The impact of the COVID-19 pandemic on the physical activity environment in English primary schools: a multi-perspective qualitative analysis

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Abstract

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Background: The COVID-19 lockdowns and social distancing measures, including school closures, had a major impact on children's physical activity in England, with data showing an initial reduction in activity in the short-term post-lockdown phase of the pandemic followed by a recovery on average in the medium-term post-lockdown period. The school environment is an important context for child physical activity. The purpose of this study is to understand the changes that took place to school physical activity environments once schools reopened after lockdowns. This information will improve understanding of why changes to children's physical activity have occurred over the course of the pandemic and the implications for future promotion of physical activity in schools.

Methods: Interviews with parents (*n* = 43), school staff (*n* = 18) and focus groups with 10- to 11-year-old children (participant *n* = 92) were conducted at two time points: between September–December 2021 and February–July 2022. Interview and focus group guides covered the impact of the pandemic on child physical activity and changes to this over time. The framework method was used for analysis.

Results: Three themes and three subthemes were generated: (1) the return to school; (2) over-pressured staff and environment and (3) the uneven impact of the pandemic. Theme 3 consists of three subthemes: (a) retained pandemic policies, (b) impact on physical activity culture and (c) different children need different things.

Limitations and future work: Conducting this research in schools during ongoing COVID-19 disruptions was a challenge and may have limited school and participant participation, particularly school staff. The parent interview sample is predominantly female, active and of higher socioeconomic status, so the experiences of male, less active and lower socioeconomic parents are limited. This study suggests that the impact of COVID-19 on child physical activity is uneven, affecting some children more than others. Future work is therefore needed to explore the details of this potential diverging experience.

Conclusion: The COVID-19 pandemic, school closures and post-lockdown school policies have impacted upon primary school physical activity environments. The post-lockdown school environment

is highly pressured, impacting the extent to which schools can support and encourage child physical activity. Future research is needed to further explore the impact of post-lockdown changes on physical activity environments in schools, particularly over the longer term, as schools continue to adapt post lockdowns. Strategies required to support school physical activity environments must be context specific and sensitive to these changes, pressures and needs.

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List of supplementary material

Report Supplementary Material 1 Topic guides

Report Supplementary Material 2 Further qualitative research information

Supplementary material can be found on the NIHR Journals Library report page (https://doi.org/10.3310/KLML4701).

Supplementary material has been provided by the authors to support the report and any files provided at submission will have been seen by peer reviewers, but not extensively reviewed. Any supplementary material provided at a later stage in the process may not have been peer reviewed.

Plain language summary

Why did we do this study?

Schools are important spaces for children's physical activity. Children can be active in physical education lessons, break times, after-school clubs and travelling to school. School closures and other COVID-19 restrictions affected children's physical activity. We wanted to know how physical activity in primary schools might have changed since the pandemic.

What did we do?

We spoke to school staff, pupils and parents two times after schools reopened. We asked about children's physical activity, and if or how this had changed over the course of the pandemic. We asked school staff about school policies around physical activity.

What did we find?

When children went back to school, schools needed a 'recovery' approach. Children's academic, social and physical skills had been affected. For this time schools prioritised physical activity, but this was short-lived. Since then, schools have been highly pressured. They have had to 'catch up' on missed learning, staff are overloaded and some pupils are still affected by the lockdowns. Physical activity policies in schools have changed, but in many different ways. Some have kept social distancing policies; others feel their school culture has changed. Additionally, pupil ability and needs are more polarised. These factors have shaped, but are also shaped by, the high pressure in schools.

What does this mean for children's physical activity?

- Supporting changing child needs in highly pressured schools is hard for state primary schools.
- Changes to school physical activity policies need to be understood and evaluated.
- Strategies to ease pressure in schools are needed to support physical activity.

Background and introduction

Physical activity is important for health and well-being across the life course,[1,2] and physical activity behaviours can track from childhood to adulthood.[3,4] In children, physical activity has been associated with reduced cardiometabolic risk and depression, and improved emotional well-being and academic performance.[5–10] The World Health Organization (WHO) and UK chief medical officers (CMOs) advise that children should partake in at least an average of 60 minutes moderate to vigorous intensity physical activity (MVPA) each day, which can be accumulated across the day.[1,2,11]

The COVID-19 pandemic and associated lockdowns in 2020 and 2021 had a major impact on children's physical activity in England and beyond, when schools were closed to most pupils, leisure and other facilities were closed and stay at home orders were in place.[12–23] Data from the acute phase of the pandemic found child and adult physical activity levels were reduced.[15,24–27] In an associated study, we reported that accelerometer measured child MVPA was 7–8 minutes lower per weekday on average in 2021 than a pre-COVID-19 comparator. Weekday sedentary time was higher by 25 minutes per day on average.[28] Factors that influence these findings have been identified, such as individual, interpersonal and environmental factors during lockdowns,[20–22,29] and various social and emotional challenges in the recovery phase.[21,27,29] More recent data measuring the medium-term impact of the lockdowns on child physical activity found average child MVPA had recovered to pre-pandemic levels in the first 6 months of 2022, but sedentary time remained higher, and most children were still not meeting WHO and CMO activity guidelines.[30]

The school environment is an important context for child physical activity.[31,32] The structured nature of the school day regulates obesogenic behaviours through compulsory physical activity, restricted eating habits, reduced screen time and regulated sleep schedules.[33–35] One study, however, found divergence in weekend MVPA dependent on child activity profiles, where more active children had higher MVPA on weekends compared to weekdays, and less active children had lower MVPA on weekends compared to weekdays.[36] In England, lockdowns to limit the spread of COVID-19 closed schools to most children. When schools re-opened COVID-19 mitigation policies were in place for several months and impacted upon a school's physical activity environment, that is policies around child physical activity and physical education (PE), how much space children had access to, how active play could be supported, and active travel (see *Figure 1* for details on school closures and policies alongside national restrictions and this study's data collection waves). However, there is a lack of information on the changes to school physical activity environments that took place, how these were experienced by staff and pupils and if/how these were removed or retained. Providing this information is essential for understanding why changes to children's physical activity occurred and the implications of any changes for the future promotion of physical activity in schools going forward.

