South Asia Vaccinates against COVID-19: Health System and Health Financing Considerations

Christopher Andersen, Kathryn Andrews, Jewelwayne Cain, Ajay Tandon[a]

Abstract

The COVID-19 pandemic is having massive health, social, and economic impacts in the South Asia Region (SAR) as well as globally. In addition to over 12 million known cases and nearly 180,000 reported deaths from the disease, the average per capita economic contraction among SAR countries is currently estimated to be -5.4% in 2020, a staggering economic loss of ~US$700 billion. Although, economic growth is projected to rebound in 2021, it will do so from a lower base and it may take countries several years to reach pre-crisis levels of economic activity. COVID-19 vaccines have the potential to be pivotal: both as health as well as economic interventions. However, health systems and health financing constraints in SAR countries may pose difficulties in both funding and distributing a large-scale vaccine roll-out for their populations. In addition to struggling economies, low levels of government revenues, low prioritization of health in government budgets, and existing weaknesses in service delivery pose challenges in many countries of the region. Afghanistan and Pakistan are likely to face significant vaccine financing and delivery challenges and – to a lesser extent – India, Bangladesh, and Nepal. Current cost projections imply reaching adequate vaccination coverage levels would require 2% of the overall government budget on average in 2022 (and over 5% in Afghanistan), making it difficult for most countries in the region to cover 70% of their population (even if the 20% subsidized coverage via COVAX is taken into account). Higher coverage rates may become necessary if new variants are found in SAR. In order to make vaccine procurement and delivery costs amount to less than 1% of government outlays, countries may need to implement a mix of reducing publicly-financed coverage or pro-actively seek out opportunities for procuring effective vaccines at lower unit costs.

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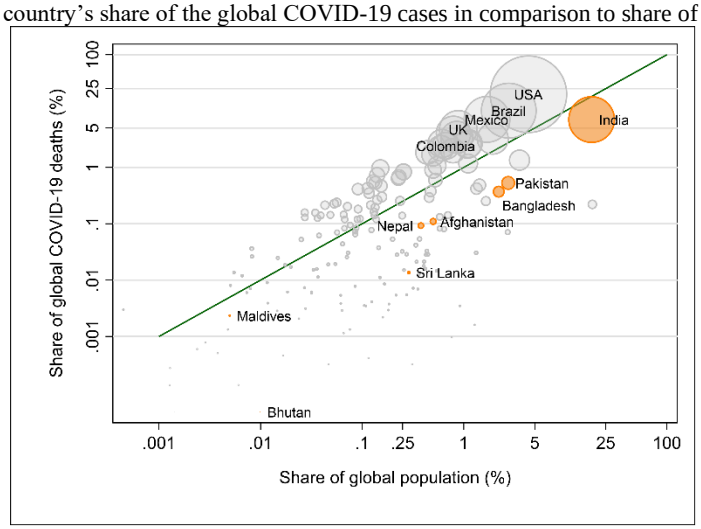
Introduction

The pandemic of the coronavirus disease 2019 (COVID-19) continues to take its toll globally. As of February 2021, there have been ~110 million reported cases of COVID-19 and ~2.5 million reported COVID-19 deaths worldwide. Due to weaknesses in testing and death registration, actual numbers are likely to be much higher, especially in developing countries. In addition to the direct impact of COVID-19 on morbidity and mortality, there are concerns regarding its longer-term health impact among those who have recovered.[1] In addition, interruptions to essential service delivery due to COVID-19 have been severe, with the largest disruptions occurring in routine immunization, non-communicable disease (NCD) care, family planning, as well as mental health services.[2] Such COVID-related interruptions in service delivery are expected to result in high rates of indirect mortality,[3] perhaps larger than the number of deaths due to the virus itself.

Despite comprising only eight countries – Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Maldives, and Sri Lanka – the South Asia Region (SAR) of the World Bank collectively accounts for one-quarter of the world's population. However, only about 15% of all global confirmed cases to date have occurred in the region, which is less than the region's share of the world's population (Figure 1). This is likely due in part to a younger population structure and to constrained testing capacity.

Figure 1. Each SAR country's share of the global COVID-19 cases in comparison to share of the global population



The pandemic has evolved differently across SAR (Figure 2). Afghanistan, Bangladesh, and Pakistan were first to experience a major surge in reported cases in May 2020 and peaked in June. India and Nepal experienced similar precipitous surges, although their epidemic curve peak was 2-3 months later. All five of these countries have subsequently seen sharp declines in reported cases, which are most likely due to a high proportion of the population being infected and the virus therefore having fewer susceptible hosts to infect. Bhutan, Maldives, and Sri Lanka have had relatively greater success in containing the pandemic. Maldives has managed to contain ongoing transmission to relatively low levels through strong public health containment measures, whereas both Bhutan and Sri Lanka managed to prevent the COVID-19 virus from entering their communities for much of 2020. However, this changed near the end of 2020, and both countries are have had to work to contain exponential spread. India has seen the highest number of deaths per million in the region, and Bhutan the lowest (Table 1). Some countries in the region have also seen second waves of infection. Per capita levels of testing have been highly unequal across the region, with India achieving the highest levels among large countries (~80 tests per 100,000 population per day), whereas Afghanistan had testing levels below 10% of India's (Figure 3).

Figure 2. 7-day daily confirmed COVID-19 cases by (a) World Bank region and (b) SAR country

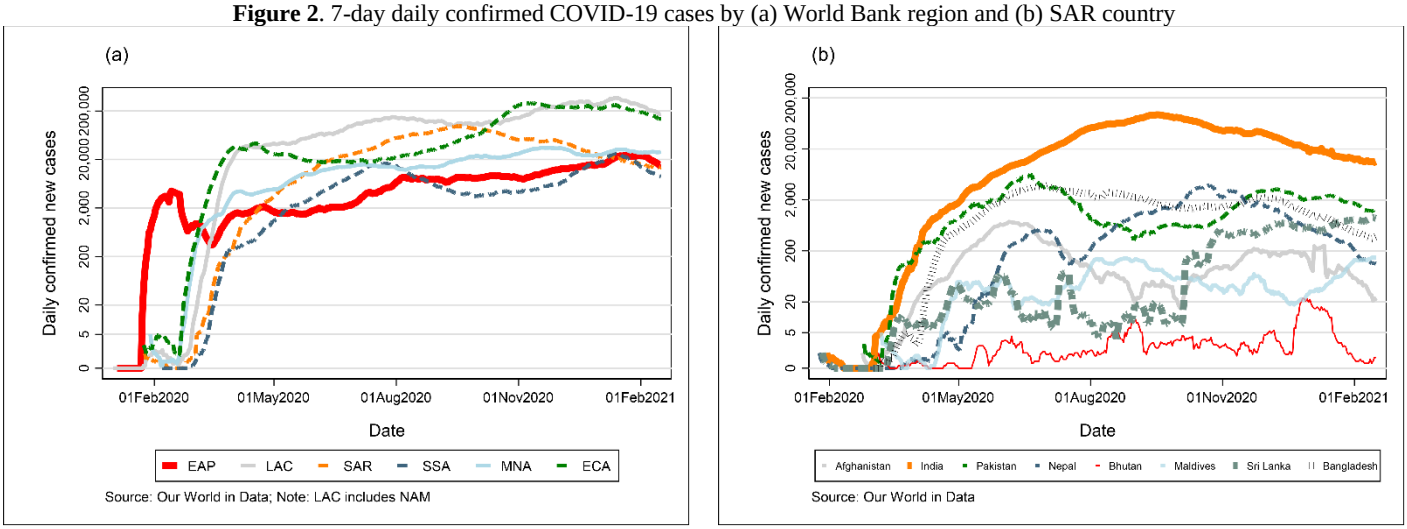
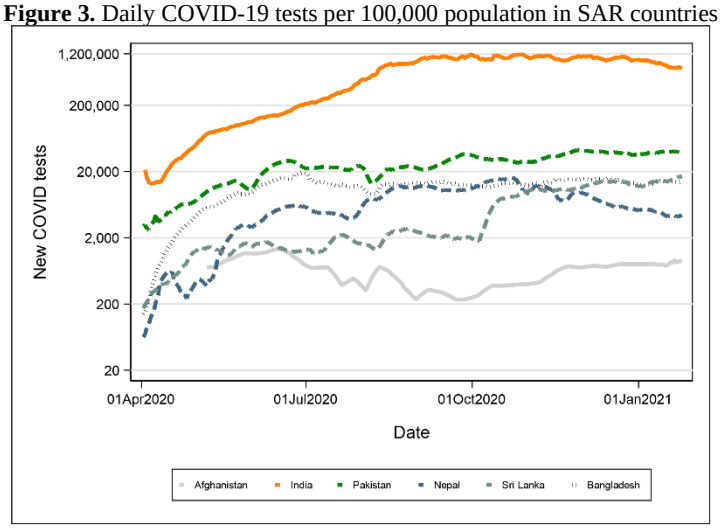


Table 1. COVID-19 cases, deaths, and case fatality rates to date, by country in SAR

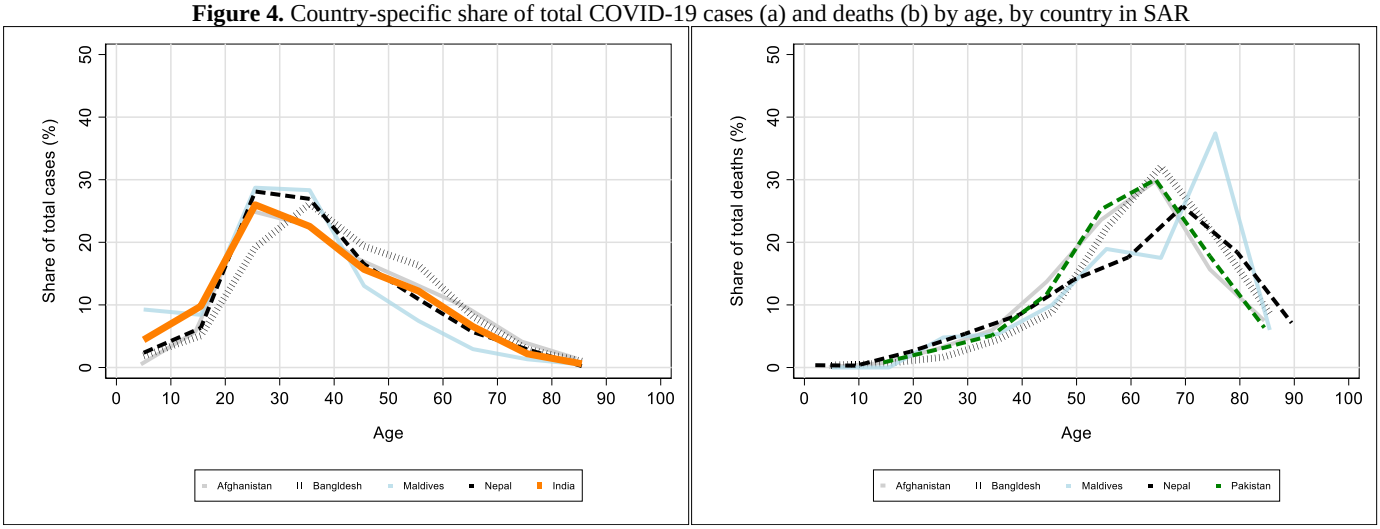
Country	Total cases	Cases per million	Total deaths	Deaths per million	Case fatality rate (%)
Afghanistan	54,891	1,410	2,397	62	4.4
Bangladesh	533,953	3,242	8,087	49	1.5
Bhutan	857	1,111	1	1	0.1
India	10,720,048	7,768	154,010	112	1.4
Maldives	15,496	28,668	51	94	0.3
Nepal	270,588	9,287	2,020	69	0.7
Pakistan	541,031	2,449	11,560	52	2.1
Sri Lanka	61,586	2,876	297	14	0.5
SAR	*12,198,450*	*7,101*	*178,423*	*57*	*1.5*

Figure 3. Daily COVID-19 tests per 100,000 population in SAR countries



Most confirmed cases in SAR have occurred among those aged 20-40 whereas most deaths have occurred among those 60+ years of age (Figure 4). This is largely a function of the fact that SAR has a relatively young population, and younger people typically have less severe COVID-19 cases and are therefore less likely to both be tested and to die of the disease. Case fatality rates have varied across countries in the region. These differences reflect age-related differences in incidence, differences in testing rates and access to quality health care, as well as data quality and reporting challenges, among other factors. True infection fatality rates (which are lower than case fatality rates because the denominator includes those who are infected but not diagnosed) are thought to be 0.01% at age 25, 0.1% at age 45, and 1% at age 65.[4]

Figure 4. Country-specific share of total COVID-19 cases (a) and deaths (b) by age, by country in SAR



COVID vaccine development began in early 2020 and has progressed at a historically unprecedented pace. By February 2021, there were 30 vaccines that had completed or were conducting Phase 3 clinical trials required to establish safety and efficacy. In November 2020, the first vaccines to demonstrate efficacy against symptomatic COVID-19 disease were candidates by Pfizer and Moderna, which used new mRNA technology. Despite having an efficacy of ~95%, the relatively high cost and stringent cold chain requirements of these vaccines make them less attractive for widespread use in South Asia. In December, AstraZeneca published data on its vaccine that showed efficacy ranging from 62-90% (depending on the dosing regimen). AstraZeneca has secured production capacity of over 3 billion doses in 2021 and is being sold at ~$3-4 per dose, which makes it an appealing candidate for South Asia. Other vaccines with established efficacy as of early February 2021 include those from the Gamaleya Institute (92% efficacy), Sinopharm (79% efficacy), Sinovac (50% efficacy), Johnson & Johnson (57-72% efficacy), and Novavax (50-89%). Importantly, the evidence available so far on vaccine use among children and youths (i.e., those under age 18 years) is extremely limited. It is also unclear how long vaccine-acquired immune protection will last. However, it is similarly unknown how long naturally-acquired immune protection will last, so it is generally recommended that those who have been previously infected with the COVID-19 virus still receive a vaccine. Some vaccines (Johnson & Johnson and Novavax) have shown reduced efficacy against a viral variant first identified in South Africa, and additional research is ongoing to determine the efficacy of other vaccines against this and other viral variants.

