

National guidance for the recovery of elective surgery in children

Health Policy team

The COVID-19 pandemic has resulted in the cessation of all but the most urgent elective children's surgical cases during the period of peak prevalence of infection in the general population.

These recommendations use the most up to date evidence to inform practice that will enable recovery of children's elective surgery.

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Updates

Main updates in this version (14 October 2020)

- A single pre-operative SARS-CoV-2 nasopharyngeal RT-PCR test is acceptable. It is advised that this is performed as close to the time of surgery as possible, preferably within 24 hours of the procedure but it is acceptable to perform it up to 72 hours prior to the procedure.
- Shielding is not recommended for children or their families prior to a procedure.

Updates in version published 11 September 2020

Guidance was updated to reflect [national infection prevention and control guidance from Public Health England \(PDF\)](#). Please refer to:

- Tables 6a and 6b in [Recommendations - Pre-operative](#)
- Table 7 in [Recommendations - Intra-operative: Minimum PPE requirements](#)

Background, aim and scope

Background: The COVID-19 pandemic has resulted in the cessation of all but the most urgent elective children's surgical cases during the period of peak prevalence of infection in the general population. In the period March to May 2020 over 50,000 children in England had surgery from all surgical specialties postponed. There is an urgent requirement to re-establish and maintain elective children's surgical services as the pandemic progresses.

Aim: To provide guidance on evidence-based practice that will enable recovery of children's elective surgery.

Scope: This guidance has been developed by the following organisations: NHS England, Public Health England, the Royal College of Surgeons of England, Royal College of Anaesthetists, Royal College of Paediatrics and Child Health, the Children's Surgical Forum, British Association of Paediatric Surgeons, Association of Paediatric Anaesthetists of Great Britain and Ireland, and The Association for Perioperative Practice.



While some recommendations focus on the systems organised in England, services in the devolved nations are encouraged to adopt them to fit local models.

Summary of recommendations

1. Prioritisation of surgical cases should be undertaken according to clinical urgency.
2. Theatre scheduling should ensure that every list is used effectively and efficiently, but take into account the additional time that may be required to perform safe elective surgery at times of high regional prevalence.
3. Elective surgical pathways should be responsive to regional prevalence of COVID-19, at times of low or moderate regional prevalence 'green' pathways can be employed.
4. Public Health England (PHE) will inform the 10 Operational Delivery Networks across England about the regional prevalence levels on a weekly basis for the ODNs to cascade to hospitals. These data will also be distributed to the Chief Medical Officers of the devolved nations.
5. Two metre distancing rules should be observed in pre- and post-operative areas including recovery. If this cannot be followed due to the restrictions of the site, local risk assessment should be undertaken.
6. All children and household members should undergo pre-operative virtual/telephone screening 24-72 hours pre-operatively specifically asking about symptoms suggestive of COVID-19 infection, including temperature, new cough, coryzal symptoms, lethargy and new shortness of breath. If symptoms are present in either the child or household members, advice should be given according to Government guidelines about COVID-19 testing and self-isolation and the procedure should be delayed until a later date. If the condition for which surgery is required does not allow a delay, a discussion about the decision making around this should occur within a multidisciplinary team and the

family. The patient and family members should be treated according to the local hospital COVID-19 positive patient pathway if the procedure goes ahead. If the child has mild coryzal symptoms and is otherwise well a pre-operative SARS-CoV-2 swab could be performed and if it is negative the child can continue to admission. It is not recommended that carers or parents accompanying the child to hospital for the procedure undergo routine swabbing.

7. During low or moderate prevalence periods, a single pre-operative swab should be taken a maximum of 72 hours before surgery and preferably as close to the time of surgery as possible. Ideally this occurs on the day of surgery, although it is recognised that access to point of care tests is currently severely limited. The rationale for performing this test is to reassure theatre staff, although there is still a risk of the patient developing COVID-19 during their inpatient stay.
8. During periods of high regional prevalence (>2%) a single pre-operative nasopharyngeal swab for RT-PCR should be taken, by a hospital setting (specialist centre or peripheral district general hospital) as close as possible to the time of surgery. Undertaking the swab in a hospital setting will enable rapid turn-around of results. Ideally the swab will be taken within 24 hours of surgery but it is acceptable to perform a swab up to a maximum of 72 hours pre-operatively.
9. Questionnaire screening of the child and household members for new symptoms of COVID-19 should be performed at the time of admission. If a child develops mild coryzal symptoms after pre-operative screening and have had a negative SARS-CoV-2 swab within 72 hours, a rapid swab could be performed to determine whether they have COVID-19 or another mild influenza like illness. Admission to a communal area should be avoided. If the swab is SARS-CoV-2 negative and the anaesthetist is happy to proceed, it is acceptable for the patient to follow the “green” pathway during times of low or moderate prevalence. If a child develops significant symptoms OR a household member has developed symptoms, the procedure should be delayed until a later date allows, and advice given according to Government guidelines about COVID-19 testing and self-isolation. If the condition for which surgery is required does not allow a delay, a discussion about the decision making around this should occur within a multidisciplinary team and the family.
10. All families should receive or have access to guidance and advice about the infection control processes associated with elective procedures considering COVID-19. ([Download our guidance for parents/carers, young people and children below.](#))
11. Pre-operative isolation is not recommended as a routine practice for children undergoing elective surgery. This paediatric specific recommendation supersedes the isolation advice within the all age guidelines produced by [PHE/NHSE](#).
12. It is the recommendation of Public Health England that regional prevalence data are used rather than local rolling period incidence data. This is because the dynamics of epidemics are such that it is very unlikely to get a highly discordant local prevalence versus regional prevalence. In addition to providing regional prevalence rate data to the Operational Delivery Networks on a weekly basis, the PHE modelling team will continue to look at local issues and in the event of high localised prevalence compared to the region as a whole, will report it as an exception to the network.
13. Units with large catchment areas should identify systems to facilitate local testing during periods of low and moderate prevalence. An example of such a system is NHS number 119, where parents can arrange drive-through or walk-through testing in the 72 hours prior to admission by dialling 119 and explaining that their child has an upcoming procedure. This will enable more equitable access to secondary and tertiary

healthcare, particularly for families who are geographically distant to the hospital or who are reliant on public transport for the journey to the hospital.

14. Children and their parents/carers should have the opportunity to discuss the procedure prior to elective admission and have access to written information. During the discussion, it should be explained that there is a small chance of the child and/or parent/carer acquiring COVID-19 in hospital. Whenever possible, consent will be taken prior to admission.
15. The number of resident carers should be prioritised as far as possible with ideally one accompanying each child to the hospital for a day-case procedure. When children require an inpatient stay, local policy should be followed, with an emphasis on resident carers being able to change but ideally just with other resident carers from the same household. Ideally the resident carer does not have a co-morbidity associated with an increased risk of severe COVID-19; this should be discussed at the pre-operative assessment.
16. All resident carers should wear a face covering while in hospital if away from the bed-space.
17. 'Hot' and 'cold' operating sites are not mandatory for children undergoing elective procedures. However, any location used for paediatric anaesthesia and surgery must be compliant with the [RcoA Guidance for the provision of paediatric anaesthesia services 2020](#) throughout the patient pathway.
18. Cubicles should be prioritised for children and accompanying parents with co-morbidities associated with an increased risk of severe COVID-19.
19. Healthcare workers (HCWs) should wear droplet precaution PPE (personal protective equipment, ie facemask, gloves and apron) when they attend to a patient and are unable to maintain 2 metre distance, in keeping with Public Health England (PHE) guidance.
20. HCWs and porters who transfer a patient to theatre should wear droplet precaution PPE, in keeping with PHE guidance.
21. A theatre team briefing should include a review of the COVID-19 swab result and discussion about anticipated transmission risk related to the procedure (including any aspects that are aerosol generating) to guide staff choices regarding PPE. Ensuring that theatre staff who need to wear airborne PPE receive adequate rest periods should be included in the team briefing.
22. [The World Health Organization \(WHO\) check](#) should be completed for every patient, with recommended droplet precaution PPE for health care workers and face coverings for resident carers.
23. The accompanying parent/carer and nurse can stay with their child for the beginning of the anaesthetic without alteration to the normal hospital policy with the aerosol generating procedure (AGP) being delayed until they leave the anaesthetic room.
24. At times of low and moderate regional prevalence of COVID-19, 'green', 'amber' and 'red' pathways can be employed as described by Public Health England. Droplet protection PPE can be worn by HCWs engaged in AGPs for 'green' patients, and normal theatre cleaning procedures and air change policy can be employed for these patients too. Laryngeal masks airways (LMAs) and oropharyngeal airways can be removed from 'green' patients in recovery by HCW wearing droplet protection PPE.
25. At times of high regional prevalence, additional precautions are recommended during AGPs being performed on 'green' patients:
 - HCWs within the anaesthetic room during AGP and the five subsequent air changes are recommended to wear airborne PPE. The minimum PPE

requirement during intubation of a child is an FFP3 mask (or equivalent), eye protection, apron and gloves.

