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**Department of Health and Human Services  
Food and Drug Administration  
Center for Biologics Evaluation and Research**

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**CBER SENTINEL PROGRAM SUFFICIENCY MEMORANDUM**

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**From:** (b) (6)  
(b) (6)

**Through:** (b) (6)  
(b) (6)

**Subject:** CBER Sentinel Program Sufficiency Assessment

**Product:** SPIKEVAX (Moderna COVID-19 Vaccine)

**Sponsor:** Moderna

**STN:** 125752/0

**Proposed Indication:** Active immunization against coronavirus disease 2019 (COVID-19) caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) in persons 18 years of age and older.

**Approval Type:** ☒ Priority ☐ Standard review

**Submission Date:** September 17, 2021

**Action Due Date:** January 31, 2022

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## 1. Objectives/Scope:

This memo reviews the capability and sufficiency of the CBER active post-market risk identification and analysis system referred to as the CBER Sentinel Program to evaluate the serious risks of myocarditis and pericarditis, and subclinical myocarditis, following administration of Spikevax (Moderna COVID-19 Vaccine) in lieu of a safety post-market requirement (PMR) study under FDAAA<sup>1</sup>, should BLA 125752/0 be approved for active immunization against COVID-19 caused by the SARS-CoV-2 in persons 18 years of age and older. The CBER Sentinel Program covers activities conducted through the contract with the Harvard Pilgrim Health Care Institute, the current and future contracts through the (b) (6), and the interagency agreement with the Centers for Medicare and Medicaid (CMS). Please see the STN 125752/0 (b) (6) review of the Pharmacovigilance Plan (PVP) for background on the serious risks of myocarditis and pericarditis, and subclinical myocarditis. Post-authorization safety data identified serious risks for myocarditis and pericarditis after Moderna COVID-19 Vaccine, with increased risk in males under 30 years of age, particularly following the second dose, and onset of symptoms within 7 days following vaccination. At the end of May 2021 CDC issued clinical considerations regarding myocarditis and pericarditis after receipt of mRNA COVID-19 vaccines among adolescents and young adults (<https://www.cdc.gov/vaccines/covid-19/clinical-considerations/myocarditis.html>). The topic was presented and discussed at Advisory Committee for Immunization Practices (ACIP) meetings. The Emergency Use Authorization (EUA) Fact Sheet was revised on June 25, 2021 to add a Warning for myocarditis and pericarditis, and the Warning was revised on November 19, 2021 to include updated information from observational analyses of postmarketing data pertaining to myocarditis and pericarditis. Postmarketing safety studies are needed to assess myocarditis and pericarditis, and subclinical myocarditis, following administration of Moderna COVID-19 Vaccine to:

- a. Quantify the magnitude of risk by age, sex, and dose
- b. Follow up cases for recovery status and long-term sequelae
- c. Characterize subclinical cases of myocarditis

## 2. CBER Sentinel Program Sufficiency Assessment:

Determination of the sufficiency of the CBER Sentinel Program to further characterize the serious risks of myocarditis and pericarditis, and subclinical myocarditis with Moderna COVID-19 Vaccine, was based on the following factors:

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<sup>1</sup> Under section 901 of the Food and Drug Administration Amendments Act (FDAAA), “The Secretary may not require the responsible person to conduct a study under this paragraph, unless the Secretary makes a determination that the reports under subsection (k)(1) and the active postmarket risk identification and analysis system as available under subsection (k)(3) will not be sufficient to meet the purposes set forth in subparagraph (B).” NOTE: The active post-market risk identification and analysis system under subsection (k)(3) refers to the Sentinel program.

<sup>2</sup> ISBT 128 is a global standard for the safe identification, accurate labeling, and efficient information transfer of medical products of human origin (including blood, cells, tissues, milk, and organ products) across disparate national and international health care systems. <https://www.iccbba.org/isbt-128-basics>

## 2.1 Identification of exposure to Moderna COVID-19 Vaccine

### 2.2 Identification of the appropriate study population: Patients $\geq$ 18 years of age

### 2.3 Characterization of occurrence of myocarditis and pericarditis, and subclinical myocarditis, with Moderna COVID-19 Vaccine