Vaccinations against COVID-19 have begun in several countries worldwide as well as in SAR. India began vaccine roll-out on January 16, 2021; other countries in SAR are following suit. At present, the World Health Organization (WHO) has only granted an emergency use listing for the Pfizer/BioNTech vaccine. However, some SAR countries are moving forward with vaccine approvals regardless of WHO recommendations. On January 3, 2021, India approved AstraZeneca's vaccine (called Covishield in India) and Bharat Biotech's Covaxin (a locally developed vaccine). Some scientists have criticized the latter, as Covaxin has not completed phase III efficacy and safety trials. Furthermore, countries are agreeing to bilateral procurement deals prior to approval. Bangladesh's drug authority has granted permission to import Covishield from India, and Pakistan will buy 1.2 million doses of the Chinese Sinopharm vaccine. Both Bhutan and Maldives received their first shipments of vaccines from India on January 20, 2021,[5] as did Nepal. Bangladesh received its first shipment from India on January 21, Sri Lanka on January 28, and Afghanistan on February 7, 2021. With the emergence of new variants of the COVID-19 virus, there has been concern regarding the efficacy of vaccines. The Pfizer and Moderna vaccines have been tested against two variants and appear effective, but the impact of new variants on other vaccines is unknown at this time.

The COVAX facility is a primary mechanism by which SAR countries will procure vaccines in 2021. COVAX is a pooled purchasing mechanism that benefits lower-income countries by negotiating with vaccine sellers at scale. Procured vaccines are then intended to be distributed to member countries as a percentage of their population. A group of 92 countries are eligible to receive free vaccines for up to 20% of their population (assuming sufficient donor financing). All eight SAR countries are among the 92 countries eligible to receive free COVID-19 vaccines via the COVAX Advance Market Commitment (AMC92). Countries can choose to purchase additional vaccines through COVAX once the donor-funded

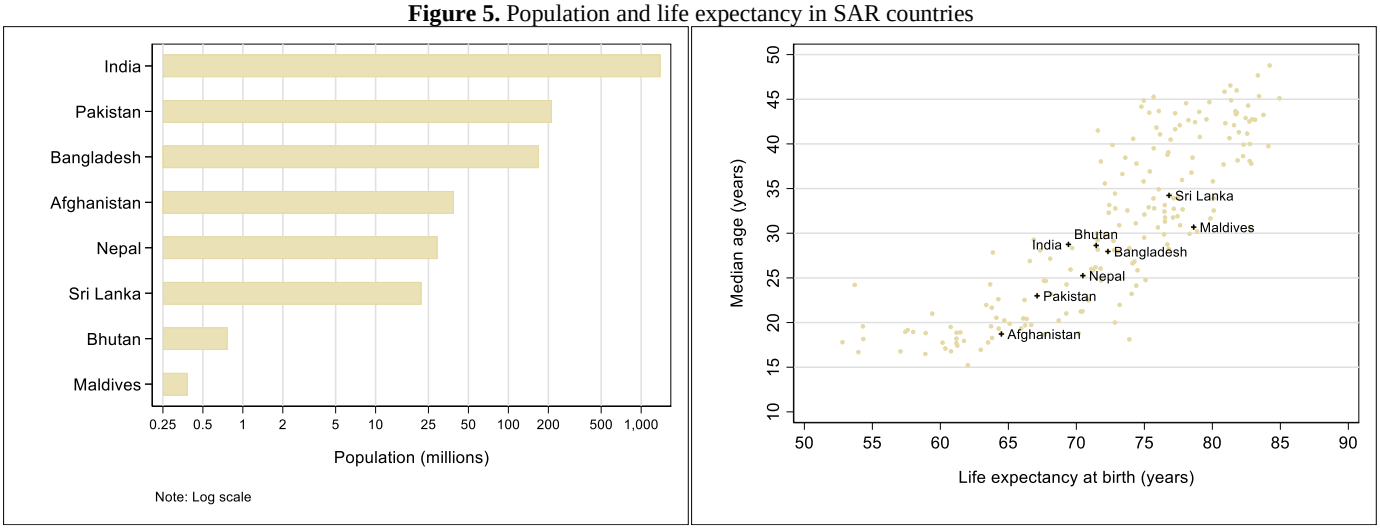
vaccine supplies are exhausted. Despite a recent $4 billion commitment from the United States, it is not clear whether COVAX will be able to raise sufficient funds to provide vaccine doses that will cover all 20% of the populations of each of the 92 eligible countries (including those in SAR).

This paper first explores demographic, socioeconomic, and health risks for COVID-19 infection and mortality in SAR and the economic and macro-fiscal impacts of COVID-19 in the region. The paper then discusses the health system and health financing characteristics the consideration of which is crucial in the financing, design, and implementation of COVID-19 vaccination strategies. Before concluding, this paper presents sample policy-relevant vaccine financing scenarios for each SAR country, highlighting potential bottlenecks and needs for additional resources.

Demographic and health risks for COVID-19 and their implications in SAR

SAR is a relatively young and diverse region, which has important implications for COVID-19 risk, transmission patterns, and vaccination strategies. Countries within SAR differ vastly in terms of size, population, and life expectancy (Figure 5). The region comprises some of the countries with the largest populations in the world (India, Pakistan, Bangladesh) as well as some with the smallest (Maldives, Bhutan). In 2021, India's population size is estimated to be 1.4 billion, followed by Pakistan at 212 million and Bangladesh at 172 million.[6] Afghanistan, Nepal, and Sri Lanka are estimated to have populations ranging from 20-40 million; Bhutan and Maldives both have 2021 population estimates of less than 1 million each (Table 2). Almost one-third of the region's population is below 15 years of age, resulting in it having the largest number of people under the age of 15 anywhere in the world. Within SAR, Afghanistan is demographically the youngest country with a median age <20, a 3% share of the population 65+ and older, and an estimated life expectancy at birth of only 64 years (Table 2). Sri Lanka has the highest median age in the region (almost 35) with >10% of the population aged 65+ years. Both Sri Lanka and Maldives have relatively high life expectancies, exceeding 75 years; an estimated 3.8% of the population is 65+ years of age in Maldives.[b] SAR includes some of the most densely populated countries (Bangladesh, Maldives) in the world, and some that are the most ethno-linguistically diverse (India). About one-third of SAR's population, on average, is urbanized: highest in Maldives (40%), and lowest in Sri Lanka (19%) and Nepal (20%).

Figure 5. Population and life expectancy in SAR countries



[b] Life expectancy and median age are not calculated from the same date. Life expectancy is calculated from life tables that are solely driven by *current* age-specific mortality rates. The median age is calculated from the population pyramid that is a result of *past* fertility and mortality patterns. Even though the current mortality rate in Maldives is lower than in Sri Lanka overall (hence Maldives has longer life expectancy) but it was the other way around in the past (more people died in Maldives than in Sri Lanka in the past, which resulted in a lower share of 65+ population in the Maldivian population pyramid today).

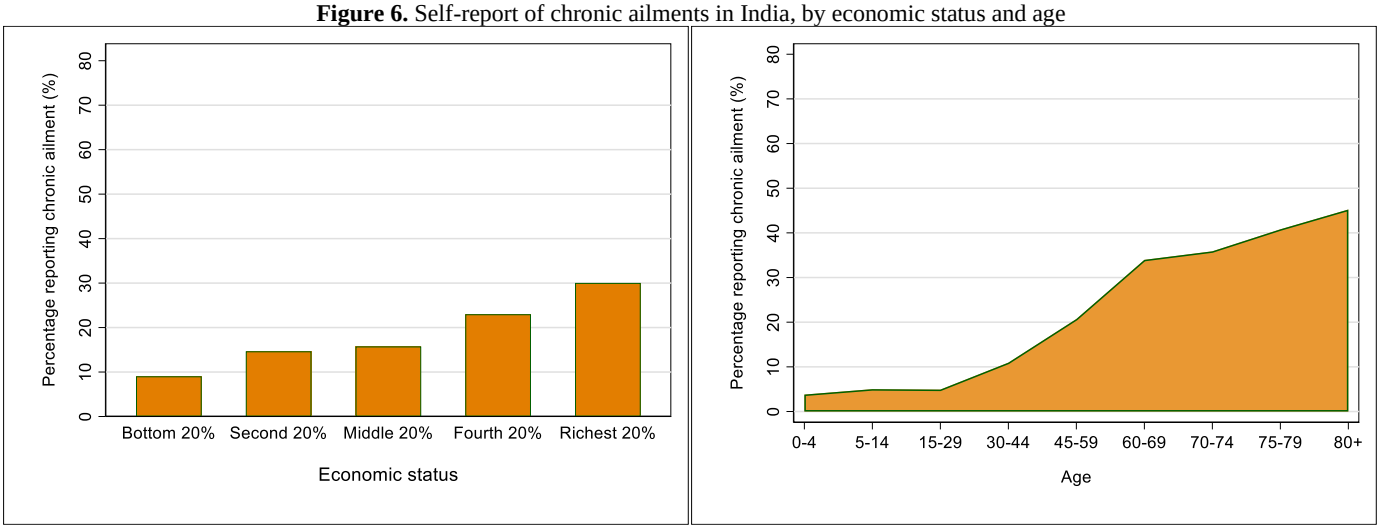
Table 2. Population, life expectancy, and share of population in older age groups, by country in SAR

Country	Population (millions)	Life expectancy (years)	Median age (years)	Share age 18+ (%)	Share age 40+ (%)	Share age 50+ (%)	Share age 65+ (%)
Afghanistan	38.9	64	19	52.1	16.8	9.1	2.7
Bangladesh	170.1	72	28	68.7	30.3	17.5	5.3
Bhutan	0.8	71	29	70.7	28.9	16.9	6.3
India	1,395.6	69	29	69.2	32.2	19.7	6.8
Maldives	0.4	79	31	76.7	25.8	13.0	3.8
Nepal	29.2	70	25	66.6	27.4	16.9	5.9
Pakistan	212.5	67	23	59.7	23.5	13.7	4.4
Sri Lanka	22.1	77	34	72.1	42.4	28.8	11.6
SAR	*1,869.5*	*71*	*27*	*67.6*	*28.4*	*17.0*	*5.9*
LMICs	*6,481.6*	*69*	*26*	*64.9*	*28.7*	*17.9*	*6.4*

Source: UN World Population Prospects (2019)

Age and sex (being male) are risk factors for COVID-19 complications, including death. In addition, membership in some ethnic groups and socioeconomic deprivation are also associated with higher risks, although the exact mechanisms remain unclear. The risk of mortality from COVID-19 is low below the age of 40, even with underlying preexisting morbidities.[7] Those aged 65+ appear to be at highest risk. Additional comorbidities and multimorbidities have been identified as risk factors for developing severe COVID-19 illness. These include conditions such as obesity and chronic illnesses such as diabetes, cardiovascular diseases, and chronic respiratory diseases, among others. In general, the prevalence of morbidities rises with age. Typical age profiles from high-income countries indicate that by age 50, almost 50% of the population has at least one morbidity and by age 65 most are multimorbid.[8] Nevertheless, it has been noted in the literature that, even though the prevalence of chronic morbidities rises with age, absolute numbers of those with morbidities tend to be higher among younger age groups. Socioeconomic deprivation is often associated with a higher prevalence of morbidities, even though self-report of chronic ailments is often lower.[9] For example, data from the 75th round of India's National Sample Survey Office (NSSO) on self-report of chronic ailments shows that the proportion reporting chronic ailments was 30% among the richest quintile versus less than 10% among the poorest (Figure 6); typically, objective measures would reveal this economic gradient to be in reverse. There is an age gradient on self-reported prevalence of ailments by age, although the magnitude is likely lower than actual prevalence due to issues of poor awareness, lower expectations, and access problems; roughly one-fifth of the population reported a chronic ailment by age 50 in India. This finding underscores the importance of objective measures of morbidity (rather than self-report) in identifying highly at-risk or priority populations for vaccination.