- A transfer of the patient from the anaesthetic room to theatre should not be delayed for air changes
 - HCWs in theatre at the time of extubation should be kept to a safe minimum and should wear airborne precaution PPE. The minimum PPE requirement during extubation of a child undergoing elective surgery is an FFP3 mask (or equivalent), eye protection, fluid repellent gown and gloves.
 - LMAs can be removed in recovery by a HCW wearing airborne PPE (oropharyngeal airways can be removed in recovery by a HCW wearing droplet precaution PPE).
 - Environmental cleaning of theatre can be commenced by HCWs wearing airborne precaution PPE (minimum FFP3 mask, visor and gloves) after three air changes following the last AGP performed or by HCWs wearing droplet precaution PPE after five air changes following the last AGP.
26. Consistent messaging regarding hand washing, social distancing and face coverings should be maintained throughout the hospital to reinforce that these infection prevention and control measures are the most effective way of reducing the transmission of COVID-19.
 27. Normal post-operative observations and care pathways should be followed.
 28. Rapid discharge after day case procedures should be supported and encouraged.
 29. Children and resident carers do not need to self-isolate after discharge from hospital unless they have been diagnosed with COVID-19 or have come into close contact with someone with COVID-19.
 30. Virtual or telephone clinics should be supported by the trust to improve access to healthcare for all patients and to reduce the number of children who need to return to the hospital for outpatient review.
 31. Surveillance of nosocomial outbreaks and monitoring of outcomes of children after surgery should be undertaken by each Trust.
 32. If a child undergoes an elective procedure within 14 days of a positive swab for SARS-CoV-2, it is recommended they are reported to the www.covidinchildren.co.uk database to enable monitoring of outcomes.
 33. National monitoring of elective surgery activity including the rates of cancellations, the incidence of COVID-19 before and after elective surgery and the clinical course of children undergoing elective procedures with COVID-19 should be undertaken.
 34. Providers should develop procedures and processes within the trust to respond to increases in regional prevalence of COVID-19 and to stratify patients according to the PHE pathways.

Background and rationale

The COVID-19 pandemic has resulted in the cessation of all but the most urgent elective children's surgical cases during the period of peak prevalence of infection in the general population. In the period March to May 2020 over 50,000 children in England had surgery from all surgical specialties postponed. There is an urgent requirement to re-establish elective children's surgical services and continue to safely provide elective surgical care to children through further periods of higher levels of prevalence.

There are now an enormous excess of children requiring elective operations and waiting far

longer than the recommended 16 week limit for a procedure that may be needed to improve conditions that are symptomatic, affect their quality of life or have a risk of complication if not operated on.

Feedback from parents reveals that COVID-19 has had an impact on the way that children and young people and their families view hospital care during the pandemic.¹ Many are concerned about being a burden to an overstretched NHS and some have turned down elective procedures because of this. Many also describe a feeling of anxiety when they come to hospital as they are aware that there is a higher risk of developing COVID-19 in hospital and that they will often be mixing with other people much more than they have in the preceding few months. There is anxiety that other families visiting the hospital may not follow the guidance about social distancing and wearing face coverings, too. Some children, young people and families have expressed concern about the privacy and confidentiality that surrounds virtual consultations and have highlighted the need for respectful and private conversations.

These concerns need to be addressed in any guidance relating to resumption of elective surgery in children.

National survey data demonstrate considerable variation between hospitals in terms of the infection control measures they have for children undergoing elective surgery. Many hospitals have based their pathways on national guidance originating from the [Royal College of Surgeons of England](#) and [Public Health England](#). These pathways do not reflect the differences between adults and children in terms of COVID-19 infection and in addition offer little guidance for parents or carers.

This was the rationale for reviewing the paediatric literature and drafting these consensus recommendations.

Principles

- The safety of children, their families and staff is paramount.
- Recommendations are to be equitable irrespective of socioeconomic status, ethnicity, or geographic location. No child should be left behind as a consequence of these recommendations.
- Recommendations are evidence-based and may change as evidence and experience evolves.
- Recommendations are to be responsive to the prevalence of COVID-19 in the community.

Summary of COVID-19 in children evidence

Testing for COVID-19

Testing for acute COVID-19 infection is performed using reverse transcriptase polymerase change reaction (RT-PCR). The diagnostic accuracy of the test is based on the ability to gain a representative sample of the person who is being tested, and for the sample to be analysed by a procedure which reliably detects the presence of SARS-CoV-2 RNA within this sample (the operational accuracy). As with any test, the results can be categorised into true positives and true negatives (where the result of the test is correct) and false positives and

false negatives (where the result of the test is incorrect), which can occur for a number of reasons. False positives can occur when there is contamination of the sample, when there is a disruption of the RT-PCR procedure (e.g. a problem with the primers or the control or the amplification process) or when there is cross reaction with other genetic material. False negatives can occur when the swab does not pick up a representative sample of patient material (i.e. a small numbers of cells or cells that are not carrying SARS-CoV-2) or when there is disruption of the RT-PCR procedure. It is also dependent on the timing of swabbing in relation to the disease process. There is concern for children that performing an accurate nasopharyngeal swab (the gold standard) is more difficult as it is an uncomfortable procedure although it is recognised that the operational sensitivity of the test has improved over the previous months as healthcare workers have become more adept at swabbing children effectively. Using saliva or oral fluids does not improve the accuracy and is therefore not recommended at this time.

The sensitivity and specificity are not the only important measures of accuracy of the result. In times of low prevalence of COVID-19 the likelihood of an individual having COVID-19 is low, and when they don't have symptoms of COVID-19 it is even lower (pre-test probability). Therefore, when a swab is performed to look for SARS-CoV-2 during periods of low prevalence, a positive result is more likely to be a false positive than a true positive (giving a low positive predictive value), whereas a negative result is more likely to be a true negative (giving a high negative predictive value). As prevalence increases, the pre-test probability of having COVID-19 increases and therefore positive results are more likely to be correct.

Table 1 below displays the changes to true positive and negatives and false positives and negatives as the prevalence levels change. We see that as prevalence increases to high levels, the proportion of true positives compared to false positives becomes higher and therefore the positive predictive value of the test is better. Table 1 also shows the changes to true negatives and false negatives as prevalence increases. This changes very little until prevalence levels become very high (>80%) and therefore a negative test is very reliable at being able to distinguish a person not having COVID-19 at the time that they are swabbed.

Table 1 Changes to true positive and negatives and false positives and negatives as the prevalence levels change (Prevalence 0.5% and 2%).

	Prevalence 0.50%				Prevalence 2%			
Specificity	98.00%		99.70%		98.00%		99.70%	
Sensitivity	PPV	NPV	PPV	NPV	PPV	NPV	PPV	NPV
100.00%	20.1%	100.0%	62.6%	100.0%	50.5%	100.0%	87.2%	100.0%
90.00%	18.4%	100.0%	60.1%	100.0%	47.9%	99.8%	86.0%	99.8%
80.00%	16.7%	99.9%	57.3%	99.9%	44.9%	99.6%	84.5%	99.6%
70.00%	15.0%	99.9%	54.0%	99.9%	41.7%	99.4%	82.6%	99.4%
60.00%	13.1%	99.8%	50.1%	99.8%	38.0%	99.2%	80.3%	99.2%
50.00%	11.2%	99.7%	45.6%	99.8%	33.8%	99.0%	77.3%	99.0%

Table 2 below displays how long a negative test can be relied upon to say that a person

without symptoms does not have COVID-19 during periods of high prevalence. For children incubating the virus at the time of testing, we can see that at 24 hours after the test is taken, 80% of these children remain non-infectious. By 72 hours after a test, if a person was incubating the virus when the test was taken, 50% of children would be shedding it (and therefore infectious) at that time.

Table 2 How long a negative test can be relied upon to say that a person without symptoms does not have COVID-19 during periods of high prevalence.

Hours after test	2.5 quantile	Median	97.5 quantile
1	0.726	0.766	0.804
3	2.228	2.298	2.363
6	4.493	4.586	4.68
12	9.017	9.159	9.295
24	17.961	18.135	18.319
32	23.748	23.929	24.125
48	34.587	34.814	35.037
60	41.961	42.212	42.427
72	48.647	48.895	49.123
84	54.633	54.867	55.095

Current prevalence rates in England vary significantly between regions (Table 3) and between age groups. Testing during periods of low prevalence is likely to result in more children being cancelled inappropriately (due to a false positive result) than because they truly have COVID-19. One can consider urgently repeating the COVID-19 test pre-operatively in asymptomatic children with no other risk factors for COVID-19 who are found to be positive on their initial test.

