LETTER TO THE EDITOR

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PFIZER/BIONTECH VACCINE SUPPLY CHAIN: THE CHALLENGES OF ORGANIZING DELIVERY

Letter to the editor

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In November 2020, the announcement by Pfizer and BioNTech of an effective vaccine against SARS-CoV-2 was a huge surprise, including the very low temperature that must be respected during delivery operations (between -70° C and -80° C), from factory to transit hubs/hospital warehouses and then to vaccination centers (see Figure 1). Anticipating the logistical challenges linked to get doses of vaccine to billions of people over the world [1], Pfizer has created dry ice packs that can transport up to 5,000 doses of vaccine all at once. As for the transport itself, third-party logistics (TPL) service providers are used to efficiently organize intercontinental shipments and national transport.

For Europe, one of the leading TPL service providers is H. Essers, who has been developing effective supply chain solutions for Pfizer in the past. Throughout 2021, H. Essers will be responsible for the physical distribution of Pfizer/BioNTech vaccine to various transit hubs and hospital warehouses throughout Europe. For this purpose, the company has 600 temperature-controlled trailers, monitored in real time 24/7. One might therefore think that the delivery issue is resolved for a large-scale vaccination. while many observers are wondering about true supply chain resilience [2].

In reality, SARS-COV-2 vaccine logistics will face two major challenges:

1. The transport of Pfizer/BioNTech vaccine, like all products, can be disrupted to a greater or lesser extent due to hazards (accidents, unfavorable weather, social problems, etc.). Disruptions can interrupt flows abruptly. As we know in business logistics, any disruption in the transport process, even a minor one, impacts the execution of orders, both upstream and downstream of the supply chain [3], resulting in bottlenecks with a direct effect on procurement activity.

2. The Pfizer/BioNTech vaccine is based on messenger RNA (mRNA) technology. To protect the RNA and deliver it to the human cells, it is encapsulated in a sphere of lipid nanoparticles that can also degrade rapidly if a temperature of -70° C to -80° C is not respected, with a tolerance of +10° C or -10° C. Deliveries are therefore based on an extremely sensitive deep-freeze supply chain, much more sensitive than the traditional cold chain (-20° C) to incidents during product transshipments.

Even if the subject remains taboo, the European authorities have considered logistical malfunctions that could notably lead to an increase in temperature during transport or storage. In this case, the Pfizer/BioNTech vaccine becomes totally ineffective. Losses are therefore anticipated, which explains why the number of doses of vaccine ordered far exceeds the needs in relation to the number of people to be vaccinated (for example, France has purchased 200 million doses for a population of 67 million and two shots).

Extreme caution is thus required when faced with unprecedented logistical challenges in the health history [4], and it is not certain that they can be easily controlled.

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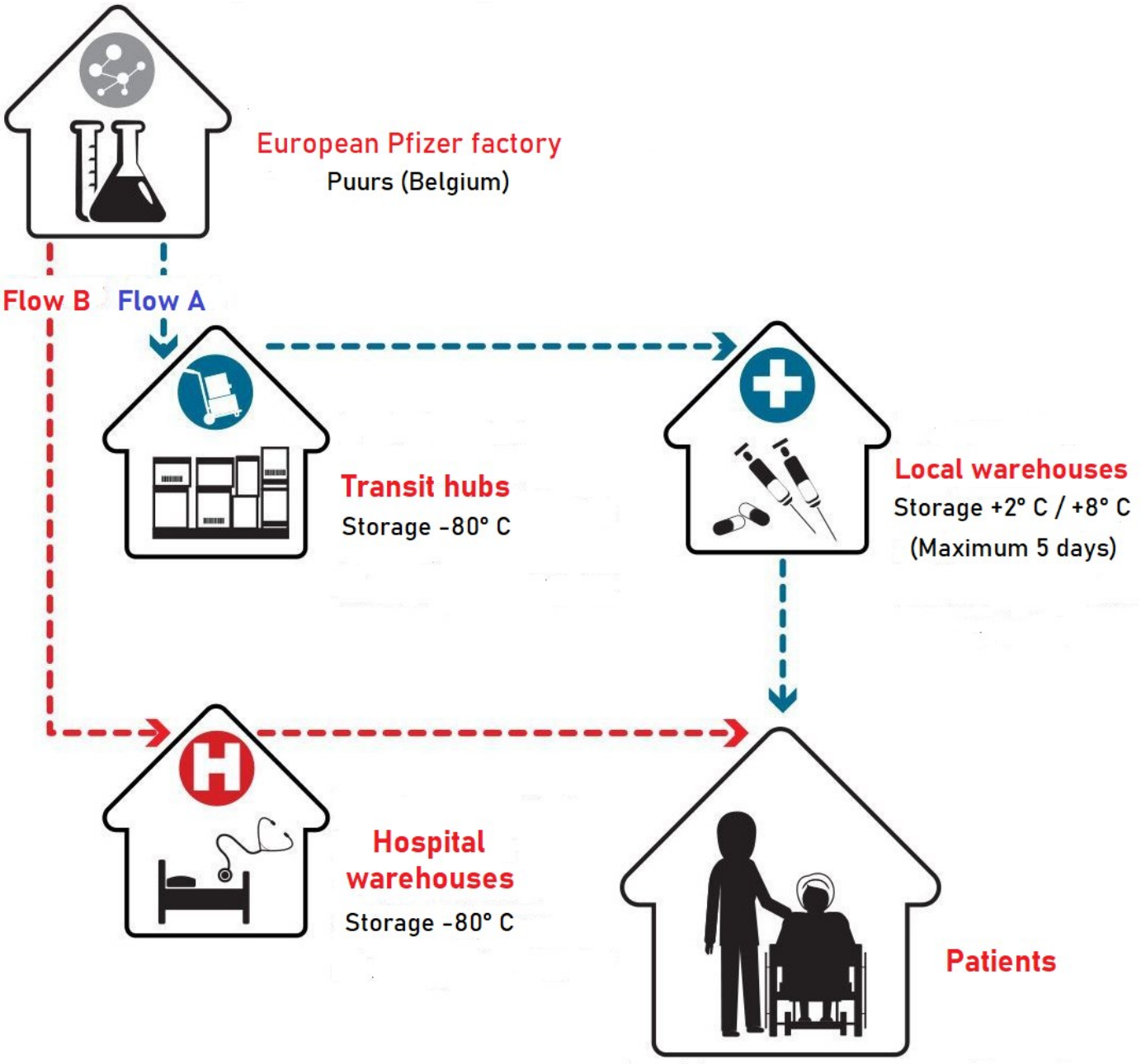
Figure 1: Delivery organization of Pfizer/BioNTech vaccine



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