COVID-19 Vulnerability Ranking

COVID-19 is an international public health emergency on a previously unforeseen scale, and while only a handful of cases have been confirmed in h Sudan, the rapid spread in other countries suggests that it poses a threat due to the extreme vulnerability of the population. In order to assist in "*containing the spread of COVID-19 pandemic, decrease morbidity and mortality*"[1], there is a need for prioritization of vulnerable areas where COVID-19 may first enter the country, and which areas have populations at greater risk for severe COVID-19 outcomes. Factors such as migration and displacement, food insecurity, acute malnutrition, access to WASH services, co-morbidities, and demographics should be considered in assessing population vulnerability for the pandemic in South Sudan.

Analysis

Each county will be given a composite score in two main areas: (1) for their assessed risk of entry and COVID-19 spread, and (2) intersectoral vulnerability. In an attempt to prioritize areas at the COUNTY level for response, two composite scores have been drafted:

Risk of Entry and COVID-19 Spread: This is a composite score from 0-12 representing the risk of COVID-19 entering the country and creating potentially large spread events in areas of high population density, such as urban areas and IDP/refugee camp sites. The composite score is comprised of three factors:

1) Population movement from neighbouring countries, including the size of the flow and whether the departure location is a COVID-19 affected area (maximum weight 6)
2) Population density, including presence of urban centers, IDP informal or camp settings, average household size, and population density at county level (maximum weight 6)

Intersectoral Vulnerability to COVID-19: Individuals with compromised immune systems, or other health vulnerabilities, are known to have a greater risk of 'severe' or 'critical' COVID-19 outcomes. This is a composite score from 0-25 comprised of food security, health, WASH and nutrition indicators which may increase the vulnerability of a population to these more serious outcomes. The composite score is derived from a number of data sources (FSNMS, IDSR, IPC, and others) and comprised of:

- Population density, including presence of urban centers, IDP informal or camp settings, average household size, and population density at county level (maximum weight 6)
- Age demographics (maximum weight 2)
- Food insecurity, including IPC Phase Classifications Acute Food Insecurity and market dependency in the lean season (Maximum Weight 6)
- IPC Phase Classifications Acute Malnutrition (Maximum Weight 4)
- Health and WASH (maximum weight 7)

Data sources, indicator thresholds, weights are summarized in the table below. Limitations of this analysis include lack of more reliable data sources on chronic illnesses in South Sudan, which has been shown to be associated with severe COVID-19 disease status, as well as access to other more relevant health datasets or more timely data in some instances. In instances where no data is available for an indicator, the weight is treated as 0.

This summary of vulnerability criteria and indicators should be considered a living document, and as the situation with COVID-19 evolves in South Sudan, or higher quality information on risk or vulnerabilities become available, indicators and results of this analysis may change.

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[1] Global Humanitarian Response Plan COVID-19. United Nations Coordinated Appeal. April – December 2020.

Type of Vulnerability	Category	Indicator	Rationale/Comments	Proposed weights and thresholds		Data sources
Risk of entry and spread of virus	**High levels of population movement**	# of individuals reported arriving from neighboring countries/camps within the last month # of individuals reported arriving from COVID affected district in neighboring countries/camps within the last month	Migration from neighboring countries with confirmed COVID-19 cases may increase the risk for cross-country transmission	1.5	>= 50 and <150 individuals[2] arriving from neighbouring countr(ies) per month	IOM Flow Monitoring REACH PRM UNHCR Flow Monitoring; UNICEF
				3	>= 150 individuals arriving from neighbouring countr(ies) per month	
				4.5	>= 15 and <150 individuals[3] arriving from COVID-affected areas in neighbouring countr(ies) per month	
				6	>=150 individuals arriving from COVID-affected areas in neighbouring countr(ies) per month	
	Population density	Presence of IDP/Refugee sites (not in host community)	Informal camps, IDPs/Refugees not integrated in the host community. IDPs/Refugees living in camp-like or informal settings are considered more vulnerable due to the poor and concentrated living conditions, which may increase the rate of COVID transmission in those populations.	0.5	>=2,000 and 5,000	CCCM Cluster – Camp-like settings in SSD; UNHCR
				1	>=5,000 and <=20,000	
				1.5	>20,000 and <=55,000	
				2	>55,000	
		Presence of large urban centres	Large urban centres may lead to increased transmission given they are often key transit hubs, markets, and have high population density.	0	<100,000	European Commission Global Human Settlement Layer
				1	>=100,000 and <=250,000	
				2	>250,000	
		Avg. # people / km^2	Increased population density may lead to increased transmission; consider urban centres and POC sites	0.25	>50th to 75th percentile	OCHA COD-PS
				0.5	>75 to 90th percentile	
				0.75	>90 to 95th percentile	
				1	>=95th percentile	
		Household size	Counties with larger household size may have higher likelihood for increased transmission due to closer proximity of household members	0	Avg. HH size is below the 50th percentile of national average	FSNMS Round 25 data[4]
				0.5	Avg. HH size is in the 50-75th percentile of national average	
				1	Avg. HH size is in the 75-100th percentile of national average	
Intersectoral Vulnerability (Risk of *severity* of the outbreak - known factors which could increase the proportion of *severe* COVID cases in an area)	Population density	Presence of IDP/Refugee sites (not in host community)	Informal camps, IDPs/Refugees not integrated in the host community. IDPs/Refugees living in camp-like or informal settings are considered more vulnerable due to the poor and concentrated living conditions, which may increase the rate of COVID transmission in those populations.	0.5	>=2,000 and 5,000	OCHA – Camp-like settings in SSD; UNHCR
				1	>=5,000 and <=20,000	
				1.5	>20,000 and <=55,000	
				2	>55,000	
		Presence of large urban centres	Large urban centres may lead to increased transmission given they are often key transit hubs, markets, and have high population density.	0	<100,000	European Commission Global Human Settlement Layer
				1	>=100,000 and <=250,000	
				2	>250,000	
		Avg. # people / km^2		0.25	>50th to 75th percentile	OCHA COD-PS

