

# Optimize

## Optimizing vaccine supply chains in low and middle income countries

**Global Vaccine Research Forum (GVRF),**  
Bamako, Mali, 6 - 9 December 2009

**OPTIMIZE**

Immunization systems and technologies for tomorrow



# What is Optimize?

## Five-year collaboration

- WHO and PATH
- Funded by The Bill & Melinda Gates Foundation

## Mandate

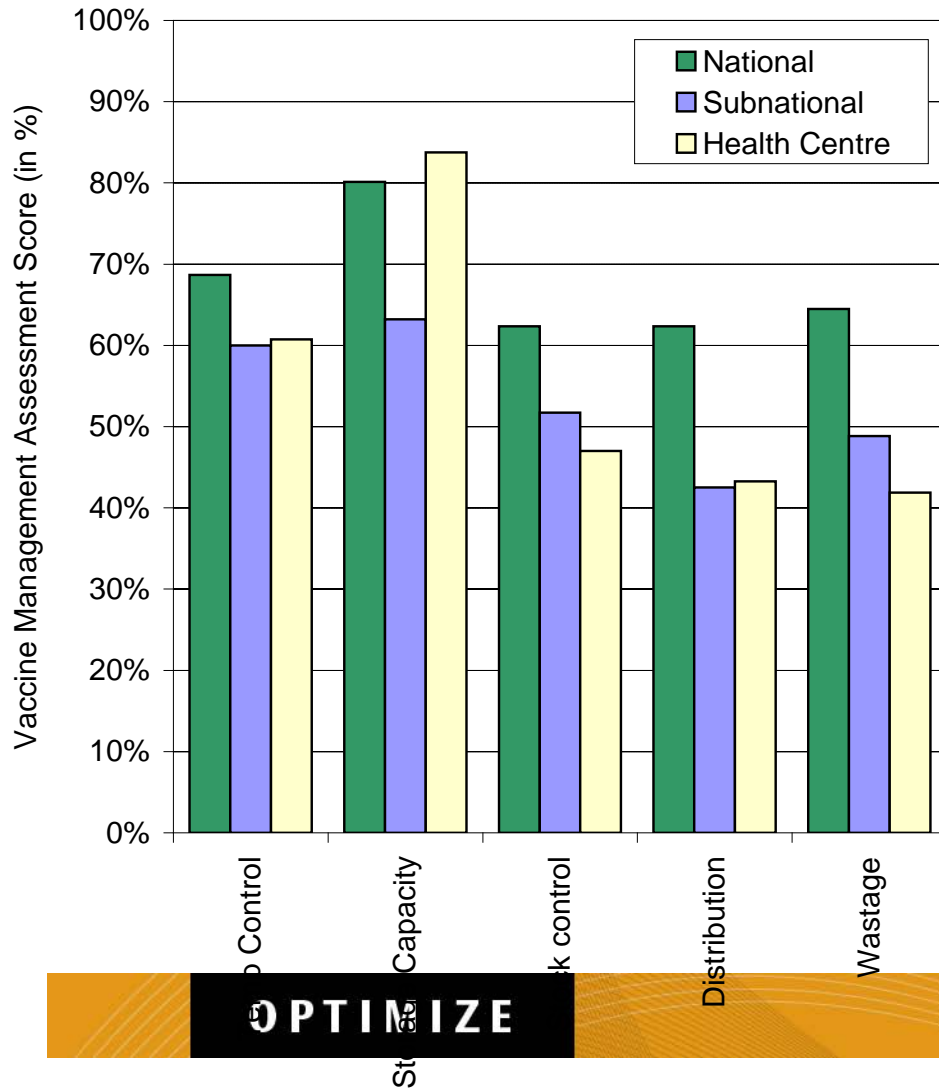
- Think ahead
- Help influence the future of technologies and logistic systems for vaccines in low and middle income countries

## Unique position

- To facilitate exploration of a new era of logistics
- Not constrained by the limitations of today's systems

