# **National Vaccine Distribution System**

# **(NVDS)**

**About NVDS:**

NVDS is a secure, information technology system that integrates the vaccine supply chain from purchasing and ordering through the distribution to participating hospitals, pharmacies, clinics, etc.

NVDS allows health care providers to input their vaccine requests (orders), thereby improving efficiency and accountability. The system evaluates vaccine orders against specific guidelines set by the CDC.

The main objective of NVDS is to ensure that the **right** vaccines are delivered in **right** quantities, in the **right** condition, at the **right** place, in the **right** time at the **right** cost.

**Importance of NVDS:**

NVDS is integral for effectively managing and distributing vaccines. Currently, vaccine management generally consists of a mess of isolated computer applications and paper-based systems that are managed by the CDC and state-level vaccination programs. The way vaccine distributed, and inventoried are complicated and costly. Little information is known about the state of vaccine supply and demand. This leads to inefficiencies and safety problems at the provider level (hospitals and clinics).By using NVDS we can improve the vaccine distribution and tracking drastically.

**Key Issues:**

* + Storage of Vaccines.
  + Distribution of Vaccines.
  + Stock control of Vaccines and Supplies.
  + Vaccinating the appropriate people.
  + Temperature control for Vaccines.
  + Financial Management.
  + Ensure the vaccines are stored properly and expiration dates are monitored.
  + Monitor the diseases that vaccines prevent.
  + Maintaining the insurance log of the patients.

**Solution for the Problem:**

The core of the solution for this problem would be to maintain a perfect communication throughout the system from the CDC to the providers and patients. So that the six rights can be achieved.  
NVDS will have an organizational structure for each bodies (enterprise) in the system.  
Each organization will take care of specific functionalities assigned to it by the Enterprise admins.  
The organizations will have many roles. A person with a certain role will carry out the actions pertaining to his role and he will be also responsible for monitoring the same.   
The CDC will be the center of the NVDS, which controls all the other enterprises like PHD, Manufacturer, Distributor and the Providers.

**Key Roles:**

* + Center for Disease Control.
    - System Admin: Monitoring and Order Processing.
    - Financial Admin: Evaluate profiles of the patient who are under insured and have no insurance and pays the amount for them.
    - Order Organization: Receives order from PHD and provides approval for them.
  + Distributor
    - Admin: Receives and process orders from the CDC and forwards the order requirements to the finance and manufacturer.
    - Finance Organization: Manages the billing and payment process. Pays the manufactures and bills the providers.
    - Inventory Organization Role: Gets request from the manufacture and then completes the request.
  + Department of Public Health
    - Admin: Hospital Registration, Approves orders from the providers.
  + Manufacturer
    - Admin: Adds new manufactures within the CDC
  + Providers
    - Hospitals
      * Satellite Clinics
    - Pharmacies
    - Clinics
  + Central Pharmacies.

**Assumptions:**

* + Insurance Company will pay the insurance money for the patients.
  + Hospitals will have some capital to pay the distributor for the orders.
  + CDC will be approving the manufactures.
  + CDC will blacklist the manufactures if the vaccines are repeatedly damaged.
  + Distributor will have some capital.
  + CDC will have capital to pay the under insured and patients with no insurance.
  + CDC will have the formula to determine the allocation of vaccines to each state.
  + Vaccines for each disease is known.
  + Approximate population of each state is known.
  + CDC determines the price of vaccines.
  + Warehouse locations are determined by the distributor.
  + Satellite clinics orders are charged under the hospitals.

**Benefits for CDC:**

* + Enroll and manage providers within the formula.
  + Place and mange vaccine orders from the providers.
  + Estimate the amount of vaccines that the providers will need every month or biweekly.
  + Compare health care provider vaccine orders to the original availability.
  + Keep track of vaccines from the manufacture, to ensure the vaccine safety.

**Benefits for Distributors:**

* + Track the approved requests.
  + Track the shipped orders.
  + Maintain the billing for providers.

**Benefits for Providers:**

* + Placeand track vaccine orders.
  + Maintain a proper inventory for satellite clinics.
  + Schedule automatic orders bi-weekly or monthly.

**Object Model –**

Public Health Department

Center for Disease Control

Manufacturer

Distributor

Inventory

State

Sites

Satellite Clinic Vaccines Inventory

Satellite Clinics

Pharmacies

Clinics

Hospitals