



## Racism and child health in the USA 1

# Racial and ethnic inequities in the quality of paediatric care in the USA: a review of quantitative evidence

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Racial and ethnic inequities in paediatric care have received increased research attention over the past two decades, particularly in the past 5 years, alongside an increased societal focus on racism. In this Series paper, the first in a two-part Series focused on racism and child health in the USA, we summarise evidence on racial and ethnic inequities in the quality of paediatric care. We review studies published between Jan 1, 2017 and July 31, 2022, that are adjusted for or stratified by insurance status to account for group differences in access, and we exclude studies in which differences in access are probably driven by patient preferences or the appropriateness of intervention. Overall, the literature reveals widespread patterns of inequitable treatment across paediatric specialties, including neonatology, primary care, emergency medicine, inpatient and critical care, surgery, developmental disabilities, mental health care, endocrinology, and palliative care. The identified studies indicate that children from minoritised racial and ethnic groups received poorer health-care services relative to non-Hispanic White children, with most studies drawing on data from multiple sites, and accounting for indicators of family socioeconomic position and clinical characteristics (eg, comorbidities or condition severity). The studies discussed a range of potential causes for the observed disparities, including implicit biases and differences in site of care or clinician characteristics. We outline priorities for future research to better understand and address paediatric treatment inequities and implications for practice and policy. Policy changes within and beyond the health-care system, discussed further in the second paper of this Series, are essential to address the root causes of treatment inequities and to promote equitable and excellent health for all children.

### Introduction

Racial and ethnic disparities in health are substantial and persistent in the USA,<sup>1,2</sup> present in the earliest years of life and shaped by structural racism. Racism, a multidimensional system of oppression that unfairly structures opportunities and resources to disadvantage children from minoritised racial and ethnic groups,<sup>3,4</sup> profoundly impacts children's health<sup>5-9</sup> throughout their lives.<sup>10</sup> In 2010, the American Academy of Pediatrics Committee on paediatric research published a landmark comprehensive report on racial and ethnic disparities in children's health and health care in the USA,<sup>11</sup> concluding that inequalities are pervasive across outcomes and across the health-care continuum. Given the emphasis on improving equity in health care and beyond over the past two decades<sup>11-13</sup> and the surge of scholarly activity in this area, this Series offers an updated and focused review on health-care inequities (paper 1) and policy solutions<sup>14</sup> (paper 2) to eliminate racial and ethnic disparities in the USA. We have adopted the definition of a health-care treatment disparity as specified in the Institute of Medicine's 2002 Unequal Treatment report: "differences in the quality of health care that are not due to access-related factors or clinical needs, preferences, and appropriateness of intervention".<sup>15</sup> Our review relies on categorising children into racial and ethnic groups, which is inherently over-simplistic and requires use of a social classification system with no biological validity; however, documenting differences in paediatric health-care quality across groups is crucial to bring change to this inequity.

This Series is guided by an ecological model of racism (figure) that emphasises the role that societal structures and systems—including health care, education, housing, and legal and economic systems—play in shaping the social, physical, and interpersonal environment and interactions children experience, inclusive of both implicit and overt racism. Together, these structures, systems, and downstream environments and interactions influence a child's opportunity for healthy development. The overarching aim of the Series is to highlight structural sources of inequitable environments for children, with this Series paper focusing on paediatric health-care specialties. The disparities in health care are the result of compounding systems within the broader ecosystem that create, sustain, and perpetuate inequities in quality of care, access, and preferences (figure).

We review studies from the USA that have been published in the past 5 years to maintain a reasonable scope and because of the importance of focusing on the most recent evidence available, although some studies used data from much earlier. We focus on differences in care that cannot be clearly accounted for by access (proxied via insurance status),<sup>15</sup> preference, or medical need; these differences will be referred to as treatment inequities throughout the Series paper. Given our definition of a health-care treatment disparity, we limit our review to studies that either adjust for or stratify by insurance status or restrict enrolment to a single-payer health care (eg, Medicaid), thereby offering a unique contribution to the paediatric health inequities

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This is the first in a Series of two papers about racism and child health in the USA. All papers in the Series are available at [www.thelancet.com/series/racism-child-health-usa](http://www.thelancet.com/series/racism-child-health-usa)

