Parental perceptions of the impact of neonatal unit visitation policies during COVID-19 pandemic

Hemananda Muniraman, Mahmoud Ali, Paul Cawley, Jessica Hillyer, Adam Heathcote, Venilla Ponnusamy, Zoe Coleman, Kendall Hammonds, Chandni Raiyani, Eleanor Gait-Carr, Sarah Myers, Katie Hunt, Vinayak Govande, Anoo Jain, Reese Clark, Cora Doherty, Venkata Raju, Paul Clarke

ABSTRACT

Objectives To ascertain parental perceptions of the impact of restricted visiting policies to neonatal intensive care units during the current COVID-19 pandemic.

Design Cross-sectional survey of parents impacted by visitation policies.

Setting Six tertiary level neonatal units, four from the UK and two from the USA, participated in the study.

Participants Parents and families of infants hospitalised in the participating centres between 1 May 2020 and 21 August 2020.

Methods Online-based and/or paper-based survey, querying the visitation policies and their impact on parents' ability to visit, care for and bond with their infants.

Results A total of 231 responses were received. Visitation limited to a single visitor with no restrictions on duration was the most frequently reported policy; 140/217 (63%). Visitation policies were perceived as being restrictive by 62% (138/219) of the respondents with 37% (80/216) reporting being able to visit less often than desired, 41% (78/191) reporting being unable to bond enough and 27% (51/191) reporting not being able to participate in their baby's daily care. Mild to severe impact on breast feeding was reported by 36% (75/209) of respondents. Stricter policies had a higher impact on families and were significantly associated with a lack of bonding time, inability to participate in care and an adverse impact on breast feeding.

Conclusions Visitation policies during the COVID-19 pandemic varied between centres and over time with stricter restrictions implemented earlier on in the pandemic. Parents reported significant impacts on their ability to visit, care for and bond with their infants with perceived severity of impact worse with stricter restrictions.

INTRODUCTION

Family centred care (FCC) and, more recently, family integrated care (FIC) models have been adopted by neonatal intensive care units (NICUs) to encourage and empower parents to engage and actively participate in the care of their infants, while collaborating with healthcare providers.1-4 FCC and FIC have been shown to improve safety and quality of care and have wide-ranging benefits including improved weight gain, higher rates of breast feeding, decreased length of stay, decreased nosocomial infection, decreased parental anxiety and stress, improved discharge readiness and parental satisfaction rates.5,6 For effective FCC, FIC and patient–infant bonding, parental presence and strong commitment from both parents and healthcare providers are essential.

In little over 8 months, the current COVID-19 pandemic caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) virus has infected over 40 million people and contributed to 1.1 million deaths worldwide.10 However, there are only a few case reports of vertical
transmission in neonates with SARS-CoV-2 published in the literature.11–14 The American Academy of Pediatrics (AAP) neonatal–perinatal COVID-19 registry update of 3 October 2020 reported that, among 3722 mother/infant dyads and 3359 COVID-19 positive mothers, only 52 (1.6%) of 3198 infants tested positive for SARS-CoV-2.15

Social distancing and wearing face masks/coverings have been shown to mitigate the spread of viral transmission. Healthcare institutions have also implemented severe visitation restrictions to control SARS-CoV-2 spread and protect the health of patients, providers and staff. The restrictions vary widely depending on local infection rates, availability of personal protective equipment and the structure and layout of the NICU.16 17 The impact of any of the restrictions on parental ability to be present and care for their infants is not well defined. Our aim was to ascertain parental perceptions of the impact of visitation restrictions during the COVID-19 pandemic on their ability to visit, care for and bond with their infants.

METHODS
We designed an 18-item questionnaire to survey parents/guardians of infants hospitalised for prospective participating neonatal units during the COVID-19 pandemic, to assess perceptions of visitation restrictions and their impact. The anonymous questionnaire included both closed and open ended questions and free-text comment sections for respondents to provide additional responses if applicable (online supplemental file 1).

Patient involvement
Patients or the public were not involved in the design or conduct of the study, but were involved in its peer review and advising on the dissemination of our research.

Participating centres and participants
We used a pragmatic approach to recruit centres and parents to participate in the survey by disseminating an open invitation over social media platforms including Twitter, neonatal forums, via email and WhatsApp groups. Centres determined their own preferred methods for publicising the study locally to parents and distributing the study information. These included poster notices in the units, social media/communication platforms for parents, and direct mailing of the survey to parents whose infants had recently been discharged from the hospital. All centres conducted a cross-sectional survey of parents of infants hospitalised at the start of the study, followed by prospective survey of parents of infants admitted thereafter during the study period. Additionally three centres mailed the survey questionnaire to parents whose infants had been recently discharged. Paper and/or online questionnaire responses were recorded via SurveyMonkey (Palo Alto, California, USA) during the study period between 1 May 2020 and 21 August 2020. An information sheet provided along with the survey/online questionnaire summarised the purpose and objectives of the study and explained the rights of participants. Participants were required to document their prior agreement to participation in the survey by first answering a consent question. A second survey was sent to site investigators to enquire about the timing and nature of visitation restriction policies and any changes over time.

Statistical analysis
Respondents’ characteristics and responses were described with descriptive statistics using frequencies and percentages to report categorical variables. Means and SDs (or medians and ranges where appropriate) were used to describe continuous variables. Perceptions of impact were compared between countries, centres and across different restriction policies: (1) one visitor at cotside for limited duration; (2) one visitor with no restriction on duration of visit and (3) two visitors for limited duration. Associations in bivariate comparisons were examined using χ² or Fisher’s exact tests as appropriate. A Wilcoxon rank-sum test was performed to assess the difference in ordinal variables between two groups. A Kruskal-Wallis test was performed to assess the difference in ordinal variables between three or more groups. Statistical significance was set at p<0.05.15 16 All statistical analyses were performed in SAS V.9.4 (SAS Institute).