Figure 6. Self-report of chronic ailments in India, by economic status and age



Source: Calculations based on data from 75th round of India's National Sample Survey Office (NSSO) household survey data.

The prevalence of risk factors for developing severe COVID-19 is increasing in SAR. Both obesity (BMI ≥30) and diabetes are risk factors for COVID-19 complications. The prevalence of obesity among adults 20+ years of age exceeds 9% in Bhutan, Maldives, and Sri Lanka (Table 3), and appears to be highest among those age 50-60 years (Figure 6).[c] The age-unadjusted population prevalence of diabetes is highest in Sri Lanka followed by India, and across most SAR countries at least 15% of the population aged 50 has diabetes, rising in prevalence thereafter. Similar increasing age gradients are observed for cardiovascular diseases and chronic respiratory diseases (Figure 7). Prevalence of cardiovascular diseases is highest in Sri Lanka, followed by Bangladesh and India. At least 10% of the population aged 50 has cardiovascular diseases across all countries in the region, increasing to almost half by age 80. The prevalence of chronic respiratory diseases is also highest in Sri Lanka, followed by Afghanistan and India. In addition to non-communicable diseases, tuberculosis (TB) is a communicable chronic lung disease that makes those infected more vulnerable to other infections. TB also often causes lung damage that can put sufferers at higher risk of developing COVID-19 complications.[10,11] The estimated prevalence of TB – including latent TB – exceeds one-quarter of the population in India and Sri Lanka. More than 10% of the population is estimated to have TB in Afghanistan, Nepal, and Pakistan. Over one quarter of the world's TB burden is in India alone,[12] making SAR a region particularly at risk for TB-related COVID-19 complications. Furthermore, indicators of undernutrition such as anemia and underweight (which are associated with impaired immune response) are common among adults in the region (Table 3), which may be a barrier to achieving a robust immune response from vaccines.

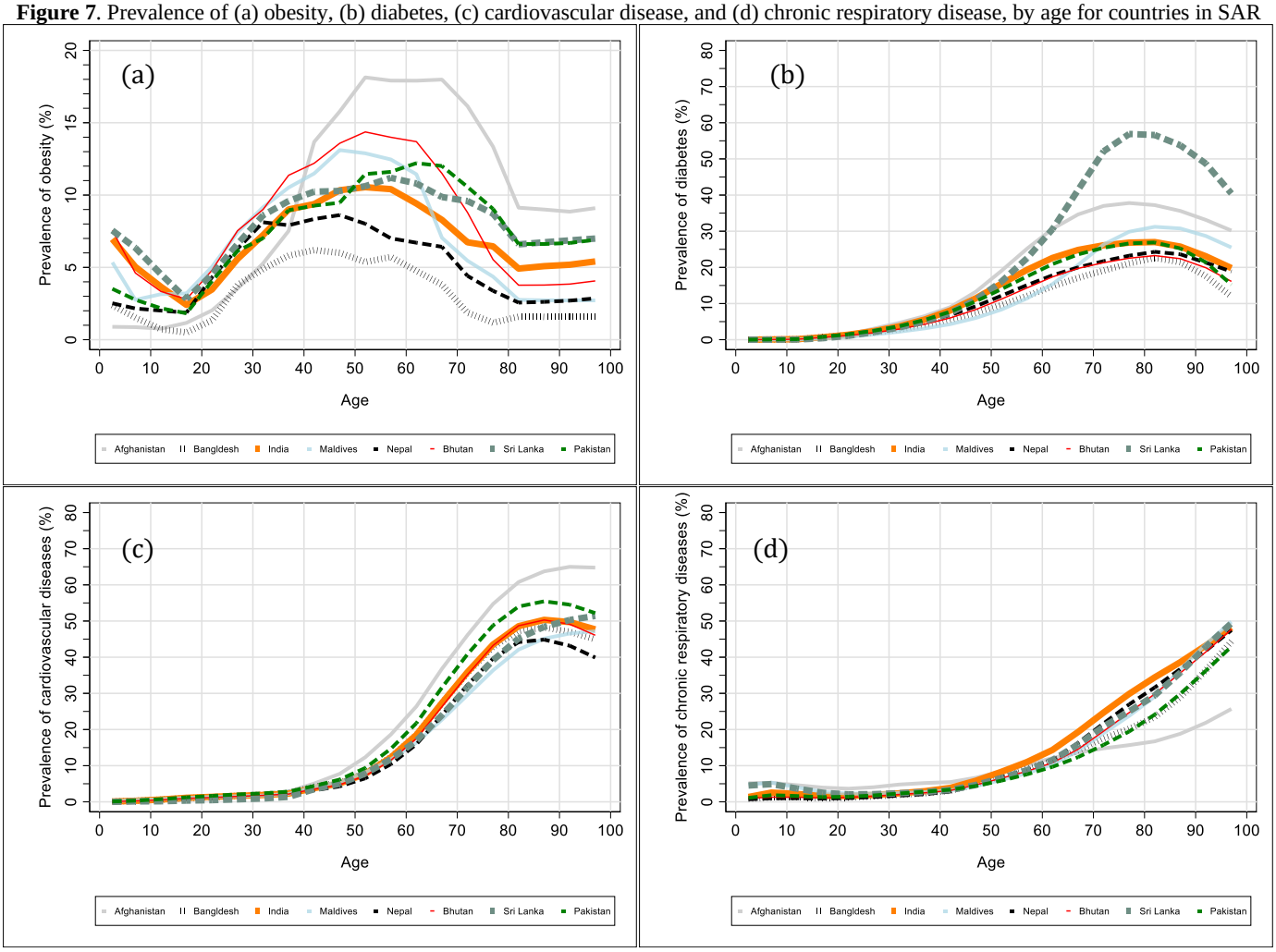
Table 3. Prevalence of obesity, diabetes, cardiovascular disease, chronic respiratory disease, and TB, by country in SAR

Country	Obesity (%)		Diabetes (%)	Cardiovascular Diseases (%)	Chronic respiratory Diseases (%)	TB (%)	Anemia (women 15-49 y) (%)	Underweight (adults 18+ y) (%)
	Children (<20)	*Adults (20+)*	*All Ages*					
Afghanistan	0.9	8.2	4.1	3.4	5.1	15.8	42.0	16.4
Bangladesh	1.2	4.4	4.4	5.3	3.8	7.6	39.9	21.0
Bhutan	4.4	9.8	4.6	4.7	3.7	5.9	35.6	10.8
India	4.3	7.7	6.3	5.2	5.0	26.9	51.4	23.3
Maldives	3.6	9.4	3.8	4.1	4.4	23.4	42.6	9.4
Nepal	2.1	6.8	4.8	4.1	3.6	14.1	35.1	16.8
Pakistan	2.6	7.9	4.2	4.0	2.9	14.5	52.1	15.0
Sri Lanka	5.1	9.0	11.3	6.4	6.1	28.0	32.6	13.9
*SAR**	*3.0*	*7.9*	*5.4*	*4.7*	*4.3*	*17.0*		
*LMICs**	*6.4*	*18.0*	*5.8*	*5.7*	*5.3*	*22.7*		

Source: IHME; WHO; * Averages are unweighted (not weighted by population)

[c] Data are estimates for 2019.

Figure 7. Prevalence of (a) obesity, (b) diabetes, (c) cardiovascular disease, and (d) chronic respiratory disease, by age for countries in SAR

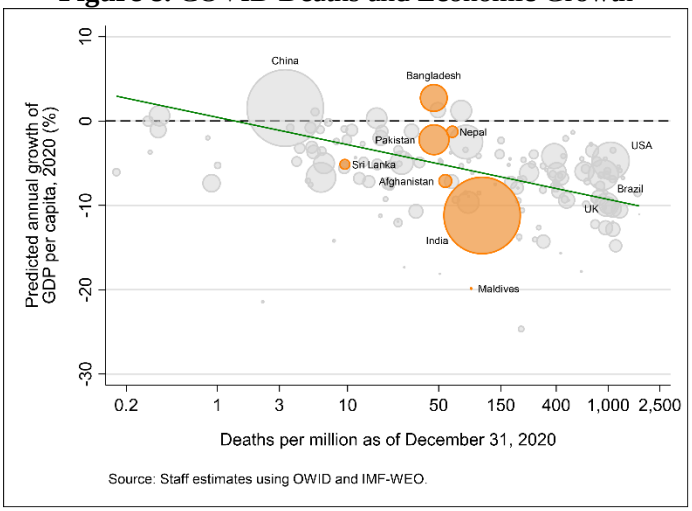


Economic and macro-fiscal impacts of COVID-19 and implications for SAR

COVID-19 has resulted in a deep global economic contraction. COVID-19 lockdown policies – in addition to voluntary social distancing – have resulted in steep declines in economic activity globally. Consumption and trade have declined, followed by investment. As a result, the world is experiencing one of the largest declines in GDP in almost a century, unprecedented in magnitude and scale, with most countries estimated to have seen negative economic growth – and all seeing a slowdown in economic growth – in 2020. Analysis of data from IMF and Our World In Data show a strong negative correlation between pandemic deaths and growth in per capita GDP (Figure 8).[d] [6,13,14] Countries that implemented more stringent lockdown policies and failed to contain the virus appear to have taken the biggest economic hit, as did those whose economies were more dependent on the services sector (including tourism) given the latter's greater dependence on face-to-face contacts as well as those dependent on industrial commodity exports.[15] Even those countries that have remained virus-free to date – e.g., some Pacific countries – have not been immune to the economic contagion from COVID-19.[16]

[d] Deaton (2021) estimates a decrease in predicted economic growth by one and half percentage points for every unit increase in logarithm of deaths per million

Figure 8. COVID Deaths and Economic Growth



SAR is largely a lower middle-income region. Among SAR countries, Afghanistan is the only country currently classified as low-income and Maldives is the only country classified as upper middle-income; the remainder are all lower middle-income (with national incomes between US$1,000-US$4,000).[e] A large share of the labor force is in the informal sector: 82% in Afghanistan, 79% in Nepal, and 76% in India (Table 4). Afghanistan is the only country in the region that is classified as a state affected by fragility, conflict, and violence. Prior to the COVID-19 crisis, SAR was the fastest growing region in the world. Over 2009-2019, annual economic growth rates averaged 5.5% -- 4.2% in per capita terms -- with Bangladesh and India posting some of the fastest annual GDP growth rates in the world, in excess of 6.0% per year.

Table 4. GDP, country classification, poverty, and informal labor by country in SAR

Country	Per capita GDP (US$)	Classification	US$1.90-day-poverty (%)	US$3.20-day-poverty (%)	Informal share labor (%)
Afghanistan	506	Low income	7.7	38.9	82.3
Bangladesh	1,990	Lower middle	4.5	31.4	59.2
Bhutan	3,447	Lower middle	0.7	8.0	71.2
India	2,031	Lower middle	9.1	42.3	76.0
Maldives	14,208	Upper middle	0.0	0.2	23.6
Nepal	1,166	Lower middle	4.5	30.3	79.2
Pakistan	1,307	Lower middle	2.2	27.2	56.7
Sri Lanka	3,928	Lower middle	0.7	9.5	41.8
SAR	*3,573*	-	*3.7*	*23.5*	*61.3*
LMICs	*3,872*	-	*17.1*	*31.8*	*52.6*

Source: IMF & WB

Current estimates indicate that COVID-19 has resulted in an average economic contraction of -4.2% (-5.4% in per capita terms) across SAR countries in 2020 (Table 5). Although SAR will not be the worst hit – MNA and LAC countries are estimated to fare much worse in terms of average economic impact – the 2020 contraction in the region is especially deep relative to 2009-2019 trend growth rates and far greater than the impact of prior crises. Despite current projections of a subdued rebound in economic growth in 2021, SAR countries on average will lose several years of economic output and it may take as many years for levels of economic activity to return to pre-crisis levels.[15] Declining economic activity, including lower remittances and a decline in employment, have hit those in the informal sector especially hard. Maldives and India are expected to contract by more than -10% in 2020; Afghanistan and Sri Lanka by more than -5%. Bangladesh is the only country in the region that is not expected to contract but it will nevertheless see a slowdown in growth relative to trends (Figure 9). GDP estimates for SAR are ~US$700 billion lower in 2020 than what they would have been had COVID-19 not

[e] In terms of WB lending, India and Sri Lanka are IBRD, Pakistan is 'blend', and the remainder are IDA-eligible countries. Income classifications are based on 2019 data and will be updated in mid-2021 based on 2020 estimates.

