

# Potential indirect impacts of the COVID-19 pandemic on children: a narrative review using a community child health lens

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Children are facing a “generation-defining disruption”<sup>1</sup> from the coronavirus disease 2019 (COVID-19) pandemic. To date, the direct health impacts of the severe acute respiratory coronavirus 2 itself have been relatively minimal for children globally, even with the Delta variant.<sup>2-5</sup> In Australia, infections have been relatively low compared with other countries because of our strict public health restrictions (Box 1). However, these restrictions are having immediate and likely longer term adverse consequences on children’s developmental potential,<sup>11-15</sup> with the impacts likely to be more severe if we do not consider the necessary policy responses as we emerge from the pandemic.<sup>1,16-18</sup> While there are also positive impacts, such as population-level resilience and rapid improvements in telehealth,<sup>19,20</sup> our review focuses primarily on potential adverse impacts. There is likely to be a disproportionate impact on children experiencing adversity (eg, socio-economic disadvantage),<sup>18,21</sup> and potential for the widening of existing disparities in child health and developmental outcomes.<sup>3,17,22,23</sup>

To understand how Australia might best respond to the needs of children, a community child health (also known internationally as social paediatrics) lens offers a useful framing for the complex issues that need to be considered. Community child health takes into account the child, family, community and system factors (including social determinants). It has a specific focus on the intersectionality between health, education and social care for achieving equitable child health and developmental outcomes and preventive care.<sup>21,24,25</sup> Community child health as a paediatric subspecialty within the Royal Australasian College of Physicians has three pillars: developmental-behavioural paediatrics, child protection, and child population health.<sup>26</sup>

This narrative review synthesises the literature on the potential adverse indirect impacts of the COVID-19 pandemic on children, using a community child health lens to organise our findings. Our literature search strategy (Box 2) consisted of two parts: (i) previous pandemics, epidemics and natural disasters; and (ii) the current COVID-19 pandemic. We identified 11 impact areas, under three broad lenses that align with community child health (Box 3). Given the broad remit of community child health, there may be additional adverse impacts yet to be reflected in the published research.

## Child-level factors

### Poorer mental health

There appear to be serious negative impacts on children’s mental health during pandemics;<sup>28-30</sup> however, longitudinal research investigating the longer term impacts is lacking.<sup>31</sup> After the 2009 H1N1 influenza pandemic, 30% of children

## Summary

- In this narrative review, we summarise the vast and burgeoning research on the potential and established indirect impacts on children of the COVID-19 pandemic. We used a community child health lens to organise our findings and to consider how Australia might best respond to the needs of children (aged 0–12 years).
- We synthesised the literature on previous pandemics, epidemics and natural disasters, and the current COVID-19 pandemic. We found clear evidence of adverse impacts of the COVID-19 pandemic on children that either repeated or extended the findings from previous pandemics.
- We identified 11 impact areas, under three broad categories: child-level factors (poorer mental health, poorer child health and development, poorer academic achievement); family-level factors that affect children (poorer parent mental health, reduced family income and job losses, increased household stress, increased abuse and neglect, poorer maternal and newborn health); and service-level factors that affect children (school closures, reduced access to health care, increased use of technology for learning, connection and health care).
- There is increasing global concern about the likely disproportionate impact of the current pandemic on children experiencing adversity, widening existing disparities in child health and developmental outcomes.
- We suggest five potential strategy areas that could begin to address these inequities: addressing financial instability through parent financial supplements; expanding the role of schools to address learning gaps and wellbeing; rethinking health care delivery to address reduced access; focusing on prevention and early intervention for mental health; and using digital solutions to address inequitable service delivery.

who experienced isolation (in the United States, Mexico and Canada) met the threshold for post-traumatic stress disorder, increasing to nearly 86% for those whose parents met the threshold.<sup>32</sup> Studies have shown the negative impact of COVID-19 restrictions on children’s mental health.<sup>33-37</sup> In Australia, mental health difficulties significantly increased for children who experienced a second lockdown (20–46% in high range; 2–13% in very high range) compared with a normative sample.<sup>38</sup> There has been a rapid increase in demand for Kids Helpline, the Australian national youth helpline, with common reasons for contact including mental health (4.6% monthly increase) and suicidal ideation or self-harm (5.7% monthly increase).<sup>39</sup> Additionally, some children with existing mental health disorders have experienced an exacerbation of symptoms.<sup>40,41</sup>