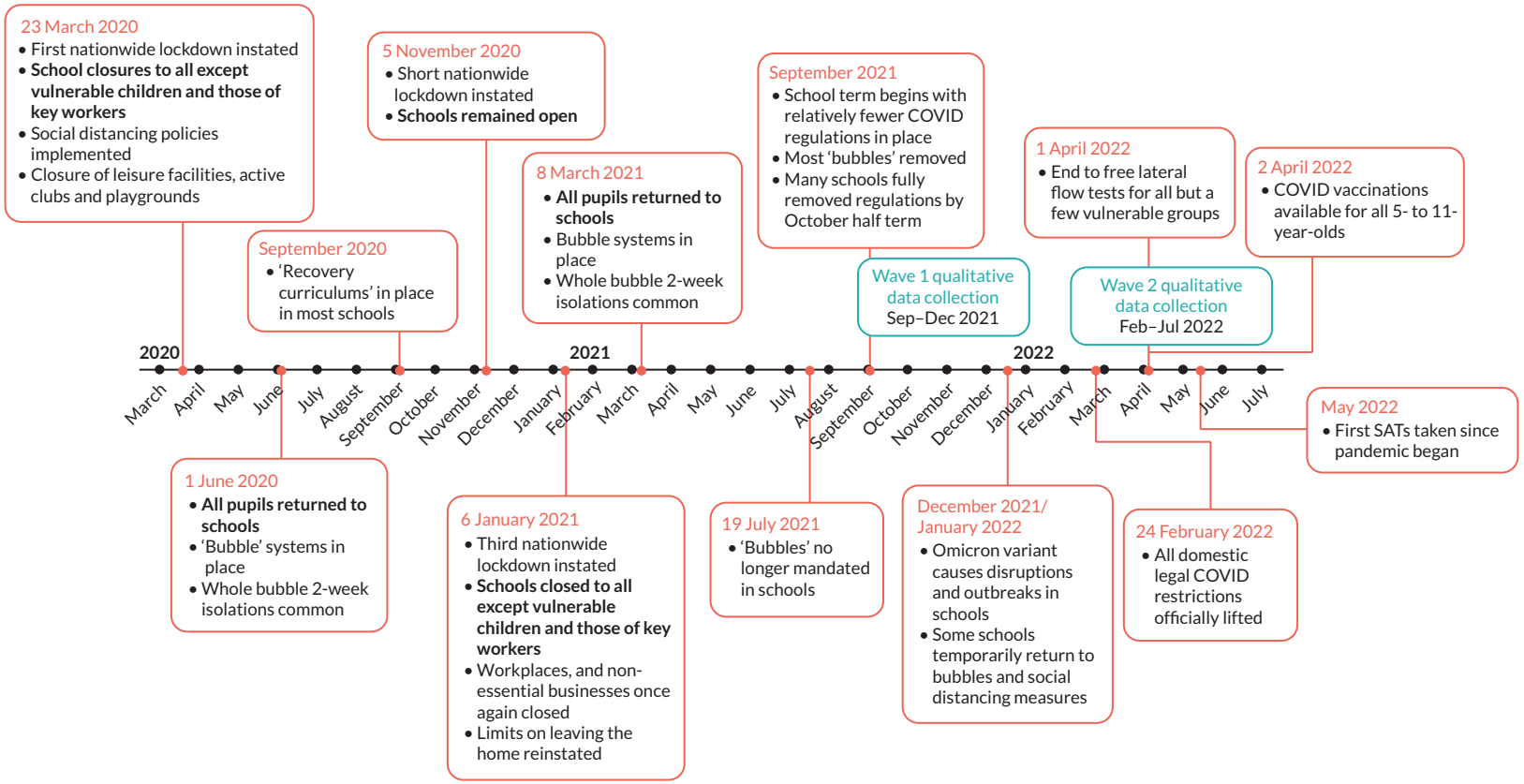

FIGURE 1 Timeline of school closures and COVID-19 policies in England. SAT, standard assessment tests.

Aims and objectives

The aims of this study are to:

1. understand the impact of COVID-19 on the physical activity environment in English primary schools and the longer-term legacy of this on child physical activity;
2. highlight implications of COVID-19-related changes on children's physical activity for schools and governing bodies to increase and support children's physical activity in the school environment.

Methods

Participants and procedure

The Active-6 project is a repeated cross-sectional natural experiment examining the impact of the COVID-19 pandemic on the physical activity of 10- to 11-year-old children and their parents/carers in England.[28–30,37–39] To measure differences over time, accelerometer, questionnaire and qualitative data were collected in two waves (Wave 1: July–December 2021; Wave 2: January–July 2022), which were then compared with baseline data collected in 2017–8 during the B-Proact1v project (Wave 0).[28,40] The schools that took part in Active-6 were state primary schools in the wider Bristol area, England, recruited from those that took part in B-Proact1v. Fifty schools participated in B-Proact1v and 28 continued into Active-6, with a range of inner-city, suburban, rural and small town schools; size in terms of classes per year group and pupil numbers; local authority, academy and faith schools; and high/medium/low deprivation based on percentage of pupils receiving free school meals and school postcode Index of Multiple Deprivation (IMD) score.

This study is drawn from qualitative data collected in Waves 1 and 2 of Active-6 (see *Figure 1*). Participant groups were (1) children aged 10–11 years (Year 6) who had worn accelerometers for Active-6, (2) parents or carers of the child participants who had worn accelerometers for Active-6 and (3) primary school staff from the participating schools. Eligibility criteria for parents and children were that they had worn an accelerometer as part of the Active-6 project and had consented to being recontacted, while school staff needed to be a member of a school supporting the Active-6 project. Parents and children were approached via the contact information provided during the Active-6 sign-up process, whereas school staff were approached directly via e-mail. Parents and children who participated in the qualitative aspects of Active-6 were not related and there was no 'complete' data set that included a child, their parent and their schoolteacher. Due to recruitment challenges, parents and school staff were convenience sampled, whereas children were purposively sampled using their accelerometer data and individual and school demographic information. Semistructured interviews were conducted with parents and school staff and focus groups were conducted with children. In total, 12 focus groups were facilitated (Wave 1 = 6, Wave 2 = 6) with 92 children from 12 schools. The number of children in these focus groups was on average 8 and ranged from 5 to 10, with no repeat children between waves. Forty parents from 15 schools participated in 43 one-to-one semistructured interviews (Wave 1 = 21, Wave 2 = 22; 3 parents were interviewed in both waves). Lastly, 18 one-to-one semistructured interviews with 13 members of school staff from 12 schools were conducted (Wave 1 = 9, Wave 2 = 9; 5 school staff were interviewed in both waves). Information power was used to derive sample size, whereby the study's aim, the extent of participants' specific knowledge and experiences in relation to our research question, theoretical background of the study, dialogue quality and the adopted cross-case analysis were reflected on and discussed within the research team throughout data collection.[41] *Tables 1–3* display participant demographic information, and participants for each group came from a range of study schools, which is explored further in the equality, diversity and inclusion (EDI) section below.

In Wave 1, parents were interviewed remotely between September and December 2021 and school staff between November and December 2021 (also remotely) by RW, TR and BT. Child focus groups were conducted in December 2021 in person in schools, facilitated by RW, TR, BT or DH. In Wave 2, parent interviews were conducted remotely via Zoom or telephone by RW between February and July 2022, and school staff interviews between May and July 2022 by RW (eight remotely via telephone or Zoom and one in-person). Child focus groups were facilitated by RW, DH and KS between May and June 2022 (see *Figure 1* for data collection waves alongside school COVID-19 measures). Parent interviews ranged from 27 to 75 minutes in duration, school contact interviews from 33 to 59 minutes and child focus groups from 33 to 61 minutes.