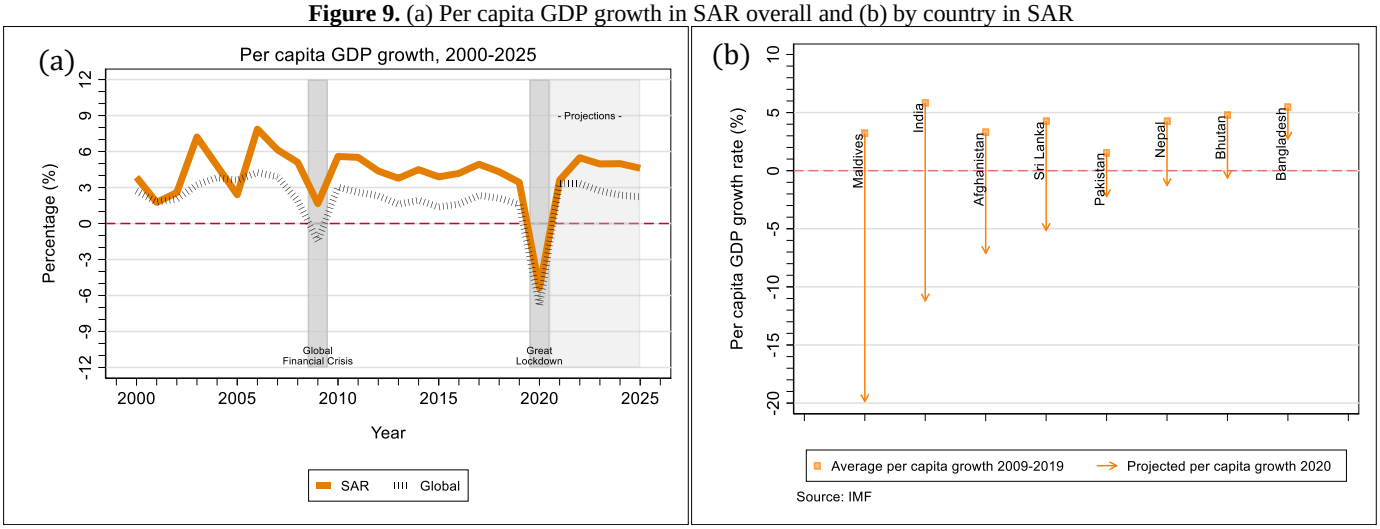
hit, indicative of the massive economic fallout from the pandemic. Currently projected per capita GDP for 2021 in the region ranges from US$506 in Afghanistan to US$14,208 in Maldives. In all countries except for Bangladesh, 2021 per capita GDP numbers will be lower than in 2019; in Afghanistan, Maldives, and Pakistan, per capita GDP for 2022 will also be lower than it was in 2019. Following the crisis, levels of extreme poverty (those living at less than US$1.90-a-day) have risen sharply across all countries; new updates indicate that between one-quarter and one-half of the population is projected to live on US$3.20-a-day in Afghanistan, Bangladesh, India, Nepal, and Pakistan, higher than pre-crisis estimates.[f]

Table 5. Average GDP growth prior to 2020, estimated for 2020, and projected for 2021 and 2021, by country in SAR

WB region	Average 2009-2019 (%)		Estimated 2020 (%)		Projected 2021 (%)		Projected 2022 (%)	
	GDP	*Per capita*	*GDP*	*Per capita*	*GDP*	*Per capita*	*GDP*	*Per capita*
East Asia & Pacific	4.4	3.2	-4.0	-5.1	4.4	3.2	4.8	3.7
Europe & Central Asia	3.3	2.9	-4.1	-4.4	4.6	4.2	4.4	4.1
Latin America & Caribbean	2.3	1.2	-8.7	-9.6	4.0	3.0	3.5	2.5
Middle East & North Africa	2.6	0.4	-11.1	-12.6	11.3	9.5	8.7	7.0
South Asia	**5.5**	**4.2**	**-4.2**	**-5.4**	**4.9**	**3.6**	**6.8**	**5.5**
Sub-Saharan Africa	4.3	1.8	-2.5	-4.8	3.7	1.2	4.7	2.3
LMICs	*3.7*	*2.1*	*-5.0*	*-6.4*	*4.7*	*3.2*	*4.9*	*3.4*

Source: IMF

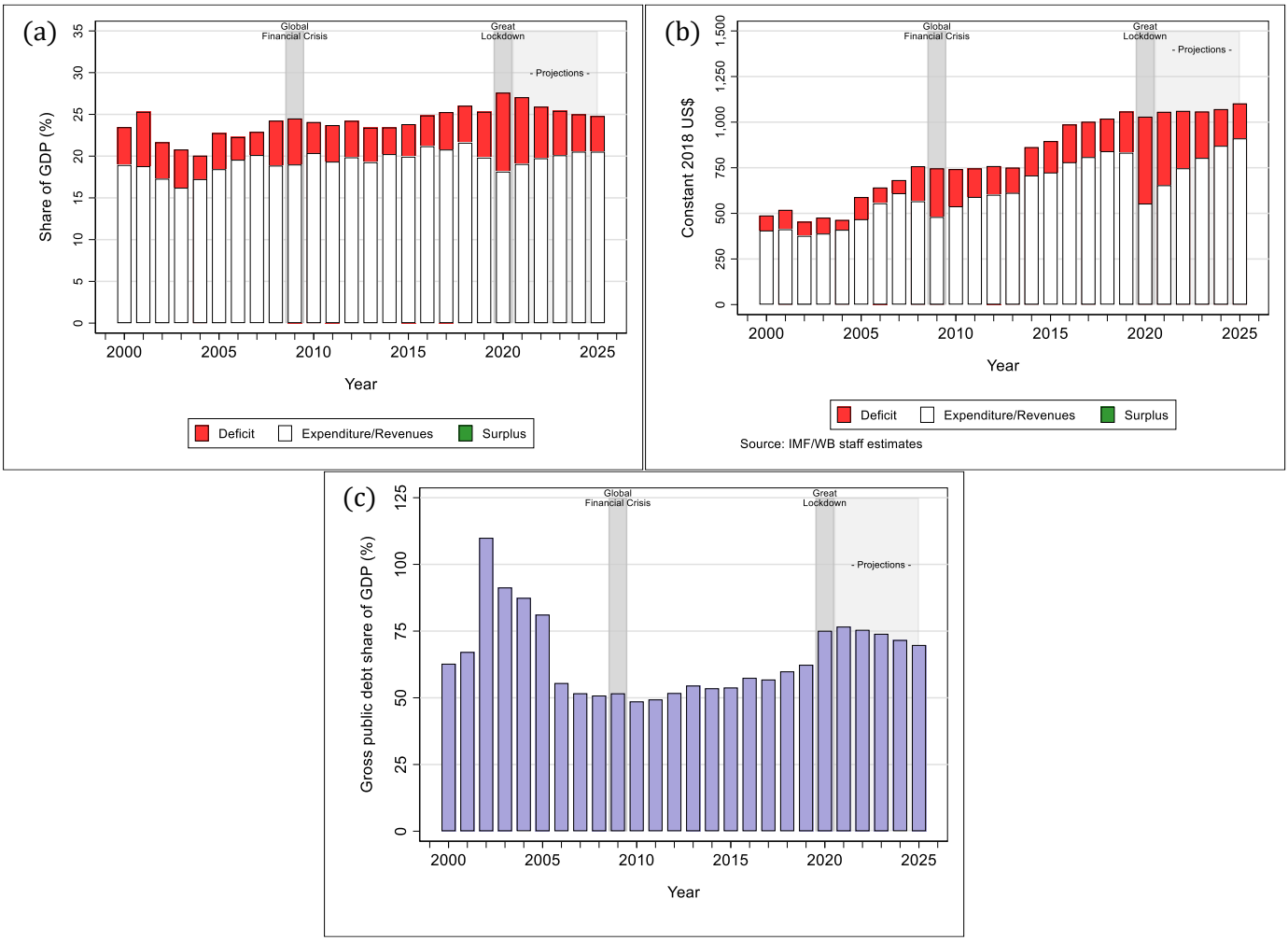
Figure 9. (a) Per capita GDP growth in SAR overall and (b) by country in SAR



SAR countries vary widely not only in terms of the size of their economies but also the size of the annual government expenditure as share of the economy. The economic contraction has also resulted in declining government revenues, with the tax revenue share of GDP – already low in the region relative to global benchmarks – declining by about 2% of GDP on average. The grant financing share of GDP has remained largely unchanged to date, but overall government revenues declined significantly in 2020. Most countries have dramatically raised borrowing: as a result, government expenditures as share of GDP have risen (Figure 10), primarily to finance the emergency pandemic response, for expanding social protection programs, and for countercyclical government spending. Consequently, public debt levels have risen across the region – in some cases as in India, Maldives, and Sri Lanka from already elevated pre-crisis levels – to exceed 60% of GDP on average. Higher public debt levels may imply higher debt servicing in the future and the potential for continued fiscal tightening, at least in the medium-term.

[f] WB Reversal of Fortune estimates

Figure 10. Deficit, expenditure/revenues, and surplus as (a) a share of GDP, (b) constant US$; and (c) public debt as a share of GDP for all countries in SAR

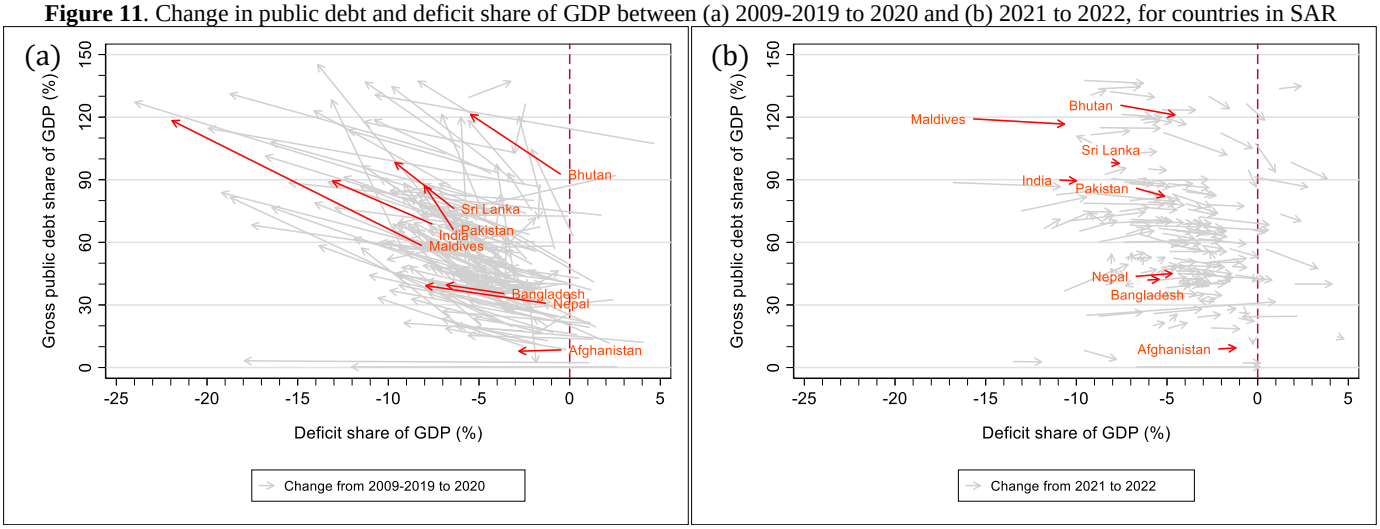


Government spending as a share of GDP in 2021 is projected to range from a low of 14.9% in Bangladesh to a high of 35.7% in Maldives. As noted earlier, low government revenues constrain government spending, despite substantial levels of deficit financing in some countries: e.g., India and Maldives are expected to run a deficit exceeding 10% of GDP in both 2021 and 2022. Debt and debt servicing burdens are high in Bangladesh, India, Pakistan, and Sri Lanka: more than 15% of government spending in 2021 and 2022 in these countries is expected to be for debt repayment (Table 6). Discretionary per capita government spending in 2021 – i.e., government spending after accounting for debt service – is expected to range from a low of US$141 in Afghanistan to a high of US$4,935 in Maldives – representing the overall baseline fiscal envelope for public financing across all sectors, including for health as well as for COVID-19 vaccine procurement and distribution. The numbers are similar for 2022. While deficits and debt are expected to shrink in 2022, the magnitude of these reversals will be much smaller and speed much slower. Countries such as Bhutan, India, Maldives, Pakistan, and Sri Lanka will face much higher debt levels than what they were before the pandemic began and this will exacerbate these countries' existing exposure to debt-related risks and vulnerabilities (Figure 11).