### 2.4 Identification of exposure to comparator product (when applicable)

## 2.1 Assessment for identification of exposure to Moderna COVID-19 Vaccine

### 2.1.1. Is the CBER Sentinel Program able to identify the product (exposure) of interest?

Please answer each question i – xi, including sub-questions.		Yes	No
i.	Is this the first or the only FDA-approved product for the indication?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ii.	Can the exposure be identified using a billing or reimbursement coding system? <i>If yes, check all that apply:</i> <input checked="" type="checkbox"/> CPT <input checked="" type="checkbox"/> HCPCS <input checked="" type="checkbox"/> NDC <input type="checkbox"/> ICD <input type="checkbox"/> Other: [Coding system]	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii.	Is the ISBT 128 coding system <sup>2</sup> needed for the product identification?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv.	Can the reimbursement code of the product identify the brand name?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
v.	Is a history of uptake for previously approved products for the same indication needed? <i>If yes, list all products:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
vi.	Is medical chart review needed to identify or validate the identification of this product?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
vii.	Are claims data sources needed for exposure identification?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
viii.	Are electronic health record (EHR) data sources needed for exposure identification?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ix.	Are any other health record type data sources needed for exposure identification? <i>If yes, all health record types needed: [e.g., Registries, any other health records]</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
x.	Is product lot number needed for identification of this product?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
xi.	Is there a care setting of interest required for identification of this product? <i>If yes, check all that apply:</i> <input type="checkbox"/> Inpatient <input type="checkbox"/> Outpatient <input type="checkbox"/> Emergency Room <input type="checkbox"/> Other: Hospitalization	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### 2.1.2. Summary for product exposure identification

☒ Available data sources in the CBER Sentinel Program are *sufficient to identify the exposure of the product Moderna COVID-19 Vaccine due to reasons identified in 2.1.1.ii. Billing codes for Moderna COVID-19 Vaccine allows for clear ascertainment of exposure to the product.*

☐ Available data sources in the CBER Sentinel Program are *NOT sufficient to identify the exposure of the product [name] due to reasons identified in [list all bullets from 2.1.1.i.—2.1.1.xi. that support insufficiency].*

## 2.2. Assessment for identification of the appropriate study population: Patients $\geq$ 18 years of age

### 2.2.1. Is the CBER Sentinel Program able to identify the study population of interest?

Please provide an answer for each question i – vi, including sub-questions.		Yes	No
i.	Does age need to be identified? <i>If <u>yes</u>, list the inclusion and exclusion criteria.. Check all that apply for the level of granularity in</i> <input type="checkbox"/> Days <input type="checkbox"/> Months <input checked="" type="checkbox"/> Years	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii.	Does sex need to be identified? <i>If <u>yes</u>, list the inclusion [List the sex to be included] and exclusion criteria [List the sex to be excluded].</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii.	Does race need to be identified? <i>If <u>yes</u>, list the inclusion [List race to be included] and exclusion criteria [List race to be excluded]</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv.	Can the study population be identified in the data sources required for the exposure and outcome identification?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
v.	Was this population previously identified within the CBER Sentinel Program activities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
vi.	Is there a requirement for linking mothers to their newborns in the data sources?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### 2.2.2. Summary for identification of study population

☒ Available data sources in the CBER Sentinel Program are *sufficient to identify the study population of interest, patients > 18 years of age, due to reasons identified in 2.2.1.i - 2.2.1.vi. This study population of interest has been identified in the data sources required of exposure (Moderna COVID-19 Vaccine) and outcome (myocarditis/pericarditis).*

☐ Available data sources in the CBER Sentinel Program are *NOT sufficient to identify the study population of interest due to reasons identified in [list all bullets from 2.2.1.i.—2.2.1.vi. that support*

## 2.3 Assessment for characterization of occurrence of myocarditis and pericarditis, and subclinical myocarditis

### 2.3.1 Is the CBER Sentinel Program able to identify the outcome(s) of interest?

Please provide an answer for each question i – xi, including sub-questions.		Yes	No
i.	Can the outcome of interest be identified using a billing or reimbursement coding system? If <u>yes</u> , check all that apply: <input checked="" type="checkbox"/> ICD <input type="checkbox"/> CPT <input type="checkbox"/> Other: Medical Record Review	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii.	Are there surrogate data elements or biomarkers that can assist to identify the outcome of interest? If <u>yes</u> , check all that apply: <input type="checkbox"/> Laboratory Test Results <input type="checkbox"/> Prescription drug <input type="checkbox"/> Order of lab test <input type="checkbox"/> Order of other diagnostic modalities <input type="checkbox"/> Other: [Data element/Biomarker]	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii.	Are there specific care settings in which this outcome is identified? If <u>yes</u> , check all that apply: <input checked="" type="checkbox"/> Inpatient <input checked="" type="checkbox"/> Outpatient <input checked="" type="checkbox"/> Emergency Room <input checked="" type="checkbox"/> Other: Hospitalization	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv.	Was this outcome previously identified within the CBER Sentinel Program activities? If <u>yes</u> , in what population was it used? It was used in a similar population of Medicare beneficiaries 65y and older.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
v.	Is there a validated and acceptable algorithm available in the literature to identify the outcome of interest? If <u>yes</u> , list the PPV [PPV] and describe the population in which it was validated:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
vi.	Is a minimum follow-up time needed to identify the outcome of interest? If <u>yes</u> , what is the required follow-up period? 3-6 months	<input checked="" type="checkbox"/>	<input type="checkbox"/>
vii.	Is medical chart review required to identify or validate the identification of the outcome?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
viii.	Is the prevalence of the outcome known? If <u>yes</u> , list background rates. 0.95-2/16 per 100,000 PY in Gubernot 2021	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ix.	Are claims data sources needed for outcome characterization?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
x.	Are electronic health record (EHR) data sources needed for outcome characterization?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
xi.	Are any other health record type data sources needed for outcome characterization? If <u>yes</u> , all health record types needed: Registries	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### 2.3.2 Summary of outcome characterization

- ☐ Available data sources in the CBER Sentinel Program are *sufficient to identify the outcome of [serious risk]* due to reasons identified in [list all bullets from 2.3.1.i.—2.3.1.xi. that support sufficiency].