### Poorer child health and development

Pandemics are related to increased rates of improper nutrition and dramatic changes in children’s play.<sup>30</sup> Sports centres and

## 1 Summary of two of the strictest periods of COVID-19 public health restrictions in Australia

	Australia-wide Stage 3 restrictions (29 March to 13 May 2020) <sup>6,7</sup>	Melbourne* Stage 4 restrictions (2 August to 14 September 2020) <sup>8,9</sup>
Physical distancing <sup>†</sup>	Recommendations in place	Recommendations in place
Leaving home	Only four reasons to leave home: food and supplies; exercise, medical care or compassionate reasons; and work and education, if necessary	Only four reasons to leave home: food and supplies; exercise, medical care or compassionate reasons; and work and education, if necessary  Exercise limited to maximum of one hour per day, within 5 km from home, with a maximum of one other person  Shopping limited to one person per household per day, within 5 km from home  Curfew from 8 pm to 5 am  Face coverings compulsory at all times for adults and children over 12 years of age
Schools	Schools closed (except for vulnerable children and children of permitted workers) and remote learning commenced	Schools closed (except for vulnerable children and children of permitted workers) and remote learning commenced  Kindergartens and childcare centres closed (except for vulnerable children and children of permitted workers)
Non-essential services	Closed (eg, restaurants and cafes, indoor play centres, public swimming pools, libraries, community centres)	Closed (eg, retail stores, restaurants and cafes, indoor play centres, public swimming pools, libraries, community centres)
Outdoor recreation	Closed (eg, playgrounds, skate parks)	Closed (eg, playgrounds, skate parks)
Hospital visitors	Restricted (eg, birthing suites, maternity wards, newborn intensive care units, special care nurseries)	Restricted (eg, birth centres, maternity wards, newborn intensive care units, special care nurseries)
Private gatherings	Not allowed	Not allowed
Public gatherings	Restricted to two people	Not allowed
Weddings	Capped at five people	Not allowed
Funerals	Capped at ten people	Capped at ten people
Home quarantine	Anyone classified as a close contact of a COVID-19 case required to quarantine at home for 14 days	Anyone classified as a close contact of a COVID-19 case required to quarantine at home for 14 days

COVID-19 = coronavirus disease 2019. \* In Melbourne, a second wave of the COVID-19 pandemic resulted in a return to Stage 3 restrictions in July 2020 before entering a new Stage 4 lockdown, the longest and strictest lockdown in Australia to date. From September 2020, a slow return to normal COVID-19 restrictions began. † Physical distancing is a term used to describe the Australian Government's recommendations around keeping a distance of 1.5 m from others, not shaking hands or hugging, and avoiding crowds and mass gatherings.<sup>10</sup> This recommendation has been in place for the duration of the COVID-19 pandemic. ♦

## 2 Search strategy using the PubMed database

Search strategy	Date range	Search terms	Initial search	Exclusion criteria
Previous pandemics, epidemics and natural disasters	Articles before 31 Dec 2019	("pandemic" or "epidemic" or "natural disaster"); "child"; and ("social" or "emotional" or "mental" or "physical" or "academic")	2426 articles	<ul style="list-style-type: none"> <li>Not relevant to children aged 0–12 years</li> <li>Not specifically about relevant pandemics, epidemics or natural disasters</li> </ul>
Current COVID-19 pandemic	Articles before 15 Oct 2021	("COVID-19" or "coronavirus" or "SARS-CoV-2"); "child"; and ("social" or "emotional" or "mental" or "physical" or "academic")*	3686 articles	<ul style="list-style-type: none"> <li>Not relevant to children aged 0–12 years</li> <li>Related to direct effects of COVID-19 infections</li> </ul>

COVID-19 = coronavirus disease 2019; SARS-CoV-2 = severe acute respiratory coronavirus 2. \* Given the rapid and emerging nature of this research,<sup>27</sup> we included opinion pieces such as journal perspectives, editorials and reviews, as well as original research. ♦