TABLE 1 Characteristics of Active-6 school staff interviews

School staff	Wave 1 *N* 9	Wave 2 *N* 9
Gender		
Male	3	5
Female	6	4
Role		
Year 6 teacher	7	5
Full-time PE co-ordinator	1	2
Deputy/headteacher	1	2

TABLE 2 Characteristics of Active-6 parent interviews

Parents	Wave 1 *N* 21	Wave 2 *N* 22
Gender		
Male	0	7
Female	21	15
Parent activity levels		
High MVPA	11	12
Medium MVPA	9	5
Low MVPA	1	5
Insufficient data	0	1
Child activity levels[a]		
High MVPA	7	8
Medium MVPA	6	10
Low MVPA	8	4
Insufficient data	0	1
Age (years)		
30–34	1	1
35–39	2	10
40–44	11	11
45–49	7	1
Ethnicity		
White British	17	16
Other	4	4
No data	0	2

TABLE 2 Characteristics of Active-6 parent interviews (*continued*)

Parents	Wave 1 *N* 21	Wave 2 *N* 22
IMD decile		
≤ 5	4	5
> 5	17	17
Parent education		
Higher degree	9	4
Degree	7	16
A level	5	2

a Twenty-three children's activity levels are reported for Wave 2 as one participant was a parent of twins.

Note
IMD decile ≤ 5 = greater level of deprivation, > 5 = lesser level of deprivation.

TABLE 3 Characteristics of Active-6 child focus groups

Children	Wave 1 *N* 47	Wave 2 *N* 45
Gender		
Male	26	22
Female	21	23
Child activity levels		
High MVPA	16	11
Medium MVPA	16	17
Low MVPA	15	17
Parent ethnicity		
White British	38	32
Other	8	7
No data	1	6

All adult participants provided written informed consent, parents consented to their child participation in the focus groups and children provided additional written assent.[42] As an appreciation of their time, parents and school staff were given a £10 gift voucher, and the children received a small incentive when they took part in Active-6 (a frisbee or kit bag). Ethical approval was gained from the School for Policy Studies Ethics Committee at the University of Bristol, UK (Ref SPSREC/20-21/150). This project is funded by the National Institute for Health and Care Research (Public Health Research Programme NIHR131847) and the project was listed on the research registry (www.researchregistry.com/browse-the-registry#home/registrationdetails/604b4760d539c90020642be6/).

Study materials

Topic guides were developed by the research team to facilitate discussions in the semistructured interviews and focus groups. An independent parent patient and public involvement (PPI) member of the study management group provided feedback on all topic guides. A flexible, iterative process of reflection was used to adjust topic guides throughout the data collection process. We felt that each interview and focus group ran well and added valuable information related to our research question. In Wave 1, these focused on changes to parent and child physical activity behaviour over the COVID-19 pandemic, any factors that may have influenced any changes, and school environment changes in this time period that might have influenced activity levels among Year 6 pupils. Building on the data collected in Wave 1, Wave 2 topic guides explored parent and child changes in physical activity and screen-viewing behaviour from January 2022 onwards, factors that had influenced possible changes and the school perspective regarding changes to and influences upon activity levels among Year 6 pupils. All topic guides are presented in *Report Supplementary Material 1* and details on the researchers and analysis in *Report Supplementary Material 2*.

Data analysis

Data were analysed using the framework method and organised using the NVivo 1.0 program (QSR International, Warrington, UK).[43] This process consisted of seven stages: (1) *verbatim* transcription of interview/focus group audio recordings (using an encrypted Dictaphone) by a university approved transcription service; (2) data familiarisation through reading and re-reading transcripts; (3) coding, undertaken by three members of the team (Wave 1 RW, BT, TR, DH or KS; Wave 2 RW, DH and KS) who each coded two transcripts from each participant group each wave using inductive and deductive codes. This process allowed the team to discuss and deliberate codes and our subjectivity in interpretation, leading to consensus;[29] (4) collectively developing a working analytical framework using inductive and deductive codes; (5) applying the analytical framework to all transcripts; (6) charting raw data into the framework matrix using NVivo, which was then manually summarised by RW and LH; and (7) interpreting the data. At the interpretation stage, we combined school, child and parent perspectives, enabling triangulation of diverse experiences. All adult participants were given the opportunity to read and amend their transcripts prior to analysis, but none opted to do this.

This study was based in critical realism, a philosophical meta-theory that argues a world exists independently of human beings (ontological realism), but our perceptions and understanding of this world are derived through perceptions mediated by language, culture and human practices (epistemological relativism).[45] This allowed us to synthesise multiple perspectives in the context of the other, wider mixed-methods findings within the Active-6 project. This also means that we recognise the subjectivity of our qualitative analysis and that our interpretations are culturally situated.

Patient and public involvement

Patient and public involvement has been central to the Active-6 project. Year 6 children, teachers and school staff in a range of roles have been engaged in our research design, study materials and dissemination plans, in two-way feedback between participants and the research team. This has included parent members of study governance groups, running child PPI group sessions at schools to review data collection methods and dissemination materials, and sharing early school-level results with schools and participating families. This engagement has provided valuable feedback to Active-6, enabling us to improve and adapt the study as it rolled out.

Equality, diversity and inclusion

Equality, diversity and inclusion were considered in participant recruitment for this study. A range of schools in terms of location (urban, suburban, town, rural), size (number of Year 6 classes) and deprivation (school postcode IMD) were included in each participant group. As recruitment was taking place each wave, participant demographics were monitored and certain schools and groups were targeted to increase their inclusion in the study. However, inclusion and representation of diverse ethnic backgrounds, lower socioeconomic status (SES) groups and male parents are limited, in part due to the challenges of conducting research during a pandemic and ongoing school and family disruptions. School staff who facilitated the accelerometer data collection were invited to participate in an interview, with attention paid to securing a range of job roles and a gender balance, which was better achieved in Wave 2 (see *Table 1*). Parents were categorised as low, medium or high MVPA level based on their accelerometer measured weekday MVPA in comparison to their school group. Their IMD score (based on home postcode), age, ethnicity and highest level of educational qualification were all noted. The majority of participants were female, white British, higher qualified, higher IMD and active. Intentional sampling helped to achieve a greater balance in Wave 2 regarding parent gender, but not in terms of participation of lower SES parents (see *Table 2*). Child activity levels were generated in the same manner, and even ratios of children with low/medium/high MVPA from schools situated in an even range of urban/rural and high/low deprivation areas were invited to attend a focus group (see *Table 3*). The demographics of the sample may mean that those schools and families facing greatest challenges are not represented in this study, and therefore work that includes these experiences is needed to ensure policy implications are relevant and suitable for all.

Results

Three main themes were generated: (1) the return to school, (2) over-pressured staff and environment and (3) the uneven impact of the pandemic. Theme 3 consists of three subthemes: (a) retained pandemic policies, (b) impact on physical activity culture and (c) different children need different things. A thematic map with hypothesised theme relationships can be seen in *Figure 2*, and overviews of these themes and their scope are provided in *Table 4*.