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[2] Median number of individual arrivals into counties in South Sudan from neighbouring countries per county was 91.5 in March 2020.

[3] Median number of individual arrivals into counties in South Sudan from confirmed COVID-affected areas in neighbouring countries per county was 14 in March 2020. It is noted that this number will likely increase as COVID spreads, so this threshold may fluctuate.

[4] FNSMS is representative of rural areas only

Category	Indicator	Rationale	Score	Threshold	Data Source
		Increased population density may lead to increased transmission; consider urban centres and POC sites	0.5	>75 to 90th percentile	
			0.75	>90 to 95th percentile	
			1	>=95th percentile	
	Household size	Counties with larger household size may have higher likelihood for increased transmission due to closer proximity of household members	0	Avg. HH size is below the 50th percentile of national average	FSNMS Round 25 data[5]
			0.5	Avg. HH size is in the 50-75th percentile of national average	
			1	Avg. HH size is in the 75-100th percentile of national average	
Demographics	Avg. # of elderly (60+) in the HH	Due to elderly vulnerability to COVID	0	<0.69	FSNMS Round 25 data[5]
			1	>=0.7 and <0.89	WFP Urban Demographics Data (only Wau, Juba, and Bor, 2017)
			2	>= 0.9	
High food insecurity	% of HHs by IPC Phase classification from Projection 1 (Feb – April 2020)	Greater food insecurity means a greater likelihood of reduced quantity or quality of the household diet, which could lead to a weakened immune system. Food insecurity, reliance on GFD can reduce immunity	0	P3 < 20%	IPC South Sudan Jan 2020
			1	P3+ >=20% AND P3+ <50%	
			2	P3+ >= 50%	
			3	P3+ >= 75% OR P4+>= 20%	
			4	P5>0 OR P4+>= 30%	
	% of HH reportedly main source of food is markets in lean season	Households that are dependent on markets for their main food source may be unable to access food as prices increase from border closures. Greater food insecurity may lead to weakened immune system.		2 if >30% in lean season	FSNMS Rd 24
High malnutrition	IPC AMN Phase classification Projection (May-August 2020)	Acute malnutrition reduces immunity	1	IPC AMN P2	IPC South Sudan Jan 2020
			2	IPC AMN P3	
			4	IPC AMN P4	
WASH	% of population travelling 30 minutes or less to a water source AND have access to soap for handwashing	Access to clean water and soap are requisite for hand-washing practices, which is an essential preventive behavior to fight COVID-19.	0	>20%	FSNMS Round 25 data[5]
			2	<=20%	
Healthcare access	% of population walking more than ½ day to a to a functional health facility	Individuals may be asked to stay at home with suspected symptoms of COVID-19, but if case is critical, access to functional facility will impact mortality rate and containment.	0	<=10%	FSNMS Round 25 data[5]
			1	>10% and <=30%	
			2	>30%	
Infectious Disease (Non-COVID)	Presence of malaria 'epidemic', malaria 'alert' or other confirmed disease outbreak	The dual burden of malaria or other infectious diseases and COVID-19 will likely increase morbidity and mortality as other illnesses become more difficult to treat due to competing health system resources. COVID will also reduce the health systems ability to deal with Areas with high burdens of disease prior to COVID may be among the heaviest hit. Especially some concerns of co-morbidity of malaria and COVID-19[6]. Malaria is treated here is a proxy for infectious diseases. Epidemic levels of malaria: # malaria cases in the given epidemiological week > long term mean + 2 SD from the same epidemiological week in previous years Alert levels of malaria: # malaria cases in the given epidemiological week > the third quartile of cases compared to the same time in previous years. OR confirmed disease outbreak	0	No disease outbreak	IDSR/EWARS
			1	'Alert' level of total morbidities or malaria specific	
			2	'Epidemic' levels of total morbidities or malaria specific OR confirmed disease outbreak	
Chronic Disease	% of HHs self-reporting a household member has a chronic illness in the last 3 months	General, self-reported question for populations that may have people with chronic health issues, however some chronic health issues may not necessarily link to immune suppression or increased risk of severe/critical COVID-19 cases.	1	> 10% HH report family members with chronic illness in last month	FNSMS Round 25

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[5] FNSMS is representative of rural areas only
[6] Preparedness is essential for malaria-endemic regions during the COVID-19 pandemic. The Lancet. March 16th, 2020