Table 6. Revenues and expenditure as a share of GDP, debt service as a share of expenditure, and discretionary expenditure in US$, by country in SAR

Country	Revenues/GDP (%)		Expenditure/ GDP (%)		Debt service/ Expenditure (%)		Discretionary expenditure (US$)	
	2021	*2022*	*2021*	*2022*	*2021*	*2022*	*2021*	*2022*
Afghanistan	25.8	26.9	28.0	28.1	0.1	0.2	141	147
Bangladesh	8.8	9.8	14.9	15.2	16.0	15.8	289	323
Bhutan	27.0	25.4	34.6	30.0	3.8	4.4	1,177	1,091
India	19.0	19.5	30.0	29.6	20.3	20.6	572	609
Maldives	20.0	22.4	35.7	33.0	7.4	8.6	4,935	5,069
Nepal	25.0	25.3	31.7	30.0	2.4	3.1	367	375
Pakistan	16.1	17.0	22.8	22.2	27.7	26.5	280	289
Sri Lanka	10.7	11.6	18.8	19.2	35.2	34.2	691	753
SAR	*19.1*	*19.7*	*27.1*	*25.9*	*14.1*	*14.2*	*1,056*	*1,082*
LMICs	*25.5*	*25.7*	*31.2*	*30.1*	*8.1*	*8.4*	*1,240*	*1,274*

Figure 11. Change in public debt and deficit share of GDP between (a) 2009-2019 to 2020 and (b) 2021 to 2022, for countries in SAR



Health system and health financing considerations for vaccination against COVID-19 in SAR

Vaccine prioritization

All countries in the region have issued or are preparing vaccine delivery guidelines and vaccine delivery has commenced. WHO has issued guidelines on how to prioritize vaccinations given insufficient supply, according to the state of the pandemic (community transmission, sporadic/cluster of cases, and no cases) (Table 7).[17]

Table 7. Vaccine prioritization guidelines from WHO

Transmission classification	Stage I (1-10% vaccine availability)	Stage II (11-20% vaccine availability)	Stage III (21-50% vaccine availability)
Community transmission	High-risk health workers; Older adults (country-determined age cut-offs)	Remaining older adults; Sociodemographic groups with comorbidities or health states determined to be high-risk of severe disease or death; Health workers engaged in immunization; High-priority school staff	Remaining school staff; Other essential workers (police, government staff, etc.); Pregnant women; Low- to moderate-risk health workers; Vaccine production personnel; Sociodemographic groups with elevated risk
Sporadic/clusters of cases	In high transmission areas: High-risk health workers; Older adults (country-determined age cut-offs)	In high-transmission areas: Sociodemographic groups with comorbidities or health states determined to be high-risk of severe disease or death; In rest of country: High-risk health workers; Older adults (country-determined age cut-offs)	In high-transmission areas: High-priority school staff; Other essential workers (police, government staff, etc.); Sociodemographic groups with elevated risk; In rest of country: High-risk health workers; Older adults (country-determined age cut-offs); Pregnant women
No cases	High-risk health workers; Essential travelers; Border protection staff	Low- to moderate-risk health workers; All at-risk travelers	Older adults (country-determined age cut-offs); Age groups at high-risk of transmission; High-priority school staff; Other essential workers (police, government staff, etc.)

Generally, country-specific vaccine prioritization plans in SAR follow those of the WHO. In all SAR countries, health care workers and the elderly are prioritized first (although the age threshold for the elderly varies) (Table 8). The number of health care workers in each country in SAR ranges from just under 6,000 in Bhutan to more than 6.8 million in India; however, in all countries except Maldives, the fraction of the total population that health care workers comprise is less than 1% (1.5% in Maldives). This leaves the majority of any initial doses available for other priority groups. After heath care workers and the elderly, essential workers (e.g. teachers, security forces), people with high-risk co-morbidities, and vulnerable populations (e.g. migrants, prisoners) are prioritized. The specific populations selected in each of these categories varies somewhat between countries.

Table 8. Vaccine prioritization and identification strategy, by country in SAR

Country	Immediate priority for vaccination	Second-phase priority for vaccination	Identification strategy
Afghanistan	- Health workers - Teachers - Security personnel - Prisoners - Population ≥ 50 years - Population < 50 with co-morbidities (TB, diabetes, heart diseases)	- Nomadic population (30-50 years) - Internally-displaced population camps (30-50 years) - Returnees from Iran and Pakistan (30-50 years) - Government employees with large face-to-face contact - Urban slum dwellers (18+)	- MOPH and other government records - Other mixed identification approaches (to be determined)
Bangladesh	- Adults aged 40+ - Adults with comorbidities (Hypertension, DM, Respiratory diseases, Heart disease, Obesity) - Teacher and educational institution staff in areas with high transmission - All government and private health care and social workers - Freedom fighters (Mukti Bahini) - Frontline law and enforcement agencies personnel directly involved COVID-19 response - Other military and paramilitary defense forces - Civil servants essential for state functioning - Other essential workers	- Remaining teacher and educational institution staff - Pregnant women declared safe by the relevant authority - Remaining civil servants, law & enforcement personal, city corporation and municipality worker, and autonomous & semi-government workers - Export oriented and other industry workers - Private workers essential to critical functioning not covered by other categories - Prisoner and people working in the prison - Urban slum/floating population - Agriculture and food workers - Homeless people/Dormitories - Other manufacturing industry workers - Remaining transport workers - Remaining older adult 50 to 54 years	- Line listing of target population determined by the prioritization group will be done before vaccination under the supervision of District/City Corporation/Municipality/Upazila COVID-19 coordination committee. - Target population will be registered by electronic voluntary registration using national identity card (NID), birth registration card, or passport. - Different departments will be requested to provide official list of staff. A list will also be provided by the first line health care providers.
Bhutan	- High risk health workers (6,000) - Other frontline workers (police, army, 35,000) - Population 60+ (41,000) - Population <60 with comorbidities (34,000)	- Remainder of population	

India	- Health care service providers and other workers in health care settings, both government and private sector - Frontline workers engaged in delivery of essential services such as police, defense, municipal workers, etc. - Population ≥ 65 years - Population 50-64 years	- Population <50 with co-morbidities such as diabetes, hypertension, cancer, lung diseases, etc. - Remainder of population based on vaccine availability	- Pre-registered beneficiaries via the COVID Vaccine Intelligence Network (Co-WIN) digital platform - Pre-registration in Co-WIN by line ministries and/or eligible beneficiaries - Population ≥50 determined by electoral rolls
Maldives	- (3%) Frontline health and social workers (3%) - (17%) Population ≥ 50 years; population < 50 years with cancer under treatment (any case currently on treatment or received treatment within last year one year), diabetes, obesity (BMI above 40), immunocompromised patients, chronic kidney diseases (stage 3 and above), COPD or chronic lung disease including asthma, on regular treatment, coronary artery disease, cardiac failure, cardiomyopathy, severe congenital heart disease, liver cirrhosis, dementia/stroke, thalassemia major, sickle cell disease, bedridden patients and caretakers	- Frontline essential workers including teachers, police, national defense force, frontline staff at travel industry including airport frontline staff and travel, counter staff at travel agencies, airline crew, frontline staff in the tourism industry, waste management, crew members of sea transportation vehicles, public transport crew (land and see), staff of correctional facilities, frontline staff working in offices/public areas who serve the public directly - International travelers	
Nepal	- Frontline workers of health and social sectors (3%) - Elderly (≥ 55 years) (12.29%) - Population 40-54 years with comorbidities (3.68%) - Migrant labors with comorbidities (1%)	- Remaining 40-54 years (9.55%) - Remaining 15-39 years (42.07%)	- Line listing of personnel to be done before vaccination with help from professional councils and subnational governments. - Elderly (≥ 55 years) will be determined by local governments/municipalities on the basis of voter list. - Population with comorbidities to be identified by health facilities/female community health volunteers and verified by local governments.
Pakistan	- Frontline health workers (staff working in ICU, HDU, isolation wards, RRTs and hospital emergencies etc.) (0.5 million) - Population 65+ (9.5 million) - Remaining health care workers (1 million) - Population 60-64 (6.3 million)	- General population - People with co-morbidities (to be confirmed from previous investigation and prescription)	- Line listing of health care worker has been started from initial high burden district and recorded in MIS. Elderly (≥65) and (60-64) will be determined through NADRA identification system and will be linked with MIS
Sri Lanka	- Health care workers (0.67%) - Armed forces, police (0.56%) - Population 60+ (14.0%) - International travelers/migrants (1.0%) - Population 50-59 with comorbidities	- Population 30-49 with comorbidities (8.8%) - Population 50-59 without comorbidities (5.7%) - Population 40-49 without comorbidities (8.1%)	

Health financing

As countries begin to roll-out vaccines, there is growing attention towards the ability of health systems to finance and deliver the vaccine, not only as a health intervention but also one that can serve as an economic stimulus. This section briefly landscapes health systems and health financing across SAR countries, focusing on issues of relevance for the vaccine roll-out. Given externalities – both health and economic – for the vaccine, public financing (either from domestic or external sources) ought to be the preferred modality, as long as it is affordable and does not impede financing for other publicly-financed productive activities, either within or outside of the health sector.

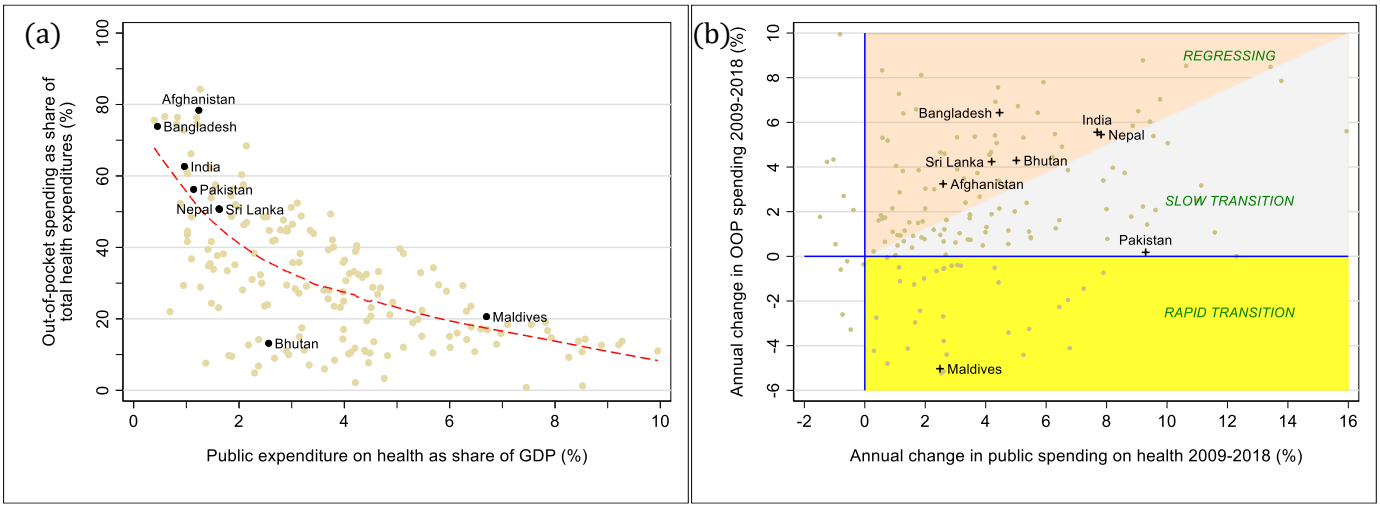
Both overall and public financing for health are relatively low in SAR and private out-of-pocket (OOP) financing dominates. The region has the lowest average per capita total spending on health as well as the lowest total health spending share of GDP (Table 9). In addition, the region has the lowest public spending on health share of GDP across all regions, one primary reason why it also has the highest private OOP financing share in total health spending. Furthermore, OOP spending has been rising at a rate higher than the growth rate of public spending on health for most countries in the region over 2009-2018, implying a regression in the region's "health financing transition" in terms of its move away from reliance on OOP financing towards public financing for health (Figure 12).[18]

Table 9. Health spending indicators, by region

Classification	Total health spending		Public spending share of GDP (%)	OOP share of total (%)	External share of total (%)
	Per capita (US$)	*Share GDP (%)*			
East Asia & Pacific	269	6.5	4.8	23.2	15.7
Europe & Central Asia	380	6.5	3.2	46.0	1.0
Latin America & Caribbean	456	6.8	3.9	33.4	2.7
Middle East & North Africa	291	6.1	3.0	40.1	3.0
South Asia	187	5.1	2.0	50.8	5.3
Sub-Saharan Africa	109	5.6	2.3	36.8	23.2
LMICs	*261*	*6.1*	*3.2*	*36.4*	*12.1*

Source: WHO (2020)

Figure 12. (a) OOP sending as a share of total health expenditure, (b) annual change in OOP spending and in public spending on health, for countries in SAR



Within SAR, there are important differences in financing for health across countries (Table 10). As with public provision, public financing dominates in Bhutan and Maldives. On the other hand, more than half of financing for health comes from private OOP sources in Afghanistan, Bangladesh, India, Nepal, Pakistan, and Sri Lanka. In Sri Lanka, OOP financing is largely incident on the well-off so is less of a risk factor for impoverishment. External financing is most prominent in Afghanistan, followed to a lesser extent in Nepal, Bangladesh, and Bhutan.