Theme 1: the return to school

When schools re-opened to all students after the first national lockdown in June 2020, it was apparent to school staff that children's physical, social and academic development had been impacted. We have reported elsewhere that parents who had children at home with them during lockdowns particularly noticed that not only had children lost their curriculum PE sessions, but they lost any active travel to and from school, active play during breaktimes, active after-school clubs and spontaneous after-school park visits.[29] Although strategies to promote physical activity at home during school closures were developed, teachers expressed difficulty in creating exciting virtual PE sessions using the child's home environment and children expressed that PE at home under lockdowns was boring.[29] It became particularly challenging for teachers to influence and engage children who were not motivated to take part and did not have a parent to encourage them, as well as children who had issues accessing the necessary technology or enough space to be able to participate.[29]

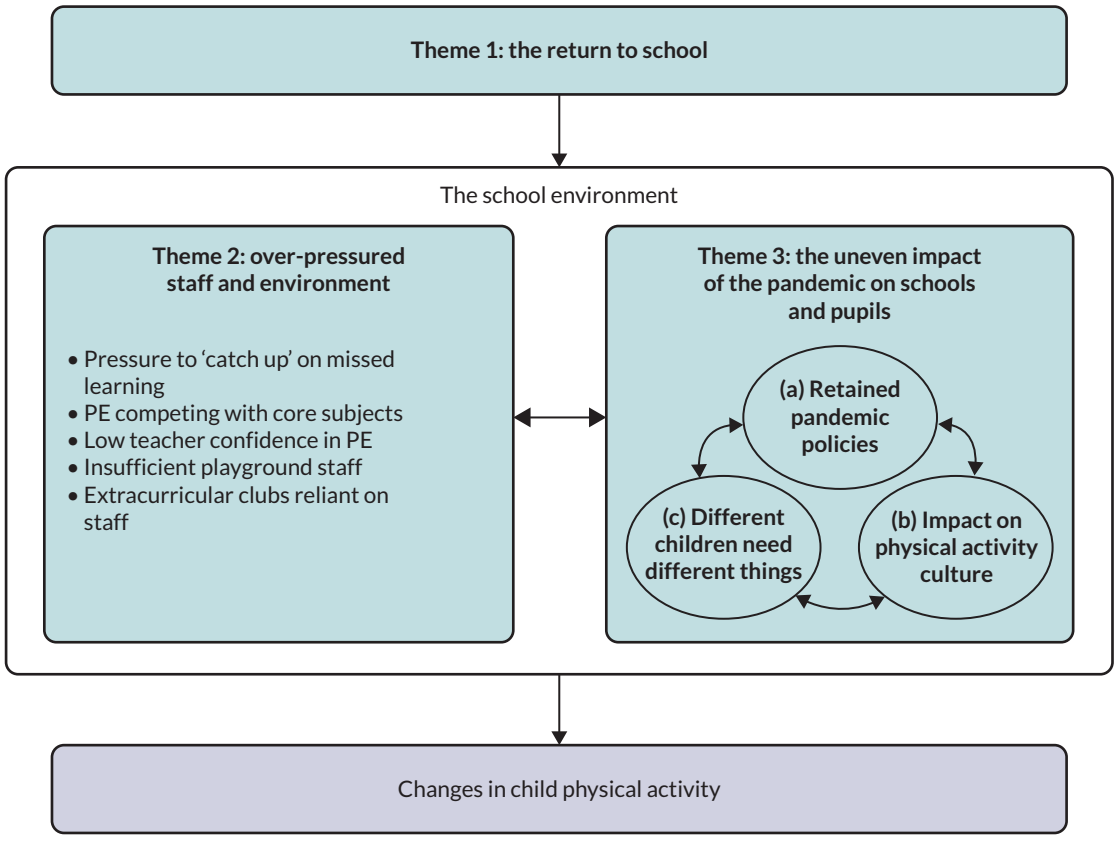

FIGURE 2 Thematic map with hypothesised relationships between themes.

TABLE 4 Theme names and overviews

Theme	Overview
Theme 1: the return to school	This theme explores schools' prioritisation of children's well-being activities, including physical activity, during the first return to school after the initial lockdown. Physical activity was perceived to be intrinsic to school attendance and diverging experiences could be seen among children. 'Recovery curriculums' reflected schools' priorities, which were implemented to even out the detrimental impact of lockdown.
Theme 2: over-pressured staff and environment	This theme explores the over-pressured staff body and school environment once the 'recovery' period was over. School staff described an exceptional pressure to 'catch up' on lost learning, that PE competed with core subjects, how staffing issues led to insufficient playground support staff, and that extracurricular clubs were reliant on scarce teaching staff time. The uneven impact of the pandemic on schools and pupils (Theme 3) has at times contributed to this pressure.
Theme 3: the uneven impact on schools and pupils	This theme reflects the uneven impact of lockdowns and COVID-19 measures on schools and their pupils. The post-lockdown physical activity environment is characterised by variation, and is explored through the following three subthemes:
Subtheme a: retained pandemic policies	The uneven impact of the pandemic was highlighted in the extent to which schools retained their social distancing policies. The retention of some policies seems to be for convenience in the over-pressured post-lockdown school environment (Theme 2).
Subtheme b: impact on physical activity culture	This theme highlights the diverse impacts of the pandemic on physical activity culture among schools. Some schools were unable to prioritise physical activity due to post-lockdown pressures (Theme 2), while others strengthened their physical activity culture having understood its benefits to pupils through the pandemic. Several schools described significant disruptions to peer role modelling for physical activity.
Subtheme c: different children need different things	The COVID-19 pandemic, school closures and ongoing disruptions have had an uneven impact on children's physical activity. School staff observed that children who were already inclined to be physically active have returned to their activities. Conversely, staff described greater challenges in getting less active children active post lockdowns, creating greater polarisation between active and inactive children. Meeting these diverse and complex needs is a challenge for schools in the over-pressured school environment (Theme 2).

Across the parent and school staff interviews, it was felt that the return to the school environment increased children's physical activity and the opportunity to develop physical skills, even while social distancing measures were in place.

> *When they went back to school they were doing more physical activity, because they were at school and so they still had their playtimes and they had just being up and about, and naturally doing more throughout their day than being at home and home-schooling. Walking to school, walking back from school … You know, all those little parts.*
>
> *Parent 17, Female, School ID 75, Wave 1*

The positive impact of attending school on physical activity was discussed through 'keyworker' children – children whose parents worked in key services that continued through lockdowns so attended school in-person. Several teachers described how during lockdowns, due to a prioritisation of well-being at school, COVID-19 mitigation measures, good weather and the smaller number of children in school, they were in fact able to do more active and outdoor activities than under pre-pandemic school conditions, and keyworker parents noted this in our interviews. PE for keyworker children in school was largely enjoyed, but some noted technical difficulties that at times made the sessions challenging, such as participating in a 'blended' lesson in a classroom while classmates at home joined virtually, or being limited to the classroom space.