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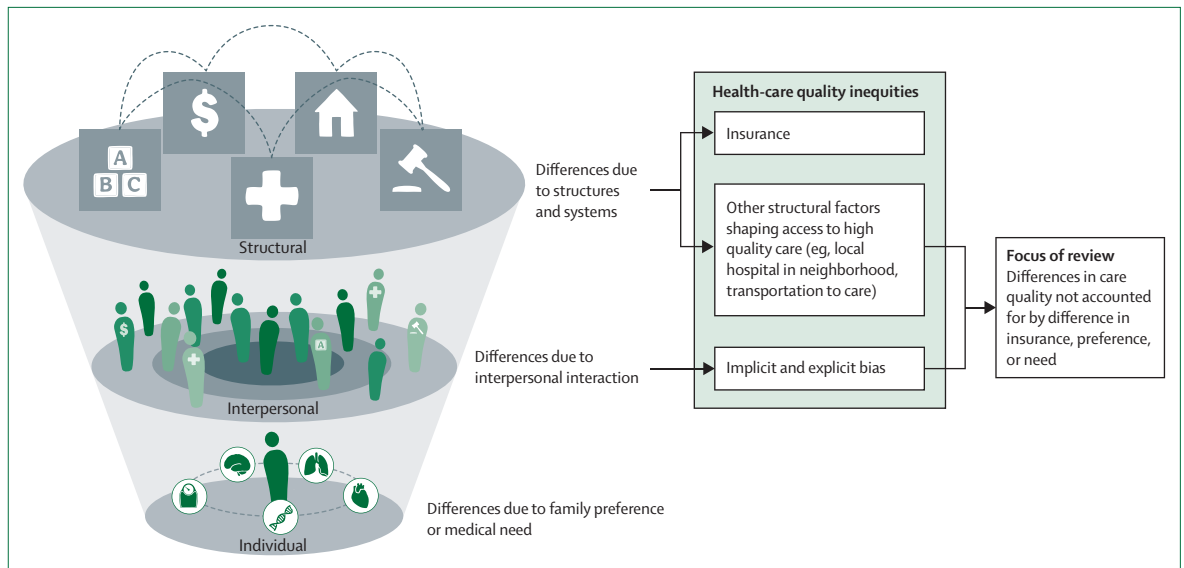
See Online for appendix

**Key messages**

- Across paediatric specialties there are persistent inequities in the health-care quality received by children in the USA; even after accounting for insurance status, children from minoritised racial and ethnic groups receive poorer care relative to non-Hispanic White children, and non-Hispanic White children are overserved relative to children from other racial and ethnic groups
- The amount and consistency of evidence on racial and ethnic disparities in children's health-care quality varies across specialties
- The study designs used in the literature are generally strong, with many studies including multiple control variables for socioeconomic position and clinical characteristics such as comorbidities or condition severity
- Few studies included Asian American and Native American children or children classified as multiethnic or multiracial, and there is little research to examine time trend analyses, disparities based on intersecting marginalised identities, or the effect of guidelines, protocols, or treatment algorithms to support equitable paediatric care
- Throughout the literature, implicit biases and stereotyping are hypothesised as causes for providers' clinical decisions that shape disparities in care, but little research has directly linked implicit bias with disparities in treatment decisions, patient satisfaction, or outcome
- Policy changes extrinsic to the health-care system are essential to address the root causes that create and perpetuate racial and ethnic disparities in children's health-care quality

literature. We recognise this is an imperfect control for differences in access to care, as health insurance plans can vary with regard to services covered and availability of practitioners and appointments. Notably, access to insurance (both public and private) is shaped by structural racism and other systemic inequities; however, a focus on disparities in insurance and related sequelae are beyond the scope of this Series paper. Specifically, we excluded outcomes focused on access issues, cost, or health outcomes not directly tied to the quality of care. We also strived to exclude outcomes directly influenced by patient or parent preferences, recognising that there is ambiguity in the role of preference even among some of the included studies. The empirical studies that we review are summarised in the appendix (pp 2–29). Throughout, we use the terminology for racial and ethnic groups as used within the study being described.

First, we review studies on health-care treatment inequities within each paediatric specialty. In accordance with other quality of care research,<sup>16,17</sup> we focus on structural measures (ie, the context in which care takes place, such as provider capacity and systems to provide high quality care), process measures (ie, transactions between providers and patients during care, including technical or interpersonal activities to maintain or improve patient health), and outcome measures (ie, the impact of care on the patient's or population's health status), to the extent evidence is available. We review neonatology, the earliest form of paediatric specialty care, specialties based on the setting of care (eg, primary care, emergency medicine, inpatient and critical care, and surgical care), and specialties focused on the treatment of specific health conditions (eg, developmental



**Figure: Ecological model of racism**

Racism is a multilevel construct that shapes child development via interconnected structures, systems, and interpersonal interactions that are influenced by implicit and explicit biases, which lead to possible sources of treatment inequities within paediatric care.<sup>15</sup>

disabilities and other special health-care needs, mental health care, endocrinology, and palliative care). Second, we consider the general patterns across specialties, the rigor and breadth of the existing research, and mechanisms for the observed patterns. Finally, we consider the implications of these results for future research, practice, and policy.

