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COVID-19 VACCINE STORAGE & DISTRIBUTION BY DNR DISTRIBUTION

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Abstract: This research discusses how the storage and distribution process of the Sinovac vaccine was being conducted as well as the challenges faced by DNR Distribution and how they overcome those challenges. This research aims to create understanding among the reader about the whole Sinovac vaccine storage and distribution process. This research was conducted with a qualitative descriptive analysis method with an online interview as its main source of data. The importer and producer of the Sinovac vaccine is Bio Farma, with DNR Distribution as its partner in distributing the vaccine in 14 Indonesian provinces. The Sinovac vaccine should be kept between 2-8°C. Challenges occur in distributing the vaccine to another island, including the scheduling and long travel time. To resolve this, DNR Distribution coordinates with the airline or ferry operator as well as carrying out a reconditioning process.

Keywords: COVID-19, vaccine, storage, distribution, reconditioning.

Introduction

In late 2019, a cluster of pneumonia cases was reported in Wuhan, China. The causative agent was then identified as a coronavirus subsequently named SARS-CoV-2 and the clinical spectrum known as the coronavirus disease 2019 (COVID-19) (Ophinni et al., 2020). The virus particles range from larger respiratory droplets to smaller aerosols and can spread from an infected person's mouth or nose when they cough, sneeze, speak, or even breathe.

In Indonesia, the first two positive cases were reported on March 2, 2020. The disease has rapidly expanded worldwide in months since the cases were announced in China. The World Health Organization (WHO) has declared the novel coronavirus as a pandemic on March 11, 2020.

The COVID-19 outbreaks have affected public health, economy, and society. It has a greater impact on vulnerable groups like older people, people

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with disabilities, ethnic minorities, and those living in remote areas. Our health is affected in numerous ways, from our mental health and the quality of air. However, to decelerate the spread of the COVID-19, the government has to restrict economic and social activities causing the GDP to fall and the raising of unemployment rate (UK Government, 2020).

In order to control the pandemic, scientists around the world have cooperated to research and develop vaccines. At least, there are now 13 different vaccines that have been administered. The first mass vaccination program started in early December 2020.

The first batch of COVID-19 vaccine ordered from Sinovac Biotech Ltd. containing 1.2 million doses arrived in Indonesia on December 6, 2020. The vaccine arrived in Soekarno-Hatta International Airport at 21:30 WIB, carried by Garuda Indonesia's aircraft type Boeing 777-300ER in a specific container to maintain its quality. The container was used considering that the vaccine needs to be shipped and stored in a temperature-controlled environment. Various types of refrigerants are classified as dangerous goods. Considerations include infrastructure availability, facilities, equipment, and trained staff to handle time- and temperature-sensitive vaccines (IATA, 2020). *Direktorat Jenderal Perhubungan Udara* (2021) stated that COVID-19 vaccines are categorized as high-value cargo and must be prioritized to be handled and transported by aircraft.

The government of Indonesia carries out four stages of COVID-19 vaccination, starting from January 2021 to March 2022 (Indonesian Ministry of Health, 2021). To support the government's program in accelerating the distribution of the Sinovac vaccine, Bio Farma as an importer and producer of the Sinovac vaccine cooperates with the private sector in distributing the vaccine all over Indonesia. In this regard, Bio Farma has entrusted and officially appointed DNR Distribution, part of DNR Corporation, to act as the Sinovac vaccine's distributor. According to *Badan Pengawas Obat dan Makanan* (2020), one of the requirements to be a vaccine distributor is by obtaining a *Cara Distribusi Obat yang Baik* (CDOB) certificate. DNR

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Distribution has obtained the certificate and it is one of the reasons why they were chosen as the partner of Bio Farma. The appointment of DNR Distribution by Bio Farma was marked by the signing of the Letter of Appointment of the COVID-19 Vaccine Distributor. It was held on March 5 2021, at Bio Farma's Head Office in Bandung.

This research is conducted to understand the storage and distribution process of Sinovac vaccine by DNR Distribution, including the Standard Operating Procedure (SOP), challenges faced during the storage and distribution process, and how DNR Distribution overcomes those challenges.

Research Method

The method used in this research is qualitative descriptive analysis. This data collection was done through interview with informant and literature studies. There were two types of data used, primary data and secondary data. The source of primary data was from an online interview with Mr. Syamratul Fuadi, the Operational Manager Region I of DNR Logistics. The source of secondary data was from various sources such as articles, reports, and guidelines related to the research theme. The data analysis tools were deep reading and deep analysis from the data given by DNR Distribution.

Discussion and Result

DNR Distribution is a *Pedagang Besar Farmasi* (PBF) under the auspices of DNR Corporation which operates as Bio Farma's partner in the process of distributing the Sinovac vaccine. It is one of the largest Indonesian PBFs with branches in majority of Indonesian provinces. DNR Distribution has obtained a certificate of *Cara Distribusi Obat yang Baik* (CDOB) for Commodity Cold Chain Product (CCP) from the *Badan Pengawas Obat dan Makanan* (BPOM) and has experienced in distributing drugs on a national scale. Bio Farma cooperates with DNR Distribution to support the vaccination program planned by the government. DNR Distribution is responsible for distributing the vaccine to 14 provinces in Indonesia with the following details.