# Challenge:

## Current vaccine supply chains are weak



### Review of Assessments

- 18 National stores
- 152 Sub-national stores
- 223 Health centers

### Enduring problems

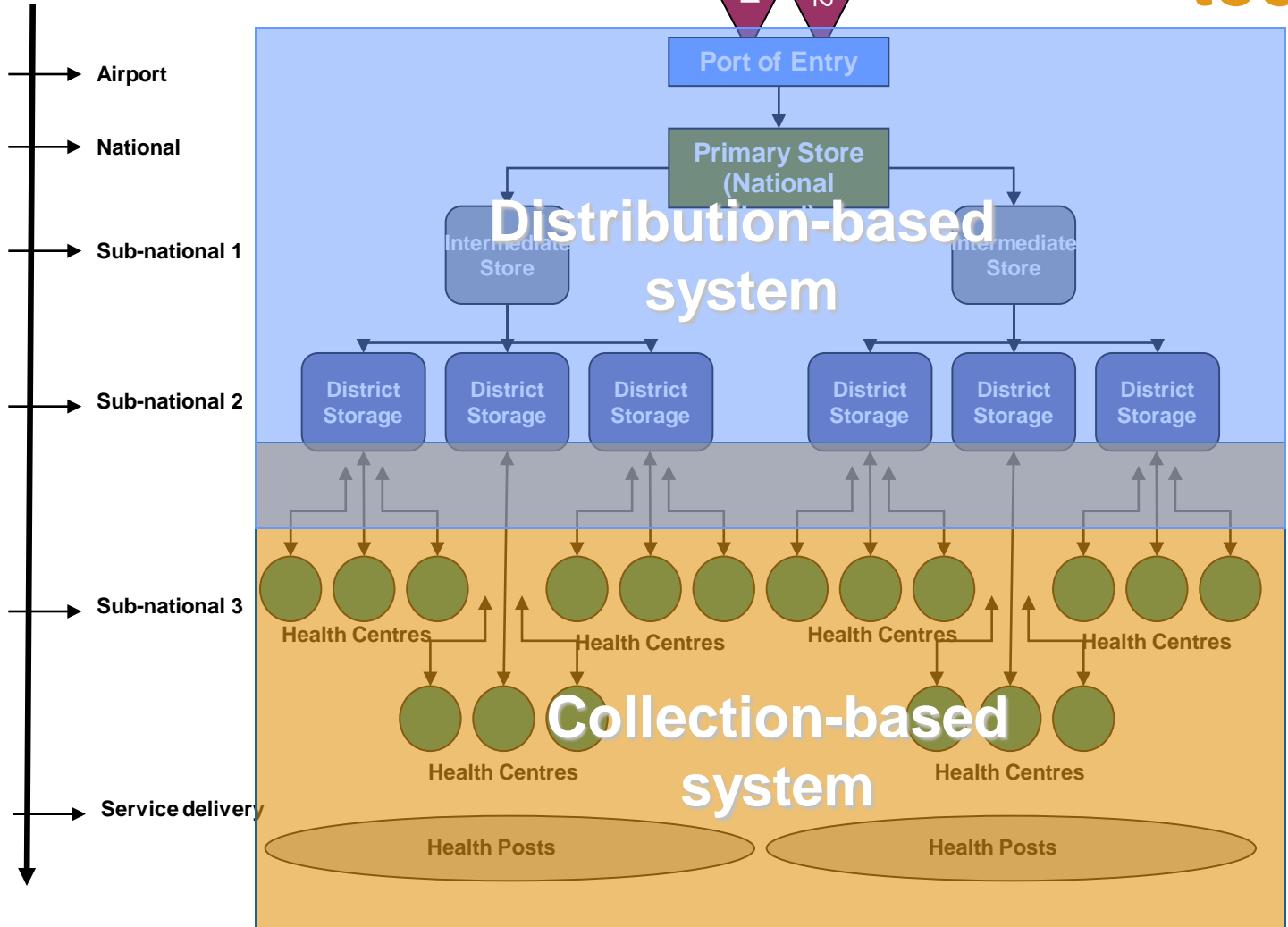
#### National level

- Warehousing
- Distribution