Temporal changes in prevalence of COVID-19 during the pandemic

Updated 18 January 2021 The table below shows how prevalence has changed between the initial peak, 23 March 2020, and now.

Location	Prevalence (Mean,95% CI)			
	29 March 2020	08 January 2021	15 January 2021	22 January 2021 (estimated)
England	3.7% (3.1-4.8)	1.84% (1.69-2.03)	1.64% (1.36-2.01)	1.41% (1.04-1.93)

	Prevalence (Mean,95% CI)			
North East	2.5% (2.0-3.3)	1.15% (0.88-1.54)	0.87% (0.54-1.54)	0.62% (0.30-1.49)
Yorkshire and The Humber	2.5% (2.0-3.3)	1.38% (1.07-1.84)	1.26% (0.78-2.22)	1.09% (0.52-2.55)
North West	3.8% (3.0-4.9)	2.67% (2.14-3.40)	2.81% (1.80-4.57)	2.74% (1.39-5.56)
East Midlands	3.5% (2.8-3.5)	1.53% (1.20-2.01)	1.33% (0.84-2.30)	1.10% (0.54-2.51)
West Midlands	3.5% (2.8-3.5)	1.39% (1.09-1.83)	1.16% (0.72-2.01)	0.91% (0.44-2.09)
East of England	3.0% (2.4-3.9)	1.69% (1.36-2.15)	1.32% (0.86-2.16)	0.97% (0.50-2.08)
London	9.0% (7.3-11.6)	3.24% (2.68-4.07)	2.71% (1.81-4.34)	2.11% (1.13-4.31)
South East	2.2% (1.8-2.9)	1.49% (1.24-1.86)	1.07% (0.74-1.70)	0.72% (0.40-1.48)
South West	1.1% (0.9-1.5)	0.59% (0.45-0.81)	0.46% (0.28-0.85)	0.34% (0.16-0.86)

Epidemiology and the risk of being infected

Children <18 years old have accounted for a minority of detected cases of COVID-19 worldwide to date, usually accounting for between 1 and 5% of total cases, depending on national testing strategies (those which have been more focussed on testing the most unwell have the smallest numbers of children). Where more granular detail is available, there has been a “U shaped” distribution of acute case detection, with cases more frequently detected in infants and older adolescents; approximately 1/3 of detected cases have been in adolescents aged 15 – 18 years.²

Widespread sero-surveillance has emerged from several countries including Spain, Switzerland, Germany and Italy, which have all reported reduced seropositive cases in children compared to adults (eg in Spain ranging from 1% positivity in <1 year, to 3% in those aged 5 to 9 year, ~4% in those aged 10 - 19 years, increasing to 6.9% in those aged 70 - 74 years). It still remains unclear to what degree their lower seropositivity is due to being less susceptible to infection, or due to reduced exposure (lockdown).³

Clinical course

There is a strong age gradient in severity of illness and risk of death⁴ as demonstrated in Figure 2 below.⁵

	Deaths	Laboratory-confirmed cases*	Case fatality ratio			Infection fatality ratio†
			Crude	Adjusted for censoring	Adjusted for censoring, demography, and under-ascertainment‡	
Overall	1023	44 672	2.29% (2.15-2.43)	3.67% (3.56-3.80)	1.38% (1.23-1.53)	0.657% (0.389-1.33)
Age group, years						
0-9	0	416	0.000% (0.000-0.883)	0.0954% (0.0110-1.34)	0.00260% (0.000312-0.0382)	0.00161% (0.000185-0.0249)
10-19	1	549	0.182% (0.00461-1.01)	0.352% (0.0663-1.74)	0.0148% (0.00288-0.0759)	0.00695% (0.00149-0.0502)
20-29	7	3619	0.193% (0.0778-0.398)	0.296% (0.158-0.662)	0.0600% (0.0317-0.132)	0.0309% (0.0138-0.0923)
30-39	18	7600	0.237% (0.140-0.374)	0.348% (0.241-0.577)	0.146% (0.103-0.255)	0.0844% (0.0408-0.185)
40-49	38	8571	0.443% (0.314-0.608)	0.711% (0.521-0.966)	0.295% (0.221-0.422)	0.161% (0.0764-0.323)
50-59	130	10 008	1.30% (1.09-1.54)	2.06% (1.74-2.43)	1.25% (1.03-1.55)	0.595% (0.344-1.28)
60-69	309	8583	3.60% (3.22-4.02)	5.79% (5.20-6.34)	3.99% (3.41-4.55)	1.93% (1.11-3.89)
70-79	312	3918	7.96% (7.13-8.86)	12.7% (11.5-13.9)	8.61% (7.48-9.99)	4.28% (2.45-8.44)
≥80	208	1408	14.8% (13.0-16.7)	23.3% (20.3-26.7)	13.4% (11.2-15.9)	7.80% (3.80-13.3)

Figure 1. Key Findings From the Chinese Center for Disease Control and Prevention Report

As a result, the clinical impact of COVID-19 disease in children has been extremely limited worldwide. There has been a handful of deaths reported, and only 70 PICU (Paediatric Intensive Care Unit) admissions in the UK during the peak of the pandemic.⁶ Not all those admissions were necessarily due to COVID-19. Severity matches case detection, with more PICU admissions in infants or very young children and adolescents. The clinical presentation is like adults, with primarily upper/lower respiratory tract symptoms, although they tend to be much milder. It is believed that a significant proportion of children develop no, or subclinical symptoms, but the true number is unknown. A recent sero-survey and symptom study in London found 40% of children to be truly asymptomatic.

Newborns have had reported infection with COVID-19, including testing positive within 12 hours of birth, indicating perinatal transmission or even intra-uterine transmission. In general neonates have also had a relatively uneventful course, with a small number needing respiratory support.

Transmission

Details regarding the role of children in transmission of COVID-19 are still emerging. Children appear to have had a limited role in transmission during the pandemic to date, based on the results of numerous contact tracing studies and the evidence of lower rates of infection in sero-surveillance studies. Household contact tracing data has consistently found children are less likely to acquire COVID-19 from an infected household member than adults within the same household (roughly by half, or less).⁷

There have been very few examples of a child as an index cases identified, so determining how infectious a child is to others once infected is challenging. Data from some laboratory studies have shown children to have viral loads similar to that of adults, however the number of children included tend to be very small, and there are concerns they are not representative of the wider population of children with COVID-19. Some studies have shown lower viral loads in children.

Outcomes of children with COVID-19 during the peri-operative period

Although data suggest a significant mortality and morbidity in adults with peri-operative SARS-CoV-2 infection, there are minimal data on the outcomes of children who have undergone surgery when they have had COVID-19 in the peri-operative period. The COVIDSurg study⁸ included 56 people under 30 years of age who were either SARS-CoV-2 positive on reverse transcriptase polymerase chain reaction (rt-PCR) or had a high clinical suspicion of COVID-19 based on clinical and/or radiological features between 7 days before surgery and 30 days after surgery. There was no mortality in this group but 30% were described as having pulmonary complications. Personal communication with the same group report that they now have 89 children recorded in their data collection tool with one paediatric death. The results are currently under further analysis and being prepared for publication.

Further detailed data are available from the [Public Health England paediatric surveillance of COVID-19](#) where six children were diagnosed with COVID-19 up to 14 days pre-operatively, none post-operatively. All children survived and, while two required respiratory support, this was not out-with the expected course for their condition. There is no data of any neonates with COVID-19 requiring an operation to date.

Great Ormond Street report that in the three months from March to May they have performed 13 procedures on 11 children who were SARS-CoV-2 positive. These children followed the expected course for their condition.

For updated summaries of the paediatric evidence, see [Don't Forget the Bubbles evidence summary](#) and [RCPCH evidence summaries](#).

Community and hospital prevalence of COVID-19

There is substantial variation between regions in the prevalence of COVID-19 and rates are increasing in the winter months. Public Health England and the Office for National Statistics (ONS) track week-on-week data to look at the prevalence of COVID-19 over time both between regions and within regions (i.e. local variation). PHE data systems are sufficiently robust to pick up significant local variations which differ significantly from the prevalence of the region as a whole. PHE will alert an ODN if a localised area has a significantly higher prevalence (>2%) compared to the whole region.

Assessing level of risk of performing elective surgery in children and amending infection control processes accordingly

We recommend that a low / moderate / high system based on accurate community prevalence rates is implemented to denote the risk level of performing elective surgery in children (Table 4).