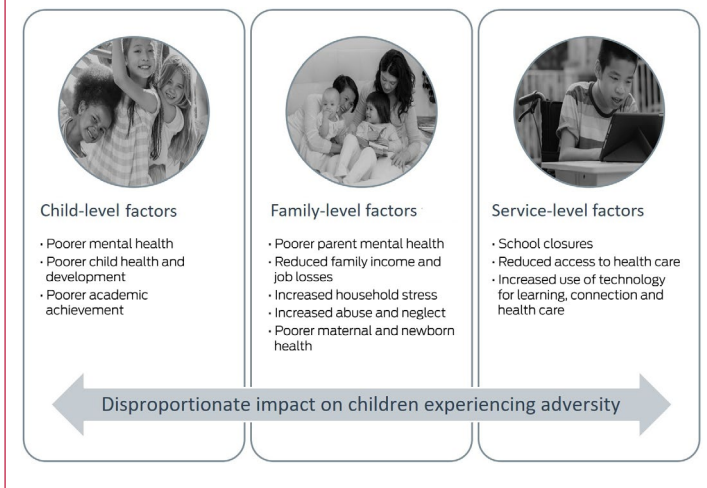
play spaces closed in many countries as part of COVID-19 restrictions,<sup>42</sup> resulting in reduced daily physical activity, increased screen time, increased snacking, and weight gain.<sup>14,33,43–45</sup> In a longitudinal study of 14 countries (including Australia), children spent 55 minutes more per day in sedentary screen time, and 81 minutes less per weekday outdoors during COVID-19 restrictions.<sup>46</sup> The risks for children with additional health care needs (eg, developmental and behavioural issues) are even greater, with limited access to health care, school and support services, including early intervention.<sup>14,25,41,42,47–50</sup> Missed routine child health checks may lead to lower rates of

children being identified as experiencing developmental delays.<sup>14</sup> Alternately, there is evidence of improvements in childhood asthma outcomes,<sup>51</sup> decreased incidence of influenza<sup>52,53</sup> and enterovirus and norovirus infections,<sup>54</sup> and possible reductions in preterm birth rates.<sup>55,56</sup>

### Poorer academic achievement

Following the Victorian Black Saturday bushfires in 2009, expected gains in reading and numeracy scores were reduced for primary school students in schools with higher bushfire

### 3 COVID-19 and associated policy responses: potential indirect impacts on children



impact.<sup>57</sup> Almost half of the Australian student population risks having their learning severely compromised due to COVID-19-related school closures, either because they are an early years student or are experiencing adversity.<sup>58,59</sup> Families may lack the resources and time needed to support their children's learning, particularly parents with lower levels of educational attainment.<sup>58</sup> Student engagement is more significantly compromised among children experiencing adversity, and it is predicted that re-engagement in the school context will be diminished, with poorer academic outcomes.<sup>15,48,58-61</sup> The estimated achievement gap between disadvantaged and advantaged students grows at triple the rate during remote learning compared with on-site learning,<sup>61</sup> with the value of gross domestic product lost from one-third of a year of remote learning estimated to be US\$871 billion in Australia.<sup>62</sup> Recent data suggest that children born during the pandemic may already be demonstrating reduced cognitive performance.<sup>63</sup>

#### Family-level factors that affect children

##### Poorer parent mental health

Mental health needs are rarely prioritised during pandemics, with limited access to trained mental health professionals.<sup>64</sup> Following the 2009 H1N1 influenza pandemic, 25% of parents who were required to isolate met criteria for post-traumatic stress disorder symptoms.<sup>32</sup> During COVID-19 restrictions, parents experienced poorer mental health, particularly those with pre-existing health problems, with a child with additional health care needs, or experiencing socio-economic disadvantage.<sup>65,66</sup> In Australia, 46% of parents reported a negative impact on their mental health,<sup>33</sup> while parent mental distress tripled from 8% before COVID-19 to 24% during the pandemic.<sup>67</sup> Lifeline Australia reported its highest volume of calls in its 58-year history in the first week of August 2021, while much of Australia was in lockdown.<sup>68</sup>

##### Reduced family income and job losses

Previous pandemics and epidemics have been associated with increased job losses and poverty, with harsher economic impacts for families experiencing adversity.<sup>30</sup> In Australia, many families experienced job losses or reduced household income during COVID-19 restrictions.<sup>33,69,70</sup> Deteriorating economic circumstances have resulted in higher rates of newly disadvantaged families and increased levels of persistent

disadvantage.<sup>16,58</sup> For parents experiencing unemployment and financial instability, the added burden of assuming the role of educator within the household may be difficult,<sup>15</sup> with economic pressure related to higher parental stress and harsher parenting.<sup>71</sup>

##### Increased household stress

Increased family conflict and negative impacts on parent-child relationships were evident during previous pandemics.<sup>30</sup> Marital dissatisfaction and divorce increases following natural disasters, due to increased stress and mental health difficulties, and disrupted external social support.<sup>71</sup> During COVID-19 restrictions, increases in caregiver stress are likely to decrease caregiving capacity.<sup>16</sup> In Australia, parents reported increased strain on parent-child relationships.<sup>40</sup> Many families have struggled to support their children's remote learning needs and other child care demands, while also balancing employment demands (including working from home requirements) or unemployment and financial instability.<sup>14,15,72</sup>