Table 10. Health spending indicators, by country in SAR

Country	Total health spending		Public spending share of GDP (%)	OOP share of total (%)	External share of total (%)
	Per capita (US$)	*Share GDP (%)*			
Afghanistan	50	9.4	1.2	78.4	16.4
Bangladesh	42	2.3	0.5	73.9	6.5
Bhutan	103	3.1	2.6	13.2	6.1
India	73	3.5	1.0	62.7	0.7
Maldives	974	9.4	6.7	20.6	0.9
Nepal	58	5.8	1.6	50.8	9.1
Pakistan	43	3.2	1.1	56.2	0.6
Sri Lanka	157	3.8	1.6	50.7	2.2
SAR	*187*	*5.1*	*2.0*	*50.8*	*5.3*

Source: WHO (2020)

Public spending on health is largely financed from domestic budgetary sources in SAR. Both social health insurance (SHI) contributions and on-budget external financing play a relatively marginal role for financing public spending on health in the region; even in countries where the contribution of external financing is relatively large, most is channeled off-budget. In general, health is accorded a relatively low priority in government budgets: at 7.5% of public spending, health's share is the lowest on average across all regions (Table 11).

Table 11. Per capital public spending on health, its composition, and macro-fiscal drivers, by region

Region	Per capita public spending health (US$)	Composition (US$)			Macro-fiscal drivers		
		Domestic	*External*	*SHI*	*Health share (%)*	*Expenditure/ GDP (%)*	*Per capita GDP (US$)*
East Asia & Pacific	203	143.6	38.9	20.8	9.8	45.4	4,302
Europe & Central Asia	211	102.7	1.1	107.6	9.8	32.3	6,093
Latin America & Caribbean	273	183.4	2.1	87.1	13.4	30.6	6,764
Middle East & North Africa	146	105.1	1.7	39.1	10.6	29.8	4,480
South Asia	114	111.2	2.5	0.5	7.5	25.5	3,075
Sub-Saharan Africa	53	44.2	6.5	2.1	9.3	23.5	2,021
LMICs	*155*	*105.0*	*9.8*	*40.2*	*10.2*	*30.5*	*4,177*

Source: WHO (2020)

Within SAR, health is accorded a relatively low priority in countries such as Afghanistan, Bangladesh, India, Nepal, and Pakistan (Table 12). Low overall size of governments in the economy are an additional constraint in countries such as Bangladesh, Pakistan, and Sri Lanka.

Table 12. Per capital public spending on health, its composition, and macro-fiscal drivers, by country in SAR

Country	Per capita public spending health (US$)	Composition (US$)			Macro-fiscal drivers		
		Domestic	*External*	*SHI*	*Health share (%)*	*Expenditure/GDP (%)*	*Per capita GDP (US$)*
Afghanistan	7	2.6	4.0	0.0	4.6	27.0	530
Bangladesh	8	7.1	1.0	0.0	3.4	13.4	1789
Bhutan	86	81.7	4.4	0.0	8.0	32.0	3360
India	20	17.0	0.2	2.6	3.4	28.2	2055
Maldives	693	687.5	5.4	0.0	21.6	31.0	10344
Nepal	16	14.5	1.5	0.0	5.1	31.9	990
Pakistan	15	14.9	0.0	0.3	5.3	21.6	1339
Sri Lanka	68	64.0	3.5	0.7	8.7	18.6	4190
SAR	*114*	*111.2*	*2.5*	*0.5*	*7.5*	*25.5*	*3075*

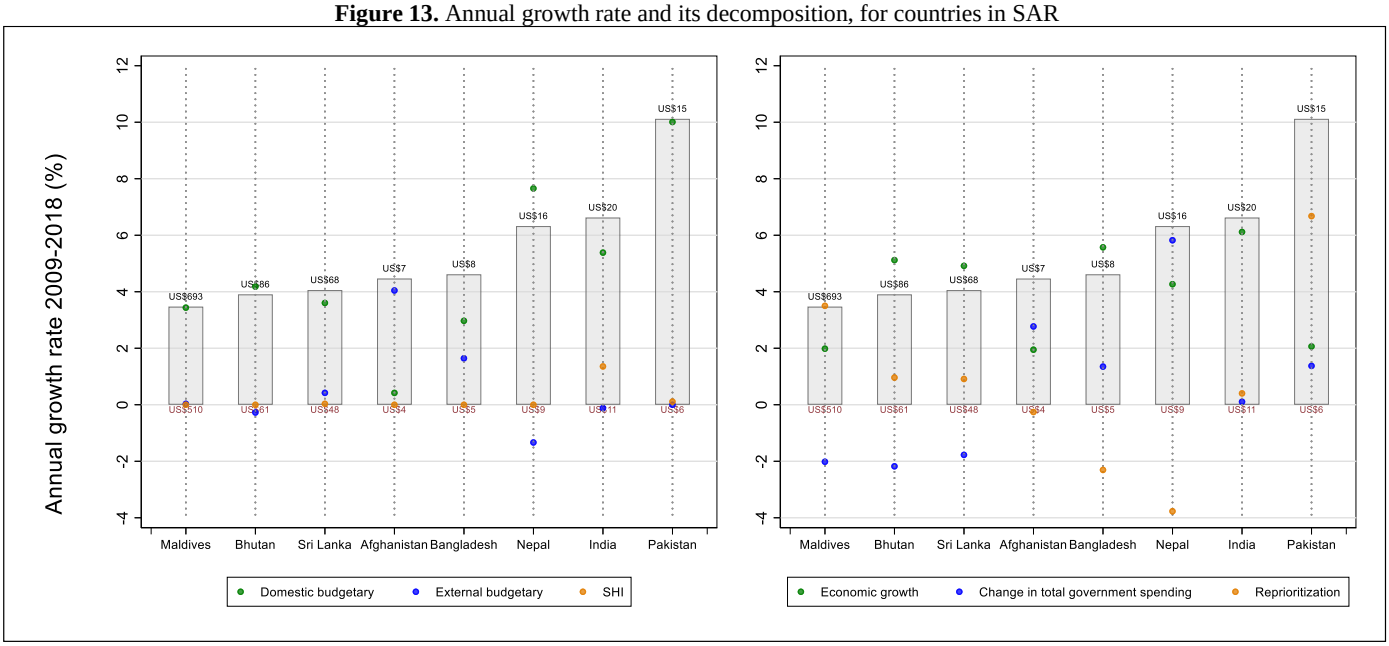
Source: WHO (2020)

Public spending on health increased by >5% per year in Pakistan, India, and Nepal over the past decade, albeit from low levels. The drivers of past changes in public spending for health can be assessed by looking at decompositions of changes: (i) in terms of changes in the *levels* due to three macro-fiscal drivers including economic growth, changes in total public spending, and changes in priority to health; and (ii) changes in the *composition* of per capita public spending for health in terms of shares from on-budget external financing for health, SHI contributions, and financing from domestic government budgetary sources. This is because per capita spending on health in any country for a given year t (P_t) must, by definition, equal:

$$P_t = H_t.G_t.Y_t = E_t + S_t + D_t,$$

where H_t is share of total government spending going to health, G_t is total government spending share of GDP, Y_t is per capita GDP, E_t is external financing for health channeled via the government budget, S_t is SHI contributions, and D_t is domestic government budgetary spending for health. Using decomposition methods elaborated by Das Gupta,[19–22] the annual growth rate in per capita public spending on health can be decomposed into changes in composition (left-hand side) and macro-fiscal drivers (right-hand side). In almost all countries, SHI played almost no role underlying the expansion; except for Afghanistan and to some extent Bangladesh, the increase was due to domestic budgetary sources in all SAR countries. Economic growth was a key driver of growth in public spending in India, Bangladesh, Sri Lanka, and Bhutan. Increased priority to health played a prominent role in Pakistan and Maldives. Higher levels of overall government spending dominated the increase in Afghanistan and Nepal (Figure 13).

Figure 13. Annual growth rate and its decomposition, for countries in SAR



Service delivery

Beyond health financing considerations, service delivery capacity will be a key bottleneck or facilitator in attaining high COVID-19 vaccine coverage. The extent to which health service delivery is centralized or decentralized in a country may influence not only vaccine distribution systems but also their efficiency and financing. In Bhutan, health services are managed primarily at the district level, but health resource allocation remains approximately evenly split between the central and local governments, and regulations and standards are set at the central level.[23] Other countries in SAR are at various stages of devolution, with responsibility for policy and planning lying at the provincial and local levels in Pakistan;[24] various central-level Directorates in Bangladesh sharing service delivery responsibility with local governments and City Corporations, and legislation in Nepal,[25] Afghanistan,[26] Maldives[27] dictating decentralization of health service delivery to local bodies.

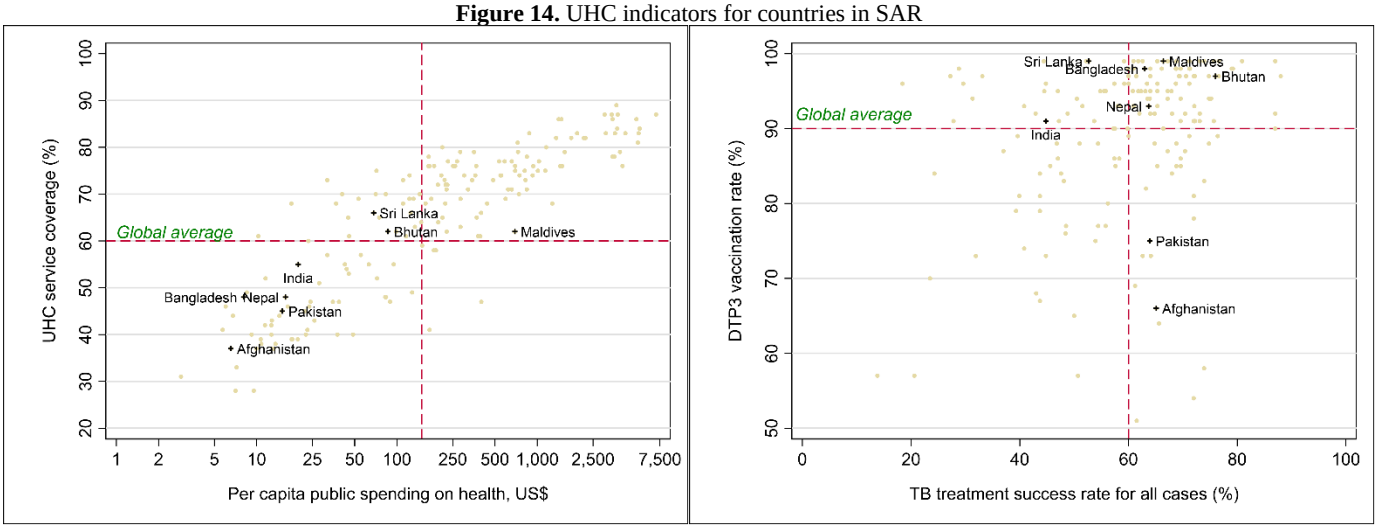
For countries with health service delivery that is highly centralized and primarily public, fragmentation and logistical challenges in vaccine delivery may be somewhat reduced. SAR is notable in that private providers often serve as the first point of contact for the health system. In many SAR countries people prefer to go to private health care providers, especially for outpatient care. Countries such as India are among the most privatized both in terms of financing as well as delivery. Private providers across the region range from informal drug sellers, traditional healers, and pharmacies to 'dual practice' (publicly employed health professionals legally providing private services outside of regular office hours) and formalized for-profit private sector operators. On the other hand, service delivery is entirely public in Bhutan and Maldives. Strong public financing and public provision co-exists with complementary private provision and private OOP financing in Sri Lanka. In addition to India, utilization at private facilities dominates service provision in Bangladesh, Nepal, and Pakistan. Afghanistan's health system is unique in that it uses a large-scale public-private model for service delivery with most publicly funded health services contracted out to non-governmental organizations (NGOs); nevertheless, even in Afghanistan, private providers dominate service provision. SAR countries with weak public sector service delivery may need additional resources to ensure strong vaccine delivery systems.

Overall risks to successful delivery of the COVID-19 vaccination are difficult to predict. Constraints to vaccination against COVID-19 in SAR could appear from three fronts: from limited supply of vaccines themselves due to production constraints, from financing-related challenges in terms of lack of adequate resources, and from service delivery barriers (including both supply- and demand-side constraints). Service delivery challenges on the supply side may appear in the form of limited human resources for health (including considerations of human resource training and allocation); inadequate

cold chain equipment and distribution systems, and supply chain monitoring systems; and challenges in identifying target populations and monitoring adverse events. On the demand side, vaccine hesitancy may pose a challenge. As most COVID-19 vaccines will likely require a second dose, to be administered several weeks after the first, challenges are expected associated with follow-up. Most vaccine service delivery infrastructure is designed for childhood immunization, rather than for adults (the target of the COVID-19 vaccine). Despite that, diphtheria-tetanus-pertussis 3 doses (DTP3) vaccination rates may serve as an approximate bellwether of a health system's capacity to identify a target population in need of vaccination and ensure that multiple doses of vaccine are administered according to schedule. Countries in SAR have highly variable DTP3 coverage rates, with Afghanistan and Pakistan lagging behind (Figure 14). Given that childhood immunization systems have benefited from decades of system strengthening, these low rates of DTP3 coverage are particularly troubling as a potential predictor of challenges in achieving high COVID-19 vaccine coverage. Within countries, DTP3 coverage is also highly variable, and lower-income members of the population are the least likely to be reached. This inequality is especially evident in Afghanistan, where only 49% of the children in the lowest income quintile received the vaccine, while 70% of their counterparts in the highest income quintile did. Similarly, in Pakistan, 52% of children in the poorest quintile were vaccinated while 91% in the highest were. These disparities in vaccine coverage by income suggest that ensuring equitable access to the COVID-19 vaccine will need to be prioritized.