RESULTS
Six tertiary level NICUs participated, four from the UK and two from the USA. Two hundred and thirty-one responses were received, of which 7 were excluded (1 lacking consent signature, 2 from non-participating sites, 4 for incomplete information on visitation policies). A total of 224 responses were included for final analysis: USA: n=131 (58%), UK: n=93 (42%). Breakdown of responses by centre was: Baylor Scott & White McLane Children’s Medical Center, Texas, USA: 80, St Joseph’s Hospital and Medical Center, Phoenix, USA: 51, St Michael’s Hospital (SMH), Bristol, UK: 31, Ashford and St Peter’s Hospital, Chertsey, UK: 27, Norwich and Norfolk University Hospital (NNUH), Norwich, UK: 25 and University Hospital of Wales, Cardiff, UK: 10.

Of respondents, 153 (70%) were mothers, 58 (27%) fathers and 5 (2%) were grandparents. Remaining 2 (1%) respondents were a sibling and a guardian. Mean (SD) age of respondents was 32 (7) years. The birth gestation of index infants was reported as being term (237 weeks) by 71 (34%) respondents, late preterm (34–36 weeks) by 36 (17%), moderately preterm (28–33 weeks) by 61 (30%) and extremely preterm (<28 weeks) by 39 (19%) respondents. Length of hospitalisation at the time of survey completion was reported as <1 week by 100 (45%), between 1 and 4 weeks by 70 (32%) and >4 weeks by 50 (23%) respondents.

Restriction policies

The most common visitation policy overall limited visiting to just one person at a time, although for an unlimited period, reported by 140 (63%) respondents, followed by allowing two visitors for a limited duration, reported by 42 (19%) respondents. Policies changed significantly over time: during May 2020, the most common policy was restriction to one visitor with restricted duration. During June, July and August 2020, the most common policy was one visitor at a time for an unlimited duration (figure 1, table 1).

Of the respondents, 122 (56%) reported that the restrictions did not affect their ability to visit, whereas 80 (37%) reported visiting less often and 14 (7%) more often. Regarding the wider family’s ability to visit, 84 (40%) reported their partner had visited less often, while 98 (45%) and 115 (54%) reported concerns that siblings and grandparents were not allowed to visit, respectively.

Concerns about the visitation policies were reported by 94 (50%) respondents: 78 (41%) respondents felt unable to bond adequately with their infant and 51 (27%) reported being unable to participate in their baby’s daily cares. A mild impact on breast feeding was reported by 50 (24%) respondents while a severe impact was reported by 25 (12%) respondents. Video/audio recordings or streaming were perceived as unhelpful by 36 (17%) respondents, many of whom expressed concerns that they received insufficient information and updates about their infants.

Majority of respondents, 176 (83%) reported a requirement to wear a face mask when visiting the NICU: 95 (45%) of respondents reported that wearing face masks was appropriate, while 73 (34%) reported that wearing a face mask affected bonding and 46 (21%) reported that the wearing of masks by staff made their interactions with staff less personal.

Comparison of different restriction policies

There was no difference in respondents’ reported ability to visit with the different restriction categories (p=0.18) (table 2). A policy of one visitor restricted to limited duration was associated with a higher proportion of concerns of lack of bonding, inability to participate in care, obtain updates and bring supplies, followed by two visitors with a restriction on duration of visit. A policy of one visitor and unrestricted visit duration was associated with a lower proportion of concerns (p≤0.02) (table 2 and figure 2).

Respondents subject to policy restrictions of one parent for a limited time were more likely to perceive a mild or severe impact compared with those facing less austere restrictions (p=0.02) (table 2 and figure 2).

Restriction policy and month of response varied among the centres, with the majority of responses from the UK in May and June 2020, and the US centres in July and August 2020 (table 3). Respondents from centres with more restrictive policies in May and June 2020 reported higher rates of insufficient bonding, higher rates of being unable to participate in their infants’ care and more mild and severe impacts on breast feeding (p=0.01) (table 4). The centre with the least restrictive policy on parental visiting (SMH, Bristol, UK) reported the lowest rates of both inability to participate and insufficient bonding (p=0.01). The centre with the most austere restrictions (NNUH, UK) had the greatest associated rates

![Figure 1](image1.png) Visitation policies over time during study period. (A) Restriction by visitor number and restricted versus unrestricted duration. (B) Breakdown of visitation policy by length of restricted duration.

<table>
<thead>
<tr>
<th>Table 1 NICU restriction policy compared by months of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Restriction policy</strong></td>
</tr>
<tr>
<td>One parent at cotside with restricted visit duration (n=35)</td>
</tr>
<tr>
<td>One parent at cotside with unrestricted duration (n=140)</td>
</tr>
<tr>
<td>Two family members at cotside with restricted visit duration (n=42)</td>
</tr>
</tbody>
</table>

Data are n (%). A chi-square test was performed to assess the association between NICU restriction and month of completion. NICU, neonatal intensive care unit.
of mild and severe adverse impacts on breast feeding reported (p=0.01) (table 4). There were no differences in responses based on countries reported for visiting, bonding or caring for infants (p>0.05).

**Comments from parents**

Comments from parents regarding visitation policies further demonstrated their impact, especially at the beginning of the pandemic when restrictions were most severe, and with extremely ill infants during end of life scenarios. One mother wrote:

I will remember this for the rest of my life. I will also remember the kindness of the staff but at 18 hours old I was told my baby might die and I had to beg to see him because I had already had my 2 hours. How is that ok???

Several comments related the impact of visitation polices on parental mental health:

Felt like my baby was not mine and I was asking permission from the nurses. Also has made me feel resentful towards [my] husband as all the emotional burden of a child in NICU fell upon myself;

The visiting times force a choice between cuddles and learning how to tube feed etc. Consequently this has left me feeling like I don’t take good care of my baby. Not acceptable for a postnatal women. I would imagine PND [post-natal depression] will be very high in this epidemic.

The comments in July and August 2020 predominantly related concerns about being unable to spend time together as family:

I have found the visiting restrictions very tough and would love for nothing more than myself and my partner to be able to see our child together. It has been an extremely tough few weeks emotionally and I wish we could support each other in NICU together and be prepared for discharge.