## Neonatology

There are well documented and enduring racial and ethnic disparities in the quality of prenatal care,<sup>18,19</sup> with implications for neonatal outcomes. Inequitable outcomes in neonatal hospital care have received substantial research attention in recent years.<sup>20–25</sup> We focus on neonatal health-care quality measures that were selected by a panel of experts.<sup>26</sup> Overall, the literature aligns with a systematic review inclusive of studies until March, 2018,<sup>27</sup> which found complex patterns of racial and ethnic disparities in structures (eg, nursing characteristics and racially segregated hospitals), processes (eg, facilitation of breastfeeding in the hospital, follow-ups, and referrals), and outcomes (eg, hospital morbidity and mortality) that typically disadvantage infants from minoritised racial and ethnic groups, particularly Black infants.

Considering the most recent literature, numerous studies show excess risk for worse quality of care for infants from minoritised racial and ethnic groups relative to White infants.<sup>20,22–24</sup> One study of very low birthweight infants found that relative to non-Hispanic White infants, non-Hispanic Black infants and Native American infants are less likely to have received any human milk at hospital discharge.<sup>23</sup> Asian and Pacific Islander infants were more likely to have received any human milk at hospital discharge, and the degree of disparities varied considerably across regions and states.<sup>23</sup> Disparities in human milk provision cannot be attributed to preference alone, as research shows racial disparities in access to maternity care practices that support breastfeeding.<sup>28</sup>

Studies of outcome measures show similar patterns. A study of 438 834 low-risk newborns from 40 hospitals in New York City (NY) found that unexpected newborn complications (defined as potentially avoidable serious or moderate complications) were higher among Hispanic and non-Hispanic Black infants relative to non-Hispanic White infants.<sup>20</sup> Another study of 19 325 preterm infants from 12 clinical sites found that sepsis, but not neonatal death, was higher among non-Hispanic Black and Hispanic neonates relative to non-Hispanic White neonates.<sup>24</sup> Although few studies have examined time trends in neonatal health-care quality disparities, there is some evidence from a study of 25 academic medical centres that racial and ethnic disparities in late-onset sepsis and receipt of antenatal corticosteroids among extremely preterm infants (<28 weeks gestation) improved between 2002 and 2016.<sup>25</sup>

## Specialties based on setting of care

### Primary care

Primary care is a key point of access for many children and families seeking health-care services. Racial and ethnic disparities in the delivery of paediatric medical home services have been well documented<sup>29,30</sup> and persist in the literature focused on processes and outcomes in general primary care<sup>31–34</sup> and asthma care,<sup>35,36</sup> although patterns are inconsistent. Considering process of care outcomes, several studies have focused on communication within primary care. A study focused on provider recommendation of human papillomavirus (HPV) vaccination within a longitudinal cohort found that among parents reporting low levels of patient-centred care (but not among those reporting high levels of patient-centred care), parents of non-Hispanic Black children had significantly lower odds of receiving a recommendation for HPV vaccination for their child than parents of non-Hispanic White children.<sup>32</sup> Similarly, a study of adolescents in the National Survey of Children's Health found that caregivers of White adolescents were more likely to report that their adolescent received risk counselling relative to reports from caregivers of children from other racial or ethnic groups.<sup>34</sup> In an analysis of 5390 children age 6–12 years, the Medical Expenditures Panel Survey did not identify racial and ethnic differences across four measures of parent–provider communication quality.<sup>37</sup>

Studies focused on asthma care processes also indicate mixed results.<sup>35,36</sup> One study used electronic health record data from 37 614 children with asthma with a primary care visit in 21 states, revealing Latino children had lower odds than non-Hispanic White children of having their asthma recorded on their problem list on the first day the diagnosis was noted, which might delay appropriate care at future visits. However, there was no difference in the rate of asthma severity documentation on the patient's problem list.<sup>35</sup> Similarly, based on parent-reported survey data from 647 families in the Population-Based Effectiveness in Asthma and Lung Diseases Network, Black children were less likely to have a written asthma treatment plan given or reviewed by a provider than their White peers; however, there were no differences observed in the frequency of asthma medication review.<sup>36</sup>

Considering outcome measures, some of the literature shows over-screening in minoritised children. One study found that temperature measurement at well-child visits was more common among Hispanic and Black children relative to non-Hispanic White children,<sup>33</sup> which could lead to overdiagnosis, recognised as potentially harmful to children.<sup>38</sup> A study using data from a network of 31 paediatric primary care clinics found that non-Hispanic Black adolescents had significantly higher odds of chlamydia screening than their non-Hispanic White peers; this difference remained even after adjusting for individual, clinician, and clinic-based characteristics.<sup>31</sup>

### Emergency medicine

The emergency department is the clinical area with the most publications showing paediatric disparities over the past 5 years. Disparities in emergency medicine are particularly concerning given the important role of the emergency department as a health-care safety net, where marginalised populations can access care regardless of insurance status or ability to pay.<sup>39</sup> The literature shows disparities in structural measures, such as waiting times at the emergency department.<sup>40,41</sup> Disparities that disadvantage minoritised children are also evident in process measures such as assignment of triage acuity.<sup>41–43</sup> Evaluation for suspected child abuse is another process measure in emergency care for which disparities have been widely reported. In a 2018 systematic review<sup>44</sup> of skeletal surveys in young, injured children (at age <60 months), five of six studies<sup>45–50</sup> examining racial disparities found that Black and Hispanic children were more likely to be evaluated with a skeletal survey than White children.