##### Increased abuse and neglect

The risk of child abuse and neglect increases during pandemics, due to increased stress and isolation for families and reduced access to support.<sup>30,73</sup> COVID-19 restrictions (eg, school closures<sup>74</sup> and job losses<sup>75</sup>) are expected to have led to increased levels of family violence and child maltreatment.<sup>13,14,16,76</sup> The risk is greater among children experiencing adversity,<sup>77</sup> with reduced access to child protection services<sup>74</sup> and restricted child welfare visits.<sup>14,25,60</sup> A marked increase in the incidence of abuse-related head injuries among children was reported at the start of the COVID-19 pandemic.<sup>78</sup> Reports to child maltreatment hotlines decreased substantially, likely largely due to decreased contact between children and both education personnel and health services.<sup>76,79</sup> In the US, criminal charges pertaining to child abuse or neglect were also lower than forecasted in the first months of the pandemic.<sup>80</sup> However, Australian data indicated that notifications made to child protection services increased once restrictions eased<sup>73</sup> and children were able to leave their home environment, potentially due to a combination of more face-to-face health appointments, schools reopening, and mandatory reporting laws for education personnel.

##### Poorer maternal and newborn health

In utero exposure to pandemics and natural disasters via maternal stress may have long term negative effects on educational attainment, lifelong earnings, and mental health problems.<sup>16</sup> Pregnant and postnatal women have reported increased anxiety and depression during COVID-19 restrictions.<sup>81,82</sup> New callers to the Perinatal Anxiety and Depression Australia helpline doubled during March–October 2020, as did duration of call times.<sup>83</sup> Many new parents were isolated from family and friends,<sup>84</sup> with limited access to face-to-face health services,<sup>85</sup> often leading to inadequate infant weight gain and increased hospital admissions.<sup>86</sup> Higher risk groups, such as new parents with a baby in a neonatal intensive care unit, may have particularly high rates of mental health problems.<sup>84,87</sup>

#### Service-level factors that affect children

##### School closures

By April 2020, remote learning had been implemented around the world.<sup>88</sup> School closures affected about 86% of the global student



population,<sup>89</sup> including around 4 million Australian students.<sup>15</sup> Early childhood education and care services also closed in many countries,<sup>90,91</sup> including parts of Australia (Box 1). Many families withdrew their children from both formal and informal child care,<sup>92</sup> including grandparent care.<sup>93</sup> School closures have been associated with a loss of access to school-facilitated health care, including free lunches and mental health care.<sup>11,17,23,43</sup> These impacts disproportionately affect children experiencing adversity.<sup>30,94,95</sup> US estimates have suggested public primary school closures could be associated with an estimated 13.8 million years of life lost due to decreased long term educational attainment.<sup>96</sup>

### Reduced access to health care

Health care infrastructure can quickly become overwhelmed during pandemics.<sup>97,98</sup> During the COVID-19 pandemic, access to essential child health services has been limited at times in Australia, with some specialists unable to take on new patients, despite large waiting lists.<sup>19</sup> Developmental-behavioural paediatric service delivery primarily moved to telehealth.<sup>99</sup> This brought additional challenges for patients with complex needs. For instance, only 30% of parents of children with neurodevelopmental disabilities reported that telehealth worked well for their child.<sup>49</sup> Referrals to child mental health services reduced substantially, before an unprecedented rise that placed increased demand on already overstretched services.<sup>100</sup> In early 2020, fewer services were provided to children, from Headspace primary youth mental health services in Victoria<sup>101</sup> to the Child Dental Benefits Schedule.<sup>102</sup> Alternately, there was no decrease in the proportion of young Australian children fully immunised in 2020.<sup>103</sup> Paediatric emergency department visits decreased,<sup>104,105</sup> partly due to lower rates of infections and injuries.<sup>104</sup> However, 31% of unwell or injured Australian children delayed or avoided accessing health care, primarily because of parental fear of exposure to COVID-19.<sup>33</sup> Conversely, there has been a substantial increase in paediatric mental health presentations to emergency departments.<sup>105</sup>

