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A REVIEW OF SCHOOL-BASED INTERVENTIONS ADDRESSING THE HEALTH AND NUTRITION OF SCHOOL-AGED CHILDREN IN SOUTHERN AFRICA

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EXECUTIVE SUMMARY

Introduction

The World Food Programme (WFP) is the leading humanitarian organization saving lives and changing lives, delivering food assistance in emergencies and working with communities to improve nutrition and build resilience. As the international community has committed to end hunger, achieve food security and improved nutrition by 2030, Goal 2 – Zero Hunger – pledges to end hunger, achieve food security, improve nutrition and promote sustainable agriculture, and is the priority of the WFP.

A key part of this is ensuring that all school-aged children have access to school meals and are healthy and ready to learn. In 2020, WFP launched the WFP School Feeding Strategy 2020 – 2030, which outlines the new approach taken by WFP to ensure that all school-going children receive a good quality meal and an integrated package of nutrition and health services. This strategy also reaches out to governments and partners to help to address gaps in guaranteeing a proper school health and nutrition response for children in schools.

As part of its effort to support the governments of Southern African states to design and deliver evidence-based interventions to promote the health and well-being of school-aged children in the region, WFP Regional Bureau Johannesburg commissioned this review in 2020 to: (a) synthesise the best available evidence on the health and nutrition conditions of school-aged children in the Southern Africa[1] region; (b) review published academic and grey literature[2] evaluating the potential impact of selected school-based health and nutrition interventions on the health, nutrition and education of school-aged children, and identify implementation challenges, gaps and lessons; (c) identify existing policies that guide and support the design and delivery of school-based nutrition interventions; and (d) conduct a short mapping of stakeholders and partners that support the development and delivery of school-based health and nutrition interventions in the Southern Africa region.

Design and Methods

A mixed methods approach involving a combination of methods, including desktop and systematic reviews, secondary data analysis, and policy and stakeholder mapping exercises, was employed. The health and nutrition status of school aged-children and adolescents (aged 5-19 years) in the Southern Africa region was assessed using published literature and reports, complemented with secondary data accessed from the global burden of disease (GBD) database and UNICEF databases.

The effects of school-based health and nutrition interventions on the health, nutrition and education of school-aged children and adolescents was investigated through a systematic review of evidence. The first phase of the assignment focused on school-based nutrition (covering micronutrient supplementation), nutrition education interventions and deworming interventions, while the second phase of the study covered school-based HIV prevention and Water Hygiene and Sanitation (WASH) interventions.

Relevant literature for the review was accessed from academic databases (MEDLINE, EMBASE, CIHNAL, Web of Science, PsychoInfo, the Cochrane databases of systematic reviews, and Google Scholar) and grey literature sources including websites of the Food and Agricultural Organisation (FAO), World Health Organization (WHO) and WFP. The original aim was to conduct a meta-analysis of the statistical data extracted from the studies identified through the search, but there were no suitable experimental studies that assessed the impact of school feeding in the region. The review therefore adopted a narrative

[1] Angola, Botswana, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Republic of Congo, Seychelles, South Africa, United Republic of Tanzania, Zambia and Zimbabwe.

[2] Grey literature consists of documents that are not published through traditional commercial means. In this case, the grey literature consisted of programme evaluations that have not been formally published.

approach. In the case of school feeding programmes, the review drew on programme evaluations (primarily commission by WFP) to provide insight into the questions posed by the study.

Key findings

Regional food security and health context

Even prior to the COVID-19 pandemic, the Southern African region was experiencing the highest levels of food insecurity in a decade. As of March 2021, approximately 45 million people in ten countries in the region were facing high levels of acute food insecurity (Integrated Food Security Phase Classification, 2021). Countries in the region face a double burden of malnutrition among children under five years – a critical period for child development – with high levels of undernutrition existing alongside emerging concerns of overweight and obesity. High levels of malnutrition have long-term implications, both for the cognitive and physical development of children and for development within the region. In addition, countries in this region (and the adolescent girls and young women in particular) have borne the brunt of the HIV and AIDS epidemic, with gender inequality being a key driver. The recent emergence of COVID-19 has shone a spotlight on the poor coverage of WASH infrastructure in schools (and often in homes) in several countries in the region, undermining potential gains made by school-based health and nutrition interventions.

Nutrition and health status of school-aged children

With the focus on the impacts of malnutrition on children under five, there is comparatively less detailed data available on the nutritional status of school-aged children. But interventions aimed at promoting the health and well-being of school-aged children (5-19 years) are an opportunity to build on the gains of nutritional interventions in early childhood or to help children who have been malnourished to 'catch up', and to lay the foundation for healthy habits in adulthood. There is therefore a need for data on the nutrition and health status of school-aged children, both to track their progress as they grow into adolescents and young adults with changing nutritional requirements, and to effectively monitor and evaluate the effects of school-based health interventions.

The available data shows that while there were improvements across all countries in the region in the prevalence of underweight for both boys and girls between 2000 and 2016, there has also been an increase in the prevalence of overweight and obesity, particularly for girls (Development Initiatives, 2020). For example, in South Africa, overweight among boys increased from 3.32% to 20.19% and from 8.86% to 29.38% among girls over this period (Development Initiatives, 2020). In this region, the prevalence of overweight and obesity tends to be higher among girls than boys in this age group, while boys are more likely to be underweight.

Another indicator of nutritional status relevant for this age group is the prevalence of micronutrient deficiencies. Data from the global burden of disease database shows that dietary iron deficiency is relatively common among 5 to 14-year-olds, and slightly lower among 15 to 19-year-olds. Prevalence among both groups was highest in Zambia and the United Republic of Tanzania in 2019. Iodine deficiencies were highest in the Democratic Republic of Congo, followed by the Republic of Congo and Angola, across both age groups, while the prevalence of Vitamin A deficiencies was low across the countries.

Analysis of data from the global burden of disease database also showed that all three of the parasitic infections reviewed in this study were prevalent among school-aged children in the region in 2019. Among 5 to 14-year-olds, ascariasis was most prevalent in the United Republic of Tanzania (22%), Democratic Republic of Congo (20%) and Mozambique (18%), while the prevalence of hookworm and trichuriasis was highest in the Democratic Republic of Congo (21% and 16% respectively). A similar pattern was noted among 15 to 19-year-olds – ascariasis was most prevalent in the United Republic of

Tanzania (16%), Democratic Republic of Congo (14%) and Mozambique (12%), and the prevalence of hookworm and trichuriasis was highest in the Democratic Republic of Congo (both 18%).

Of the infectious diseases reviewed, malaria had the highest prevalence among 5 to 14-year-olds and was most prevalent (above 20%) in Mozambique, Democratic Republic of Congo and the Republic of Congo. Among the older group, HIV and other STIs were also prevalent, with prevalence higher among older females. Most recently, the COVID-19 pandemic has had a devastating impact across the world. While children (particularly young children) have been less likely to become infected or require hospitalisation, many children have been negatively impacted by the lockdowns and other measures put in place to mitigate the pandemic, with poverty, hunger and malnutrition likely to increase.

Drawing on UNICEF mortality data, mortality rates in both age groups have declined over the past 10 years, although at differing rates across countries. But mortality is still high, with the highest mortality rates in the Democratic Republic of Congo for both age groups (22.21 deaths per 1000 children aged 5 in the younger age group, and 19.11 per 1000 children aged 15 for the older group in 2019). Overall, the high levels of malnutrition and other health challenges have long-term implications, both for the cognitive and physical development of children and for development in the region.

Mapping school-feeding, policies and stakeholders in the sector

School-feeding programmes are present in all 16 countries, although they vary in reach and duration. While programmes in Zimbabwe, the United Republic of Tanzania and Mozambique were implemented relatively recently, others such as in Lesotho (1961) and Botswana (1966) are long-standing programmes. Most programmes employ geographical or categorical targeting, but six countries – Angola, Eswatini, Lesotho, Botswana, Namibia and Seychelles – have universal or near-universal programmes in place. Almost all target primary school learners, with some extending to pre-school and fewer programmes extending to secondary school learners. Most countries in the region also implement complementary interventions such as deworming programmes, nutrition education and training, and WASH initiatives, among others. School-based sexual health interventions to prevent HIV vary across (and within) the countries and may include curriculum-based interventions and/or extra-curricular activities.

In at least nine of the 16 countries, references to school feeding and other school-based health and nutrition interventions are included in two or more policies, although the level of detail varies. Nine countries in the region have dedicated school feeding or school nutrition policies to guide the implementation of these interventions, but detailed guidance on dietary guidelines or standards for school meals is limited. The review also found that there are many international stakeholders at regional and country levels, with many supporting nutrition interventions more broadly.

Effects of school-based health and nutrition interventions

While school nutrition programmes, deworming and nutrition education interventions are widespread in the region, the evidence base for their effectiveness in improving child health and education outcomes in Southern Africa over the last decade is limited. School-based WASH interventions suffer from a similarly limited evidence base in the region over this period. This is in contrast to the evidence base for school-based HIV prevention interventions, which is substantial.

The available evidence on the effects of school feeding programmes in the region is drawn from a small number of quasi-experimental and non-experimental studies and therefore provides a limited basis for drawing broad conclusions. The findings suggest that school feeding programmes are associated with improvements in school enrolment and attendance, but studies also noted that these outcomes are likely to be influenced by a range of other factors such as the quality of teaching, the school environment, household socio-economic status and competing demands outside of school. There is limited evidence (or investigation) of the potential impact of school feeding on learning and cognitive outcomes in this region. The available studies found improvements in self-reported short-term hunger and measures of

dietary diversity at household level. Only two studies assessed objective measures of nutritional status such as anthropometry and both found a positive association between the intervention – which comprised providing a breakfast in addition to the existing school feeding programme – and improvements in stunting (a 'catch up' effect), while one observed a protective effect against overweight and obesity. Including these and other nutritional indicators in the regular monitoring of school feeding programmes would allow for a better understanding of the impacts of these programmes on the nutritional status of school-aged children, and how the programmes can be strengthened.

Of the few studies that considered school-based nutrition education interventions, there were consistent reports of improved knowledge as a result of nutrition education. This was borne out by two experimental studies conducted in South Africa which both found improvements in levels of knowledge – but no significant impacts on subsequent behaviour. Future nutrition education interventions may benefit from further research into the potential pathways and approaches needed to bring about behavioural change and the promotion of healthy eating habits.

The review identified few (four) studies that assessed deworming interventions, providing a limited evidence from which to draw conclusions. These studies suggest that the school-based (targeted) deworming interventions can reduce the prevalence of parasitic interventions after treatment.

The evidence base for school-based HIV prevention interventions is rigorous and substantial and includes several randomised control trials. The studies reviewed here provide evidence of the protective effect for girls of staying in school, with support measures for encouraging girls to stay in school showing varying degrees of success. Other interventions also measured HIV (and/or STI infection) as a primary outcome but the pattern for these interventions was less clear. Several school-based programmes impacted on age of sexual debut and other sexual risk behaviours (e.g., condom use and partner selection) – which differs from the indicative findings on nutrition education – but this was not always consistent even within studies, where effects might be found on some behaviours but not on others. Several of the interventions included multiple components and out-of-school activities or engagements, thus addressing the broader environments in which school-aged children live. Fewer studies had changes in HIV and sexual health knowledge as their primary outcome, but five of the six studies that did found significant improvements in levels of knowledge as a result of HIV prevention education interventions.

Lastly, the evidence base for school-based WASH interventions was also limited and covered a range of interventions with varying outcomes. Efforts at improving knowledge of health and WASH-based messaging appeared successful, but there was insufficient evidence to draw conclusions on the extent to which this was disseminated or impacted on lasting behaviour change.

The review also identified a number of implementation challenges faced by the interventions, which could be grouped into programme design, implementation, financing and governance challenges. Limited rigorous monitoring and evaluation of programmes was identified as a major gap.

Conclusion

The finding that national school feeding programmes (of varying sizes) have been established in almost all 16 countries in the region shows the high level of 'buy-in' on the need for such programmes. Other complementary programmes such as school-based nutrition education and deworming interventions are also widespread, with an emphasis on HIV prevention interventions given the size of the epidemic in the region. With the limited evidence base for (and research focus on) some of these interventions, emphasis in the short-term should be placed on addressing the implementation challenges that impact the effectiveness of these programmes and implementing further rigorous monitoring and evaluation systems so that the programmes can be strengthened and the impacts on children can be clearly assessed.

The following are lessons that emerged that can contribute to improved design and implementation of programmes in the region going forward.

- Adopting a **life course approach** to health and nutrition interventions acknowledges the first 1,000 days as a critical window for child growth and development, but also recognise that the emphasis on investing in and monitoring the nutritional status of young children is "essential but not sufficient" (Bundy et al., 2018). It draws attention to the nutritional and health status of school-aged children in their own right (as well as being a means to maintain and build on earlier investments and support the health of future generations); it highlights school-aged children's changing nutrition and health needs (by age and gender) as they grow and develop; and positions schools as an important delivery platform for health messaging and services. A life course approach also flags the importance of 'starting early', both in terms of ensuring adequate nutrition and establishing healthy, protective habits and behaviours.

- The review of the health status of school-aged children emphasises the need for school-based health and nutrition interventions to adopt a **gender lens**. The increased vulnerability of girls and young women in the region to HIV infection (as compared to their peers), the negative impacts of the lack of WASH facilities and services in schools on girls' learning, and the differential malnutrition outcomes underscore the need for such an approach.

- Nutrition, WASH and HIV prevention interventions all include educational elements in an effort to effect **behaviour change**. Lessons can be learnt from the body of research investigating the potential pathways (and mediators) and approaches needed to bring about behavioural change and promote healthy habits.

- School-based interventions do not occur in a vacuum, and an array of 'external' factors may impact on their effectiveness. Changing behaviours is not a straightforward task and requires an **ecological** or systems approach that recognises that schools intersect with other settings in which children live and which shape their choices and behaviours.

- In addition to informing interventions with multiple elements across different sites, such an approach recognises the importance of an **enabling legal and policy environment** that provides a framework for collaboration across sectors, clarifies mandates and that can also set standards, as in the case of school feeding programmes. Addressing child malnutrition requires linking or integrating school feeding and other complementary programmes into national policies and strategies.

- A related lesson from the HIV and AIDS literature is the need to think beyond individual behaviours and to consider **structural** interventions. The challenges that many children face require multiple points of intervention, as well as a multi-sectoral approach to improving children's health and nutrition status. In the realm of HIV prevention, this has included exploring the role of economic strengthening measures such as cash transfers and other social protection measures – which can also contribute to reducing food insecurity – as well as measures to keep girls in school because of the protective efforts of education. Effective school-based health and nutrition interventions and efforts to improved access to WASH in schools can also play a role in retaining girls in school.

- Challenges in the **delivery and implementation** of programmes can undermine the effectiveness and potential gains of school-based health and nutrition programmes, even when they are well designed. Attention needs to be paid to addressing obstacles in implementation so that the full potential for improving child outcomes can be realised.

- The limited evidence base for several school-based health and nutrition interventions in the region points to the need for establishing rigorous **monitoring and evaluation systems** that

can provide the evidence needed to inform policy decisions, strengthen the design and implementation of interventions and advocate for greater investment in the health and nutrition of school-aged children. The human and socio-economic costs of the COVID-19 pandemic only reinforce this imperative.

1 INTRODUCTION

1.1 Background

World Food Programme School Feeding Strategy 2020-2030

1. Poor health, prevalent among learners from disadvantaged communities, has a significant effect on education and is the cause of absenteeism that contributes to grade repetition, early school leaving, and poor education outcomes. Many of the poor health conditions of these learners are preventable and treatable through an essential integrated package of health and nutrition services. The school system is potentially a cost-effective platform for delivering such an integrated package of health and nutrition services to school-aged children in rural and poor areas, as these areas are more likely to have schools than health centres.

2. The World Food Programme (WFP) has been supporting school feeding for the past six decades. According to WFP's analysis of available evidence, school feeding is the costliest element of an integrated package of health and nutrition services, but it is cost-effective because of the multiple benefits generated. WFP's benefit cost analysis of national school feeding programmes and WFP-supported programmes found that every USD 1 invested in school meals programmes yields an economic return of USD 3-10 from improved health, education, and productivity (WFP, 2020, p.20).

3. As human capital development of children is vital for a country in many ways, investing in it has proven to help children achieve their best as well as create productivity, stability and improve resilience in communities. In 2020, WFP launched the WFP School Feeding Strategy 2020 – 2030, which entails the new approach taken by WFP to ensure that all school-going children receive a good quality meal and an integrated package of nutrition and health. This strategy also reaches out to governments and partners to help to address gaps in guaranteeing a proper school health and nutrition response for children in schools. The new strategy recognises the necessity for WFP to work collaboratively with other United Nations agencies, governments, and stakeholders in delivering an integrated response to contribute to the achievement of the Sustainable Development Goals (SDGs).

4. The original **Theory of Change** for the School Feeding Strategy has since been updated. The updated Theory of Change sets out the impacts, outcomes, assumptions and theory of action, and links these to the SDGs. Key elements of the Theory of Change are set out as follows:

Table 1: Summary of Theory of Change

Impacts	1. Girls and boys, especially those that are vulnerable, have the opportunity to achieve their full potential. 2. Improved livelihoods of smallholder farmers & actors, especially women, in local value chain
Results (relating to children)	1. Improved learning outcomes of girls and boys** 2. Improved health (physical & psycho-social) of girls & boys** 3. Increased access to education for girls & boys**. 4. Enhanced diet diversity of girls & boys** 5. Reduced short-term hunger for girls & boys** 6. Improved nutritional status of girls & boys** **denotes that children, especially those that are vulnerable, will be targeted

Source: WFP (2020). WFP School Feeding Strategy 2020 – 2030.

5. **Context-specific approach:** According to the strategy, WFP will work closely with governments and partners by using a context-specific approach to ensure that primary school children have access to good quality meals in school as well as receiving an integrated package of nutrition and health.

1.2 Purpose, scope and objectives

6. The WFP Regional Bureaux of East & Central Africa, Southern Africa and West Africa appointed the Centre for Learning on Evaluation Results Anglo-phone Africa (CLEAR-AA) to conduct a review of the literature on school-based interventions addressing the health and nutrition status of school-aged children in Sub-Saharan Africa. The Regional Bureaux require the information to develop plans for implementing the WFP School Feeding Strategy 2020 - 2030. This report presents the results of the review for the WFP Southern Africa region.

7. The specific objectives of the regional review were to:

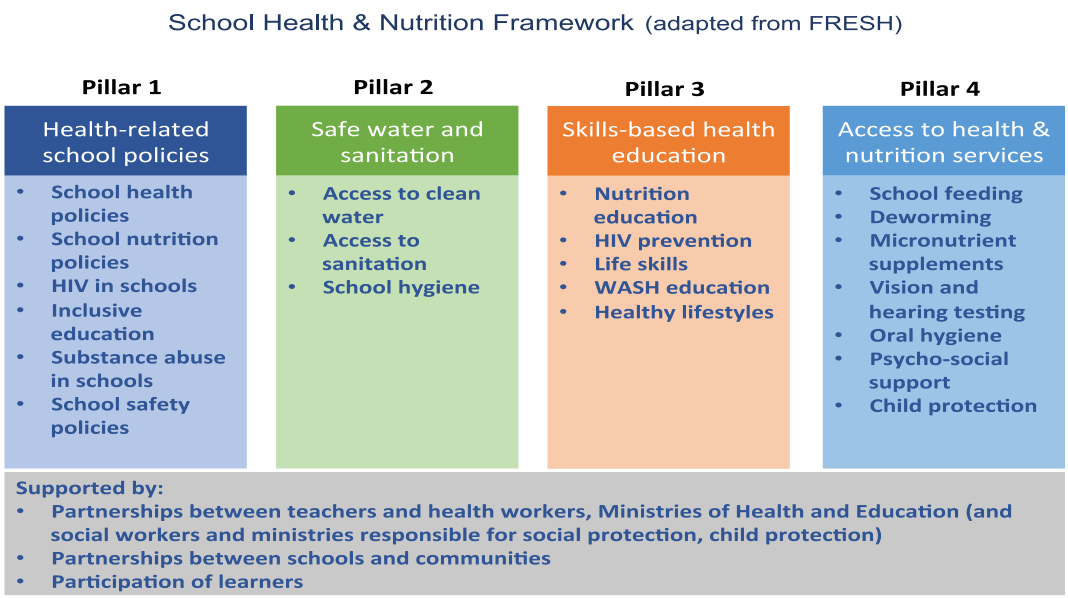
    a. Develop an analysis of the regional situation of health and nutrition of school-aged children and undertake a review of evidence to understand the effectiveness of school-based health and nutrition interventions on the health, nutrition and education of the target children.
    b. Using evidence from the situation analyses and evidence review, highlight lessons learned and best practices, challenges and gaps in the implementation of school health and nutrition interventions in the Southern Africa region.
    c. Examine the existing policy and legal framework for school health and nutrition in Southern Africa.
    d. Conduct a regional stakeholder mapping and analysis. This should include an analysis of regional bodies, United Nations agencies and main partners and their position on the issue in the region

8. The report focuses on 16 countries that fall within the Southern Africa region as defined by WFP. The report covers the 12 countries in which WFP is active – Angola, Democratic Republic of Congo, Eswatini, Lesotho, Republic of Congo, Madagascar, Malawi, Mozambique, Namibia, United Republic of Tanzania, Zambia and Zimbabwe – and also includes Botswana, Mauritius, Seychelles and South Africa. The Southern Africa region as defined in this report is broader than the groupings commonly used by other United Nations agencies.3

9. School health and nutrition covers a wide range of school-based interventions for example, school feeding, health checks (visual and hearing tests), vaccinations, Water, Sanitation and Hygiene (WASH), health education, and HIV prevention education (Figure 1). During the inception process, it was agreed with WFP that the first phase of the assignment would focus on school-based nutrition, covering micronutrient supplementation, and nutrition education interventions, and deworming interventions. The second phase of the study covered school-based HIV and WASH interventions.

[3] There is overlap between this grouping and the membership of the Southern African Development Community (SADC), except that the grouping of countries used in this report includes the Republic of Congo (a member of the Economic Community of Central African States rather than SADC) and does not include Comoros, which is a member of SADC.

Figure 1: School Health and Nutrition Framework



Source: UNESCO, UNICEF, WHO, World Bank and Education International Inter-agency Flagship Programme (2002) on Focusing Resources on Effective School Health (FRESH)

1.1 Methodological approach and limitations

10. The team adopted mixed methodology approaches to collect and analyse data from both secondary data sources and existing published literature. The detailed methodology is contained in Annex C and summarised in Table 1.

Table 2: Methodological approaches and data sources used in the assignment

Component of assignment	Approach	Main data sources
Analysis of regional situation of health and nutrition of school-aged children	Descriptive statistical analysis of trends and prevalence of health and nutrition problems, and mortality	Global Burden of Diseases database (IHME, 2019) UNICEF data on mortality UNICEF data on stunting UNICEF-World Bank Global Nutrition UNICEF-World Bank Joint Database on WASH
Effectiveness of school-based health and nutrition interventions	Systematic review of academic literature and grey literature, and meta-analysis where appropriate	African Index Medicus, Campbell Collaboration, DOPHER, EMBASE, PubMed, Cochrane Library, Trial registers, Web of Science. Grey literature sourced through Google Scholar, government and institution websites.
Policy and legal frameworks for school health and nutrition	Mapping of policies of countries in the region, as well as policies of regional institutions	Websites of country governments and websites of United Nations entities
Stakeholders and their positions	Mapping of stakeholders: United Nations entities in the region, regional economic communities, and civil society organizations.	Websites of United Nations entities, regional economic communities, and civil society organisations

1.2 Limitations

11. There are some limitations to this review. Due to time constraints, the focus of the review was narrowed to a limited set of school-based health interventions (school nutrition programmes and school-based

deworming, WASH and HIV prevention programmes). A challenge in the Southern Africa review was that the grouping of countries by region as defined by WFP does not coincide with regions as delimited by other agencies, making it difficult to draw on existing regional analyses since the definitions do not align. Further, while academic articles were identified through the database search for several of the interventions including for HIV, there were few studies assessing the effects of school health and nutrition programmes (and particularly school feeding) on outcomes for children, . This gap meant that the review draws to a greater extent on grey literature (programme evaluations) than in the West Africa and Eastern and Central Africa regions. These studies provide useful insights into the implementation and effects of school nutrition programmes but were more likely to be based on non-experimental designs, making it difficult to definitively attribute any changes in outcomes of interest to the programmes being evaluated.

1.3 Structure of the report

12. The remainder of the report is organised into the following chapters:

- Section 2 presents the regional context that includes the socio-economic context and the state of food security and nutrition.

- Section 3 presents information on the current status of the health and nutrition of school-aged children in the region. In outlining the nutritional status of school-aged children, this section presents information on obesity, overweight and underweight, and nutritional deficiencies such as Vitamin A. It also covers a range of parasitic infections to which school-aged children are exposed. It further presents the latest available data on the prevalence of infectious diseases and the burden of mortality of school-aged children.

- Section 4 discusses interventions to improve the health and nutrition status of school-aged children. It focuses specifically on school-based interventions and includes a mapping of school-feeding programmes in the region, as well as the policy context and the position of regional stakeholders relating to the school-based interventions reviewed.

- Section 5 presents the results and discussion of a systematic review of the effectiveness of school-based health and nutrition interventions. The section is organised according to the main interventions identified for this regional study, namely school-feeding programmes and school-based deworming, nutrition education, HIV interventions and WASH interventions.

- Section 6 discusses the challenges and gaps in implementing school-based health and nutrition interventions in the region.

- Section 7 sets out the conclusions and lessons learnt.

2 REGIONAL CONTEXT

2.1 Political and socio-economic overview

13. Southern Africa is a heterogeneous region, encompassing both high income (Mauritius and Seychelles) and upper middle-income countries (Botswana, Namibia and South Africa), as well as several low-income countries.[4] The region includes countries with particularly low levels of human development, such as Malawi (ranked 174th of 189 countries in the 2020 Human Development Index (HDI) rankings), the Democratic Republic of Congo (Democratic Republic of Congo, 175th) and Mozambique (181st, see Table 2). As is widely recognised, higher levels of national income do not necessarily translate into higher levels of human development: six of the 16 countries in the region, including the regional economic powerhouse of South Africa, fall into the 'medium' HDI group, while another six countries fall in the 'low' HDI grouping. These challenges in human development are also reflected in the World Bank's Human Capital Index (HCI, see Table 2). With the exception of the Seychelles (0.63) and Mauritius (0.62), the HCI estimates suggest that children in most Southern African countries will attain around 40% of their potential by the time they turn 18 years old as a result of the limitations of health and education in the country in which they live.[5] This has implications both for individual children's futures and for the region's economic and social development.

14. Despite being home to several advanced economies, poverty affects most countries in the region. Using the World Bank (2020b) definition of living on less than $1.90 a day, extreme poverty is negligible in Mauritius and Seychelles but is prevalent even in the upper-middle income countries of Namibia (14%), Botswana (15%) and South Africa (19%, see Table 2). In seven other countries, close to 50% or more of the population live in extreme poverty. This includes Madagascar and the Democratic Republic of Congo, where more than three-quarters (77%) of the population are estimated to live in extreme poverty. Levels of multidimensional poverty, which goes beyond income to include access to services, among others, are even higher (see Table 2). In addition, a defining characteristic of this region is acute income inequality which excludes large segments of the population from basic services and adequate health and nutrition. South Africa (63), Namibia (59.1), Zambia (57.1), Eswatini (54.6), Mozambique (54) and Botswana (53.3) are estimated to have Gini coefficients[6] of over 50, representing some of the highest levels of income inequality in the world.

15. The region also has stubbornly high levels of unemployment, averaging 12.5% between 2011 and 2019 – higher than other regions in Africa over this period (African Development Bank, 2020). These high rates of unemployment (often even higher for youth) contribute to poverty and inequality in the region. Prior to the COVID-19 pandemic, the African Development Bank projected that the Southern African region would recover from an estimated 0.7% economic growth rate in 2019 to 2.1% in 2020, with variation across the countries (AfDB, 2020).[7] But the pandemic and the subsequent lock down measures to contain it are likely to adversely affect economic growth and contribute to increased poverty and inequality in the region.

[4] This report draws on the World Bank country income classification (World Bank, 2020a).

[5] The World Bank's Human Capital Index aims to indicate the amount of 'human capital' a child born today could expect to attain by age 18, given the level of education and health in the country in which she lives.

[6] The Gini coefficient is a measure of the distribution of income across a population, with a higher value indicating greater inequality.

[7] This projection applied to the grouping of Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Sao Tome & Principe, South Africa, Eswatini, Zambia and Zimbabwe.

Table 3: Overview of socio-economic indicators in Southern Africa

Countries	HDI value, 2020	Ranking (of 189 countries)	World Bank country income classification 2020*	Poverty headcount ratio, $1.90 a day (% of population)	Multi-dimensional poverty, headcount ratio (% of population)	Gini coefficient	Gender Development Index, 2020*	Human Capital Index, 2020*
Angola	0.581	148	LMIC	52% (2018)	56% (2018)	51.3	4	0.36
Botswana	0.735	100	UMIC	15% (2015)	21% (2015)	53.3	1	0.41
Democratic Republic of Congo	0.480	175	LIC	77% (2012)	82% (2012)	42.1	5	0.37
Eswatini	0.611	138	LMIC	29% (2016)	35% (2016)	54.6	1	0.37
Lesotho	0.527	165	LMIC	28% (2017)	-	44.9	1	0.40
Madagascar	0.528	164	LIC	77% (2012)	-	42.6	2	0.39
Malawi	0.483	174	LIC	71% (2016)	76% (2016)	44.7	1	0.41
Mauritius	0.804	66	HIC	-	0% (2017)	36.8	1	0.62
Mozambique	0.456	181	LIC	64% (2014)	77% (2014)	54.0	4	0.36
Namibia	0.646	130	UMIC	14% (2015)	26% (2015)	59.1	1	0.45
Republic of Congo	0.574	149	LMIC	38% (2011)	43% (2011)	48.9	3	0.42
Seychelles	0.796	67	HIC	1% (2013)	2% (2013)	46.8	-	0.63
South Africa	0.709	114	UMIC	19% (2014)	19% (2014)	63.0	1	0.43
United Republic of Tanzania	0.529	163	LMIC	49% (2017)	58% (2018)	40.5	3	0.39
Zambia	0.584	146	LMIC	59% (2015)	64% (2015)	57.1	2	0.40
Zimbabwe	0.571	150	LMIC	34% (2017)	-	44.3	3	0.47

Sources: HDI: http://hdr.undp.org/en/content/latest-human-development-index-ranking; World Bank country classification by income: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups; poverty indicators: World Bank's Poverty and Equity Data Portal; gini coefficient: http://hdr.undp.org/en/indicators/67106; GDI: http://hdr.undp.org/en/content/gender-development-index-gdi; and HCI: https://datacatalog.worldbank.org/dataset/human-capital-index.

*****_Notes_: An **HDI value** above 0.800 is classified as very high; 0.700 – 0.799 as high; 0.550 – 0.699 as medium; and below 0.550 as low. **GDI groups**: Countries are divided into five groups by absolute deviation from gender parity in HDI values. Group 1 = countries with high equality in HDI achievements between women and men; group 2 = medium to high equality in HDI achievements; group 3 = medium equality in HDI achievements; group 4 = medium to low equality; and group 5 = low equality. **Gini coefficient** (2010-2018): Measure of deviation of the distribution of income among individuals or households within a country from a perfectly equal distribution. A value of 0 represents absolute equality, a value of 100 absolute inequality.

16. Several of the countries in this region perform relatively well on the Gender Development Index (GDI), with nine of the 16 countries being classified as having high or high to medium gender parity in HDI values.[8] Despite this, gender inequalities persist in the region, ranging from customary practices and social norms to unequal access to labour markets and other economic resources (SADC, 2020).

17. In addition to the emerging impacts of the COVID-19 pandemic, the primary public health concerns in the region are HIV, tuberculosis and malaria.

2.2 State of food security and nutrition in Southern Africa

18. Even prior to the COVID-19 pandemic, the Southern African region was experiencing the highest levels of food insecurity in a decade, with 41.2 million people in 13 Southern African Development Community (SADC) member states estimated to be food insecure in 2019 (SADC, 2020). This increased by almost 10% in 2020, compared with data provided the same time the previous year – and with the full effects of the COVID-19 pandemic still unknown (SADC, 2020).

19. As of March 2021, approximately 45 million people (of 188 million) in ten countries in the region were facing high levels of **acute food insecurity** (Integrated Food Security Phase Classification phase 3 or above; ICP, 2021).[9] This means that "people are marginally able to meet minimum food needs but only by depleting essential livelihood assets or through crisis or emergency coping strategies" (IPC, 2021, p1). The four countries hosting 80% of this population in crisis or worse are the Democratic Republic of Congo (19.6 million), South Africa (11.8 million), Zimbabwe (3.38 million) and Mozambique (2.9 million).

20. The same analysis found that key **drivers** of this acute food insecurity include the devastating socio-economic impacts of the COVID-19 pandemic (and the mitigation measures aimed at curbing it), together with high prices for food commodities and declining economies in which increasing unemployment and low incomes are a feature. In addition, continuing drier than normal conditions across parts of the region has affected cropping (IPC, 2021). Climate-related challenges and El Niño-induced shocks continued to affect the region.

21. Measures of malnutrition provide insights into the effects of the high levels of food insecurity in the region (see Annex D: Data tables). Table 7 provides an overview of the trends in the **prevalence of undernourishment** (POU)[10] and severe food insecurity[11] in the region prior to the COVID-19 pandemic (FAO et al, 2020b). The most recent POU estimates (2017–2019) range from 5.3% of the total population in Mauritius and 5.7% in South Africa, through to 41.7% in Madagascar. When comparing estimates from 2004-2006 to the recent estimates, the largest improvement can be seen in Angola (falling from 52% to 18.6%), while the largest increase in undernutrition was seen in Lesotho (increasing from 13.8% to 32.6%). Furthermore, the share of the total population impacted by severe food insecurity more broadly is generally – and often significantly – higher than those experiencing undernourishment (see Table 7).[12]

[8] The GDI considers three aspects, namely life expectancy at birth, education, and standard of living (estimated earned income).

[9] The countries analysed include the Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mozambique, Namibia, South Africa, Zambia and Zimbabwe.

[10] Prevalence of undernourishment is an estimate of the proportion of the population without access to enough dietary energy for a healthy, active life.

[11] People experiencing severe food insecurity have run out food, experience hunger and, at the most extreme, have gone for days without eating, putting their health and well-being at grave risk.

[12] The exceptions to this pattern are Lesotho and Tanzania.

22. Standard indicators of malnutrition tend to focus on **children under five** because of the vital role that adequate nutrition plays in the healthy cognitive and physical development of young children – and the long-lasting consequences of malnutrition during this period. The prevalence of wasting,[13] stunting[14] and overweight[15] in children under five in the region illustrates the damaging effects of malnutrition in this critical period for child development (see Annex D: Data tables, Table 7). For example, the prevalence of **stunting** in children under five years – an indicator of chronic undernutrition – was more than 30% in 2020 (considered very high) in eight countries (Angola, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mozambique, the United Republic of Tanzania and Zambia); and above 20% (considered high) in another five countries (Botswana, Eswatini, Mauritius, South Africa and Zimbabwe; UNICEF/WHO/World Bank, 2021).

23. Many countries in the region also face a double burden of malnutrition in which undernutrition co-exists alongside the emerging concerns of **overweight** and **obesity** (see Annex D: Data tables, Table 7). The prevalence of overweight in children under five years in 2019 was particularly high in South Africa at 13.3%, compared to other countries in the region (FAO et al., 2020b). The prevalence of overweight among children under five years was higher than the Sub-Saharan Africa average (3.9%) in six Southern African countries. This is likely to be driven in part by increasingly sedentary lifestyles and diets that are high in processed and energy-dense foods (WHO, 2020a). Overweight and obesity are of concern because they are significant risk factors for several non-communicable diseases.

24. In addition to a lack of (access to) food and overnutrition, the food that is available may not contain the vitamins and minerals required to meet children's full nutritional needs. This 'hidden hunger' is a **deficiency of micronutrients** that children need to grow and develop. The most common deficiencies in children globally are iron, vitamin A and iodine, and children in low- and middle-income countries are disproportionately affected (WHO, 2020). In Sub-Saharan Africa, the prevalence of anaemia (iron or B12a deficiency) in children under 5 is estimated to be 60%, while the global prevalence is 42% (WHO, 2017). Vitamin-A deficiency is a leading cause of blindness in children and can exacerbate serious illness, leading to increased mortality (WHO, 2017). Table 7 shows the prevalence of anaemia in women of reproductive age, ranging from 22% in the Seychelles to more than half (52%) of women in this age group in the Republic of Congo. Overall, micronutrient deficiency tends to be prevalent in countries with poor dietary diversity and where incomes are lower, such as where poorer households subsist mainly on cereals that are affordable and accessible but on their own provide limited nutrients (WHO, 2017).

25. These high levels of malnutrition have long-term implications, both for the cognitive and physical development of children and for development within the region. The Cost of Hunger in Africa (COHA) studies[16] draw on modelling to estimate the social and economic impact of undernutrition

[13] *Wasting*: Low weight-for-height, generally the result of weight loss associated with a recent period of inadequate dietary energy intake and/or disease. In children under five years of age, wasting is defined as weight-for-height less than -2 standard deviations below the WHO Child Growth Standards median.
[14] *Stunting*: Low height-for-age, reflecting a past episode or episodes of sustained undernutrition. In children under five years of age, stunting is defined height-for-age less than -2 standard deviations below the WHO Child Growth Standards median.
[15] *Overweight*: Body weight that is above normal for height as a result of an excessive accumulation of fat. It is usually a manifestation of expending less energy than is consumed. In children under five years of age, overweight is defined as weight-for-height greater than 2 standard deviations above the WHO Child Growth Standards median.
[16] The Cost of Hunger in Africa is an African Union Commission and NEPAD Planning and Coordinating Agency led initiative. It is a multi-country study aimed at estimating the economic and social impacts of child undernutrition in Africa.

on child health and education in four countries in the region. Table 3 presents selected results from each of these studies, demonstrating the negative effects of childhood malnutrition on health, education and productivity in adulthood. The studies highlight the need for a multi-sectoral policy approach to address the challenges of child malnutrition.