Considering disparities in outcome measures within paediatric emergency medicine, the most robust evidence exists in pain management.<sup>51–57</sup> Disparities have been documented in the provision of opioid analgesics for children presenting with any painful condition<sup>56</sup> and specifically among those with objective diagnoses, such as long bone fractures,<sup>51–53,55,57</sup> appendicitis,<sup>51–57</sup> and migraines.<sup>58</sup> Findings of disparities in pain management for children with fractures are consistent with previous research investigating disparities in paediatric trauma care, such as the management of supracondylar fractures<sup>59</sup> and replanting an amputated digit,<sup>60</sup> as highlighted in a 2019 systematic review.<sup>61</sup>

Beyond treatment of more stigmatised conditions, such as child abuse, the literature on opioids,<sup>51–57</sup> antibiotics,<sup>62,63</sup> intravenous fluids,<sup>64</sup> and diagnostic imaging<sup>41,65–68</sup> suggest an overall trend of more care for White patients. This trend is seen even for care that is not evidence based, such as antibiotics for viral illness,<sup>62,63</sup> chest x-rays and laboratory testing for asthma and bronchiolitis,<sup>65,67</sup> and other low-value care (ie, services where the potential for harm exceeds benefits, such as imaging for constipation or headache<sup>69</sup>). A single-centre study found that Black and Hispanic children and children of other races were less likely to receive intravenous fluids for gastroenteritis and dehydration than White children, despite guidance from a clinical care pathway.<sup>64</sup>

By contrast, there was also evidence that standardised protocols within the emergency department can reduce disparate treatment relative to clinical judgement alone.<sup>70</sup> The general pattern of less treatment for minoritised children was also found for procedures<sup>41</sup> and subspecialty consultations<sup>71</sup> in the emergency department, and minoritised children are more likely to leave the emergency department without complete evaluation or care.<sup>72</sup> Potential undertreatment in Black children can affect outcomes; for example, a delayed diagnosis of appendicitis increases the

risk of ruptured appendicitis.<sup>68</sup> Finally, there was some evidence to suggest intersections of race with age and sex.<sup>43,56,71</sup> In one sample in which fever was the chief complaint at the emergency department, racial disparities in triage score was only evident in children older than 1 year.<sup>43</sup>

### Critical and inpatient hospital care

The literature on racial and ethnic disparities in paediatric critical and inpatient care quality<sup>73–79</sup> shows evidence of inequitable care across some studies, with mixed results. Considering studies of process measures, a study of 424 adolescents who had posterior spinal fusion for idiopathic scoliosis at a single institution documented disparities in postoperative pain before implementing a coordinated care pathway; following implementation, these differences were eliminated.<sup>79</sup> Another study of 91 549 children found non-Hispanic Black and Hispanic children were less likely than non-Hispanic White patients with similar asthma acuity to receive chest x-rays in inpatient and emergency encounters.<sup>73</sup> Two studies of asthma-related hospitalisations indicated no racial differences in 30-day all-cause revisit rates<sup>74</sup> or referral to an asthma specialist,<sup>75</sup> although non-Hispanic Black children were less likely than non-Hispanic White children to receive a written asthma action plan.<sup>75</sup> Another study included 904 families with children who were inpatients at a paediatric tertiary care hospital and found that, relative to parents of White patients, parents of non-White patients reported lower satisfaction related to family-centred care, patient–provider relationships, and cultural competency across all provider types; meanwhile, there were no disparities in satisfaction related to hospital systems, processes, and infrastructure.<sup>76</sup>

Studies of outcome measures within critical and inpatient hospital care also found patterns that disadvantage minoritised children. A study of 3231 patients from 16 hospitals examined racial and ethnic disparities in inpatient adverse events from medical records and found that Latino patients were more likely to have preventable and high-severity adverse events relative to White patients.<sup>77</sup>

### Surgery

Some,<sup>80,81</sup> but not all,<sup>82</sup> studies of racial and ethnic disparities in the quality of surgical care for children indicate differences in care, mostly within the domain of outcome measures. In a study of 100 639 children in the Nationwide Inpatient Sample who had an appendectomy, perioperative complications were consistently higher for Black children compared with White children, with no evidence of the racial disparity gap narrowing over time, controlling for clinical characteristics including perforated appendicitis status, laparoscopy status, and number of comorbidities.<sup>80</sup> Similarly, in a study of 66 157 children in the Healthcare Cost and Use Project Kids' Inpatient

Database who had inpatient gastrointestinal surgical procedures, Black and Native American children and children classified as other races had elevated odds of postoperative complications relative to White children.<sup>80</sup> By contrast, a study of 786 children undergoing laparoscopic appendectomy at a single hospital found that the mean postoperative length of stay was similar among Black, Hispanic, and White children.<sup>82</sup>

