellam and Barclay. The dynamics of the humoral immune response following SARS-CoV-2 infection and the potential for reinfection. (Paper 4a for SAGE 26)

[2] Rapid review on transmission of SARS-CoV-2 by children, update submitted 10 April 2020
Provided to SPI-M via SAGE secretariat

[3] Bi et al. Epidemiology and Transmission of COVID-19 in Shenzhen China: Analysis of 391 cases and 1,286 of their close contacts. medRxiv 2020.03.03.20028423; doi: 10.1101/2020.03.03.20028423
Close contacts were defined as those who lived in the same apartment, shared a meal, traveled, or socially interacted with an index case during the period starting two days before symptom onset.

[4] Zhang et al. Age profile of susceptibility, mixing, and social distancing shape the dynamics of the novel coronavirus disease 2019 outbreak in China. medRxiv 2020.03.19.20039107; doi: 10.1101/2020.03.19.20039107

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https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-13-europe-npi-impact/

[11] Luo et al. Modes of contact and risk of transmission in COVID-19 among close contacts. medRxiv 2020.03.24.20042606; doi: 10.1101/2020.03.24.20042606
Close contacts include such unprotected contacts as living in the same household, face-to-face working together, sharing the same classroom, visit or stay in the same hospital ward, taking the same car or aeroplane, sharing neighbouring seats in the same train or ship as a diagnosed COVID-19 patient. It also includes giving direct care to a diagnosed patient. Full definition provided in Appendix 1 of paper

[12] Crisanti et al. Suppression of COVID-19 outbreak in the municipality of Vo', Italy. Unpublished

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Annex A: The Wider Impacts of School Closures on Children

Gavin Morgan (University College London)
Brooke Rogers (King's Collee London)
Chris Bonell (London School of Hygiene & Tropical Medicine)
G.J. Melendez-Torres, University of Exeter
Alaster Smith (Department for Education)

Summary

1. This research note identifies the existing evidence, main gaps in our evidence base, and proposes ways to address these gaps in respect to the wider impacts of current and possible school interventions on children. This information will contribute to a greater understanding of the full picture when considering the impact of the interventions on the transmission of COVID-19, as well as on educational, social, and psychological outcomes of the children.

2. Consensus that the known gaps exist around understanding:
    a. The variability of impacts (age, stage, vulnerability);
    b. Impacts on education;
    c. Impacts on the social and emotional development of children;
    d. Impacts on teachers, parents and caregivers; and
    e. The practicalities of closure and reopening.

    This list is not extensive. Refinement is required moving forward.

3. Proposed recommendations to address this research gap include but are not limited to headteacher/school surveys, surveys into the practice of educational psychologists – and their views of the impact of this upon their practice, analysis of local authority data re schools that are open, the development of a survey/frontline portal to enable development of the issues from the bottom-up; identify solutions to better enable families to practically sustain education; identify the impact of interventions on behaviour across different age groups inside and outside of school; and identifying what people (children, teachers, parents) are doing, as well as understanding what is driving the behaviour.

A. Variability of impacts (age, stage, vulnerability)

What does the existing evidence say?

4. Impacts are likely to vary dependent upon age group. We begin formal schooling in the UK very early when compared to our European neighbours – Reception and Y1 children (age 4-5) are likely to be affected least.

5. Those in times of transition and exam years – Y6 moving into secondary school, and those at the top end of secondary are likely to be affected more. No formal 'ending' of their schooling, no exams, prom etc.

6. Many children will adapt and be just fine. There will be opportunities for families to bond more closely and to undertake a range of activities together. The Effective Pre-School, Primary and Secondary Education (EPPSE) project shows what types of child-adult interactions help learning and demonstrates the importance of children's home learning environments. Education is far broader than the classroom and the curriculum.

7. However, the more vulnerable children in our society are likely to be affected the most. This is expected to be the case among a range of vulnerabilities. For example, those with SEND (special educational needs and disability) are very likely be adversely affected. Children with EHCPs (Education, Health and Care Plans) can still attend a setting – many parents are choosing not to send children with SEND to school.