Table 4: Selected results from COHA country studies in Southern Africa

Countries	Selected results
Eswatini, 2013	• 12% of grade repetitions in school in Eswatini were associated with undernutrition (largely in primary school) • 15% of child deaths in Eswatini were associated with undernutrition • The annual costs associated with child undernutrition in 2009 were estimated to be equivalent to 3.1% of GDP.
Malawi, 2015	• 18% of all repetitions in 2012 was estimated to be associated with stunting before the age of 5 years (mostly at primary school level). • Between 2008 and 2012, 23% of all child mortalities were associated with undernutrition. • The total losses associated with undernutrition are estimated at US$ 597 million for the year 2012, equivalent to 10.3% of the GDP of that year.
Lesotho, 2016	• Between 2008 and 2014, an estimated 19.5% of all child deaths in Lesotho were directly associated with undernutrition. • Overall, 18% of all repetitions in 2014 were associated with stunting (largely in primary school). • An estimated US$200 million were lost in the year 2014 as a result of child undernutrition, equivalent to 7.13% of GDP in 2014.
Madagascar, 2016	• Overall, approximately 14.5% of GDP was lost in 2013 as a result of the consequences of undernutrition in children (largely in primary school). • 44% of infant deaths were associated with undernutrition in 2013. • Children with undernutrition have a repetition rate of 22.8%. This rate is higher than the repetition rate of children who do not, which is only 16.9%.

Source: National Cost of Hunger Reports, see: https://www.wfp.org/publications/cost-hunger-africa-series.

2.3 The state of HIV and AIDS and WASH in Southern Africa

26. The region has borne the brunt of the HIV and AIDS epidemic, with **prevalence** rates among those aged 15 to 49 years estimated at around 20% or higher in South Africa (19%), Botswana (20.7%), Lesotho (22.8%) and Eswatini (27%) in 2019 (see Annex D: Data tables, Table 8).

27. Increased access to antiretroviral treatment for HIV has saved many lives, with AIDS-related deaths declining by 49% in east and southern Africa[17] since 2010 (UNAIDS, 2020). In addition, the decrease in new HIV infections in eastern and southern Africa since 2010 is larger than in any other region in the world (with new infections declining by 38%; UNAIDS, 2020). But the HIV burden remains, and further progress is required to end the epidemic.

28. In Sub-Saharan Africa, **gender inequality** is a key driver of the epidemic, with adolescent girls and young women aged 15 to 24 years at particularly high risk of infection, accounting for about one in four new infections even though they make up only 10% of the population (UNAIDS, 2020; see Annex D: Data tables, Table 2Table 8). In eastern and southern Africa, the incidence of HIV infections remains high among adolescent girls and young women (aged 15 to 24 years), who are 2.5 times more likely than their male peers to acquire HIV infection (UNAIDS, 2020).

[17] This grouping refers to Angola, Botswana, Comoros, Eritrea, Eswatini, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Rwanda, Seychelles, South Africa, South Sudan, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

29. The Joint United Nations Programme on HIV and AIDS (UNAIDS) attributes this to unequal gender norms in the region and notes that tackling these gender dynamics requires a **comprehensive approach**, including (a) combination prevention programmes that take account of gender inequality, (b) improving girl's access to secondary education (which can have a protective effect against HIV) and (c) increasing access to sexual and reproductive health services (UNAIDS, 2020, p32). While lessons about how HIV and COVID-19 together impact on people living with HIV are still emerging, there are lessons learned from the response to HIV epidemic that can also be applied to the response to COVID-19.

30. The response to COVID-19 has also shone a spotlight on the importance of water, sanitation and hygiene at home, in schools, communities and health facilities for reducing the transmission of infection. Schools provide an important platform for reaching large numbers of children with safe water, adequate sanitation (which may not be available at home) and health messaging for improved health outcomes (UNICEF and WHO, 2020). Such infrastructure is also essential for supporting the implementation of healthy school nutrition programmes (including where cooking is done on site) and complementing other health programmes such as deworming.

31. However, the coverage of WASH infrastructure in schools in several countries in the region is notably poor. The WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) reports on country, regional and global estimates of progress on drinking water, sanitation and hygiene. The JMP database contains data on the availability of **water services in schools** in Southern Africa for 13 of the 16 countries in the region. Of these, as many as 68% of schools in Angola, 63% in Madagascar, 56% of the Republic of Congo and 51% of the Democratic Republic of Congo have no water service – that is, they have drinking water from an unimproved source or no water source at all at the school. At the other end of the spectrum, fewer than 1% of schools in Botswana, Mauritius, the Seychelles and South Africa had no water service.

32. Of the 11 countries for which there is data on the availability of **sanitation services**, some 40% of schools in the Republic of Congo are classified as having unimproved sanitation facilities or no sanitation facilities; followed by 28% of schools in Madagascar and 16% in Malawi. In contrast, fewer than 1% of schools in Botswana, Eswatini, Mauritius and the Seychelles had no sanitation facilities. Little information is available on **hygiene services** in this region, and levels of access vary widely for the three countries in the region for which JMP has data. Three-quarters of schools in Malawi are regarded as having no handwashing facilities or no water available; followed by 37% of schools in Zimbabwe and fewer than 1% of schools in the Seychelles.

33. Against this background, there is clearly a need to accelerate progress on the coverage of WASH in schools in much of the region, to decrease the potential for disease transmission, support simple protective health measures such as handwashing, and to address issues of **dignity** and access to education opportunities, especially for girls (Agol & Harvey, 2018; UNICEF and WHO, 2020).

3 HEALTH AND NUTRITION STATUS OF SCHOOL-AGED CHILDREN

3.1 Status of school-aged children's health and nutrition in Southern Africa

34. The standard nutritional indicators presented in the previous section tend to focus on children under five years, the total population or adults. While there is increasingly robust data on the nutritional status of young children[18] given the critical nature of early development for the

[18] For example, see https://data.unicef.org/topic/nutrition/malnutrition/.

trajectories of children's lives, there is comparatively less detailed data available on the nutritional status of school-aged children and adolescents generally (Development Initiatives, 2020). This is despite the recognition of schools as a platform for health and nutrition interventions and the need to monitor **nutritional indicators** among school-age children, both to track their progress as they grow into adolescents and young adults with changing nutritional requirements, and to inform and effectively evaluate school-based health interventions.

35. The consequences of malnutrition in childhood include adverse effects on the physical and cognitive development of children, increased vulnerability to diseases as they grow up, and negative implications for social and economic development within the region. Children are particularly vulnerable to the effects of malnutrition because childhood is a period of rapid growth and development in which adequate nutrition is critical, and the effects of malnutrition are likely to be felt well into adulthood. To provide insight into the health and nutrition status of school-aged children (aged 5 to 19 years), this section draws on three sources of the data, namely: (a) data on child and adolescent underweight, overweight and obesity as reported in the 2020 Global Nutrition Report (Development Initiatives, 2020); (b) the Global Burden of Disease (GBD) data compiled by the Institute for Health Metrics and Evaluation (IHME) on the prevalence of micronutrient deficiencies, intestinal worms and certain communicable diseases in this age group (Global Burden of Disease Collaborative Network, 2020) and (c) data from UNICEF on child mortality.

36. **Underweight**, **overweight** and **obesity** are key indicators for monitoring the nutritional stats of school-age children. Data from the 2020 Global Nutrition Report (see Annex D: Data tables, Table 10) shows that in general in this region, the prevalence of overweight and obesity is higher among girls than boys in this age group, while boys are more likely to be underweight (Development Initiatives, 2020).

37. While there have been improvements across all countries in the region in the prevalence of underweight for both boys and girls between 2000 and 2016, there has also been a concerning increase in the prevalence of overweight and obesity, particularly for girls (Development Initiatives, 2020). For example, in South Africa, overweight among boys increased from 3.32% to 20.19% and from 8.86% to 29.38% among girls over this period. Approximately a quarter of girls aged 5 to 19 years in Botswana (24.63%), Eswatini (24.97%), Lesotho (24.68%), Seychelles (24.27%) and South Africa (29.38%) are overweight.

38. Further analysis in the 2020 *Global Nutrition Report* noted some particularly large gender gaps on these indicators in this region. For example, Lesotho has the largest gap between boys (32.5%) and girls (14.1%) in childhood and adolescent underweight globally (difference 18.4%), followed by Zimbabwe (boys 32.5%, girls 15.0%, difference 17.5%) and the Democratic Republic of Congo (boys 37.8%, girls 21.9%, difference 15.9%). For overweight, the largest gap between boys and girls in this age group is again seen in Southern African countries, notably in Lesotho (boys 6.2%, girls 24.7%, difference 18.5%), Eswatini (boys 8.3%, girls 25.0%, difference 16.7%) and Zimbabwe (boys 6.7%, girls 22.3%, difference 15.8%).

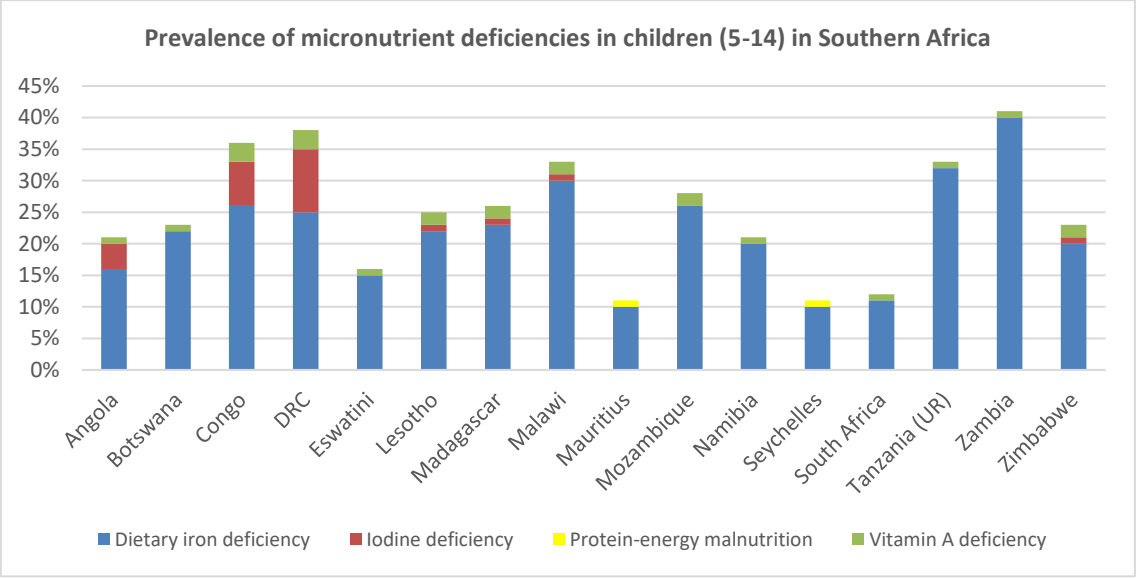
39. Another indicator of nutritional status relevant for this age group is the prevalence of **micronutrient deficiencies**. As shown in Figure 2, the most common micronutrient deficiency for school-aged children in Southern Africa is **dietary iron deficiency**.[19] Among 5 to 14-year-olds, prevalence ranges from 10% in Mauritius and Seychelles and 11% in South Africa to 32% in the United Republic of Tanzania and 40% in Zambia. Prevalence was lower among older adolescents

[19] Further detail is available in Annex D: Data tables, Table 11.

(15-19 years) but was again highest in the United Republic of Tanzania (25%) and Zambia (26%). A lack of iron has been shown to reduce cognitive and work performance and endurance which can be seen in the school setting.

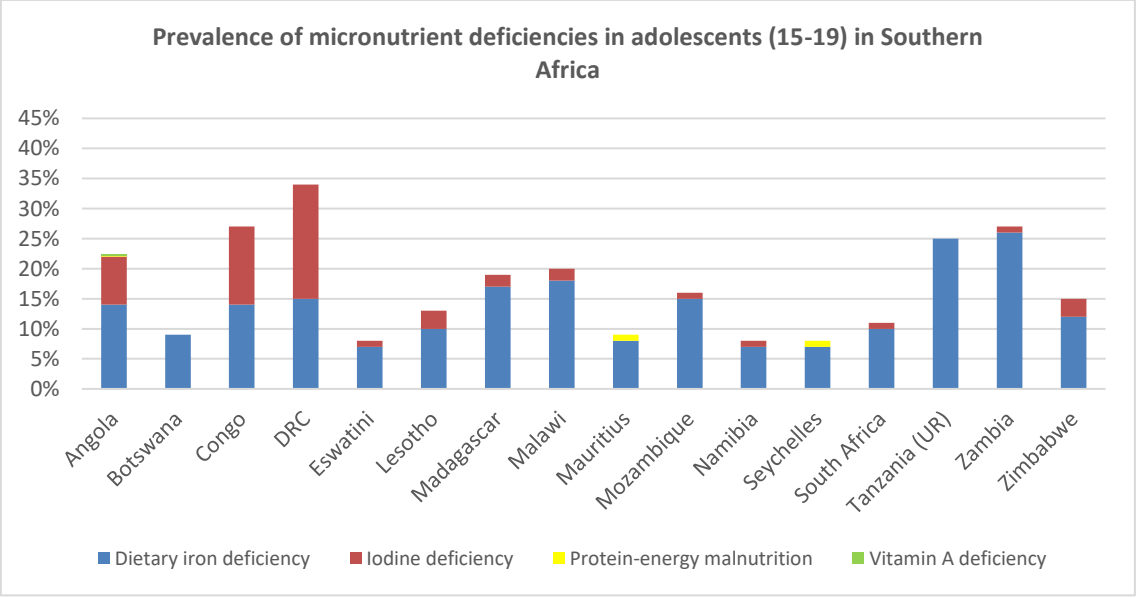
40. Iodine is essential for the normal functioning of the thyroid. Across both age groups, the prevalence of **iodine deficiency** was relatively high in the Democratic Republic of Congo (10% in the younger group, 19.1% in the older groups), followed by the Republic of Congo (6.6% and 12.8% respectively) and Angola (4.2% and 8.4%). Prevalence stood at 3% or below in other countries in the region. The prevalence of **Vitamin A deficiency** (at 3% or less) was low.

Figure 2: Prevalence of micronutrient deficiencies among children aged 5-14 years in Southern Africa, 2019



Source: Global Burden of Disease Collaborative Network (2020). *Global Burden of Disease Study 2019 (GBD 2019) Results*. Seattle, United States: Institute for Health Metrics and Evaluation (IHME).

Figure 3: Prevalence of micronutrient deficiencies among adolescents aged 15-19 years in Southern Africa, 2019

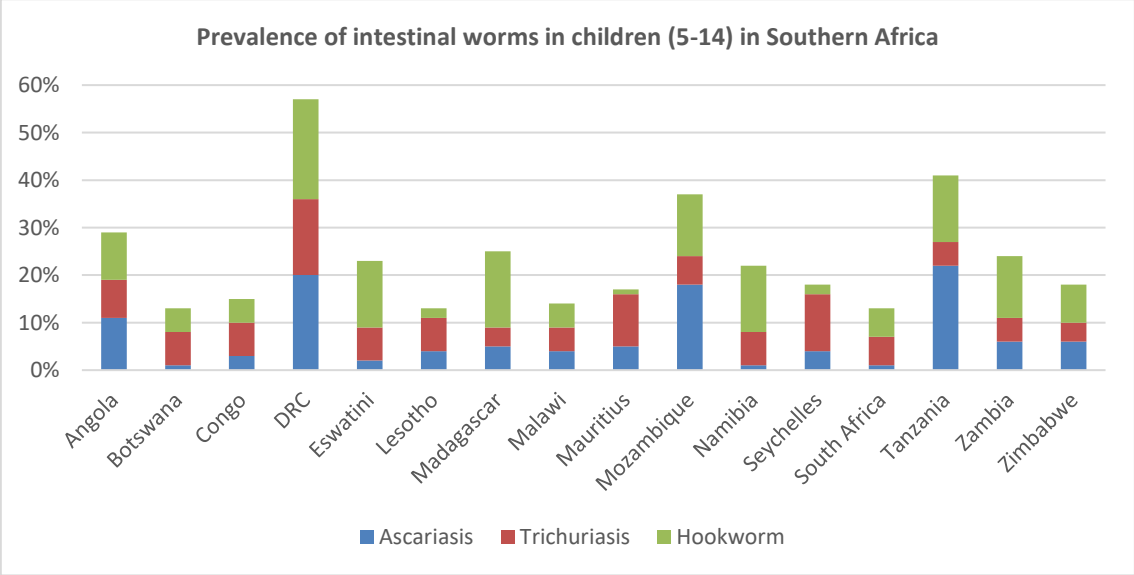


Source: Global Burden of Disease Collaborative Network (2020). *Global Burden of Disease Study 2019 (GBD 2019) Results*. Seattle, United States: Institute for Health Metrics and Evaluation (IHME).

41. Soil-transmitted helminth (STH) infections or intestinal worms are among the most common infections worldwide. STH infections vary from mild to severe and negatively affect nutritional status and school performance among children (WHO, 2020b). Worms increase malabsorption of nutrients and lead to a loss of iron and protein, among other nutritional effects (WHO, 2020b). The main species infecting people are the roundworm (*Ascaris lumbricoides*), whipworm (*Trichuris trichiura*) and hookworms, all of which respond to the same treatment regime (WHO, 2020b). Deworming interventions are commonly integrated into school health and nutrition programmes to reduce negatives impact on child growth and nutrition.

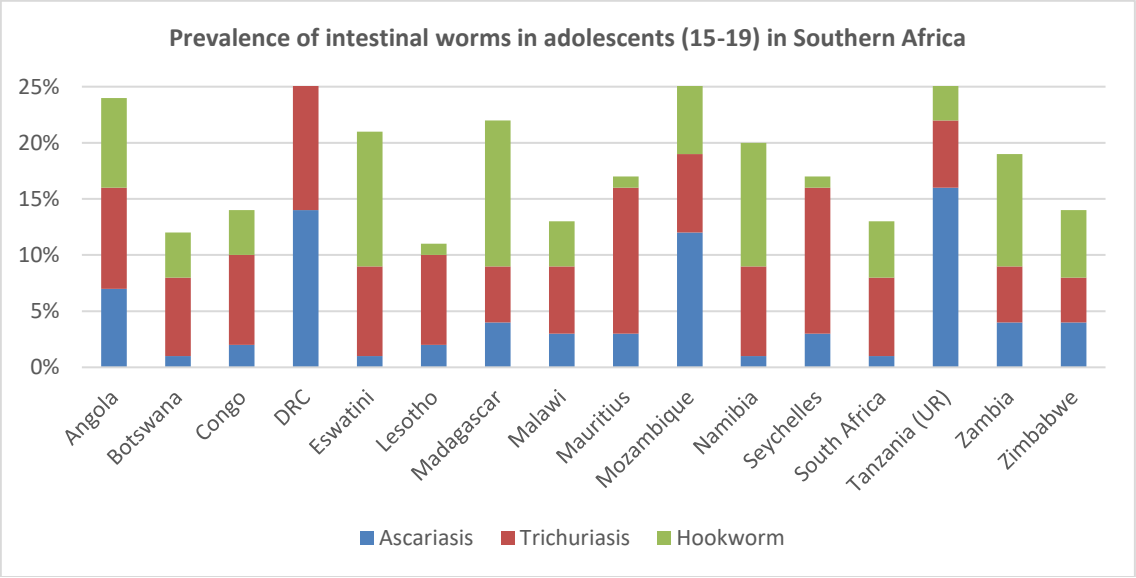
42. Figure 4 and 5 show that all three of these **parasitic infections** were prevalent among school-aged children in Southern Africa in 2019. Among the younger group, ascariasis was most prevalent in the United Republic of Tanzania (22%), Democratic Republic of Congo (20%) and Mozambique (18%), while the prevalence of hookworm and trichuriasis was highest in the Democratic Republic of Congo (21% and 16% respectively). Similarly, among the older group, ascariasis was most prevalent in United Republic of Tanzania (16%), Democratic Republic of Congo (14%) and Mozambique (12%), and the prevalence of hookworm and trichuriasis was highest in the Democratic Republic of Congo (both 18%).

Figure 4: Prevalence of parasitic infection among children aged 5-14 in Southern Africa, 2019



Source: Global Burden of Disease Collaborative Network (2020). *Global Burden of Disease Study 2019 (GBD 2019) Results*. Seattle, United States: Institute for Health Metrics and Evaluation (IHME). Retrieved from http://ghdx.healthdata.org/gbd-results-tool (4 January 2021).

Figure 5: Prevalence of parasitic infection among adolescents aged 15-19 in Southern Africa, 2019

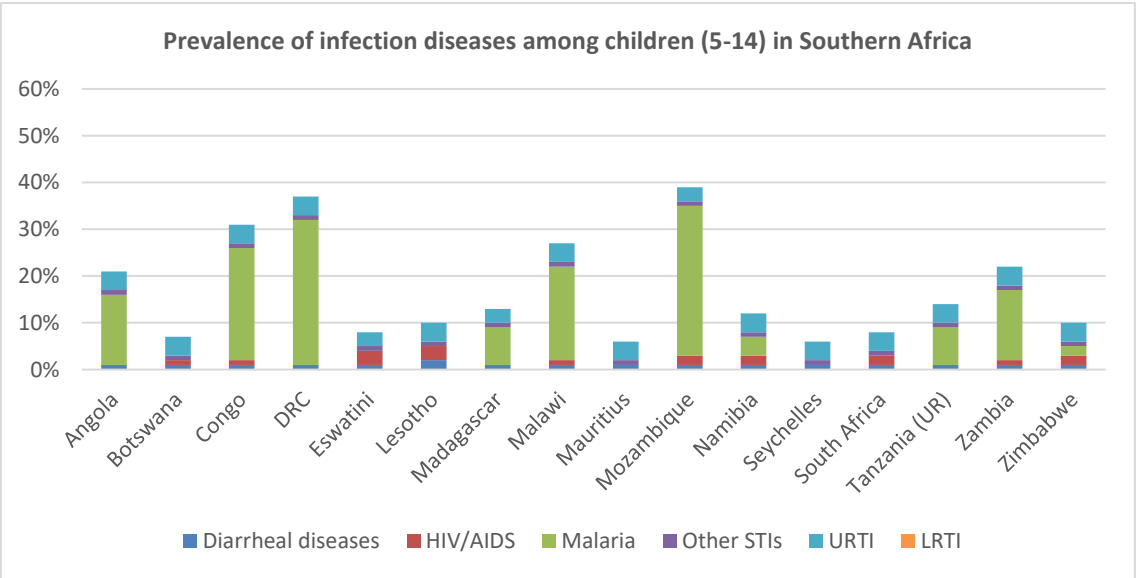


Source: Global Burden of Disease Collaborative Network (2020). *Global Burden of Disease Study 2019 (GBD 2019) Results*. Seattle, United States: Institute for Health Metrics and Evaluation (IHME). Retrieved from http://ghdx.healthdata.org/gbd-results-tool (4 January 2021).

43. The prevalence of **infectious diseases** is another useful indicator of the health status of school-aged children. Figures 6 and 7 show that the combined burden of selected infectious diseases is largest in Mozambique, Democratic Republic of Congo, the Republic of Congo and Malawi.

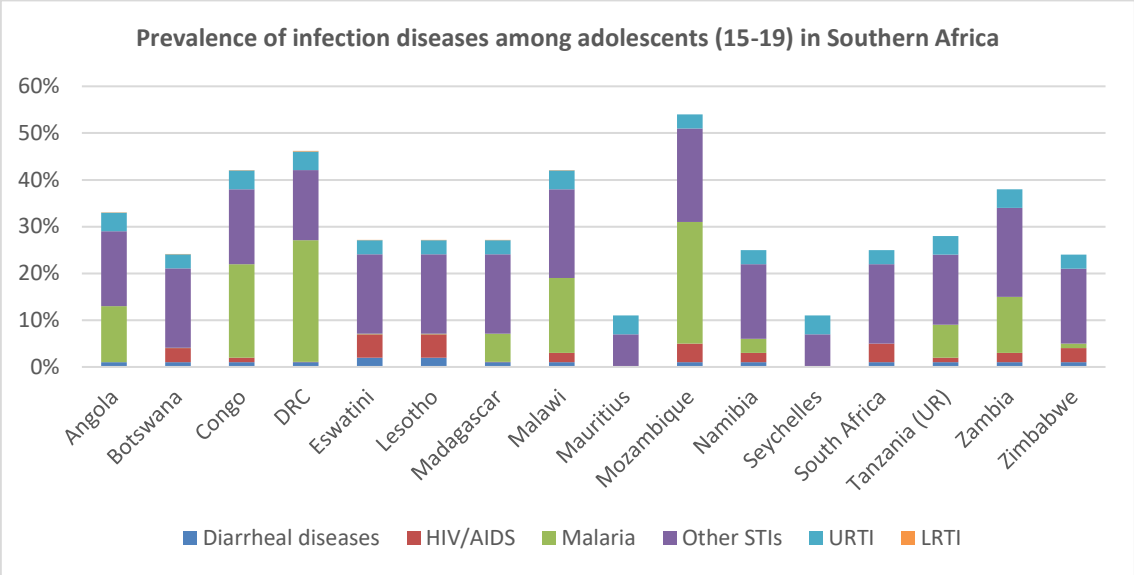
44. Among the younger age group (5 to 14 years), malaria is the largest disease burden in these four countries, as well as in Angola, Madagascar, United Republic of Tanzania and Zambia. In the older group, sexually transmitted infections (STIs, excluding HIV and AIDS) also contribute a large share to the disease burden and are substantially more prevalent among females. The prevalence of upper respiratory tract infections ranged from approximately 2.0% to 4% in all countries in both age groups, while the prevalence of lower respiratory tract infections was less than 1%. The prevalence of diarrheal diseases among school-aged children is negligible, at less than 2% across countries in both age groups.

Figure 6: Prevalence of infectious diseases among children aged 5-14 years in Southern Africa, 2019



Source: Global Burden of Disease Collaborative Network (2020). *Global Burden of Disease Study 2019 (GBD 2019) Results*. Seattle, United States: Institute for Health Metrics and Evaluation (IHME). Retrieved from http://ghdx.healthdata.org/gbd-results-tool (4 January 2021).

Figure 7: Prevalence of infectious diseases among adolescents aged 15-19 years in Southern Africa, 2019



Source: Global Burden of Disease Collaborative Network (2020). *Global Burden of Disease Study 2019 (GBD 2019) Results*. Seattle, United States: Institute for Health Metrics and Evaluation (IHME). Retrieved from http://ghdx.healthdata.org/gbd-results-tool (4 January 2021).

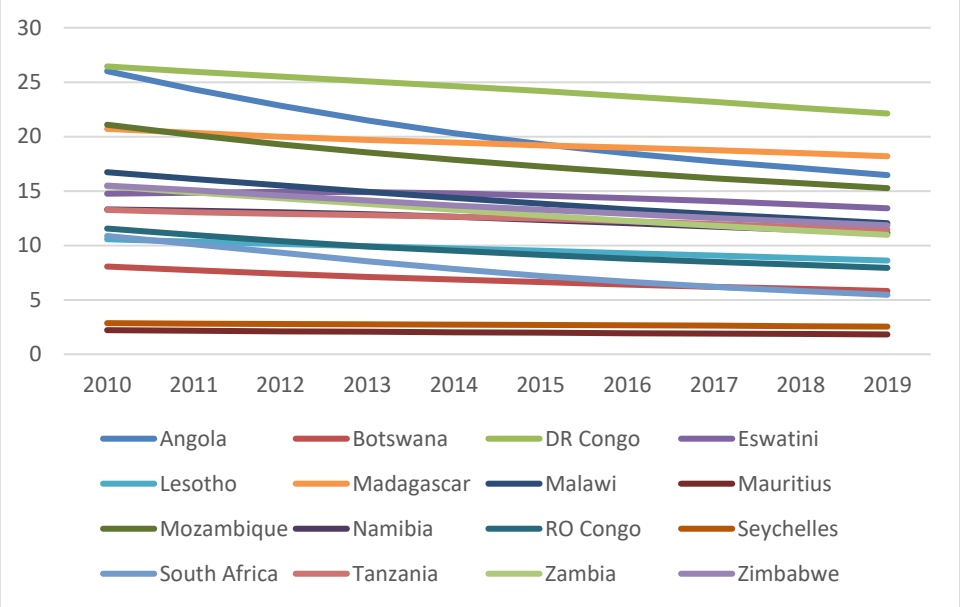
45. While Southern Africa continues to be hardest hit by the HIV epidemic globally, the prevalence of HIV among school-aged children is relatively low, even for older adolescents. Disaggregating this data by gender shows that in the countries where HIV tends to be most prevalent (Eswatini, Lesotho, Mozambique, South Africa, Namibia, Zambia and Zimbabwe), prevalence is higher among females in the older age group – in line with evidence that in Sub-Saharan Africa, adolescent girls and young women aged 15 to 24 years are particularly vulnerable to HIV infection (UNAIDS, 2020). Lower levels of infection among children reflect successful efforts to reduce vertical (mother-to-child) transmission of HIV through the use of antiretrovirals. In eastern and southern Africa, 95% of pregnant women received antiretroviral therapy to prevent vertical transmission in 2019, with the rate of both new child infections and infections overall declining in recent years (UNAIDS, 2020).

46. Most recently, the **COVID-19** pandemic has had a devastating impact across the world. While children (particularly young children) have been less likely to become infected or require hospitalisation, many children have been negatively impacted by the measures put in place to mitigate the COVID-19 pandemic. The socio-economic effects of lockdowns and other restrictions have pushed many households into poverty, schools have closed (or re-opened with restrictions) and health systems have come under strain (UNICEF, 2020). The strain of dealing with waves of COVID-19 infections as well as restrictions on movement and fears of infection at health facilities have disrupted access to routine maternal and child health care services (including vaccinations and supplementation) as well as, sexual reproductive and health services and family planning. School closures have interrupted learning, access to nutrition support through schools and social support systems, with lasting effects on children's learning, mental health and well-being. UNICEF (2020) outlines multiple pathways through which COVID-19 is impacting on nutrition, resulting in more vulnerable children suffering from malnourishment. High levels of inequality exacerbate these effects.

47. Lastly, figure 8 and 9 present UNICEF mortality data showing that **mortality rates** among children aged 5 to 14 years in Southern Africa (defined as deaths per 1000 children aged 5) have declined in all 16 countries over the last decade, although at different rates (for further detail, see Annex D: Data tables).

48. The decrease was marginal in Mauritius and Seychelles but mortality rates for this age group in these two countries are low. The most substantial decrease for this age group over this period was in Angola (from 26.01 deaths per 1000 children aged 5 in 2010 to 16.46 in 2019), followed by Mozambique (from 21.09 in 2010 to 15.26 in 2019) and South Africa (from 10.87 in 2010 to 5.46 in 2019). It is possible that some of the decline in child mortality in South Africa reflects the scale-up of HIV testing and antiretroviral treatment to prevent vertical transmission of HIV (UNAIDS, 2020). Angola and the Democratic Republic of Congo had similar mortality rates for this age group in 2010, but while there was a substantial decrease in Angola, the decrease was more limited in the Democratic Republic of Congo, which continues to have highest mortality rate for this age group (22.21 in 2019) in the region.

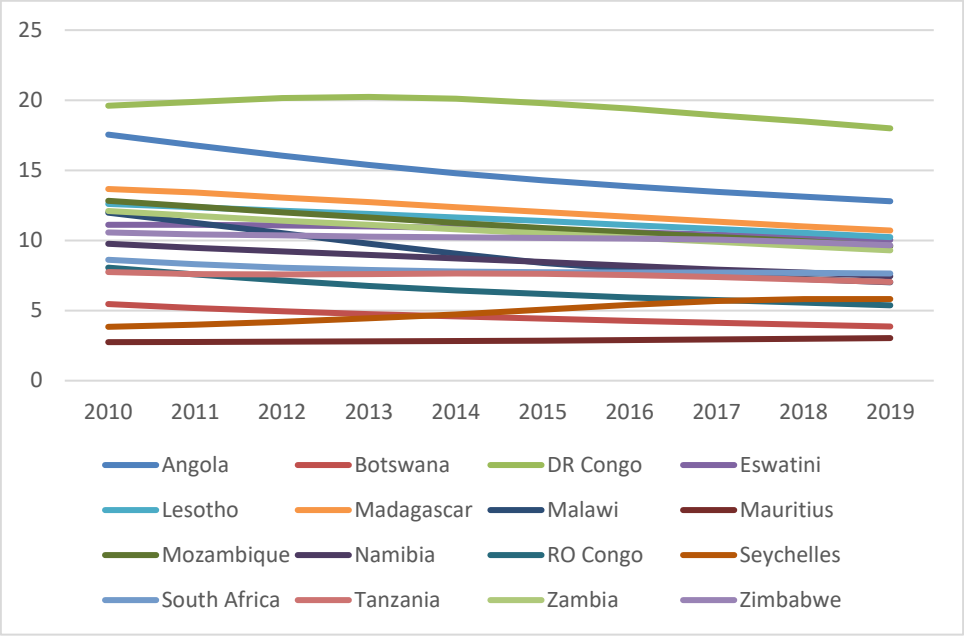
Figure 8: Trend in all-cause mortality in children aged 5-14 years in Southern Africa, 2010-2019



Source: UNICEF (2020) Mortality among children, adolescents and youth aged 5-24. See https://data.unicef.org/topic/%20child-survival/child-and-youth-mortality-age-5-24/. See tables in appendix for figures.

49. Among the older age group, mortality rates (defined as deaths per 1000 children aged 15) have declined in all countries in the region except Mauritius and the Seychelles, which both saw a slight increase over the last decade (see Figure 9 or Annex D: Data tables for the detail). The decreases over time among this age group tend to be smaller than for the younger age group, with the highest decrease again being found in Angola (from 17.55 deaths per 1000 children aged 15 in 2010 to 12.79 in 2019). Again, while the mortality rates for this age group in the Democratic Republic of Congo decreased slightly between 2010 and 2019 (from 19.6 to 17.99), the Democratic Republic of Congo continued to have the highest mortality rate for this age group in 2019.

Figure 9: Trend in all-cause mortality in adolescents aged 15-19 years in Southern Africa, 2010-2019



Source: UNICEF (2020) Mortality among children, adolescents and youth aged 5-24. See https://data.unicef.org/topic/%20child-survival/child-and-youth-mortality-age-5-24/. See tables in appendix for figures.

50. While this overview provides insight into the variation across countries, analysis of trends at a regional or national level often masks significant **inequalities** across areas or populations within a country (Development Initiatives, 2020). Thus, while some countries in the region are wealthier than others, the extreme levels of inequality in the region mean that most of these countries are home to vulnerable children who face food insecurity and malnutrition. Thus, evidence-based interventions that address nutrition inequities and support the health of all children and adolescents are required across the region.

4 SCHOOL-BASED HEALTH AND NUTRITION INTERVENTIONS

51. Despite the challenges noted above, the burden of malnutrition among children is preventable. There is a need to invest in children in the first 1,000 days of life (from conception to age two), as this is a critical period of rapid growth and brain development that lays the foundation for health and well-being in later life (Black et al, 2013). But it has also been argued that the focus on investing in the first 1,000 days of a child's life is "essential but insufficient" (Bundy et al, 2018). Bundy and colleagues (2018) argue for additional interventions aimed at **school-aged children**, namely in (a) middle childhood (5 to 9 years), "when infection and malnutrition inhibit growth and mortality is higher than previously recognised"; (b) the adolescent growth spurt (10 to 14 years); and (c) the late adolescence phase of growth and consolidation (15 to 19 years), when "new responses are needed to support brain maturation, intense social engagement, and emotional control".

52. Interventions aimed at promoting the health and well-being of school-aged children (5 to 19 years) are an opportunity to build on the gains of nutritional interventions in early childhood or to help children who have been malnourished to 'catch up'; they can also lay the foundation for healthy habits in adulthood. The 2016 Lancet Commission on adolescent health and well-being argued that investments in adolescents can yield "a triple dividend of benefits" – meeting the immediate needs of adolescents, supporting future health in adulthood and ensuring the welfare of the next generation of children (Patton et al., 2016).

4.1 Extent of school-based health and nutrition interventions in Southern Africa

53. There are a range of school-based health and nutrition interventions in the region that aim to improve the overall health of school-age children and contribute to improved educational outcomes. **Examples** include school-based nutrition interventions (e.g., nutrition-sensitive school feeding and supplementation), food gardens, health and nutrition education, de-worming, WASH interventions, physical activities and interventions to prevent HIV and other STIs. This review focused on school-based nutrition interventions (school feeding, nutrition education and supplementation) as well as school-based deworming programmes and HIV and WASH-related interventions.

54. Internationally, several reviews have documented evidence of the positive impacts of school feeding programmes in incentivising school attendance, reducing absenteeism and contributing to improved school performance and learning; and improving health and nutrition outcomes such as alleviating hunger, addressing micronutrient deficiencies and improving anthropometric measures (for example, see Bundy et al., 2009; Kristjansson et al., 2016). These programmes can also provide support to households by reducing the cost of sending a child to school and providing economic opportunities for community members through direct employment or local procurement. Combining these programmes with complementary nutrition and health interventions can provide a cost-effective means of supporting improved outcomes for children (African Union, 2018).

55. We drew on two recent reviews (African Union, 2018; FAO et al., 2018) to **map school-based feeding programmes** in the region, and included notes on the availability of complementary health interventions where available (for the detailed mapping, see Annex D: Data tables, Table 18). School-feeding programmes are present in all 16 countries, although they vary in reach and duration. While programmes in Zimbabwe (2016), the United Republic of Tanzania (2015) and Mozambique (2013) were implemented relatively recently, others such as in Lesotho (1961) and Botswana (1966) are long-standing programmes. WFP plays some form of direct role in implementation in most of the countries, with some exceptions such as Botswana, Mauritius, Seychelles and South Africa. Most programmes employ geographical or categorical targeting, but six countries – Angola, Eswatini, Lesotho, Botswana, Namibia and Seychelles – have universal or near-universal programmes in place.

56. All provide a daily on-site meal or snack, with a small number providing take-home rations in the form of cash or in-kind. Details of the composition and diversity of the meals provided in each of the programmes are beyond the scope of this study, but literature on the impacts of school-feeding programmes such that this is an important area for further attention.

57. The programmes in at least 14 of the 16 countries target primary school learners, with seven countries also implementing programmes at (selected) pre-primary schools. In four countries (Eswatini, Mozambique, South Africa, Zimbabwe), the programmes extend to secondary schools. More than half of the school feeding programmes in this region have government as a primary (though not necessarily sole) funder. Government involvement in implementation tends to be led by the Ministries of Education, with the Ministries of Health and Agriculture involved in the Republic of Congo and Angola. An exception is Botswana, where school feeding is led by the Ministry of Local Government and Rural Development and the Department of Local Government, Finance and Procurement Services.