### Subspecialties focused on childhood conditions

#### Developmental disability and children with special health-care needs

Racial and ethnic disparities in process measures for childhood developmental disabilities have been noted,<sup>83–85</sup> and the recent literature is consistent with previous reports.<sup>86–92</sup> Data from 7950 children from the Early Childhood Longitudinal Study-Birth Cohort show that Black and Asian children were less likely than White children to be diagnosed with a developmental disability by preschool (aged 4 years) or kindergarten (aged 5–6 years), even after controlling for scores on formal developmental assessments.<sup>92</sup> Similarly, a study using a national sample of children with special health-care needs found that Latino children received fewer specialty services than non-Hispanic White children, with this disparity moderated by physician responsiveness to parental concerns (ie, a passive or reassuring response was associated with Latino children receiving fewer services than non-Hispanic White children).<sup>87</sup>

Likewise, a study using administrative data to examine children with autism spectrum disorder who have Medicaid insurance documented racial and ethnic differences across all minoritised groups for nine common autism-related services, with patterns of disparities varying across types of services.<sup>86</sup> Black, Asian, and Native American or Pacific Islander children received fewer outpatient services than White children, but there was no disparity for Latinx children; at the same time, Black and Asian children received more school-based services than White children. The contrasting patterns for outpatient and school-based services could be driven by geography (ie, in metro areas with large minoritised child populations, children might have easier access to school-based services compared with outpatient services) or discriminatory practices that result in a higher likelihood for minority children to be placed in special education and, therefore, to receive services that can be billed to Medicaid.<sup>86</sup>

Finally, several studies focused on care quality among parents of children with special health-care needs, all using data from the 2009–10 National Survey of Children with Special Health Care Needs.<sup>88–91</sup> Each study found evidence that compared with parents of White children, parents from minoritised racial and ethnic groups reported lower quality of care in terms of family-centred care,<sup>89,91</sup> parent satisfaction with care,<sup>90</sup> and care coordination.<sup>88</sup>

#### Mental health specialty care

Studies that examined racial or ethnic disparities in the quality of paediatric mental health-care services<sup>93–100</sup> consistently provide at least some evidence of disparate treatment disadvantaging children from minoritised racial and ethnic groups, with most studies focused on process measures. In a study of Medicaid data from four states examining disparities in processes of care, the reduction of antidepressant prescribing following the Food and Drug Administration box warning about increased suicide ideation was slower among providers treating large numbers of minoritised children than those treating small numbers of minoritised children.<sup>93</sup> Black and Latino patients and their White peers were treated by largely separate providers whose responses to the box warning differed, with providers treating predominantly White patients responding faster than those treating predominantly minority patients.<sup>93</sup>

One study included 819 patients at five hospitals and found that African American children with suicidality were less likely to have documentation of caregiver counselling on lethal means restriction before discharge (ie, how to restrict access to lethal means of suicide, such as firearms, medications, and cars) relative to their White counterparts.<sup>94</sup> However, disparities were not present across the other eight indicators of mental health-care quality, such as mental health assessment and substance use screening in emergency departments, timely consultations, and discharge communication with an outpatient provider for inpatients (appendix p 30). Three studies using Medicaid data focused on children with major depressive disorder diagnoses,<sup>96,98,99</sup> finding lower rates of minimally adequate care for minoritised children relative to non-Hispanic White children.

Other studies of Medicaid data have identified disparities in quality of care related to outpatient mental health service use following a traumatic brain injury<sup>97</sup> and complex differences in adequate treatment for attention-deficit hyperactivity disorder (ADHD).<sup>95</sup> Finally, in a national survey of 2401 children with ADHD, non-Hispanic Black, Hispanic, and children classified as other were less likely than non-Hispanic White children to have ever received ADHD medication, and Hispanic children were less likely than non-Hispanic White children to be receiving medications for ADHD.<sup>100</sup>

#### Endocrinology

Research on racial and ethnic disparities in endocrinology care has focused on use of growth hormones<sup>101,102</sup> and diabetes care.<sup>103,104</sup> We recognise that within this specialty area in particular, deciphering between quality and preference is challenging; we erred on the side of being overly inclusive since preferences are shaped by experiences within the health-care system.<sup>15</sup> Studies of paediatric growth hormone use to treat short stature have documented that non-Hispanic White children are more likely than



non-Hispanic Black or Hispanic children to receive growth hormone treatment.<sup>101,102</sup> For diabetes care, relative to non-Hispanic White children, non-Hispanic Black and Hispanic children were less likely to be treated with an insulin pump,<sup>103,104</sup> and non-Hispanic Black children were less likely to have continuous glucose monitoring,<sup>103</sup> even after controlling for insurance status.