- Temperature
- Stock control
- Wastage

#### Sub-national and health centre level

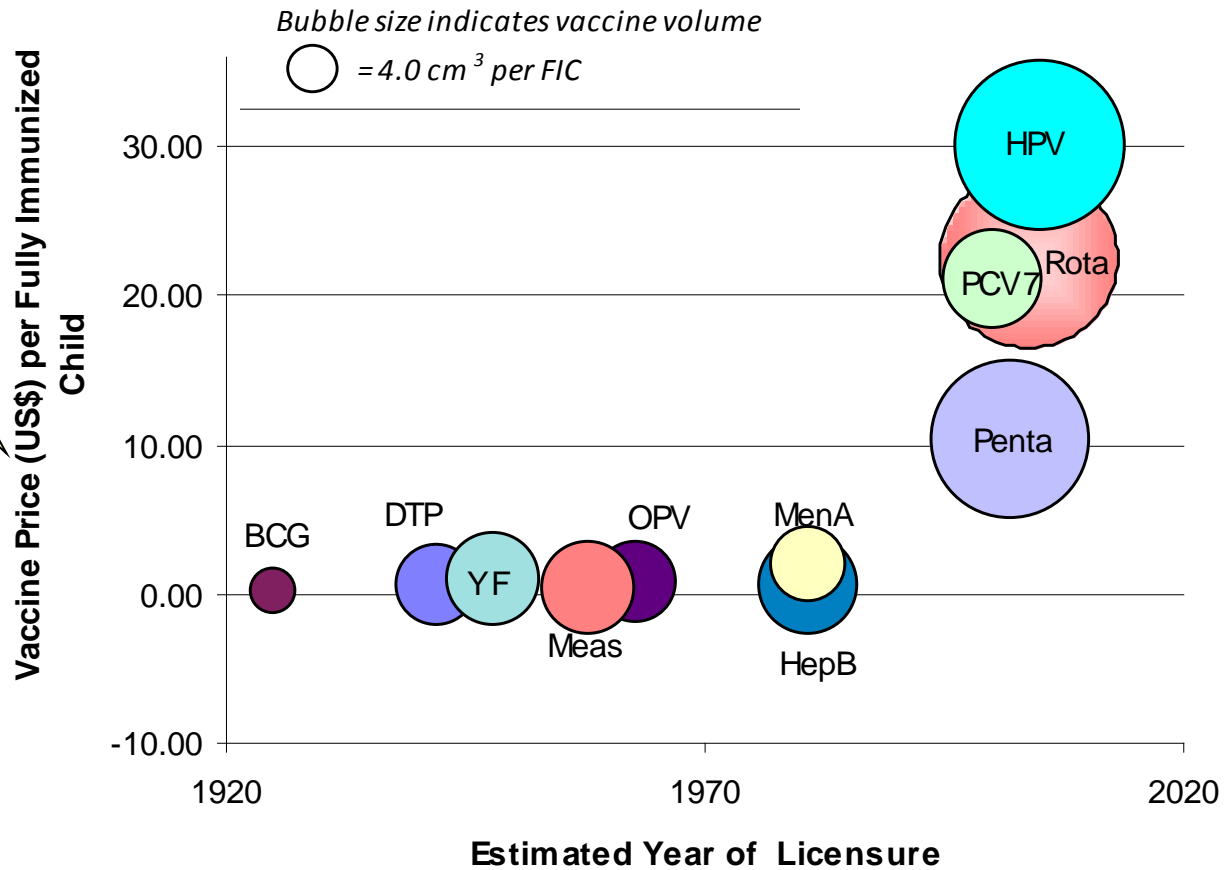
- Problems amplify and ripple down the system

# Challenge: Current Supply Chains are too complex



# Challenge: Stakes are higher

Newer