> *It was warm, it was spring, it was summer, we went out and let [keyworker children] play for longer. […] If anything, they probably had more physical activity when they were in school. […] So COVID-19 made us kind of freer to go out. The children at home, we knew, would not be doing very much physical activity*
>
> *School Contact 6, Year 6 Teacher, School ID 71, Wave 1*

> *I was in school. Playtime was amazing then. [… We] used to play tennis, because we used to be able to get, like, balls and tennis rackets out*
>
> *Focus Group 3, School ID 95, Wave 1*

> *We had to do [PE] in class, which was annoying because we did not get to move around as much and run around*
>
> *Focus Group 5, School ID 72, Wave 1*

In September 2020 when the school term began, most schools undertook some form of 'recovery curriculum' to support the development of the pupils' social, physical and emotional skills and reacclimatise them to the school environment (see *Figure 1*). Underlying this approach was recognition of the uneven impact school closures had on pupils, and how some children had fallen far behind expected development levels. The recovery curriculum, then, meant pushing academic priorities aside in the short term to bring children up to a base-level skill set to cope with the school environment, while understanding that these measures were a necessary pathway to be able to once again focus on academic outcomes. Being physically active in school at this time played a key role in this adjustment, with schools using physical activities, sports and games to practise teamworking, increase stamina and assist conflict resolution. The COVID-19 risk levels at this time being relatively high also encouraged staff to spend more time in outdoor activities.

> *We found that when the children came back, they didn't even know how to sit on the chair properly, they'd been sat on the sofa doing their work for the last six months. They just had their brother or sister to deal with for the last six months, they didn't have these 30-odd children. […] For the first term, we completely redesigned our curriculum. For the first weeks there was no maths and English. […] We focused on our five golden threads. A lot around team-building, physical activity, conflict resolution. […] It was all around the social skills and their building up stamina to be able to sit down and do an English lesson. […] Then, when we were going into the fourth, fifth, sixth week of the first term, we started dripping in snappy maths and English lessons. Again, very physical [active] maths and English lessons. […] Then, we started weaving in the more classic maths and English lesson of sitting down and doing a worksheet*
>
> *School Contact 7, Deputy Head Teacher, School ID 57, Wave 1*

Theme 2: over-pressured staff and environment

Lost learning and skill development among children over the pandemic created exceptional pressure for students to academically 'catch up', which staff explained exacerbated pre-existing issues within the highly demanding state primary school environment, such as limited resources and overburdened workloads. Although school staff described an ability to prioritise social, emotional and physical well-being and recovery during the first reopening of schools in September 2020 (Theme 1), by September 2021 pressures from governing bodies impacted the extent to which they could diverge from the expected curriculum, including a waning of the use of physical activity to assist social, academic and physical development. This pressure for pupils to academically catch up was exacerbated by an increased need to support children who were not yet reaccustomed to learning in the school environment.

> *The government has made it clear that they would like pupils to be back on track … I think that's just filtered through our Trust and it's filtered through the Heads and it's filtered through to classes*
>
> *School Contact 1, Head Teacher, School ID 44, Wave 2*

> *I feel like I'm needing to do more for them than I would have done historically with the same aged cohorts. Just a little bit more spoon-feeding and I don't even mean academically. I just mean helping them listen, helping them achieve what I've asked them to do, or helping them understand what the structure of the activity is*
>
> *School Contact 9, Year 6 Teacher, School ID 61, Wave 2*

These post-lockdown school pressures impacted upon the time for and quality of structured and unstructured physical activity. For the Year 6 cohort in this study, who took the first Standard Assessment Test (SAT) exams since the pandemic began (in May 2022), teachers described how PE lessons and other additional physical activities competed for time against 'higher priority' core subjects which are assessed. This is counter to the experience of many schools during the recovery curriculum, where outdoor and active time helped children's behaviour and ability to concentrate in the classroom.

> *At the moment, I don't think many [classes] are doing [The Daily Mile] because the curriculum is so tight that we can't literally fit it in*
>
> *School Contact 5, Year 6 Teacher, School ID 25, Wave 1*

> *Before SATs we didn't do as much PE as we did. I think it was because we were all getting ready for SATs. […] the teachers are always like, 'We'll do PE if we have time.' It's like PE is for the spare time. It's not really that important to them*
>
> *Focus Group 5, School ID 75, Wave 2*

Many Year 6 teachers described a lack of confidence in delivering quality PE at the Year 6 level. At this age, pupils can be experienced in a sport or activity if they attend a club outside of school. Teachers are aware these pupils are about to go to secondary school where PE will be taught by a subject specialist, and several teachers described how they felt the PE provision in the postgraduate certificate of education (PGCE) teaching qualification was inadequate and left them feeling ill-equipped to teach. Staff described how this had been an issue before the pandemic but was exacerbated by post-lockdown academic pressures. Teachers described feeling inclined to cancel PE or preferring for it to be delivered by external providers, to use PE time to complete administrative tasks. Using timetabled PE to catch up on other work further reduces PE training and continuing professional development (CPD) opportunities for staff, and improving delivery of PE lessons requires teachers to find time in their already over-burdened workload or, more often, to do so outside of work hours.

> *When you are a primary school teacher, obviously you deliver all of the provision. We can't all be brilliant at everything. So, the most obvious thing to say is there are some teachers who don't feel that they are good at delivering PE, particularly as you go higher up the school, where actually there are children who might do the sport externally and might actually end up knowing more than you do. It can sometimes feel like you are trying your best, but maybe what you are delivering is not as good as it could be*
>
> *School Contact 9, Year 6 Teacher, School ID 61, Wave 2*

> *Occasionally we'll have a PE staff meeting but they're few and far between. I don't think many people do [the CPD courses that are available] because of time. When you go back to it, it's down to time*
>
> *School Contact 4, Year 6 Teacher, School ID 71, Wave 2*

Playground support staff were often insufficient as staff retention was challenging at this time. This impacted upon the quality of the playground support staff, where the high turnover required ongoing training in facilitating games and activities. With fewer staff in the playground and lower staff-to-children ratios, fewer physical activities were supported during break and lunch times.

> *Sometimes I do training with the lunchtime staff and I train them in what things they could do at lunchtime with the children, so different sports, different games they can play. Whether it's because of COVID or not, we have such a high turnover of staff and quite often there's not a lot of staff that turn up*

> *for work. […] If we've only got a couple of staff outside, they can't then offer the activities. [… We then have an issue with] whether we can keep upskilling them because every year we keep getting different ones and it keeps changing all the time*
>
> *School Contact 3, PE Coordinator, School ID 72, Wave 2*

School environment pressures also impacted the number and variety of extracurricular clubs, which were often dependent on staff skills and availability. However, the teaching workload required teachers to use their spare time in the evenings or weekends to find the capacity to run these clubs, which meant needing to catch up on core academic workloads. For these reasons, it required staff who were highly motivated to organise these clubs, without which the number and variety of clubs might have been reduced.

