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DEFENSE INTELLIGENCE AGENCY

U-20-0002/OSG **April 16, 2020**

(U) Office of the Surgeon General (OSG): COVID-19 Vaccine and Therapy Development Update

(U) This paper responds to a Director request for information on Vaccine and Therapy Development against COVID-19 during the 1700 CICG Sync meeting on 08 April 2020.

(U) Potential Treatments for COVID-19

(U) A vaccine for COVID-19 is likely to be the most effective method of controlling the current pandemic and preventing further COVID-19 spread. The small number of genetic differences between the original strain of the novel coronavirus from Wuhan and those currently circulating in the US population indicates that a vaccine may likely offer lasting immunity. Although all replicating viruses accumulate some mutations that persist due to natural selection, the genetics of SARS-CoV-2 suggest that it is not mutating at a high rate which would indicate a single vaccine would be sufficient to confer lasting immunity. Potential treatments, via antivirals or other methodologies, are needed to treat those already infected with COVID-19. The timelines for both a publically available vaccine(s) and effective COVID-19 treatments are currently at a minimum 12 – 18 months away, though the FDA's COVID-19 Treatment Accelerated Program is likely to accelerate future their availability.

(U) Vaccines

(U) As of 14 April, 2020, according to academic and open source reporting, there are 79 potential candidate vaccines in various stages of research and development. The furthest along in the clinical process is an experimental vaccine developed by Hong Kong-listed CanSino Biologics Inc. and the Beijing Institute of Biotechnology, which is in phase two of three clinical trials. The other two being tested in humans are treatments developed separately by U.S. drug makers Moderna Inc. and Inovio Pharmaceuticals Inc., according to a WHO document.

- (U) The ongoing COVID-19 pandemic will likely expedite candidate vaccine testing and approval. Vaccine trials require large and diverse population sample sizes to ensure proper testing of the efficacy and safety of candidate vaccines. The global nature of the COVID-19 pandemic and continued presence of large cohorts of infected individuals will ensure these needs are met.

(b)(3):10 USC 424; (b)(6)

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(U) Antivirals

(U) Antivirals are drugs created to attack the virus and may do so in a variety of ways, such as inhibiting viral replication or preventing viral entry in the cell.

- (U) As of 15 April, according to scientific reporting, there are at least 13 different antiviral candidates being studied for their potential repurposing as a COVID-19 treatment. Gilead's remdesivir is receiving the most media attention likely due to the World Health Organizations public show of support. Remdesivir was originally developed as a treatment for Ebola, and is now in clinical trials as a treatment for COVID-19 in mild to moderately sick patients. Previously developed therapeutics, such as remdesivir and BioSig Technologies' merimepobid, offer a faster path to market and are likely to attract continued support.

(U) Other Treatments

(U) There are three other types of treatments also being explored: drug therapies, human antibody therapy, and engineered antibodies. Amongst drug therapies, the most well-known is hydroxychloroquine which is commonly used as an antimalarial drug. To date the results regarding efficacy are inconclusive and there are potentially dangerous side effects associated with its use. Antibody therapy is less likely to become a viable treatment option given the technology needed for development is not far enough along at this time.

cc: DIA Dep DIR
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(U) Prepared by: Office of the Surgeon General

(b)(3):10 USC 424; (b)(6)