vaccines are bulkier but also more costly



# Challenge: Storage volume requirements are expanding

PCV, Rota, & HPV: 310%

Rapid changes in formats & volumes (e.g., Rotarix)

A: Traditional vaccines

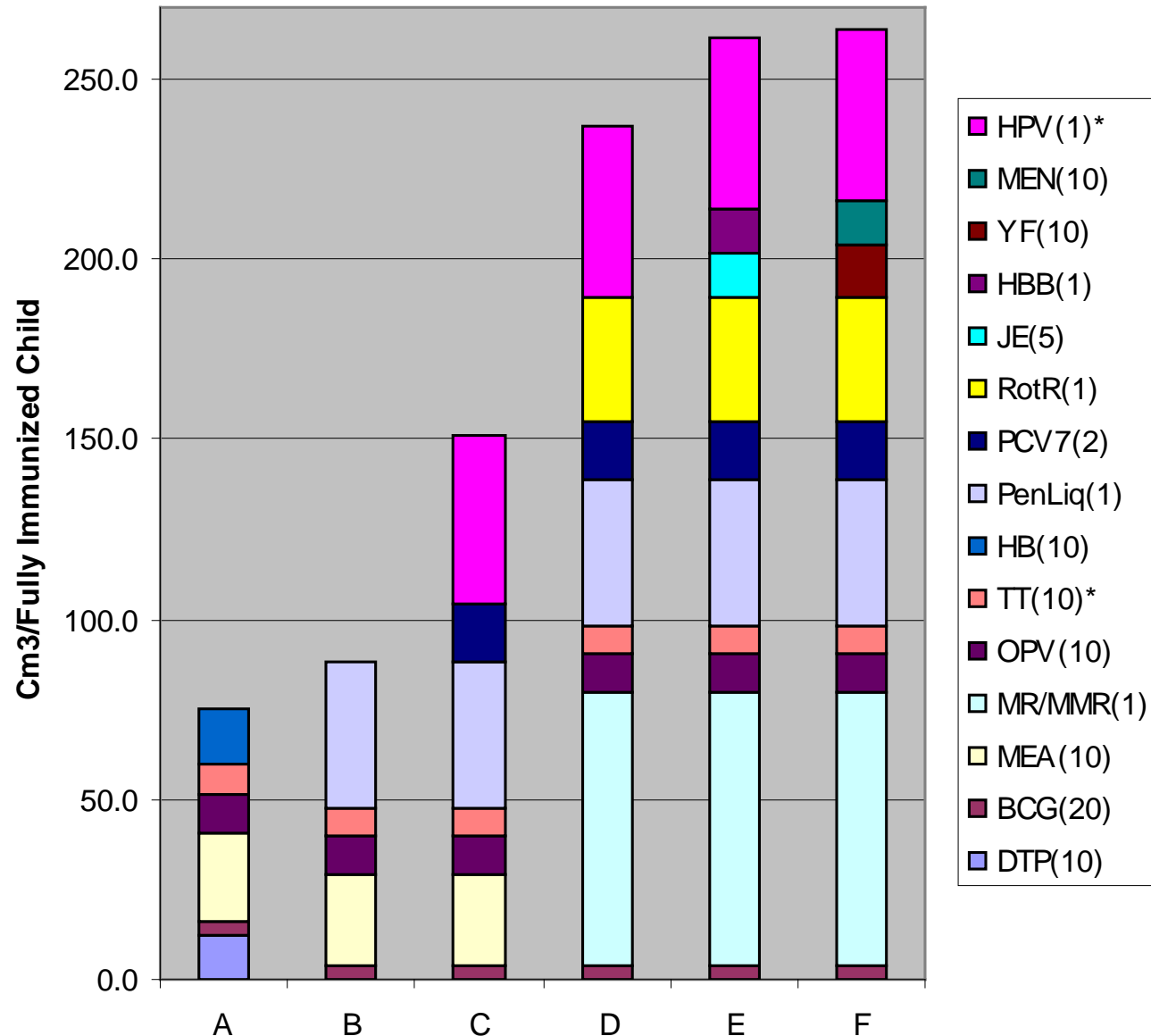
B: A + Hep B + Hib (penta)