Similarly, low overall levels of public financing and poor universal health coverage (UHC) service coverage rates (including for detection of new and relapsed TB cases and their successful treatment,[23] a UHC indicator serving as a proxy for system capacity to identify and manage an infectious disease requiring complex treatment,[g] suggest that India, Nepal, and Bangladesh could also face some challenges either from a demand, supply, or financing perspective. In particular, the UHC service coverage index would suggest that weak service delivery in Afghanistan, Bangladesh, Nepal, and may need to be strengthened by additional resource allocation.

Figure 14. UHC indicators for countries in SAR



Fiscal aspects of vaccination against COVID-19 in SAR

This section summarizes some of the fiscal issues and challenges that countries could face in procuring and delivering the vaccine. Countries in South Asia are relying on multiple sources of financing to cover COVID-19 vaccinations. Sources include domestic financing, multilateral financing, and bilateral or multilateral aid. Table 13 presents financing under discussion as of February 2021, as well as country-specific coverage targets.

[g] Tuberculosis effective treatment coverage provides an indication of the effectiveness of national tuberculosis (TB) programs in finding, diagnosing and treating people with TB. It is estimated by multiplying TB treatment coverage rate by the TB treatment success rate of previous year. For Sri Lanka, while the treatment success rate is relatively high at 85%, coverage rate is estimated at only 61 percent. As a result, effective treatment coverage for the country is very low at 53%.

Table 13. Planned financing sources for vaccination, by country in SAR

Country	Cost assumptions (after COVAX coverage of 20%)[§]	Target coverage	Vaccine financing method	Publicly known external financing amount/supply*
Afghanistan	~$4 per dose + international + domestic distribution costs	60%	COVAX	20% of population
			Government of India	500,000 doses
Bangladesh	~$4 per dose + international + domestic distribution costs	80%	COVAX	20% of population
			Government of India	2 million doses
Bhutan	Domestic distribution costs only	100%	Government of India	100% of population
India	~$3 per dose + domestic distribution costs	100%	COVAX	20% of population
Maldives	~$4 per dose + international + domestic distribution costs	100%	COVAX	20% of population
			Government of India	100,000 doses (10% of population)
Nepal	~$4 per dose + international + domestic distribution costs	72%	COVAX	20% of population
			Government of India	1 million doses
Pakistan	~$7 per dose + international + domestic distribution costs	70%	COVAX	20% of population
Sri Lanka	~$4 per dose + international + domestic distribution costs	100%	COVAX	20% of population
			Government of India	500,000 doses

[§] These per dose cost assumptions are proposed by the authors roughly based on potential procurement arrangements and do not reflect country-reported or authorized assumptions; these estimates are described further in the text

* In order to reach the target coverage, remaining financing will need to be sourced from donors, lenders, and domestic resources (including sources such as the World Bank, Asian Development Bank, which have arrangements in progress)

In addition to country-specific costing estimates, international organizations have proposed cost assumptions for planning purposes. Specifically, current estimates from a UNICEF working group assume domestic delivery costs would be roughly US$1.66 per dose.[29] This would be the outlay required for governments to deliver the initial 20% population coverage vaccine delivery from COVAX should things go as planned. Current estimates from UNICEF and PAHO indicate a total pricing of US$19.10 per person for non-COVAX-subsidized purchases. This estimate includes $7 per dose of vaccine plus $0.89 per dose for international delivery costs plus the $1.66 for domestic delivery times 2 doses. However, these estimates are constantly in flux given the rapidly developing vaccine market. Relatedly, the vaccine cold chain requirements are stringent, and failing to maintain appropriate storage conditions, and/or failing to administer the vaccine within a given time period will result in wastage. Wastage rates are likely dependent on vaccine type (different vaccines have different cold chain requirements) and service delivery efficiency; assumptions on wastage rates of the vaccine range between 0% and 10%, and should be incorporated into estimates of doses and financing needed.

This paper presents three policy-relevant illustrative scenarios to demonstrate the extent to which countries in SAR may require additional resources to cover vaccination costs. While there are various potential delivery cost assumptions that have been posited,[29,30] to ease interpretation, the cost per dose of international delivery is assumed to be $0.89 and the cost of domestic delivery is assumed to be $1.66 for all countries and across all scenarios. A constant 10% wastage is also assumed, and the target coverage is assumed to be 70% (needed for herd immunity) across all countries and scenarios (the first 20% of which will be covered by COVAX), despite alternative country-specific coverage targets. While global COVID-19 vaccine production capacity is expected to allow for 85% of the global population to be vaccinated in 2021, this coverage will not be enjoyed evenly (concentrated in high-income countries). It may therefore be reasonable to assume that 30% of the population across SAR will be vaccinated by the end of 2021 (this is also in line with currently-observed trends in distribution rates in SAR thus far). The three scenarios examine the financial burden on country governments under varying assumptions of the costs per dose (which differ based on vaccine procurement arrangements), which remain uncertain.

Scenario I is the most pessimistic in terms of vaccine cost. Specifically, this scenario assumes that the cost of the vaccine per person is a constant US$19.10 across all countries, which is derived from the basic internationally-recommended cost assumptions described above. Scenario I assumes 20% coverage from COVAX in 2021 (as is currently intended), and 50% self-financed by countries—10% in 2021 and 40% in 2022—to reach the estimated 70% coverage needed for herd immunity. As a result, costs in 2021 are relatively limited (Figure 15). The remainder of coverage – for an assumed remaining 50% of the population – is where the fiscal burdens will be rather high for most countries: highest for Afghanistan, followed by Pakistan, Bangladesh, and Nepal. In particular, the estimated costs in 2022 exceed 2% of government budget in Afghanistan (5.5%), Pakistan (2.6%), Bangladesh (2.4%), and Nepal (2.1%), which is likely to be difficult for governments to cover. In

Afghanistan and Bangladesh, the costs of procuring and delivering the vaccine would amount to roughly equal to or more than the estimated share of health in government budgets (budget estimates as of 2018) (Table 14). Given that SAR is a relatively young region (Table 2), and considering that information is limited on the safety and efficacy of vaccinating those under age 18 years, if countries in SAR consider vaccinating only those age 18 and above, the financing considerations could look slightly different. Specifically, if – rather than setting a 70% coverage target for the entire population – governments were to target vaccinating 100% of those age 18 years and above, then total costs to the government would reduce by 34% in Afghanistan and 19% in Pakistan (given the relatively young population). In contrast, costs would be 11% higher in Maldives (given the relatively older population). Since COVID-19 vaccines are a worthy investment to make, the issue will be more in finding ways to finance this rather than not do so – whether this will require additional taxes, development assistance, or borrowing – given the criticality of vaccines for both health and the economy.

Figure 15. Scenario I: percent of government spending on vaccines in contrast to other sectors, associated with 20% coverage from COVAX and 10% of self-financing in 2021, 40% self-financed by countries in 2022, assuming US$19.10 per vaccinated person for all countries in SAR

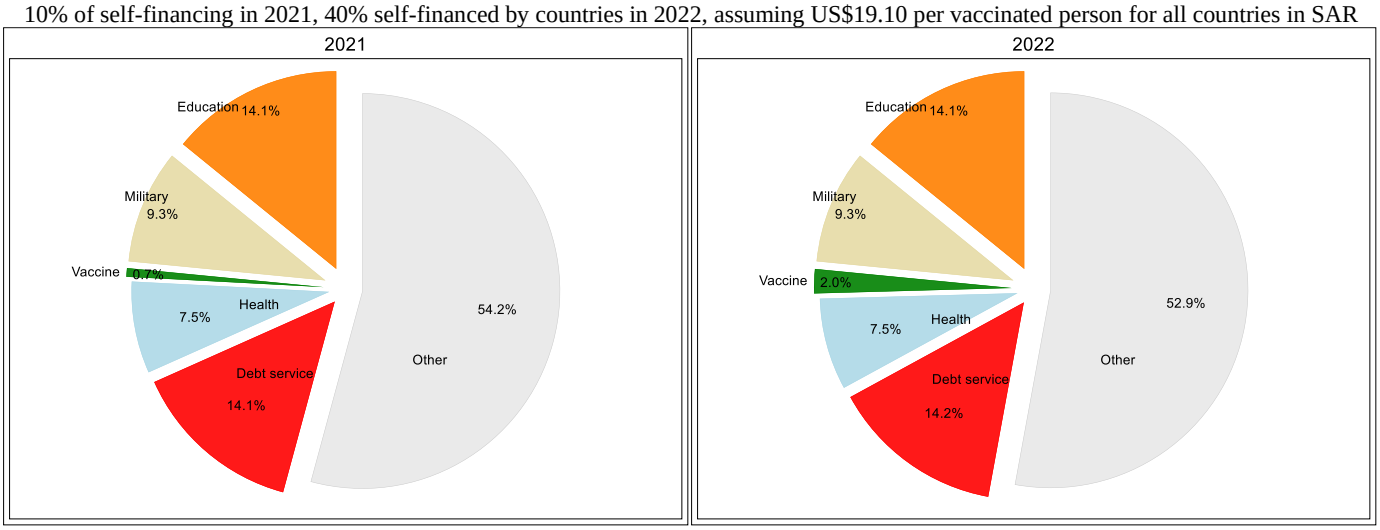


Table 14. Scenario I: coverage, costs, budget share, and GDP share associated with 20% coverage from COVAX and 10% self-financing in 2021, 40% self-financed by countries in 2022, assuming US$19.10 per vaccinated person, by country in SAR

Country	Coverage*		Vaccine cost ($M)		Share health (%)		Share budget (%)		Share GDP (%)	
	2021	*2022*	*2021*	*2022*	*2021*	*2022*	*2021*	*2022*	*2021*	*2022*
Afghanistan	11.7	15.9	105.2	319.5	41.8	119.1	1.9	5.5	0.53	1.55
Bangladesh	51.0	68.7	459.6	1,378.3	27.0	71.8	0.9	2.4	0.14	0.37
Bhutan	0.2	0.3	2.1	6.2	2.8	9.0	0.2	0.7	0.08	0.22
India	418.7	563.8	3,771.8	11,307.5	13.0	36.2	0.4	1.2	0.13	0.37
Maldives	0.1	0.2	1.0	3.1	0.2	0.7	0.1	0.2	0.02	0.05
Nepal	8.8	11.8	78.9	237.3	14.4	41.8	0.7	2.1	0.23	0.64
Pakistan	63.7	86.6	574.3	1,736.5	17.2	49.6	0.9	2.6	0.21	0.58
Sri Lanka	6.6	8.9	59.7	178.1	4.2	11.4	0.4	1.0	0.07	0.19
SAR	-	-	-	-	15.1	42.5	0.7	2.0	0.18	0.50

*Population in millions

Scenario II is intended to be the most realistic given current cost and production information. This scenario assumes 20% coverage from COVAX with 10% self-financed in 2021 and 40% coverage in 2022 using more realistic country-specific cost assumptions. Beyond what is covered by COVAX (first 20%), cost per dose in India is estimated at approximately $3 (Serum Institute prices), and other countries including Bangladesh,[31] Afghanistan, Maldives, Nepal, and Sri Lanka either already have agreements or may be likely to purchase doses from India at an estimated price of $4-5 each. Thus, cost per vaccinated person in India includes the $3 per dose price plus $1.66 for domestic distribution multiplied by 2 doses. Following the same logic, the cost per vaccinated person in Afghanistan, Bangladesh, Maldives, Nepal, and Sri Lanka is the sum of $4 per dose plus the international and domestic transport costs ($0.89+$1.66) multiplied by 2 doses. Little information is available on Pakistan's vaccine procurement arrangements, so in the absence of other information, the Gavi-

recommended $7 per dose cost is assumed (amounting to $9.55 per dose including international and domestic transport costs). Finally, Bhutan and Maldives are receiving notable coverage of vaccines from India. For Bhutan, all doses will be provided free of cost from India so only local delivery costs ($1.66 per dose) will be shouldered by the government. Maldives is receiving 20% coverage from COVAX and an additional 10% coverage from India (requiring only local delivery costs of $1.66 per dose), so only needs to shoulder the full cost (estimated at $4 per dose plus the international and domestic transport costs) for the remaining 40% coverage. Under this scenario, vaccine delivery costs would amount to an average of ~1.0% of the government budget (average of 0.22-0.25% of GDP) in both 2021 and 2022 across all countries in SAR (Figure 16, Table 15). Under this scenario, vaccine financing is less burdensome on country governments. Only Afghanistan (1.5%) would see outlays of greater than 1% of budget in 2021. However, in 2022, more countries including Afghanistan (3.9%), Bangladesh (1.7%), Nepal (1.5%), and Pakistan (2.7%) would incur costs greater than 1% of budget. For all countries, the cost is less than the total health budget in both 2021 and 2022. While these estimated expenses are notably less than those from Scenario I (most pessimistic scenario), they remain non-negligible and countries are likely to still need to mobilize additional financing to cover costs in order to reach coverage rates required for herd immunity.