58. School feeding programmes in ten of the 16 countries mainly source food domestically, with food more likely to be sourced from abroad in countries with low or emerging capacity.[20] African Heads of State adopted a continental strategy to promote home grown school feeding (HGSF) programmes in 2016 to enhance educational indicators while boosting income generating activities and local economic development (African Union, 2018).

59. Most countries in the region also implement **complementary** interventions such as deworming programmes, nutrition education and training, and WASH initiatives, among others. At least 10 countries were reported to implement deworming interventions, while a number have some form of nutrition education or trainings (African Union, 2018). A regional overview of national school food and nutrition programmes in Africa (FAO et al, 2018) found that, of 29 countries with food and nutrition education as part of their primary school curricula, almost half (14 countries) were in the SADC region. The study also reported that food and nutrition education is not generally offered as part of school feeding programmes in sub-Saharan Africa, except in the SADC region.

60. School-based sexual health interventions to prevent **HIV** vary across the countries. They include education interventions that are integrated into the curriculum, which may be teacher-led and/or peer-led, as well as extra-curricular activities such as clubs or after-school programmes. The review of effectiveness showed that interventions may have multiple components that include out-of-school and community-based activities, sometimes linking to health centres. Increasingly, the protective role of education itself is being recognised, for reducing both HIV risk and new infections. For example, UNAIDS (2020) notes that there is a positive association between condom use the last time they had higher-risk sex and completion rates of lower secondary school among adolescent girls and young women in eastern and southern Africa. Combination approaches that include behavioural, biomedical and structural components (such as enabling girls to stay in school) have been associated with steady reductions in HIV infections (UNAIDS, 2020).

61. School-based **WASH** interventions include the provision of WASH infrastructure at schools, as well as WASH education initiatives aimed at promoting improved hygiene-related behaviours and reducing the transmission of infections and diseases. As noted in the regional context (UNICEF & WHO, 2020), the coverage of WASH in schools in this region is low, particularly when it comes to hygiene services (that is, handwashing facilities or water available at the school), which in turn undermines both the potential health and nutritional outcomes of school feeding initiatives and any efforts at WASH-based education interventions, as learners will be limited in their ability to put their new knowledge into practice.

4.2 Policy and legal frameworks

62. A regional overview of national school food and nutrition programmes in Africa (FAO et al., 2018, p21) highlighted that the design and implementation of a school feeding and nutrition programme "requires a multisectoral policy and strategic approach supported by a comprehensive legal, regulatory and institutional enabling environment". An **enabling** policy and legal framework improves accountability, allows for the setting of standards and effective regulation of the quality and safety of school meals, and can assist in clarifying institutional mandates and responsibilities in the design and implementation of these programmes, as well as providing a framework for coordination and collaboration (FAO et al., 2018). Such enabling policy and legal frameworks would also support the effective implementation of complementary school-based health interventions.

63. Table 19 in Annex E presents a **summary review** of policies in place at national level in Southern Africa to support the development and implementation of school-based health and nutrition

[20] Angola, Botswana, Lesotho, Mauritius, Namibia, Seychelles, South Africa, UR Tanzania, Zambia, Zimbabwe.

interventions. A limitation of this policy mapping exercise is that it did not include a review of agricultural policies due to time constraints, which will be conducted by WFP as a follow-up activity.

64. In at least nine of the 16 countries, references to school feeding and other school-based health and nutrition interventions are included in two or more policies, although the level of detail varies. The exception is the Democratic Republic of Congo, where school feeding is not addressed in national policies (African Union, 2018). Nine countries in the region have dedicated school feeding or school nutrition policies to guide the implementation of these interventions,[21] but detailed guidance on dietary guidelines or standards for school meals is limited. References to the role of WASH infrastructure and interventions in the school feeding or school nutrition policies tends to be limited, as are links to school-based HIV prevention interventions.

65. At a **regional level**, the SADC regional *Food and Nutrition Security Strategy 2015-2025* (SADC, 2014) provides a strategic framework for these interventions. The strategy highlights the critical role of adequate nutrition in the first 1,000 days for child development and for social and economic development of the region but also calls for a life-cycle approach in addressing food and nutrition security challenges. It further highlights how ongoing gender inequalities and the HIV epidemic undermine food security in the region. Two strategic objectives, namely (a) improving access to adequate and appropriate food (quality and quantity) and (b) improving the utilisation of nutrition, health, diverse and safe food, identify promoting school nutrition programmes at pre-schools and primary schools as a priority action and means of enhancing social protection. The policy also flags the need to address micronutrient deficiencies and improve WASH interventions. It includes an M&E strategy and results framework, but the nutritional status outcome indicators do not foreground indicators specific to school-age children and adolescents. An exception is an indicator to measure the percentage of school-aged children who are overweight and obese. The framework also includes an indicator on the number of member states promoting consumption of foods with adequate micronutrients as the means of monitoring micronutrient supplementation to adolescent girls and women before and during pregnancy. Other indicators promote a broad range of nutrition-specific and nutrition-sensitive interventions, including in priority areas such as supporting improved access to food markets for small scale-traditional entrepreneurs. Mentions of nutrition education focus on training primary health workers.

66. The SADC region has developed a Regional Strategy for HIV prevention, treatment and care and sexual and reproductive health and rights in key populations (2008) as well as various HIV prevention-related regional minimum standards.[22] Most member states have developed national policies on HIV and AIDS or National Strategic Plans. SADC also implemented the SADC Regional Water Supply and Sanitation Programme (SADC RWSSP), one aspect of which is aimed at establishing a collaborative regional framework for effective planning and management of water supply and sanitation, although there is no specific focus on schools.

4.3 Regional stakeholders in school health and nutrition

67. A wide range of stakeholders are working on health and nutrition in schools or with school-aged children. For WFP, the primary partner in school health and nutrition is government ministries. Key Ministries such as Health, Education, Agriculture and Social Protection have set up departments that are responsible for the design and implementation of school health and nutrition activities. Various ministries have incorporated school health and nutrition in their

[21] Eswatini, Lesotho, Madagascar, Malawi, Namibia, Republic of Congo, Seychelles, while guidelines in Tanzania are in progress. Zambia has a National School Health and Nutrition Policy (2006) and a policy on Home-Grown School Meals (2020).

[22] https://www.sadc.int/issues/hiv-aids/

policies (as noted above) and implement activities such as deworming programmes and WASH interventions etc., both in schools and in communities.

68. This section maps the **regional** stakeholders in the field of school health and nutrition, covering United Nations entities in the region, Regional Economic Communities, research institutions, international non-governmental organizations with a multi-country presence in the region, and regional farmers organisations. Given the volume of stakeholders working at a national level, this mapping exercise focuses on regional stakeholders. An overview is provided below, with the detailed results of the mapping reported in Annex E. A limitation of this exercise is that it relied on the websites and documents of organizations that could be considered stakeholders in food security and nutrition, and these did not always have information on the position of these organizations on school health and nutrition. Due to time constraints, it was agreed in the inception phase that the stakeholder mapping would not include interviews with stakeholder organizations, nor does it include national level or the private sector stakeholders.

United Nations entities

69. The FAO, UNICEF and the World Health Organization (WHO) are three major United Nations entity stakeholders in this region. The International Fund for Agricultural Development (IFAD) also has a nutrition focus, while the Joint United Nations Programme on HIV and AIDS (UNAIDS) is a key stakeholder in coordinating action on the HIV/AIDS pandemic.

70. The **FAO's** *School Food and Nutrition Framework* (2019) seeks to guide FAO's support to countries in leveraging the synergies presented by schools as platforms for a holistic approach to improving levels of nutrition, reducing poverty, and enabling inclusive food systems. FAO is one of the contributors to the *Home Grown School Feeding Framework* and is expected to collaborate with WFP and other stakeholders in supporting governments to design and implement home grown school feeding.

71. The International Fund for Agricultural Development (**IFAD**) has nutrition as one of its areas of focus. IFAD aims to contribute to nutrition-sensitive agriculture in the production of food by smallholder farmers and female farmers who receive support from IFAD via national governments. IFAD's role in Home Grown School Feeding to date has been limited.

72. **UNAIDS**, PEPFAR and partners developed the *Start Free Stay Free AIDS Free* framework which takes a life-cycle approach to fast-tracking the end of HIV and AIDS, with a focus on young people under 24 years of age. As well as working to reduce the risk of women living with HIV passing the virus on to their children *(start free)* and promoting children's access to effective testing and treatment *(AIDS free)*, the framework focuses on young people as they transition from adolescence into early adulthood, a time of complex changes and greater peer influence in decision-making *(stay free)*. The framework identifies a supportive social environment that enables adolescents to remain in school, have access to information on sexual and reproductive health and gain life skills to prepare them for economic independence as protective factors. In addition, UNAIDS in partnership with UNESCO, UNFPA, UNICEF and UN Women, implemented the *Education Plus* initiative (2021-2025), a high-level political advocacy drive to accelerate actions and investment to prevent HIV, aimed at empowering adolescent girls and young women and achieving gender equality in sub-Saharan Africa – with secondary education as the strategic entry point.

73. **UNICEF** is another major stakeholder in the region. UNICEF's 2019 *State of the World's Children* report focuses on food and nutrition of children. Key messages include: (a) Investing in nutrition for children and young people is a cornerstone investment if the world is to achieve the SDGs by 2030; and (b) Improving children's nutrition requires food systems to deliver nutritious, safe,

affordable and sustainable diets for all children. The report stresses the importance of middle childhood (5 to 9 years) as an opportunity for children who experienced stunting to catch up. Nutrition habits are also established during this period. The report notes that data on what school-aged children eat is limited, but that diets of adolescents aged 10 to 19 years in low and middle-income countries are generally nutritionally poor. UNICEF's *Child Friendly Schools Framework* promotes a child rights and holistic approach to education that includes the promotion of the physical and emotional health of children by addressing their key nutritional and health care needs and equipping them with knowledge for the future. UNICEF is also an active player in the WASH sector in the region, supporting over 100 countries to establish and rehabilitate WASH facilities in schools. They work directly with schools to improve access to basic water, sanitation and handwashing facilities. The WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) expanded its global databases to include WASH in schools, which includes tracking 'basic' drinking water, sanitation and hygiene services in pre-primary, primary and secondary schools. UNICEF also works to prevent new HIV infections and improve access to testing and treatment to save lives. They have set targets for ending AIDS in their Strategic Plan and in the *Start Free Stay Free AIDS-free framework*, in which they play a global leadership role (see UNAIDS). In the *Strategic Plan 2018–2021*, UNICEF's core objectives are: (1) 'Finishing the job' of eliminating mother-to-child transmission; (2) seeking opportunities to prevent HIV in adolescents and young women; and (3) timely initiation and retention of children and adolescents in treatment and care.

74. In August 2019, the **WHO** Regional Committee for Africa developed a strategic plan to reduce malnutrition in Africa. The strategy aims to reduce all forms of malnutrition throughout the life course. Its objectives are to strengthen policies and regulatory frameworks, strengthen national capacity and evidence base for nutrition programming. Its guiding principles include a life-course approach, multi-sectoral collaboration, universal health coverage and partnerships. One of the priorities in the strategic plan is to strengthen multi-sectoral collaboration to prevent malnutrition, and advocates for strong collaboration between health and education sectors for educating school-aged children on nutrition practices in schools). As noted above, WHO has collaborated with UNICEF through the JMP to produce regular updates on WASH since 1990. Together, they are responsible for monitoring SDG targets 6.1 and 6.2, which relate to universal access to WASH, and SDG target 4a on inclusive and effective learning environments for all.

75. United Nations Economic Commission for Africa (**UNECA**) supports Member states of SADC and the Common market for Eastern and Southern Africa (COMESA). UNECA Head office in Addis Ababa collaborated with FAO and the African Union in preparing the 2019 Africa Regional Overview of Food Security and Nutrition.

76. The United Nations Educational, Scientific and Cultural Organization (**UNESCO**) has education as a core focus, and addresses health and HIV and AIDS within this. UNESCO plays a key role in assisting stakeholders to develop and implement Comprehensive Sexuality Education programmes and materials, to facilitate the development of accurate and age-appropriate knowledge, attitudes and skills that contribute to positive relationships, health and well-being, and respect for human rights and gender equality. In 2018, UNESCO in collaboration with UNAIDS, the United Nations Development Programme, UNFPA, UN Women and WHO, published an updated International Technical Guidance on Sexuality Education. The Guidance outlines key concepts, topics and learning objectives to guide the development of locally-adapted curricula for learners aged 5 to 18.

African organizations

77. There are several continental (Africa-wide) stakeholders with regional offices/hubs or a presence in countries covered by the WFP Southern Africa region, as well as regional entities as outlined below.

78. The **African Union** (AU) adopted the revised *Africa Regional Nutrition Strategy 2015-2025* that mirrors nutrition targets adopted by African countries at the World Health Assembly in 2011. The AU works with Member States to improve nutrition and knowledge or evidence, such as in the case of the Cost of Hunger in Africa study. The AU strongly supports school feeding. It has the AU School Feeding Initiative where the AU is working with Member States to implement school feeding. The AU commissioned a major study on Sustainable School Feeding in Africa (African Union, 2018) with the support of WFP. The African Day of School Feeding was instituted in January 2016 through AU Decision of African Union Heads of State and Government in recognition of the value of home grown school feeding.

79. **AUDA-NEPAD**: School feeding is one of the African Union Development Agency (AUDA)-NEPAD's flagship projects under the Food and Nutrition Programme. In 2019, AUDA-NEPAD published the *Home Grown School Feeding Handbook* based on lessons learned from Botswana, Ghana, and Nigeria.

80. The **African Development Bank's** *Banking on Nutrition* programme seeks to unlock the nutrition potential in the bank's investment portfolio. The Bank launched its 2018-2025 Multi-sectoral Nutrition Action Plan in December 2018. The plan targets nutrition-smart investments in agriculture, water and sanitation, and social protection, and projected a 40 per cent reduction in stunting by 2025. The Action Plan includes the use of school-based food and nutrition interventions covering school feeding, micronutrient supplements, deworming, health promoting behaviours, WASH and creating enabling school environments.

81. The Southern Africa Development Community (**SADC**) is a major regional player with the overall objectives of achieving regional integration and poverty alleviation. SADC has identified agriculture and food security as a key regional integration theme and produces an annual *Synthesis Report on the State of Food and Nutrition Security and Vulnerability in Southern Africa*. The 2014 SADC *Food and Nutrition Security Strategy* identifies promoting school feeding schemes for primary schools as a priority action for achieving enhanced, sustainable social protection in the region.

82. The Common Market for Eastern and Southern Africa (**COMESA**)'s 2016 Health Charter identifies poor nutrition as one of the major drivers of disease burdens in the COMESA region and on the continent, and urges COMESA states to (a) review national agricultural policies; (ii) prioritize rural agriculture and infrastructure in national development planning; (iii) mainstream nutrition in national development and social protection policies and programmes; and (iv) progressively make access to food, clean water and sanitation by all justiciable. The COMESA Social Charter (2015) aims to promote the welfare of people in the region and improve the quality of life. It has the well-being of the child as one of its pillars and refers to maternal and child health, but the emphasis is on children under-five years.

83. The Southern African Confederation of Agricultural Unions (**SACAU**) is a regional farmers' organisation representing the interests of farmers in Southern Africa. SACAU aims to promote a transformative agenda to agricultural development which is growth oriented and enterprise development focused. Core to its mission is promoting, advancing, protecting, defending the common interests of farmers in the region. Membership consists of 17 farmer organisations in 12 countries, and SACAU is recognised as the main dialogue partner on agricultural matters by SADC and COMESA.

African research institutions

84. Africa Research Universities Alliance (**ARUA**) Centre of Excellence in Food Security is concerned about triple burden of malnutrition and high intake of low nutrient higher energy food leading to malnutrition, and how these impact on vulnerable groups especially children. It brings together members from East, West and Southern Africa as well as a broader consortium of African and international partners working on food security research, policy and capacity development. One of the research focus areas is exploring pathways to providing sufficient, safe, nutritious and consumer driven food for populations of 21st century Africa. The Centre's vision is to Harness partnerships in research and innovation to drive agricultural and food system transformation to ensure sustainable food security and nutrition in Africa. The Centre is led by University of Pretoria, South Africa in collaboration with University of Ghana, Legon, Accra and the University of Nairobi.

International organisations, donors and non-governmental organizations

85. While it is outside the scope of this study to map all civil society and non-governmental organisations (NGOs) in each country in the Southern Africa region, the mapping focused on global and regional organisations with a presence in the countries that form part of the WFP Southern Africa region.

86. **Save the Children International** subscribes to the *FRESH framework for School Health and Nutrition* (SHN). The SHN programme is linked to the Save the Children education sector programmes. SHN interventions are adapted to country contexts and needs and include providing school children with access to improved WASH facilities; access to deworming and micronutrient supplementation, vision and hearing screening, oral health promotion, malaria prevention and treatment, and obesity reduction; skills-based health education for developing lifelong health behaviours, including HIV and AIDS prevention; and advocacy for national policies supporting schools and communities. Save the Children produced a *Health Education Manual* (2013) to assist SHN Programme Managers to design and implement health education in schools, for children aged 8-10 years. The lessons cover WASH, infectious diseases, 'taking care of our bodies', preventing disease and injury, nutrition and sexual reproductive health, including HIV and AIDS prevention.

87. **World Vision International** released its *Health Sector and Nutrition Approach 2020-2030* that sets the high-level goal of ensuring healthy lives and promoting well-being for all children. While children under-five years are their main target group, the new approach recognises the need to improve the health and nutrition of adolescent girls to reduce under-five mortality and maternal mortality. The approach makes provision for improving dietary diversity and addressing micronutrient and iron deficiency in adolescents aged 12 to 18 years. Health and nutrition interventions are linked with other interventions such as WASH, child protection, mental health, and infectious and neglected tropical diseases.

88. The Global Alliance for Improved Nutrition (**GAIN**) has nine country offices, including in Mozambique and the United Republic of Tanzania. GAIN's aim is to make diets more affordable and accessible, and it supports large-scale food fortification in Ethiopia, Kenya, Mozambique, Nigeria and the United Republic of Tanzania; better diets for children in Ethiopia, Mozambique and Nigeria; and adolescent nutrition in Mozambique. GAIN adopts a food systems approach to nutrition, working closely with governments to shift policies in favour of nutritious diets.

89. **Project Concern International** operates in Malawi, the United Republic of Tanzania and Zambia. Its food security programmes are designed to end hunger and malnutrition by imparting climate-smart and nutritionally-targeted agriculture practices, strengthening livelihoods; improving health nutrition and hygiene practices; and supporting integrated school feeding programmes. Such

programmes include training teachers, parents, volunteers and students in healthy eating and personal hygiene; working with schools and community leaders to keep girls in school; supporting government-led vaccination and health days and distribution of deworming kits and improving school infrastructure with an emphasis on water and sanitation. They also work with government agriculture extension officers and schools to establish school gardens and partners with local farmers and schools to establish a local supply of fresh, nutritious food.

90. **CARE International's** focus areas include food and nutrition, education and health, although the health and food and nutrition programmes tend to focus on children under five years. CARE does works with adolescent girls on improving health, namely reducing anaemia and improved sexual reproductive health especially for married adolescent girls. CARE supports smallholder agriculture, especially women farmers, to meet their food needs and develop sustainable livelihoods. There is no reference to school health and nutrition in the organization's description of its programmes.

91. Among **Oxfam's** programmes in support of ending poverty are: (a) water and sanitation; (b) food, climate and natural resources; and (c) extreme inequality and essential services (which includes supporting campaigns for health and education). Oxfam works to improve and sustain livelihoods (including helping small-holder farmers), empower women and youth, support access to services such as education, health and water, and respond to humanitarian crises in several countries in Southern Africa, with a particular emphasis on the Democratic Republic of Congo.

92. **Mary's Meals** works in 19 countries across the world. The organisation's goal is to ensure that every child receives a nutritious daily meal in a place of education. Mary's Meals operates in four Southern African countries, feeding children at rural schools and in prisons in Madagascar; feeding children in an impoverished district in Zimbabwe; providing daily meals to children in the Eastern Province in Zambia and reaching 30% of primary school-aged children in Malawi with school meals.

93. The **Southern Africa Food Lab** initiative brings together diverse, influential stakeholders in southern African food system to respond to systemic issues and complex social challenges in creative ways. The purpose of the Food Lab is to facilitate interaction, communication and collaboration between different stakeholders (including those with conflicting interests) to highlight the need for and to design and implement coherent, systemic responses to the food system through collaborative learning and experimental action. Programmes include social protection, rural livelihoods and food security, and supporting smallholder agriculture. It is housed under the Food Security Initiative at Stellenbosch University, South Africa.

94. The **Global Fund** is an international partnership designed to accelerate the end of the AIDS, tuberculosis and malaria epidemics. The Fund increased its investment in 13 countries in sub-Saharan Africa to reduce HIV incidence among adolescent girls and young women and promotes the protective role that access to education plays for young women in reducing the risk of HIV infection.

95. USAID is the lead implementer of the **DREAMS** (Determined, Resilient, Empowered, AIDS-free, Mentored and Safe) partnership, a public-private partnership aimed at reducing rates of HIV among adolescent girls and young women in the highest HIV burden countries.[23] The DREAMS partnership goes beyond individual health initiatives to address structural inequalities that increase vulnerability to HIV, including poverty, gender inequality, sexual violence, and a lack of

[23] Eswatini, Kenya, Lesotho, Malawi, Mozambique, South Africa, Tanzania, Uganda, Zambia, Zimbabwe. More recently expanded to Botswana, Côte d'Ivoire, Haiti, Rwanda, Namibia and South Sudan.

education. The core package of services comprises a number of components, including school and community-based HIV and violence prevention programmes and education subsidies. Supporting innovative approaches to keeping girls in secondary school are also a key focus of work.

Implications for WFP

96. The stakeholder mapping revealed a diverse range of organisations involved in school health and nutrition in the region. WFP has partnerships with several other United Nations entities at country level through the United Nations Strategic Development Cooperation Framework (UNSDCF), and collaboration with the United Nations Rome-Based Agencies (RBAs), namely, FAO and IFAD, through the Home Grown School Feeding Programme. There are undoubtedly opportunities for strengthening WFP's partnerships at country level with other United Nations organisations in pursuing an integrated approach to the health and nutrition of school-aged children. There are also opportunities for joint United Nations advocacy on school health and nutrition.

97. The African Union and its implementing agency (AUDA-NEPAD) as well as regional intergovernmental bodies, have policies and programmes on school health and nutrition. WFP's support at country level to strengthen the policy environment for school health and nutrition should be aligned to the policies of the African Union and the relevant regional intergovernmental bodies.

98. The stakeholder mapping identified several international NGOs that have a footprint in a number of countries in the region, and so present opportunities for partnerships in strengthening national capacities for implementation of school feeding, for example. It was beyond the scope of the review to map the national NGOs and community-based organizations (CBOs) in each of the countries in the region. Partnering with national NGOs, particularly those with strong capacities, should not be confined to implementation but should include advocacy on issues pertaining to the health and nutrition of school-aged children.

99. The need for evidence generated through sound research is a theme that runs through the remaining sections of this review report. There are research institutions in the region that are potential partners for WFP to expand the evidence base for more effective policies and programmes in school health and nutrition.

5 EFFECTIVENESS OF SELECTED SCHOOL-BASED HEALTH AND NUTRITION INTERVENTIONS

100. This section presents the results of a review of literature addressing the effectiveness of selected school-based health and nutrition interventions in improving education, health, nutrition and other outcomes for school-aged children and their households. It considers school feeding programmes and/or supplementation, nutrition education and deworming as well as HIV and WASH interventions. The study search identified a total of 58 papers to be included in this review: (a) 12 studies assessing school feeding programmes; (b) two additional studies addressing micronutrient supplementation (also addressed through school feeding programmes); (c) two papers that rigorously evaluated school-based nutrition education interventions; (d) four that considered the effectiveness of school-based deworming interventions; (e) 32 studies that assessed school-based HIV interventions and (f) six studies that assessed school-based WASH interventions. The details of the methodology and search strategy used can be found in Annex C: Methodology.

5.1 School nutrition programmes

101. After screening papers against the inclusion criteria, the review identified 12 studies that considered the effectiveness of school feeding or nutrition programmes in Southern Africa. This included both academic papers and programme evaluations (grey literature). Details of these studies are presented in Annex F: Summary of studies. Because of the limited number of published academic papers on the topic, this review also drew on programme evaluations to provide insights into the implementation and effects of school nutrition programmes. The paucity of academic papers on school feeding programmes in the region points to the relative lack of attention the effectiveness of such programmes receives when compared with, for example, school-based HIV prevention interventions.

102. Five of the studies assessed school feeding programmes in Malawi (which has more than one large-scale programme). Two papers evaluated the effectiveness of the same programme (one at pilot stage) in South Africa (n=2), while the others assessed programmes in Eswatini, Lesotho, Republic of Congo, the United Republic of Tanzania and Zambia (one each).

103. The review revealed a striking lack of experimental **study designs**[24] in assessing school feeding programmes, both when compared to the other two regions and to the designs employed for research on school-based HIV prevention and other health interventions. Five of the studies identified in this review adopted quasi-experimental designs,[25] while the other seven (mostly programme evaluations) adopted non-experimental designs, which are primarily descriptive and make it difficult to attribute any changes in outcomes of interest to the programmes being evaluated with a degree of confidence. No randomised control trials (RCTs) of school feeding programmes were identified in Southern Africa. Devereux and colleagues (2016, p14) suggested possible explanations for the lack of impact assessments of school feeding on child outcomes in South Africa which may be applicable to the region more broadly, namely: (a) school feeding is often seen as a logistical exercise in which the benefits of feeding poor children at school are obvious and where the focus is on monitoring efficient and cost-effective implementation, rather than on quantifying impacts; (b) it is methodologically difficult to evaluate a long-running national programmes when there is no baseline survey data and when it is difficult to feasibly establish a

[24] An example is randomised control trials which are considered the gold standard in research for assessing effectiveness.

[25] Quasi-experimental designs resemble experimental designs, but the participants are not randomly assigned. They are therefore not as reliable in attributing changes to the intervention, since there may have been other pre-existing differences between groups that resulted in the observed changes.

control group because almost all eligible schoolchildren are benefiting from the programme, as is the case in several countries in this region; and (c) there is often a lack of clarity around what hypothesised impacts should be assessed, as the expected outcomes of school feeding programmes are often unclear.

104. A review of school feeding across the African Union (African Union, 2018) observed that rate of enrolment, rate of attendance and other education and learning outcomes are the most common objectives/indicators for school feeding programmes, although many also include health and nutrition outcomes as well. The **outcomes** of interest that emerged from this review comprised: (a) educational outcomes (e.g. impacts on school enrolment and attendance, retention and dropout, academic performance); (b) nutritional outcomes (e.g. impacts on short-term hunger, dietary diversity, anthropometric measures) and (c) health (e.g. prevalence of parasitic infection etc.) and (d) other often economic outcomes, where noted (for example, effects on job creation and local economic development, gendered impacts etc.). The following sections provide a detailed narrative review of the evidence reported by authors of the included studies, by programme and type of outcome.

Effects of school nutrition programmes on educational outcomes

105. The most frequent educational outcomes identified in this review included attendance (or absenteeism) and enrolment, and dropout or retention, with few considering learning and cognitive outcomes. At the continental level, a review of school feeding programmes in 32 countries in Sub-Saharan Africa (including seven countries in Southern Africa) concluded that school feeding programmes have a statistically significant positive effect on *enrolment*, with an effect size of approximately 10% (Gelli, 2015). The changes in enrolment varied by the model of school feeding delivery and by gender. Onsite meals appeared to have stronger effects in the first year of programme implementation in the lower primary grades, and on-site meals combined with take-home rations were effective in programmes running longer than a year, particularly for girls that received the take-home rations.

Table 5: Distribution of studies identified in this review, by educational outcomes

Study	Country	Enrolment	Attendance	Dropout	Concentration participation	Learning, cognition
Gandure et al., 2019 *(non-experimental)*	Eswatini	X				
Graham et al., 2015 *(quasi-experimental)*	South Africa		X			X
Mary's Meals, 2016 *(quasi-experimental)*	Malawi	X	X	X	X	
Manea, 2020 *(non-experimental)*	Malawi	X		X		
Nkhoma et al., 2014 *(quasi-experimental)*	Malawi				X	
Peacocke et al., 2018 *(non-experimental)*	Lesotho	X				
Tirivayi et al., 2019 *(quasi-experimental)*	Malawi	X	X	X		X
Trevant et al., 2014 *(non-experimental)*	Zambia	X	X	X		
Turner et al., 2015 *(non-experimental)*	United Republic of Tanzania	X	X			

Visser et al., 2013 *(non-experimental)*	Republic of Congo	X		
Webb et al., 2018 (quasi-experimental)	Malawi	X	X	X

a. Enrolment, attendance and learner retention

106. Ten of the 11 studies that considered education outcomes reviewed the effects of school feeding programmes on motivating children to attend and stay in school. Most reported improvements in attendance (reducing absenteeism), retention (reducing dropouts) and enrolment, but the limitations of some of the study designs mean that in several cases it is difficult to confidently attribute these changes specifically to school feeding programmes in the region.

107. A quasi-experimental evaluation of the School Meals Programme (SMP) in Malawi (Tirivayi et al., 2019) compared SMP-targeted and non-targeted primary schools, drawing on data from a previous evaluation (2013) as the baseline. The study found that relative to non-targeted schools, ***absenteeism***[26] in SMP-targeted schools declined by 5 percentage points, most notably among boys. The evaluation team argued that the gender difference could be linked to reports of other factors that might prompt absenteeism that were specific to girls (e.g. bullying and violence against girls in schools and cultural factors such as early marriage and cultural sexual initiation). There was a relatively small decline in dropout rates that only marginally significant statistically. An unintended impact appeared to be the observed higher under-age enrolment in the early standards (grades) in SMP targeted schools than non-targeted schools. But despite study participants reporting migration to targeted schools, no significant impact was found on new enrolment when analysing the administrative data. The study also aimed to measure the impact of the SMP on attentiveness in the classroom (as reported by teachers and as a first step towards improved learning) but the research team was unable to obtain sufficient longitudinal data for a robust analysis.

108. Similarly, an earlier WFP-commissioned quasi-experimental evaluation of the same programme (Webb et al., 2018) also reported improvements in student ***attendance*** and ***enrolment*** and a reduction in *health-related* ***absence*** in SMP-targeted schools compared to non-targeted schools. The research team also evaluated a Purchase from Africa for Africans SMP – which promoted local procurement for school meals – since there was some overlap in implementation districts but they were unable to assess the impacts of the project because of a lack of data.

109. Further indications of the positive effects of school feeding on education outcomes in the Malawian context comes from a 'year one' impact assessment of a school feeding programme run by the non-profit Mary's Meals.[27] The quasi-experimental study found that the school feeding programme increased access to primary school education for children living in poverty. Specifically, ***enrolment*** at programme schools increased over the evaluation period (late 2014 to mid-2015) by 36%, notably higher than the average enrolment increases in the country programme which Mary's Meals had tracked over time. This was partly due to localised flooding which had led to migration between schools. Enrolment in the control group schools also increased, but at a lower rate. There were also indications that enrolment at the programme schools had become more gender-balanced over the period. In addition, both school records of attendance and survey responses of teachers showed a reduction in daily ***absenteeism*** (from 33% to 2%) in programme schools, while in the control schools there was an increase, perhaps linked

[26] Absenteeism was defined as the number of students absent more than 20% of school days in the previous month over total number of students in school.

[27] This is part of a five-year impact assessment being conducted in Malawi, Zambia and Liberia with technical support from INTRAC.

to the worsening food insecurity in the country at the time. There was a significant reduction in the share of children at programme schools who reported wanting to leave school early in the day due to hunger, and significant improvements (with large effect sizes) in children's reported ***concentration*** and ***participation*** in class in programmes schools, while results in control schools for these three indicators remained constant. There was also a larger reduction in the number of children who ***dropped out*** of school in programme schools. Children's anxiety about being hungry at school also decreased at programme schools but increased at the control schools over the same period.

110. Another quasi-experimental evaluation assessed the effects of a breakfast feeding programme in South Africa, which is run by a private foundation in partnership with the National School Nutrition Programme (NSNP; Graham et al., 2015). The programme provides breakfast to primary school children in addition to the NSNP meal. The study was conducted in a single district and compared (a) schools where children received the NSNP only (one meal a day), (b) schools that received an additional meal (breakfast) funded by the private foundation, and (c) schools that had recently become eligible to receive the NSNP but had not yet done so (i.e., the control group). The researchers found that schools with the breakfast programme had higher rates of ***zero absenteeism*** than both the 'NSNP only' and the control schools. This finding supported the perception among stakeholders that the breakfast motivates children to attend school, and to get to school on time (Graham et al., 2015).

111. In Lesotho, a non-experimental programme evaluation compared three modes of delivery of the universal National School Feeding Programme (Peacocke et al., 2018) and reported that teachers, children and parents considered school feeding to be a strong motivation for children to ***attend*** school (based on qualitative data and survey responses). Providing free school meals to primary school children formed a key part of the introduction of Lesotho's compulsory free primary education (FPE) in 2000, which makes teasing out the effects of school feeding on enrolment (as separate from FPE) particularly difficult in this context. A review of administrative records showed an initial increase in ***enrolment*** between 2000 and 2006, followed by a longer period of decline until 2015, suggesting that the provision of free school meals is only one of several contributory factors affecting enrolment. However, the researchers also observed that sharp declines in primary school attendance were linked with extended periods when certain schools did not receive food, lending support to the reported perceptions that school meals are an incentive for children to attend school, particularly for the poorest households. A non-experimental evaluation of the universal National School Feeding Programme (NSFP) in Eswatini (Gandure et al., 2019) noted a similar perception among school committee members and other stakeholders that the availability of school meals increased enrolment and attendance at school and reported on trends in enrolment figures and dropout rates based on data from the Education Management Information System (EMIS, disaggregated by gender), but was not able to reliably measure the contribution of the school feeding programme to these patterns due to the absence of a control group. A further non-experimental study in rural Malawi considered the effects of a school feeding programme on enrolment and dropout rates and found an increase in enrolment over the study period but little change in the dropout rate. The study faced the same limitations in attributing these changes to the programme but noted that larger effects for both indicators were found when considering food-insecure areas and suggested that the educational impacts of such programmes may be greater when implemented in areas of food insecurity.

112. Several evaluations of WFP country programmes in the region also touched on the effectiveness of the school feeding components in supporting educational outcomes, but where the study designs were non-experimental or not designed to explicitly assess impacts, it is not possible to attribute observed changes to the effects of school feeding programmes or to exclude alternative

explanations. These studies are included here to give a sense of findings in these countries, with the caveat that these findings are indicative only.

113. For example, an evaluation of the WFP country programme in the Republic of Congo (Visser et al., 2013) noted that enrolment in the targeted schools increased (from 6% in 2010 to 26% in 2012), along with increases in the enrolment of indigenous children and the ratio of girls to boys but was unable to exclude alternative explanations for these changes. A review of the WFP country programme in Zambia (Trevant et al., 2014) found a slight numeric increase in attendance and enrolment between 2011 and 2013, and a slight drop in the dropout rate over the same period, suggesting a degree of stability where the school feeding programme is implemented, but again could not reliably attribute these changes to the programme. However, as in Lesotho, the evaluation team noted reports that attendance rates dropped when meals were not available and rose again when daily meals were available again (Trevant et al., 2014). In the United Republic of Tanzania, a review of the WFP country programme in 2015 reported positive perceptions among teachers, parents and other local stakeholders of the effects of school feeding on enrolment, attendance, concentration and performance (Turner et al., 2015), but the administrative data showed declining attendance and enrolment for girls and boys at the targeted schools in line with national trends (Turner et al., 2015). These findings support the contention that school feeding is one of several factors influencing decisions on enrolment and attendance.

b. Other learning and cognitive outcomes

114. Only three studies assessed learning outcomes such as literacy and changes in school performance. A quasi-experimental evaluation in Malawi (Tirivayi et al., 2019) assessed literacy as an expected outcome of the SMP, which included providing teaching and literacy instructional materials as well as training for teachers in addition to school meals. The study found a modest impact of the intervention on ***literacy*** for primary school children. Specifically, the study compared the performance of children at SMP-supported schools and non-supported (control) schools on an Early Grade Reading Assessment and an Oral Reading Fluency assessment and found that the SMP had minimal impact on the literacy of grade 4 learners. The authors argued that this may be due to mediating factors such as the observed higher under-age enrolment in SMP-supported schools; the lack of ECD centres to provide a foundation for learning; late and patchy implementation of literacy promotion activities; high student-to-teacher ratios and fewer years of teaching experience at that level. But positive impacts were observed among grade 6 learners in terms of reading above the national benchmark (reading fluency was 54% higher among children in SMP schools than in non-supported) as well as in initial letter sound observation and listening and reading comprehension.

115. The quasi-experimental study in South Africa that assessed the effects of a breakfast feeding programme in addition to the NSNP meal reported that adding a second nutritious meal may lead to improved ***school performance*** (Graham et al., 2015). The study found that children at schools receiving the NSNP achieved higher school marks than those at control schools in both the first and the last term, while children who received the breakfast in addition had higher marks at both points than either the control or NSNP only schools. The researchers suggested that while school performance is shaped by many factors and cannot be attributed to school feeding alone, the results indicate that children who receive meals during the day perform better than children in schools in the same district who did not. Educators and principals at the schools also reported that meals have positive effects on children's ***concentration*** and ***participation***. Confirming these results with rigorous impact evaluations would provide a valuable evidence base for arguments to add breakfast (or an additional meal) to school feeding programmes.

116. A small longitudinal study in Malawi (Nkhoma et al., 2014) evaluated **cognitive** and anthropometric outcomes among entry-level primary school children. A total of 226 schoolchildren aged six to eight years in two rural primary schools were followed for one school year. The study compared children attending an SFP school, who received a daily ration of corn-soy blend porridge, with those attending another (non-SFP), who did not. The study found that the SFP was associated with an improvement in *reversal learning* among children, one of the three indicators of cognitive performance tested. The authors noted that, given the high levels of micronutrient differences among Malawian school children and the fact that the porridge is fortified with micronutrients (including iron, vitamin A, vitamin B-12, and zinc), the "finding on cognitive function would suggest that children in the SFP school may have derived cognitive benefit from one or more of the micronutrients in the porridge" (Nkhoma et al., 2014, p 1328).