8. A period of learning at home is also likely to reinforce inequalities between children, and months away from school could mean that emerging learning problems are missed by educational psychologists. Assessments of development undertaken remotely are limited. This, potentially, means that opportunities for early intervention into any emerging concerns will be missed.

9. SEND is a very wide-ranging term, and will include children with learning needs, sensory needs, physical difficulties and social, emotional and mental health (SEMH) difficulties. Attachment is likely to be a significant issue, especially for children with SEMH. For some children school provides the most stable and secure part of their lives. For some children, especially with SEMH, a secure emotional attachment to a teacher or school staff member may well be stronger than with their own parents – these children will be adversely affected by a lack of emotional attachment. We know that a failure to positively support psychological wellbeing are likely to have longer term negative implications for child development (WHO, 2004; Norredam et al, 2018). We also know that school attachment and belonging are linked to later educational attainment (Wong et al., 2019).

10. 94% of vulnerable children are not in school[3]. A recent Department for Education (DfE) (2020) report[4] found that the risk to vulnerable children's welfare has increased significantly as a result of school closures. Vulnerable children not in school are most likely at home. The risk of harm and abuse in the home is likely to be higher due to isolation, financial stress and based on experiences in other countries (p. 1, 7, 8). For example, incidents of domestic violence in China tripled over the course of the epidemic (similar in Italy) (DfE, 2020, p. 8).

11. Parents and carers are reporting that previously available formal and informal support has decreased as a result of the coronavirus outbreak. Additionally, there is some evidence to indicate that EHC needs assessment and review work are being withdrawn. This may result in an escalation of needs (DfE, 2020, p. 7).

12. CSC referrals have decreased to around school holiday level, and National Panel Notifications for Serious incidents are not increasing. There are concerns of underreporting which may lead to a substantial surge demand in the future (DfE, 2020, p. 8).

What are the main gaps in our evidence base?

13. Lack of evidence that needy and vulnerable children are actually in school, despite schools remaining open for children with SEND and EHCPs – where are these children? What are they doing? How are they being supported, and importantly, safeguarded?

14. How are child protection services functioning currently in terms of referrals, follow-up, etc. and with respect to vulnerable children?

15. Who is actually attending schools at the moment – are they targeting vulnerable children?

16. How are schools accomplishing safeguarding functions when most children are not in schools?

17. Why are children with SEND/EHCPs not attending?

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[3] The attendance data is for state-maintained schools, is patchy for post-16 education, and does not include the early years.

[4] The scope of the DfE (2020) report is currently schools only (i.e. excludes early years and furthur education) (DfE, 2020, p. 2).

18. Differential impacts on different categories of SEND – physical/sensory difficulties etc.

19. Could we target groups of children to attend school?

B. Education

What does the existing evidence say?

20. Educational outcomes are seriously at risk, especially for disadvantaged pupils (DfE, 2020, p.1).

21. Schools are struggling to adjust their teaching patterns to engage pupils in out of school learning, especially in deprived areas. Teachers are reporting that they expect students' studies to be impacted significantly. (DfE, 2020, p. 1).

22. It is assumed that most students have access to devices and The Internet, though an important minority do not (DfE, 2020, p. 5).

23. Inequities are commonplace, with the majority of teachers surveyed by DfE felt that Year 8 students were likely to undertake less work per day than they should be. This translated to 14% believed to be doing less than an hour a day in affluent areas, compared to 43% in less advantaged areas (DfE, 2020, p. 5).

What are the main gaps in our evidence base?

24. What teaching is actually taking place at home?

25. Parents are their children's first educators and time to support their children's development at home could be positive. However, it cannot be assumed that all parents have the knowledge, confidence, resources and time to support learning opportunities for children. Schools and settings have a role to play here.