Table 4 Categorisation of local prevalence levels

Low	Low levels of COVID-19 in community (prevalence < 0.5%)
Moderate	Low to moderate levels of COVID-19 in community (prevalence >0.5% but <2%)
High	Moderate to high levels of COVID-19 in community (prevalence >2%)

Infection control recommendations should be amended in real time to reflect the level of risk. Although no changes in infection control measures are required when prevalence rises from low to moderate levels, there is an expectation that the situation is monitored closely in case the prevalence continues to rise to high rates. In this situation, there is expected to be some reduction in elective activity within hospitals during periods of high regional prevalence due to lower staff numbers due to staff members isolating and waiting for air-changes between AGPs.

Actions:

- **Public Health England / NHSE:** Formal weekly review of the regional prevalence levels by Public Health England. Public Health England to communicate the regional prevalence rates/level of risk each Friday to the 10 Operational Delivery Networks across England for them to cascade to hospitals. These data will also be distributed to the Chief Medical Officers of the devolved nations and it recommended that their relevant agencies share regional prevalence data. If prevalence levels are significantly higher in a localised area (i.e. 2%) compared to the rest of the region, PHE will inform the individual ODNs.
- **ODNs:** Effective communication with all providers about the prevalence levels for the region.
- **Providers:** Pre-operative practices around COVID-19 should alter according to a low-moderate / high system based on regional variation. In accordance with PHE IPC guidance, when regional levels are low or moderate, the ‘green, amber and red’ patient pathways can be followed with reduced IPC requirements as appropriate. Enhanced screening and IPC measures will be required during periods of high regional prevalence.

Recommendations - Red, Amber and Green pathways

In light of revised [PHE guidance on infection prevention and control](#), it is recommended that children are stratified according to a red, amber, green system similar to the PHE recommendations. Careful consideration should be taken about performing any elective surgery on children who fall into red or amber categories.

Figure 2. Red, amber and green pathways for elective surgery for children

	High risk COVID-19 Pathway - Red	Medium Risk COVID-19 Pathway - Amber	Low Risk COVID-19 Pathway - Green
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<p>During low and medium prevalence of COVID-19</p>	<p>a) Symptomatic or suspected COVID-19 individuals including those with a history of contact with a suspected COVID-19 case</p> <p>b) Confirmed SARS-CoV-2 on RT-PCR</p> <p>c) Symptomatic individuals who decline testing</p>	<p>a) Asymptomatic for COVID-19 with no known recent contact but testing for SARS-CoV-2 has not been performed</p>	<p>a) No symptoms or known recent contact with COVID-19</p> <p>AND</p> <p>have a negative SARS-CoV-2 test within 72 hours of treatment</p> <p>OR</p> <p>b) Have recovered from COVID-19 with at least 3 consecutive days without fever or respiratory symptoms and a negative COVID-19 test</p>
<p>During high prevalence of COVID-19</p>	<p>a) Symptomatic or suspected COVID-19 individuals including those with a history of contact with a COVID-19 case</p> <p>b) Confirmed SARS-CoV-2 on RT-PCR</p> <p>c) Symptomatic individuals who decline testing</p>	<p>a) Asymptomatic for COVID-19 with no known recent contact but testing for SARS-CoV-2 has not been performed</p>	<p>a) No symptoms or known recent contact with COVID-19</p> <p>AND</p> <p>have 1 negative SARS-CoV-2 test a maximum of 72 hours before treatment and preferably a maximum of 24 hours before treatment</p> <p>OR</p> <p>b) Have recovered from COVID-19 with at least 3 consecutive days without fever or respiratory symptoms and a negative COVID-19 test</p>

Recommendations - Theatre list planning

Management of the theatre waiting list will be determined by multiple factors including the clinical urgency of the procedure, changes in the clinical condition which have occurred

between listing of a case and the time of operation, pre-operative assessment and (non-COVID) investigations which are required and taking consent. This is because the clinical indications for some procedures may have changed as a result of the positive impact of lockdown on children's health, eg reduced upper respiratory infections. In addition, adjustments in the planning of the theatre list may be required to consider additional protective measures in theatre, primarily the time required for air changes after airway manipulation.

Guidance on the recovery of surgical services and on the clinical urgency of the procedure has been published by the Royal College of Surgeons of England (Table 5)⁹.

Table 5. Prioritisation of surgical procedures, Royal College of Surgeons England

Priority level 1a	Emergency - operation needed within 24 hours
Priority level 1b	Urgent - operation needed within 72 hours
Priority level 2	Surgery that can be deferred for up to 4 weeks
Priority level 3	Surgery that can be delayed for up to 3 months
Priority level 4	Surgery that can be delayed for more than 3 months

During periods of low and moderate prevalence cases of category 1, 2, 3 and 4 urgency can be undertaken. During high periods every attempt should be made to continue elective surgery, but local providers should risk assess this and match capacity to service demands / staff availability.

Recommendations

- Prioritisation of surgical cases should be undertaken according to clinical urgency.
- Theatre scheduling should take into account the additional time that may be needed to perform a case if a patient is on an 'amber' or 'red' COVID-19 pathway, or the prevalence of COVID-19 is high but ensure that the list is used effectively and efficiently.

Actions

- Providers: Local hospital policy will enable effective theatre list management to ensure that children can be operated on according to clinical urgency, within the context of changes due to the regional and national levels of, and response to, COVID-19.

Recommendations - Pre-admission

1. Pre-assessment and information for parents and managing expectations

Pre-assessment of children undergoing surgery improves the efficiency of surgical lists as well as reducing the rate of on the day cancellations. The aim of pre-assessment is two-fold: to determine the need for pre-operative investigations and/or optimisation; and assessing the risk of the patient or family member having COVID-19. The former is likely to be embedded within hospital policy but use of teleconferencing or telephone screening may need to be employed, along with advice in-line with hospital policy about attending for pre-operative investigations. The latter is expected to be an additional formal process which is performed 48 hours prior to admission and at the time of admission

Pre-assessment offers an opportunity to provide the child and family with clear information about the infection control processes involved in the admission - [Download our posters for parents, children and young people below](#). During this discussion, it should be explained to the family that there is a small chance of the child and/or parent/carer acquiring COVID-19 in hospital. This is an opportunity to reiterate the importance of parents/carers adhering with infection prevention practices in hospital. It was agreed that a parent information resource would be developed to support this.

Pre-operative information for parents is essential and should reflect the need for hospital practices to adapt to external changes, particularly as community prevalence changes.

Recommendations

- All children and household members should undergo pre-operative virtual/telephone screening 24-72 hours pre-operatively specifically asking about symptoms suggestive of COVID-19 infection, including temperature, new cough, coryzal symptoms, lethargy and new shortness of breath. If symptoms are present in either the child or household members, advice should be given according to Government guidelines about COVID-19 testing and self-isolation and the procedure should be delayed until a later date. If the condition for which surgery is required does not allow a delay, a discussion about the decision making around this should occur within a multidisciplinary team and the family. The patient and family members should be treated according to the local hospital COVID-19 positive patient pathway if the procedure goes ahead. If the child has mild coryzal symptoms and is otherwise well a pre-operative SARS-CoV-2 swab could be performed and if negative the child can continue to admission.
- Screening of the child and household members for new symptoms of COVID-19 should be performed at the time of admission. If a child develops mild coryzal symptoms after pre-operative screening and have had a negative SARS-CoV-2 swab within 72 hours, a rapid swab could be performed to determine whether they have COVID-19 or another mild influenza like illness. If negative and the anaesthetist is happy to proceed, it is acceptable for the child to follow the “green” pathway during times of low or moderate prevalence. If a child develops significant symptoms OR a household member has developed symptoms, the procedure should be delayed until a later date allows, and advice given according to Government guidelines about COVID-19 testing and self-isolation. If the condition for which surgery is required does not allow a delay, a discussion about the decision making around this should occur within a multidisciplinary team and the family.

Action

- **Providers:** To establish a safe and effective method of screening patients and their household members pre-operatively for symptoms and signs of COVID-19, preferably prior to physical entry into the hospital.

Recommendation

- All families should receive or have access to guidance and advice about the infection control processes associated with elective procedures considering COVID-19.
[Download our posters for parents, children and young people below](#)

Action

- **Providers:** To signpost parents and children to accurate information about the infection control processes in place related to COVID-19 at the time they are booked for a procedure. This can be provided online and/or by post. Provider specific information may also be produced and delivered about local hospital policy including local pre-operative processes, use of kitchen facilities and parent accommodation.

2. Pre-operative isolation

Until recently, many institutions asked for adults and children is to enforce 14 days of shielding prior to a planned operation. However, the impact of complete shielding on a family is significant and includes children not being able to attend school, parents not being able to go out to work and loss of any local support network. In addition, anecdotal data suggest that adherence to even short periods (<72 hours) of recommended isolation is poor and therefore cannot be relied upon.