Effects of school feeding programmes on nutritional outcomes

117. Five studies considered the effects of school feeding on nutritional outcomes. Two studies, both in Malawi, considered the effects of school feeding on reported hunger; two (also in Malawi) touched briefly on dietary diversity while another two studies (which assessed the same programme in South Africa at different points of implementation) considered the effects on longer-term nutritional outcomes for school-aged children. Self-reported hunger is a subjective measure that does not capture improved nutrient intake or dietary diversity, and thus other measures of nutritional status should also be monitored, such as assessing observed changes in micronutrient deficiencies and taking anthropometric measures such as weight, height and body mass index and other body measurements.

Table 6: Distribution of studies identified in this review, by nutritional outcomes

Study	Country	Short-term hunger	Dietary diversity	Stunting	Overweight
Tirivayi et al., 2019 (quasi-experimental)	Malawi	X	X		
Webb et al., 2018 (quasi-experimental)	Malawi		X		
Mary's Meals, 2016 (quasi-experimental)	Malawi	X			
Graham et al., 2015 (quasi-experimental)	South Africa			X	X
Hochfeld et al., 2016 (non-experimental)	South Africa			X	

a. Hunger and dietary diversity

118. A 2019 quasi-experimental evaluation of the SMP in Malawi found that relative to non-targeted schools, beneficiary households linked to the SMP schools showed a significant improvement in reported ***short-term hunger***, increased ***meal frequency*** and ***dietary diversity*** among learners and their households, and decreased negative coping strategies (Tirivayi et al., 2019). Household hunger in SMP beneficiary households was 43% lower than in non-beneficiary households, although the percentage of households that experienced hunger (49%) was still higher than the target (25%). The gains in dietary diversity[28] were mostly observed in male-headed households. The impact of the programme at a household level on *minimum acceptable diet*[29] rates among

[28] Defined as the number of food groups eaten the day before.

[29] This indicator is applied to young children rather than school-age children and is a reflection of effects of the programme at a household level.

young children was not statistically significant overall but showed a positive impact in male-headed households, a finding the authors attributed to the greater vulnerability of female-headed households. The SMP also showed greater positive impacts on reducing hunger and negative coping strategies in poorer households compared to non-poor households. The study found no evidence of meal substitution among learners receiving on-site meals. An earlier evaluation of the SMP and the PAA-supported SMP in Malawi (Webb et al., 2018) found self-reported improvements in ***dietary diversity***[30] in school meals and at household level, specifically for the PAA-supported SMP which promoted local procurement of school meals.

119. The 2016 impact assessment of the Mary's Meals school feeding programme in Malawi also found that by the end of the academic year under study, ***hunger*** had decreased significantly among children at intervention schools but had increased in the control group schools, demonstrating the chronic food insecurity in these areas and the protective effect of the feeding programme against the increasing food shortages. Specifically, 87% of children who received school meals reported that they felt hungry at school at least sometimes at baseline; by the end of the academic year, this has reduced to 13%. At the same time, 81% of children at the control group schools reported feeling hungry at school at baseline; by the end of the year this had increased to 88%.[31] This finding was supported by the responses provided by community members, teachers and volunteers across the programme and control schools.

120. A recurring theme in several of the programme evaluations included in this review was that, while they had intended to assess the nutritional effects of school feeding, there was ***insufficient monitoring data on nutrition*** on which to base an analysis. For example, the evaluation of the NSFP in Eswatini reported that no comprehensive data on children's nutritional status had been collected over the evaluation period (Gandure et al., 2019), while the evaluation of the NSFP in Lesotho reported that the nutritional benefits to children were unclear because the SFP results framework had no nutrition outcomes, nutrition indicators were not tracked, and the programme was not integrated with interventions for the prevention of malnutrition (Peacocke et al., 2018). The evaluation team also argued that any potential nutritional benefits were likely to be undermined by the conditions at the schools, which included a lack of clean water in a third of schools and 95% of the toilets in an unfit condition. Further, the authors of an evaluation of a breakfast feeding programme in South Africa pointed out that while NSNP monitors service delivery indicators to track the administration and functioning of the programme, it does not provide any information on the impact of the NSNP on the nutritional status of children (or their school performance, (Graham et al., 2015).

b. Anthropometric measures

121. The two studies that assessed the impact of the programmes on anthropometric measures both evaluated a breakfast feeding programme in South Africa that provided an early morning meal in addition to the NSNP meal the children were already receiving, through a public-private partnership.

122. One of these quasi-experimental evaluations, conducted in Lady Frere, South Africa, compared schools that received both the NSNP meal and the breakfast; schools that received the NSNP meal only and schools that had recently become eligible for the NSNP but were not yet receiving it (Graham et al., 2015). The study found that children in the schools receiving both the NSNP meal

[30] Defined as the number of food groups included in a single meal.

[31] The authors report that statistically analysis showed significant differences with large effect sizes when comparing the programme group at baseline and endline and comparing the programme and control group at endline.

and the breakfast, and those attending the (slightly wealthier) control schools that received neither, had lower rates of stunting (9% and 7% respectively) than those children receiving the NSNP only (15%; Graham et al., 2015). The researchers, therefore, contend that the addition of a nutritious breakfast can positively impact ***stunting*** levels among school-aged children. There is still a debate in the literature as to whether older children who have experience stunting can indeed 'catch up' in this way. But an earlier pilot study of the programme conducted in Alexandra township observed a similar shift, finding that the levels of ***severe stunting*** were reduced by 4.7 percentage points over a ten-month period (Hochfeld et al., 2016). However, this study did not include a control group and so the changes cannot be definitively attributed to the breakfast programme; further research is required.

123. Furthermore, the Lady Frere study found that the breakfast programme appeared to have a protective effect against ***overweight*** and ***obesity*** (Graham et al., 2015). This is partly explained by the breakfast porridge that is fortified with essential vitamins and minerals and so is suitable for children who are either under-weight or over-weight, as both are linked to poor nutrient intake (Hochfeld et al., 2016). The Lady Frere study found that children at the intervention schools were significantly less likely to be overweight or obese than those at the control schools; and that learners at the schools receiving both the NSNP meal and the breakfast were significantly less likely than those receiving the NSNP only to be overweight or obese. These effects were strongest for girls. The argument for a protective effect seems to be further supported by an analysis of the data from the control schools that went on to receive the NSNP after the study period, which showed a reduction in rates of overweight once learners start receiving the NSNP (Graham *et al.* 2015).

Effect of school feeding on other (economic) outcomes

124. Other secondary outcomes of interest in relation to school feeding programmes include ***local economic development*** outcomes, either through direct job creation or through boosting entrepreneurship and local agriculture through local procurement. The findings on these outcomes in the studies identified here were primarily descriptive, drawn from interviews with local stakeholders, and are limited in scope.

125. Webb and colleagues in Malawi (2018) found that the PAA-supported SMP was effective at ***improving market linkages*** between local farmers and schools. The PAA-supported SMP worked with male and female farmers to improve their food production which, together with the volume of sales to schools, is expected to lead to increased income. But the researchers noted that farmers were not able to provide sufficient food to schools because of the limited size of farmers' land, production planning and dry spells, resulting in schools buying additional food from local markets and farmers who were not members of the targeted Farmers Organisations. Other studies highlighted similar challenges (see section on Challenges and Gaps).

126. An evaluation of three modes of delivery of the NSFP in Lesotho (Peacocke et al., 2018) reported that community members argued that the only tangible economic outcome of the SFP was the ***direct employment*** of cooks and caterers, with little economic transaction between the school and the community beyond this. While the direct employment provided income to community members in these roles over the period 2007 to 2011, the static payments by the government over this period led to a 40 percent decline in their relative value. This also reduced the opportunity for cooks and caterers to invest in assets or small businesses and, together with late payments, increased the risk of debt that community members face when engaging in the SFP and reduced their ability to purchase food products from local producers. A similar challenge was noted in a programme evaluation of the NSFP in Namibia (Land et al., 2020). In short, the Lesotho evaluation "found little evidence that local purchases for school feeding had a significant impact on the

livelihood opportunities and incomes of men and women food producers in rural areas" (Peacocke et al., 2018, p. 17).

127. At a global level, a study by Verguet et al (2020) estimated the ***multi-sectoral gains*** of school-feeding programmes in low- and middle-income countries, looking specifically at returns not only to health, nutrition and education, but also to social protection and the local agricultural economy. The authors applied their benefit-cost analytical framework to 14 countries, including Botswana, Namibia and South Africa. They estimated that while school feeding budgets across these 14 countries total approximately USD11 billion a year, the estimated human capital gains are USD180 billion – USD USD24 billion from health and nutrition gains, and USD156 billion from education. The study further estimated that school feeding programmes also offer annual social protection benefits of USD7 billion and gains to local agricultural economies worth USD23 billion. The analysis suggests that the overall benefits of school feeding are far greater than the returns to public health alone.

5.2 Micronutrient supplementation

128. Micronutrient supplementation and fortification initiatives aim to address the micronutrient deficiencies that compromise the health, growth and development of school-aged children by providing supplementary micronutrients. While a number of studies that investigated the effects of micronutrient supplementation on specific vulnerable populations (e.g., infants and young children, children with HIV infection, pregnant women) or that compared different methods of providing micronutrients to children were noted, this review identified only two studies that assessed school-based micronutrient supplementation interventions over the last decade (over and above the assessments of school feeding programmes, which generally incorporate micronutrient supplementation). Both studies were conducted in South Africa and employed experimental designs.

129. One study assessed an adaptation of the micronutrient powders (MNPs) often added to complementary foods high in inhibitors of iron and zinc, because of the recommendation that MNPs with high amounts of iron should not be used in malarial areas (Troesch and colleagues, 2011). In a double-blind control trial among South African children in two primary schools found that when added to maize porridge, the adapted MNP increased serum ferritin ($P < 0.05$), body iron stores ($P < 0.01$) and weight-for-age Z-scores ($P < 0.05$) and decreased transferrin receptor ($P < 0.05$). The prevalence of ***iron deficiency*** decreased by 31% ($P < 0.01$) and the prevalence of ***zinc deficiency*** decreased by 12% ($P < 0.05$).

130. The second study involved an RCT to assess the effect of African leafy vegetable consumption on the ***iron***, ***zinc*** and ***Vitamin A*** status of school children at two schools, who received a daily school meal for three months (Van der Hoeven et al., 2016). The study found that the African leafy vegetables did not improve the iron, zinc or Vitamin A status of children if only mild deficiencies were present.

131. The search of academic databases also yielded a protocol for a forthcoming study in Côte d'Ivoire, South Africa and the United Republic of Tanzania that aims to assess the effects of school-based physical activity and multi-micronutrient supplementation interventions (independently and in combination) on the growth, health and well-being of school children (Gerber et al., 2020).

5.3 Nutrition education interventions

132. At least four of the evaluations relating to school feeding programmes (and discussed above) described positive improvements in ***health and nutrition knowledge*** among children or adults as a result of nutrition education activities, but these tended to be based on self-reports and often

did not assess if this knowledge was translated into practice. In Malawi, training of school personnel, farmers and households on nutrition and dietary diversity was found to be effective in improving knowledge at follow-up and compared to the control schools; and reportedly resulted in improved diversification of their household diet (Webb et al., 2018). Graham and colleagues (2015) reported improved nutrition literacy and increased knowledge of hygiene among learners benefiting from the breakfast feeding programme in South Africa, while the pilot study of the same programme reported that learners and food handlers expressed increased knowledge of healthy foods, with learners in focus group discussions being able to differentiate between 'good' and 'bad' foods (Hochfeld et al., 2016). An evaluation of the NSFP in Eswatini also reported that learners had increased knowledge of nutrition, based on focus group discussions (Gandure et al., 2019).

133. Two further two studies assessed nutrition education interventions in South Africa using experimental designs and found improved levels of knowledge but no significant impacts on subsequent behaviours. The *HealthKick* initiative, a three-year randomised controlled trial in the Western Cape, South Africa, aimed to promote healthy eating habits and improving the dietary quality of children in low-income settings (de Villiers et al., 2016). The study found that the intervention significantly ***improved knowledge*** among Grade 4 children in the intervention group at the first and second follow-up compared with the control group. The intervention also showed a significant effect on self-efficacy at the second follow-up but did not improve their ***eating behaviour***. These results echoed the findings of an earlier nutrition education intervention conducted in low-income areas in the North West province in South Africa (Oosthuizen et al., 2011). The intervention consisted of providing nutrition education lessons over the course of a term to grade 7 learners. But the ***dietary variety*** in the average diet remained low even after the intervention, with the authors attributing the limited effects to the constraints children in low-income areas face in translating improved knowledge into food choices in practice. An overview of national school food and nutrition interventions in Africa (FAO et al, 2018) argued that food and nutrition education should be evaluated further to determine the competencies and approaches needed to bring about behavioural change and the promotion of healthy eating habits.

5.4 Deworming interventions

134. The effectiveness of school-based deworming interventions to addressing parasitic infection has also received relatively limited research attention in the Southern Africa region over the last decade. The review noted studies assessing the prevalence of parasitic infections among school-aged children and others assessing community-based deworming interventions but few that evaluated school-based deworming interventions in the region. Internationally, there is continued debate about the effectiveness of mass (community-based) deworming versus targeted deworming interventions on health and educational outcomes for children (Clarke et al., 2017; Welch et al., 2017). Four studies that assessed school-based deworming interviews were identified in this review – two from Zimbabwe, one from Zambia and one in South Africa.

135. In Zimbabwe, a geospatial study compared the prevalence and intensity of STH infections before and after a six-year control intervention involving the deworming of school-aged children (Midzi et al., 2020). The treatment consisted of preventative chemotherapy targeting all children enrolled at school in Zimbabwe. The study reported that the national ***prevalence*** of STH infections in school-aged children was estimated at 5.8% at baseline, with 0.8% of infections of moderate and heavy intensity; by the follow up in 2017, national prevalence of STH in school-aged children was estimated at 0.8%, with infections of moderate and heavy intensity almost non-existent (0.1% prevalence).

136. A second, earlier, study in Zimbabwe assessed the efficacy of a repeated combined school-based anti-helminthic and prompt malaria treatment, provided to a cohort of primary school children

(Midzi et al., 2011). Children received the combined treatment at baseline and again at 6, 12 and 33 month follow up surveys. The study found that two rounds of these combined treatments at six monthly intervals significantly reduced the overall ***prevalence*** of *S. haematobium, S. mansoni*, hookworms and *P. falciparum* (related to malaria) infection in primary schoolchildren by 74%, 71%, 67% and 59% respectively (all $p < 0.001$). The prevalence of co-infections was also reduced.

137. In Zambia, a prospective matched control study conducted in 14 schools in Lusaka evaluated the impact of a comprehensive primary school-based health intervention programme on student-reported ***morbidity*** and ***anthropometric outcomes*** (Wei et al., 2019). The intervention involved training teachers to deliver health lessons and refer ill students for further care, and administering vitamin A and deworming medication biannually. The study assessed the impacts of the *combined* intervention and found that it decreased the adjusted odds of self-reported acute illnesses by 38% (95% CI: 0.48, 0.77) and of stunting by 52% (95% CI: 0.26, 0.87) and increased ***health knowledge*** by 0.53 standard deviations (95% CI: 0.24, 0.81). No impact was found on weight or student absenteeism.

138. In South Africa, a two-year longitudinal cohort study consisting of three cross-sectional surveys in eight primary schools investigated intestinal parasite infections in an impoverished area in Port Elizabeth (Yap et al., 2015). The disease, activity and school children's health (DASH) study assessed children on a range of health, cognitive performance and psychosocial health indicators at each survey point. Children who were diagnosed with parasitic worm infections were subsequently treated with albendazole. After the first survey, researchers found that intestinal parasite infections had a small but significant negative effect on the ***physical fitness*** of infected children who had lower maximal oxygen intake, and a negative impact on ***anthropometric indicators*** (Müller et al., 2016). An associated observational study reported that children infected with STHs exhibited lower selective attention, lower school performance and lower grip strength (a measure of physical activity; all $p<0.05$). The researchers concluded that STHs and low physical fitness appear to hamper children's ability to pay ***attention***, impeding their academic performance (Gall et al., 2017). In terms of the treatment intervention, the researchers reported shrinking risk profiles after repeated deworming (after each of the three surveys) with respect to soil-transmitted helminthiasis, specifically *Ascaris lumbricoides* and *Trichuris trichiura* but noted that deworming interventions should be complemented by other public health measures (Müller et al., 2017).

5.5 School-based HIV prevention interventions

139. The review identified 32 papers that met the inclusion criteria for considering the effectiveness of school-based HIV interventions. These papers referred to 25 unique studies, with some drawing on the same data but presenting a different aspect or finding. The types of studies included for analysis were randomised controlled trials (n=7), cluster-randomised controlled trials (n=8), quasi-experimental studies (n=10), longitudinal studies (n=2) and (waves of) cross-sectional surveys (n=4). A further study analysed administrative data over time to assess the uptake of a school-based recruitment programme.

140. Most reported on studies (or study sites) in South Africa (n=17 papers), with the rest of the papers covering studies in the neighbouring countries: six in Malawi, four in Zimbabwe, three each in Botswana and United Republic of Tanzania, two in Zambia and one paper each in Mozambique and Eswatini. Details of these studies are presented in Annex F: Summary of studies).

141. The most commonly evaluated school-based HIV prevention **intervention** in the Southern Africa region was schooling itself. Fourteen of the papers assessed whether or not formal schooling – or interventions to support girls in particular to stay in school or return to school – reduced the risk of HIV infection. Nine papers considered the effectiveness of teacher-led education. Some

assessed the training of teachers to facilitate the interventions, while one intervention worked with teachers to create a safer school environment by addressing the issue of teachers offering academic favours in exchange for sex. Other papers focused solely on the effects of the teacher-led interventions on learners. The delivery approaches varied and included whole-class sessions, small group discussions, participatory approaches, drama-based learning methods, games, comics and drawing on soccer-based language and metaphors and, in one case, extra-curricular youth clubs that leveraged off a mass media campaign and television series. Some of these interventions were complemented by other components in addition to the education intervention, such as community-based activities, 'homework' to encourage engagement with caregiver, support from Youth Development Specialists to coordinate use of school and community resources, facilitating access to testing or linking adolescents to information and services at youth-friendly health clinics to foster healthy sexuality. A further six papers specifically considered the effectiveness of peer-led education programmes, while a seventh assessed a programme with both teacher-led and peer-led components. A further paper assessed the effectiveness of a school-based voluntary male medical circumcision (VMMC) demand-creation initiative.

142. The most commonly measured **outcomes** related to age of sexual debut and various forms of sexual risk behaviour such as use of condoms and partner selection. Ten papers included measures of HIV biomarkers. Biomarkers for Herpes Simplex Virus (HSV-2) were also measured in seven studies, with at least two papers measuring other STIs. Sexual and reproductive health knowledge and attitudes were also included as outcomes, as were psychosocial measures that might form pathways to or mediate behaviour change. Other outcomes that were assessed included adolescent-caregiver communication, schooling outcomes, HIV counselling and testing utilisation, VMMC rates and child wellbeing and quality of life.

Effectiveness of school-based interventions for HIV prevention

143. Nine studies had **HIV incidence** – and seven had **HSV-2 incidence** – as a key outcome. Six of the nine studies found a reduction in risk of HIV infection, while three of the seven found a reduction in risk of HSV-2 infection. Most of these studies assessed schooling or support for schooling as the intervention.

144. An RCT in South Africa that tested the effectiveness of a monthly cash transfer for adolescent girls, conditional on school attendance, did not find any difference in HIV incidence between the intervention group and control group (Pettifor et al, 2016). An explanation for this was that school attendance was high across both groups. But the study did find that girls who dropped out of school or did not attend school for 80% of the time or more were significantly more likely to acquire HIV infection, irrespective of the intervention. This was confirmed by another paper drawing on the data from the same study (Stoner et al, 2017). A cluster randomised trial in Zomba, Malawi, tested providing incentives in the form of school fees and cash transfers to school-aged girls to stay in or return to school, and found that at the 18-month follow up, weighted HIV and HSV-2 prevalence was lower in the combined intervention group than in the control group, although the same did not hold for those who had already dropped out of school at baseline (Baird et al, 2012).

145. Findings from a longitudinal study in Zimbabwe indicated that grade attainment was associated with lower levels of both HIV and HSV-2 among girls, and with HSV-2 but not HIV in boys (Mensch et al, 2020). School enrolment and academic skills were not significantly associated with STIs for either boys or girls. An analysis of two waves of a cross-sectional household survey in Botswana took advantage of a natural experiment as a result of a policy reform and found that each additional year of secondary schooling led to a reduction in the cumulative risk of HIV infection by 8.1 percentage points, relative to baseline prevalence (De Neve et al, 2015), with the effects being

particularly large in women. Furthermore, a study drawing on data from the South African conditional cash transfer RCT described above modelled a combination of hypothetical interventions addressing specific risk factors, to determine which intervention – or combination – would be associated with the largest reduction in HIV prevalence (Stoner et al, 2018a). An intervention to increase schooling and decrease depression and transactional sex showed the largest reduction in incident infection; but this was closely followed by an intervention on only transactional sex and depression. On the other hand, a cluster RCT in Zimbabwe assessing the effectiveness of school support as a structural HIV prevention intervention (through provision of school fees, uniforms, school supplies and a school-based 'helper') did not find a difference between the intervention group and control on HIV or HSV-2 biomarkers (Hallfors et al, 2015).

146. Other prevention education interventions were also assessed for their impacts of these bio-markers, although the pattern for these interventions was less clear. A longitudinal study of a school-based, extra-curricular HIV prevention programme consisting of children clubs and that leveraged off a television series (Soul Budddyz) found that ex-club members were more likely to be HIV negative than the controls (Johnson et al, 2018). However, a multi-component HIV prevention intervention for young people in Zimbabwe, which included peer educators, did not find any impact of the intervention on the prevalence of HIV or HSV-2 (Cowan et al, 2010). A teacher-led HIV/STI risk reduction programme in South Africa included measures of biologically confirmed curable STIs (including HSV-2) as outcomes and found that while the main effect was non-significant, an interaction analysis showed that the intervention significantly reduced curable STIs at a 42-month follow up in adolescents who reported sexual experience (Jemmot et al, 2015).

147. Findings relating to **sexual debut and risky sexual behaviour outcomes** varied, with several studies finding some improvements. The specific behaviours measured varied, and even within some studies, some sexual behaviours changed while others did not. Among the interventions that showed positive effects on sexual debut and/or certain risky sexual behaviours were school attendance (Stoner et al, 2018b), access to school (Toska et al, 2017) or support for school attendance (Baird et al, 2010; Hallfors et al, 2015; Pettifor et al, 2016).

148. Others included an HIV risk reduction peer education programme in Malawi (Mwale & Muula, 2019) which found increased condom use at last sex[32] and lower odds of having multiple partners; the extra-curricular Soul Buddyz clubs in South Africa (Johnson et al, 2018), which found the ex-Buddyz were more likely to have only had one partner in the past year and to have used a condom at first sex; a teacher-led HIV/STI risk-reduction education programme in South Africa (Jemmot et al, 2015), which found a reduction in unprotected sex averaged over the course of the follow-up period of 54 months; and a teacher-led HIV prevention education intervention in South Africa (Helleve et al, 2011) in which perceptions of teachers as 'caring' (as a result of the intervention) among female students and students at one of the two sites were associated with lower likelihood of initiating sexual intercourse. A combined HIV and substance abuse prevention programme found positive effects on risk behaviours at last sex (Tibbets et al, 2011), while the PREPARE intervention in United Republic of Tanzania, which included teacher-led, peer-led and health care provider support components, found a significant effect on sexual debut for both sexes and on action planning to use condoms, but found increased actual condom use only among males (Mmbaga et al., 2017). Although indirect, a Go Girls! Initiative programme aimed at reducing girls' vulnerability to HIV in three countries found that in Botswana (but not Malawi or Mozambique), girls who attended intervention schools were significantly more likely to report a reduction in teachers offering sex for favours. Others showed mixed or no significant associations (Behrman, 2015; Cowan et al, 2015; Denison et al, 2012; Kaufman et al, 2010; Mason-Jones et al, 2011; Mason-

[32] This refers to the last occasion the study participant had sex.

Jones et al, 2013; Matthews et al, 2012; Matthews et al, 2016), with at least one study concluding that school-based interventions should to be supplemented by programmes that change the environment in which adolescents make decisions about sexual behaviour (Matthews et al, 2012).

149. **HIV and sexual and reproductive health knowledge** were measured as key outcomes in six studies and statistically significant improvements were noted in five. A peer-led programme in South Africa called *Listen up* found improvements in knowledge regarding HIV transmission that were still statistically significant five- and seven-months post-intervention (Timol et al, 2016). A small quasi-experimental study in Zambia found that, immediately post-intervention, drama-based learning methods appeared to be more effective than conventional methods in improving HIV knowledge, although the study did not specify the HIV knowledge measures used (Siame & Peter, 2019). A teacher-led HIV education intervention designed in the United States and adapted to Eswatini found significant differences between the intervention and control groups in HIV-related knowledge and some self-efficacy measures (Burnett et al, 2011), while a youth-led peer education model by Restless Development in Zambia was associated with higher levels of HIV and reproductive health knowledge, as well as with more positive attitudes towards people living with HIV and greater reported self-efficacy in refusing unwanted sex and accessing condoms (Denison et al, 2012). A multi-component HIV prevention intervention in Zimbabwe – that had to shift from a school-based to a community-based study design during the study period – reported modest improvements in knowledge and attitudes (Cowan et al, 2010).

150. Two studies included a focus on improving **interpersonal communication** between adolescents and their caregivers on issues of sexuality. A cluster randomised control trial of a teacher-led HIV education intervention in a site in United Republic of Tanzania and two sites in South Africa found that the effects on communication with adults about sexuality issues were stronger in the United Republic of Tanzanian site than in the other two, and that this increase in interpersonal communication was associated with positive changes in a number of social cognition outcomes (Namisi et al., 2015). However, the hypothesis that increased interpersonal communication would mediate age of sexual debut was not confirmed. A quasi-experimental study in South Africa of an interactive HIV prevention curriculum in schools by Grassroots Soccer found no difference between programme graduates and non-graduates in levels of communication about HIV (Kaufman et al, 2010).

151. Two studies (in South Africa and Eswatini) showed improved **service utilisation**. A small study assessing a school-based HIV education intervention in Eswatini, in which a mobile HIV testing unit was available on one Saturday session after the HIV testing module was presented, found significant differences between the intervention and control group on the protective behaviour of getting an HIV test. In South Africa, a voluntary male medical circumcision (VMMC) demand-creation strategy implemented information and awareness raising sessions at high schools, along with access to counselling and HIV testing and transport to clinics for volunteers. The initiative was associated with an over five-fold increase in VMMC uptake over the average number of procedures conducted during community engagement phases (Montague et al, 2014).

152. Three studies included less common outcomes that may be of interest here. One was a quasi-experimental study in South Africa that considered the role of **mental health distress** in the (positive) relationship between adverse childhood experiences at baseline and HIV risk behaviour at follow up. The study explored the pathways through which this takes place and found that the provision of free schooling (essential to access to education in deprived areas) moderated these pathways (Meinck et al, 2019). Understanding the pathways to behaviour change and the factors that mediate them provide insights into how to more effective promote positive behaviour change. In Zimbabwe, a study drew on a cross-sectional child survey to test the relationship between

indicators of **general school quality** and of **HIV-specific characteristics**, and individual child wellbeing. School quality was associated with children being in the correct grade for age but not with primary or secondary school attendance. General and HIV-specific school quality had significant positive effects on wellbeing in primary school-age children but not in secondary school-age children, and the study was unable to show that school quality provided an additional benefit to the wellbeing of vulnerable children. The third study was a cluster RCT assessing the effects of PREPARE, a multi-component school-based prevention programme on adolescent sexual risk behaviour and **intimate partner violence**, which increases the risk of STIs, including HIV infection (Mathews et al., 2016). While the did not find effects of the intervention on sexual risk behaviour, it did find a reduction in reporting of intimate partner violence among the intervention group, potentially lowering the risk for HIV.

5.6 WASH in school interventions

153. As in the case of the other school-based health and nutrition interventions here, the effects of school-based WASH interventions have received significantly less research focus in the region that the school-based HIV prevention interventions. Six studies assessing school-based WASH interventions were identified in this review. The study designs included a cluster RCT, two quasi-experimental designs, a cross-sectional survey, a cross-sectional analysis of administrative data and a qualitative study. Three of the studies were conducted in Zambia, two in United Republic of Tanzania and one in South Africa. Details of these studies are presented in Annex F: Summary of studies.

154. The **interventions** assessed included the provision of WASH infrastructure in schools as a structural intervention; the role of children as 'change agents' or disseminating health information to their family members and communities; a comparison of physical improvements in hygiene and sanitation facilities with an education programme on handwashing; education workshops drawing on a computer-based education programme and an address by a teacher, a video show and a leaflet given to pupils. **Outcomes** included individual knowledge and attitudes, prevalence of parasitic infection, observed habitual handwashing, engagement with parents (communicating health messages), and education efficiency and progression (by grade and gender), among others.

Effectiveness of school-based WASH interventions

155. Two studies considered the effectiveness of educational WASH interventions on **levels of knowledge and attitudes**. The first was part of a large, community-based study on *taenia solium* prevention,[33] and assessed the effectiveness of education workshops with primary school children in rural areas of Eastern Zambia using a computer-based education programme called *The Vicious Worm*. Levels of knowledge of *T. solium* remained significantly higher than at the initial 'pre' questionnaire, even after a year had passed. Some specifics of the parasite's life cycle were not completely understood but the key messages for disease prevention were retained. A cluster RCT in the United Republic of Tanzania also assessed a health education intervention aimed at improving knowledge and attitudes related to *T. solium* cysticercosis and taeniasis.[34] This intervention consisted of an address by a trained teacher, a video show and a leaflet given to each pupil. The study also found improvements in knowledge linked to the intervention but noted a

[33] *Taenia solum* is also known as the pork tapeworm. According to WHO, infection occurs when a person eats raw or undercooked, infected pork. *T. solium* eggs may also infect humans if they are ingested by a person via the fecal-oral route, or by ingesting contaminated food or water, causing infection with the larval parasite in the tissues (cysticercosis). See https://www.who.int/news-room/fact-sheets/detail/taeniasis-cysticercosis.
[34] Taeniasis is an intestinal infection caused by tapeworms including *T. solium*.

need for further research to assess the effectiveness of message transmission from children to parents and to the general community (Mwidunda et al., 2015).

156. Another study did just this, focusing on the role of **children as WASH change agents** to disseminate health messaging from a school-based WASH intervention to their families and communities (Bresee et al., 2016). The qualitative study in Zambia engaged with children through role plays and focus group discussions about this role, and then provided children with 'homework' that included sharing health messages and how to build a handwashing station, for which they were encouraged to engage with their family. The study found that the children were enthusiastic in doing so and mothers reported having trust in the children to relay health information. But the children were only able to enact small behaviour changes (rather than the larger infrastructure changes required, such as the construction of toilet latrines), and ongoing guidance was required.

157. A quasi-experimental study conducted in South Africa measured observed **habitual handwashing** as the primary outcome and compared the effects of an education programme on handwashing alone in one school with the combined effects of the same programme and physical improvements in hygiene and sanitation facilities in another (Bulled et al., 2017). This small study found a significant increase in observed habitual handwashing following improvements in hygiene and sanitation facilities, with smaller increases in handwashing occurred following education alone.

158. A fifth study had the **prevalence of trachoma**[35] as the primary outcome (Chen et al, 2021). This cross-sectional study in the United Republic of Tanzania collected data on pre-existing health messages and water infrastructure in the schools. Analysis of this data found that having a washing station in the school was associated with lower community rates of trachoma, but primary school health messages and materials on trachoma were not associated with clean faces or lower community rates of prevalence. Unlike the Zambian study, this study concluded that students are unlikely to effectively disseminate health (WASH) information.

159. Lastly, a cross-sectional Zambia study analysed administrative education data to determine the impact of a lack of WASH facilities in schools on **repetition and dropout rates**, particularly for girls. The study found that a lack of WASH in schools was associated with high rates of repetition and dropout in school for girls compared to boys, especially from the age of 13 and in grades 6, 7 and 8 (Agol & Harvey, 2018). The authors attributed this to the challenges of menstrual hygiene as young girls enter puberty and argue that "ensuring adequate access by teenage girls can be a strategic step towards bridging gender inequalities in the learning environment (p294)."

5.7 Summary of findings

160. While school nutrition programmes, deworming and nutrition education interventions are widespread in the region, the evidence base for their effectiveness in improving child health and education outcomes in Southern Africa over the last decade is limited. This is in contrast to the evidence base that has been built around school-based HIV prevention interventions, which is substantial. While school-based WASH interventions are not be as widespread (given the patchy coverage of WASH services and infrastructure in schools in the region), this review found that they suffer from a similarly limited evidence base in the region over this period. A striking finding specific to school feeding programmes in the region is the lack of experimental studies assessing

[35] Trachoma is a disease of the eye caused by infection with the bacterium Chlamydia trachomatis and which can cause blindness. According to WHO, infection spreads through personal contact (via hands, clothes or bedding) and by flies that have been in contact with discharge from the eyes or nose of an infected person. See https://www.who.int/news-room/fact-sheets/detail/trachoma.

the effectiveness and impacts of these programmes, especially given the presence of national programmes in almost all of the countries in the region.

161. The available evidence on the effects of **school feeding** programmes in the region is drawn from a small number of quasi-experimental and non-experimental studies and therefore provides a limited basis for drawing broad conclusions. The findings suggest that school feeding programmes are associated with improvements in school enrolment and attendance and, to a lesser extent, reduced dropouts, but studies also noted that these outcomes are likely to be influenced by a range of other factors such as the quality of teaching, the school environment, household socio-economic status and competing demands outside of school. There is limited evidence (or investigation) of the potential impact of school feeding and supplementation on learning and cognitive outcomes in this region. The available studies found improvements in self-reported short-term hunger and measures of dietary diversity at household level. Only two studies assessed objective measures of nutritional status such as anthropometry and both found a positive association between the intervention – which comprised providing a breakfast in addition to the existing school feeding programme – and improvements in stunting (a 'catch up' effect), while one observed a protective effect against overweight and obesity. Including these and other nutritional indicators in the regular monitoring of school feeding programmes would allow for a better understanding of the impacts of these programmes on the nutritional status of school-aged children, and how the programmes can be strengthened.

162. Of the studies that considered **school-based nutrition education** interventions, there were consistent reports of improved knowledge as a result of nutrition education. This was borne out by two experimental studies conducted in different parts of South Africa which both found improvements in levels of knowledge, but no significant impacts on subsequent behaviour. The authors of one of the studies attributing this to the constraints children in low-income areas face in implementing healthy food choices in practice (Oosthuizen et al., 2011). Future nutrition education interventions would benefit from further research into the potential pathways and approaches to needed to bring about behavioural change and the promotion of healthy eating habits.

163. Again, the review identified few (four) studies that assessed **deworming** interventions, providing a limited evidence from which to draw conclusions. These studies suggest that the school-based (targeted) deworming interventions can reduce the prevalence of parasitic interventions after treatment. There was also an indication of positive effects on morbidity, stunting and health knowledge, but these findings were from a single study (Wei et al., 2019). At least one study recommended combining school-based deworming interventions with other health and nutrition interventions to maximise health and nutrition outcomes (Müller et al., 2017).

164. The evidence base for **school-based HIV prevention interventions** is rigorous and substantial and includes several RCTs. The studies reviewed here provide evidence of the protective effect for girls of staying in school, with support measures for encouraging girls to stay in school showing varying degrees of success. Other interventions also measured HIV (and/or STI infection) as a primary outcome but the pattern for these interventions was less clear. Several school-based programmes impacted on age of sexual debut and other sexual risk behaviours (e.g., condom use and partner selection) – which differs from the indicative findings on nutrition education – but this was not always consistent even within studies, where effects on some behaviours might be found but not on others. Several of the interventions assessed included multiple components and out-of-school activities or engagements, addressing the broader environments in which school-aged children make decisions. At least one of the studies went beyond measuring if behaviour change occurred or not, to exploring the pathways to behaviour change and mediating factors (Meinck et

al, 2019). Fewer studies had changes in HIV and sexual health knowledge as their primary outcome (as this is an intermediate step on the way to behaviour change), but five of the six studies that did found significant improvements in levels of knowledge as a result of HIV prevention education interventions.

165. Lastly, the evidence based for **school-based WASH** interventions was also limited and covered a range of interventions was varying outcomes. Efforts at improving knowledge of health and WASH-based messaging appeared successful, but there was insufficient evidence to draw conclusions on the extent to which this was disseminated or impacted on lasting behaviour change. A cross-sectional study that considered the gendered effects of the lack of WASH facilities in schools on grade repetition and school dropout rates found that the absence of adequate facilities appears to disproportionally impact on adolescent girls, with negative consequences for their academic achievement (Agol & Harvey, 2018).

6 CHALLENGES AND GAPS

166. The effectiveness of school-based health and nutrition interventions discussed thus far is affected by the programme components (e.g., quality of design, service delivery, funding and programme management, and monitoring and evaluation systems etc.) and how the programmes are implemented in practice. This section highlights some of the challenges and gaps identified in the course of this review that impact on the effectiveness of these interventions.

167. Two studies that provide a **continental overview** of national school feeding programmes also identified areas of challenges and gaps. The comprehensive study on sustainable school feeding on the African continent commissioned by the African Union (2018) noted the following gaps and areas for improvement: (a) an ongoing focus on education-based objectives rather than a cross-sectoral approach; (b) single line ministries and/or WFP being the sole financing and implementation agencies; (c) a lack of monitoring and evaluation (M&E) for school feeding programmes on a national scale; (d) a lack of large-scale structured demand programmes and supply-side responses to support the expansion of HGSF and local production capacities; (e) limited cross-sectoral coordination and integration of school feeding into national development plans and agendas; and (f) the ongoing challenge of achieving complete national ownership of school feeding programmes.

168. Survey respondents in a regional overview of national school food and nutrition programmes in Sub-Saharan Africa (FAO, ABC & FNDE, 2018) also identified several service delivery challenges and gaps in school feeding programmes, including: (a) low coverage within countries; (b) heavy reliance on external funding; (c) insufficient human, financial and technical resource capacities; (d) a lack of nutrition guidelines for school meals; (e) weak institutional arrangements to support school feeding; (f) insufficient school-based food and nutrition education training; (g) poor or inadequate quantity and quality of school meals; (h) poor kitchen and storage facilities for school feeding; and (i) a lack of adequate M&E systems (FAO, 2018).