C: B + Pneumo + HPV

D: C + MR/MMR + Rota

E: D + JE + Hep B Birth (Asia)

F: D + YF + Men A (Africa)



## Challenge :

# Supply chain expansion is not specific to immunization

### An increasing number of interventions

Expand services to a broader target group

Need to ensure reliable access to quality products

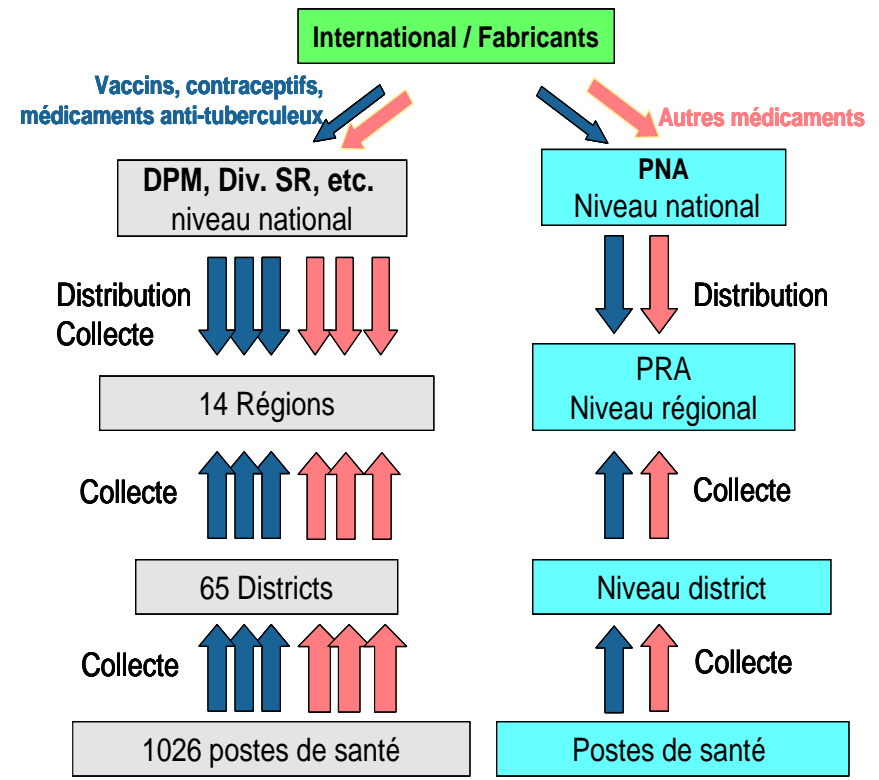
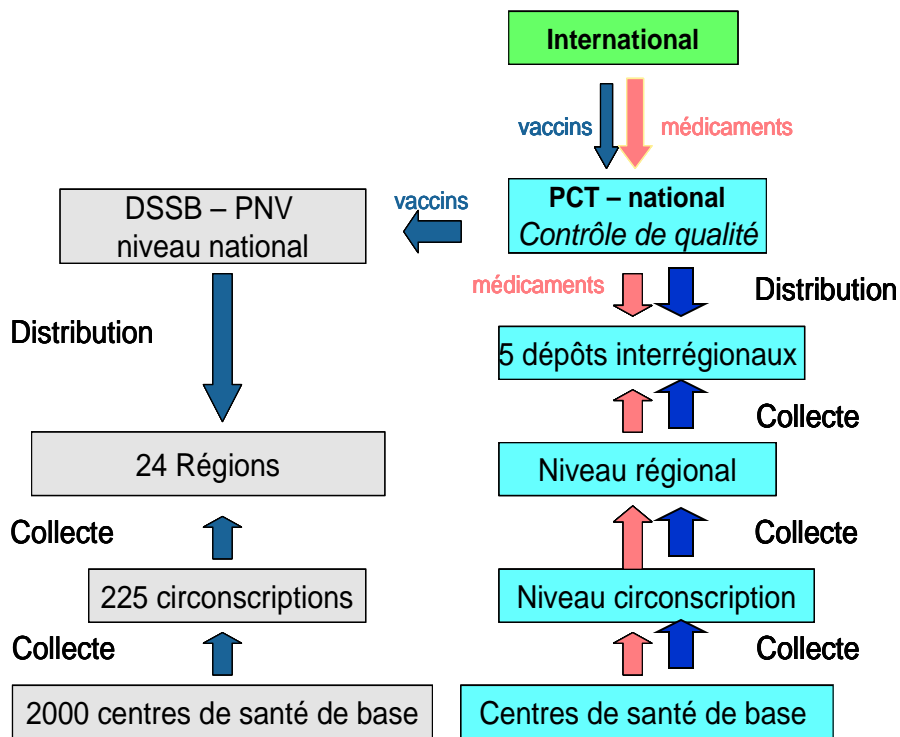
- **HIV/ AIDS**
  - Anti-retro viral, reagents, condoms
- **Malaria**
  - Artemisinin Combination Treatments, bednets
- **Family Planning and human and reproductive health**
  - Oxytocin, Condoms
- **Tuberculosis**
  - TB treatments for DOTS/ DOTS+