[Guidance from Public Health England \(20 August 2020\) \(PDF\)](#) recommends that shielding can now be reduced to the period between the swab being taken and admission to hospital. As children cannot effectively isolate as a parent or guardian is almost always needed, and because children are less likely to contract COVID-19, isolation is not recommended for children. For isolation to be effective for children the isolation period would need to be significantly longer to allow for both the parent and child to not cross-infect each other during the period of isolation, and isolation from other household members would also have to occur. The benefits of isolating are therefore not seen and are of minimal effectiveness as children are far less likely to be infected compared to adults.

Recommendation

- Pre-operative isolation is not recommended as a routine practice for children undergoing elective surgery.

3. Pre-operative SARS-CoV-2 testing

Reverse transcriptase polymerase chain reaction (RT-PCR) performed on a single swab of throat then nose looking for SARS-CoV-2 is the recommended test for diagnosing acute COVID-19.¹⁰ It has a high analytical sensitivity and can detect low levels of SARS-CoV-2 with good reproducibility.

However, from a clinical perspective, SARS-CoV-2 is more commonly detected in the lower respiratory tract, meaning that combined throat and nose swabbing may not detect SARS-

CoV-2 in a person who has COVID-19, with an estimated sensitivity of 80%.¹¹ In addition, studies show that SARS-CoV-2 can continue to be detected for a prolonged period after clearance of the active virus, demonstrated by the inability to replicate the virus in a laboratory after detection of SARS-CoV-2 with RT-PCR.¹² This gives the potential for both false negative results (the test is negative but the patient does have COVID-19) and false positive results (the test is positive but the patient does not have COVID-19).¹³ When the community prevalence level is low, the false positive rate is higher than the true positive rate, meaning that some patients will not be able to undergo an elective procedure, even though they do not have COVID-19.

The optimal time to perform a test is directly before commencing a procedure. Point of care testing for SARS-CoV-2 is available and is seen as the 'gold standard' but is currently significantly limited. This may change over time. In view of the potential for false positive and false negative RT-PCR results in the context of low community level of COVID-19, a single pre-operative test in an asymptomatic child is reported to have a 40% chance of predicting whether they develop COVID-19 during their admission. The addition of a second test 72-96 hours later increases the predictive power to 80%. However, in the context of very low community levels of COVID-19, the rate of detection of asymptomatic SARS-CoV-2 infection in a child is very low. As the prevalence of COVID-19 increases, the predictive power of the test also increases with the number of true positive results increasing and therefore a proportional reduction in the number of false positive results. The prevalence of COVID-19 must reach exceedingly high levels (>80%) before a proportional increase in the number of false negative results rises and therefore the negative predictive power of the test is maintained during current levels of infection.

A number of informal surveys of multidisciplinary healthcare workers (HCWs) in theatre clearly demonstrate that the absence of a negative pre-operative COVID-19 swab result would result in HCWs having a much lower threshold for donning airborne PPE including for non-AGPs during periods of low prevalence. In addition, it is recognised that a single pre-operative nasopharyngeal swab is recommended for adult patients undergoing elective surgery; a different protocol for adults and children regarding swabbing could generate unnecessary concern for staff, particularly when children and adults are cared for on the same site.

The group has moved from recommending two pre-operative swabs during times of high prevalence to using one pre-operative swab for a number of reasons. Firstly, the most important aspect of performing a swab for COVID-19 before a procedure is that it is performed as close in time to the procedure as possible. As demonstrated by Table 1, a swab's reliability reduces with time and therefore we recommend that whenever possible, a swab is performed within 24 hours of the planned procedure. It is recognised that this may not be achievable in some/many trusts but a maximum period for relying on a negative swab before a procedure should be 72 hours.

Secondly, the ability to perform two tests on children is significantly limited in many centres in the country. This limitation will reduce children's access to surgical services and for many will be counter-productive in giving children access to much needed care. There may be some situations where hospitals consider performing two pre-operative swabs, for example for children who are anticipated to have a long post-operative stay on intensive care to further reduce the likelihood that a child is incubating infection prior to procedure. This strategy is only effective if the child has isolated between the two swabs, something which is almost

impossible for children when they require a carer to be present, as described in the section on pre-operative isolation.

In order to ensure the rapid turnaround of tests to enable children to safely undergo elective procedures it is recommended that testing is performed by hospitals rather than test and trace services where the time to return the swab results may considerably be longer. Many specialist centres have a wide catchment area so close engagement with local hospitals to provide swabbing for children who require an elective procedure with effective communication of the test results is strongly recommended.

As the prevalence of COVID-19 is higher in adults, and particularly HCWs, the messaging to parents should address their concerns about this. The routine pre-operative swabbing of parents/carers who attend with a child was discussed. This is of little benefit as transmission is minimal when infection prevention and control measures are followed (wearing masks, handwashing, social distancing) and the significant risk of false positive results may result in unnecessary cancellations. The need for fastidious infection prevention and control measures, in particular hand washing, wearing face coverings and socially distancing, should be re-enforced prior to and during the admission as this is the key to preventing spread of COVID-19 in the hospital. The routine swabbing of carers or parents who accompany children attending for elective procedures is therefore not recommended.

Recommendations

- A single pre-operative swab should be taken within 72 hours before admission and preferably as close to the time of surgery as possible. During periods of high prevalence (>2%, pre-operative swabbing in the 24 hours prior to surgery is recommended. However, if this is not achievable, testing within a hospital setting within the 72 hours prior to surgery should be performed.

Recommendations

- Units with large catchment areas should identify systems to facilitate local testing during periods of low and moderate prevalence. An example of such a system is the NHS number 119, where parents can arrange drive-through or walk-through testing in the 72 hours prior to admission by dialling 119 and explaining that their child has an upcoming procedure. This will enable more equitable access to secondary and tertiary healthcare, particularly for families who are geographically distant to the hospital or who are reliant on public transport for the journey to the hospital.
- During periods of high prevalence, hospital testing, whether by specialist centre or local hospital is recommended to ensure rapid turnaround of results to enable swabbing to be performed as close to the time of procedure as possible.
- Whichever testing facilities are used, HCWs have a responsibility to check the result. This may include seeing a text message of the result or reviewing the hospital results system.

Recommendation

- The regional prevalence levels are used to determine low, moderate and high levels of prevalence.

Action

- **PHE** - To communicate the regional prevalence levels to ODNs on a weekly basis. If localised areas within a region have significantly higher prevalence levels (i.e. >2%), PHE will inform the ODN about the details of these areas.
- **ODNs** - To effectively communicate relevant details of regional prevalence to the gold command team of every provider undertaking elective surgery for children
- **Providers** -
 - To have awareness of this guidance and create local processes and procedures to enable the information given by ODNs to be applied for children undergoing elective surgery.
 - To accept valid tests performed through local systems including community testing stations and peripheral hospitals.
 - To have a robust method for local test results to be communicated with the appropriate team, who are responsible for seeing the communication of the test results.

4. Pre-admission consent

It is good practice for the risks and benefits of any procedure to be discussed in detail before the day of admission for a procedure. Many clinicians use this opportunity to take consent, allowing time for questions and providing written information for the child and parent/carer. The Royal College of Surgeons of England has published dedicated guidance on consent to treatment while COVID-19 is still prevalent in society.¹⁴ Virtual consultations may impact on the ability to take written consent for procedures prior to admission.

While some hospitals now have the facility to take 'eConsent', this is not available for many. Nevertheless, families should have the opportunity to discuss the details, risks and benefits of a procedure prior to admission including receiving online, electronic or paper information about the procedure whenever possible (resources include [EIDO Healthcare Inform](#)). During the consent process, it should be explained that there is a small chance of the child and/or parent/carer acquiring COVID-19 in hospital.

Recommendation

- Children and their parents/carers should have the opportunity to discuss the procedure prior to elective admission and have access to written information. During the discussion, it should be explained that there is a small chance of the child and/or parent/carer acquiring COVID-19 in hospital. Whenever possible, consent will be taken prior to admission.

