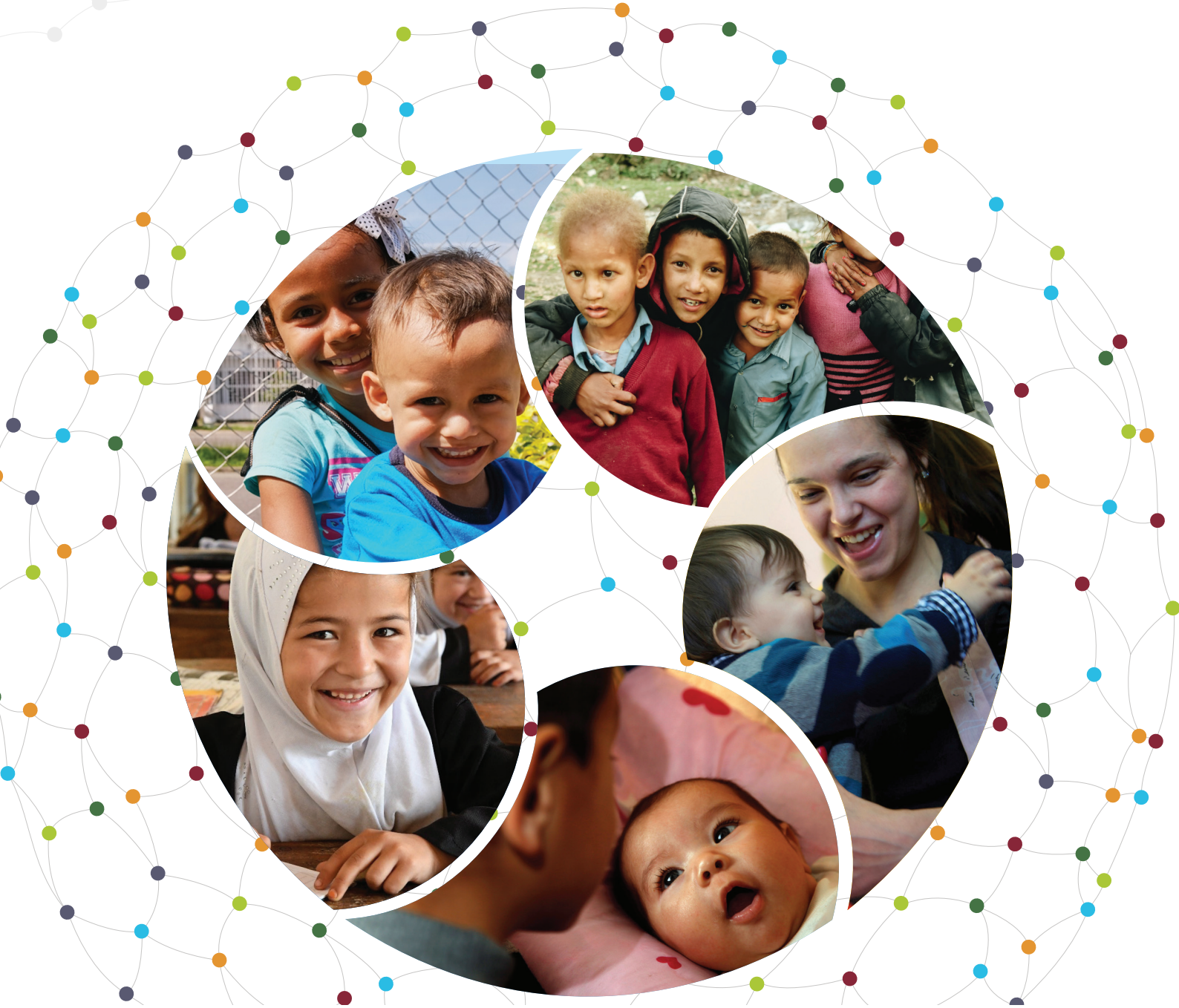
ECDAN
Early Childhood Development Action Network

ACCELERATING PROMOTION OF EARLY CHILD DEVELOPMENT THROUGH SYSTEMS:

Mixed-method evidence review of the potential applications of systems thinking in scaled efforts to enable every child to thrive.