#### Palliative care

A few studies focused on racial and ethnic disparities in health-care quality among children experiencing end-of-life care.<sup>105–107</sup> Considering process measures, a study of 1193 children from the Pediatric Health Information System database who had undergone stem-cell transplantation found that Hispanic children were 59% less likely than non-Hispanic White children to receive inpatient palliative care consultations; no differences were evident for other racial groups.<sup>107</sup> Considering outcome measures, two studies used administrative data on deaths in California to identify children with cancer (n=3732)<sup>105</sup> and complex chronic conditions (n=8654)<sup>106</sup> and found that relative to non-Hispanic White children, Black, Hispanic, and Asian American children were more likely to have a hospital death,<sup>105</sup> and Hispanic children were more likely to have medically intense care within the last days of life.<sup>105,106</sup> These disparities have consequences for patients and their families, given that high-intensity care is associated with worse caregiver outcomes.<sup>108,109</sup>

#### Other subspecialty care

Little research within the study period focuses on racial and ethnic disparities in paediatric care within specialties of neurology,<sup>110</sup> oncology,<sup>111</sup> otolaryngology,<sup>112</sup> and urological medicine.<sup>113</sup> Considering paediatric neurology, in a study of 247 children with epilepsy, Hispanic children had a lower likelihood of seizure remission relative to non-Hispanic White children, despite no differences between these two groups of children in the number of antiseizure medication prescriptions, types of anti-seizure medications, or proportion of days covered by these prescriptions, thus the disparity is not explained by prescribing or refill patterns.<sup>110</sup> Another study found that non-Hispanic Black, Hispanic Black, and White Hispanic children were less likely to be diagnosed with a leukodystrophy relative to non-Hispanic White children, even though leukodystrophy disease-associated allele frequencies were the same or higher in populations of Latino or African descent.<sup>114</sup> One otolaryngology study that included 1511 children in Florida who had cochlear implantation found that non-Hispanic Black and Hispanic children were less likely than White children to receive a cochlear implant younger than 2 years,<sup>112</sup> adding to a growing body of evidence on disparities in paediatric otolaryngology care.<sup>115,116</sup>

## Discussion

Across paediatric specialties, the literature in the past 5 years on racial and ethnic disparities in paediatric health-care quality describes pervasive inequities in the health-care quality received by children in the USA. Notably, the studies included in this review all controlled for or stratified by insurance status to minimise differences attributable to access. Overall, the research designs were strong: half of the studies included control variables for socioeconomic position beyond insurance status, a large majority included control variables for clinical characteristics (eg, comorbidities or condition severity), and many studies used data collected from multiple sites, thus increasing generalisability. Although a few studies reported complex patterns, most studies reported patterns of inequitable care that disadvantage children from minoritised racial and ethnic groups relative to non-Hispanic White children or overserve non-Hispanic White children for at least one study outcome.

Several studies included time trend analyses,<sup>25,57,80</sup> documenting promising patterns of attenuating disparities in quality of care for some outcomes (eg, opioid prescription disparities for long bone fractures<sup>57</sup> and neonatal late-onset sepsis)<sup>25</sup> but not others (surgical complications for children with appendicitis).<sup>80</sup> Of the identified studies, only a few<sup>21,37,82,110</sup> reported null findings across all study outcomes; however, null studies are less likely to be published than other studies due to publication bias. Samples were collected from patients from diverse geographical areas and medical settings and from administrative records; we could not discern any patterns based on geography that could account for discrepancies across studies, and further work should consider disparities related to regional and other geographical factors. Finally, our review indicates that experiences of Asian American and Native American children, and those classified as multiethnic or multiracial, were less represented within the existing literature relative to other groups of children.

Eliminating the contribution of access-related constraints and family preference to the observed disparities was impossible, and this proved a challenge to our review. Although all included studies adjusted for insurance status, different types of insurance might confer different levels of access to care, so it is an imperfect control. Furthermore, families belonging to minoritised racial and ethnic groups might experience more substantial structural constraints that obstruct engagement in optimal care (eg, less access to paid family and medical leave<sup>117</sup> and transportation). Although we excluded outcomes that are highly likely to be driven by patient or family preference (eg, outcomes related to high-quality psychiatric care), we erred on the side of inclusion, given that preference is influenced by the quality and content of communication with providers, as well as historical events or discriminatory personal experiences that undermine trust or ability to engage

with the medical system, even when accounting for insurance status.<sup>15</sup> We did not identify studies of health-care disparities that met our inclusion criteria during the review period for several specialty areas (eg, anesthesiology, dermatology, neurosurgical care, and ophthalmology). Across several of these specialties, we identified articles documenting disparities in outcomes, treatment utilisation, and accessing care, but no studies met our inclusion criteria.<sup>111,118–120</sup>