169. Similar challenges to the global ones above are identified in the Southern Africa region. For example, at country level, an implementation evaluation of the NSNP in South Africa (JET Education Services, 2016) found that, while the programme is reaching the intended beneficiaries and most receive meals regularly, there are service delivery challenges relating to the composition of the meals (diversity and quantity); food preparation (including storage space) and health and safety; and timely and delivery by service providers; as well as programme management challenges with the disbursement of funds to schools and the contracting and payment of service providers. The study also noted that monitoring and reporting systems are in place, but they are hampered by a

lack of national norms and standards and capacity shortages. This study and other country-level evaluations provide insight into these challenges and gaps in practice in the region. The following section synthesises key challenges that emerged in the course of this review, including implementation challenges that emerged for WASH and HIV-related interventions.

Programme design

170. The overview study commissioned by the African Union (2018) highlighted that offering complementary health interventions is a cost-effective means of enhancing education and nutrition outcomes, but if **nutrition guidelines** for school meals do not exist or are not enforced, the effects on these outcomes will be limited, even when complementary interventions are in place. Other programme design challenges related to school feeding range from the **timing of meals**, which can be less than optimal for supporting children's energy and nutritional needs throughout the day (e.g., JET Education Services, 2016), through to the bigger picture systems challenges of designing and implementing the **value chains** for school nutrition, particularly in the context of promoting home grown school feeding.

171. A programme design challenge that was noted in the HIV prevention literature (and applies to other school-based health and nutrition interventions reviewed here as well) is the need to ensure that programmes and interventions are relevant and **responsive to the context** in which they are implemented, taking into account social, cultural and economic factors that impact on effectiveness or result in resistance (Sadiq Sani et al., 2018).

172. A gap noted in the studies on nutrition education is the need to draw evidence-based approaches to achieving **behaviour change** into the design of such programmes (FAO et al, 2018).

173. Another design challenges relates to the fact that a range of factors external to school-based health and nutrition programmes can limit their effectiveness. Examples include the quality of teaching, the school environment, household poverty or general food insecurity, or gender-based norms and practices. This requires acknowledging the social determinants of health that impact on children's lives and behaviours and adopting an ecological or **systems** approach to programme design (Mason et al., 2013).

Implementation

174. A number of implementation challenges were noted in the programme evaluations of the school feeding programmes. These included challenges in **procuring sufficient food** to meet the demand and **delivering the food timeously**, without delays and in a predictable manner. Reasons for this included planning and logistical challenges, funding constraints and management capacity, as well as external factors such as droughts or poor road networks. These shortfalls in the food required led to food being provided less frequently and reliably than intended, and in smaller portions. These shortfalls were quite significant at times, adversely affecting the potential nutritional gains for children. In one example, an evaluation of a school feeding programme in Madagascar (Pinault et al., 2019) reported challenges in securing sufficient food to cover the needs of primary school children over the course of the year; as a result, about half of the students reported still being hungry after the school meal.

175. Linked to this are the challenges of **procuring adequate food locally**, whether through a HGSF model or similar programme, or through school gardens. Meeting the demand for the school feeding programmes can be challenging, whether in terms of supplying the volume of food needed, the nutritional diversity required or the demand for some processed products that local producers cannot meet. One study suggested that this approach requires juggling priorities, since relying on local traders and farmers to buy small quantities of food may be more expensive (and

more vulnerable to shocks) than procuring food from larger-scale suppliers as supermarkets or specialised farmers, resulting in a shift in this direction in practice (de Casto et al., 2018). The review of school feeding programmes in Africa (African Union, 2018) pointed to the lack of the large-scale structured demand programmes and supply-side responses needed to support the expansion of HGSF and local production capacities. Other challenges affecting local production and procurement include securing land for school gardens (or communal gardens to supply schools) and adverse weather conditions affecting the region, such as El Niño-induced drought and localised floods.

176. Another challenge for school feeding is the variable **nutritional quality** of meals, with a tendency to focus on providing children with a meal (to address short-term hunger) and placing less emphasis on the nutritional value of those meals and whether or not they meet children's age- and gender-specific nutritional needs. A 2016 evaluation of the NSNP in South Africa reported that only half (50.2%) of the schools visited for the study served a main meal comprising three food groups (starch, protein and vegetables/fruit); and fruit or vegetables were the food group most often not served (JET Education, 2016). Monitoring the composition and nutritional content of school meals is crucial in achieving improved health and nutrition.

177. **Inadequate infrastructure** at schools to support feeding programmes was another frequent challenge – specifically limited (or no) kitchen facilities and storage space as well as inadequate cooking/feeding equipment. As noted, many schools in the region also lack adequate clean running water and/or toilets fit for use, undermining children's health and the potential benefits of school-based nutrition programmes and WASH education initiatives. The gendered effects of this poor coverage have been noted (e.g., Agol & Harvey, 2018), with a lack of sufficient and adequate WASH facilities acting as a barrier to achieving quality education for girls in particular. The need to address the poor coverage of WASH infrastructure to reduce the transmission of disease has also been thrown into sharp relief by the COVID-19 pandemic.

178. Challenges identified in implementing school-based **HIV interventions** are somewhat different and include, among others, resistance to teaching sexuality education and safe sex promotion; a lack of skills, training or time on the part of already busy teachers to convey sensitive information; little open communication about sexual health matters between youth and adults; and logistical challenges in school environments (Sadiq Sani et al., 2018). Programme fidelity, or not implementing programmes uniformly across sites, can also undermine the effectiveness of programmes (e.g., Matthews et al., 2012).

Financing, resourcing and governance

179. **Sustainability** and **financing** were also identified as a challenge in the implementation of school nutrition programmes, although the financial and institutional arrangements varied across countries. Adequate funding emerged as a challenge for HIV prevention interventions as well.

180. Linked to this was the observation that more could be done to strengthen **multi-sectoral links**, oversight and coordination, such as linking school feeding to agricultural policies and national development plans or working to operationalise cross-institutional strategies or frameworks for coordination. A challenge for school-based HIV prevention interventions is ensuring a range of stakeholders – students, teachers, parents, school authorities, health workers and even the public – are involved in (and on board with) the intervention from the early stages, as broad collaboration can be key to successful implementation. On a practical management level, a challenge for WASH infrastructure initiatives is to encourage local **ownership** of the infrastructure and to work with schools and other local stakeholders to ensure the ongoing maintenance.

181. In school feeding programmes, the time burden and the often unequal, **gendered division of labour** was also noted as a challenge. Whether as volunteers or caterers and cooks, the responsibility for preparing the food tends to fall to women, placing considerable demands on their time and for which they often receive little or no remuneration. These demands must be juggled with other care and household commitments, while other examples were given of static and/or delayed payments to cooks and caterers, which led to a decline in the real value of their income and limited their ability to invest in their enterprises or purchase locally. For example, an evaluation of the NSFP in Namibia (Land et al., 2020) observed that many (mostly female) cooks spend as much as 6-8 hours a day supporting school feeding, time which could be used to meet other household responsibilities and/or seek alternative sources of paid income. Thus, programmes may reinforce unequal gender roles rather than support women's empowerment as intended.

Monitoring and evaluation

182. Lastly, a clear gap in Southern Africa is the **limited evidence base** for school-based health and nutrition interventions, both compared to other regions in Sub-Saharan Africa and compared to school-based HIV prevention interventions or other social protection interventions, such as cash transfers. While school feeding is a widely implemented intervention in the region, investments in monitoring and evaluation appear to be **largely neglected**. In addition to the lack of RCTs in Southern Africa, many country programmes appear to have limited or unrealistic results frameworks and do not systematically and consistently track performance beyond basic operational indicators such as the number of meals delivered. This is particularly the case for nutritional outcomes. The gaps in both monitoring data and rigorous impact assessments limit the evidence available to feedback to decision-makers.

7 CONCLUSIONS AND LESSONS LEARNED

183. School-aged children in southern Africa face a number of health and nutrition challenges, but many of these health conditions of these learners are preventable and treatable through an integrated package of health and nutrition services. Given the increase in enrolment and the reach of schools, the **school system** provides a critical opportunity for delivering essential health and nutrition services to children of school-going age.

184. The finding that national school feeding programmes have been established in almost all of the 16 countries in the Southern Africa region (with others being piloted on a slightly smaller scale) shows that there is a high level of 'buy-in' on the need for such programmes. Other complementary programmes such as school-based nutrition education and deworming interventions are also **widespread**, and there is a particular emphasis on HIV prevention interventions given the size of the epidemic in the region. The coverage of WASH facilities in school, on the other hand, is low in several countries and undermines the efforts of the other health and nutrition interventions. With the limited evidence base for the effectiveness of school feeding in particular, emphasis should be placed on addressing the **implementation** challenges that impact the effectiveness of these programmes and implementing further rigorous monitoring and evaluation systems so that the programmes can be adapted and strengthened to better improve outcomes for school-age children and the impacts on child outcomes can be clearly assessed.

185. The **evidence** that is available on school feeding is broadly in line with the international literature, showing positive effects for short-term hunger and keeping children in school, with tentative findings of positive impacts on learning and anthropometric outcomes. Implementation challenges abound, including a focus on food rather than child and adolescent nutrition, which undermine the potential gains of these programmes. More rigorous, longitudinal research that

includes identified control groups would provide more reliable information on what works and what does not in this context.

186. While the implementation of the school-based health and nutrition interventions reviewed here may differ slightly, there are some lessons that have emerged that can contribute to improved design and implementation of programmes in the region going forward.

- Adopting a **life course approach** to health and nutrition interventions acknowledges the first 1,000 days as a critical window for child development, but also recognise that the emphasis on investing in and monitoring the nutritional status of young children is "essential but not sufficient" (Bundy et al., 2018). It draws attention to the nutritional and health status of school-aged children in their own right (as well as being a means to maintain and build on earlier investments and support the health of future generations); it highlights school-aged children's changing nutrition and health needs (by age and gender) as they grow and develop; and positions schools as an important delivery platform for health messaging and services. A life course approach also flags the importance of 'starting early', both in terms of ensuring adequate nutrition and establishing healthy, protective habits and behaviours.

- The review of the health status of school-aged children emphasises the need for school-based health and nutrition interventions to adopt a **gender lens**. The increased vulnerability of girls and young women in the region to HIV infection (as compared to their peers), the negative impacts of the lack of WASH facilities and services in schools on girls' learning, and the differential malnutrition outcomes underscore the need for such an approach.

- Nutrition, WASH and HIV prevention interventions all include educational elements in an effort to effect **behaviour change**. Lessons can be learnt from the body of research investigating the potential pathways (and mediators) and approaches needed to about behavioural change and promote healthy habits.

- School-based interventions do not occur in a vacuum, and an array of 'external' factors may impact on their effectiveness. Changing behaviours is not a straightforward task and requires an **ecological** or systems approach that recognises that schools intersect with other settings in which children live and which shape their choices and behaviours.

- In addition to informing interventions with multiple elements across different sites, such an approach recognises the importance of an **enabling legal and policy environment** that provides a framework for collaboration across sectors, clarifies mandates and that can also set standards, as in the case of school feeding programmes. Addressing child malnutrition requires linking or integrating school feeding and other complementary programmes into national policies and strategies.

- A related lesson from the HIV and AIDS literature is the need to think beyond individual behaviours and to consider **structural** interventions. The challenges that many children face require multiple points of intervention, as well as a multi-sectoral approach to improving children's health and nutrition status. In the realm of HIV prevention, this has included exploring the role of economic strengthening measures such as cash transfers and other social protection measures – which can also contribute to reducing food insecurity – as well as measures to keep girls in school because of the protective efforts of education. Effective school-based health and nutrition interventions and efforts to improved access to WASH in schools can also play role in retaining girls in school.

- Challenges in the **delivery and implementation** of programmes can undermine the effectiveness and potential gains of school-based health and nutrition programmes, even when they are well designed. Attention needs to be paid to addressing obstacles in implementation so that the full potential for improving child outcomes can be realised.

- The limited evidence base for several school-based health and nutrition interventions in the region points to the need for establishing rigorous **monitoring and evaluation** systems that can provide the evidence needed to inform policy decisions, strengthen the design and implementation of interventions and advocate for greater investment in the health and nutrition of school-aged children. The human and socio-economic costs of the COVID-19 pandemic only reinforce this imperative.

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Annex B: Acronyms

AfDB	African Development Bank
AIDS	Acquired Immunodeficiency Syndrome
AU	African Union
AUDA	African Union Development Agency
COHA	Cost of Hunger in Africa
COMESA	Common market for Eastern and Southern Africa
ECD	Early Childhood Development
ECOWAS	Economic Community of West African States
EMIS	Education Management Information System
FAO	Food and Agriculture Organization of the United Nations
GBD	Global Burden of Disease
GDI	Gender Development Index
HCI	Human Capital Index
HDI	Human Development Index
HIV	human immunodeficiency virus
HGSF	Home Grown Feeding School
IFAD	International Fund for Agricultural Development
IHME	Institute of Health
IPC	Integrated Food Security Phase Classification
JMP	WHO/UNICEF Joint Monitoring Programme for WASH
M&E	Monitoring and evaluation
NSFP	National School Feeding Programme
NSNP	National School Nutrition Programme P
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
POU	Prevalence of undernourishment
RCT	randomised control trials
SADC	Southern African Development Community
SDG	Sustainable Development Goal(s)
SFP	School Feeding Programme
SMP	School Meals Programme
STH	Soil-transmitted helminths
STI	Sexually transmitted infections
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VMMC	Voluntary male medical circumcision
WASH	Water, sanitation and hygiene
WFP	World Food Programme
WHO	World Health Organization

Annex C: Methodology

This annex sets out the common methodology used for the systematic review in the three regional studies.

Search strategy

We conducted a literature search of key academic and grey literature sources as listed below:

- Academic databases:
  - African Index Medicus
  - Campbell Collaboration
  - Cumulative Index to Nursing and Health Allied Literature (CINHAL)
  - DOPHER
  - EMBASE
  - JBI collaboration
  - PubMed via Ovid Medline
  - Scopus
  - The Cochrane Library
  - Trial registers (e.g. Pan African Clinical Trials Registry, Cynical Trials.gov, WHO clinic trials)
  - Web of Science
- Google Scholar for additional resources
- Other grey and non-academic literature sources:
  - Government health departments or ministries
  - Government education departments or ministries
  - Government departments or ministries responsible for social protection/development
  - Sub-national government entities responsible for health, welfare, nutrition
  - National school feeding/food/meals programmes and agencies
  - National and local non-governmental organizations
  - International non-governmental organizations
  - Private foundations and philanthropic organizations
  - Bilateral and multilateral organizations or agencies (for example: FAO, IFAD, UNDP, UNICEF, WFP, WHO, World Bank, UK AID/DFID, USAID, OECD)
  - Continental and regional institutions: African Union Commission, and African Union Development Agency, UN Economic Commission for Africa, ECOWAS, East African Community, SADC, African Development Bank.

Supplementary searches

We conducted further supplementary searches as follows:

- Checked the reference lists of the included studies (backward chasing), and citation follow up (forward chasing) with the aim of identifying additional papers/reports that may have been missed by the database and grey literature searches.
- We consulted the WFP regional offices focal persons to help us identify any policy documents and other relevant reports in their possession.

Inclusion/exclusion criteria

The studies were included in the review if they met the following criteria:

- Studies focused on school-aged children and adolescents (5-19 years) in one of the three regions in Sub-Saharan Africa (in this case, Southern Africa);
- Studies that assessed one or more of our focused school-based interventions: school feeding and/or supplementation or school-based deworming, nutrition education, HIV or WASH interventions
- Studies published between January 2010 and November 30, 2020.

The outcomes of interest included educational, nutritional and health outcomes. The outcomes of interest were categorised in Southern Africa as follows:

- Educational outcomes (for example, impacts on school enrolment and attendance, retention and dropout, academic performance, and completion rate)
- Nutritional outcomes (knowledge, impacts on short-term hunger, dietary diversity, stunting, thinness, overweight and obesity, nutrient and energy intake, nutrition knowledge)
- Health outcomes (knowledge, prevalence of parasitic infection such as hookworm, sexual risk behaviours, HIV or HSV-2 prevalence, etc.)

Study selection for inclusion

One regional consultant conducted the database searches for all three regions. In the first phase of the study, the searches were conducted separately for each region and three screening for inclusion was conducted per region. In the second phase, the study search included all three regions, and the screening was conducted twice (by pairs of researchers) to eliminate any selection bias. First, the reviewers screened all the titles, followed by the abstracts and full texts of the potentially qualifying titles and abstracts. This was done after the removal of duplicate studies/reports.

Data collection and analysis

We extracted both qualitative textual and quantitative statistical data from the included studies using a data extraction form. Following the data extraction, a narrative synthesis of the data was performed with a tabulation of the results (see Annex F). We had planned to conduct a meta-analysis of the statistical data to estimate the effect of each intervention. However, following the completion of the data extraction it was not possible to perform this analysis because of the heterogeneity of the included studies – the data reported were not always similar, there was important statistical information missing for some intervention and control groups, and not all studies (particularly in the Southern Africa region) were suited to this kind of analysis. Therefore, we extracted the quantitative data that were reported in the studies and use it to support the qualitative narrative synthesis of the findings.

In separate step, we also considered studies that focused on implementation challenges as well as outcomes, to get a sense of challenges, gaps and lessons learnt. These studies tended to be qualitative and are not included in either the data extraction summary or the PRISMA flow diagram.

Quality assessment of included studies

Ideally, for any systematic review, a quality of risk bias assessment of the included studies needs to be carried out using an appropriate quality assessment/risk of bias tool. The aim is to evaluate the methodological quality and strength of the evidence (Booth et al., 2016). However, in this review we took a decision, in consultation with the commissioners of the review, not to do an in-depth quality assessment of the studies due to time constraints.

Figure 10: PRISMA flow diagram illustrating selection process for school feeding, deworming and nutrition education interventions

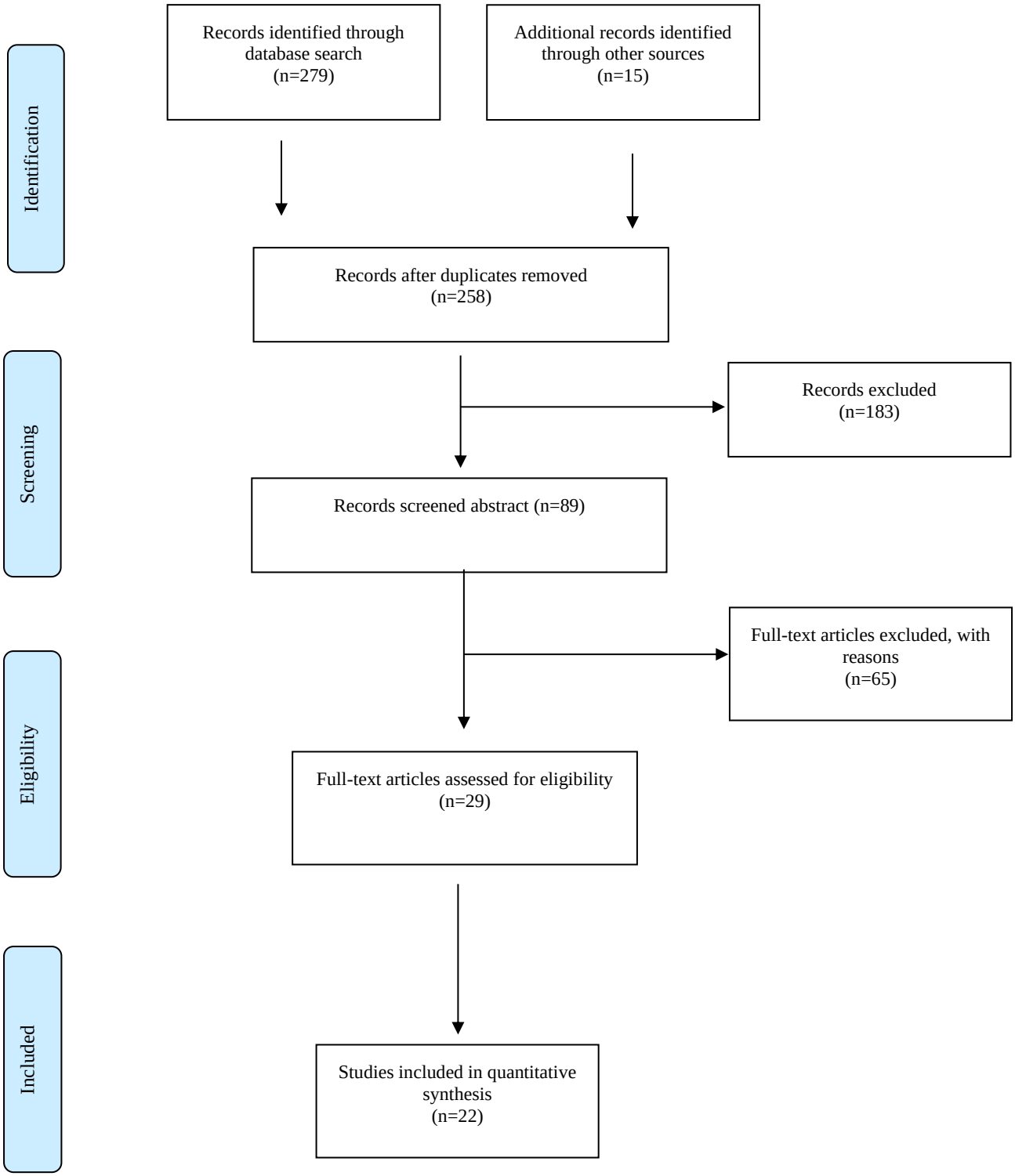


Figure 11: PRISMA flow diagram illustrating selection process for school-based HIV interventions

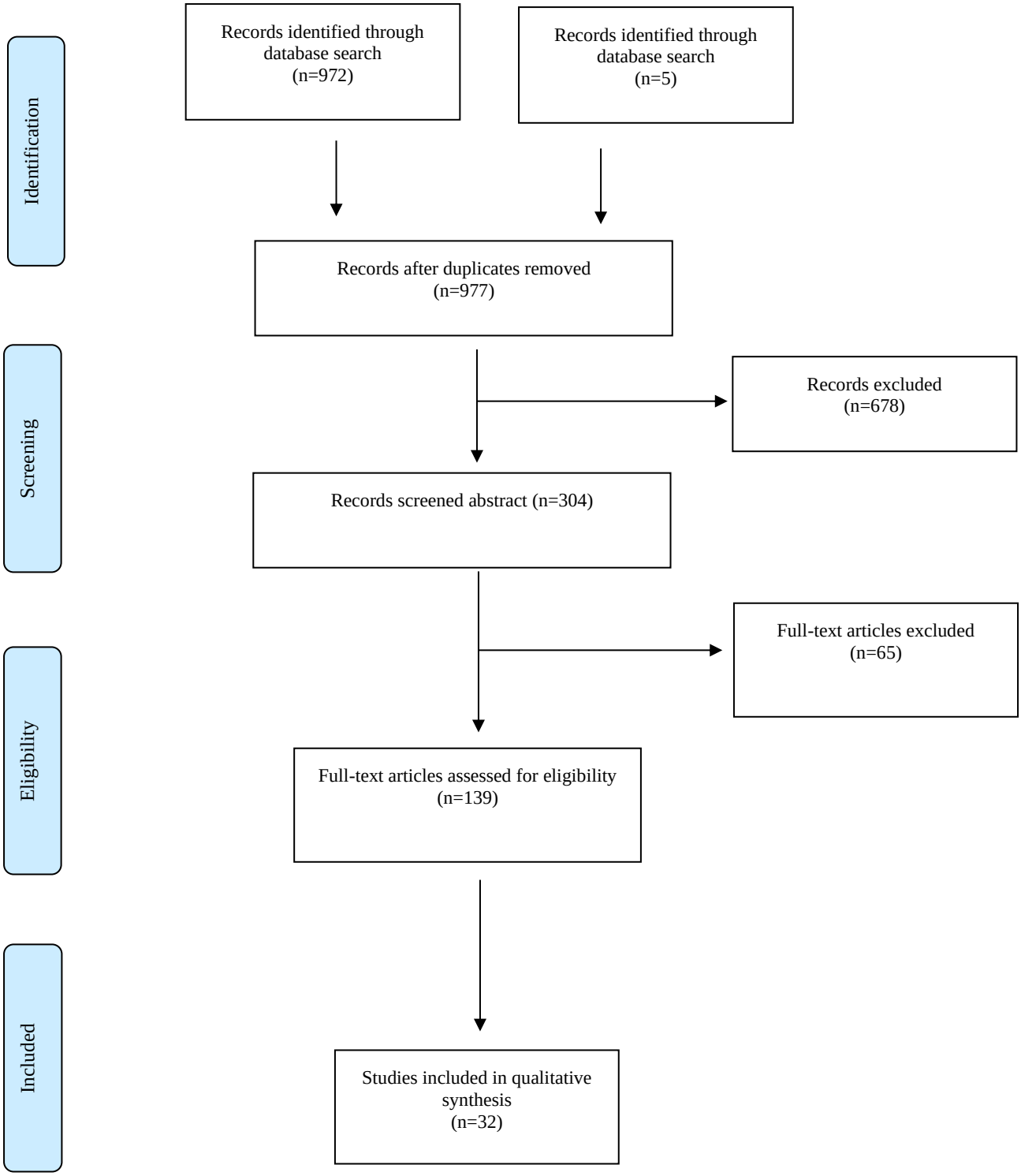
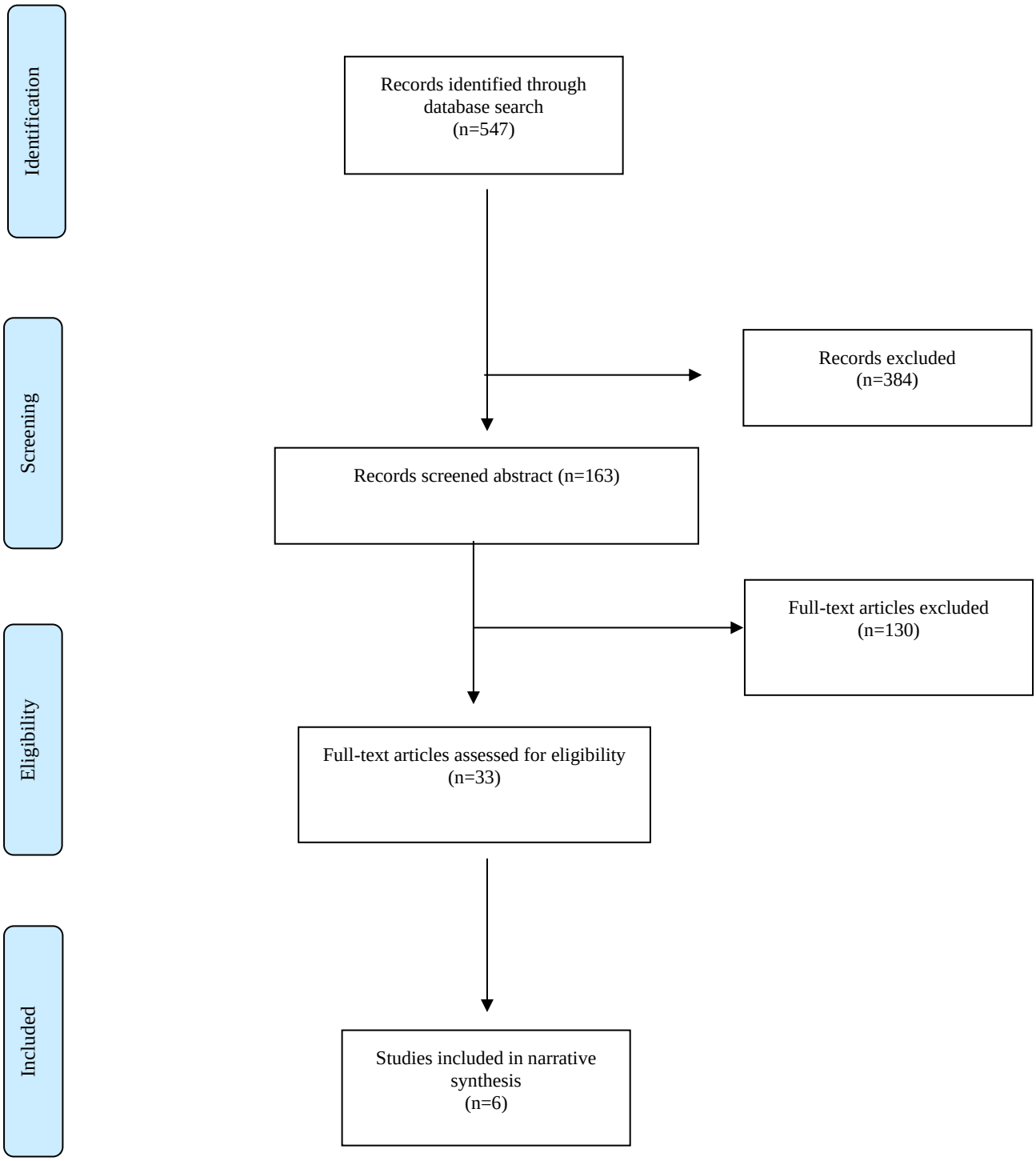


Figure 12: PRISMA flow diagram illustrating selection process for school-based WASH interventions



Annex D: Data tables

Table 7: Measures of malnutrition in Southern Africa (percentage)

Country	Prevalence of undernourishment (POU) in the total population		Prevalence of severe food insecurity in the total population		Prevalence of wasting: children under 5 years of age	Prevalence of stunting: children under 5 years of age*	Prevalence of overweight children under 5 years of age		Prevalence of obesity in the adult population (18 years and older)		Prevalence of anaemia in women of reproductive age: (15-49 years)	
	2004-2006	2017-2019	2014-2016	2017-2019	2019	2020	2012	2019	2012	2016	2012	2016
Angola	52.2	18.6	21.0	n.a.	4.9	37.7	n.a.	3.4	6.8	8.2	47.3	47.7
Botswana	22.5	24.1	34.9	41.2	n.a.	22.8	10	n.a.	17.5	18.9	29.4	30.2
Democratic Republic of Congo	n.a.	n.a.	n.a.	n.a.	n.a.	40.8	4.9	n.a.	5.6	6.7	44.7	41
Eswatini	9.4	16.9	29.4	30.0	2.0	22.6	10.7	9.0	14.9	16.5	26.7	27.2
Lesotho	13.8	32.6	n.a.	27.0	2.1	32.1	7.3	6.6	14.9	16.6	27.2	27.4
Madagascar	33.5	41.7	n.a.	n.a.	6.4	40.2	1.1	1.4	4.3	5.3	36.6	36.8
Malawi	22.5	18.8	51.7	51.8	1.3	37	9	2.5	4.8	5.8	32.3	34.4
Mauritius	5.1	5.3	5.2	6.7	n.a.	24.2	n.a.	n.a.	9.6	10.8	21.6	25.1
Mozambique	33.4	32.6	40.7	40.7	4.4	37.8	7.8	7.0	6.1	7.2	49.9	51
Namibia	15.7	14.7	30.6	31.3	n.a.	18.4	4.7	n.a.	15.1	17.2	24.7	23.2
Republic of Congo	34.1	28.0			8.2	18	3.5	5.9	8.3	9.6	53.8	51.9
Seychelles	n.a.	n.a.	3.2	n.a.	n.a.	7.4	10.2	n.a.	12.4	14.0	20.3	22.3
South Africa	3.5	5.7	18.0	n.a.	2.5	23.2	17.2	13.3	26.1	28.3	25.7	25.8
United Republic of Tanzania	31.7	25.0	n.a.	23.8	3.5	32	5.1	2.8	6.9	8.4	29.6	28.5
Zambia	n.a.	n.a.			4.2	32.3	8.4	5.2	6.8	8.1	31.2	33.7
Zimbabwe	n.a.	n.a.	35.5	34.2	2.9	23	5.8	2.5	14.3	15.5	30.1	28.8

Source: FAO, IFAD, UNICEF, WFP and WHO (2020) *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome: FAO.
**Source of stunting data*: UNICEF/WHO/World Bank (2021) *Levels and trends in child malnutrition.*

Table 8: Prevalence of HIV among the general population (15 – 49 years) and youth (15 – 24 years) in Southern Africa, 2019

2019 Data	HIV prevalence (15-49)	HIV prevalence (15-24)		
		All	Female	Male
Angola	1.9 [1.5–2.2]	0.8 [0.4 - 1.3]	1.2 [0.5 - 1.9]	0.4 [0.1 - 0.7]
Botswana	20.7 [18.2–22.1]	7.1 [4.7 - 9.6] *	9.3 [5.1 - 13.1] *	5.0 [3.0 - 6.6] *
Democratic Republic of Congo	0.8 [0.6–1]	0.3 [0.2 - 0.5]	0.5 [0.2 - 0.7]	0.2 [0.1 - 0.3]
Eswatini	27 [24.6–28.7]	8.1 [4.4 - 10.6]	12.3 [5.7 - 16.2]	4.1 [2.1 - 5.9]
Lesotho	22.8 [20.3 - 24.0]	7.2 [4.2 - 10.1]	10.1 [4.9 - 14.2]	4.5 [2.1 - 6.4]
Madagascar	0.3 [0.2 - 0.3]	<0.1 [<0.1 - <0.1]	<0.1 [<0.1 - 0.1]	<0.1 [<0.1 - <0.1]
Malawi	8.9 [7.6–9.6]	3.1 [2.0 - 4.3]	4.2 [2.2 - 5.8]	2.1 [1.2 - 2.8]
Mauritius	1.2 [1.1–1.4]	0.2 [0.2 - 0.3]	0.2 [0.1 - 0.3]	0.3 [0.2 - 0.5]
Mozambique	12.4 [9.8–15.6]	5.0 [2.4 - 7.9]	7.1 [3.0 - 11.4]	2.8 [1.0 - 4.9]
Namibia	11.5 [10.4–12.4]	3.8 [2.5 - 5.2]	4.8 [2.6 - 6.7]	2.7 [1.6 - 3.7]
Republic of Congo	3.1 [2.3–4.4]	1.4 [0.7 - 2.4]	2.2 [0.8 - 4.1]	0.6 [0.2 - 1.0]
Seychelles	No data	No data	No data	No data
South Africa	19 [16.1–20.9]	6.8 [3.4 - 10.2]	10.2 [4.1 - 16.0]	3.4 [1.4 - 5.1]
United Republic of Tanzania	4.8 [4.1–5.3]	1.7 [1.0 - 2.4]	2.2 [1.0 - 3.3]	1.2 [0.5 - 1.6]
Zambia	11.5 [10.9–12.1]	4.1 [2.4 - 5.5]	5.5 [2.8 - 7.4]	2.6 [1.4 - 3.8]
Zimbabwe	12.8 [10.9–14.7]	4.6 [2.9 - 6.4]	5.9 [3.2 - 8.4]	3.3 [2.0 - 4.5]

Source: See https://aidsinfo.unaids.org/.

* Children estimates were not available at the time of publication.

Table 9: Coverage of WASH in Schools in Southern Africa, 2019

2019 Data	Percentage of schools with no water service[36]				Percentage of schools with no sanitation service[37]				Percentage of schools with no hygiene service[38]			
	National	Pre-primary	Primary	Secondary	National	Pre-primary	Primary	Secondary	National	Pre-primary	Primary	Secondary
Angola	68	-	82	52	-	-	-	-	-	-	-	-
Botswana	<1	-	<1	<1	<1	-	<1	<1	-	-	-	-
Democratic Republic of Congo	51	-	51	57	7	-	7	-	-	-	-	-
Eswatini	14	-	17	9	<1	-	<1	<1	-	-	-	-
Namibia[39]	Nd	Nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	Nd
Lesotho	-	-	-	-	4	-	4	-	-	-	-	-
Madagascar	63	-	63	74	28	-	36	21	-	-	-	-
Malawi	8	-	8	5	16	-	19	35	76	-	59	63
Mauritius	<1	-	<1	<1	<1	-	<1	<1	-	-	-	-
Mozambique	-	-	-	-	-	-	-	-	-	-	-	-
Republic of Congo	56	44	60	32	40	40	40	25	-	-	-	-
Seychelles[40]	<1	-	<1	<1	<1	-	<1	<1	<1	-	<1	<1
South Africa	<1	-	-	-	12	-	-	-	-	-	-	-
United Republic of Tanzania	29	-	28	-	-	-	-	<1	-	-	-	-
Zambia	17	-	18	5	-	-	-	-	-	-	-	-
Zimbabwe	13	-	14	12	3	13	2	3	37	35	37	41

Sources: HIV prevalence: UNAIDS (2020). UNAIDS Data 2020. See https://www.unaids.org/en/ resources/documents/2020/unaids-data. WASH in schools: WHO-UNICEF Joint Monitoring Programme Data, as at August 2020. See https://washdata.org/monitoring/schools.

[36] Drinking water from an unimproved source or no water source at the school.
[37] Unimproved sanitation facilities or no sanitation facilities at the school.
[38] No handwashing facilities or no water available at the school.
[39] No entry for WASH in schools was found for Namibia.
[40] The HIV epidemiological estimates for the Seychelles were not available at the time of publication.

Table 10: Measures of malnutrition in children and adolescents aged 5-19 years in Southern Africa

Percentage of children and adolescents aged 5-19 years (2016)						
Countries	**Underweight[41]**		**Overweight[42]**		**Obesity[43]**	
	Boys	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**
Angola	35.83	21.16	6.89	14.76	1.71	2.94
Botswana	31.93	16.45	10.44	24.63	3.48	9.07
Democratic Republic of Congo	37.83	21.88	6.11	13.97	1.26	2.97
Eswatini	28.81	14.1	8.27	24.97	2.69	9.3
Lesotho	32.54	14.09	6.19	24.68	1.37	8.71
Madagascar	30.19	19.76	7.86	13.45	1.86	1.66
Malawi	31.38	16.77	6.25	14.77	1.05	2.78
Mauritius	29.37	18.44	11.19	18.44	3.77	5.42
Mozambique	25.85	16.14	7.79	17.01	1.34	3.03
Namibia	32.55	19.36	9.8	20.83	2.94	6.82
Republic of Congo	34.47	21.38	7.78	13.73	2.14	1.71
Seychelles	29.94	18.71	21.07	24.27	10.77	10.8
South Africa	24.26	15.34	20.19	29.38	9.82	12.81
United Republic of Tanzania	30.5	18	7.49	16.11	1.66	3.17
Zambia	29.9	17.55	8.41	16.67	2.09	3.44
Zimbabwe	32.5	14.96	6.54	22.32	1.42	6.54

[41] Adolescent underweight: Children and adolescents aged 5–19 years who are more than one standard deviation below the median BMI-for-age of the WHO growth reference for school-aged children and adolescents (%).
[42] Adolescent overweight: Children and adolescents aged 5–19 years who are more than one standard deviation above the median BMI-for-age of the WHO growth reference for school-aged children and adolescents (%).
[43] Adolescent obesity: Children and adolescents aged 5–19 years who are more than two standard deviations above the median BMI-for-age of the WHO growth reference for school-aged children and adolescents (%).