EXECUTIVE SUMMARY



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Introduction

A great deal is already known about how to effectively promote healthy child development through interventions in health, education, and other sectors (1). The pre-eminent global framework for promotion of ECD at scale is the WHO, UNICEF and World Bank's Nurturing Care Framework for Helping Children Survive & Thrive to Transform Health and Human Potential (NCF). Within the NCF, based on evidence, five key domains of nurturing care are identified as well as strategic actions to promote ECD at scale (2). However, in spite of what is known, few interventions promoting early child development (ECD) have been equitably and sustainably scaled and even prior to the COVID-19 pandemic substantial inequities existed in child development indicators between and within countries (3, 4).

The pandemic and other major disruptions to child health and development including conflict, natural disasters and the climate crisis make the challenge of progressing towards the Sustainable Development Goal 4.2.1 vision of enabling all children to reach their developmental potential immense. However, these disruptions also present a timely opportunity to address longstanding challenges in ECD and think differently about how to better promote child development at scale moving forwards.

Systems thinking describes a way of conceptualising real-world phenomena which aims to improve understanding of a whole, its component parts and the interconnections between them (5). It explicitly acknowledges complexity and recognises that context in which systems exist is dynamic and change over time (5). While systems thinking has a long history in some sectors (e.g. information technology, finance, agriculture), its application in many other social sectors is relatively new and in the global child development agenda is under-developed.

For this project we suggest that systems thinking might offer new insights into longstanding challenges in promotion of ECD at scale, including sustainability and equity. Right now, the COVID-19 pandemic and other major system disruptors (e.g., the climate crisis, economic crises, conflict), offer a relatively unique window of opportunity to investigate whether applied systems approaches could promote system resilience and accelerate progress in regaining lost ground for children. This evidence review has harnessed the lessons learned from failures and successes in applying systems thinking across sectors, to suggest a number of potential ways forward for an accelerated ECD equity ecosystem.

Within this report we use the following definitions of systems related key terms;

Key term	Definition
Systems thinking	A broadly inclusive, cross-disciplinary conceptual framework and way of conceptualising real-world phenomena as systems which aim to improve understanding of a whole, its parts and interconnectedness between components or factors, acknowledging that the context in which this exists is dynamic and changes over time 5,6
Applied systems thinking	The application of a broad array of qualitative and quantitative methods and tools designed to better understand system behaviours and intervene in the context of complexity and uncertainty 7
Complex Intervention	An intervention which has a number of interacting components within the experimental and control interventions; having a number and difficulty of behaviours required by those delivering and receiving the intervention; having a number of groups or organisational levels targeted by the intervention; having a number and variability of outcomes; a high degree of flexibility or tailoring of the intervention permitted 8
Early Child Development	Children's cognitive, physical, language, motor, and social and emotional development, between conception and age eight years 2

Aim & Objectives

This evidence review aimed to explore the potential application of systems thinking in accelerating progress in equitable and sustainable promotion and implementation of ECD at scale.

The three main objectives of our evidence review were to:

1. Systematically review the evidence of impact for complex systems interventions on outcomes at scale across sectors through published and grey literature review.
2. Qualitatively explore multi-sectoral stakeholder experiences, perspectives, and examples in implementing complex systems interventions at scale in diverse settings.
3. Synthesize the results of Objectives 1 and 2 to consider future directions and implications for practitioners, researchers, policy makers and funders regarding the potential application of systems thinking in ECD.

Methods

Mixed-methods evidence synthesis including an intersectoral systematic review of published and grey literature, combined with qualitative analysis of interviews and focus group discussions to explore key informant perceptions and experiences of applied systems thinking. This project was approved by the Royal Children's Hospital Melbourne Human Research Ethics Committee Reference number 788894.