Recommendations - Pre-operative

Table 6a Pre-operative recommendations and actions for providers

Recommendation	Actions for providers
<p>Telephone / virtual screening for child and household symptoms of COVID-19 should be undertaken 24-72 hours pre-operatively.</p>	<p>To establish a safe and effective method of screening patients and their household members pre-operatively for symptoms and signs of COVID-19</p>
<p>Parents / carers should be informed about stringent infection control measures (social distancing, wearing a mask, regular hand washing) and parental visiting</p>	<p>To inform parents / carers of hospital infection control measures prior to attendance in hospital. This can include over the telephone, by email and/or directing to the hospital webpage</p>
<p>During low and moderate prevalence periods, a single pre-operative swab should be taken within 72 hours before admission and preferably as close to the time of surgery as possible.</p> <p>During high prevalence periods periods, a single pre-operative swab taken as close to the time of procedure as possible should be undertaken in a hospital (specialist or local) setting. Preferably a maximum of 24 hours pre-operatively but up to 72 hours is acceptable.</p>	<p>To have awareness of this guidance and create local processes and procedures to enable the information given by ODNs to be applied for children undergoing elective surgery.</p>
<p>Units with large catchment areas should utilise local testing centres and local hospitals to perform pre-operative testing during periods of low and moderate prevalence. Local hospitals should be utilized during periods of high prevalence.</p>	<p>To accept valid tests performed through local systems including community testing stations and peripheral hospitals.</p> <p>To have a method for local test results to be communicated with the appropriate team.</p>
<p>The risks of the procedure should be discussed pre-operatively including specific advice about COVID-19 and the risk of a child or parent contracting it during their hospital visit.</p>	<p>To communicate the risks associated with COVID-19 with parents and children before attending hospital. This could be provided during the pre-assessment, unless procedure-specific risks need to be discussed.</p>

Recommendation	Actions for providers
Admission screening questions about symptoms of COVID-19 in the child or accompanying carer/parent.	To establish a safe and effective method of screening patients and their household members pre-operatively for symptoms and signs of COVID-19.
	To consider rapid SARS-CoV-2 testing of children with mild coryzal symptoms who are well enough to undergo anaesthetic at the time of admission.

Table 6b Pre-operative recommendations and actions for PHE and ODNs

Recommendation	Action for PHE	Action for ODNs
<p>During low and moderate prevalence periods, a single pre-operative swab should be taken within 72 hours before admission and preferably as close to the time of surgery as possible.</p> <p>During high prevalence periods periods, a single pre-operative swab taken as close to the time of procedure as possible should be undertaken in a hospital (specialist or local) setting. Preferably a maximum of 24 hours pre-operatively but up to 72 hours is acceptable.</p>	To communicate the regional prevalence levels to ODNs on a weekly basis.	To effectively communicate relevant details of regional prevalence to the gold command team of every provider undertaking elective surgery for children

Recommendations - Peri-operative

1. Number of parents/carers per child

Each child who attends for an elective procedure is expected to be accompanied by a parent/carer, called a “resident carer” here on in. One resident carer is expected to attend for a child undergoing a day case procedure. For children who require an inpatient stay the local visiting policy should be followed by resident carers. The epidemiological risk of having COVID-19 is approximately the same for all members of the same household. Therefore, changing resident carers who live in the same house does not increase the risk of exposing HCWs or other resident carers to COVID-19.

Keeping the number of resident carers at the bed space and within the hospital to a minimum enables effective social distancing to protect the child, parent/carer and HCWs. Ideally the

accompanying resident carer will not have any co-morbidities likely to increase the chance of more severe COVID-19 disease, and this should be discussed during the pre-operative assessment. If the accompanying resident carer has a co-morbidity for whom shielding is recommended, every effort should be made to accommodate the child and adult in a cubicle.

Resident carers will be expected to wear a face covering when they are not at the bed space.

If the two parents/carers live in different households, then only one parent/carer should remain during the admission. If the inpatient admission is prolonged, local guidance should be followed in terms of swapping between parents/carers from two different households.

Recommendation

- Resident carers should be minimised as far as possible with ideally one accompanying each child to the hospital for a day case procedure. When children require an inpatient stay, local policy should be followed, with an emphasis on resident carers being able to change but ideally just with other resident carers from the same household. Ideally the resident-carer does not have a co-morbidity which requires shielding; this should be discussed at the pre-operative assessment.

2. Face coverings for children and adults attending hospital for elective procedures

Face coverings, along with physical distancing and eye protection are effective methods of reducing the transmission of viruses¹⁵ and hospitals now require adult visitors to wear face coverings during their visit.¹⁶ It is recognised that children under the age of 10 may find it difficult to wear a face covering but many younger children may tolerate this and encouragement of the use of face coverings for children aged 5 and over is reasonable. Some older children, for example those with learning and behavioural difficulties, may struggle to tolerate a face covering.

Resident carers are expected to wear a face covering throughout their child's stay in hospital whenever they are away from the bed space.

Recommendation

- All resident carers should wear a face covering while in hospital if away from their bed space.

3. Place of admission

Many adult hospital trusts have embraced a surgical pathway which includes using 'hot' and 'cold' sites. The number of children with COVID-19 has been very low¹⁷ and, as described above, the peri-operative risk that COVID-19 poses in children is significantly lower than in adults.⁸ The utility of hot and cold sites is therefore minimal for children and was felt by the group not to be necessary. However, it is recognised that some trusts may opt to utilise the

same model of hot and cold sites for children and adults. Any location used for paediatric anaesthesia and surgery must be compliant with the [RCoA Guidance for the provision of paediatric anaesthesia services 2020](#) throughout the patient pathway. In addition, at times when 'green' pathways are being employed in children undergoing elective surgery, considerations should be given to physical separation of those children from other children in the hospital, particularly in pre- and post-operative care areas, and in recovery

Children undergoing elective surgery may be admitted to a day case or inpatient bed. Although it is preferable that each child and carer is situated within a cubicle at each stage of their inpatient stay, it is recognised that this is not feasible in many settings. When the number of cubicles is limited, children and parents with co-morbidities likely to increase the chance of more severe COVID-19 disease should be prioritised, along with children in the 'red' pathway.

Within a day case and inpatient unit, a minimum distance of 2 metres between beds is mandatory.¹⁸ If 2 metre separation is considered impossible, local providers need to make their own risk assessment to balance lack of physical separation versus potential detriment of failure to provide adequate levels of elective children's surgery. Consideration of parents who are accompanying and staying over with their children should also be taken to enable them to physically distance from other people.

Recommendations

- 'Hot' and 'cold' operating sites are not mandatory for children undergoing elective procedures. However, any location used for paediatric anaesthesia and surgery must be compliant with the [RCoA Guidance for the provision of paediatric anaesthesia services 2020](#) throughout the patient pathway.
- Children on 'green' elective pathways should be physically separated from other children in the hospital. Cubicles should be prioritised for children and accompanying parents with co-morbidities likely to increase the chance of more severe COVID-19 disease.
- Two metre distancing rules should be observed and local risk assessments undertaken if this is not possible.

4. Pre-operative and post-operative reviews by all healthcare workers

Healthcare workers have the highest prevalence of COVID-19 and therefore need to take adequate precautions to reduce the risk of transmission to children and their parents/carers. Droplet precaution personal protective equipment (PPE) is recommended for all interactions between families and healthcare workers in the pre- operative and post-operative period. The normal pre-operative checks by anaesthetists, surgeons and admitting nurse should be undertaken, in addition to the COVID-19 specific recommendations above.

Recommendation

- Healthcare workers can wear droplet precaution PPE when they attend to a green patient during periods of low and moderate prevalence.

5. Transfer to theatre

Ideally children will be transferred directly from their inpatient or day-case ward to the anaesthetic room for the theatre that will be used for their procedure. It is recognised that in some hospitals a waiting area outside theatre may be used to improve patient flow. Hospital porters and accompanying health care workers will be expected to wear droplet precaution PPE during patient transfers.

Recommendation

- Healthcare workers and porters who transfer a patient to theatre should wear droplet precaution PPE.

Recommendations - Intra-operative: Green patients during low and moderate prevalence of COVID-19

1. Theatre briefing and World Health Organisation check

Each theatre list should commence with a full-team briefing about each patient on the list. This should include checking the COVID-19 result and a discussion about whether a patient is on a green, amber or red pathway for COVID-19, any aerosol generating procedures (AGPs) and when airborne precaution PPE is recommended and for whom. HCWs should wear the minimum recommended level of PPE but that if HCWs feel more comfortable escalating their PPE (eg to wearing an FFP3 mask) this should be an individual choice. The WHO check should be completed for every patient in line with hospital policy. Resident carers should wear a face covering when appropriate.

Recommendations

- A theatre team briefing should include a discussion about anticipated transmission risk related to the procedure (including any aspects that are aerosol generating) to guide staff choices regarding PPE. Ensuring that theatre staff who need to wear aerosol PPE receive adequate rest periods should be included in the team briefing.
- The WHO check should be completed for every patient with recommended droplet precaution PPE for health care workers and face coverings for resident carers.

2. Induction of anaesthesia

The accompanying parent/carer and nurse can stay with their child for the beginning of the anaesthetic without alteration to the normal hospital policy . Healthcare workers involved in induction of anaesthesia of patients on the green pathway should wear droplet protection PPE i.e. surgical face mask Type II, disposable gloves, apron and eye protection. Normal IPC policy around cleaning of anaesthetic room should be followed and there are no additional requirements with respect to air changes.