Comments from respondents are summarised in full in online supplemental file 2.

**DISCUSSION**

We report the results of a bi-national survey of parents affected by neonatal unit visitation policies during the current COVID-19 pandemic. This pandemic has led to widespread restrictions on family visiting to the hospital, especially in intensive care units where the most critical patients are cared for.17 NICUs present a unique setting where infants often stay for weeks to months and parents play a vital role in their care. There has been a paradigm shift in the parental role in the neonatal unit; parents are no longer considered ‘just visitors’ but rather an integral and essential part of care provision.1–5 However, the pandemic and resultant visitation restrictions have severely disrupted the parental presence and their ability to facilitate and augment care in the NICU. The short-term and long-term effects of these restrictions are unknown, but may be significant.19

While we found that the majority of parents understood the need for revised visitation policies, they reported significant concerns about their consequent ability to visit, care for, and bond with their infants. The visitation restrictions were implemented between mid-March and early April 2020 in the USA and UK during the early stages of the pandemic. Our study shows that
parents have been significantly impacted since this time, especially with being denied the opportunity to spend time with their critically ill infants and particularly during end of life situations. The initial guidance of the AAP on management of infants born to suspected and confirmed COVID-19 positive mothers during this period recommended temporary separation of the infant pending testing of both infant and mother.\textsuperscript{20} By June and August 2020, with mounting evidence of the low risk of vertical transmission, very few case reports of neonates being affected, and better availability of personal protection equipment, modified restrictions permitted one or both parents to spend more time with their babies. Our data suggest that this resulted in a less severe impact, with fewer major concerns about being unable to spend sufficient time together as a family. The AAP has since revised its guidance to recommend rooming in for parents with mild to moderate symptoms, with appropriate isolation precautions.\textsuperscript{21}

Within the UK, early national guidance in March 2020 relating to NICU visitation policies was limited; reflecting the scarcity of evidence. However, separation of an otherwise well infant from a SARS-CoV-2 positive mother was not advocated and breast feeding was not discouraged providing that hygiene precautions were adhered to.\textsuperscript{22} By April and May 2020, more comprehensive guidance was jointly issued by the UK Royal College of Paediatrics and Child Health (RCPCH), British Association of Perinatal Medicine and Bliss baby charity; they strongly advocated for the role of parents as part of the infant’s therapeutic team and not as mere visitors, and as such stressed that ‘parental restrictions should be exercised only when absolutely necessary, as a temporary and proportionate response to a peak in viral transmission’.\textsuperscript{23–25} Restricted visiting on time of day was discouraged and, where possible, units were advised to allow parents to be present together.\textsuperscript{23–25} In June 2020, RCPCH medical guidance advised a nuanced response: that parent and baby form one family ‘bubble’, and that cotside face coverings would be unlikely to offer significant additional protection if sufficient spacing was maintained from other staff, parents and visitors.\textsuperscript{23}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2}
\caption{Parental perception of impact of restriction policies.}
\end{figure}
Our findings highlight the complex challenges of developing and implementing guidelines during a rapidly evolving novel pandemic, with limited evidence and experience available, and the expected tradeoffs on the established standard of care and its benefits.19 Some of the impacts may be mitigated by individualising policies to meet the unique requirements of the affected population and local centres, and in situations including end of life care or life-threatening surgeries/procedures, and by constant re-evaluation of emerging evidence and the impact of policies.19 Policy makers must recognise and reflect that parents are key partners in the care of their baby on the NICU and integral to optimal outcomes.

The free-text comments provided by parents highlighted the emotional and psychological burden of the restrictions on them. Preterm birth is associated with increased anxiety, postnatal depression (PND) and post-traumatic stress symptoms (PTSS) in both mothers and fathers.24

### Table 3

<table>
<thead>
<tr>
<th>Centres</th>
<th>Visitation policy/policies</th>
<th>Implementation date</th>
</tr>
</thead>
</table>
| Norfolk and Norwich University Hospital, Norfolk, UK | 1. Only one parent allowed at a time to visit for a limited duration (for maximum 2 hours/day)  
2. Only one parent allowed at a time to visit for a limited duration (for a 4-hour period per day)  
3. Both parents allowed to visit together at a time, but for a limited duration (3 hours/day)      | 1. 27 March 2020 to 5 May 2020  
2. 6 May 2020 to 25 May 2020  
3. 26 May 2020 to September 2020 (to date) |
| Ashford and St Peter’s Hospital, Chertsey, UK     | 1. Only one parent allowed at a time to visit for a limited duration (2 hours/day)  
2. Two family members allowed at a time for a limited duration (2 hours/day)  
3. Two family members allowed at a time for a limited duration (4 hours/day) | 1. 25 March 2020 to 3 May 2020  
2. 4 May 2020 to 27 July 2020  
3. 28 July 2020 to September 2020 (to date) |
| St Michael’s Hospital, Bristol, UK            | Two parents allowed at bedside for infants in intensive care areas. One parent (either parent)  
at bedside for infants in high dependency/special care areas. No time restrictions on visiting in any dependency areas | 8 April 2020 to September 2020 (to date) |
| University Hospital of Wales, Cardiff, UK     | Only one parent allowed at a time with no restriction on duration of visit | 1 April 2020 to September 2020 (to date) |
| St Joseph’s Hospital and Medical Center, Arizona, USA | 1. Two family members allowed at a time for unlimited duration  
2. Only one parent allowed at a time with no restriction on duration of visit | 1. 15 March 2020  
2. 23 March 2020 to September 2020 (to date) |
| Baylor Scott & White McLane Children’s Medical Center, Texas, USA | Only one parent allowed at a time with no restriction on duration of visit | 17 March 2020 to September 2020 (to date) |