KEY FINDINGS

Systematic literature review

We conducted an interdisciplinary systematic literature review designed to rigorously answer the question ***'What is the evidence of impact for complex systems interventions on outcomes at scale across sectors?'***

We searched three databases (Pubmed, SCOPUS and Econlit) from 2010 to 2021 to capture published literature across a range of disciplines (e.g. economics, agriculture, health and social sciences) and included studies with an experimental or quasi-experimental study design, a priori determination of outcomes of interest and/or inclusion of a comparator group. We included studies from high and low-and middle-income countries although restricted to English literature.

Of the 42,660 papers initially identified and screened, most (n=42,550) were excluded because they were duplicates, not relevant to the primary research question or otherwise did not meet inclusion criteria. Of papers included in full-text review (n=110) there were n=105 excluded. Reasons for exclusion related to study design (i.e. historical analysis or lack of comparator) (72%), lack of relevance to research question (i.e. intervention or outcome not related to a complex system) (10%), or interventions that were not at scale (16%) or being a duplicate (1%). A secondary search was completed by searching through the reference lists and citations of the included studies, but no additional studies met the criteria for inclusion. Therefore from 42,660 screened abstracts there were 5 papers included.

Search strategy details and inclusion/exclusion criteria can be found here.

Summary of five included studies

References	Sector	Country	Population	Intervention	Comparator	Outcome
Abdallah et al, 2020 (9)	Health (Reproductive, maternal, newborn and child health and nutrition (RMNCHN))	India, Bihar	8 districts	Household and community-level interventions to improve RMNCHN	30 non-focus districts in the state of Bihar	Significant improvements in indicators during first phase where intensive support was provided
Ashish KC et al, 2019 (10)	Health (Newborn)	Nepal	12 hospitals, (n=89,014 women-infant pairs)	Neonatal resuscitation quality improvement package	Hospitals not yet enrolled	Improved neonatal resuscitation practices and decreased intrapartum related deaths
Patel et al, 2016 (11)	Health (Community)	Northern Ghana	3 districts (n=184,000 people)	Community-Engaged Emergency Referral System	Unexposed subdistricts in Upper East and West regions	Improved referral practices, overall facility-based maternal mortality as well as accident-related deaths decreased relative to non-intervention areas
Rawat et al, 2017 (12)	Health (Nutrition)	Vietnam	15 provinces (n=340,000 mothers of children aged 2yo)	Social franchising with a mass media campaign and community mobilisation	Counselling with less intensive mass media and non-intensive community mobilisation	Improvements in feeding practices (dietary diversity and minimum acceptable diet) but not growth were observed in the intervention group Significant declines in stunting were seen in both intervention and comparison groups over time
Waiswa et al, 2021 (13)	Health (Child)	Uganda	16 districts	Community and District-management Empowerment for Scale-up (CODES)	Unexposed districts	Improved treatment of malaria, diarrhoea, pneumonia, improved stool disposal, improved coverage of immunisation and Vitamin A supplementation

Characteristics of included studies

The five included papers showed positive impact of multi-faceted interventions within pre-existing government health systems. They described interventions applied at subnational scale in five countries (Nepal, Vietnam, Ghana, Uganda, India). Interventions varied in the way they applied systems thinking tools and methods. Notable features of these successful interventions include:

- Clearly defined goals and aims
- Deep understanding of local context, in some cases with a history of embedded implementation research
- Targeting of multiple system levels, beyond a focus on front-line worker alone (e.g. hospital leadership, district level management)
- Use of pre-existing services as units for scaling (e.g. hospitals, districts, communities)
- Co-design and implementation incorporating both 'top-down' and 'bottom-up' elements with a strong focus on stakeholder engagement, especially community (e.g. traditional social groups) as well as health leadership
- Data and indicators for monitoring and evaluation and embedded continuous learning processes
- Monitoring and evaluation incorporating mixed methods

Included papers also described enablers and challenges to ongoing scaling and a need to include measurement of intervention sustainability.