Induction and maintenance of anaesthetic and pre-operative procedures including nerve blocks, epidurals, line insertion and urinary catheter insertion should be performed without alteration to the anaesthetist's normal practice.

3. PPE requirements for theatre staff

Public Health England updated the PPE guidance for AGPs on 20 August 2020 [19](#)

Staff should use standard IPC measures with respect to PPE, theatre cleaning and air changes. Staff can wear droplet precaution PPE including a Type 2 surgical face mask, eye protection, apron and disposable gloves.

Recommendations

- During periods of low and moderate prevalence for 'green' patients, theatre staff working in theatres can wear droplet precaution PPE.

4. Extubation, removal of laryngeal mask airways (LMAs or equivalent) and oropharyngeal airways

Laryngeal masks and oropharyngeal airways can be removed safely in recovery with HCWs wearing droplet precaution PPE.

5. Theatre cleaning cases

Standard cleaning protocols can be used for patients on a 'green' pathway during periods of low and moderate prevalence and there is no requirement for additional theatre air changes between cases.

Recommendations - Intra-operative: 'Amber' and 'Red' patients during low and moderate prevalence and all patients during high prevalence

1. Theatre briefing and World Health Organisation check

Each theatre list should commence with a full-team briefing about each patient on the list including checking the COVID-19 swab result. This should include a discussion about any aerosol generating procedures (AGPs) and when airborne precaution PPE is recommended. The WHO check should be completed for every patient in line with hospital policy. Resident carers should wear a face covering when appropriate.

Recommendation

- A theatre team briefing should include a discussion about anticipated transmission risk related to the procedure (including any aspects that are aerosol generating) to guide staff choices regarding PPE. Ensuring that theatre staff who need to wear aerosol PPE receive adequate rest periods should be included in the team briefing.
- The WHO check should be completed for every patient with recommended droplet precaution PPE for health care workers and face coverings for resident carers.

2. Induction of anaesthesia

Healthcare workers who are in the anaesthetic room at the time of any AGP should be limited to essential members of the team only, preferably just anaesthetist, operating department practitioner +/- member of theatre team. All healthcare workers in the anaesthetic room at the time of AGP should wear airborne precaution PPE to reduce their risk of exposure to COVID-19. It was agreed by the group that the minimum requirement for airborne PPE is an FFP3 mask (or equivalent), eye protection and gloves.

The accompanying parent/carer and nurse can stay with their child for the beginning of the anaesthetic without alteration to the normal hospital policy with the AGP being delayed until they leave the anaesthetic room.

There should be a delay of five air changes between the end of the AGP occurring and the entry of other staff into the anaesthetic room who are not wearing airborne precaution PPE.¹⁸ A transfer of the patient from the anaesthetic room to theatre should not be delayed for air changes as air should not be passing from the anaesthetic room to theatre and therefore not a risk to people in theatre, who will already be wearing droplet precaution PPE.

Induction and maintenance of anaesthetic and pre-operative procedures including nerve blocks, epidurals, line insertion and urinary catheter insertion should be performed without alteration to the anaesthetist's normal practice.

Recommendation

- The accompanying parent/carer and nurse can stay with their child for the beginning of the anaesthetic without alteration to the normal hospital policy with the AGP being delayed until they leave the anaesthetic room.
- Healthcare workers within the anaesthetic room during the aerosol generating procedure and the 5 subsequent air changes are recommended to wear airborne PPE. The minimum PPE requirement during intubation of a child undergoing elective surgery is an FFP3 mask (or equivalent), eye protection, fluid-repellant gown and gloves.
- A transfer of the patient from the anaesthetic room to theatre should not be delayed for air changes

3. PPE requirements for theatre staff

Public Health England updated the PPE guidance for AGPs on 20 August 2020.¹⁹

Recommendation

- Hospital policy should follow PHE guidance regarding classification of AGPs and use of PPE in the recommended settings. At times of high regional prevalence of COVID-19 airborne PPE should be used for all AGPs.

4. Extubation, removal of laryngeal mask airways (LMAs or equivalent) and oropharyngeal airways

At times of high prevalence of COVID-19 extubation should continue to be performed in theatre with the safe minimum number of healthcare workers present. All healthcare workers present in theatre at the time of extubation are expected to wear airborne precaution PPE. The group agreed that the minimal PPE requirement during extubation of a child undergoing elective surgery is an FFP3 mask (or equivalent), eye protection, fluid repellent gown and gloves. Movement of a patient from theatre to recovery should not be delayed for air changes within theatre, as the air leaving the theatre will be significantly diluted and will not be a risk to other members of staff outside theatre who should be wearing droplet precaution PPE as standard.

Waiting for five air changes prior to cleaning commencing is the second major factor that affects list efficiency. It is noted that five air changes should occur after the last AGP, which for some children may be a significant proportion of time before they actually leave theatre, enabling cleaning to occur as soon as a patient leaves. At times of high prevalence it was agreed that HCWs wearing airborne precaution PPE could enter and commence cleaning after 3 air changes to allow time for droplets to settle. Organisations must establish the time taken for air changes in their operating theatres and anaesthetic rooms.

Laryngeal mask airways (LMA) and oropharyngeal airways (such as Guedel airways) often remain in situ when a patient enters recovery. LMA removal is an AGP and HCWs should wear airborne PPE to remove it. Removal of oropharyngeal airways can be performed in droplet PPE.

Recommendations

- Healthcare workers in theatre at the time of extubation should be kept to a safe minimum and should wear airborne precaution PPE. The minimum PPE requirement during extubation of a child undergoing elective surgery is an FFP3 mask (or equivalent), eye protection and gloves.
- Environmental cleaning of theatre can be commenced by HCWs wearing airborne precaution PPE after 3 air changes following the last AGP performed or by HCWs wearing droplet precaution PPE after five air changes following the last AGP.
- Removal of Laryngeal Mask Airways and oropharyngeal airways can be performed in recovery. Removal of an LMA necessitates wearing airborne PPE. Removal or oropharyngeal airways can be performed by a HCW wearing droplet precaution PPE.

Recommendations - Intra-operative: Minimum PPE requirements

Table 7. Minimum PPE requirements. Note, if a risk of splash or spraying of bodily fluids, an apron should be substituted for a fluid-repellant gown and eye protection should be considered.

	Low and moderate regional prevalence (<2%)	High regional prevalence (?2%)
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	Green	Amber	Red	Green	Amber	Red
AGPs	FRSM II Apron Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves
Non-AGPs	FRSM II Apron Gloves	FRSM II Apron Gloves	FRSM II Apron Gloves	FRSM II Apron Gloves	FRSM II Apron Gloves	FRSM II Apron Gloves
Cleaning	Standard cleaning	Enhanced Cleaning	Enhanced Cleaning	Enhanced Cleaning	Enhanced Cleaning	Enhanced Cleaning
Air changes after AGP	None	5 air changes	5 air changes	5 air changes	5 air changes	5 air changes
Extubation in theatre	FRSM II Apron Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves
LMA removal In theatre or recovery	FRSM II Apron Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves	Eye protection FFP3 / Hood Fluid- repellant gown Gloves
Oropharyngeal removal In theatre or recovery	FRSM II Apron Gloves	FRSM II Apron Gloves	FRSM II Apron Gloves	FRSM II Apron Gloves	FRSM II Apron Gloves	FRSM II Apron Gloves

Recommendations - Post-operative and discharge (all prevalence levels)

1. Post-operative monitoring and ongoing care

Normal post-operative care should be undertaken according to local policy. The recommendations regarding hand washing, social distancing and wearing face coverings, as

described above, should be followed and signs to reinforce the messaging around social distancing and wearing of masks are recommended. The need for these measures between healthcare workers and resident carers, healthcare workers and healthcare workers and resident carers with other resident carers should be made clear.

Recommendations

- Consistent messaging regarding hand washing, social distancing and face coverings should be maintained throughout the hospital to reinforce that these infection prevention and control measures are the most effective way of reducing the transmission of COVID-19.
- Normal post-operative observations and care pathways should be followed.

2. Discharge from day surgery and inpatient beds

Discharge after day case surgery should focus on safe recovery with effective discharge processes in place including early preparation of take-home medications, discharge letters and follow-up arrangements to avoid delays in discharge. Resident carers should be given clear safety netting advice about return with contact numbers of the ward to feel secure in early discharge. A focus on safe, rapid discharge will enable fewer patients and resident carers to remain in a day surgery ward at any one time, will allow more effective social distancing and will enable smooth patient flow for effective use of theatre lists.