### Table 4

<table>
<thead>
<tr>
<th>Centres</th>
<th>NNUH (25)</th>
<th>ASPH (27)</th>
<th>SMH (31)</th>
<th>UHW (10)</th>
<th>SJHMC (51)</th>
<th>BSW (80)</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner visiting less often</td>
<td>13/23 (57)</td>
<td>14/26 (53)</td>
<td>11/31 (35)</td>
<td>2/9 (22)</td>
<td>13/46 (28)</td>
<td>31/79 (39)</td>
<td>0.18</td>
</tr>
<tr>
<td>Not enough bonding</td>
<td>17/23 (74)</td>
<td>12/23 (52)</td>
<td>6/25 (24)</td>
<td>2/8 (25)</td>
<td>13/40 (33)</td>
<td>28/72 (39)</td>
<td>0.02</td>
</tr>
<tr>
<td>Unable to participate in cares</td>
<td>13/23 (57)</td>
<td>9/23 (39)</td>
<td>3/25 (12)</td>
<td>1/8 (13)</td>
<td>6/40 (15)</td>
<td>19/72 (26)</td>
<td>0.01</td>
</tr>
<tr>
<td>Unable to receive updates</td>
<td>7/23 (30)</td>
<td>8/23 (35)</td>
<td>5/25 (20)</td>
<td>1/8 (13)</td>
<td>2/40 (5)</td>
<td>14/72 (19)</td>
<td>0.08†</td>
</tr>
<tr>
<td>Bring milk and supplies</td>
<td>6/23 (26)</td>
<td>3/23 (13)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>9/72 (13)</td>
<td>0.02†</td>
</tr>
<tr>
<td>Breast feeding</td>
<td>0.01‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No impact</td>
<td>3/15 (20)</td>
<td>10/24 (42)</td>
<td>18/26 (69)</td>
<td>5/7 (71)</td>
<td>26/41 (63)</td>
<td>34/58 (59)</td>
<td></td>
</tr>
<tr>
<td>Mild impact</td>
<td>6/15 (40)</td>
<td>7/24 (29)</td>
<td>7/26 (27)</td>
<td>2/7 (29)</td>
<td>14/41 (34)</td>
<td>14/58 (24)</td>
<td></td>
</tr>
<tr>
<td>Severe impact</td>
<td>6/15 (40)</td>
<td>7/24 (29)</td>
<td>1/26 (4)</td>
<td>0 (0)</td>
<td>1/41 (3)</td>
<td>10/58 (17)</td>
<td></td>
</tr>
</tbody>
</table>

Data are n (%).  
*Analysed by chi-square test unless specified.  
†Fisher’s exact test.  
‡Kruskal-Wallis test.

ASPH, Ashford and St Peter’s Hospital; BSW, Baylor Scott & White McLane Children’s Medical Center; NNUH, Norfolk and Norwich University Hospital; SJHMC, St Joseph’s Hospital and Medical Center; SMH, St Michael’s Hospital; UHW, University Hospital of Wales.
and fathers; symptoms persist even at 2–4 years postpartum.\textsuperscript{26–28} The additional impact of the COVID-19 pandemic and adding to their burden through restrictive visiting policies would seem only likely to increase the risk of PND and PTSS and disruption of parental–infant bonding.\textsuperscript{16–19}

There are a few study limitations. While parents and public were not involved in the design and validation of the survey questionnaire, we included multiple options for free text and comments throughout and received many comments that described the significant impact of the visitation policies. This was designed as a pragmatic survey whereby centres could participate any time during the study period once they received local approvals, hence different centres joined at different times with varying restriction policies. Respondents completed the survey at different times of their infants’ hospitalisations, including a few at the time of admission, most during the hospitalisation and few after discharge. This may impact on their perceptions of visitation restrictions, but also allowed us to evaluate impact during different stages of hospitalisation. Each centre determined their own preferred method to distribute and collect responses, hence we are unable to provide a response rate as a proportion of the overall denominator population. Not all questions were answered by all respondents. Data included in the analysis had responses from at least 85% of respondents and we report denominators for response rate in each analysis. Our results may be affected by participation bias: those who responded may be more or less biased towards the restriction policy than the total parent population. Respondents, particularly first time parents, may have had difficulty in evaluating the impact of limitations if they had not experienced any other type of care; this was noted in a few comments. Our findings of significant association between severity of visitation policies and perceived impact may have been affected by confounding factors, such as variation in policies over time and differences between centres and countries. However, sample size was too small to perform secondary analysis to adjust for these factors. We attempted to account for multiple comparisons by using FDRs throughout the analyses.

Strengths of the study are the large number of responses obtained from six tertiary-level NICUs in two countries at a time when both were severely affected by the pandemic. Comparing centres, the one with least restrictive policy reported a lower impact on breast feeding and bonding, whereas the centre with the most restrictive policy had the greatest adverse impact on breast feeding as reported by parents. These associations are important as they suggest a direct link between severity of restriction regime and impact on breast feeding.

We believe that our findings, showing that parents perceived a significant impact from visitation policies and an association of their impact with severity of restrictions are important as we enter a COVID-19 resurgence or ‘second wave’, and as centres consider/reconsider their visitation policies, hopefully with parents and babies foremost in mind.

**Author affiliations**
1 Department of Pediatrics, Creighton University School of Medicine, Omaha, Nebraska, USA
2 Saint Joseph's Hospital and Medical Center, Phoenix, Arizona, USA
3 Neonatology Association Limited, Obstetrix Medical Group of Phoenix, Mednax, Phoenix, United States
4 Division of Neonatology, Department of Pediatrics, Baylor Scott and White McLane Children’s Medical Center, Temple, Texas, USA
5 Division of Neonatology, Department of Paediatrics, University Hospitals Bristol and Weston NHS Foundation Trust, Bristol, UK
6 Neonatal Intensive Care Unit, Jenny Lind Children's Hospital, Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, UK
7 Neonatal Intensive Care Unit, Ashford and St Peter’s Hospitals NHS Foundation Trust, Chertsey, UK
8 Baylor Scott and White Research Institute, Temple, Texas, USA
9 Neonatal Intensive Care Unit, University Hospital of Wales, Cardiff and Vale University Health Board, Cardiff, UK
10 MEDNAX Inc, Sunrise, Florida, USA
11 Norwich Medical School, University of East Anglia, Norwich, United Kingdom

**Twitter** Hemananda Muniraman @hmuniraman, Paul Cawley @PaulCawleyUK, Adam Heathcote @AdamHeathcote, Cora Doherty @CoraDoherty, NeoImprOutcomes and Paul Clarke @paulclarke

**Acknowledgements** We sincerely thank all parents who generously responded to our survey. We are most grateful to the reviewers for their valuable comments on the earlier version of our manuscript.