Qualitative interviews

We interviewed 22 key informants (KIs) who came from the ECD community as well as experts in systems thinking from other sectors (i.e. health, food systems, agronomy, ecology, social policy, international development). They represented academic institutions and non-government organisations (international and domestic, for-profit, and not-for-profit) and UN agencies. While half of KIs were based in academic institutions, many had dual roles and experience and expertise across sectors and disciplines. KIs were from six countries although many worked in diverse settings. Online interviews/focus groups were conducted via Zoom between November 2021 and February 2022 using a semi-structured approach and question guide. Qualitative content analysis explored KI experiences and perspectives of systems thinking. Five key themes emerging from qualitative analysis:

Theme 1: Why use systems thinking?

Applied systems thinking has a variable history across sectors, often driven by the need for innovative approaches to tackle complex problems where traditional approaches are perceived to fall short. These drivers include limitations of an empirical evidence base to inform public policy coupled with challenges related to complexity, scaling, sustainability, and equity.

Theme 2: What is systems thinking?

Terminology was recognised as important with challenges related to lack of clarity and multiple definitions of terms related to systems thinking. However, defining features of systems thinking approaches, consistent with previous literature, were noted including explicit acknowledgement of complexity, a focus on connections between systems components, emergence and non-linearity.

Theme 3: Systems thinking in practice

Systems thinking was described in different stages of its evolution and application across different sectors although its history spans many decades. KIs highlighted that practitioners in different fields may already apply elements of systems thinking without naming this approach. In some sectors (e.g., private consulting), applied systems thinking was described as being in an early stage of emergence with efforts to apply systems thinking approaches, tools and methods like *"building a plane while flying"* (KI2). In other sectors (e.g., health, agriculture, ecology) a long history of systems thinking application was described, with well-developed application of approaches, tools and methods.

Differences in underlying definitions of systems thinking were also noted to have practical implications. Most notably a difference between mechanistic and ecological approaches was highlighted. Mechanistic approaches were described to be hierarchically structured and focused on improving system performance (i.e. outputs or outcomes), whereas ecological approaches were explained as framed around learning networks with a specific purpose and focused on process and participation rather than

performance. Examples of ecological systems informed program design included strengths-based programming to build resilience among marginalised communities.

Consistent with the systematic review findings, KIs described (1) examples of incorporating applied systems thinking alongside other design and implementation approaches, and (2) features of successful systems interventions based on *context, purpose, process and collaboration*.

Theme 4: Relationship with scaling, sustainability, equity and resilience

The relationship between the application of systems thinking approaches with scaling, sustainability, equity and resilience appeared complex with mixed KI perceptions. Whilst some KIs described how applied systems thinking might influence these aspects of ECD program design and implementation, measured examples were scarce, highlighting an important area for further evaluation and research.

Theme 5: Measurement – data, indicators, monitoring and evaluation

Data and measurement were seen as crucial, with a real focus on the importance of what is measured and why. However, measurement at many levels was highlighted as a challenging area, due to a number of factors, including the inherent difficulty, in systems interventions, in establishing a comparator control group, as is often required in traditional experimental research design. Identified successful systems interventions within health which employed mixed methods approaches to monitoring and evaluation, together with process indicators and feedback loops to facilitate rapid, continual learning were instructive. These and other measurement approaches, tools and methods highlighted by KIs warrant further exploration and development in the application of systems thinking moving forwards. KIs highlighted a range of innovative approaches, methods, and tools they were aware of being used to address measurement challenges in the field.

These and other resource links suggested by KIs and detailed in the full report, provide an opportunity for further exploration of monitoring and evaluation approaches and development of related indicators, potentially relevant to ECD.

Overall key findings

Key findings are based on the systematic review and qualitative thematic analysis of KI interviews and focus groups. These provide insights into the potential application of systems thinking for addressing commonly experienced challenges to equitable and sustainable promotion of ECD at scale. Five overall key findings are described below.

1. There are compelling drivers towards systems thinking in ECD.

KIs described an increased focus on systems across multiple sectors over variable periods of time. Often this was described as arising from the need for innovative approaches to tackle complex problems where traditional (single intervention) approaches were perceived to fall short. Especially when addressing complexity and in the context of challenges with sustainable and equitable implementation and scaling. These resonated with similar identified challenges in promotion of ECD at scale.