# Challenge:

## Multiplicity of supply chains yields in wastage and duplication of efforts

### Tunisia 2009

### Senegal 2009



➡ Cold chain

➡ Ambient temperature chain

# At the crossroads

- The simplicity of the system developed in the 80's has reached its limits ...
- Ad hoc adjustments (adding more fridges, increasing frequency of supplies, etc.) are no longer enough ...
- We need a complete overhaul of the system!



# The 10 Attributes of SCM of the Future

1. Streamlined
2. Information-driven
3. Distribution-based delivery
4. Integrated (all health programs)
5. Adaptable to varying quantities
6. Minimized risk
7. Effective staff and efficient management
8. Maximized coverage - population and area
9. Sustainable
10. Environmentally conscious

# What will Optimize do?

## INNOVATE

- Define ideal product attributes
- Increase dialogue with industry
- Promote of an environment conducive to innovation

**Policies, guidelines and processes in place**

## DEMONSTRATE

- Implement specific interventions with collaborating countries
- Document existing ongoing experiences
- Model potential impact

**Evidence base created and lessons documented**

## FACILITATE

- Engage key partners- within immunization and across public health
- Develop a joint vision for the future
- Implementation strategy in place

**Partners agree on 2025 vision and action plan**

# Two streams of efforts underway

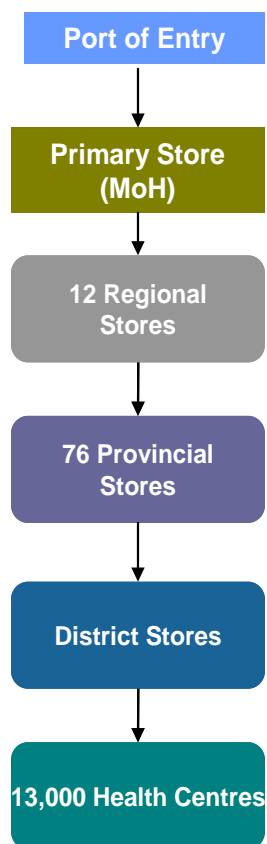
Improve product design

Strengthen supply chains

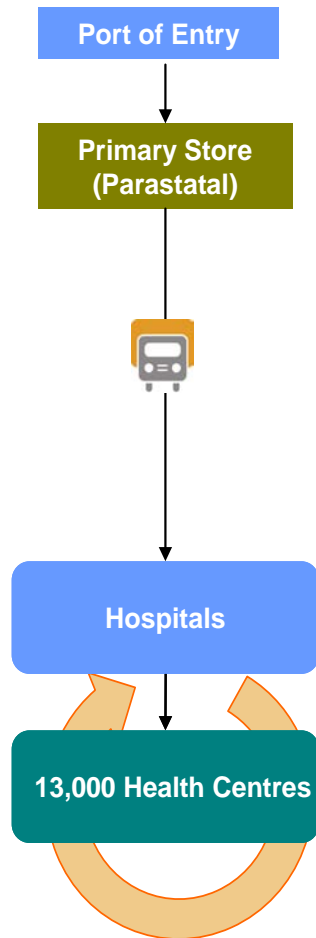
# Systems, Technologies & Practices

# Streamlining the supply chain

## Bus. as usual



## Streamlined



## Rational

- Fewer storage steps: less vaccine in the pipeline
- Intermediate admin levels manage information, not physical stocks: "virtual stores"
- Distribution rather than collection system: more regular supplies

# Supply Chain Modelling

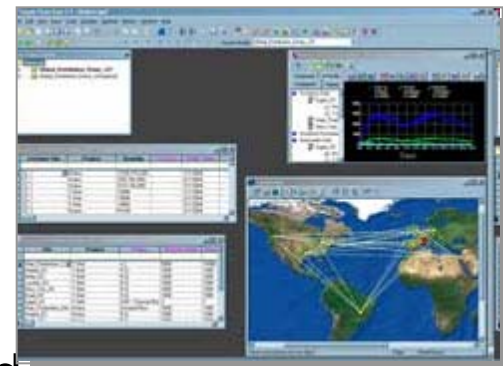
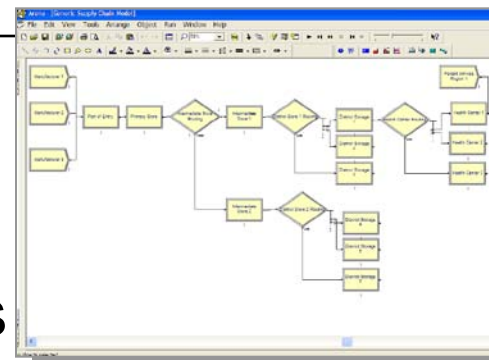
To analyze and optimize vaccine supply chain design and configurations for countries

To simulate cost and impact on the supply chain of:

- Trade-off between storage and distribution
- Optimal frequency of distribution
- New storage and distribution technology options
- Changes in immunization policies (out of the cold chain)

Collaboration between

- WHO, PATH & University of Pittsburgh



# *Energy* and the Cool Chain

## Reduce energy / increase reliability:

- Lower demand through efficiency
- Alternate supply with renewable energy

## Improve service with new product challenges for :

- Passive cooling containers and carriers
- Battery-free solar fridges
- Lifetime batteries for solar power systems

# Increased Storage **Volumes** in the Cool **Chain**

## Support Product Changes

- Larger cold rooms
- Larger intermediate shipping containers

## Explore Logistic Changes

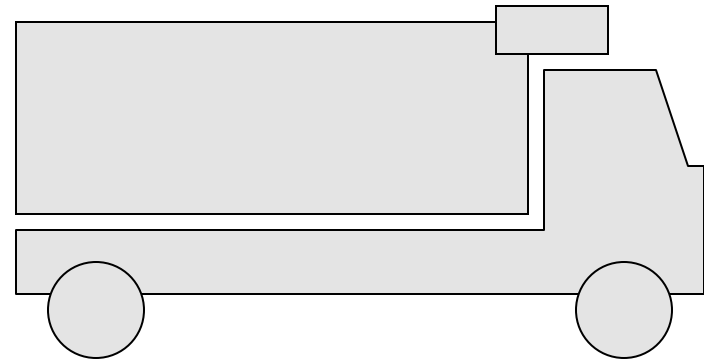
- Alternate transportation options
- Alternate storage temperature options