**Contributors** HM conceptualised and designed the study, designed the data collection instrument, obtained ethical/institutional research board approval, collected data, drafted the initial manuscript and revised the manuscript. MA, JH, AH, EG-C, SM, and ZC, recruited participants, collected data, reviewed and revised the manuscript. KH and CR designed and performed the data analysis, reviewed and revised the manuscript. VP, CD, AJ, VG and VR coordinated and supervised data collection and critically reviewed the manuscript for important intellectual content. PClarke co-designed the data collection instrument, coordinated and supervised data collection revised and critically reviewed the manuscript for important intellectual content. RC critically reviewed the manuscript for important intellectual content. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work. HM is guarantor.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Competing interests** None declared.

**Patient consent for publication** Not required.

**Ethics approval** The study was determined exempt from requiring full review by the institutional review board at St. Joseph’s Hospital and Medical Center (PHXNR-20-500-170-73-21) and was approved by MEDNAX Research Advisory Committee (RA ID: 607025162). All participating centres obtained approval from their respective research governance managers and/or ethics/institutional boards prior to commencing the study.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available upon reasonable request. Deidentified participant data are available upon request.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.
REFERENCES
Information sheet for study participants/Parents

Study title: Parental perceptions of Neonatal unit visit restrictions during the COVID-19 pandemic.

You are invited to participate in the survey. This document explains information about this study. You should ask questions about anything that is unclear to you. We encourage individual responses from each parent if possible.

PURPOSE OF THE STUDY: With the current COVID-19 pandemic, there have been changes to the visitation policy to the Neonatal Unit in order to safeguard the health of the infants, their families, and the health care workers. This research study aims to understand the perceptions and concerns of parents regarding the changes made to the Neonatal unit visitation policy.

PARTICIPANT INVOLVEMENT: If you agree to take part in this study, you will be asked to complete a survey which is anticipated to take about 5 minutes. You do not have to answer any questions you don’t want to.

ALTERNATIVES TO PARTICIPATION: Your alternative is to not participate. Your relationship with your health care provider or department will not be affected whether you participate or not in this study.

CONFIDENTIALITY: There will be no identifiable information obtained in connection with this study. Your name, address or other identifiable information will not be collected.

INVESTIGATOR CONTACT INFORMATION: Principal Investigator: Hemananda Muniraman via email at hemu_muniraman@mednax.com

1. Please read the following information and click agree to confirm your agreement to participate in the survey.

1. I have read the above information sheet and wish to take part in the survey.
2. I have had the opportunity to have my questions answered and have no further questions.
3. I understand that my participation is voluntary and all the information collected is kept confidential.
4. I am aware that on completing the survey, I would not be able to withdraw my responses to be included in the survey.

☐ Agree: I wish to participate in the survey

☐ Disagree: I do not wish to participate in the survey
2. Do you feel the visiting policy in NICU during COVID pandemic is?
   - [ ] Appropriate
   - [ ] A little too restrictive, but understandable for the safety of the babies, families and care givers
   - [ ] Too restrictive
   - [ ] Not restrictive enough

3. What restrictions does apply to your Neonatal unit visit?
   - [ ] Only one parent allowed at a time to visit for limited duration (less than 2 hours per day)
   - [ ] Only one parent allowed at a time to visit for limited duration (between 2 and 4 hours per day)
   - [ ] Only one parent allowed at a time to visit for limited duration (between 4 and 6 hours per day)
   - [ ] Only one parent allowed at a time to visit for limited duration (between 6 and 12 hours per day)
   - [ ] Only one parent allowed at a time with no restriction on duration of visit
   - [ ] Two family members allowed at a time for limited duration
   - [ ] No restrictions

   Other (please specify)

4. Has the new visitation policy affected your ability to visit NICU?
   - [ ] No
   - [ ] Yes: I visit more often
   - [ ] Yes: I visit less often

5. Has the new visitation policy affected your partner's or family member's ability to visit NICU? You may choose more than one option.
   - [ ] No
   - [ ] Yes: Partner visits more often
   - [ ] Yes: Partner visits less often
   - [ ] Yes: Siblings not allowed to visit
   - [ ] Yes: Grandparents not allowed to visit

   Other (please specify)
6. What are your concerns regarding visiting your baby in the NICU? Please select all that apply.

☐ I have no concerns

☐ Because of the current visitation policy, I feel like I am not bonding enough with my baby.

☐ Because of the current visitation policy, I feel like I am not able to participate in the daily cares of my baby.

☐ Because of the current visitation policy, I feel like I am not receiving enough updates or information about my baby.

☐ Because of the current visitation policy, I feel like my ability to bring my milk and other supplies to the hospital has changed.

☐ Please state any other ways you consider that the current policy has affected your care and relationship with your own baby.

☐

7. What impact, if any, has the change in visitation policy had on breastfeeding your baby?

☐ Not applicable/did not plan to breast feed my baby

☐ No impact

☐ Mild impact

☐ Severe impact

Any comments? (optional)

☐

8. How has the video streaming/telephone updates helped you to address your concerns and worries about your baby during this time?