2. Terminology is important but also a challenge.

The multiple related, overlapping and sometimes highly technical definitions of systems thinking may be a barrier to engaging practitioners and policymakers. This is despite the fact that many stakeholders may already be using applied systems thinking without defining their work as such.

3. There is an evidence gap between systems thinking and measuring impact at scale.

There are very few documented examples in the published literature describing measured impact of applied systems thinking on prospectively defined population outcomes at scale. This is potentially due both to challenges in systems terminology as well as measuring impact in systems interventions. In our extensive systematic literature review, only five studies were identified, all within the health sector.

4. Successfully applied systems thinking interventions have common elements.

- Purpose: clearly defined and shared goals and aims for multiple stakeholder groups.
- Context: deep understanding of local context, in some cases with a long history of embedded implementation research.
- Process: codesign and implementation that incorporates both 'top-down' and 'bottom-up' elements and a strong focus on stakeholder engagement, especially at community level. In all examples program design targeted multiple system levels, beyond a focus on front-line workers alone.

- Continual learning: using data and indicators for monitoring, adaptation and feedback as well as mixed methods approaches for monitoring and evaluation.
- Collaboration and networking: is key to intervention design and implementation.

5. Innovation is required to address measurement challenges.

The iterative, multifaceted nature of complex systems interventions makes application of traditional research, program monitoring and evaluation methods challenging. However, existing implementation frameworks, with an emphasis on context and process, may provide an opportunity for integrating relevant indicators to measure and evaluate systems thinking approaches. To do this, data and development of indicators which allow for comparison of applied systems thinking approaches across contexts are needed.

Implications and future directions

Now is a crucial moment in time for ECD. Challenges such as the COVID-19 pandemic, climate crisis and conflicts present major set-backs in international efforts to enable all young children to thrive and reach their full developmental potential. However, systems disruptions also present opportunities to change and explore innovative approaches to address longstanding challenges in efforts of the ECD community to promote child development at scale.

Building on key findings, the following implications and future directions are proposed for further consideration of practitioners, policymakers, funders, researchers and other stakeholders within and beyond the ECD community.

For practitioners

Reframing common challenges from a systems lens and building capacity within the ECD community related to application of tools and methods will be required. Opportunities to consider include development of;

- **Learning networks**, engaging ECD stakeholders as well as systems thinking experts and practitioners from other sectors to continue to share learnings and experiences related to applied systems thinking.
- **Strategies to document application of systems thinking** approaches more clearly and in ways which are comparable across settings.
- **Data and indicators** to measure systems thinking processes and impact as well as innovations in program monitoring and evaluation, to better capture systems change. This requires motivation and data literacy.

For policymakers

Systems disruptions associated with the pandemic and the urgency of emerging challenges such as the climate crisis provide an opportunity to consider;

- **Innovative policy scaffolding** to drive system change (e.g. alter policy regulatory environment, change and incentivise different funding mechanisms linked to practice). Such scaffolding needs to address the underlying social determinants of child health and development.
- **Creation of capacity building infrastructure** (including data and learning system capacity and capability) that can accelerate system changes.

For researchers

To address evidence gaps in systems thinking related to ECD will require research that;

- Is embedded into existing implementation research platforms.
- Engages with innovative approaches for research co-design, mixed methods evaluation and processes which embed continual participatory learning.
- Considers where applied systems thinking tools and methods can be drawn from other sectors into existing ECD intervention design and implementation research frameworks.
- Develops and tests indicators which allow comparability of both applied systems thinking implementation processes and impact across settings.

For funders

- To explore the potential of applied systems thinking in strengthening promotion of ECD at scale, long-term investment in partnerships which support program co-design and implementation within existing systems is needed.
- Accountability in investment is crucial but will require consideration of innovative approaches for monitoring and evaluation as well as development and testing of relevant data and indicators to ensure that progress can be measured, tracked and compared across settings.
- Investment in networks which focus on capacity building, knowledge sharing and ongoing learning related to application of systems thinking across sectors, with a focus on community and primary stakeholders may also be beneficial.