Source: Development Initiatives (2020). *2020 Global nutrition report: action on equity to end malnutrition.* Bristol, United Kingdom: Development Initiatives.

Table 11: Measures of micronutrient deficiencies in children aged 5 to 14 years and 15 to 19 years in Southern Africa

Countries	Dietary iron deficiency				Iodine deficiency			
	5 to 14		15 to 19		5 to 14		15 to 19	
Angola	16.4%	*[11.2% - 22.2%]*	13.6%	*[8.2% - 19.7%]*	4.2%	*[2.9% - 5.6%]*	8.4%	*[6.3% - 10.9%]*
Botswana	22.4%	*[16.1% - 29.2%]*	8.6%	*[4.1% - 14.9%]*	0.1%	*[0.1% - 0.2%]*	0.3%	*[0.2% - 0.4%]*
Democratic Republic of Congo	24.8%	*[18.9% - 30.3%]*	15.2%	*[10.7% - 19.8%]*	10.0%	*[6.9% - 13.3%]*	19.1%	*[14.5% - 24.1%]*
Eswatini	15.2%	*[10.3% - 20.7%]*	7.1%	*[3.5% - 11.8%]*	0.4%	*[0.2% - 0.6%]*	0.8%	*[0.6% - 1.2%]*
Lesotho	21.8%	*[16.7% - 27.4%]*	9.5%	*[6.3% - 13.3%]*	1.5%	*[0.9% - 2.3%]*	3.3%	*[2.4% - 4.5%]*
Madagascar	23.3%	*[17.6% - 29.0%]*	16.5%	*[10.3% - 23.9%]*	0.8%	*[0.5% - 1.2%]*	1.9%	*[1.4% - 2.6%]*
Malawi	30.2%	*[24.2% - 36.3%]*	17.6%	*[10.8% - 25.2%]*	0.9%	*[0.5% - 1.4%]*	2.2%	*[1.6% - 3.0%]*
Mauritius	10.4%	*[6.1% - 15.6%]*	7.7%	*[3.4% - 13.3%]*	0.1%	*[0.0% - 0.1%]*	0.3%	*[0.2% - 0.4%]*
Mozambique	25.9%	*[20.3% - 31.7%]*	15.1%	*[8.8% - 21.8%]*	0.4%	*[0.2% - 0.6%]*	1.0%	*[0.7% - 1.3%]*
Namibia	19.7%	*[13.6% - 25.4%]*	7.1%	*[4.1% - 10.8%]*	0.3%	*[0.2% - 0.4%]*	0.5%	*[0.4% - 0.7%]*
Republic of Congo	25.8%	*[18.4% - 33.3%]*	14.5%	*[7.1% - 23.4%]*	6.6%	*[4.5% - 8.8%]*	12.8%	*[9.6% - 16.4%]*
Seychelles	9.6%	*[5.2% - 15.0%]*	6.6%	*[2.3% - 12.8%]*	0.1%	*[0.0% - 0.1%]*	0.2%	*[0.2% - 0.3%]*
South Africa	11.3%	*[7.6% - 15.5%]*	10.0%	*[6.9% - 13.7%]*	0.3%	*[0.2% - 0.4%]*	0.6%	*[0.4% - 0.8%]*
United Republic of Tanzania	31.7%	*[24.8% - 38.5%]*	24.8%	*[16.6% - 34.0%]*	0.2%	*[0.1% - 0.3%]*	0.4%	*[0.3% - 0.6%]*
Zambia	39.6%	*[34.5% - 44.9%]*	25.5%	*[20.5% - 30.7%]*	0.4%	*[0.3% - 0.6%]*	1.0%	*[0.7% - 1.3%]*
Zimbabwe	19.9%	*[14.4% - 25.9%]*	11.8%	*[7.5% - 16.7%]*	1.2%	*[0.7% - 1.8%]*	2.6%	*[1.9% - 3.7%]*

Table 12: Measures of micronutrient deficiencies in children aged 5 to 14 years and 15 to 19 years in Southern Africa (continued)

Countries	Protein-energy malnutrition				Vitamin A deficiency			
	5 to 14		15 to 19		5 to 14		15 to 19	
Angola	0.2%	*[0.1% - 0.2%]*	0.2%	*[0.1% - 0.2%]*	1.3%	*[0.8% - 1.9%]*	0.1%	*[0.1% - 0.2%]*
Botswana	0.3%	*[0.2% - 0.4%]*	0.3%	*[0.2% - 0.4%]*	1.2%	*[0.8% - 1.8%]*	0.1%	*[0.0% - 0.1%]*
Democratic Republic of Congo	0.3%	*[0.2% - 0.4%]*	0.3%	*[0.2% - 0.4%]*	2.7%	*[1.9% - 3.7%]*	0.1%	*[0.1% - 0.2%]*
Eswatini	0.3%	*[0.2% - 0.3%]*	0.3%	*[0.2% - 0.3%]*	0.8%	*[0.6% - 1.3%]*	0.1%	*[0.0% - 0.1%]*
Lesotho	0.3%	*[0.3% - 0.5%]*	0.3%	*[0.3% - 0.4%]*	1.5%	*[1.0% - 2.1%]*	0.1%	*[0.1% - 0.1%]*
Madagascar	0.4%	*[0.3% - 0.5%]*	0.4%	*[0.3% - 0.5%]*	1.7%	*[1.1% - 2.4%]*	0.0%	*[0.0% - 0.1%]*
Malawi	0.4%	*[0.3% - 0.6%]*	0.5%	*[0.4% - 0.6%]*	2.3%	*[1.6% - 3.0%]*	0.0%	*[0.0% - 0.1%]*
Mauritius	0.8%	*[0.5% - 1.1%]*	0.8%	*[0.6% - 1.1%]*	0.2%	*[0.1% - 0.3%]*	0.0%	*[0.0% - 0.1%]*
Mozambique	0.2%	*[0.1% - 0.2%]*	0.2%	*[0.2% - 0.2%]*	2.4%	*[1.7% - 3.4%]*	0.0%	*[0.0% - 0.0%]*
Namibia	0.4%	*[0.3% - 0.5%]*	0.4%	*[0.3% - 0.5%]*	0.7%	*[0.5% - 1.0%]*	0.1%	*[0.0% - 0.1%]*
Republic of Congo	0.2%	*[0.1% - 0.2%]*	0.2%	*[0.2% - 0.3%]*	3.2%	*[2.3% - 4.4%]*	0.2%	*[0.1% - 0.2%]*
Seychelles	0.5%	*[0.4% - 0.7%]*	0.6%	*[0.5% - 0.8%]*	0.2%	*[0.2% - 0.4%]*	0.0%	*[0.0% - 0.1%]*
South Africa	0.3%	*[0.2% - 0.5%]*	0.3%	*[0.2% - 0.5%]*	0.5%	*[0.4% - 0.7%]*	0.1%	*[0.0% - 0.1%]*
United Republic of Tanzania	0.2%	*[0.1% - 0.3%]*	0.2%	*[0.1% - 0.3%]*	1.3%	*[0.9% - 1.8%]*	0.1%	*[0.0% - 0.1%]*
Zambia	0.2%	*[0.2% - 0.3%]*	0.3%	*[0.2% - 0.3%]*	1.1%	*[0.8% - 1.6%]*	0.1%	*[0.1% - 0.1%]*
Zimbabwe	0.4%	*[0.3% - 0.5%]*	0.4%	*[0.4% - 0.5%]*	2.0%	*[1.4% - 2.8%]*	0.1%	*[0.1% - 0.1%]*

Table 13: Measures of parasitic infection (three types) in children aged 5 to 14 years and 15 to 19 years in Southern Africa

Countries	Ascariasis				Hookworm disease				Trichuriasis			
	5 to 14		15 to 19		5 to 14		15 to 19		5 to 14		15 to 19	
Angola	11%	*[7% - 16%]*	7%	*[5% - 11%]*	10%	*[7% - 14%]*	8%	*[6% - 12%]*	8%	*[5% - 11%]*	9%	*[5% - 13%]*
Botswana	1%	*[1% - 2%]*	1%	*[0% - 1%]*	5%	*[3% - 7%]*	4%	*[3% - 6%]*	7%	*[4% - 9%]*	7%	*[5% - 11%]*
Democratic Republic of Congo	20%	*[14% - 28%]*	14%	*[10% - 20%]*	21%	*[17% - 25%]*	18%	*[14% - 21%]*	16%	*[12% - 20%]*	18%	*[14% - 23%]*
Eswatini	2%	*[1% - 3%]*	1%	*[1% - 2%]*	14%	*[9% - 19%]*	12%	*[8% - 16%]*	7%	*[5% - 11%]*	8%	*[5% - 12%]*
Lesotho	4%	*[2% - 5%]*	2%	*[1% - 4%]*	2%	*[1% - 2%]*	1%	*[1% - 2%]*	7%	*[5% - 11%]*	8%	*[5% - 12%]*
Madagascar	5%	*[3% - 8%]*	4%	*[2% - 6%]*	16%	*[11% - 22%]*	13%	*[9% - 19%]*	4%	*[3% - 6%]*	5%	*[3% - 7%]*
Malawi	4%	*[3% - 6%]*	3%	*[2% - 5%]*	5%	*[3% - 6%]*	4%	*[3% - 5%]*	5%	*[3% - 8%]*	6%	*[4% - 9%]*
Mauritius	5%	*[3% - 8%]*	3%	*[2% - 5%]*	1%	*[1% - 2%]*	1%	*[1% - 1%]*	11%	*[7% - 17%]*	13%	*[8% - 19%]*
Mozambique	18%	*[11% - 25%]*	12%	*[8% - 18%]*	13%	*[9% - 19%]*	11%	*[8% - 16%]*	6%	*[4% - 9%]*	7%	*[4% - 10%]*
Namibia	1%	*[1% - 2%]*	1%	*[1% - 1%]*	14%	*[11% - 18%]*	11%	*[9% - 15%]*	7%	*[4% - 10%]*	8%	*[5% - 11%]*
Republic of Congo	3%	*[2% - 4%]*	2%	*[1% - 3%]*	5%	*[3% - 6%]*	4%	*[3% - 5%]*	7%	*[4% - 10%]*	8%	*[5% - 12%]*
Seychelles	4%	*[2% - 6%]*	3%	*[2% - 4%]*	2%	*[1% - 2%]*	1%	*[1% - 2%]*	12%	*[8% - 18%]*	13%	*[9% - 19%]*
South Africa	1%	*[1% - 2%]*	1%	*[1% - 1%]*	6%	*[4% - 8%]*	5%	*[3% - 6%]*	6%	*[4% - 9%]*	7%	*[5% - 11%]*
United Republic of Tanzania	22%	*[16% - 30%]*	16%	*[11% - 21%]*	14%	*[11% - 19%]*	12%	*[9% - 16%]*	5%	*[3% - 8%]*	6%	*[4% - 9%]*
Zambia	6%	*[4% - 9%]*	4%	*[3% - 6%]*	13%	*[9% - 17%]*	10%	*[7% - 15%]*	5%	*[3% - 7%]*	5%	*[3% - 8%]*
Zimbabwe	6%	*[4% - 9%]*	4%	*[3% - 6%]*	8%	*[5% - 11%]*	6%	*[4% - 9%]*	4%	*[2% - 6%]*	4%	*[3% - 6%]*

Table 14: Prevalence of infectious diseases among children aged 5 to 14 years and 15 to 19 years in Southern Africa

Countries	Diarrheal diseases				HIV/AIDS				Malaria			
	5 to 14	-	15 to 19		5 to 14		15 to 19		5 to 14		15 to 19	
Angola	1.0%	*[0.8% - 1.3%]*	0.9%	*[0.7% - 1.0%]*	0.2%	*[0.1% - 0.3%]*	0.4%	[0.2% - 0.7%]	14.6%	[11.4% - 18.8%]	12.0%	*[9.4%; 15.5%]*
Botswana	1.4%	*[1.1% - 1.8%]*	1.4%	*[1.1% - 1.6%]*	0.6%	*[0.4% - 0.9%]*	3.1%	[2.2% - 4.3%]	0.1%	[0.0% - 0.2%]	0.1%	*[0.0%; 0.1%]*
Democratic Republic of Congo	0.9%	*[0.7% - 1.1%]*	0.7%	*[0.6% - 0.9%]*	0.1%	*[0.1% - 0.1%]*	0.2%	[0.1% - 0.2%]	30.9%	[24.6% - 44.5%]	25.9%	*[20.5%; 37.3%]*
Eswatini	1.5%	*[1.2% - 1.9%]*	1.5%	*[1.2% - 1.8%]*	3.0%	*[2.4% - 3.6%]*	5.2%	[3.8% - 7.1%]	0.1%	[0.0% - 0.1%]	0.1%	*[0.0%; 0.1%]*
Lesotho	1.5%	*[1.2% - 2.0%]*	1.5%	*[1.3% - 1.8%]*	2.9%	*[2.4% - 3.3%]*	4.6%	[3.6% - 5.9%]	0.0%	[0.0% - 0.0%]	0.0%	*[0.0% - 0.0%]*
Madagascar	1.4%	*[1.1% - 1.8%]*	1.3%	*[1.0% - 1.5%]*	0.0%	*[0.0% - 0.0%]*	0.0%	[0.0% - 0.1%]	7.7%	[5.8% - 13.9%]	6.1%	*[4.5% - 11.1%]*
Malawi	1.3%	*[1.0% - 1.6%]*	1.1%	*[0.9% - 1.4%]*	1.2%	*[1.0% - 1.3%]*	1.7%	[1.4% - 2.1%]	19.6%	[14.9% - 24.5%]	16.1%	*[12.2% - 20.3%]*
Mauritius	0.7%	*[0.5% - 1.0%]*	0.4%	*[0.3% - 0.5%]*	0.0%	*[0.0% - 0.0%]*	0.0%	[0.0% - 0.1%]	0.0%	[0.0% - 0.0%]	0.0%	*[0.0% - 0.0%]*
Mozambique	1.0%	*[0.7% - 1.2%]*	0.9%	*[0.7% - 1.1%]*	2.1%	*[1.8% - 2.5%]*	3.9%	[2.7% - 5.8%]	32.0%	[22.7% - 40.3%]	26.5%	*[18.8% - 33.3%]*
Namibia	1.4%	*[1.1% - 1.8%]*	1.3%	*[1.1% - 1.6%]*	1.6%	*[1.3% - 1.9%]*	2.0%	[1.7% - 2.4%]	3.8%	[0.1% - 23.2%]	3.1%	*[0.1% - 18.9%]*
Republic of Congo	0.9%	*[0.7% - 1.2%]*	0.8%	*[0.6% - 0.9%]*	0.5%	*[0.4% - 0.7%]*	0.7%	[0.4% - 1.0%]	24.0%	[7.6% - 53.1%]	19.9%	*[6.3% - 44.2%]*
Seychelles	0.6%	*[0.4% - 0.8%]*	0.3%	*[0.2% - 0.4%]*	0.0%	*[0.0% - 0.0%]*	0.0%	[0.0% - 0.1%]	0.0%	[0.0% - 0.0%]	0.0%	*[0.0% - 0.0%]*
South Africa	0.8%	*[0.6% - 1.1%]*	0.8%	*[0.7% - 1.0%]*	1.6%	*[1.3% - 1.9%]*	3.9%	[3.3% - 4.5%]	0.1%	[0.0% - 0.8%]	0.1%	*[0.0% - 0.6%]*
United Republic of Tanzania	1.0%	*[0.8% - 1.3%]*	0.9%	*[0.8% - 1.1%]*	0.5%	*[0.4% - 0.5%]*	0.9%	[0.7% - 1.1%]	8.3%	[7.6% - 9.1%]	6.9%	*[6.3% - 7.5%]*
Zambia	1.2%	*[0.9% - 1.5%]*	1.1%	*[0.9% - 1.3%]*	1.2%	*[1.0% - 1.3%]*	2.3%	[1.8% - 2.9%]	14.7%	[8.3% - 21.5%]	12.1%	*[6.9% - 17.8%]*
Zimbabwe	1.4%	*[1.1% - 1.7%]*	1.4%	*[1.2% - 1.7%]*	2.0%	*[1.7% - 2.3%]*	2.9%	[2.4% - 3.4%]	1.7%	[0.3% - 5.9%]	1.4%	*[0.3% - 4.7%]*

Table 15: Prevalence of infectious diseases among children aged 5 to 14 years and 15 to 19 years in Southern Africa (continued)

Countries	STIs				Upper respiratory infections				Lower respiratory infections			
	5 to 14		15 to 19		5 to 14		15 to 19		5 to 14		15 to 19	
Angola	1.2%	*[0.9% - 1.7%]*	16.4%	*[12.7% - 20.9%]*	4.4%	*[3.3% - 5.7%]*	4.0%	[2.7% - 5.8%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
Botswana	1.2%	*[0.9% - 1.6%]*	16.6%	*[13.1% - 20.9%]*	3.6%	*[2.6% - 4.6%]*	3.3%	[2.1% - 4.9%]	0.1%	[0.1% - 0.2%]	0.1%	[0.1% - 0.1%]
Democratic Republic of Congo	1.2%	*[0.8% - 1.6%]*	15.4%	*[11.9% - 19.9%]*	3.9%	*[2.9% - 5.0%]*	3.6%	[2.4% - 5.2%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
Eswatini	1.2%	*[0.9% - 1.7%]*	16.9%	*[13.2% - 21.3%]*	3.3%	*[2.4% - 4.3%]*	3.1%	[2.0% - 4.4%]	0.1%	[0.1% - 0.2%]	0.1%	[0.1% - 0.1%]
Lesotho	1.3%	*[0.9% - 1.7%]*	16.8%	*[13.1% - 21.3%]*	3.5%	*[2.6% - 4.5%]*	3.3%	[2.1% - 4.7%]	0.2%	[0.1% - 0.2%]	0.1%	[0.1% - 0.2%]
Madagascar	1.3%	*[1.0% - 1.7%]*	16.9%	*[13.7% - 20.9%]*	3.2%	*[2.4% - 4.2%]*	3.1%	[2.1% - 4.6%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.2%]
Malawi	1.5%	*[1.1% - 2.0%]*	18.5%	*[14.7% - 23.5%]*	3.8%	*[2.9% - 4.9%]*	3.8%	[2.5% - 5.4%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
Mauritius	0.5%	*[0.4% - 0.7%]*	6.8%	*[5.3% - 8.7%]*	4.2%	*[3.1% - 5.4%]*	3.6%	[2.3% - 5.2%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
Mozambique	1.5%	*[1.1% - 1.9%]*	20.4%	*[16.6% - 25.4%]*	2.7%	*[2.0% - 3.6%]*	2.7%	[1.8% - 3.9%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
Namibia	1.1%	*[0.8% - 1.6%]*	16.4%	*[12.8% - 20.8%]*	3.6%	*[2.7% - 4.6%]*	3.4%	[2.2% - 4.8%]	0.1%	[0.1% - 0.2%]	0.1%	[0.1% - 0.2%]
Republic of Congo	1.2%	*[0.9% - 1.7%]*	15.9%	*[12.4% - 20.5%]*	4.1%	*[3.1% - 5.4%]*	3.8%	[2.5% - 5.5%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
Seychelles	0.5%	*[0.3% - 0.7%]*	6.9%	*[5.2% - 8.9%]*	4.4%	*[3.3% - 5.7%]*	3.6%	[2.4% - 5.2%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
South Africa	1.2%	*[0.8% - 1.8%]*	16.7%	*[13.1% - 21.0%]*	3.7%	*[2.8% - 4.8%]*	3.4%	[2.3% - 4.9%]	0.1%	[0.1% - 0.2%]	0.1%	[0.1% - 0.2%]
United Republic of Tanzania	1.1%	*[0.8% - 1.4%]*	15.2%	*[12.3% - 18.9%]*	3.7%	*[2.7% - 4.8%]*	3.6%	[2.4% - 5.2%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
Zambia	1.5%	*[1.1% - 1.9%]*	19.5%	*[15.6% - 24.5%]*	4.0%	*[3.1% - 5.2%]*	4.1%	[2.7% - 6.0%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]
Zimbabwe	1.1%	*[0.8% - 1.5%]*	15.6%	*[12.1% - 20.1%]*	3.6%	*[2.7% - 4.6%]*	3.3%	[2.2% - 4.7%]	0.1%	[0.1% - 0.1%]	0.1%	[0.1% - 0.1%]

Table 16: All-cause mortality among children aged 5-14 years in Southern Africa, 2010 – 2019

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Angola	26.01	24.35	22.83	21.50	20.32	19.31	18.47	17.72	17.09	16.46
Botswana	8.06	7.72	7.41	7.12	6.86	6.63	6.41	6.20	6.01	5.82
Democratic Republic of Congo	26.45	25.97	25.53	25.09	24.65	24.18	23.70	23.21	22.65	22.12
Eswatini	14.75	14.86	14.92	14.91	14.77	14.58	14.34	14.07	13.75	13.42
Lesotho	10.57	10.35	10.14	9.93	9.73	9.51	9.30	9.07	8.85	8.61
Madagascar	20.71	20.35	19.98	19.69	19.46	19.21	18.98	18.76	18.49	18.19
Malawi	16.73	16.11	15.51	14.94	14.36	13.83	13.32	12.87	12.45	12.04
Mauritius	2.22	2.16	2.11	2.07	2.02	1.98	1.93	1.90	1.86	1.82
Mozambique	21.09	20.15	19.30	18.56	17.87	17.25	16.68	16.17	15.72	15.26
Namibia	13.31	13.20	13.05	12.86	12.63	12.33	12.06	11.73	11.44	11.14
Republic of Congo	11.55	10.96	10.40	9.91	9.50	9.12	8.80	8.50	8.22	7.94
Seychelles	2.86	2.82	2.79	2.76	2.73	2.70	2.67	2.64	2.59	2.54
South Africa	10.87	10.12	9.34	8.56	7.84	7.20	6.66	6.20	5.81	5.46
United Republic of Tanzania	13.26	13.04	12.90	12.79	12.64	12.45	12.24	11.96	11.69	11.46
Zambia	15.43	14.87	14.34	13.81	13.28	12.75	12.25	11.80	11.37	10.97
Zimbabwe	15.50	15.06	14.58	14.13	13.67	13.28	12.89	12.52	12.19	11.85

Source: UNICEF (2020) Mortality among children, adolescents and youth aged 5-24. See https://data.unicef.org/topic/ %20child-survival/child-and-youth-mortality-age-5-24/.

Table 17: All-cause mortality among children aged 15-19 years in Southern Africa, 2010 – 2019

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Angola	17.55	16.77	16.04	15.38	14.80	14.29	13.85	13.46	13.13	12.79
Botswana	5.46	5.18	4.94	4.74	4.58	4.42	4.26	4.13	3.99	3.86
Democratic Republic of Congo	19.60	19.89	20.17	20.24	20.11	19.80	19.40	18.93	18.48	17.99
Eswatini	11.12	11.11	11.07	11.01	10.89	10.75	10.60	10.42	10.23	10.04
Lesotho	12.60	12.37	12.12	11.89	11.64	11.39	11.09	10.81	10.54	10.24
Madagascar	13.67	13.41	13.06	12.73	12.37	12.03	11.68	11.33	11.00	10.71
Malawi	11.98	11.26	10.52	9.76	9.05	8.41	7.94	7.56	7.26	7.01

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Mauritius	2.75	2.76	2.77	2.80	2.82	2.86	2.90	2.94	2.99	3.04
Mozambique	12.83	12.42	12.01	11.64	11.24	10.89	10.56	10.24	9.95	9.59
Namibia	9.76	9.48	9.22	8.98	8.72	8.46	8.20	7.93	7.71	7.45
Republic of Congo	8.06	7.58	7.13	6.75	6.44	6.17	5.94	5.75	5.57	5.37
Seychelles	3.84	3.99	4.19	4.44	4.73	5.06	5.41	5.68	5.81	5.82
South Africa	8.62	8.31	8.06	7.89	7.79	7.74	7.71	7.70	7.69	7.64
United Republic of Tanzania	7.75	7.61	7.58	7.59	7.64	7.63	7.54	7.40	7.21	7.04
Zambia	12.10	11.76	11.42	11.11	10.78	10.49	10.19	9.90	9.60	9.29
Zimbabwe	10.57	10.44	10.35	10.28	10.23	10.18	10.14	10.05	9.88	9.65

Source: UNICEF (2020) Mortality among children, adolescents and youth aged 5-24. See https://data.unicef.org/topic/ %20child-survival/child-and-youth-mortality-age-5-24/.

Table 18: School feeding interventions in Southern Africa

Sources: African Union. (2018). *African Union Study on Sustainable School Feeding in Member States*; FAO et al., (2018). *Regional overview of national school food and nutrition programmes in Africa*, and information provided by WFP Regional Bureau Johannesburg. Both reviews conducted surveys of national school feeding programmes in Africa. Data presented here pre-dates the COVID-19 pandemic.

Country	Primary SFP, year started	Actors involved in implementation	Models	Description	Primary funder(s)	Targeting	Beneficiaries[44] and/or coverage (% of school children[45]	Food source	Other health interventions noted in the mapping
Angola	School Meals Programme	WFP, CISP (NGO), Sahrawi authorities	Single model	In-school meals served during lunch time	Funded through national budget	Universal	1 516 133 33% Primary school	Mostly domestic, HGSF used to supply meals	None noted
Botswana	Botswana Supplementary Feeding Programme, 1966	Ministry of Local Government and Rural Development, Department of Local Government Finance and Procurement Services	Single model	In-school meals: one school meal served at 11AM daily.	Government	Universal	331 000 Primary schools	Mostly domestic; produce bought in part from local farmers	None noted
Democratic Republic of Congo	WFP School Feeding Programme, 2003/04	WFP, World Vision, Lutheran World Federation, Caritas, Samaritan's Purse, COOPI, Ministry of Education involved in selection of schools.	Single model	In-school meals: Daily meal served at 1.30PM, subject to food availability	WFP	Geographic and categorical: emergency zones in the east in schools that meet criteria relating to receiving IDPs, returnees, or refugees; low enrolment rates; gender disparity; degree of micronutrient deficits.	160 000 2% Primary schools, some pre-primary	Abroad, HSGF not used to supply meals	Deworming

[44] African Union (2018) and information collated by WFP Regional Bureau Johannesburg.
[45] Coverage is based on data provided in 2016 (FAO, 2018).

Country	Primary SFP, year started	Actors involved in implementation	Models	Description	Primary funder(s)	Targeting	Beneficiaries[44] and/or coverage (% of school children[45]	Food source	Other health interventions noted in the mapping
Eswatini	National School Feeding Programme, 2002	Ministry of Education and Training	Single model	Comprises school meals, gardens and nutrition education. Children receive one meal a day which is expected to provide 150 grams of cereals (rice or maize meal), 40 grams pulse (beans or peas14), 7.5 grams of vegetable oil and peanut butter.	Funded through national budget, supported by donors and fees paid by parents	Universal	357 078 100% Primary and secondary schools		School health, hygiene, water, sanitation, deworming, HIV and AIDS as well as psychosocial support
Lesotho	National School Feeding Programme, 1961	Ministry of Education and Training, WFP, Food Management Unit of the Prime Ministers' Office, National Managing Agents, communi-ty-based caterers	1) WFP model, international procurement 2) Catering model: caterers procure, prepare, serve food; 3) National Managing Agent Feeding; private businesses contracted to procure, process, deliver food.	In-school meals: One daily meal in low-lands served at 11.00AM; two meals served in foothills and high-lands served at 7.30AM and 11.00AM	Government	Universal	390 000 84% Pre-primary and primary school (grades R-7)	Both – abroad (WFP), domestic (NMA/ catering model); HGSF used to supply food under catering model	WASH, nutrition, life skills education; school gardens

Country	Primary SFP, year started	Actors involved in implementation	Models	Description	Primary funder(s)	Targeting	Beneficiaries[44] and/or coverage (% of school children[45]	Food source	Other health interventions noted in the mapping
Madagascar	WFP School Feeding Programme, 2005	WFP, Ministry of National Education (MEN), GRET (NGO), ADRA (NGO)	1) WFP provides a cooked hot meal; 2) ASBAL HGSF pilot by World Bank; 3) Projet Nutrimad (Porridge for the Children) implemented by GRET (NGO); 4) Riz proteines (Protein rice) implemented by ADRA (NGO).	In-school meals and THRs. Daily meals served at 9.00AM for the morning session, noon for the afternoon session.	International development partners (WFP, World Bank)	Geographic targeting: 11 districts in three southern regions, and two urban areas.	240 000 7% Pre-primary and primary school	Primarily abroad, HGSF used for schools under the ASBAL model	Deworming, micronutrient fortification, other education assistance programmes
Malawi	National School Meals Programme (SMP), 1999	Ministry of Education, Science and Technology; WFP; Mary's Meals	(1) WFP centralised model; (2) Government centralised model; (3) Mary's Meals	In-school meals and THR: Daily meal served before 7:30AM and THR (cash or food) distributed in majority of schools during lean season of January-March.	WFP through McGovern-Dole (United States Department of Agriculture) funding; government	Categorical – targeting based on food insecurity and education indicators	2,559,073 (Government – 700,000, WFP – 954,669, Mary's Meals – 904,404) 50% Primary schools, some ECD centres	Primarily abroad, HGSF used in part	Deworming, vitamin A supplementation, teacher training, health assessments HEB (during emergencies)

Country	Primary SFP, year started	Actors involved in implementation	Models	Description	Primary funder(s)	Targeting	Beneficiaries[44] and/or coverage (% of school children[45]	Food source	Other health interventions noted in the mapping
Mauritius	Hot meal project, 2020		Unclear	A daily hot meal is provided at midday	Government	To be rolled out to ZEP (Priority Education Zones) primary schools	Unclear – limited	Domestic	Unclear
Mozambique	Projecto Nacional de Alimentação Escolar (PRONAE, NSFP), 2013	Ministry of Education & Human Development; Ministry of Agriculture & Food Security	Single model		International development partners	Geographic and categorical	139 000 4% Primary and secondary schools	Unclear	Deworming, WASH
Namibia	Namibia School Feeding Program, 1991	Ministry of Education, Arts and Culture, WFP	Single model	In-school meals: Daily meal served as mid-morning snack for schools with morning session and afternoon snack for schools with afternoon sessions.	Government	Universal	330 000 72% Pre-primary and primary schools (grades 0-7)	Domestic, does not use HGSF to supply meals	Deworming; trainings on nutrition, health, sanitation
Republic of Congo	School Feeding Programme, 2001/02	Ministry of Primary and Secondary Education and Alphabetization, WFP, IPHD (NGO), Ministry of Health, Ministry of Agriculture	Single model	In-school meals: Daily meal served at noon.	Government, Alphabetization	Geographic – districts identified as most vulnerable to food insecurity.	95 000 31% Primary schools (grades 1-6)	Abroad, HGSF not used to supply meals	Deworming; introduction of fortified cassava, flour forthcoming
Seychelles	School Meals Programme, 1960s		Unclear	Daily in-school meal	Government	Unclear	4 000 (2008) 97%	Domestic	Nutrition education in curriculum

Country	Primary SFP, year started	Actors involved in implementation	Models	Description	Primary funder(s)	Targeting	Beneficiaries[44] and/or coverage (% of school children[45]	Food source	Other health interventions noted in the mapping
South Africa	National School Nutrition Programme	Department of Basic Education	(1) Government programme (2) NGOs, public-private partnership offering additional meals in selected schools/region	South Africa's NSNP delivers a cooked lunch consisting of a starch, a protein and a vegetable, to all Quintile 1 – 3 primary and secondary schools nationally. These schools service the most deprived communities.	Government	Most deprived schools (all quintile 1 – 3 primary and secondary schools) nationally	9 million 73% Primary and secondary schools	Domestic	Deworming, nutrition education; provision of nutritional supplements (e.g. iron) are mandate of DoH.
United Republic of Tanzania	HGSF pilot, 2015	Government, District Council (Local Government Authority), WFP and cooperating partner Project Concern International (iNGO)	1) HGSF involving cash transfer to district and/or schools to procure food locally; 2) traditional school feeding by Government for boarding schools; 3) school meals programmes by NGOs; 4) community-led school meals	In-school meals: Mid-morning porridge and cooked meal served at 10.00AM and 1.00PM, respectively (HGSF model).	1) HGSF funded by WFP and community, 2) funded by Government, 3) funded by charity organisations and NGOs, 4) funded by community.	Geographic and categorical: most food insecure districts, with universal targeting in assisted wards	28 000 0.3% Primary school (grade 1-7)	Domestic – HGSF used to supply meals	Deworming; trainings on nutrition, health, sanitation; school gardening, poultry

Country	Primary SFP, year started	Actors involved in implementation	Models	Description	Primary funder(s)	Targeting	Beneficiaries[44] and/or coverage (% of school children[45]	Food source	Other health interventions noted in the mapping
Zambia	Home Grown School Meals, 2003	Government through Ministry of General Education, WFP	1) Government/ WFP model, 2) ad hoc support from churches and 3) CSB meals	In-school meals: one hot meal per day served at 11AM	1) HGSM funded by government, WFP, 2) other models funded by churches and faith-based organisations	Categorical – schools chosen based on poverty, food insecurity, low performance on education indicators	1 052 000 33% Pre-school and primary school	Domestic – HGSF supplies meals	Micro-nutrient powders, nutrition education (only on a pilot basis)
Zimbabwe	HGSF programme, 2016	Government through the Ministry of Primary and Secondary Education, UN agencies, NGOs and civil society	1) Government model, 2) ad hoc school feeding through NGOs based on geographical targeting	In-school meals: one hot meal per day served during mid-morning.	Government	Categorical – phased approach based on grade level.	1 510 618 75% Phase I (2016): pre-primary, Phase II was junior learners, Phase III - secondary	Domestic – HGSF used in part to supply meals	Deworming, WASH

Annex E: Policy and stakeholder mapping – WFP Southern Africa region

Table 19: Policies to support the implementation of school-based health and nutrition initiatives in Southern Africa

Country	Policy type	Title	Years	Description	Web link
Angola	Legal framework	SFP regulation - Presidential decree 138/13	2013	FAO notes that this decree approves the regulation of SF in Angola. It establishes norms and requirements for preparation, attribution and controls to be carried out and defines stakeholder responsibilities.	Link
Botswana	Education sector plan	Education and Training Sector Strategic Plan	2015 – 2020	Refers to effective coordination of the national SFP as a means of supporting learner retention and refers to provision of feeding programme for expansion of the pre-primary programme. Does not make mention of WASH in schools. Make some mention of HIV and AIDS, but mainly in relation to educators and TVET institutions rather than schools. Botswana has no SF policy; SF is not mentioned in the National Health Policy and there is no national nutrition policy.	Link
Democratic Republic of Congo	Poverty Reduction Strategy Paper	Poverty Reduction Strategy Paper 2	2013	Briefly mentions nutrition priorities outlined in the 2011 strategic nutrition plan: promotion of early and exclusive breastfeeding (0-6 months) complementary feeding (6-24 months), addressing micronutrient deficiencies (vitamin A, iron, iodine, etc.) and sick/malnourished children. Also refers to need to improve access to potable water, hygiene and sanitation, with the priority being to reform the Potable Water and Sanitation sectors by developing a national strategy based on capacity building of provinces and ETDs. HIV and AIDS is identified as a key development problem, to be addressed by reducing transmission of HIV, improving universal access to care and treatment, mitigating the socio-economic impact of HIV and AIDS and ensuring support to the implementation of the National Strategic Plan.	Link
Eswatini	School feeding policy	National Framework for Food Security in Schools	2013	Identifies school meals, school garden and nutrition education as key to integrated approach to school food security. Refers to HGSF. Includes guidelines on nutritional intake.	Source: WFP (RBJ)
	Education sector policy	National Education and Training Sector Policy	2018	Encourages the development of schools as centres of care and support (SCCS) that provide universal feeding schemes from Grade 0 and in primary schools to improve equitable access for all children. Notes that programmes will be put in place to ensure that schools have access to adequate WASH facilities. Also notes learners and teachers will be empowered to deal with health and protection issues such as HIV/AIDS. Life skills, guidance and counselling, and mitigation and prevention of HIV prevalence training will be provided for school- based guidance officers.	Link

Country	Policy type	Title	Years	Description	Web link
Lesotho	School feeding policy	School feeding policy only	No date	Sets out minimal nutritional requirements, notes preference for locally produced food and outlines stakeholder roles.	Source: WFP (RBJ)
	Nutrition policy	National Nutrition Policy	2011	Has express objectives on ensuring optimal nutrition for school-age children, ensuring adequate micronutrient status for all and strengthening nutrition aspects in TB & HIV prevention, treatment and care programmes. School meals mentioned but no detail given. Policy aims to link with the water and sanitation sector to advocate for WASH infrastructure and promote use and awareness of WASH practices.	Link
	Education sector plan	Education Sector Plan	2016-2026	References expanding school feeding in ECDs and notes that the universal free school feeding programme attracts school-age children into Lower Basic Education schools. Notes the lack of Lack of gender-sensitive sanitation facilities but strategic action is focused on pre-schools. Includes a strategic objective to strengthen the Education sector's institutional and policy framework for HIV and AIDS interventions and to establish effective support systems for infected and affected learners, teachers and sector employees.	Link
Madagascar	School feeding policy	National school feeding policy	2016 – 2021	Notes the multisectoral nature of SF, including the links between school food and local agricultural production and the role of community participation. It includes examples of menus and required nutrient intakes.	Source: WFP (RBJ)
	Nutrition policy	National Action Plan for Nutrition	2012-2015	Includes explicit focus on school-aged children as vulnerable and identifies nutrition education, WASH, micronutrient supplementation and deworming as key interventions to prevent malnutrition.	Link
Malawi	School feeding policy	National School Health and Nutrition Policy	2012	A key objective is that government ensures good nutrition during the education life cycle by managing a National School Meals Programme and providing complementary nutritional interventions; another is that activities and infrastructure at school are conducive to safeguard and promote learners' health and nutrition, and health-seeking habits. Identifies five priority areas; (a) school nutrition, including school meals; (b) school health, hygiene, sanitation, (c) child protection, (d) institutional set-up, (e) mainstreaming nutrition, health, hygiene and sanitation as life skills, as well as cross-cutting issues relevant for SHN.	Source: WFP (RBJ)
	Nutrition policy	National Multi-Sector Nutrition Policy	2018-2022	Identifies school feeding and school health and nutrition programmes as high-impact interventions to address underweight among children. Notes inadequate availability of and access to WASH, therefore policy will promote improved WASH practices at community and household level. Government established nutrition care support and treatment (NCST) interventions aimed at addressing malnutrition among adolescent and adults with chronic illnesses such HIV and AIDS, but treatment and control of acute malnutrition has faced several challenges. Thus, nutrition assessment, counselling, and support services interventions for those living with HIV to be scaled up.	Link
	Social protection strategy	Malawi National Social Support Programme II		Guides the development of a social protection system through school meals and other instruments such as cash transfers.	Link