☐ Very helpful

☐ Helpful

☐ Somewhat helpful

☐ Not helpful

9. Are you expected to wear any protective equipment during your visit?

☐ Face mask

☐ Gown/Apron

☐ Face mask and gown/apron

☐ Other (please specify)

☐
10. Do you find wearing face mask during your NICU visit..
   ○ The right thing to do
   ○ The right thing to do, but gets in the way of me bonding
   ○ Feels like it’s too much, but I understand it’s for safety of the infants
   ○ Is too restrictive

11. Do you find the staff wearing face mask has affected your interaction or relationship with them?
   ○ Yes, makes the interaction less personal
   ○ No

12. What was your child’s gestation at birth?
   ○ Term (more than 37 weeks)
   ○ Late preterm (between 34 and 37 weeks gestation)
   ○ Moderate preterm (between 28 and 34 weeks gestation)
   ○ Extreme preterm (less than 28 weeks gestation)

13. How long has your child been in the NICU?
   ○ <1 week
   ○ 1 weeks-4 weeks
   ○ >4 weeks

14. What is your relationship to your child?
   ○ Mother
   ○ Father
   ○ Grandmother
   ○ Grandfather
   ○ Guardian
   ○ Sibling
   ○ Other

15. What is your age?
16. In what country do you currently reside?
- United States
- United Kingdom
- Australia
- New Zealand
- Ireland
- Other (Please specify)

17. Please specify the city or state in which your NICU/Hospital is located?

18. If you wish, please offer any other comments or suggestions related to the current restrictive policy - all comments will be valuable and will be kept anonymous.
# Supplemental material

<table>
<thead>
<tr>
<th>#</th>
<th>RESPONSES</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>staff wearing face masks was essential and although reduced the more personal side of parental care was essential to safety of staff and babies - very happy with the care and communication throughout our time with the NICU teams</td>
<td>8/21/2020 2:18 AM</td>
</tr>
<tr>
<td>2</td>
<td>We appreciate all you are doing to keep everyone especially our baby safe and know it's hard on you all too! The vcreate is fantastic and love the updates!</td>
<td>8/11/2020 3:47 PM</td>
</tr>
<tr>
<td>3</td>
<td>I think less visitors in general is the way forward, women get more time to get the hang of breastfeeding and concentrate on recovery. There is less chance of people bringing illnesses into the hospital. Visitors don't interrupt all the vital work that the midwives etc are trying to do. Hoping there will be a change to less visitors / visiting hours when this is over.</td>
<td>8/11/2020 3:46 PM</td>
</tr>
<tr>
<td>4</td>
<td>The policy changed on 15/05 and dads can now visit too. The two hour limit remains.</td>
<td>8/11/2020 3:46 PM</td>
</tr>
<tr>
<td>5</td>
<td>I understand restrictions are for safety of the infants , just wish me and my wife could visit at the same time</td>
<td>8/11/2020 3:40 PM</td>
</tr>
<tr>
<td>6</td>
<td>We were discharged end of April. We were in NICU when the restrictions were implemented. Only one parent at a time could visit and this really affected my relationship as we both couldn't be with our daughter at the same time. Although restrictive, it was for the best of everyone especially the babies so we were very patient.</td>
<td>8/11/2020 3:39 PM</td>
</tr>
<tr>
<td>7</td>
<td>- restrictions are too much - allow both biological parents to visit at the same time</td>
<td>8/11/2020 3:39 PM</td>
</tr>
<tr>
<td>8</td>
<td>Did not understand why parents needed weekly covid swab, while staff didn't.</td>
<td>8/11/2020 3:35 PM</td>
</tr>
<tr>
<td>9</td>
<td>2 hrs a day not enough for dads to visit ad bond with triplets</td>
<td>8/11/2020 3:34 PM</td>
</tr>
<tr>
<td>10</td>
<td>maybe its time to let siblings visit for short period of time, or one or 2 family members. Or even just both parents be allowed togeather. Also i feel i understand why masks are needed but are they so beneficial that it should effect babies bonding and development?</td>
<td>8/11/2020 3:32 PM</td>
</tr>
<tr>
<td>11</td>
<td>I understand the importance of wearing PPE and feel like my babies are protected well. Restriction on grandparents not visiting is difficult, perhaps one visit would be helpful.</td>
<td>8/11/2020 10:45 AM</td>
</tr>
<tr>
<td>12</td>
<td>We should find a way to allow the baby to see parents face safely</td>
<td>8/11/2020 9:31 AM</td>
</tr>
<tr>
<td>13</td>
<td>i understand the restrictions because of COVID but feel unable to fully help.</td>
<td>8/6/2020 9:41 AM</td>
</tr>
<tr>
<td>14</td>
<td>I felt that the hospital achieved a sensible, practical balance between the safety of all concerned and the importance of bonding &amp; being there for your sick baby.</td>
<td>8/5/2020 10:13 AM</td>
</tr>
<tr>
<td>15</td>
<td>Restrictions to nicu caused may issues when taking our baby home. Missing out on vital care for our baby ment when are baby came home we were not ready. We were also unable to room in at the nicu which again effected are experience of taking our baby home.</td>
<td>8/1/2020 2:59 PM</td>
</tr>
<tr>
<td>16</td>
<td>I'm currently in the Transitional Care unit on the Joan Brooker ward, and as such our visitation restrictions are in line with those of the ward, not NICU. This means we are allowed no visitors at all, no partners or children. On one hand this is understandable as it would not be fair to the other mothers on the ward with no visitors. However, the mothers on the ward do not appear to be on the ward for longer than a few days (of course there are always exceptions), whereas I've been here for almost two weeks with no direct contact with my husband or 22 month old son. It is looking likely that my newborn and I shall remain in the unit for another 3/4 days, which is necessary for his health, but I am missing my family dreadfully. I am lucky that my premature son is healthy and with me, instead of me having limited access to him in NICU, and I was given a choice after delivery as to what I would rather do - being in TC was the more beneficial option for my newborn -but having the option of having visitors would relieve some of the stress and upset of being separated from my family.</td>
<td>8/1/2020 2:58 PM</td>
</tr>
<tr>
<td>17</td>
<td>If mother is staying in the hospital to breast feed the infant, support for her via partner should be allowed by them staying at the hospital to assist with care of their baby and reduce the workload on the mother. There cannot be much additional risk by the father staying at the hospital if they have been to visit for the 2 hour period when tested, found negative for the virus. Perhaps after negative result fathers can stay for the duration required if possible they would have no contact outside the hospital and minimalize risk?</td>
<td>8/1/2020 2:57 PM</td>
</tr>
<tr>
<td>18</td>
<td>To allow just family bubble to visit there brother his now 9 weeks And has never met his sisters only by video call</td>
<td>8/1/2020 2:56 PM</td>
</tr>
</tbody>
</table>
### Parental Perception of Neonatal Unit Visitation Policy during COVID epidemic