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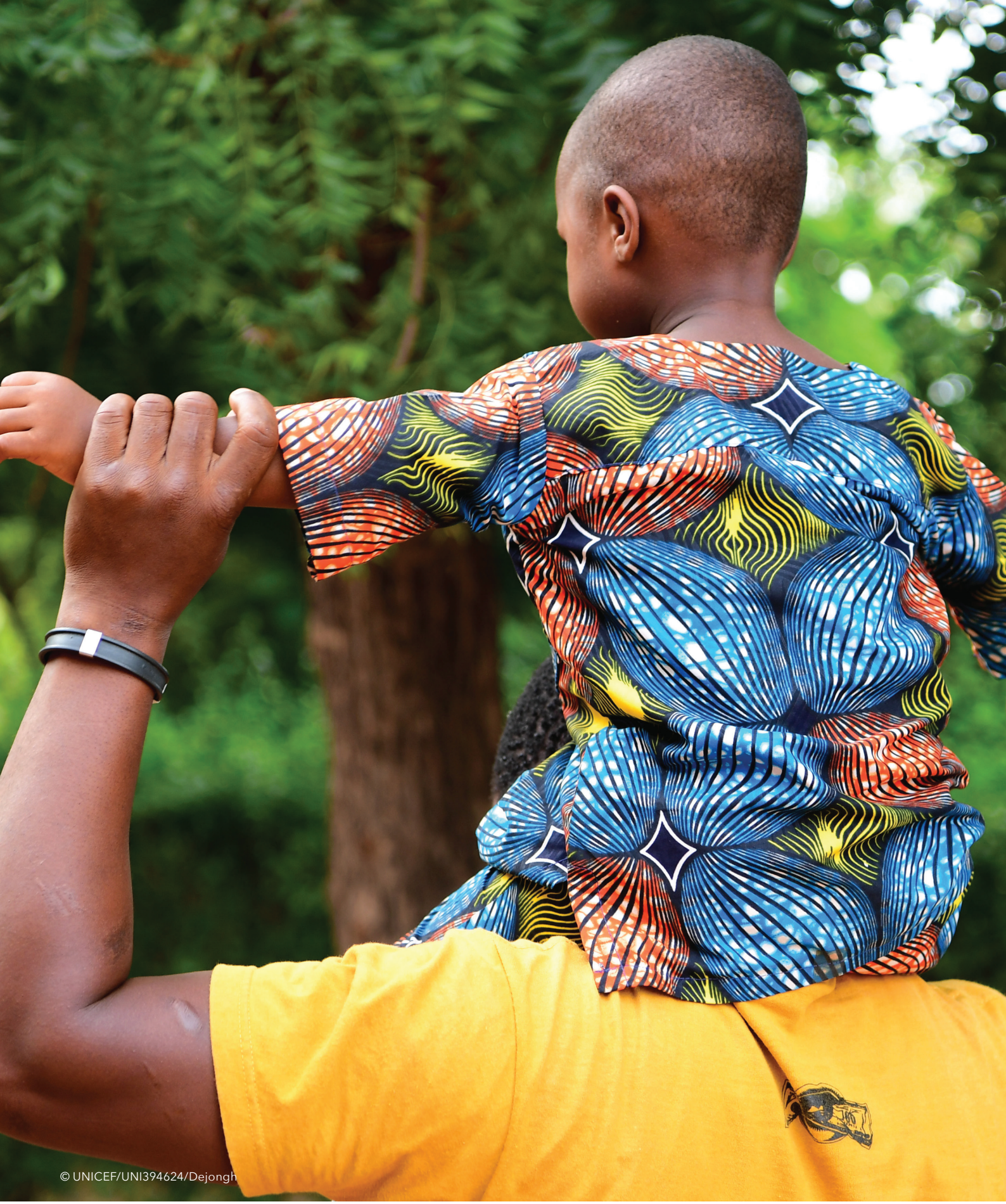

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