# Transport

***Cold box volumes often too small***

***Switch to:***

- Rolling passive containers
- Refrigerated container trucks



# Peripheral levels

**More fridge volume needed.**

**No electricity, or poor electricity reliability**

**Challenges with existing technology:**

- Gas/kerosene devices
- Solar power

**PATH/WHO "Challenge" generated 5 proposals from private solar companies ...**




# Information & Communication Technologies: Traceability in national vaccine supply chains

## Bar codes

- In use since the 1940s but have data capacity - size limitations



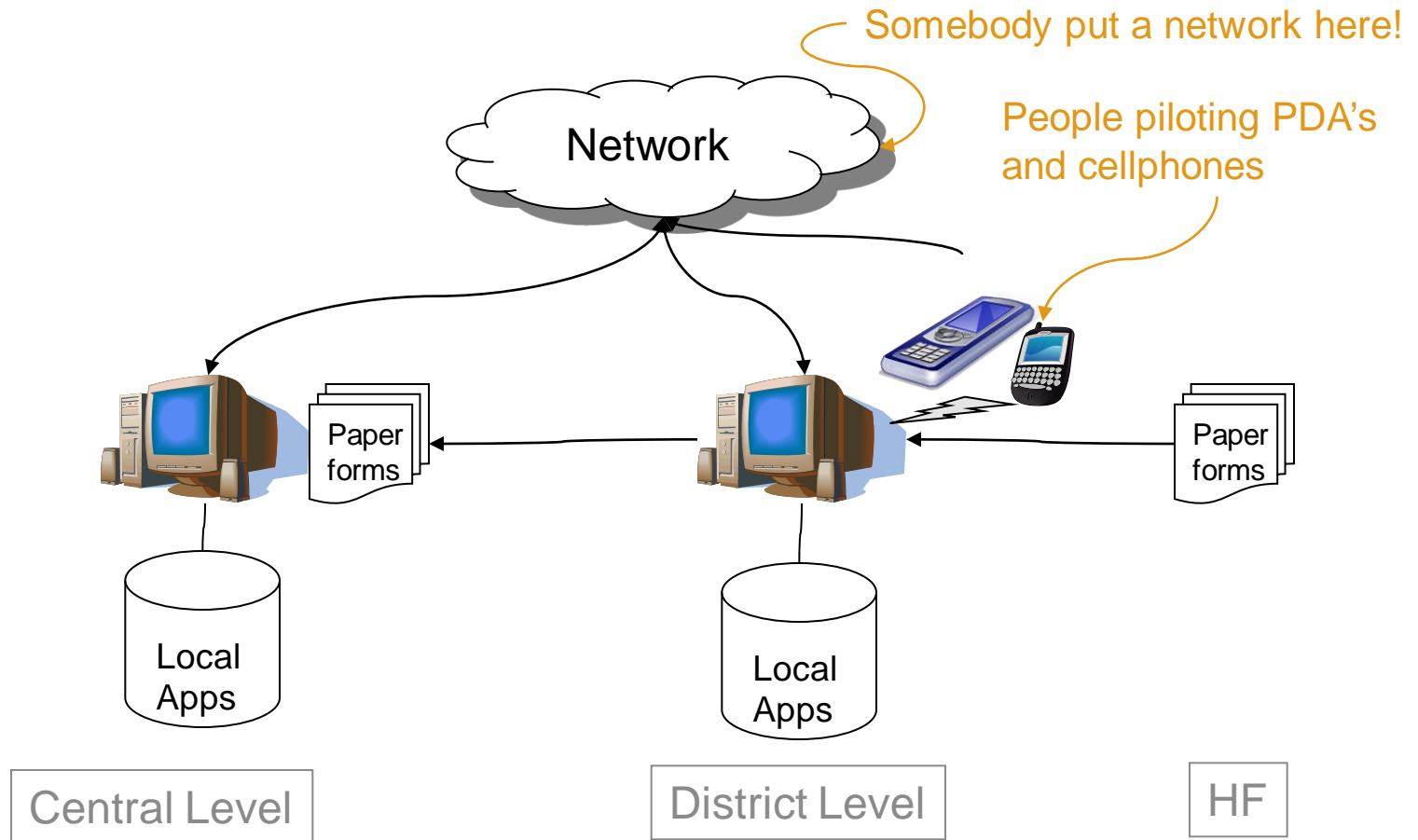
## Datamatrixes

- Larger data capacity
- Can be small Very small   
- Small size limited by the sensitivity of the reading instrument
- Patent expired 2007