Isolation after discharge from hospital could have two utilities. The first is to reduce the risk of a child who has just undergone surgery contracting COVID-19. The second is to reduce the community transmission of COVID-19 after children and resident carers have stayed in hospital where the prevalence of COVID-19 is higher than in the community. When community levels of COVID-19 are low, the risk of contracting the infection is low and the risk of transmission can be effectively reduced by following the guidance around hand washing, distancing and face coverings. When community levels are higher it is likely that local restrictions will be enforced to keep people at home, effectively isolating children who have undergone surgery. For this reason, the group did not feel it necessary for children and resident-carer to self-isolate after discharge from hospital; instead they should be advised to follow current government rules about socialising, social distancing and wearing face coverings in public places. Written or online information which can be given to families at discharge would support these messages.

Families should be asked to monitor for symptoms of COVID-19 after discharge from hospital. If they develop symptoms they should access local testing and follow national guidance about household isolation. If the child becomes positive for COVID-19 within 14 days of admission they should be encouraged to inform the surgical team who are encouraged to report the case to www.covidinchildren.co.uk.

Recommendations

- Rapid discharge after day case procedures should be supported and encouraged.
- Children and resident-carer do not need to self-isolate after discharge from hospital unless they have been diagnosed with COVID-19.

3. Follow-up

Whenever possible children should be followed-up by teleconference or telephone consultation to avoid the need to keep returning to hospital and the time away from work and school that travel requires, to avoid the costs of travel and to reduce the risk of exposure to COVID-19. Virtual consultations should occur in areas which ensure privacy and confidentiality for the children and families. In the experience of clinicians in the meeting virtual consultations should also not be expected to give high-quality images which enable wound review.

Children and families who do need to attend outpatient clinic, for example for wound review or examination, or Accident and Emergency for a complication, should be advised to wear face coverings and to socially distance, as described above.

Recommendation

- Virtual or telephone clinics should be supported by the trust to improve access to healthcare for all patients and to reduce the number of children who need to return to the hospital for outpatient review.

4. Monitoring

Having active surveillance systems in place will allow the safety of these recommendations to be evaluated and amendments made in a timely fashion. Staff may also feel more confidence in adopting these recommendations in the knowledge that outcomes are being actively monitored.

Recommendations

- Surveillance of nosocomial outbreaks and monitoring of outcomes of children after surgery should be undertaken by each trust.
- If a child undergoes an elective procedure within 14 days of a positive swab for SARS-CoV-2, it is recommended they are reported to the www.covidinchildren.co.uk database to enable monitoring of outcomes.
- National monitoring of elective surgery activity including the rates of cancellations, the incidence of COVID-19 before and after elective surgery and the clinical course of children undergoing elective procedures with COVID-19 should be undertaken

Methodology for developing recommendations

Key stakeholders representing national groups (NHS England, Public Health England, Royal College of Paediatrics and Child Health, Royal College of Anaesthetists, Association of Paediatric Anaesthetists of Great Britain and Ireland, British Association of Paediatric Surgeons, Association of Perioperative Practice), professional groups (paediatric infectious diseases, infection control, paediatric surgery, paediatric anaesthesia, theatre staff, virology and epidemiology) and parents was identified to support the development of these recommendations. The devolved nations were represented.

The group met virtually on 25 June 2020 and again on 2 July. The current evidence about COVID-19 in children regarding incidence, prevalence, co-morbidities and surgical outcomes was initially reviewed. The current prevalence data were discussed and the modelling tools used to determine the risk of contracting COVID-19 in the community and hospital were described. Each step in the elective surgical pathway (Figure 1) were discussed systematically by the group prior to developing consensus recommendations and actions.

Following updated PHE guidance on the 20th August, 2020 the guidance was updated to reflect these changes but continues to use regional prevalence to stratify the pre- and peri-operative procedures to reduce COVID-19 transmission to HCWs and to protect patients.

Table 7. Children’s elective surgical pathway

Pre-admission	Pre-op	Peri-op	Post-op
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<ul style="list-style-type: none"> • Pre-assessment <ul style="list-style-type: none"> ◦ Information for parents / expectations • Isolation pre-op <ul style="list-style-type: none"> ◦ How long ◦ Who needs to isolate • COVID screening pre-op <ul style="list-style-type: none"> ◦ Virological including who gets screened and how (home testing/pre-admission clinic, local testing, how many tests? nature of test) ◦ Clinical screening • Role of pre-assessment to facilitate testing 	<ul style="list-style-type: none"> • Number of parents/carers • Place of admission <ul style="list-style-type: none"> ◦ Role of hot and cold sites (if no cold sites, is there any rationale for pre-op screening?) ◦ Day area versus inpatient area ◦ Cubicle versus bay • PPE required <ul style="list-style-type: none"> ◦ For parent/carer ◦ For child (and lower age limit) ◦ When should PPE be worn ◦ 1 metre versus 2 metres • Screening on admission <ul style="list-style-type: none"> ◦ Review by anaesthetist 	<ul style="list-style-type: none"> • Transfer to theatre <ul style="list-style-type: none"> ◦ Who accompanying and PPE required ◦ Use of reception area outside theatre whilst 'waiting' • Anaesthetic room <ul style="list-style-type: none"> ◦ PPE requirements ◦ Ventilation / air change aspects ◦ Parent/carer aspects ◦ Induction of anaesthesia ◦ Transfer from anaesthetic room to operating room • Theatre <ul style="list-style-type: none"> ◦ PPE requirements for non-airway staff ◦ What constitutes an AGP ◦ Extubation ◦ Cleaning ◦ Timing between cases / air changes • Recovery <ul style="list-style-type: none"> ◦ PPE requirements ◦ Removing supraglottic airways or Guedel airway <ul style="list-style-type: none"> ▪ Repatriation to ward 	<ul style="list-style-type: none"> • Post-op considerations (inc post-op obs, PPE (day surgery and admissions)) • Further considerations for prolonged inpatient admissions inc PPE for parents and repeated testing • Discharge from day surgery and from ward - any safety netting re COVID? • Isolation following discharge • Any other post discharge considerations?
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The draft recommendations and [information resources \(parents/carers and young people\)](#) were then reviewed by the Royal College of Paediatrics and Child Health, Royal College of Anaesthetists, Association of Paediatric Anaesthetists of Great Britain and Ireland, Royal College of Surgeons of England, British Association of Paediatric Surgeons and the

Association of Perioperative Practice and endorsed by each of these organisation on 14 July 2020.

Steering group

- Chair: Sanjay Patel, Paediatric ID, Southampton
 - Alasdair Munro, Paediatric Registrar, Southampton
 - Chris Gildersleve, Paediatric Anaesthetist, President APAGBI
 - Clare Johns, Parent Advisor
 - Conor Doherty, Paediatric ID, Glasgow
 - Daniel Eve, NHSE National Programme of Care Manager, CYP
 - Declan Bays, Senior Mathematical Modeller, Public Health England
 - Emma Andrews, Network Manager, Yorkshire & Humber Paediatric Critical Care Network
 - Emma Bennet, Yorkshire and Humber ODN Children's Surgery Manager
 - Gaynor Evans, IPC Cell, NHSE
 - Hannah Williams, Senior Mathematical Modeller, Public Health England
 - Helen Dunn, Lead Nurse for Infection Prevention Control, GOSH
 - Hermione Lyall, Paediatric ID, Imperial College, London
 - Melissa Ashe, Head of Policy, RCPCH
 - Neil Herbert, Theatre Manager, Alder Hey Children's Hospital
 - Nick Gent, Senior Medical Officer, Public Health England
 - Nigel Hall, Paediatric Surgeon, Southampton
 - Oliver Gee, Paediatric Surgeon, Birmingham Children's Hospital and Chair, Specialised surgery in children CRG, NHSE
 - Paul Randell, Virologist, Imperial College, London
 - Rachel Harwood, Paediatric Surgery Registrar, Alder Hey Children's Hospital
 - Richard Stewart, Paediatric Surgeon, President of BAPS
 - Russell Perkins, Paediatric Anaesthetist and Paediatric Lead for RCOA
 - Sean O'Riordan, Paediatric ID, Leeds
 - Sharon Christie, Paediatric ID, Belfast
 - Simon Clark, Neonatologist; Vice President for Policy, RCPCH
 - Simon Courtman. Paediatric Anaesthetist, SW Clinical Lead for Paediatric Surgery ODN and Secretary, APAGBI
 - Simon Kenny, Paediatric Surgeon and National Clinical Director CYP, NHS England
 - Tina Barnes, Parent Advisor
 - Tracey Williams, President, Association for Perioperative Practice
-
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Downloads

[Information for parents and carers - poster](#) 338.7 KB

[Information for young people - poster](#) 339.29 KB

[Information for children: 'My operation and coronavirus' - poster \(Centre for Perioperative Care\)](#) 909.22 KB