The studies included in this review discussed a range of potential root causes for the observed disparities, such as biases and stereotyping as possible causes for providers' clinical decisions.<sup>31,40,57,64,67,70,86,92,93,98</sup> The interactions between patients and providers—including clinical decisions—are shaped by upstream systems and structures (figure), thus reflecting multiple intervention points to improve equity in care. Several studies used a before–after design and showed that guidelines and protocols within health-care settings support equal treatment.<sup>70,79</sup> Some studies examined whether the site of care could explain the disparities in treatment quality (eg, size and racial composition of the practice).<sup>20,31,40,93</sup> Other studies tested whether differences in treatment were related to the characteristics of the providers, such as responsiveness to concerns,<sup>87</sup> provision of patient-centred care,<sup>32</sup> specialty training,<sup>31,98</sup> or years of experience.<sup>31</sup> Distal structural factors, including housing, education, employment, and criminal justice, and the racism that underpins these factors are recognised as fundamental drivers of health-care disparities.<sup>121</sup> However, these factors were infrequently given extensive discussion within the studies identified. Only a portion of studies named racism as the suggested mechanism for the inequities in quality of care. Potential policy solutions to address these upstream factors are discussed in the second paper in this Series.<sup>14</sup>

Qualitative approaches to understand parental perspectives of experiences of racism in health-care might help to generate solutions that paediatricians and others can implement in partnership with families and communities.<sup>122</sup> Although our review was limited to quantitative studies, qualitative research can be superior for understanding patient perceptions and experiences of care. Two qualitative studies have identified ineffective communication and neglectful and judgmental care for Black and Hispanic families with infants receiving neonatal intensive care.<sup>123,124</sup>

### Implications for research, practice, and policy

Inequitable treatment is pervasive across paediatric care contexts. An ecological model of racism can inform strategies for eliminating this elevated risk of receiving inferior care among children from minoritised racial and ethnic groups. Building on these findings, we propose six specific research recommendations (panel).

First, we need additional and ongoing research to clarify the discrepant results observed for specific outcomes covered in this review and evaluate changes over time.

Second, concerted efforts to understand and intervene on the drivers of provider decision making that perpetuate inequitable treatment need to be developed, tested, disseminated, and scaled. Although research has shown that paediatric providers have implicit racial bias,<sup>125</sup> little research has directly linked implicit bias with disparities in treatment decisions, patient satisfaction, or outcomes.<sup>126,127</sup> Furthermore, evidence suggests that existing interventions related to implicit biases generally do not lead to sustained change in clinical behaviours or learning environments, thus emphasising the importance of structural changes within and beyond the health-care system.<sup>128</sup>

Third, more work is needed to characterise the experiences of Asian American and Native American children and of children belonging to multiple racial and

#### Panel: Recommendations for research, practice, and policy

##### Research

- Conduct qualitative, quantitative, and mixed-methods studies to better understand and effectively intervene on the drivers of provider decision making that perpetuate inequitable treatment
- Use qualitative, quantitative, and mixed-methods approaches to understand parents' and children's experiences of racism in health care
- Further examine the experiences of Asian American and Native American children and of children classified as belonging to multiple racial and ethnic groups
- Further examine inequities across intersections of race and ethnicity with other socio-demographic characteristics and identities including sex, gender identity, sexual orientation, family immigration history, language proficiency, socioeconomic position
- Enhance understanding of the potential for carefully developed treatment algorithms to reduce paediatric health-care disparities, along with other technological innovations and quality improvement strategies that could mitigate inequitable treatment within paediatric care
- Develop evidence-informed approaches to redesigning existing policies that systematically deny minoritised children and their families access to high-quality, equitable health care

##### Practice

- Hospitals and other health-care systems should review hospital policies and guidelines with an equity-focused anti-racism lens to identify and address obstacles to high-quality care that systematically sustain disparate treatment
- Senior management of health-care systems and providers must take steps to eliminate race-based paediatric care practices
- Health-care practices should adopt equity metrics as a part of quality improvement portfolios and conduct recurrent audits with feedback to providers
- Hospitals and other health-care systems should consider use of community health workers as team members within the health-care workforce

##### Policy

- End the racial segregation of paediatric care, including but not limited to health-care financing reform and local, state, and national policies to reduce residential segregation
- Enhance the diversity of the medical workforce, which will require attention to equity and increased access at every level of the education system, from early childhood education through and beyond medical training
- Comprehensive anti-racist policy efforts, beyond the health-care system, are needed to address the interconnected root causes that create and perpetuate inequitable treatment