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Table 1. Distribution of the Sinovac vaccine in 14 Indonesian provinces.

Province	Stock In	PO SMDV	Total Shipment	Shipment Realization vs Stock In (%)	Shipment Realization vs PO SMDV (%)
Aceh	15,340	15,340	15,340	100%	100%
Banten	30,670	20,270	20,270	66%	100%
Bengkulu	2,560	2,560	2,560	100%	100%
Gorontalo	1,380	1,380	1,380	100%	100%
West Java	37,510	37,510	37,510	100%	100%
Central Kalimantan	9,250	9,250	9,250	100%	100%
North Kalimantan	2,270	2,270	2,270	100%	100%
Maluku	2,160	2,160	2,160	100%	100%
North Maluku	1,690	1,690	1,690	100%	100%
West Nusa Tenggara	6,450	6,450	6,450	100%	100%
Papua Barat	4,070	4,070	4,070	100%	100%
Central Sulawesi	5,470	5,470	5,470	100%	100%
Southeast Sulawesi	8,240	8,240	8,240	100%	100%
North Sulawesi	17,210	17,210	17,210	100%	100%
Grand Total	**144,140**	**133,870**	**133,870**	**93%**	**100%**

The vaccine distribution scheme by DNR Distribution begins with the delivery of vaccines by Bio Farma to each DNR Distribution hub in the 14 provinces. Sinovac vaccine is sent by Bio Farma in a vial which is packed in a sealed inner box equipped with a barcode. Bio Farma has determined the allocation of vaccines for each district and city in the province. However, DNR Distribution cannot directly send vaccines without request from the

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District Level Health Office. DNR Distribution send vaccines based on the request from the District Level Health Office which entered the Bio Farma system, namely the *Sistem Manajemen Distribusi Vaksin* (SMDV). After the request is submitted, DNR Distribution can access this system via user login and process the vaccine delivery. DNR Distribution then delivers the vaccine along with *Berita Acara Serah Terima* (BAST) and a data logger to record the temperature of the vaccine periodically starting from check-out until received by the District Level Health Office.

During the distribution of the Sinovac vaccine, a handling procedure is being conducted in order to maintain the quality of the vaccine. It is carried out when the vaccine arrives at the hub. Vaccines are transported to the DNR Distribution hub along with a report, including a Vaccine Arrival Report (VAR). It informed the quantity, batch number, and expiration date. The vaccine that has been received is then checked for temperature, ensuring the range is between 2-8°C. If the temperature is out of range, DNR Distribution will issue a non-conformance report to Bio Farma. Meanwhile, vaccines within the temperature range will be stored in a warehouse equipped with a chiller and an alarm that will ring when the temperature approaches 2°C or 8°C. Assuming that the alarm rings, the team in charge of guarding the vaccine for 24 hours will take preventive measurements. The action is required to prevent the vaccine from damage. Before delivering the vaccine, a validation process is carried out by the pharmacist and the legal team. Both parties validate: the box which will be used in the delivery process, the size of the box, the amount of vaccine loaded in a single box, the quantity of ice packs based on distance and time, as well as the fleet used in delivery.

Vaccines are distributed from the hub to the District Level Health Office by trucks equipped with Static Reefer Container (SRC). Generally, trips from hub to District Level Health Office use only land transportation. Supposing the District Level Health Office is located on a different island from the hub, the shipment will be accomplished by truck to the airport or port. Afterward, the journey will be continued by airplane or ferry to the

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destination island, then continued by truck to reach the local District Level Health Office. In this case, DNR Distribution has to face challenges, such as departure schedules and long travel time to reach certain islands.

A case of vaccine distribution using more than one mode of transportation is shipment to the Tanimbar Islands Regency, located in Maluku Province. It is transported using truck and ferry. The ferry departs once a week or once every two weeks with a time period of three days. The DNR Distribution team needs to validate with the aim of ensuring the temperature stays between 2-8°C for three days. This validation was carried out due to the deactivation of the truck engine during the trip. With the purpose to resolve this, DNR Distribution has prepared two schemes in order to maintain the quality of the vaccine. The first scheme is by requesting an exception from PT ASDP Indonesia Ferry to turn on the truck engine with the aim of maintaining the quality of the vaccine. On the other hand, the second scheme is by carrying out a reconditioning process every 2x24 hours. Reconditioning process requires a spare box and spare ice packs. With the intention to prevent liquidation of the ice packs, DNR Distribution will coordinate with the ferry operator to use their freezer or carry a portable one. In the reconditioning process, the spare box is going to be filled with new ice packs. Later, the vaccine is moved to the box and resealed.

After arriving at the local airport or port, the journey will be continued by truck to the District Level Health Office. Later on, the vaccine is going to be stored by each District Level Health Office. In order to maintain the quality of the vaccine, the District Level Health Office monitors the temperature until the vaccination is being held.

Conclusion

DNR Distribution is a *Pedagang Besar Farmasi* (PBF) that has a role as a partner of Bio Farma in distributing the Sinovac vaccine. This article describes the responsibility of DNR Distribution in maintaining the quality of the vaccine until it is received by the District Level Health Office. The

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scheduling of transportation modes and long travel time are the main challenges in distribution to another island which can be overcome by coordinating with the airline or ferry operator as well as carrying out a reconditioning process.

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