### Increased use of technology for learning, connection and health care

Technological solutions have been important approaches for addressing the effects of the COVID-19 pandemic,<sup>48</sup> for instance through the rapid advancement of telehealth. Yet evidence for the efficacy of telehealth and the impacts of remote learning remain unclear.<sup>99,101</sup> Schools have used technology to move the education curriculum to a remote learning environment; however, many children do not have the necessary skills or self-confidence to use technology for learning, particularly younger children and those experiencing adversity.<sup>15</sup> In 2013, it was estimated that only 68% of children living in Australia's most disadvantaged communities had access to the internet at home.<sup>106</sup> Technology has also been used to facilitate social interactions between children in an attempt to alleviate loneliness and maintain a sense of connectedness.<sup>13,48</sup> Connection to extended family and the wider community has also largely been limited to being facilitated by technology. Although yet unknown, this may have both hindered local social connections (with less supervision of children and supports for families) but strengthened other connections for families living far apart. Telehealth services rapidly expanded as they became an essential aspect of children's health and developmental care,<sup>12</sup> while also trying to ensure that existing inequities in access to care were not exacerbated.<sup>47,107</sup> In Australia, 27% of children accessed telehealth in 2020, with the majority of parents reporting finding it convenient for their family.<sup>108</sup>

## Strategies for the future

This narrative review brings together vast and burgeoning research that shines a spotlight on the potential indirect adverse impacts of the COVID-19 pandemic on children, and on the possible widening of existing health disparities that must not be ignored.<sup>3,17,21-23</sup> Without proper planning, evaluation and policy commitment, the inequitable and likely long-lasting impacts of COVID-19 restrictions will be inevitable.

Taking into account the opportunity created by the pandemic disruptors and rapid technological advances, we propose five potential strategy areas that underpin community child health, with a focus on both upstream and downstream determinants of health, highlighting the need to work across sectors (Box 4). They are not designed to be all encompassing, but rather point to areas of immediate policy relevance and likely impact based on the findings of this review. Because of the complexity of child development and the multifactorial nature of adversity and ensuing inequities, these five strategy areas will be most effective if considered both within place-based system change that embeds thoughtful co-design, implementation and evaluation, and at whole system levels such as state and national policy (where many are already considered but not yet implemented or coordinated). Place-based approaches in particular, given the current state and federal policy interest (eg, Stronger Places, Stronger People),<sup>109,110</sup> provide a timely option for the co-implementation of all of these strategies. This could best meet more acute community need while also building the efficacy and resilience of communities for future crises.

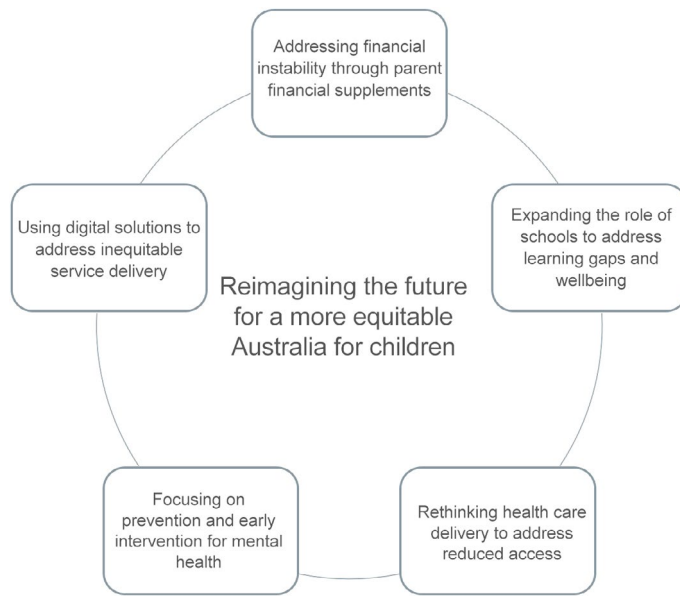
### Addressing financial instability through parent financial supplements

International trials show the benefit of conditional and non-conditional cash transfers for children's developmental outcomes.<sup>111,112</sup> The newly expanded US child tax credit<sup>113,114</sup> is direct recognition that parents of young children will be affected by a combination of job losses, home schooling and poorer mental health due to the COVID-19 pandemic. There is an opportunity to converge what we know about the importance of early childhood development with the importance of social determinants and develop a parent financial supplement that recognises the importance of early childhood; is of sufficient scale to offset the potential damage of COVID-19 restrictions; and takes an approach that invests in the future of Australian children. In Australia, the advent of JobKeeper (a wage supplement for eligible businesses to retain their workforce)<sup>115</sup> and the increase to JobSeeker (unemployment benefit) supplements were so impactful that by September 2020, the estimated number of people living in poverty reduced by around 32%.<sup>116</sup> It is perhaps timely to review Australia's Family Tax Benefit<sup>117</sup> system to meet the needs of the 68% of families with children under 5 years of age who are experiencing financial stress.<sup>70</sup>