### Search strategy and selection criteria

We searched PubMed for human studies published in English from Jan 1, 2017, to July 31, 2022, using the search terms (“Race Factors”[Mesh] OR ethnic\* OR minorit\* OR race\* OR racial OR “race/ethnic” OR “racial/ethnic” OR “racial disparit\*” OR “ethnic disparit\*” OR “ethnic difference\*” OR “racial difference\*” OR “race difference\*”) AND ((Healthcare Disparities[mesh] OR (healthcare disparit\*) AND (quality OR “Quality of Health Care”[Mesh])) AND (Adolescent[mesh] OR Child[mesh] OR Infant[mesh] OR Pediatrics[mesh] OR (adoles\* OR child\* OR infan\* OR paed\* OR pediater\* OR teen\* OR youth\*))). In addition, we reviewed the reference lists from the identified articles and our personal reference libraries. We included quantitative studies of children and adults younger than 21 years set in the USA. The selected studies had a primary objective to compare at least one health-care quality outcome between two or more racial or ethnic groups and adjusted for or stratified by insurance status or restricted enrolment to a single payor type (eg, Medicaid). The final reference list was generated based on these criteria and relevance to the broad scope of our review.

ethnic groups. Given the heterogeneity within the broad racial and ethnic categories that are typically considered, disaggregation of subgroups whenever possible is crucial to provide accurate information for specific groups, thus ensuring that interventions and policies address the unique challenges faced by each group.<sup>129</sup>

Fourth, the next wave of research should investigate the intersection of race and ethnicity with other sociodemographic characteristics such as sex, gender identity, sexual orientation, family immigration history, language proficiency, and measures of socioeconomic position.<sup>130</sup> Intersecting forms of inequity are important to document and address; for example, parent–provider language concordance might contribute to paediatric quality of care outcomes.<sup>131,132</sup>

Fifth, although there is some evidence that treatment algorithms can reduce paediatric health-care disparities,<sup>70</sup> the full potential of technological innovations and other quality improvement strategies for reducing racial and ethnic disparities across paediatric specialties is unclear.<sup>122</sup> There are complex technical and ethical considerations related to the introduction of treatment algorithms and machine learning-based models,<sup>133,134</sup> many of which rely on incomplete information related to social and structural contexts, learning from and calibrating against bias, and overly relying on biological data available via electronic records;<sup>135</sup> therefore, caution is needed.

Finally, there is an urgent need for research to identify strategies to intervene on systemic causes of health-care inequities (eg, access to care, institutional type, location, and quality of care) that are shaped by historical and present-day injustices within core societal systems,

including housing, education, and employment.<sup>121,136</sup> Some multisite studies reported that racial and ethnic differences in treatment could be explained by the site of care<sup>40</sup> or largely different providers treating White and non-White children.<sup>93</sup> Accordingly, we require evidence-informed approaches to redesign existing policies that systematically deny minoritised children and their families access to the same opportunities and services as their White counterparts.

Our review also has implications for practice and policy (panel). First, hospitals and other health-care systems should investigate sources of structural racism within their policies and guidelines. Policies should be reviewed with an equity-focused anti-racism lens to identify and address obstacles to high-quality care that systematically sustain disparate treatment.<sup>137,138</sup> Second, senior management of health-care systems and providers must take steps to eliminate race-based paediatric care,<sup>139</sup> as outlined in a position statement by the American Academy of Pediatrics.<sup>140</sup> Third, health-care practices should adopt equity metrics as a part of quality improvement and safety portfolios<sup>136</sup> and conduct recurrent audits with feedback to providers. Fourth, policy changes to end racial segregation of paediatric care<sup>141–143</sup> and to enhance the diversity of the medical workforce<sup>144</sup> are needed, which could have a meaningful influence on disparities in quality of care.<sup>145,146</sup> Fifth, integration of community health workers as team members within the health-care workforce might bolster health-related outcomes among minoritised populations.<sup>147</sup> Finally, policy changes extrinsic to the health-care system are essential to address the root causes that create and perpetuate disparities.<sup>14</sup>

### Conclusions

There are widespread inequities in treatment across many paediatric care specialties. Our review of recent literature reveals an urgent need to develop and implement effective interventions, including coordinated health care and cross-sectoral strategies that fundamentally redesign systems and policies to promote equitable and excellent health for all children. Extending on this conclusion, the second paper<sup>14</sup> of this Series provides an overview of the status of inequities within intersecting systems that shape child health, including housing, employment, health insurance, the criminal legal system, and immigration and outlines promising policy solutions to address racism embedded within these systems.

#### Contributors

NS, ARC, TJJ, ATA, AMB, SC, AC, MJ, JK, LMP, NP, SFS, and NH-G conceptualised the project and established the method. NS, ARC, TJJ, ATA, AMB, SC, AC, JK, LMP, NP, and SFS contributed to formal analysis of existing studies and to writing the original draft. AF created the search strategy to identify relevant studies for the review. NB designed the figures. NH-G supervised the project. All authors critically reviewed, edited, and approved the draft.

#### Declaration of interests

AC has a contract with Organon & Co (previously part of Merck) as a clinical trainer for the Nexplanon contraceptive device. In this role, she



provides training and education to resident physicians at her institution in the use of the subdermal implant device. She does not receive payment or any other form of incentive from Organon & Co in this role. NH-G is the co-owner of XNY Genes. All other authors declare no competing interests.

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