> *It's having enough adults on the staff team, that aren't at complete breaking point, that are willing to help us [the PE lead and assistant]. […] Ideally, because we've got so many children who are engaged in clubs, we would take every child to an event with us but it's having those adults who are willing to do it*
>
> *School Contact 6, PE Coordinator, School ID 74, Wave 2*

Theme 3: the uneven impact of the pandemic

This theme describes how the lockdowns and COVID-19 measures had an uneven impact on schools and their pupils. The post-lockdown physical activity environment is characterised by variation and is explored through three subthemes: retained pandemic policies; impact on physical activity culture and different children need different things.

Subtheme a: retained pandemic policies

Many measures were put in place in schools to reduce the spread of COVID-19, such as 'bubbles' (smaller groups of children and at times staff that limited contact at school, often at the year group level), limited access to sports equipment due to sanitisation requirements, staggered break and lunch times, and staggered times for the start and end of the school day. These had an impact on pupils' physical activity. How these restrictions were retained once they were no longer prescribed varied greatly across schools. When students returned to school, many were not adjusted to the social expectations and demands of the school environment (Theme 1). This translated to the playground, with several teachers describing increased conflict and incidents in the playground post lockdowns.[29] For many schools, retaining 'bubbles' and staggered break and lunch times beyond necessary COVID-19 measures was positive, seen as a way to mitigate this, as children had more space to move around in, less competition to access the sports and other playground resources, and smaller and familiar groups encouraged some children to participate in break time sports and activities.

> *What we realised was that having fewer children in the playground meant 1) there were fewer accidents happening and 2) all of the children could use the equipment, all of the children had much more space to run around and enjoy and it has worked really successfully. […] So all the school is never in the one playground at the one time anymore. And the children love it, we love it as staff from a safety perspective, and it has worked really, really well*
>
> *School Contact 8, Year 6 Teacher, School ID 31, Wave 2*

> *The interesting thing is when they were in their bubbles at school, obviously you only played with those 30 children, but a lot of the girls started playing football with [the boys] at lunchtime and [male child] really loved that. He said, 'We're really lucky at our school, the girls are allowed to play with us,' and now they've sort of continued that*
>
> *Parent 15, Female, School ID 61, Wave 1*

Despite some schools finding many COVID policies to be beneficial to child well-being, others sought to remove COVID-19 playground restrictions as soon as possible. Although incidences of conflict may have been reduced by bubbles and zoning, opportunities for conflict resolution and older peer modelling were also reduced (Subtheme b). Some school staff described choosing to remove COVID-19 restrictions to enable such social encounters to return, with one Head Teacher critiquing a culture of structured play as a barrier to developing essential social skills. These staff saw greater opportunity for children to access space and equipment for physical activity *without* social distancing restrictions.

> *There has been a bit of a drive to structure play all the time for children in schools. Actually, sometimes, just letting them play without structure is what's important socially for them. Then, they come across problems, and they have to solve them themselves*
>
> *School Contact 7, Head Teacher, School ID 71, Wave 2*

> *the whole 'bubble' system within schools, that kind of limited play opportunities and everyone was segregated into separate areas and we couldn't have everyone out to play at once [… and] they couldn't use all of the equipment […] I think the whole school play thing is far healthier in terms of physical health and far healthier in terms of children being able to play with each other*
>
> *School Contact 1, Head Teacher, School ID 44, Wave 2*

For some schools the post-lockdown social and behavioural challenges in their pupils were not resolved within the recovery curriculum period (Theme 1). A return to unstructured play and pre-pandemic playground culture was not feasible for some pupils, even if desired by the staff, and nor was it feasible for the staff in the over-pressured post-lockdown school environment (Theme 2). Staff found some children needed a continuation of structured play, which several teachers referred to as 'scaffolding' in the playground and classroom, while they developed their social, physical and academic skills (Theme 1 and Subtheme c). Other children and staff described retaining COVID-19 policies for staff convenience and not necessarily what might be best for pupils and their physical activity.

> *It was causing more arguments, taking a class outside and just letting them play. We were getting lots of issues. Then a lot of teachers were like, 'Well I don't want to do that then, I just want to keep them in the classroom because [going out] creates arguments.' That's not the solution, the solution was that they needed structured games and they needed to be taught that conflict resolution*
>
> *School Contact 2, Year 6 Teacher, School ID 81, Wave 2*

> *We're usually set in different zones for different games but I think it'd be nice if people get to choose where they want to go. […] I think [the school is] keeping it just because they find it easier*
>
> *Focus Group 1, School ID 74, Wave 2*

Beyond the playground, schools retained other social distancing and recovery curriculum policies as staff found them to be beneficial to academic learning, physical activity, behaviour and well-being. However, where schools decided to continue the use of outdoor or movement breaks it was explicitly linked to improving pupil concentration and academic learning. Having pupils come to school dressed for PE, a policy to reduce sanitation needs, maximises PE time but also potentially relieves small pressures from an over-pressured environment.

> *Again, in line with most schools, because of the whole sanitising and touching thing, we opted to get rid of the change [of clothes] for PE. We asked children, on PE days, to come in already in their tracksuits and trainers. […] We've maintained it because that has affected physical activity positively because when you've got your timetabled slot for PE you can just go and do it. […] so that maximises PE time*
>
> *School Contact 1, Head Teacher, School ID 44, Wave 2*

Subtheme b: impact on physical activity culture

Some school staff and parents described their school as having a culture that prioritised sport and physical activity. A positive and supportive culture for physical activity in primary schools was seen to have broad positive impacts on the pupils, by providing opportunities to have most, if not all, pupils engaged in physical activity, building confidence, social skills, co-operative behaviour and academic capacity. Most parents and staff who described this culture in their school perceived it to be a priority set by the senior leadership team (SLT), specifically a Head Teacher or Principal, or in some cases driven by members of teaching staff. Several school policies and expectations set by the SLT around increasing physical activity were described, such as a requirement for every teacher to run an extracurricular club, schools working to have every child attend an after-school club or policies protecting PE lessons or ensuring external PE provision was used as teacher CPD.

Building on Theme 2, many schools described the challenge of prioritising physical activity in the post-lockdown school environment. Structural issues such as competing academic priorities, a lack of staff resource and a post-lockdown reduced external provider offer meant some schools were unable to support physical activity at lunchtimes, bring their extracurricular club offer back to pre-COVID-19 levels, or teachers cancelled PE for core priorities. These structural issues directly impacted on the physical activity culture within a school.