### Expanding the role of schools to address learning gaps and wellbeing

COVID-19 restrictions made it clear that children need to be at school to both learn and be well.<sup>61</sup> The Learning through COVID-19 project, undertaken by the Institute for Social Science Research at the University of Queensland, highlights four action areas to address worsening educational disadvantage in Australia: student mental health; the future roles of teachers and communities; digital equity; and

#### 4 Five potential strategy areas that align with community child health and are of immediate policy relevance and likely impact



protections for vulnerable students.<sup>118</sup> As such, there is the need for more systematic attention to and investments in children's health and wellbeing at school.<sup>119</sup> For example, the Victorian Framework for Improving Student Outcomes<sup>120</sup> now explicitly places children's learning and wellbeing as central to school improvement. Schools could be articulated as public health universal platforms, with a focus on promotion, prevention and equity in both learning and wellbeing (including accountability metrics<sup>119</sup>), noting the connection with the years before school (eg, preschool).

#### Rethinking health care delivery to address reduced access

Access to routine child health services has been limited at times in Australia during the COVID-19 pandemic.<sup>19</sup> There is a plethora of interest in a more integrated approach to health care, including co-location and hubs in policies like the Royal Commission into Victoria's Mental Health System,<sup>121</sup> the National Children's Mental Health and Wellbeing Strategy,<sup>122</sup> and the National Action Plan for the Health of Children and Young People.<sup>123</sup> Integrated service hubs provide the opportunity to bring together health and social care to best meet the needs of the population, especially in geographic areas where families are experiencing adversity. These policies, which include a focus on the first 2000 days of life,<sup>124</sup> could facilitate practitioners working together to ensure that services are co-designed and respond to the needs of children and their families, use evidence-based care, and fund evaluation to determine if care is making a difference.<sup>125</sup>

#### Focusing on prevention and early intervention for mental health

Growing evidence for the impact of COVID-19 restrictions on mental health is alarming, given an already high prevalence

of childhood mental health disorders that are unequally distributed.<sup>126</sup> Governments are contributing large amounts of funding for mental health services, with pre-pandemic processes such as the Productivity Commission report on mental health<sup>127</sup> and the Royal Commission into Victoria's Mental Health System<sup>121</sup> pointing to an already fragmented and inadequate system. While this is a pivotal time to address acute need, reform should be anchored in prevention and early intervention. Government reforms in areas such as primary health care,<sup>128</sup> mental health<sup>121,127</sup> and community health<sup>129</sup> provide the opportunity for funding model reforms across universal and primary health services to re-orient service, program and workforce delivery to prevention and early intervention. As detailed in the National Children's Mental Health and Wellbeing Strategy,<sup>122</sup> there should be a focus on empowering families and using community-based approaches; the important role of education settings; and embedding a culture of evaluation into mental health supports. There must also be a focus on reducing inequities.<sup>130</sup>

#### Using digital solutions to address inequitable service delivery

There is the potential to use existing digital solutions to integrate digital navigation and digital interventions. The Australian government-funded Raising Children Network website received over 43.5 million page views in 2020 (an increase of 30% from the previous year), with a particular peak in COVID-19 advice.<sup>131</sup> Digital technologies can be designed to help deliver equitable, high quality care across Australia and potentially to create a digital overlay to our currently fragmented services through digital navigation and therapies. With the right training,<sup>123</sup> and guidelines to drive excellent care,<sup>132</sup> this could revolutionise the way we reach families and deliver the services they need, creating a more accessible and efficient service delivery system.

#### Conclusion

The indirect impacts of COVID-19 and related policy responses will likely have broad, long-lasting implications for children. History shows us that children already experiencing adversity lose out the most,<sup>22</sup> with the potential for widening health inequities.<sup>119</sup> The international body of literature emerging from the COVID-19 pandemic suggests that now is the time to not only repair the past, but to start to re-imagine the future for a more equitable Australia for children. The COVID-19 pandemic has highlighted that it is possible to make transformational changes that could deliver on community child health aspirations. We have the opportunity to build a better and more equitable Australia, for the children of today and the adults of the future.<sup>17</sup>

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