26. We need to understand the evidence base on different approaches to distance learning among school age children with a view to enhancing the effectiveness and equity of provision now. This could potentially be met though a rapid review by UCL Institute of Education's EPPI Centre. Private schools reportedly have excellent interactive systems – could we learn from them and perhaps require sharing of resources?

27. How can we best help and support schools and staff that are open in meeting the development and learning needs of their pupils whilst they are out of school – the need to build resilience in the school system.

28. Do we have good data on the proportion of children and families who are practically able to sustain online and home-based learning?

C. Social and emotional development

What does the existing evidence say?

29. Almost 7 in 10 (67%) respondents noted school closure had impacted on their child's mental health and almost 3 in 10 (26%) on their child's physical health (DfE, 2020, p 7).

30. Many children will miss the opportunities for pro-social interactions with their peer group.

31. The most vulnerable will also be negatively affected by existing family distress, housing, poverty, lack of outside space and opportunities for play and exercise, crucial for positive mental health and wider development.

32. Secondary impacts on children's social and emotional development may be unexpected in their range. These will likely worsen the longer that schools remain closed, and the country is subjected to lockdown. For example, parental unemployment – along with the effect that this will have upon parental mental-health and the subsequent impact upon their children – again attachment issues loom large.

33. Time out of school also generates substantial psychological inequalities on children. This is best understood with respect to summer holidays, where the relationship between parental socioeconomic position and mental wellbeing is mediated by loneliness, lack of socialisation, lack of physical activity and hunger. It is reasonable to expect that similar mechanisms apply here (Morgan et al., 2019).

34. When considering mental wellbeing at population levels (i.e. across children), symptomatology and wellbeing will be on a spectrum with likely bell-shaped distribution, rather than in terms of discrete cases (e.g. prevalence of depressive disorders).

What are the main gaps in our evidence base?

35. There is a lack of evidence on medium to longer term impacts of this upon mental health. Understandably there are only a few studies into this - Sprang et al (2013) report that children isolated or quarantined during pandemic diseases were more likely to develop acute stress disorder, attachment disorder and grief. Around 30% of the children who were isolated or quarantined met the clinical criteria for post-traumatic stress disorder. Time is an important issue – the longer this goes on, the

more profound the difficulties will be and the greater the cost and challenge to overcome them – it is a fine balance and secondary impacts need to be carefully considered.

36. Relatedly, what are the inequity-generating impacts on children's mental wellbeing of this pandemic (and its responses), and how severe are these gradients? Is this moderated by strong community/voluntary/school responses or parental coping?

37. What is schools' capacity to implement different interventions aimed at supporting mental health and wellbeing? Are schools anticipating 'system overload', both in terms of missed work and catch-up learning and in terms of a backlog of pressing student needs to be addressed?

38. Two urgent areas where experts are expressing concern, but require data to understand the impact are:
    a. Increases in child suicide.
    b. The impact of the lack of socialisation on pre-school children.

D. Impacts on teachers, parents and caregivers

What does the existing evidence say?

39. DfE (2020) estimates that approximately 24% of children of critical workers live in households where all adults are critical workers (p. 6).

40. Approximately 2%-4% of keyworker children are in school. Early Years provision is more of a concern, with reports from NHS and in the media of staff being unable to work due to childcare commitments (DfE 2020, p. 1, 7).

What are the main gaps in our evidence base?

41. DfE has a limited ability to monitor the impact of school closures on the ability of critical workers to go to work (DfE, 2020, p. 6).

42. What messages of support are being offered to parents? To children? How are messages being conveyed to families and children?

43. What are the chronic stress/mental health impacts on parents who are having to work at the same time as caring for children?

44. What are the impacts of parental chronic stress/mental health on the wellbeing of children?

E. Practicalities

What does the existing evidence say?

45. There are risks of opening too soon – teacher health and workload will have an impact – concerns about children being 'super-spreaders' infecting staff and therefore their families.