<table>
<thead>
<tr>
<th>Date</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/21/2020</td>
<td>Having only one visitor at a time has discouraged my husband from wanting to come visit the baby with me. I am having to drive myself to the hospital while still on pain meds from my c-section, since he is unwilling to sit in the lobby for an hour while I breastfeed and hold my baby.</td>
</tr>
<tr>
<td>7/22/2020</td>
<td>I feel both parents should be allowed to be with their child together.</td>
</tr>
<tr>
<td>7/22/2020</td>
<td>Having only one visitor at a time has discouraged my husband from wanting to come visit the baby with me. I am having to drive myself to the hospital while still on pain meds from my c-section, since he is unwilling to sit in the lobby for an hour while I breastfeed and hold my baby.</td>
</tr>
<tr>
<td>7/22/2020</td>
<td>I feel both parents should be allowed to be with their child together.</td>
</tr>
<tr>
<td>7/22/2020</td>
<td>Raising siblings see babies!! our other children are only with us for the summer and it is very unfortunate they can not meet the babies</td>
</tr>
<tr>
<td>7/22/2020</td>
<td>Text update system with verification code</td>
</tr>
<tr>
<td>7/22/2020</td>
<td>Myn overall experience was great, all nurses are amazing.</td>
</tr>
<tr>
<td>7/22/2020</td>
<td>NA</td>
</tr>
<tr>
<td>7/21/2020</td>
<td>understanding the safety measures and how sensitive baby is but the bonding issue for babies in NICU for more than a week as the baby is not able to see parents entire face until they get</td>
</tr>
<tr>
<td>ID</td>
<td>Comment</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>39</td>
<td>My husband and I had a great NICU experience! The nurses were amazing and very helpful. As a RN, I was very impressed and pleased with the level of care my twins received.</td>
</tr>
<tr>
<td>40</td>
<td>I feel like these restrictions/policies keep my baby safe and healthy</td>
</tr>
<tr>
<td>41</td>
<td>I feel like Video streaming should be in practice. I feel also when doctors are making rounds, updates should be given over the phone</td>
</tr>
<tr>
<td>42</td>
<td>Baylor Scott &amp; White is an amazing facility with amazing doctors and nurses</td>
</tr>
<tr>
<td>43</td>
<td>Parents especially if married and living together should be able to visit together</td>
</tr>
<tr>
<td>44</td>
<td>None</td>
</tr>
<tr>
<td>45</td>
<td>would allow 2 people in, so parents can bond together with baby</td>
</tr>
<tr>
<td>46</td>
<td>Really wish we could have other family able to visit with the same restrictions as parents</td>
</tr>
<tr>
<td>47</td>
<td>Non-parents should be able to visit subject to the same rules as the parents wish the hospital here has video like other hospitals</td>
</tr>
<tr>
<td>48</td>
<td>I think the policy is just fine</td>
</tr>
<tr>
<td>49</td>
<td>I want my family to come visit her when they can, like my brother, it kills me that he can not be on the visiting list and only one person can come in at a time because I live in another city and I have to share time just to make it back home at a good time</td>
</tr>
<tr>
<td>50</td>
<td>NA</td>
</tr>
<tr>
<td>51</td>
<td>Having to split time when parent, grandparents live in another city and have to get back home at a descent time</td>
</tr>
<tr>
<td>52</td>
<td>I believe the preventive measures taken to be appropriate</td>
</tr>
<tr>
<td>53</td>
<td>Great communication between Dr’s and nurses and I</td>
</tr>
<tr>
<td>54</td>
<td>I think 1 person in the NICU @ 1 time is a bit too restrictive, if both parents are wearing masks and do not have COVID symptoms, they should both be allowed to visit the baby at the same time</td>
</tr>
<tr>
<td>55</td>
<td>I hope 2 parents can visit the baby at the same time for some situations (how to bath the baby, how to take care of the baby, ask the doctor a question). In those situations if both parents are present, the parents get more info and learn more so they can take better care of the baby when go back home.</td>
</tr>
<tr>
<td>56</td>
<td>The only other comment I would add is that we didn’t fully understand the point of the restriction - one parent at a time but we can come and go as we please - that still puts both of us coming in and out, does not restrict our presence in the room, but does take away from our time as a family.</td>
</tr>
<tr>
<td>57</td>
<td>4 v creates asked for and missed BUT great when received</td>
</tr>
<tr>
<td>58</td>
<td>For the short time that our daughter was in NICU we found the staff to be fantastic and incredibly friendly. The medical care she received was second to none.</td>
</tr>
<tr>
<td>59</td>
<td>With one twin at home and one in NICU my heart has been torn in two. I have experienced periods of blackout because of the extreme stress and the separation. Finally being able to stay in a bedroom in NICU, after 3 months, has been life changing and I feel so much better.</td>
</tr>
<tr>
<td>60</td>
<td>I feel the current restrictions are well justified and respectfully and compassionately enforced by staff who really understand how hard it is for the parents of children on this unit.</td>
</tr>
<tr>
<td>61</td>
<td>When there is a clear “why” for the restrictions we can go along with them. Sometimes the restrictions feel like over zealous caution that is not really making a tangible difference, but is virtue signalling and designed to give the appearance of ‘taking this seriously.’</td>
</tr>
<tr>
<td>62</td>
<td>This may have always been in place, but the fact that there is no water allowed is very frustrating for mothers who are breastfeeding and needing to wear masks.</td>
</tr>
<tr>
<td>63</td>
<td>Understand restrictions to protect baby,. made mom spend more individual time with baby so</td>
</tr>
</tbody>
</table>
bonded more than baby bonded with dad, hard to not be with baby as a family, milestones were not able to be celebrated as a family.