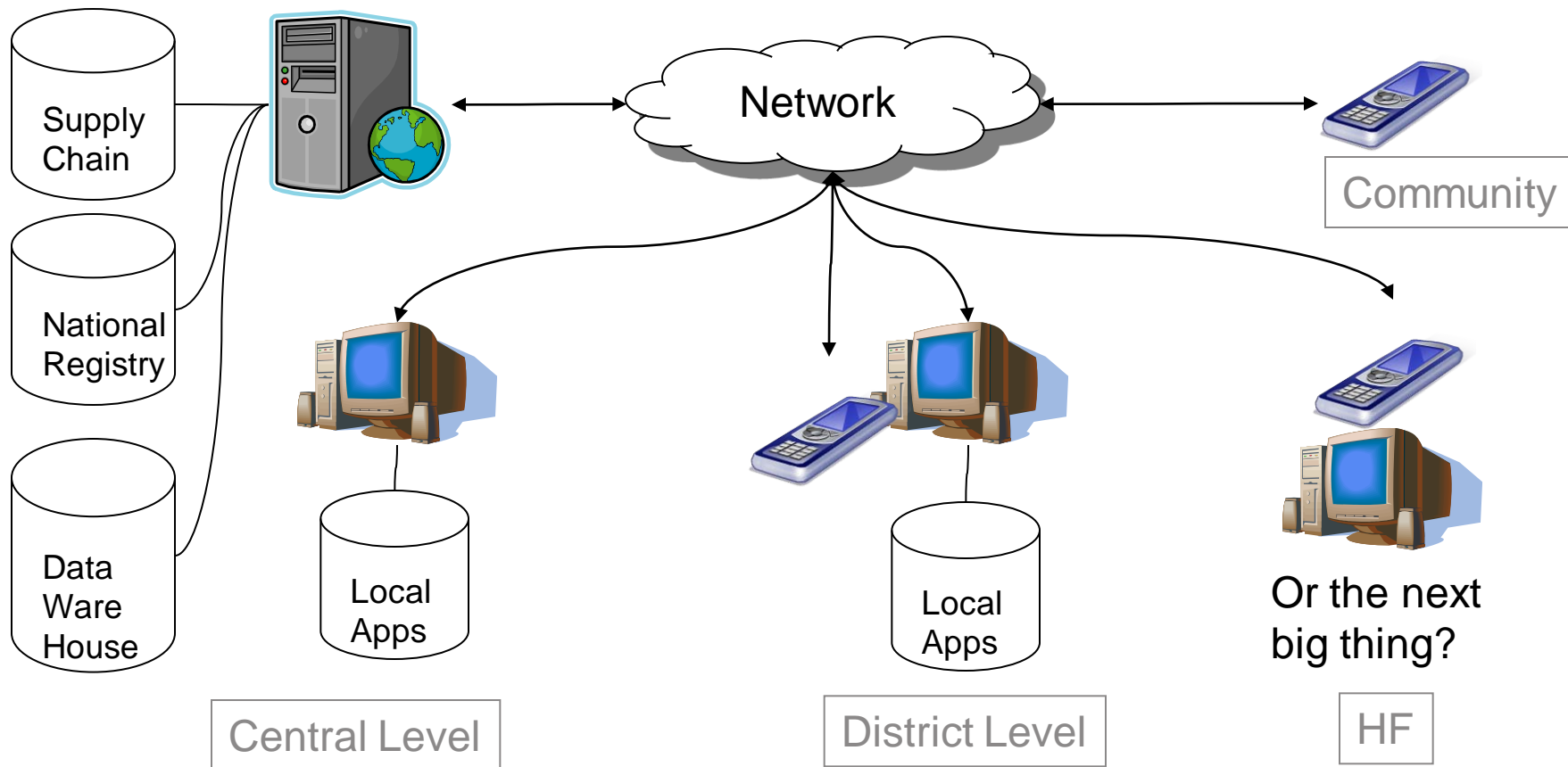


## Collaboration with Oracle and MIT-Zaragoza

# Information & Communication Technologies: Today



# Information & Communication Technologies: Tomorrow?



# *Demonstration projects in collaboration countries*

# Work Underway in Four Countries

Possible collaboration with other countries on more focused areas of operational research

Albania

Tunisia

Guatemala

Nicaragua

Senegal

Thailand

Vietnam

South Africa

## Specific interventions

| COUNTRY | MAIN ACTIVITY                                 | ADDITIONAL ACTIVITIES          |  |
|---------|---|--------------------------------|--|
| Albania | Information Systems (Immunization registries) | Temperature monitoring systems | Vaccine distribution and storage cost-benefit modelling      |
| Vietnam | Commune level storage solutions               | Logistics information systems  | Role and performance of private sector immunization services |
| Senegal | Integration of supply chains                  | Moving warehouses              | Maintenance  |
| Tunisia | Integration of supply chains                  | Streamlining                   | Cold chain technologies/<br>Solar solutions                  |

## Documenting ongoing experiences

| Main focus  | Country                  |
|---|--------------------------|
| Controlled ambient temperature use of OPV                     | Mali                     |
| Streamlining and outsourcing the supply chain                 | Thailand                 |
| Feedback on presentation and packaging of future HPV vaccines | Vietnam                  |
| Cost of the VillageReach moving warehouse concept             | Mozambique               |
| Lessons learned from the use of VVMs                          | All WHO regions          |
| Integration of supply chains                                  | East and Southern Africa |
| Outsourcing   | South Africa             |

# *Conclusion*

## Reminder:

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# Merci! Thank you!



For more information:

[www.technet21.org](http://www.technet21.org) | [www.path.org](http://www.path.org) | [www.who.int](http://www.who.int)