- ☒ Available data sources in the CBER Sentinel Program are *NOT sufficient to identify the outcomes of myocarditis and pericarditis* due to reasons identified in 2.3.1.vi.—2.3.1.viii. Based on the prevalence of background rates estimated in the CBER Sentinel data sources and the number of observed myocarditis/pericarditis events in the CBER Sentinel Program on-going near-real time surveillance, the CBER Sentinel data sources are currently not sufficiently powered to assess the magnitude of risk for the 12-30 years old that has been reported in VAERS in an epidemiology study (e.g., self-controlled analyses). CBER Sentinel will continue to monitor these safety outcomes. In order to follow up cases for recovery status and long-term sequelae, a minimum follow up time of 3-6 months is required. CBER Sentinel data sources do not have sufficient longitudinal data on patients to conduct this type of analysis. Additionally, a study of subclinical myocarditis using CBER Sentinel data sources is not feasible because of the absence of a definition of subclinical myocarditis and unknown background incidence of troponin abnormalities.

## 2.4. Assessment for identification of exposure to comparator product (when applicable)

### 2.4.1. Is the CBER Sentinel Program able to identify the required comparator product?

Respond to the questions below, if applicable.

Please provide an answer for each question i – xi, including sub-questions		Yes	No
i.	Is a comparator product needed for the assessment? <i>If <b>no</b>, skip to section III for Recommendation. If <b>yes</b>, list all products:</i>	<input type="checkbox"/>	<input type="checkbox"/>
ii.	Can the comparator product be identified using a billing reimbursement code? <i>If <b>yes</b>, check all that apply:</i> <input type="checkbox"/> CPT <input type="checkbox"/> HCPCS <input type="checkbox"/> NDC <input type="checkbox"/> ICD <input type="checkbox"/> Other: [Billing reimbursement code]	<input type="checkbox"/>	<input type="checkbox"/>
iii.	Can the comparator product be exclusively identified using the billing reimbursement codes?	<input type="checkbox"/>	<input type="checkbox"/>
iv.	Is the ISBT 128 coding system <sup>2</sup> needed for the comparator product identification?	<input type="checkbox"/>	<input type="checkbox"/>
v.	Can the reimbursement code of the comparator product identify the brand name?	<input type="checkbox"/>	<input type="checkbox"/>
vi.	Is medical chart review needed to identify or validate the identification of this comparator product?	<input type="checkbox"/>	<input type="checkbox"/>
vii.	Are claims data sources needed for exposure identification of the comparator product?	<input type="checkbox"/>	<input type="checkbox"/>
viii.	Are electronic health record (EHR) data sources needed for exposure identification of the comparator product?	<input type="checkbox"/>	<input type="checkbox"/>

Please provide an answer for each question i – xi, including sub-questions		Yes	No
ix.	Are any other health record type data sources needed for exposure identification of the comparator product? <i>If <u>yes</u>, list all health record types needed: [e.g., Registries, any other health records]</i>	<input type="checkbox"/>	<input type="checkbox"/>
x.	Is product lot number needed for identification of this comparator product?	<input type="checkbox"/>	<input type="checkbox"/>
xi.	Is there a care setting of interest for identification of this comparator product? <i>If <u>yes</u>, check all that apply: <input type="checkbox"/> Inpatient <input type="checkbox"/> Outpatient <input type="checkbox"/> Emergency Room <input type="checkbox"/> Other:</i>	<input type="checkbox"/>	<input type="checkbox"/>

#### 2.4.2. Summary for comparator exposure identification

- ☐ Available data sources in the CBER Sentinel Program are *sufficient to identify the comparator product* due to reasons identified in [list all bullets from 2.4.1.i.—2.4.1.xi. that support sufficiency].
- ☐ Available data sources in the CBER Sentinel Program are *NOT sufficient to identify the comparator product* due to reasons identified in [list all bullets from 2.4.1.i.—2.4.1.xi. that support insufficiency].

#### 3. Recommendation:

- ☐ The CBER Sentinel Program is *sufficient* to assess the serious risk of [describe] associated with [product] at this time. [Summarize all bullets 2.1.—2.4. that support sufficiency]
- ☒ The CBER Sentinel Program is *NOT* sufficient to assess the serious risks of myocarditis and pericarditis, and subclinical myocarditis associated with Spikevax (Moderna COVID-19 Vaccine) in lieu of PMR safety studies under FDAAA. At the time of BLA approval, the data sources in the CBER Sentinel Program are not sufficient to identify the outcomes due to lack of sufficient power to assess the magnitude of risk in patients <30 years of age. In addition, CBER Sentinel Program is not sufficient to follow up cases for recovery status and long-term sequelae, or for identification and characterization of subclinical myocarditis cases.