We share deep sadness with Nepal.

‘Peace at Home, Peace in the World’
K. Atatürk

PUBLIC HEALTH INSTITUTE OF TURKEY
DEPARTMENT OF VACCINE PREVENTABLE DISEASES
Vaccine Logistics Unit

Tarkan M. Yamanoglu, MD, PhD
COUNTRY OVERVIEW

- Turkey is located between Asia and Europa
  - Mainly in western Asia and comparably small area in Southeastern Europa
- Capital city **Ankara**
- Population **77,695,904**
- 783,562 km² area
- **Climate and infrastructures are variable.**
  - Four different climates have their own effect on the locations. Turkey's diverse regions have different climates, with the weather system on the coasts contrasting with that prevailing in the interior. The Aegean and Mediterranean coasts have cool, rainy winters and hot, moderately dry summers. Average temperature is between 10 to 17 °C. Eastern areas are generally in snow for 120 days with an average of 1 °C, and some villages can be isolated during snow storms.
  - There are 313,151 kilometers of paved roadways in Turkey, including 2,010 km of expressways.
  - Mostly perfect internet infrastructure with different options (cable, fiber, ADSL, GSM and 3G).
  - Nearly generators or UPSs are used for electricity back-up at vaccine stored locations
# Immunization schedule & target diseases

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Antigens</th>
<th>Antigens</th>
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<tbody>
<tr>
<td>1995</td>
<td>6 antigens</td>
<td>BCG, Diphtheria, Pertussis, Tetanus, Measles, Polio (Oral)</td>
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<td>2002</td>
<td>7 antigens</td>
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<td>2010</td>
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</tr>
</tbody>
</table>

Turkey MoH investment in vaccines

1.3 Million cohort/year

50 Million doses/year
(Vaccine and Antisera)

One dose package
Except BCG and OPV

Immunization Programmes
Childhood
Adult
Pregnant
Risky Groups
Immunization supply chain

Central vaccine store → Province Public Health Directorate → District Public Health Center → Service delivery sites

1 month → 950
1 month → 22000
3 months → 81

# of trucks: 9
# of transfer vehicle: 114
Why temperature monitoring is important?

Expanding volume – Due to one package doses

Some expensive vaccines in immunization programme

No VVM usage, except OPV

Both heat and freeze sensitive vaccines are stored together

Rigid alarm cut-off temperatures, +2 to +8 0C

Mostly domestic refrigerators used

Cold storage boxes have WHO spect but not registered yet (2015)

Mostly less knowledgeable labors about cold-chain, after family medicine practice (jumping a better level with time)
Integrated Health Information System

- Family Medicine / Hospital Information Systems (AHBS, HBS)
- E-NABIZ (Health Net-2)
- SAĞLIK NET-2 (Health Net-2)
- Vaccine Tracing System (ATS)
- Decision Support System (KDS)
- Temperature Control
- Stock Control
- Management
- Personal Users
PROJECT HISTORY

- Project for a 5 year contract. 3 contracted services
  - Installation temp hardware
  - Training 2 level users
  - Inventory
  - Installation and Maintenance of the Temperature Tracking Equipment (Telemetry System) which is spread to all parts of the country
  - Development and Upgrades of the Customized Software and Applications.
  - Developing and Training of the Call Center.

- 2010 project idea born
- 2011 QR code implantation
- 2012 first trial system (asi-net)
- 2013 second trial
- 2014 installation
- 2015 additioal installations
ATS OVERVIEW
(VTS-Vaccine Tracing System)
• ATS (Vaccine Tracing System)
• Tested for 50,000 telemetry devices
• Tested for concurrent access and processing for 20,000 users
• Minimum 8 hours without electricity
• Offline temperature recording, Min 10 days
• Audible Alarm
• SMS and e-mail capability
• 7/24 Live Call Center (for alarm and technical assistance)
• Maximum on site support available in 8 hours
• QR-Code based
  • Inventory tracing (in stores, locations and vehicle)
  • Child pairing
  • Able to stop usage by warning the clinician in case of;
    • suspicious temperature exposure or wait for confirmation
    • expire date (ranking the usage and transfer by exp date)
    • MoH hesitation, with LOT
ATS – Temperature View
Three zoom levels

- Normal
- Suspicious case
- Not allowed - waiting for upper level confirmation
## ATS – INVENTORY TRACKING

### Stok Listesi

<table>
<thead>
<tr>
<th>Seri No</th>
<th>Parti No</th>
<th>Ürün</th>
<th>Taşıma Birimi Tipi</th>
<th>Doz</th>
<th>Birim</th>
<th>Stok Birimi</th>
<th>Durum</th>
<th>Son Kullanma Tarihi</th>
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</table>

Toplam Doz: 662969, 13827
CALL CENTER

→ 7/24 functioning
→ Alarms sent to call center system
→ Risk assessment – process (Written procedures under development),
→ Risk management: Direct advise & Additional expertise involved
→ response time 10 minutes “monitoring system-software module”
→ Multi level notification

SYSTEM MANAGEMENT

咣 Administers, consultants and engineers gather at least once a week

咣 Discuss user habits, critics and suggestions, forthcoming issues
咣 Analysis the system by the automated reports
咣 Check the progress of the project
咣 Feedbacks from users and call center
咣 Refine the system
咣 Define time table for next levels
咣 Brain storm of new options
INCENTIVES

• Evidence based assured vaccine quality
• Linkage vaccine information to child

• Linkage immunization information to Health-Net
• Preventive alert system- Flagging-documenting cold chain performance

• Reduce wastage
• Easy inventory and temperature monitoring

• Determine some topics to work on;
  • Optimization of logistics
  • Reducing costs
  • Feedback based optimization
  • Simulation modules;
    disaster, outbreak, new vaccine implementation
MAIN IMPACTS

• Awareness of importance about cold chain
• Vaccine store improvements
• Importance of SOPs (Standart Operating Procedures)
• Enhanced stock management
  (expiration date based transportation & usage)
• Fixing & repairing vaccine stores/refrigerators
• Prevention of long term temperature tracking device alarms
• Decision making algorithm
• Need of mathematical Modelling
LESSONS LEARNED

• Interaction with 3rd party software developers
• Syncronisation and optimisation amongs Information Systems
• Consideriation of power loss
• Planning – Time table based
• Training of end users
• Monitor-feedback of the system and users
• Colloboration of the teams (managers, end-users, contractor)

Project faith

It is not easy