Figure 16. Scenario II: percent of government spending on vaccines in contrast to other sectors, associated with 20% coverage from COVAX and 10% self-financed in 2021, 40% self-financed by countries in 2022, assuming country-specific costs for all countries in SAR

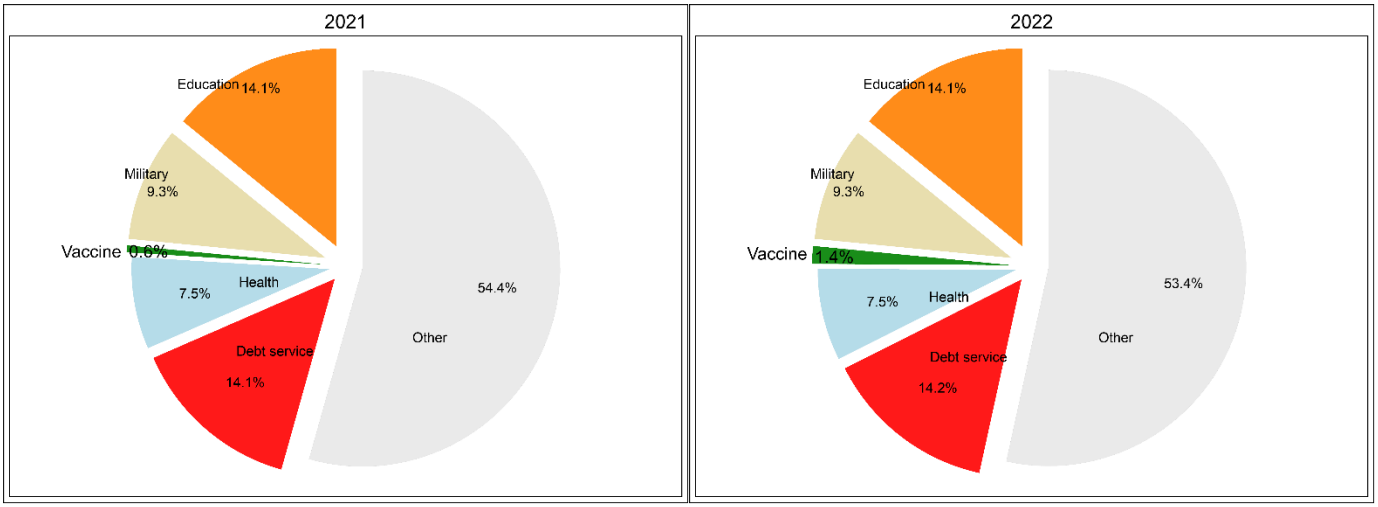


Table 15. Scenario II: 20% coverage from COVAX and 10% self-financed in 2021, 40% self-financed by countries in 2022, assuming country-specific costs, by country in SAR

Country	Coverage*		Vaccine cost ($M)		Share health (%)		Share budget (%)		Share GDP (%)	
	2021	*2022*	*2021*	*2022*	*2021*	*2022*	*2021*	*2022*	*2021*	*2022*
Afghanistan	11.7	15.9	84.5	229.6	33.6	85.6	1.5	3.9	0.43	1.10
Bangladesh	51.0	68.7	369.3	990.4	21.7	51.6	0.7	1.7	0.11	0.27
Bhutan	0.2	0.3	0.8	1.1	1.1	1.6	0.1	0.1	0.03	0.04
India	418.7	563.8	2,450.1	5,780.3	8.4	18.5	0.3	0.6	0.09	0.19
Maldives	0.1	0.2	0.4	2.3	0.1	0.5	0.0	0.1	0.01	0.04
Nepal	8.8	11.8	63.4	170.5	11.6	30.0	0.6	1.5	0.19	0.46
Pakistan	63.7	86.6	601.6	1,819.2	18.0	52.0	0.9	2.7	0.22	0.61
Sri Lanka	6.6	8.9	47.9	128.0	3.4	8.2	0.3	0.7	00.6	0.14
SAR	-	-	-	-	12.2	31.0	0.6	1.4	0.14	0.35

*Population in millions

Scenario III is an optimistic scenario that still assumes 20% coverage from COVAX with 10% self-financed in 2021 and 40% self-financed in 2022 but that vaccine costs can be negotiated down to a maximum of $3 per dose (plus international and domestic transport costs), mirroring the vaccine costs in India. This scenario presents results demonstrating the (smaller, but still substantial) fiscal burden on countries if vaccine prices are consistently on the low end of observed prices thus far. This results in a total $11.10 per vaccinated person for the vaccines provided beyond the initial 20% coverage from COVAX (or 30% coverage for Maldives, which is receiving 20% coverage from COVAX and an additional 10% coverage from

India). Additional exceptions are for Bhutan, where all doses will be coming from India so only local delivery costs will be considered and for India (where only domestic transport costs are required since the $3 vaccine is manufactured in India), where the results for Scenario II And Scenario III are the same. If vaccine prices in the region are reduced to a maximum of $11.10 per vaccinated person (including distribution costs), this will enable 70% coverage at a relatively affordable cost of ~0.5% of the overall government budget in SAR in 2021 and ~1.1% in 2022 (~0.12% and ~0.28% of GDP, respectively) (Figure 17, Table 16). However, these overall seemingly more affordable costs mask significant country-by-country heterogeneity; costs in all countries except for Afghanistan would not exceed 1.1% of government budget in 2021, but the share of budget required to achieve 70% coverage is at least 1.3% in Afghanistan, Bangladesh, Nepal, and Pakistan in 2022. This suggests that even under optimistic costing circumstances, some countries in SAR may require additional financing to achieve herd immunity through vaccination.

Figure 17. Scenario III: percent of government spending on vaccines in contrast to other sectors, associated with 10% self-financed in 2021, 40% self-financed by countries in 2022, assuming vaccine costs are negotiated down to no more than $11.10 per vaccinated person, for all countries in SAR

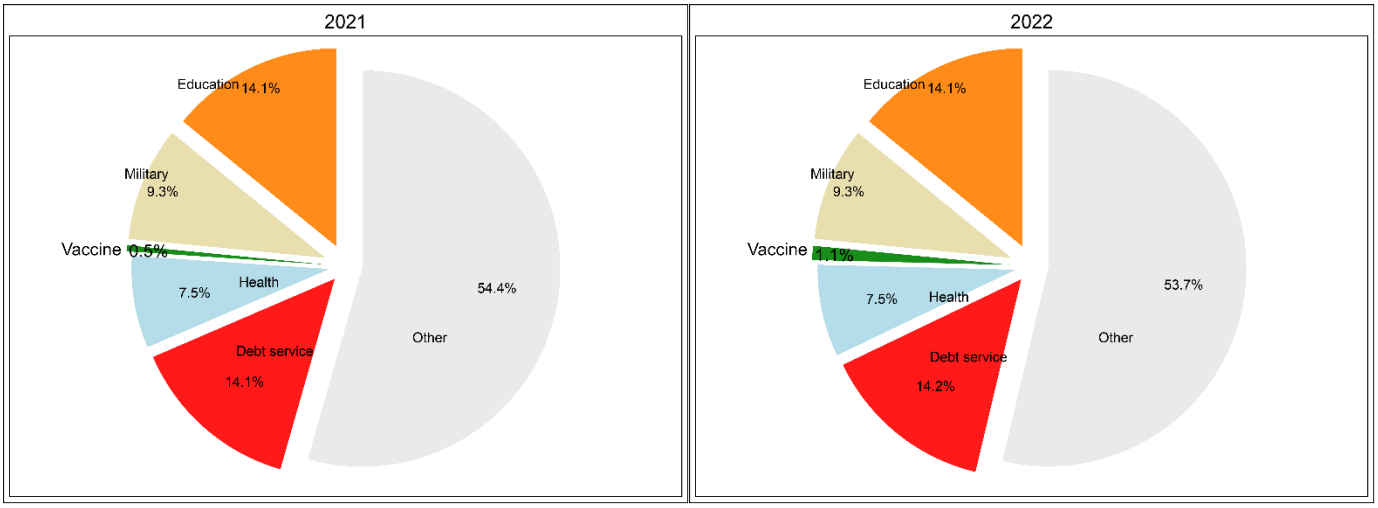


Table 16. Scenario III: 20% coverage from COVAX and 10% self-financed in 2021, 40% self-financed by countries in 2022, assuming vaccine costs are negotiated down to no more than $11.10 per vaccinated person, by country in SAR

Country	Coverage*		Vaccine cost ($M)		Share health (%)		Share budget (%)		Share GDP (%)	
	2021	*2022*	*2021*	*2022*	*2021*	*2022*	*2021*	*2022*	*2021*	*2022*
Afghanistan	11.7	15.9	76.0	194.5	30.2	72.5	1.4	3.3	0.39	0.93
Bangladesh	5.10	68.7	331.8	839.2	19.5	43.7	0.7	1.5	0.10	0.23
Bhutan	0.2	0.3	0.8	1.1	1.1	1.6	0.1	0.1	0.03	0.04
India	418.7	563.8	2,450.1	5,780.3	8.4	18.5	0.3	0.6	0.09	0.19
Maldives	0.1	0.2	0.4	1.9	0.1	0.4	0.0	0.1	0.01	0.03
Nepal	8.8	11.8	57.0	144.5	10.4	25.4	0.5	1.3	0.17	0.39
Pakistan	63.7	86.6	414.6	1,057.2	12.4	30.2	0.7	1.6	0.15	0.35
Sri Lanka	6.6	8.9	43.1	108.5	3.0	6.9	0.3	0.6	0.05	0.12
SAR	-	-	-	-	10.6	24.9	0.5	1.1	0.12	0.28

*Population in millions

Conclusions

This paper provides crucial landscaping background information on the trajectory of the COVID-19 pandemic in SAR, the implications of SAR's specific health and demographic characteristics, the expected economic impact of COVID-19 in the region, and considerations for financing the required vaccines. Efforts to address COVID-19 in SAR have the potential to contribute to "building back better" and rely on ongoing and detailed examination of key contextual factors.

The COVID-19 pandemic has had, and will continue to have, a vast health, social, and economic impact on SAR countries. In addition to its direct impact on morbidity and mortality, the pandemic is adversely affecting economic activity due to lockdowns and voluntary social distancing. The average per capita economic contraction among SAR countries is currently projected to be -5.4% in 2020, an economic loss of ~US$700 billion. Even though economic growth is currently expected to rebound to some extent in 2021, assuming vaccines will roll-out in 2021, it will do so from a lower base and it may take a couple of years to return to pre-COVID-19 levels. Fiscal tightening will pose a challenge for public financing for several years to come.

The COVID-19 vaccine is a welcome 'light at the end of the tunnel', not only in terms of its role in preventing cases and deaths, but also as a mechanism for stimulating economies. However, both health systems and health financing constraints in SAR countries may pose difficulties in both funding and distributing the vaccine. In many SAR countries, low levels of public financing, a predominance of private out-of-pocket (OOP) spending, and high rates of utilization in the private sector, have contributed to weaknesses in primary health care (PHC), including pandemic preparedness, and in containing COVID-19. These same attributes could pose a challenge in the financing and delivery of the COVID-19 vaccine given challenges related to attainment of key UHC service coverage indicators.

Afghanistan and Pakistan are likely to face significant vaccine financing challenges and – perhaps to a lesser extent – India, Bangladesh, and Nepal. Current fiscal costs – assuming pessimistic vaccine costs of US$19.10/dose – would imply more than 2% (more than 5% in the case of Afghanistan) of the overall government budget in several countries in 2022, making it difficult for these governments in the region to cover 70% of their population (including 20% via COVAX). The most realistic costing and production information available at present still implies that costs in some countries (particularly Afghanistan and Pakistan) will exceed 2% of government outlays, meaning that countries would need to implement a mix of reducing publicly-financed coverage or pro-actively seek out opportunities for procuring effective vaccines at a lower unit costs (e.g., as the case in India). Fortunately, many countries may be able to rely on supportive financing from various development banks, but few of these arrangements have been publicly-announced as of yet. For countries such as Afghanistan and Pakistan, where notably less than 70% of the population is age 18 and above, the potential benefits and drawbacks of vaccinating 100% of those age 18 and above (instead of 70% of the total population) could be explored. A more manageable scenario would also be one in which countries are able to negotiate and procure vaccines at rates similar to those that India has done – implying vaccine costs can be reduced to approximately $3 per dose – to facilitate a more financially tenable achievement of 70% coverage over 2021-2022.

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