> *Post-pandemic we've been fully focused on just the daytime core offer of what we're here for, so the afterschool clubs have taken a backseat*
>
> *School Contact 1, Head Teacher, School ID 44, Wave 2*

> *One thing that, maybe, [the pandemic] has impacted slightly is other staff's willingness to run clubs […] outside of school at the moment. Obviously they're still adjusting back to their own roles really*
>
> *School Contact 6, PE Coordinator, School ID 74, Wave 2*

Conversely, having seen the social, physical and academic benefits of prioritising physical activity and well-being once schools returned (Theme 1), some schools felt that the COVID-19 pandemic strengthened the physical activity culture among the SLT and/or teaching staff. Despite the over-pressured environment described in Theme 2, several schools we spoke to described how they ensure PE remains a priority lesson that is never cancelled, or had a stronger structured breaktime and extracurricular club offer than before the pandemic. The ability to ring-fence these activities in the post-lockdown school environment was connected by interviewees to the SLT setting a physical activity culture. Despite in some ways adding pressure to staff workload, this expectation gave staff permission to prioritise physical activity.

> *I would say that since COVID the senior leadership team have been more aware of getting as much activity into the school day as possible. And there has been a push on certain members of the lunchtime team, at lunchtime, focusing on certain activities outside*
>
> *School Contact 2, PE Coordinator, School ID 72, Wave 1*

School staff also described changed patterns of role modelling and peer aspiration around physical activity within schools, since school closures. Peer role modelling was seen by several staff as an important factor in maintaining an active school culture, whereby pupils saw children like themselves taking part in and enjoying activities, enabling them to consider taking part themselves. As we have reported in a related study, with 2 years of interruptions to this, several schools described how the physical activity culture among the pupils had been eroded, particularly among girls.[39] Where children no longer aspired to participate in active clubs and physical activity they retreated from these, leading to a lower skill level which in turn adversely affected their enjoyment and motivation to take part.

> *We absorb messages, and habituate something by seeing it. In lockdown the messages from seeing their peers, seeing sport, those vanished. […] A new narrative emerged where it's cooler to hang at the park*

> *or play PlayStation because they did it in lockdown. I don't think it will be a long-lived thing, but I do worry for this current cohort [Year 5 and 6], and the cohort that is currently Year 7, how they will fare going through*
>
> *School Contact 7, Head Teacher, School ID 71, Wave 2*

Subtheme c: different children need different things

The pandemic had a varied impact on children's physical activity, dependent on whether they attended school or not, that is keyworker children, their parental/carer support, their home and local environment, and their post-lockdown school environment, amongst others (Theme 1, see also).[29] A related Active-6 study has suggested that the impacts of the pandemic on child physical activity differ by socioeconomic position and gender with greater impact on children living in lower income households and among girls.[39] Many school staff we spoke to observed that children who were already inclined to participate in physical activity, returned to or maintained their activity through the ongoing COVID-19-related disruptions to school. Conversely, some staff described challenges in getting less active children participating in clubs, creating greater polarisation between active and inactive children. Lost learning, physical skill development and active school culture over 2 years of COVID-19 disruptions have made it harder for children who would previously have struggled to attend clubs to do so post lockdowns.

> *[Pre-pandemic] with the pupil premium funding [a grant given to schools in England to decrease the attainment gap for the most disadvantaged children] you would make sure that every pupil premium child attended a club after school, because it gave […] them confidence, you know, it made a huge difference. That has been harder to reach, because there has been such interruption of the clubs. […] We brought them back […at] the very earliest we could, when lots of schools didn't. […] [But pupil premium students] just didn't come back to clubs in the numbers that they previously were. So, those children weren't feeling part of the cricket team, the football team, the dance group, the performing arts group, the IT, the athletics and cross-country*
>
> *School Contact 7, Head Teacher, School ID 71, Wave 2*

Across our interviews we heard a vast range of child preferences for types of activity, the ethos of these, the skill level and the environment for them. This creates a challenge for schools to try to offer opportunities that provide for this, due to such divergent post-lockdown child abilities and needs (Theme 1) and the over-pressured school environment (Theme 2). But school staff, children and parents described how choice and variety would encourage more children to participate. Yet the disruption to the development of children's physical and social skills,[39] particularly in teamworking and conflict resolution (Theme 1 and Subtheme a), as well as the increasingly pressured environment for staff (Theme 2) now set the broader context of how physical activity is unfolding in the post-lockdown school environment. These are also reasons why participation in physical activity and active extracurricular clubs could be of greater importance for well-being than before the pandemic.

> *For some children, the academic pressures are such that school is really tough for them. [PE is], maybe, one time in the week that they really feel success and confidence. […] For other children, they have really poor stamina and fitness, it's really important for them to be able to ensure that develops. For other children, who need to develop social skills around fairness, particularly for the transition to secondary school, […] they have to learn the lessons that are all about the social, mental health, things*
>
> *School Contact 5, Year 6 Teacher, School ID 63, Wave 2*

In the increasingly pressured post-lockdown state primary school environment, meeting these varied needs was expressed as challenging, and schools may struggle to find the resources and skills to meet these complex and varied needs. Some school staff are concerned that not engaging children in physical activity in younger years may result in some children falling through the cracks and their physical activity being impacted for life.

Our deputy is very keen, at the moment, to work out who can swim and who can't before we move into Year 7 because we have that national curriculum objective that we have to have them know how to swim 25m. […] If parents can't pay for it then it doesn't happen. We're going to end up with a few children who are never going to be able to swim.

School Contact 4, Year 6 Teacher, School ID 71, Wave 2

Discussion

This analysis has provided a unique multi-perspective qualitative understanding of child physical activity environments in English state primary schools over the first year post-COVID-19 lockdowns. The three themes and three subthemes provide insight into how the school physical activity environment changed over the first year post lockdown and school closures, particularly in regard to school and teacher prioritisation of physical activity, if/how social distancing measures were retained, pupil engagement and ability, and how these were experienced by pupils and staff. These insights are an essential part of the picture of understanding why changes to children's physical activity occurred post lockdown and has implications for promoting and supporting physical activity in schools from this point onwards.

Structured environments such as schools have been suggested to increase children's physical activity.[33–35] School closures and COVID-19 restrictions meant most children in England were home schooled for many months, impacting upon their school regulated activity, diet, screen use and sleep patterns. This study suggested that children's physical activity was improved when children returned to schools, which is supported by other research,[23] and has flagged the central role of school and the school day on children's physical activity. However, previous studies have highlighted pre-existing barriers to school and teacher attempts to increase and support child physical activity within the school environment. These have included individual teacher factors such as confidence, motivation and the value they place on physical activity; school level factors such as space and facilities, senior support to prioritise physical activity and heavy workloads; and pupil factors such as ability and interest.[46–50] This study suggests the over-pressured post-lockdown school environment has exacerbated these pre-existing challenges to promoting physical activity, and that the extent to which schools are able to facilitate physical activity is uneven. This finding is also consistent with the body of evidence that has shown that there is a need to increase PE teaching expertise among primary school staff.[51,52]

This study has found schools have retained COVID-19 and social distancing policies to varying degrees. These policies and changes need to be evaluated and considered in conjunction with current knowledge of each policy area and its impact on child physical activity. For example, in this study we found several schools retained a policy of pupils coming dressed for PE on PE days which reduced contact and assisted COVID-19 mitigation, but also eased some pressure in the day. This policy could enable general child activity across the day. Studies have explored the impact of school uniform in limiting physical activity and how a 'sports uniform' could improve activity, which may be gendered.[53–55] However, other studies have found particular groups, for example girls or girls from particular faith communities, feel self-conscious or uncomfortable in PE kit.[56,57] These complex factors need to be considered. School culture is an important factor in school physical activity.[58] Peer modelling has been identified as a key predictor of children's physical activity,[59] and reductions in peer role modelling and participation in physical activity were observed in this study. SLT support to set a physical activity culture in a school has been highlighted elsewhere as an important factor,[60] which supports this study's findings, but school cultures have also been disrupted unevenly by the pandemic and are influenced by the highly pressured school environment.

