(ix) Improving research and appropriate best practice results on communicable and noncommunicable diseases, especially from within the region, promoted through relevant regional research training opportunities, including study reports and webinars, provided by regional and international agencies.

2. Pillar 2: Technical Preparedness

66. **Key challenges.** There is a need to improve coordinated response through regional alignment in planning and implementing measures in response to public health threats, including the current COVID-19 pandemic. During emergencies, existing national public health surveillance systems may be underperforming, disrupted, or nonexistent, or they may become overwhelmed without an early warning system to detect and react rapidly to suspected disease outbreaks. Evidence from national data shows vast differences in how many tests are conducted per 100,000 people across CAREC member countries, as well as vast differences in national capacity for polymerase chain reaction (PCR) testing and ability to keep surveillance testing capacity in line with escalating pandemic developments. National results from PCR testing show how the daily rate of positive tests runs high, up to and above 20% to 30% in episodes during the past years in several CAREC countries.[68] Increase in the daily rate of positive tests shows that the reported number of confirmed cases only represents a minor proportion of the total number infected, and consequently, there is a need to expand testing. WHO recommends testing volumes to be expanded, so daily rates of positive tests will not exceed 5%.

67. Given the high rate of positive PCR tests, only a small portion of infected are caught by the surveillance sampling and testing. That leaves a huge proportion of the pandemic undetected. This makes calculations of needed healthcare resources from surveillance data impossible. Differences in proportion of infections detected and several other complications due to significant inter- and intra-country differences in surveillance sampling, principles for selection of cases to test, and choice of methods for analysis make comparisons of epidemiological statistics between CAREC countries difficult. Therefore, a data- and facts-driven coordinated action to control, mitigate, and contain the pandemic becomes very hard to formulate across CAREC countries.

68. A regionally synchronized planning and operation of surveillance, using the same methods for sampling and analysis, would thus be very helpful in enabling a regional "joint grip" on the extent of the COVID-19 challenge. Such a joint regional approach, with comparable data from countries, would help decision makers choose approaches to reduce risk from further spread of the disease. Cross-country access to and sharing of quality data is a critical prerequisite for guiding a coordinated response. This requires the development of proper data sharing platforms and data visualization tools, as well as supporting the respective capacity-building efforts.

69. Sufficient laboratory infrastructure is a critical element of enhanced surveillance and overall health systems capacity, particularly during pandemic threats. The COVID-19 pandemic revealed the need for a surge capacity plan by establishing decentralized testing capacity in subnational laboratories under the supervision of the national reference laboratory, if available.[69] This is illustrated by the WHO-recommended goal to stem epidemic spread by increasing the number of sampling and testing to keep the daily positive test rates below 2%. Using experience and statistical data from CAREC countries from the past year, planning for better surge capacity preparedness can be achieved.

[68] Our World in Data. ourworldindata.org (accessed 21 September 2021).

[69] World Health Organization. 2020. *Laboratory Testing Strategy Recommendations for COVID-19*.

70. Results of the national assessments conducted in CAREC countries revealed critical gaps in different components of laboratory quality management systems (LQMS), such as quality control and assurance measures of national laboratory networks, insufficient specimen transport and referral, and lack of integration of and interoperability between the health and laboratory information systems, among others. All the components of the LQMS, including biosafety and biosecurity, equipment maintenance, quality control, quality assurance, external quality assurance, supply chain management with a specimen transport system, information management, personnel management, and professional development, must be functioning well to ensure that the country's laboratory system is capable in effectively responding to public health threats and emergencies. In addition, the pre-analytical part of laboratory testing, such as sample collection and the training of personnel involved in sample collection, even when not performed by the laboratory, needs to be considered.

71. **Proposed actions.** Pillar 2 will focus on improving technical preparedness in the region. Areas of intervention may include the following:

(i) Improving sharing of epidemic information according to IHR and in line with laws and regulations in respective CAREC member countries.
(ii) Strengthening national and regional laboratory networks and laboratory systems for testing.[70] This includes improving the multifunctional equipment and methods for detecting potential pathogens; boosting PCR capacity and next-generation sequencing capacity; and establishing a Central Asian Regional Centre for Epidemiology, Virology and Bacteriology.[71]
(iii) Exchanging strategies of sampling to enable cross-country comparisons, improve capacity for referral transport of specimens, and reduce turnaround time from sampling to result report, as well as capacity boosting for sensitivity and reliability through quality assurance and upgraded biosafety standards.
(iv) Improving laboratory infrastructure and ensuring proper laboratory workflow and management according to international quality and biosafety requirements, including through existing regional initiatives and hubs.
(v) Implementing support quality management systems (QMS) in laboratories through mentoring with trained national mentors.

3. Pillar 3: Access to Supplies and Surge Capacity

72. **Key challenges.** An efficient end-to-end supply chain is critical to delivering quality and affordable lifesaving medicines when and where they are needed. Supply chain management encompasses all activities required in acquiring and moving health products from manufacturer to user—from forecasting and procurement to storage and transport— considering the financial and information flows required to move the products through the supply chain. Reducing inefficiencies across the supply chain increases the quality and timing of service delivery while freeing up much-needed resources. In the CAREC region, such inefficiencies include limited competition in the market, leading to constrained supplies and higher prices. Many of these inefficiencies were amplified during the COVID-19 pandemic, bringing the long-standing vulnerability of medical supplies into sharp focus. Additionally, global shortages of medicines and supplies were experienced, and when they were available, the prices were very high and quality was not always assured.

73. Inadequate regulatory mechanisms and enforcement result in delayed registration and importation of products while leaving the markets open to the entrance of poor-quality and falsified medicines. Poor data quality and lack of

[70] A network is the physical number of laboratories and their served catchment areas, served facilities, or served populations. Laboratory systems include functionalities of reporting, quality assurance, and quality control mechanisms.

[71] *Turkmenistan Golden Age News*. 2021. Central Asian Regional Center for Epidemiology, Virology and Bacteriology.