Country	Policy type	Title	Years	Description	Web link
Mauritius	Nutrition policy	National Plan of Action for Nutrition	2016-2020	Mentions 'improving food' distributed through the School Feeding Programme for Zone Education Prioritaire (ZEP) schools and promotes increased nutrition education. Notes that guidelines will be established on meals being served to children in School Canteens. Does not make mention of WASH. Prevention of HIV and AIDS is included as a key area of intervention, but the intervention is limited to integrating nutrition into the essential package of care, treatment and support for people living with HIV/AIDS and efforts to prevent infection (little detail provided).	Link
Mozambique	Education sector policy	Education Strategic Plan	2012-2016	Includes rationale for school feeding and nutrition under 'specific programmes' for the most vulnerable children. The integration of cross-cutting issues such as WASH is still very limited. The Plan recognises that Mozambique continues to have high HIV/AIDS prevalence rates. Four levels of action against HIV and AIDS established, namely: (a) developing actions to prevent and mitigate the impact of HIV and AIDS on teachers, managers and employees, (b) developing training actions and actions to reduce the impact of HIV and AIDS on pupils and students; (c) developing an institutional framework that allows the sector to respond appropriately to the HIV and AIDS pandemic, (d) developing relationships with government and non-government partners for effective support in combating HIV and AIDS.	Link
Namibia	School feeding policy	Namibia School Feeding Policy	2019	Includes enhanced school participation, health and nutrition, support to small holder producers and strengthened sectoral linkages as rationale for SF. Refers to daily calorie requirements (but no practical examples). Discusses complementary services: health, hygiene, nutrition education; water and sanitation; micronutrient supplementation; deworming and HIV education, among others. Commits government to ensuring that every school has access to safe water and sanitation facilities to prevent the spread of infection, ensuring the training of teachers and children on proper hygiene and sanitation, promoting hand washing activities in schools and establishing hygiene clubs in schools. Also refers to expansion of the School-Led Total Sanitation Programme (SLTS). Policy also supports the promotion of HIV/AIDS awareness and prevention education activities and the use of the NSFP as a platform to support HIV/AIDS awareness and prevention education campaigns by appropriate partners.	Link
	Nutrition policy	Multi-sectoral nutrition plan, results framework	2013 – 2015/16	Simply refers to the need to implement recommendations from the SFP review and to build school gardens in schools operating the School Feeding Programme. Does map other complementary interventions such as WASH, supplementation and deworming and hygiene practices such as handwashing. Also refers to HIV but primarily in relation to infant feeding (not schools).	Link

Country	Policy type	Title	Years	Description	Web link
Republic of Congo	School feeding policy	National School Feeding Policy	2016	Goal is to promote the intellectual, physical, mental and moral development of children through a healthy, balanced school diet based on local products. Structured around six strategic axes, one of which is Health, Nutrition, Hygiene and Sanitation (which includes ensuring healthy food for all students, reducing micronutrient deficiencies; ensuring a minimum energy intake of 800 kcal/child/day and promote good practice in WASH in pre-schools and primary schools. Includes target of extending government school feeding to achieve (near) universal coverage in primary schools by 2025.	Link
Seychelles	School nutrition policy	National School Nutrition Policy	2008	Includes nutrient standards for school meals, guidelines for menu planning and guidelines for nutritious snacks to be stocked at tuckshops.	Link
	Nutrition policy	National Food and Nutrition Security Policy	2013	Identifies school-going children as a vulnerable group, highlights the role of schools in nutrition education but makes little mention of school meals or other complementary interventions. This will also relate to health and medical support provisions and initiatives. Refers to food and nutritional aspects related to people living with chronic conditions such as HIV/AIDS and those on ARVs as requiring review but does not mention in relation to schools.	Link
South Africa	School health policy	Integrated School Health Policy	2012	Defines essential school health package of services, including health (nutrition) education in the curriculum; learner screening; onsite services (including, among others, deworming and bilharzia control, immunisations, sexual and reproductive health services which will focus on dual protection to prevent pregnancies and STIs including HIV and provision of HIV counselling and testing; and environmental assessments, including provision of adequate water, sanitation, physical safety and issues related to food safety and suitability. Briefly describes NSNP as part of national context.	Link
	Nutrition policy	National Policy on Food and Nutrition Security	2013	Mention is made of an improved school nutrition programme as an example of a nutritional safety net.	Link
United Republic of Tanzania	School feeding policy	National School Feeding and Nutrition Guidelines		Drafting in progress. School feeding and gardens briefly mentioned in National Multisectoral Nutrition Action Plan 2016-2021, no detail given.	Source: WFP (RBJ)
	Education sector plan	Education Sector Development Plan	2017-2021	Mentions strengthening school health and nutrition in collaboration with MOH under the objective: Equitable access to and successful completion of basic education for all. Briefly mentions WFP school feeding programme under 'development partner contributions'. Notes strategies to be put in place to strengthen school WASH and ensure that separate latrines are available for adolescent girls, in sufficient number and adhering to WASH standards. Also refers to strategy to strengthen sexual and reproductive health knowledge and improve HIV prevention interventions, as well as a strategy to provide global citizenship and life skills education on HIV prevention.	Link

Country	Policy type	Title	Years	Description	Web link
Zambia	Nutrition policy	National Food and Nutrition Strategic Plan	2011-2015	Strategic Direction 4 specifies improving nutrition education and nutritious feeding through school. A 2006 National School Health and Nutrition policy notes the need to initiate school feeding and other health and nutrition initiatives. Includes a strategic objective of providing adequate, safe and cost-effective water supply, sanitation and hygiene services to households by 2015; another on integrating and strengthening the food and nutrition component in HIV treatment, care and support.	Link
	Education sector plan	Education and Skills Sector Plan	2017-2021	Identifies expanding school feeding programmes, strengthening WASH and MHM programmes in schools and developing minimum standards for WASH in schools as among key strategic interventions to improve equity in the delivery of primary education; it also notes the need to strengthen HGSF as part of removing barriers to education. Refers to programmes aimed at effective prevention, care and support, and creating a conducive teaching and learning environment where teaching staff, non-teaching staff, and learners are not discriminated against based on their HIV status.	Link
	HGSF strategy	National Strategy Home-Grown School Meals	2020 – 2024	Notes that HGSM strategy contributes to the overarching goal of government to eradicate poverty and hunger; HGSM is intended as an integrated and multi-sectoral approach spanning education, nutrition and agriculture. Four strategic objectives identified: (a) To improve enrolment, attendance, retention and progression of learners; (b) To increase awareness, production and consumption of nutritious, diverse and safe food among learners; (c) To promote market participation of smallholder farmers with quality and diversified food products in the HGSMs programme; and (d) To strengthen implementation and sustainability of the HGSM programme. Includes adequate WASH in schools as part of Theory of Change.	Source: WFP (RBJ)
	Social protection policy	National Social Protection Policy	2014–2018	Identifies nutrition and supplementary feeding interventions such as the Home-Grown School Feeding Programme as forms of social assistance; notes limited coverage, and inadequate and unpredictable funding as key challenges.	Link
Zimbabwe	School health policy	Zimbabwe School Health Policy	2018	Objectives include improving access to and use of school health and nutrition services. References, among others, the National Sanitation and Hygiene Strategy (2011-2015) and the National Water Policy of 2013; the Food and Nutrition Policy (2012) and the National Nutrition Strategy (2014- 2018); and the National HIV and AIDS Strategic Plan II (2011) and the National Adolescent Sexual and Reproductive Health Strategy (2010). Notes implementing strategies, including (a) the institutionalised school nutrition programme at all primary and secondary schools and (b) age appropriate sexual and reproductive health and life skills education, including Comprehensive Sexuality Education and information on available sexual and reproductive health services, in line with the government approved Curriculum Framework for Primary and Secondary Education. Outlines a comprehensive school health package that includes health education and health and nutrition services (including screening, immunisation, School Feeding Programme and Health and Hygiene Education for food safety, potable water supplies, sanitation services and waste management including personal hygiene etc.). Also refers to health promotion and psychosocial support for school staff living with HIV.	Link

Country	Policy type	Title	Years	Description	Web link
	Nutrition policy	Zimbabwe National Nutrition Strategy	2014-2018	Mentions strengthening school health and nutrition management, defined as immunization, de-worming, family planning, school feeding in locations vulnerable to household food insecurity in emergencies, and increasing access to improved sanitation facilities. SF targets included in strategic actions.	Link

Table 20: Stakeholders in support of school-based health and nutrition initiatives in Southern Africa

Name of organization	Countries covered/ member countries[46]	Stakeholder category	Position on school health and nutrition	Sources of information
Food and Agriculture Organization of the United Nations	Global, with regional sub-regional and country offices	UN entity	FAO coordinates the joint publication of the State of Food Security & Nutrition with WFP, UNICEF and IFAD. FAO has been involved in school feeding (e.g. Home Grown School Feeding – collaboration with WFP and IFAD). The **FAO School Food and Nutrition Framework (2019**) informed by recommendations adopted at the Second International Conference on Nutrition (ICN2). The framework seeks to guide FAO's support to countries in leveraging synergies presented by schools as platforms for a holistic approach to raising levels of nutrition, reducing poverty, and enabling inclusive food systems. These synergies are aimed at benefiting children and adolescents' diets, nutrition and well-being, as well as the school's and community's development and empowerment. FAO is one of the contributors to the **Home Grown School Feeding Framework**, and is expected to collaborate with WFP and IFAD and other stakeholders in supporting governments to design and implement Home Grown School Feeding.	www.fao.org http://www.fao.org/3/ca4091en/ca4091en.pdf http://www.fao.org/publications/sofi/en/
FAO Africa Regional Conference (ARC)	All Sub-Saharan Africa excluding Sudan	United Nations entity	ARC's role is to provide guidance on priorities for FAO's work in the Africa region. And is an important platform for advocacy on food security and nutrition. Ending Hunger is one of FAO's Regional Initiatives supported by ARC. The Regional Initiative focuses on strengthening capacities of regional and national institutions in policies, planning, measurement, governance etc. of food security and nutrition. A second Regional Initiative that focuses on value chains includes nutrition-sensitive value chains, briefly mentions school gardens. The third Regional Initiative focuses on building resilience in areas affected by climate change and conflict (working with WFP).	http://www.fao.org/3/nc610en/nc610en.pdf
FAO Sub-regional office Southern Africa (Harare)	Supports: **Angola,** Botswana, Comoros, **Lesotho,** Madagascar**, Malawi,** Mauritius, **Mozambique**, **Namibia**, Seychelles, South Africa, **Eswatini**, **United**	United Nations entity	The Sub-Regional Office provides technical support to FAO Country Offices in supporting governments with policies and strategies to improve the food security and nutrition, in line with FAO Africa Regional Initiative of Ending Hunger.	http://www.fao.org/africa/southern-africa/en/

[46] Countries in bold are those covered by the WFP Regional Bureau Johannesburg

Name of organization	Countries covered/ member countries[46]	Stakeholder category	Position on school health and nutrition	Sources of information
	Republic of Tanzania, Zambia and **Zimbabwe**.			
IFAD Eastern & Southern Africa regional group	Countries covered: **Angola**, Comoros, Eritrea, **Eswati**ni, Ethiopia, Kenya, **Lesotho**, Madagascar, **Malawi, Mozambique**, Rwanda, **United Republic of Tanzania**, Uganda, **Zambia, Zimbabwe**	United Nations entity	IFAD is one of the contributors to the **Home Grown School Feeding Framework**, and is expected to collaborate with WFP and IFAD, focusing on the supply of food for schools from smallholder producers. The mapping did not identify any projects	https://www.ifad.org/en/web/operations/regions/esa
UNAIDS	Eastern and Southern Africa	United Nations entity	The Joint United Nations Programme on HIV/AIDS (UNAIDS) unites the efforts of 11 UN organizations—UNHCR, UNICEF, WFP, UNDP, UNFPA, UNODC, UN Women, ILO, UNESCO, WHO and the World Bank. The 'Education Plus' initiative is a high-profile, high-level political advocacy drive to accelerate actions and investments to prevent HIV. It is centred on the empowerment of adolescent girls and young women and the achievement of gender equality in sub-Saharan Africa—with secondary education as the strategic entry point.	https://www.unaids.org/en
United Nations Economic Commission for Africa (Addis Ababa)	Continental (Regional). Has subregional offices in Eastern, Western, Central and Southern Africa	United Nations entity	Serves as a regional intergovernmental and multi-stakeholder platform, conducts research and provides policy advice to 54 Member countries. 2019 joined FAO and AU on the Regional Overview of Food Security and Nutrition. Also collaborated with WFP and African Union Commission on Cost of Hunger study.	www.uneca.org
UNECA Sub-regional office (Lusaka, Zambia)	Not stated	United Nations entity	Focus is on inclusive industrialization aimed at sustainable economic growth and reducing poverty and inequality in the region. Assist member states to develop policies and collaborate with SADC and COMESA.	https://www.uneca.org/sro-sa
UNESCO	Regional office for Southern Africa in Harare	United Nations entity	UNESCO addresses health and HIV and AIDS within it core education focus. UNESCO plays a key role in assisting stakeholders to develop and implement Comprehensive Sexuality Education programmes and materials, to facilitate the development of accurate and age-appropriate knowledge, attitudes and skills that contribute to positive relationships, health and well-being, and respect for human rights and gender equality. In 2018, UNESCO in collaboration with other UN agencies, published an updated International Technical Guidance on Sexuality Education. The Guidance outlines key concepts, topics and learning objectives to guide the development of locally-adapted curricula for learners aged 5 to 18.	https://csetoolkit.unesco.org/toolkit/getting-started/what-comprehensive-sexuality-education
UNICEF Eastern and Southern Africa Regional Office (Nairobi)	**Angola,** Botswana, Burundi, Comoros, Eritrea, **Eswatini,** Ethiopia, Kenya, **Madagascar, Malawi, Namibia, Mozambique**, Rwanda, Somalia, South Africa, South Sudan, Uganda,	United Nations entity	**UNICEF's 2019 State of the World's Children report** focuses on children, food and nutrition. The agenda in Eastern and Southern Africa to put children's nutrition first includes: 1. Empowering families, children and young people to demand nutritious food 2. Driving food suppliers to do the right thing for children 3. Building healthy food environments for all children 4. Mobilising supportive systems to scale up nutrition results for every child	https://www.unicef.org/media/60831/file/SOWC-2019-ESA.pdf

Name of organization	Countries covered/ member countries[46]	Stakeholder category	Position on school health and nutrition	Sources of information
	United Republic of Tanzania, Zambia, Zimbabwe		5. Collecting, analysing and using good-quality data and evidence regularly to guide action and track progress. UNICEF's **Child Friendly Schools Framework (CFS)** promotes a child rights and holistic approach to education that includes the promotion of the physical and emotional health of children by addressing their key nutritional and health care needs and equipping them with knowledge for the future. UNICEF also supports over 100 countries in establishing and rehabilitating **WASH** facilities in schools. The WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) tracks 'basic' drinking water, sanitation and hygiene services in pre-primary, primary and secondary schools. On HIV and AIDS, improving access to testing and treatment are the pillars of UNICEF's HIV response. UNICEF plays a global leadership role in the Start Free Stay Free AIDS-free frameworks.	
World Health Organization	Global, with regional and country offices	United Nations entity	WHO provides scientific advice and decision-making tools to assist countries to take action to address all forms of malnutrition to support health and well-being for all, at all ages. With the World Bank and UNICEF, WHO contributes to the **Global Database on Child Growth and Malnutrition**. WHO jointly leads the **United Nations Decade of Action on Nutrition (2016-2015)** with FAO, in collaboration with FAO, IFAD and UNICEF. Action Area 3 of the Work Programme of the Decade covers **social protection and nutrition education**. It argues that **social protection measures such as food distribution, cash transfers and school feeding** can increase incomes and strengthen resilience. When combined with relevant health services, well-designed social protection programmes result in improved height, reduced anaemia, increased diet diversity and raised consumption of nutrient-dense foods, especially in low-income households with infants and children. The Work Programme identifies knowledge and education on nutrition as critical for healthy choices and practices in feeding infants and children, and for making informed healthy lifestyle choices. It sees food and nutrition education included in primary and secondary school curricula (including teaching hygiene, food preparation and culinary practices in schools). WHO partners with NICEF, through the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) to produce regular updates on WASH since 1990. Together, they are responsible for monitoring SDG targets 6.1 and 6.2 which is universal access to WASH and SDG target 4.a – inclusive and effective learning environments for all.	https://www.who.int/health-topics/nutrition https://www.who.int/nutrition/decade-of-action/workprogramme-doa2016to2025-en.pdf?ua=1
WHO Africa Regional Office (Brazzaville, Republic of Congo)	Three Inter-Country Support Teams: Central Africa (Libreville) Eastern and Southern Africa (Harare) West Africa (Ouagadougou)	United Nations entity	WHO Regional Committee for Africa adopted the Strategic Plan to reduce the double burden of malnutrition in the Africa Region: 2019 – 2025 (in August 2019). The strategy aims to reduce all forms malnutrition throughout the life course. Its objectives are to strengthen policies and regulatory frameworks, strengthen national capacity and evidence base for nutrition programming. Its guiding principles include a life-course approach, multisectoral collaboration, universal health coverage and partnerships. One of the priorities is to strengthen multi-sectoral collaboration to prevent malnutrition, and advocate for strong collaboration between health and education sectors for educating school-aged children on nutrition.	https://www.afro.who.int/sites/default/files/2019-08/AFR-RC69-7%20Strategic%20Plan%20to%20reduce%20the%20double%20burden%20of%20malnutrition.pdf

Name of organization	Countries covered/ member countries[46]	Stakeholder category	Position on school health and nutrition	Sources of information
World Bank	Global, with regional (Africa) and sub-regional offices. Presence in 26 countries in Eastern & Southern Africa; and 22 countries in Western & Central Africa.	Bretton Woods Institution	Reducing all forms of malnutrition is central to WB goals of reducing extreme poverty and increasing prosperity, as well as building resilience and preventing instability. The Bank is concerned about the slower rate of reduction in stunting in Sub-Saharan Africa compared to other regions and sees accelerating the reduction in stunting as key to maximizing return on investments in early childhood development, education, and policies aimed at fostering and enhancing human capital accumulation and job creation. The Bank supports countries to develop investment cases for reducing stunting and other forms of malnutrition. It publishes country nutrition profiles on all Sub-Saharan African countries including those where it is not supporting nutrition-related activities. The Bank hosts the **Global Database on Child Growth and Malnutrition** with WHO, UNICEF. Further, the main policy areas of the Fast Track Initiative Grant III for Basic Education include a focus including school health, nutrition and HIV and AIDS in the upper secondary school curricula.	http://documents1.worldbank.org/curated/en/126621505397202676/pdf/119719-WP-ASA-Full-Report-V7-WEB-PUBLIC.pdf www.worldbank.org
African Union	All African countries member states	Continental Intergovernmental Organization	AU adopted the revised **Africa Regional Nutrition Strategy 2015-2025** that mirrors nutrition targets adopted by African countries at the World Health Assembly in 2011. The AU works with Member States to improve nutrition and knowledge/evidence – for example, the **Cost of Hunger in Africa** study. The AU strongly supports school feeding. It has the AU School Feeding Initiative where the AU is working with Member States to implement school feeding. The AU commissioned a major study on **Sustainable School Feeding in Africa** (2018) with support of WFP. The **African Day of School Feeding** was instituted in January 2016 through AU Decision by African Union Heads of State and Government in recognition of the value of home-grown school feeding.	https://au.int/en/about-au-school-feeding https://au.int/en/documents/20181008/sustainable-school-feeding-report
NEPAD/African Union Development Agency	Supports all Member States of the African Union	Implementing agency of the African Union	School feeding is one of NEPAD/AUDA's flagship projects under the Food and Nutrition Programme. Recently published the **Home Grown School Feeding Handbook** based on lessons learned from Botswana, Ghana, and Nigeria.	https://www.nepad.org/publication/home-grown-school-feeding-handbook
African Development Bank (AfDB)	Continental (Regional) All African states are members.	Development Finance Institution	Overarching objective is to spur sustainable economic development and social progress in Regional Member Countries by mobilizing and allocating resources for investment in RMCs; and providing policy advice and technical assistance to support development efforts. Nutrition forms part of the AfDB Human Capital Development Strategy. The African Leaders for Nutrition (ALN) is in partnership with the AU and Bill & Melinda Gates Foundation, aimed at sustaining high-level political will and investments in nutrition across the continent. ALN use two advocacy tools – the **Nutrition Accountability Scorecard** (2019) highlights country progress and provides a snapshot of Africa's progress against global nutrition targets; the **Economic Investment Case for Nutrition** (was to be launched in 2019) – a bi-annual review of economic studies of cost-effective nutrition interventions in Africa to identify gaps and needs to finance nutrition targets. **Banking on Nutrition** – seeks to unlock the nutrition potential in the bank's investment portfolio. AfDB launched its 2018-2025 Multi-sectoral Nutrition Action Plan in December	https://www.afdb.org/en/topics-and-sectors/sectors/human-capital-development/nutrition https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-

Name of organization	Countries covered/ member countries[46]	Stakeholder category	Position on school health and nutrition	Sources of information
			2018. The plan targets nutrition-smart investments in agriculture, water and sanitation, and social protection, and projected a 40% reduction in stunting by 2025. The Action Plan includes the use of **school-based food and nutrition interventions** covering school feeding, micronutrient supplements, deworming, health promoting behaviours, WASH and an enabling school environment.	Documents/Banking_on_Nutrition_ActionPlan_A4_V1d_single.pdf
Southern Africa Development Community (SADC)	Member states: **Angola,** Botswana, Comoros**, Democratic Republic of Congo**, **Eswatini, Lesotho**, **Madagascar**, **Malawi,** Mauritius, **Mozambique, Namibia**, Seychelles, South Africa, **United Republic of Tanzania, Zambia, Zimbabwe**	Regional Economic Community	Adopted the **SADC Food and Nutrition Security Strategy 2015-2025**. The FNSS is linked to other strategies e.g. health and education. The strategy notes the double burden in the SADC region of stunting and wasting/underweight among children alongside levels of obesity among adult females that are above the average for Africa. The FNSS addresses supply-side agriculture (access to water and land for agriculture, reduced food losses and waste, technology for agriculture). The monitoring and intervention emphasis is on children and mothers (first 1,000 days). There is reference to promoting school feeding schemes for primary schools as a social protection measure. While there are regional water supply and sanitation initiatives, there is little reference to WASH in schools. SADC Member States are addressing HIV and AIDS through multi-sectoral national responses. One of the issues addressed is mitigating the socio-economic impact, especially in providing support for orphans and other vulnerable children, by developing and implementing strategies for social support, such as shelter, schooling, nutrition, health and social services.	https://www.nepad.org/publication/sadc-food-and-nutrition-security-strategy-2015-2025
Common Market for Eastern & Southern Africa (COMESA) HQ in Zambia	Burundi, Comoros, **Democratic Republic of Congo,** Djibouti, Egypt, Eritrea, **Eswatini,** Ethiopia, Kenya, Libya, Madagascar, **Malawi,** Mauritius, Rwanda, Seychelles, Somalia, Suda**n**, Tunisia, Uganda, **Zambia, Zimbabwe**	Regional Economic Community	COMESA's 2016 Health Charter identifies poor nutrition as one of the major drivers of disease burdens in the COMESA region and on the Continent, and urges COMESA States to (i) review national agricultural policies to align them to CAADP; (ii) prioritize rural agriculture and infrastructure in national development planning; (iii) mainstream nutrition in national development and social protection policies and programmes; and (iv) progressively make access to food, clean water and sanitation by all justiciable. COMESA adopted the COMESA Social Charter (2015) that aims to promote the welfare of people in the region and improve the quality of life. The charter has the well-being of the child as one of its pillars. There is reference to maternal and child health, but the emphasis is on children under 5 years. The COMESA Regional HIV and AIDS Policy is a guide to member States and others in the region on HIV and AIDS response. The policy objective is to free the COMESA region from HIV and AIDS in line with the African Union Catalytic Framework to End HIV/AIDS, TB and Malaria by 2030, Global UNAIDS Strategy on the Fast-Track to end AIDS, and the UN Sustainable Development Goal 3: Ensure healthy lives and promote well-being for all at all ages. HIV and Adolescent Sexual Reproductive Health Objective: To improve protection of, and skills, capacity, knowledge and access to HIV and sexual reproductive health services, and prevent new HIV infection among adolescents, and young women and men. Measure: Mainstream adolescent HIV and comprehensive sexual and reproductive health education in school.	https://www.comesa.int/wp-content/uploads/2020/05/ENG_COMESA-Health-Framework.pdf https://www.comesa.int/wp-content/uploads/2020/05/ENG_COMESA-Social-Charter.pdf

Name of organization	Countries covered/ member countries[46]	Stakeholder category	Position on school health and nutrition	Sources of information
Southern Africa Confederation of Agricultural Unions (SACAU)	17 farmer organisations in Botswana, **Eswatini**, **Lesotho**, **Madagascar**, **Malawi**, **Mozambique**, **Namibia**, Seychelles, South Africa, **United Republic of Tanzania**, **Zambia**, **Zimbabwe**	Regional farmers organisation	A membership-based organisation, SACAU officially recognised by COMESA, SADC, AUC, NEPAD and other intergovernmental bodies as their partner on matters relating to agricultural development in the southern African region. SACAU is committed to a transformative agenda to agricultural development which is growth oriented and enterprise development focused. Core to its mission is promoting, advancing, protecting, defending the common interests of farmers in the region.	http://www.sacau.org/our-members/
Africa Research Universities Alliance Centre of Excellence in Food Security	Led by **University of Pretoria, South Africa** in collaboration with University of Ghana, Legon and University of Nairobi. Has association with University of Western Cape and University of Fort Hare (historically disadvantaged universities)	Continental research body. Has links with IPFRI and FANR in SADC	Concern about triple burden of malnutrition, and high intake of low nutrient higher energy food leading to malnutrition, and impact on vulnerable groups especially children. Also notes that many on the continent rely on agriculture for livelihoods. One of its research focus areas is to explore pathways to providing sufficient, safe, nutritious and consumer driven food for populations of 21st century Africa. Objectives are to design foods with local and indigenous African plants and animals that are affordable, marketable and convenient, nutrient dense, and implement appropriate food processing technologies for SMMEs to manufacture convenient African foods; policies and programmes to ensure nutrient adequate foods are available, culturally acceptable, accessible and affordable to African populations.	https://arua.org.za/centres-of-excellence/coe-food-security/
Action Against Hunger	Burkina Faso, Cameroon, Central African Republic, Chad, Cote d' Ivoire, **Democratic Republic of Congo**, Kenya, Liberia, **Madagascar**, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Somalia, South Sudan, **United Republic of Tanzania**, Uganda, **Zimbabwe**	International NGO	Operates in 40 countries globally. Funded through private sector foundations and individual donors. Operations cover health and nutrition, food security and WASH. Also covers humanitarian crises. Does not have a specific focus on school health and nutrition.	https://www.actionagainsthunger.org/
CARE – East, Central and Southern Africa (Nairobi)	Includes: Democratic Republic of Congo, Madagascar, Malawi, South Africa, United Republic of Tanzania, Zambia, Zimbabwe	International NGO	Operates in over 100 countries globally. Work includes food and nutrition, education and health. Its health, food and nutrition programmes focus on children under-five years. CARE also works with adolescent girls on improving health - reducing anaemia and sexual reproductive health especially for married adolescent girls. CARE supports smallholder agriculture, especially women farmers, to meet their food needs and develop sustainable livelihoods. There is no reference to school health and nutrition in the description of its programmes. However, the School Water, Sanitation, and Hygiene plus Community Impact (SWASH+) project is an action-research and advocacy project focused on increasing the scale, impact, and sustainability of school water, sanitation, and hygiene (SWASH)	https://care.org/our-work/food-and-nutrition/

Name of organization	Countries covered/ member countries[46]	Stakeholder category	Position on school health and nutrition	Sources of information
			programming in Kenya. The goal was not just to measure the impact of school WASH programs, but to understand the barriers to maintaining these programs in the long-term. It also sought to increase the financial and human resources schools invested in WASH. SWASH+ categorizes its work into three main areas: studies, advocacy, and tools.	
Global Alliance for Improved Nutrition (GAIN)	Offices in African countries: Ethiopia, Kenya, **Mozambique**, Nigeria and **United Republic of Tanzania**	International NGO	GAIN's aim is to make healthier diets more affordable and accessible in the countries GAIN works in. It supports large-scale food fortification in Ethiopia, Kenya, Mozambique, Nigeria and Tanzania; better diets for children in Ethiopia, Mozambique and Nigeria; and adolescent nutrition in Mozambique.	https://www.gainhealth.org/homepage
Global Fund to End HIV, TB and Malaria	Global	International partnership	The Global Fund is an international partnership designed to accelerate the end of the AIDS, tuberculosis and malaria epidemics. The Fund increased its investment in 13 countries in sub-Saharan Africa to reduce HIV incidence among adolescent girls and young women and promotes the protective role that access to education plays for young women in reducing the risk of HIV infection.	https://www.theglobalfund.org/en/
Project Concern International (PCI)	Botswana, Burundi, Ethiopia, Kenya, **Malawi**, **United Republic of Tanzania**, **Zambia**	International NGO	PCI food security programmes are designed to end hunger and malnutrition by imparting climate-smart and nutritionally-targeted agriculture practices, strengthening livelihoods; improving health nutrition and hygiene practices; and supporting integrated school feeding programmes. School feeding programmes form part of an integrated approach that includes training teachers, parents, volunteers and students in healthy eating and personal hygiene, working with schools and community leaders to keep girls in school, supporting government-led vaccination and health days and distribution of deworming kits, and improving school infrastructure with an emphasis on water and sanitation. PCI also works with government agriculture extension officers and schools to establish school gardens, and partners with local farmers and schools to establish a local supply of fresh, nutritious food.	https://www.pciglobal.org/school-feeding/
Save the Children (International)	Burkina Faso, **Democratic Republic of Congo**, Ethiopia, Kenya, **Malawi**, **Mozambique**, Niger, Nigeria, Rwanda, Sierra Leone, Somalia, South Sudan, Sudan, **United Republic of Tanzania**, Uganda, **Zambia**, **Zimbabwe**	International NGO	Save the Children subscribe to the FRESH framework for School Health and Nutrition (SHN), and within the organization, the SHN programme is linked with the Education Sector programmes and seen as a continuation of the Early Childhood Development Programme. Save the Children's SHN programme operates in 30 countries globally. Interventions are adapted to country contexts and needs and include providing school children with access to improved WASH facilities; access to deworming and micronutrient supplementation, vision and hearing screening, oral health promotion, malaria prevention and treatment, obesity reduction; skills-based health education for developing lifelong health behaviours, including HIV and AIDS prevention; ensuring national policies support schools and communities. Save the Children produced a Health Education Manual (2013) to assist SHN Programme Managers to design and implement health education in schools, for children aged 8-10 years. The lessons cover WASH, Infectious Diseases including Neglected Tropical Diseases, Taking care of our bodies, Preventing diseases and injury, Nutrition, Sexual	https://www.savethechildren.org/us/what-we-do/education/school-health-and-nutrition https://www.savethechildren.org/content/dam/global/reports/education-and-child-

Name of organization	Countries covered/ member countries[46]	Stakeholder category	Position on school health and nutrition	Sources of information
			Reproductive Health including HIV and AIDS prevention. Save the Children works closely with schools and their communities to ensure proper sanitation through building latrines and appropriate hand washing facilities and providing access to safe drinking water. Most importantly, through education, students learn how to adapt their daily habits to improve their health, nutrition, hygiene.	protection/health-ed-man.pdf
World Vision International	**Angola**, Burundi, Central African Republic, Chad, **Democratic Republic of Congo**, **Eswatini**, Ethiopia, Ghana, Kenya, **Lesotho**, **Malawi**, Mali, Mauritania, **Mozambique**, Niger, Rwanda, Senegal	International NGO	Health Sector and Nutrition Approach 2020-2030 sets the high-level goal: Ensure healthy lives and promote well-being for all children. While children under-five are the main target of World Vision, the new approach recognises the need to improve the health and nutrition of adolescent girls to reduce both under-five and maternal mortality. The approach makes provision for improving dietary diversity and addressing micronutrient and iron deficiency in adolescents 12-18 years. Health and nutrition interventions are linked with other interventions e.g., WASH, child protection, mental health, infectious and neglected tropical diseases. In addition, World Vision implements WASH in schools programming in 40 countries. World Vision is prioritising WASH service levels beyond basic access. This includes improved water, equitable access to toilets, and facilities for menstrual hygiene. World Vision has partnered with Sesame Workshop to roll-out a school-based program called WASH UP! The program uses fun and engaging learning materials, featuring the puppet Raya to teach children to learn, practice, and share healthy WASH habits. Raya also serves as a role model for school-aged girls and provides educational resources to teachers as well. World Vision International also support programmes with the objective of ending discrimination and stigma, including a programme in Zimbabwe for young girls that gives them the opportunity to focus on their education and avoid early teenage pregnancy.	https://www.wvi.org/africa https://www.wvi.org/sites/default/files/2020-06/HN%20Sector%20Approach%20%281%20June%202020%29.pdf

Annex F: Summary of studies

Table 21: Summary of reviewed papers on the effects of school nutrition programmes in Southern Africa

Author, year, country	Design, participants, sample size	Intervention	Outcomes measured	Main findings
Gandure et al. 2019 Eswatini	Cross-sectional mixed methods study of 147 schools (primary and secondary) in four regions. WFP evaluation of the Eswatini National School Feeding Programme (2010 – 2018)	SFP (meals)	Education: enrolment, attendance. No nutrition data collected over evalution period.	Qualitative affirmation that school feeding reduced school dropouts, but indicators and lack of targets do not allow for conclusions about change (or attribution to school feeding).
Graham et al. 2015 South Africa	Comparative cross-sectional in one district comparing schools receiving only the National School Nutrition Programme; schools receiving both the NSNP and a TigerBrands Foundation in-school breakfast feeding programme, and a control group receiving neither yet.	School meals + breakfast	Education: Learner performance Nutrition outcomes: stunting, overweight	Learners at schools receiving the NSNP only had somewhat higher stunting rates (14.5%) than children at the (better off) control schools and those receiving the additional TBF breakfast. Both programmes showed a protective effect for overweight, with a stronger effect where children received both (especially for girls). Both appear to be linked to improvements in school performance relative to control group.
Hochfeld et al. 2013 South Africa	Tiger Brands Foundation's in-school breakfast feeding programme in Alexandra, Johannesburg	School meals + breakfast	Learner performance at school, attendance, nutritional status	Statistically significant improvements in nutritional status over the period of the pilot programme, most notably the reduction in numbers of overweight and stunted children. This evaluation has direct implications for the NSNP in that the study schools were all also in receipt of the NSNP.
Mary's Meals, 2016 Malawi	*Design:* Quasi-experimental impact assessment over a year *Participants:* Programme sample: Children, teachers and volunteers in ten schools where Mary's Meals' programme was introduced at the start of the year.	School meals	Hunger, enrolment, attendance, drop out, concentration and attention, happiness, anxiety	• Child hunger at school decreased • The physical and emotional effects of hunger decreased • Enrolment increased • Numbers of children out of school decreased • Attendance improved • General absence and absence due to hunger decreased

Author, year, country	Design, participants, sample size	Intervention	Outcomes measured	Main findings
	Control group: Children, teachers and volunteers in ten schools which are not supported by programme. Existing sample: Teachers in schools which have been part of the Mary's Meals programme for a minimum of three years.			• General drop out and drop out due to hunger decreased • Children leaving school early during the school day decreased • Concentration and attention at school improved • Happiness at school increased • Anxiety due to hunger decreased
Manea, 2020 Malawi	*Design:* Analysis of cross-sectional surveys	School meals	Primary school enrolment and retention rates	Estimates school feeding has increased enrolments by 7 percentage points on average, but impact on retention rates is limited. Impacts on enrolments in food-insecure areas are larger, and there is a significant increase of around 2 percentage points in the retention rate of students in these same areas.
Nkhoma et al., 2014 Malawi	Quasi-experimental 226 schoolchildren aged 6–8 y in 2 rural Malawian public primary schools were followed for one school year. Children attending one school (SFP school) received a daily ration of corn-soy blend porridge, while those attending the other (non-SFP school) did not.	School meals	Cognitive and anthropometric outcomes	At follow-up, the SFP sub-cohort had a greater reduction than the non-SFP sub-cohort in the number of intra-extra predimensional shift errors made (mean 18.5 and 24.9, respectively; P-interaction = 0.02) and also showed an increase in MUAC (from 16.3 to 17.0; P-interaction <0.0001). The results indicate that the SFP in Malawi is associated with an improvement in reversal learning and catch-up growth in lean muscle mass in children in the SFP school compared with children in the non-SFP school.
Peacocke et al. 2018 Lesotho	Cross-sectional school and household survey of 660 parent households & staff from 44 schools in five districts plus interviews and discussions with a range of stakeholders; evaluation of three delivery models of National School Feeding Programme (2007-2017)	SFP (meals)	Perceived enrolment, attendance	Teachers, children and parents consider school feeding to be a major reason why children attend school with rates of enrolment, attendance and transition consistently higher for girls than for boys. Nutrition benefits to children are unclear.