To encourage children to be active, schools need a range of clubs and staff capacity to support varying child needs,[51,52] however, other Active-6 analysis has found an increased demand for school-based active clubs since the lockdowns, which schools are struggling provide.[61] Other recent evidence, including Active-6, has also found that the impact of the pandemic on child physical activity, and the recovery, is uneven across demographic groups such as gender, age, ethnicity and SES.[25,62] These findings are mirrored in this study, which suggest that children who were active before the pandemic lockdowns returned to active clubs, and those who were less active are now even harder to engage, resulting in a greater polarisation of child ability and activity levels. The Active-6 study has found that although child physical activity has returned to near pre-pandemic levels,[30] children are more dependent on organised activities, such as active clubs, for this physical activity.[39] Combined with the findings of this present study, it seems that school-based active clubs and activity (such as PE lessons) may be of

greater importance in child physical activity than before the pandemic, particularly in addressing the growing polarisation and inequalities of child physical activity.[62]

Study implications

The key findings and implications of this study are summarised in *Table 5*. The study's key finding is that the post-lockdown primary school environment and staff body are characterised as over-pressured, with staff expected to deliver on core academic work while trying to meet complex post-lockdown pupil needs. This is impacting upon the child physical activity environment, although this impact is characterised by variety and divergence of experience. Schools would benefit from upstream policy changes to alleviate the pressure placed on them through school governance systems. This might enable schools to retain and continue the physical activity and well-being-centred approach seen during recovery curriculums. This implication has been included in an Active-6 study policy briefing which has been developed in partnership with key policy and practitioner stakeholders.

Several additional implications have arisen in this study. Many Year 6 class teachers feel unconfident in delivering quality PE lessons. COVID-19 social distancing policies have been retained to varying degrees within schools, at times in the interests of pupils and at others in the interests of the over-pressured school. These policies should be evaluated for their impact on child physical activity. Schools' physical activity cultures have changed in varying ways since lockdowns. Context-specific research is necessary to understand how these cultures are created and shaped, and future intervention work should make school culture, ethos and context central in their implementation and evaluation. Lastly, the COVID-19

TABLE 5 Key findings and implications

	Key finding	Implications
1.	The post-lockdown state primary school environment is characterised as over-pressured, with expectations for staff to deliver on academic core work while trying to meet complex post-lockdown pupil needs. This can be at the detriment to child physical activity and well-being.	Government and the Department for Education should reduce pressure on the school system. This could enable schools to balance physical activity with academic core work through: • increasing staff supported active club offers • enabling teaching and playground staff to take up opportunities for PE CPD • enabling staff to support complex pupil needs and address barriers preventing participation.
2.	Many teachers feel unconfident in delivering quality PE lessons, particularly to older children/ year groups.	Training in PE in the general primary school teacher qualification is currently inadequate. Awarding bodies could dedicate more time in the training to deliver quality PE. PE CPD provision must be available but, importantly, teachers need to feel they are able to take up opportunities (see *Study implications*).
3.	COVID-19 social distancing policies have been retained to varying degrees in schools. These have been in the interests of pupils at times, but also in the interests of the over-pressured school.	Schools should seek evaluation of these policies for their impact on child physical activity.
4.	Schools' physical activity cultures have changed and been impacted by the pandemic in varying ways.	Further context-specific academic research is warranted to understand how school physical activity cultures are created and shaped. Future research and intervention must understand school culture and ethos and develop school-specific strategies.
5.	The COVID-19 lockdowns had an uneven impact on children's physical activity, and some groups risk getting left behind.	Strategies to have all pupils participating in physical activity are necessary even more so than before the pandemic. Schools should be supported in meeting these more divergent levels of child ability and need.

lockdowns had an uneven impact on children's physical activity, and some groups risk getting left behind. Strategies to reach all pupils are necessary even more so than before the pandemic, and schools should be supported in meeting these now more divergent levels of child ability and need.

Strengths, limitations and future research

This study has several strengths. It combines school, parent and child perspectives, enabling triangulation of opinions and experiences. Furthermore, data were collected at two time points in a period of rapid change, both in COVID-19 policy and mitigation strategies, particularly within schools, but also in embodied experiences of the pandemic and restrictions. This has provided rich data on a complex issue, supporting an analysis that has been able to consider how experiences have changed over time.

Active-6 was limited to the school sample from the comparator baseline B-Proact1v study. At the time of data collection (both quantitative and qualitative) schools were under great pressure, negotiating ongoing COVID-19 complications and outbreaks while supporting our work. This likely limited the numbers of schools able to participate in Active-6. Although a range of schools participated in this qualitative study (see *Methods*), these factors again may have contributed to our participant sample from within these schools. It was challenging to recruit staff for interviews, particularly SLT staff, and the parent interview sample is predominantly female, active and of higher SES. Therefore, the experiences of male, less active and lower SES parents are limited, and this must be considered in interpretation of the parent findings.

This study suggests that the impact of COVID-19 on child physical activity is uneven, affecting some children more than others. Future work is therefore needed to explore the details of this potential diverging experience, to understand which sorts of schools followed which paths through the pandemic and how children have been differently affected, particularly over the longer term. Importantly, in light of the varying experiences this study has highlighted, future work to support schools to improve child physical activity and their physical activity environments must be context specific: sensitive to staff abilities and capacities, the SLT, school space and environment, facilities, wider neighbourhoods and environments, demographics, cultures and indicators of deprivation such as numbers of pupils receiving free school meals.

Conclusion

The COVID-19 pandemic, school closures and post-lockdown school policies have impacted upon primary school physical activity environments. The post-lockdown school environment is highly pressured, impacting the extent to which schools can support and encourage child physical activity. Future research is needed to further explore the impact of post-lockdown changes on physical activity environments in schools, particularly over the longer term, as schools continue to adapt post lockdowns. Strategies required to support school physical activity environments must be context specific and sensitive to these changes, pressures and needs.

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Ethics statement

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Data-sharing statement

All data requests should be submitted to the corresponding author for consideration. Access to anonymised data may be granted following review.

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List of abbreviations

CMOs	chief medical officers	PPI	patient and public involvement
CPD	continuing professional development	SAT	standard assessment test
		SES	socioeconomic status
IMD	Index of Multiple Deprivation	SLT	senior leadership team
MVPA	moderate to vigorous intensity physical activity	WHO	World Health Organization
PE	physical education		

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