64  No comments  6/26/2020 3:18 PM

65  I dont like personel using gloves and touch everything at the same time, so it is contaminated. I prefer they wash their hands each time they will touch him  6/26/2020  3:16 PM

66  Absolutely wonderful support and rules are good and understandable. Thankyou for everything  6/24/2020 1:44 AM

67  Home life is different at the moment but our 6 year old is struggling with the fact he can't see his brother which makes him upset. It would help us as a family if he could just visit if only for a little bit. Staff wearing facemasks - sometimes hard to hear what they say.  6/23/2020 9:28 PM

68 set one rule and keep it, rule change every day is confusing  6/23/2020 1:41 PM

69 set one rule and keep it, rules change every day is confusing  6/23/2020 1:37 PM

70  Given we are swabbed weekly and temperature checked daily, it seems unnecessary to make us wear masks when it's only us and our baby and no staff are within two meters.  6/21/2020 8:14 AM

71  please allow mom and dad to visit together  6/19/2020 2:00 PM

72  all safety precautions that have been put in place are all welcome if it means keeping my baby, others babys and staff all safe. The staff are all friendly and helpful so the masks have not affected the standard of care or even the relationships with parents  6/13/2020 11:30 AM

73  please allow both parents to visit bedside together  6/12/2020 9:36 PM

74  Both parents once screened and wearing masks should be able to see their baby together  6/12/2020 7:01 PM

75  both parents must visit together  6/12/2020 6:59 PM

76  The staff have been immeasurably helpful and supportive at St.Michael's Maternitu Hospital in Bristol, UK. Every single member of staff has been wonderful. The only slight upset is that I cannot get to know our baby with my partner in the high dependency ward, but can in the NICU, itself. Other than that, they have provided a wonderful experience, and in would recommend this Maternity hospital to anyone considering there options.  6/12/2020 2:19 PM

77  Anyone who passes health screening should not need a mask  6/12/2020 12:30 AM

78  Thank you very much for your care.  6/12/2020 12:27 AM

79  Policy should have been made much clearer from the start to parents and staff. As restrictions are in place more effort should be made to call parents to give updates.  6/11/2020 6:05 AM

80  my mum was my biggest support throughout my pregnancy as my husband left me during, it breaks my heart that she can't see her granddaughter as well as him  6/8/2020 6:07 AM

81  I honestly felt it was too far for mums and dads to not see their child. More welfare support should be given for mums. Also I only had 4 photos/videos in 2 weeks and not allowed my phone for photos etc. Whilst only one mum could be on one side of the room they didn't seem much Social Distancing in the staff. Sometimes it felt like I was the one they were protecting themselves from rather than everyone being precautionary. Some nurses were excellent. Really relaxed you. Others too clinical and made you feel in the way. The doctors however were fab. Poor dad of my daughter had to weight 3 weeks to see his daughter .... madness ! The labour rules introduced also are madness. Girls I spoke to on the ward were devestated to be doing it on their own until 5cm dilated . Again little support from Midwifes .  6/7/2020 7:08 AM

82  I have found the visiting restrictions very tough and would love for nothing more than myself and my partner to be able to see our child together. It has been an extremely tough few weeks emotionally and I wish we could support each other in NICU together.  6/1/2020 11:18 AM

83  After care for me on Blakeny ward was very sub par. I felt rushed out the hospital to use the beds for other patients was left too long without basics such as pressure socks and two hour wait for pain relief. Rushed out the room to be cleaned. But the family liason team have been amazing at accommodating with extra info and videos and the voice recording devices are brilliant. The team in NICU are amazing!  5/26/2020 8:37 AM

84  It was hard to be alone with baby with no partner allowed. I barely slept that week and was exhausted and stressed. I believe it impacted my BP and my mental health. I still feel like  5/22/2020 4:34 AM
<table>
<thead>
<tr>
<th>Comment</th>
<th>Date/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can completely understand why visiting it’s restricted and am aware that it’s just a bad situation in the middle of a pandemic. The family liaison team were really helpful. It felt really odd being only allowed to see my baby for 2 hours a day. One day was readmitted to the delivery suite so my partner went and I was literally across the corridor but unable to see my poorly baby which emotionally is just very challenging. I am extremely grateful of the care given to my son by a highly skilled and dedicated bunch of professionals.</td>
<td>5/21/2020 4:08 AM</td>
</tr>
<tr>
<td>Whilst I understand why to a certain degree the longer term impact of this on my mental health has been extraordinary. I get to see my baby 1 time every 48 hours, how can anyone say that is a reasonable response to a virus that can be managed with appropriate PPE? I will remember this for the rest of my life. I will also remember the kindness of the staff but at 18 hours old I was told my baby might die and I had to beg to see him because I had already had my 2 hours. How is that ok??</td>
<td>5/17/2020 3:43 AM</td>
</tr>
<tr>
<td>Whilst I hate leaving my babies each day, I have no doubt that they are receiving the best care and that the hospital are doing everything to connect us to our babies.</td>
<td>5/16/2020 11:12 AM</td>
</tr>
<tr>
<td>To allow both parents in NiCu a day at different times so the parents can do most of the feeding and cares.</td>
<td>5/15/2020 9:37 AM</td>
</tr>
<tr>
<td>We think having 2 hours perhaps where both parents could visit would be helpful. No slot allocations as takes away personalisation and we feel is too much when it’s our baby. 4 hour slots can be too much, prefer the 2 hour, one parent per day</td>
<td>5/15/2020 9:33 AM</td>
</tr>
<tr>
<td>Maybe consider both parents visiting for a booked time slot maybe 1-2 times a week.</td>
<td>5/15/2020 9:21 AM</td>
</tr>
<tr>
<td>I find it hard to comment on the policies in place as my baby was born during COVID19 so I don’t know any different. I find it hard being restricted to 2 hours but also as my partner struggles to visit his son, I have little support as other family members can’t come. I also feel it is effecting my children’s bond with their brother. It is paramount to keep these NiCU babies safe</td>
<td>5/14/2020 7:00 AM</td>
</tr>
</tbody>
</table>