46. Social distancing in schools will be very hard to implement - if not impossible, for younger children.

47. There will also be important contextual effects to consider upon return to school. What this means is that the impact of poor mental wellbeing will be experienced in schools above and beyond the aggregate decreases in mental wellbeing. This is important because it means child outcomes will likely reflect a double burden of both poor mental health and contextual effects of poor mental health.

48. Again, we can also expect these contextual effects to be inequitable in their impact, focusing primarily on schools where existing high burdens of deprivation and poverty exist.

49. There are also likely wider impacts on children in context arising from access to services, e.g. child protection—for which school is a key referral mechanism.

50. Universal impacts are perhaps best understood as shifting the risk curve. We know that within populations and sub-populations risk is normally distributed, so the focus of general intervention is to shift the risk distribution up or down, rather than targeting the 'neediest'.

What are the main gaps in our evidence base?

51. In preparation for when schools reopen, we need to consider the implications of this period of closure. How will this change the role that parents seek to have in their children's education? What additional social and educational support will our children and their teachers need as they try to bring life back to normal?

52. What is the state of schools' readiness to return children—in terms of physical health and protective measures; mental health and addressing child distress; exacerbation of existing vulnerabilities?

53. What additional interventions to support return to school and associated challenges would schools most like to access?

54. We need to understand the proposed interventions and challenges/solutions to applying the interventions to different age groups within (and without) of school settings. For example, encouraging and enabling young adults to engage in social distancing vs keeping early years children from interacting. What is the evidence/experience of this?

55. Behaviour – how does age and type of setting impact the understanding of, and compliance with, social distancing measures? Ditto variation by CiN/CLA/EHCP.

56. Is there a role for social media in understanding compliance across different groups? And of perception of risk?

57. Planning the return to school – this in itself will not be straightforward

58. Identify the options and practicalities of what a return might look like (See CB's work with heads).

59. If transmission is largely behaviourally driven then what are the relative risks for;
    a. Pre-school/ early years – no sense of social distance, adult controlled low(ish) density locations.
    b. Primary – more sense of self and others, still adult control but more per setting.
    c. Secondary – more autonomy, larger numbers, lower self-control
    d. Post-compulsory – 18-24 increasingly "adult" control and regulation.

60. We need to understand more about the behaviour of children prior to and during school openings.
    a. 5-16 settings
        i. Who is still attending? How are they getting to and from school?
        ii. School work?
        iii. Going to shops?
        iv. What are they doing with their 1-hour outdoor time? Supervised?
        v. Are they following rules?
    b. Early Years settings
        i. Who is attending? Frequency of attendance?
        ii. Where and how often going out and about?
        iii. Where is the balance of risk in considering reopening for Early Years settings; while we know that young children play in closer proximity, they are also fewer in number in any given setting

Proposals to address these issues

61. Headteacher/school surveys

62. Surveys into the practice of educational psychologists – and their views of the impact of this upon their practice

63. Local authority data on schools that are open

64. Involvement of professionals – educational psychologists – in researching and planning for this.

65. A survey of educational psychologists (colleagues at UCL have already offered to do this)

66. Survey/portal on the frontline: The issues need to be identified from the bottom-up, as well. We need to commission work to find out what the issues/challenges are for teachers, for parents, and for children. Use teachers and parents as citizen scientists in their communities.

67. Identify solutions to better enable families to practically sustain education? What has already been considered? For example, providing tools for every child (unused tablets in schools) and ensuring access to wifi (free/subsidised?) for every child?

68. Identify ways to capture the sectors and occupations of parents in order to understand the relationship between school attendance (especially of key workers) and presenteeism/absenteeism across sectors.

69. We need to identify the impact of interventions on behaviour across different age groups inside and outside of school.

70. We need to identify how age and type of setting impact the understanding of, and compliance with, social distancing measures?

71. Move beyond simply trying to identify what people (children, teachers, parents) are doing, to understanding what is driving the behaviour.

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