Author, year, country	Design, participants, sample size	Intervention	Outcomes measured	Main findings
Tirivayi et al., 2019 Malawi	*Design*: Comparative cross-sectional survey *Participants*: 128 targeted and 63 non-targeted schools, 996 early grade learners, 922 beneficiary and 476 non-beneficiary households in seven targeted districts	SFP (meals and take-home rations, THRs, for girls and orphaned boys)	Education: new enrolment, retention, literacy. Nutrition: short-term hunger, meal frequency, dietary diversity, minimum acceptable diet (MAD) rates.	SMP associated with reduced short-term hunger, increased meal frequency and dietary diversity among learners and households. Insignificant impacts on MAD rates among children; varied at household level. Minimal impact on literacy among Standard 2 learners but significant improvements (particularly for girls) among standard 4 learners. Absenteeism declined relative to non-targeted schools. No impact on enrolment.
Trevant et al., 2014 Zambia	*Design:* Non-experimental (descriptive review of programme performance), no control	School meals (assessed as part of broader country programme)	Attendance, enrolment, dropout	Found a slight numeric increase in attendance and enrolment between 2011-2013; the drop-out rate only slightly decreased during the period.
Turner et al., 2015 United Republic of Tanzania	*Design:* Non-experimental (descriptive review of programme performance), no control	School meals (assessed as part of broader country programme)	Attendance, enrolment	WFP data showed declining attendance and enrolment for girls and boys at WFP-supported schools. These data reflect national trends exacerbated by the declining number of feeding days and removal of the mid-morning meal in early 2013.
Visser et al., 2013 Republic of Congo	*Design:* Non-experimental (descriptive review of programme performance), no control	School meals (assessed as part of broader country programme)	School enrolment, attendance	WFP-supported schools increased enrolment year by year, from 6 percent in 2010 to 25.7 percent in 2012. Enrolment of indigenous children also increased. The ratio of girls to boys in the targeted schools increased from 0.90 in 2008 to 0.95 in 2012. Attendance rates at WFP-supported schools were consistently high throughout the evaluation period.
Webb et al. 2018 Malawi	WFP evaluation of USDA McGovern-Dole School Meals Programme (2013 – 2016) and Purchase from Africans for Africa (PAA).	SFP (meals)	Enrolment and retention	Appears to have contributed positively to enrolment, attendance; reduced health-related dropout from 25% to 14%. Could not assess literacy due to data challenges; unrealistic targets for reducing inattention.

Table 22: Summary of reviewed papers on the impact of school-based HIV-related interventions on outcomes for school-aged children in Southern Africa (n=32).

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Baird et al., 2010 Malawi	*Design*: Randomised CCT intervention *Participants*: Never-married, 13–22-year-old females in Zomba *Sample size*: n=3,805 (intervention: n= 1,225 girls in 88 randomly selected EAs)	Zomba Cash Transfer Program targeted young women, providing incentives (in the form of school fees and cash transfers) to current schoolgirls and recent dropouts to stay in or return to school. The cash transfer comprised an average offer of US$10 per month conditional on satisfactory school attendance – plus direct payment of secondary school fees. *Duration: The CCT was transferred in equal amounts for 10 months.*	Self-reporting schooling outcomes, early marriage, teenage pregnancy, self-reported sexual activity and risk behaviours	Intervention led to significant declines in early marriage, teenage pregnancy, and self-reported sexual activity among programme beneficiaries after one year of implementation. For beneficiaries who were out of school at baseline, the probability of getting married and becoming pregnant declined by more than 40 and 30%, respectively. The incidence of the onset of sexual activity was 38% lower among all beneficiaries than the control group.
Baird et al. 2012 Malawi	*Study design*: Cluster randomised trial. *Participants*: Never-married women aged 13–22 years from 176 enumeration areas *Sample size*: n=1289 (with complete interview and biomarker at baseline)	Zomba Cash Transfer Program targeted young women, providing incentives (in the form of school fees and cash transfers) to current schoolgirls and recent dropouts to stay in or return to school. The cash transfer comprised an average offer of US$10 per month conditional on satisfactory school attendance – plus direct payment of secondary school fees. *Duration: The CCT was transferred in equal amounts for 10 months.*	Behavioural risk assessments at baseline and 12 months; serology tested at 18 months. Primary outcomes: Prevalence of HIV and HSV-2 at 1.8 months	Weighted HIV prevalence at 18-month follow-up was 1·2% in the combined intervention group versus 3% in the control group (adjusted odds ratio [OR] 0·36, 95% CI 0·14–0·91); weighted HSV-2 prevalence was 0·7% (five of 488 participants) versus 3·0% (27 of 796 participants; adjusted OR 0·24, 0·09–0·65). In the intervention group, there was no difference between conditional versus unconditional intervention groups for weighted HIV prevalence or weighted HSV-2 prevalence. For individuals who had already dropped out of school at baseline, we detected no significant difference between intervention and control groups for weighted HIV prevalence or weighted HSV-2 prevalence.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Behrman, 2015 Malawi, Uganda	*Design*: Natural experiment, using data from nationally representative, cross-sectional household-based surveys: 2010 Malawi Demographic Health Survey (DHS) and 2011 Uganda AIDS Indicator Survey (AIS) *Target group and sample size*: 1445 Malawian women born 1978 – 1983, 15% (n=220) tested positive for HIV in 2010; 2309 Ugandan women born 1981 – 1986, 9% (n=205) tested positive for HIV in 2011.	Primary schooling (introduction of universal primary education)	Age at marriage, schooling of partner in adulthood, sexual debut, age difference between spouses, recent self-reported sexual behaviour	A one-year increase in schooling decreases the probability of an adult woman testing positive for HIV by 0.06 ($p < 0.01$) in Malawi (and by 0.03 ($p < 0.05$) in Uganda). In supplementary analyses exploring potential pathways through which such effects may occur, it was found that increased primary schooling positively affects women's literacy and spousal schooling attainment in Malawi. But primary schooling had no effect on sexual debut, age difference between spouses or recent (adult) sexual behaviour.
Burnett et al, 2011 Eswatini	*Design*: Randomized control trial *Participants*: Form 2 (grade 9) and Form 4 (grade 11) *Sample*: 135 students	School-based HIV education intervention designed in the United States and adapted for Swaziland. Interactive techniques, such as role playing, were used. The curriculum also used group discussions to help students understand and internalize possible outcomes of these various behaviours. A mobile HIV testing unit was available on one Saturday session, after the HIV testing module was presented.	HIV-related knowledge, attitudes, and protective behaviours including HIV testing; association of components of Self-Efficacy Theory with these behaviours	Study found significant differences between the intervention and control groups regarding HIV knowledge, self-efficacy for abstinence, condom use, and getting HIV test results, outcome expectations for knowing one's own HIV status, and the protective behaviour of getting an HIV test.
Cowan et al, 2010 Zimbabwe	*Design:* Cluster randomised controlled trial *Participants*: Originally intended to follow a cohort of Form 2 pupils (9th school year); large 'outmigration' led to shift to population-based assessment; final survey of young adults aged 18 – 22 *Sample size*: baseline n=6791 pupils; final survey (4 years later): n=4,684	Community-based multi-component HIV prevention intervention for young people, including intervention at secondary schools. The intervention included peer educators, who used theoretically-based materials delivered using participatory methods which aimed to enhance knowledge and develop skills. Also included community activities targeting parents and other community members, and provision of reproductive health services.	Two primary endpoints: prevalence of HIV and of HSV-2. Secondary endpoints included pregnancy prevalence and reported knowledge, behaviour and attitudes.	There were modest improvements in knowledge and attitudes among young men and women in intervention communities, but no impact on self-reported sexual behaviour. There was no impact of the intervention on prevalence of HIV or HSV-2 or current pregnancy. Women in intervention communities were less likely to report ever having been pregnancy.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
De Neve et al., 2015 Botswana	*Design*: Analysis of cross-sectional, nationally representative household 2004 and 2008 Botswana AIDS Impact Surveys *Participants*: Secondary school learners *Sample size*: n=7018	Length of schooling (policy reform allowed for a natural experiment)	New HIV infections (HIV biomarkers)	Each additional year of secondary schooling caused by the policy change led to an absolute reduction in the cumulative risk of HIV infection of 8·1 percentage points (p=0·008), relative to a baseline prevalence of 25·5% in the pre-reform 1980 birth cohort. Effects were particularly large in women (11·6 percentage points, p=0·046).
Denison et al, 2012 Zambia	*Design*: Quasi-experimental design *Participants and sample size*: 2133 8th and 9th grade students in 13 intervention versus 13 matched comparison schools	Restless Development's youth-led model places trained Volunteer Peer Educators aged 18–25 years, in schools to teach HIV prevention and reproductive health. VPEs also run youth centres, extracurricular and community-based activities.	HIV/RH knowledge, attitudes, and behaviours	Intervention students had significantly higher levels of HIV knowledge [OR 1.61, 95% CI 1.18–2.19; P<0.01] and reproductive health (OR 1.71; 95% CI 1.21–2.49; P<0.01), more positive attitudes toward people living with HIV and greater self-efficacy to refuse unwanted sex and access condoms. No evidence of differences in ever having had sex was found (28% in intervention; 29% in comparison schools). But intervention students were more likely not to have had sex in the previous year (OR 1.26, 95% CI 1.03–1.56; P<0.05) and to have had only one sex partner ever (OR 1.43, 95% CI 1.00–2.03; P<0.05).
Hallfors et al., 2015 Zimbabwe	*Design*: Clustered randomized control trial. *Participants and sample size*: 328 orphan adolescent girls in grade 6 at rural primary schools.	School support as a structural HIV prevention intervention. The intervention group received school fees, uniforms and school supplies and were assigned a school-based "helper." In 2011-12, the control group received delayed partial treatment of school fees only. *Duration: 2007 to 2010.*	*Primary outcomes*: HIV and HSV-2 biomarkers (collected from 88% of sample). *Secondary*: Sexual debut, ever married, ever pregnant, school dropout, years of schooling, meals per day, HRQoL.	The two groups did not differ on HIV or HSV-2 biomarkers. The comprehensive five-year intervention continued to reduce the likelihood of marriage, improve school retention, improve SES (food security), and marginally maintain gains in quality of life, even after providing school fees to the control group.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Helleve et al., 2011 South Africa	*Design*: Data derived from the SATZ project; a cluster-randomized controlled trial conducted in high schools in three sites. *Participants*: High school students in South Africa (Cape Town and Mankweng) *Sample size*: n=3483	Teachers at the intervention schools at the two sites were trained over 4 days on teachers' knowledge, facilitating skills, self-awareness and ownership to the aims of the programme and creating a safe environment by using non-judgmental and participatory teaching methods. The learner programme consisted of a school-based HIV prevention education programme administered by teachers and comprising 16 lessons, implemented with varying fidelity.	Association between students' perceptions of care (caring teachers) and reported onset of sexual activity	Students from the intervention group perceived greater care from teachers than students in the control group. Female students and students from Cape Town perceived having received more care, and their perception of care was associated with the number of lessons received, how often students expressed their opinions in class and how often teachers talked about HIV/AIDS, condoms and abstinence. Students who perceived that their teacher cared for their health and well-being were less likely to initiate sexual intercourse.
Jemmot et al, 2015 South Africa	*Design:* Randomised controlled trial *Participants:* Grade-6 learners (mean age = 12.4 years) in Eastern Cape, South Africa. Nine matched-pairs of schools were randomly selected and within pairs randomized.	Theory-based HIV/STI risk-reduction intervention. Each intervention included 12 one-hour modules, with two modules delivered during each of six sessions on consecutive school days, sessions involving games, brainstorming, role-playing, group discussions, and comic workbooks with a series of characters and storylines.	Primary outcome: Measures of unprotected intercourse. Secondary: other sexual behaviours, theoretical constructs, and biologically confirmed curable STIs (chlamydial infection, gonorrhoea, trichomoniasis) and HSV 2.	The HIV/STI risk-reduction intervention reduced unprotected intercourse averaged over the entire follow-up period, OR = 0.42, 95% CI [0.22, 0.84], an effect not significantly reduced at 42- and 54-month follow-up compared with 3, 6, and 12-month follow-ups. The intervention caused positive changes on theoretical constructs averaged over the five follow-ups, though most effects weakened at long-term follow-up. The intervention's main effect on STI was nonsignificant, but an Intervention-Condition x Time interaction revealed it significantly reduced curable STIs at 42-month follow-up in adolescents who reported sexual experience.
Johnson et al, 2018 South Africa	*Design*: Longitudinal study *Participants*: Women aged 18–28 years. *Sample size*: n=320 who had ever had sex (136 were members of Soul Buddyz Clubs between 2004 and 2008; 184 were matched controls from the same communities).	Soul Buddyz clubs, an extracurricular, school-based HIV prevention program, that leveraged off a mass media television	Incidence of HIV, sexual risk behaviour	Ex-Buddyz were more likely to be HIV negative than controls (AOR 2.92, 95% CI 1.26–6.77, p = 0.013). Ex-Buddyz were more likely to have only had one sexual partner in the past year (AOR 2.14, 95% CI 1.17–3.89, p = 0.013) and 1.7 times more likely to have used a condom at first sex (95% CI 0.99–2.92, p = 0.053). Participation in an SBC is associated with a decrease in young women's HIV risk and

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Kaufman et al, 2010 Botswana, Zimbabwe	*Design*: Quasi-experimental – cross-sectional comparison of participants & control, 2-5 years after GRS programme *Participants*: Students 15 to 19 *Sample size*: n=553 (260 graduated from the GRS program 2-5 years pre-survey, 293 were a comparison group of same-grade peers who had not participated).	10-hour interactive HIV prevention curriculum in schools by Grassroots Soccer, using soccer language, activities, and metaphors to educate youth about HIV prevention and life skills.	HIV-related knowledge, attitudes, communication, perceived norms and behaviours	No significant differences in knowledge observed between graduates and non-graduates, although graduates did demon-strate slightly higher knowledge of condom use as an HIV prevention method (X2=4.5, p=0.03). Also, no differences in communication about HIV, sexual debut. Sexually active graduates had fewer sexual partners (adjusted F=6.2, p=0.015) and fewer partners in the past two months (adjusted F=4.1, p=0.046). Overall, findings suggests that knowledge and communication gains from youth-targeted programs may diminish overtime, while ef-fects on sexual behaviour appear to vary across countries.
Mason-Jones et al, 2011 South Africa	*Design*: Quasi-experimental design *Participants:* Grade 10 students at 30 public high schools (15 in intervention, 15 in comparison) in the Western Cape, South Africa. *Sample size*: 3934	A government-led peer education programme in which peer educators received intensive training. The intervention consisted of a mixture of taught weekly classroom sessions conducted during 'life orientation' classes by peer educators following a standard curriculum, 'strat chats'; impromptu conversations with fellow students led by the peer educators, referral of students identified as in need of further social or health care support and setting up community projects.	Primary outcomes: Age of sexual debut, use of condom at last sex Psychosocial outcomes such as decision making, goal orientation, critical thinking and self-esteem	No significant difference was detected in the age of sexual debut, use of condoms at last sex, goal orientation, decision-making or future orientation for students in the intervention group as compared to the comparison group. Issues around the implementation of the programme suggested that this was sub-optimal.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Mason- Jones et al, 2013 South Africa	*Design*: Quasi-experimental design *Participants and sample size*: n=728 students from 15 randomly selected public high schools in the Western Cape, South Africa, and 15 matched comparison schools (n=295 in intervention group and 433 in comparison).	Peer education programme implemented by peer educators who received skills training sessions of 1 hour each per month for the duration of the evaluation delivered by skilled facilitators, 'talk groups' and mentoring sessions of up to 1 hour duration each per month, and 3 day camps which included 11 further training sessions.	Primary outcomes: Age of sexual debut, use of condom at last sex Psychosocial outcomes such as decision making, goal orientation, critical thinking and self-esteem	At follow-up, there were no significant differences in the age of sexual debut, use of condom at last sex, goal orientation, critical thinking and self-esteem scores of the peer educators compared to students in the comparison group. Decision-making scores were significantly higher in the peer educators, compared to students in the comparison group (adjusted difference between means 0.14, 95% CI 0.02 to 0.26). Even a highly intensive peer education training programme had limited effects on peer educators themselves. It is clear that community factors, gendered power relations and poverty need to be addressed to have a lasting impact.
Matthews et al., 2012 South Africa, United Republic of Tanzania	*Design*: The SATZ project, a cluster-randomized controlled trial of school-based interventions in three sites: Cape Town (SA), Mankweng (SA) and Dar es Salaam (Tanzania). *Participants*: Students aged 12–14. *Sample size*: 5,352, 4,197 and 2,590 students participated at baseline in Cape Town, Dar es Salaam and Mankweng, respectively; 73%, 88% and 83% were retained 12–15 months later.	School-based HIV prevention education programme administered by Life Orientation or Science teachers specifically trained for this programme. Sessions involved teacher presentations, whole class and small group discussions, small group activities and role-plays, all supported by materials. Also homework assignments to be accomplished with the help of parents.	Delayed sexual debut and condom use	In Dar es Salaam, students in the intervention were less likely to have their sexual debut during the study (OR 0.65, 95% CI 0.48–0.87). In Cape Town and Mankweng, the intervention had no impact. The interventions were effective at delaying sexual debut in Dar es Salaam but not in South Africa, where they need to be supplemented with programmes to change the environment in which adolescents make decisions about sexual behaviour.
Matthews et al., 2016 South Africa	*Design*: Cluster randomised controlled trial *Participants*: Grade 8 learners in 42 high schools *Sample size*: Of 6,244 sampled adolescents, 55.3 % participated.	PREPARE, a multi-component, school-based HIV prevention intervention comprising education sessions, a school health service and a school sexual violence prevention programme.	*Primary outcomes*: Sexual debut, condom use Secondary outcomes: intimate partner violence (IPV), transactional sex	At 12 months there were no differences between intervention and control arms in sexual risk behaviours. Participants in the intervention arm were less likely to report IPV victimisation (35.1 vs. 40.9 %; OR 0.77, 95 % CI 0.61–0.99; t(40) = 2.14) suggesting the intervention shaped intimate partnerships into safer ones, potentially lowering the risk for HIV.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Meinck et al, 2019 South Africa	*Design*: Quasi-experimental = cross-sectional survey with a 99% one-year follow up. *Participants*: Adolescent girls aged 12 to 17 at baseline in two provinces. *Sample size*: n = 1498	Free schooling provision	Mental health distress, sexual risk behaviour	Internalizing and externalizing mental health distress fully mediated the positive relationship between adverse childhood experiences at baseline and HIV risk behaviour at follow-up. Free schooling provision at baseline and follow-up eliminated the pathway from internalizing to externalizing mental health distress by moderating the pathway between ACEs and internalizing mental health distress. It also weakened the pathway from externalizing mental health distress to HIV risk behaviour at follow-up through a direct negative effect on externalizing mental health distress. Reducing ACEs and adolescent mental health distress is essential for reducing HIV risk behaviour among girls in South Africa.
Mensch et al., 2020 Malawi	*Design*: Longitudinal – analysis of Malawi Schooling and Adolescent Study (a longitudinal survey that followed 2,649 young people aged 14–17 at baseline from 2007 to 2013)	School enrolment, grade attainment and academic skills—numeracy and Chichewa literacy	HIV and HSV-2 incidence	Grade attainment was significantly associated with lower rates of both HSV-2 and HIV among girls, and negatively associated with HSV-2 but not HIV among boys. School enrolment and academic skills were not significantly associated with STIs for boys or girls.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Mmbaga et al, 2017 United Republic of Tanzania	*Design*: Cluster randomised controlled trial *Participants*: Adolescents aged 12–14 in Dar es Salaam from 38 public primary schools. *Sample size*: 5091 at baseline; n=4783 at 6 months and n=4370 at 12 months.	Three components: one implemented by teachers, one by peer educators, and one by health care providers during adolescents' visits to youth friendly health service clinics. Three peer-led lessons taught over 8 hours and six teacher-led lessons taught over 11 hours. The teacher-led lessons were integrated in the primary school science curriculum and taught as 16 interactive teaching and learning sessions suited for large classes with some didactic lessons, each session lasting for 40–80 min. Peer-led lessons were implemented over 9 weeks (once a week), each session lasting 60–90 min. The sessions which were part of an after-school life skills training curriculum, designed to be interactive, with teachers available to support when needed.	Self-reported sex initiation and condom use in the past six months.	The intervention had a significant effect on delaying sexual initiation in both sexes. The intervention positively influenced action planning to use condoms for both sexes and increased actual condom use among male adolescents (p = 0.004) only.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Montague et al, 2014 South Africa	*Participants:* Male students in 42 high schools in rural KwaZulu-Natal.	Voluntary male medical circumcision (VMMC) information and awareness raising sessions held at high schools. The three-phase VMMC demand-creation strategy was implemented together with a local NGO and involved: (i) community consultation and engagement; (ii) in-school VMMC awareness sessions and centralized HIV counselling and testing (HCT) service access; and (iii) peer recruitment and decentralized HCT service access. Transport was provided for HIV negative volunteers to the clinic for the VMMC procedure; HIV infected volunteers were referred to clinics for further care.	Number of circumcisions,	Between March 2011 and February 2013, 5165 circumcisions were performed, 71% in males aged 15-19 years. Demand-creation strategies were associated with an over five-fold increase in VMMC uptake from an average of 58 procedures/month in initial community engagement phases, to an average of 308 procedures/month in the peer recruitment–decentralized service phase. Post-operative adverse events were rare (1.2%), mostly minor and self-resolving. This approach was feasible, acceptable and safe in this setting. Adaptive demand-creation strategies are required to sustain high uptake.
Mwale & Muula, 2019 Malawi	*Design*: Quasi-experimental *Participants*: Boys and girls aged between 10 and 19 years from six secondary schools in Northern Malawi, all with prior exposure to the standard life skills BCI protocol. *Sample size*: Experimental group: n=158; control: n=147	Experimental participants were exposed to an HIV risk reduction intervention (peer education) while control participants were exposed to a Health Promotion Package.	Sexual risk behaviour	At 8 months, the intervention group was 96% less likely to have sex than the control (OR¼0.04, CI¼0.01–0.20); 3.49 times as likely to report condom use when they had sex (OR¼3.49, 95% CI¼0.96 to 12.65) and they had lower odds of having multiple sexual partners. There were no significant differences on abstinence or the desire to have medical male circumcision.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Namisi et al., 2015 South Africa, United Republic of Tanzania	*Design*: The SATZ project, a cluster-randomized controlled trials of school-based interventions in three sites: Cape Town (SA), Mankweng (SA) and Dar es Salaam (Tanzania). *Participants*: Students aged 12–14. *Sample size*: 80 schools – 26 in Cape Town, 24 in Dar es Salaam, 30 in Mankweng. After matching, schools were randomly allocated to intervention and delayed intervention groups. Students participating in the baseline and to be followed-up: n=12,462.	School-based HIV prevention education programme administered by Life Orientation or Science teachers specifically trained for this programme. Sessions involved teacher presentations, whole class and small group discussions, small group activities and role-plays, all supported by materials. Also homework assignments to be accomplished with the help of parents. *Duration: 11 (Mankweng) or 17 (Cape Town and Dar es Salaam) school hours plus booster sessions approximately 6 months later.*	Effects on communication about sexuality with significant adults (including parents) and – where significant – communication as a mediator of other outcomes (reduced reported sexual transition and social cognition predictors of such transition)	Intervention group was significantly associated with fewer reported sexual debuts in Dar es Salaam only (OR 0.648). Effects on communication with adults about sexuality issues were stronger for Dar es Salaam than for the other sites. In Dar, increase in communication with adults partially mediated associations between intervention and a number of social cognition outcomes. The hypothesized mediational effect of communication on sexual debut was not confirmed.
Pettifor et al. (2016) South Africa	*Design*: A phase 3 randomised controlled trial (HPTN 068) *Participants*: Girls aged 13–20 years in rural South Africa if they were oenrolled in grades 8–11, not married or pregnant, able to read, they and their parent/guardian had the documentation to open a bank account and were residing in the study area, intending to remain until trial completion. *Sample size*: n=2,537 girls (and their parents or guardians): randomly assigned to the intervention group (n=1,225) or control group (n=1,223).	A monthly cash transfer conditional on school attendance (≥80% of school days per month) versus no cash transfer. Participants received pre-test HIV counselling, HIV and HSV-2 testing, and post-test counselling at baseline. *Duration: Maximum of three years.*	*Primary outcome*: HIV incidence. *Secondary outcomes*: HSV-2 incidence; school attendance; no. of self-reported vaginal sex acts in past 3 months; age difference between the young woman and any of the past three sexual partners; age of coital debut; incident pregnancy; no. of unprotected sex acts in the past 3 months. Physical violence from a partner in the past 12 months and transactional sex.	HIV incidence was not significantly different between those who received a conditional cash transfer (1.94% per person-years) and those who did not (1.70% per person-years; hazard ratio 1.17, 95% CI 0.80–1.72, p=0.42). Girls receiving the CCT were less likely to have experienced physical violence from a partner, to have had a sex partner in the past 12 months, or to have had unprotected sex in the previous 3 months. Most girls in both study groups stayed in school, but girls who dropped out of school or did not attend for 80% of the time or more were significantly more likely to acquire HIV.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Puffal et al, 2014 Zimbabwe	*Design*: Manicaland HIV/STD Prevention Project is a longitudinal, population-based, open cohort study monitoring HIV trends in adults. *Participants*: From 2009 to 2011, a child survey was conducted among children aged 2–14 years in a randomly selected one-third of study households and among adolescents aged 15–17 years in two-thirds of study households. *Sample size*: n=5520 12–17-year-olds from round 5 of the survey	Indicators of school quality – one measuring general school characteristics (physical infrastructure, staffing and teaching, fee support), and one measuring HIV-specific characteristics (HIV policies, awareness, and curriculum).	Individual child wellbeing (domains for primary school-aged children: health behaviours, physical health, risk and safety, psychological health, household resources; these plus social wellbeing for secondary school age); education indicators	School quality was not associated with primary or secondary school attendance but was associated with children's being in the correct grade for age [adjusted odds ratio 2.0, 95% confidence interval (CI) 1.2–3.5, $P = 0.01$]. General and HIV-specific school quality had significant positive effects on wellbeing in the primary school-age children (coefficient 5.1, 95% CI 2.4–7.7, $P < 0.01$ and coefficient 3.0, 95% CI 0.4–5.6, $P = 0.02$, respectively), but not in the secondary school-age children ($P > 0.2$). There was no evidence that school quality provided an additional benefit to the wellbeing of vulnerable children.
Schwandt & Underwood, 2016 Botswana, Malawi, and Mozambique	*Design:* Quasi-experimental – cross-sectional post-intervention survey, with control schools *Participants:* Adolescent girls aged 11–18 in school in in three countries. *Sample size: n*=1249	Go Girls! Initiative Programme aimed at making schools safe for girl learners to reduce girls' vulnerability to HIV. Multiple components, including training of all teachers and school personnel who worked with girl learners aged 10–17. Training was followed up with quarterly review meetings with the training facilitators and trained school personnel. *Duration: Three- or four-day workshop of fourteen sessions.*	Change in teacher behaviours, including teachers asking for sex in exchange for good grades or other "favours."	In Botswana, girls who attended an intervention school (as compared to girls who attended a non-intervention school) were significantly more likely to report a reduction in teachers offering sex in exchange for favours. Communication interventions that both challenge and empower school personnel to create safer environments for schoolgirls can have positive effects, particularly in settings with sufficient resources (structural support) to support change.
Siame & Peter, 2019 Zambia	*Design*: Quasi-experimental. *Participants and sample size*: 140 Grade 11 pupils (70 in experimental and 70 in the control group) at a single secondary school	Drama-based learning methods to enhance understanding of HIV/AIDS	Understanding of HIV/AIDS (not clearly defined)	There was a significant different in the post-test scores between the experimental and control groups, suggesting that in the short-term, the use of drama-based methods of teaching appears more effective than conventional teaching methods in improving knowledge of HIV.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Stoner et al., 2017 South Africa	*Design*: Phase 3 randomized controlled trial (HPTN 068) *Participants*: Young women aged 13–23 years in rural Mpumalanga *Sample size*: n=2,328 in analysis cohort for incident HIV infection; n=2,238 in incident HSV-2 cohort.	School attendance and school dropout, data collated from high school attendance registers. *Duration: Up to four assessments of the young women and her parent/guardian were conducted from 2011 to 2015.*	Incident HIV and HSV-2	Risk of infection increased over time as young women aged and was higher in young women with low school attendance (<80% school days) compared to high (≥80% school days). Young women with low attendance were more likely to acquire HIV (HR: 2.97; 95% CI: 1.62, 5.45) and HSV-2 (HR: 2.47; 95% CI: 1.46,4.17) over the follow up period than young women with high attendance. Similarly, young women who dropped out of school had a higher weighted hazard of both HIV (HR 3.25 95% CI: 1.67,6.32) and HSV-2 (HR 2.70; 95% CI 1.59,4.59).
Stoner et al., 2018 South Africa	*Design*: Phase 3 randomized controlled trial (HPTN 068) *Participants*: Girls aged 13–20 years *Sample size*: n=2,086 included in analysis cohort (of 2,553)	School attendance *Duration: Up to four assessments of the young women and her parent/guardian were conducted from 2011 to 2015.*	Partner selection (characteristics of sex partners, partner age and number) as a mediator of the relationship between school attendance and HIV/HSV-2	Young women with high attendance in school had a lower cumulative incidence of HIV compared to those with low attendance (risk difference=-1.6%). Partner age difference (CDE=-1.2%) and number of partners (CDE=-0.4%) mediated a large portion of this effect - almost full mediating the effect of school in HIV (CDE= −0.3%). The same patterns were observed for the relationship between school attendance and cumulative incidence of HSV-2 infection, indicating the importance of school attendance in reducing partner number and partner age difference in this relationship.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Stoner et al., 2018 South Africa	*Design*: Phase 3 randomized controlled trial (HPTN 068) *Participants*: Girls aged 13–20 years *Sample size*: n=2,086 included in analysis cohort (of 2,553)	Hypothetical interventions (and combinations of interventions) to reduce specific risk factors – including low school attendance, intimate partner violence, depression, transactional sex, and age-disparate partnerships	Incident HIV infections	Many factors had strong associations with HIV but potential intervention estimates did not always suggest large reductions in HIV incidence because the prevalence of risk factors was low. When modelling combination effects, an intervention to increase schooling, decrease depression, and decease transactional sex showed the largest reduction in incident infection (risk difference, –1.4%; 95% CI, –2.7% to –.2%), but an intervention on only transactional sex and depression still reduced HIV incidence by –1.3% (95% CI, –2.6% to –.2%). To achieve the largest reductions in HIV, prevalence of the risk factor and strength of association with HIV must be considered. Additionally, intervening on more risk factors may not necessarily result in larger reductions in HIV incidence.
Tibbets et al, 2011 South Africa	*Design*: Quasi-experimental *Participants*: Four intervention schools in one township near Cape Town, South Africa were matched to five comparison schools *Sample size*: n= 4040 (equal numbers of male and female)	HealthWise, a school-based HIV and substance abuse prevention programme designed to promote social-emotional skills, increase knowledge and refusal skills relevant to substance use and sexual behaviours, and encourage healthy free time activities. *Duration: 12 eighth grade lessons and 6 ninth grade booster lessons are delivered by teachers over two to three regularly scheduled class periods.* In addition, two Youth Development Specialists coordinate utilization of school and community resources and opportunities.	Polydrug use measures, lifetime sexual activity, condomless sex refusal, risk at last sex	Among virgins at baseline (beginning of eighth grade) who had sex by Wave 5 (beginning of 10th grade), HealthWise youth were less likely than comparison youth to engage in two or more risk behaviors at last sex. HealthWise was effective at slowing the onset of frequent polydrug use among non-users at baseline and slowing the increase in this outcome among all participants. Programme effects were not found for lifetime sexual activity, condomless sex refusal and past-month polydrug use.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Timol et al., 2016 South Africa	*Design*: Quasi-experimental. *Participants*: Grade 8s growing up in risky environments in public schools in the Western Cape *Sample size*: n=7,709 learners across three waves of the study in 27 peer intervention schools and 8 control schools (baseline: 2904 learners (2225 in intervention group, 679 in control group; Immediately post intervention: 2594 learners (2036 in intervention, 558 in control). Five to seven months post-intervention: 2211 learners (all from intervention schools).	Structured, time-limited, curriculum-based, peer-led educational programme called *Listen Up*, addressing supporting peers, sexual decision-making, healthy relationships, HIV risk, alcohol misuse and unwanted pregnancy in seven structured sessions (35 to 45 minutes each).	Future orientation, sensation-seeking, self-efficacy in sexual relations, HIV transmission knowledge, HIV prevention knowledge, HIV attitudes, sexual attitudes, decision-making, healthy relationships and social support.	Immediately post-intervention, statistically significant improvements were noted for intervention schools when compared to baseline levels on 5 of the 10 measures. Comparing baseline values with results five- and seven-months post-intervention, statistically significant results were noted for self-efficacy in sexual relations and knowledge regarding HIV transmission. Some pre-existing differences between intervention and control schools limit the conclusions that can be drawn.
Toska et al., 2017 South Africa	*Design*: Cross-sectional survey *Participants and sample size*: 1060 HIV-positive adolescents (10–19-year-olds) recruited from a health district in the Eastern Cape province	Combination social protection, including access to school as a form of social protection provision (defined as access to free schooling or ability to afford school fees, uniforms and equipment).	Unprotected sex at last sexual intercourse; STI Symptomatic; adolescent pregnancy	Lower rates of unprotected sex among HIV-[positive adolescents were associated with access to school (OR 0.52 95 % CI 0.33–0.82 p = 0.005), parental supervision (OR 0.54 95 % CI 0.33–0.90 p = 0.019), and adolescent-sensitive clinic care (OR 0.43 95 % CI 0.25–0.73 p = 0.002). Combination social protection had additive effects amongst girls.

Table 23: Summary of reviewed papers on the impact of WASH-related interventions on outcomes for school-aged children in Southern Africa

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Agol & Harvey, 2018 Zambia	*Design*: Analysis of administrative data in the Education Management Information System (EMIS) *Participants*: Learners at just over 10,000 schools in Zambia	WASH provision in schools - number of toilets in relation to the number of students and whether these were considered improved or not, and the number and type of available water sources on the school premises.	Educational efficiency (repetition) and progression (dropout rates), disaggregated by gender and grade.	Lack of WASH in schools is associated with high rates of repetition and dropout in school for girls compared to boys, especially from the age of 13 and in grades 6, 7 and 8.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Bresee et al, 2016 Zambia	*Design*: Qualitative (separate focus group discussions with pupils and mothers on their experiences with the 'homework). *Participants*: 38 girls and 39 boys aged 8 – 12 years at five schools in rural Zambia (conducted in the context of USAID-funded WASHplus program 'Schools Promoting Learning Achievement through Sanitation and Hygiene' (SPLASH),	Role-play and focus group discussions among pupils on their perceived ability to serve as change agents. Children were then given 'homework' that included information on health messages and on how to build a hand-washing station and were encouraged to engage their family.	Role of pupils as change agents; their ability to disseminate information and catalyse change at home	Pupils were enthusiastic about engaging with parents (typically male heads of household) and successful at constructing handwashing stations. Mothers reported high levels of trust in children to relay health information learned at school. Pupils were able to enact small changes to behaviour, but not larger infrastructure changes, such as construction of latrines. Discrete activities and guidance are required.
Bulled et al, 2017 South Africa	*Design*: Quasi-experimental (pre- and post-intervention observations) *Participants*: Male and female learners at two neighbouring primary schools - 'young' (grades R-3) and 'old' (grades 4–7)	Physical improvements in hygiene and sanitation facilities; education programme on hand washing (classroom discussion and activities, posters, images in bathrooms, student dramas).	Handwashing for disease prevention	Significant increases in hand washing occurred following improvements in hygiene and sanitation facilities (School A: $t = 13.86$, $p = 0.0052$). Smaller increases in hand washing occurred following education (School A: $t = 2.63$; $p = 0.012$; School B, no infrastructure improvements: $t = 1.66$, $p = 0.239$).
Hobbs et al, 2019 Zambia	*Design*: Pre-intervention and post intervention (in the context of the large-scale, community-based CYSTI-STOP study) *Participants*: 86 children aged 10 – 18 years at three primary schools in rural areas of Eastern Zamiba in follow up assessment - 87% of the initial workshop respondents	Education workshops using a computer-based education programme 'The Vicious Worm' as the educational tool. *Duration: Sessions were between 30 (QS2) and 45 (QS1) minutes in duration.*	Taenia solium knowledge retention	Knowledge of T. solium at 'follow-up' was significantly higher than at the initial 'pre' questionnaire administered during the Vicious Worm workshop that took place one year earlier. While some specifics of the parasite's life cycle were not completely understood, the key messages for disease prevention, such as the importance of hand washing and properly cooking pork, remained well understood by the students, even one year later.

Author, year, country	Design, participants, sample size	Intervention, duration	Outcomes measured	Main findings
Chen et al, 2021 Tanzania	*Design*: A cross-sectional survey *Participants*: Survey was carried out in 92 villages in a district, which included 85 primary schools. A random sample of 3084 children aged 0–5 were examined for facial cleanliness in all villages. In 50 villages, a random sample of 50 children aged 1–9 per village were examined for follicular trachoma (TF).	Health messages and water infrastructure in the schools	Prevalence of trachoma	Having a washing station in the school was associated with lower community rates of trachoma. Primary school health messages and materials on trachoma were not associated with clean faces or lower rates of trachoma in the community. The target audience for primary school health promotion is likely the students themselves, without immediate rippling effects in the community.
Mwidunda et al, 2015 Tanzania	*Design:* School-based cluster randomised controlled trial *Participants:* 60 schools (30 primary, 30 secondary)	Health education intervention for improving knowledge and attitudes related to Taenia solium Cysticercosis and Taeniasis, consisting of an address by a trained teacher, a video show and a leaflet given to each pupil.	Individual knowledge and attitudes related to *Taenia solium Cysticercosis* and *Taeniasis*	The intervention was linked to improvements in knowledge regarding taeniasis, porcine cysticercosis, human cysticercosis, epilepsy, the attitude of condemning infected meat but it reduced the attitude of contacting a veterinarian if a pig was found to be infected with cysticercosis. This study demonstrates the potential value of school children as targets for health messages to control T. solium cysticercosis and taeniasis in endemic areas. Studies are needed to assess effectiveness of message transmission from children to parents and the general community and their impacts in improving behaviours facilitating disease transmission

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