



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, PhD¹



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

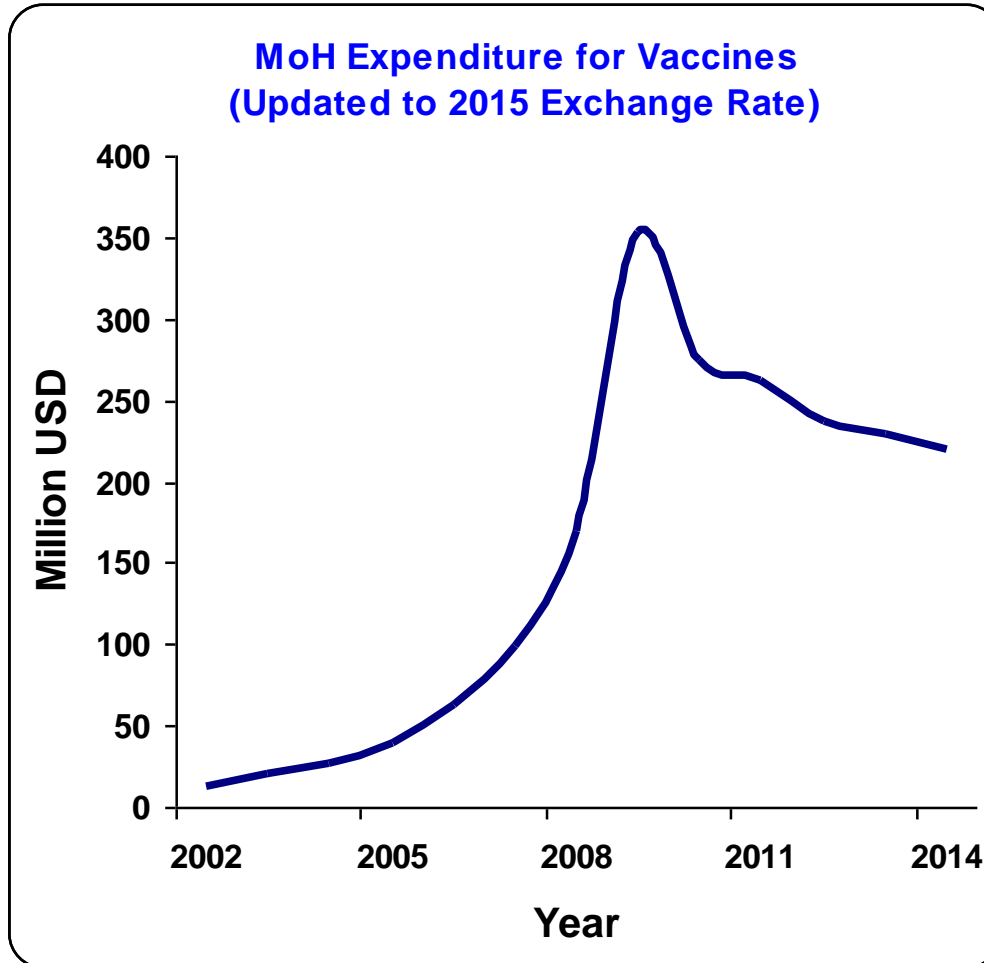


Immunization schedule & target diseases

1995	2002	2010	2012
(6 antigens)	(7 antigens)	(11 antigens)	(13 antigens)
BCG	BCG	BCG	BCG
Diphtheria	Diphtheria	Diphtheria	Diphtheria
Pertussis	Pertussis	Pertussis (acel.)	Pertussis (acel.)
Tetanus	Tetanus	Tetanus	Tetanus
Measles	Measles	Measles	Measles
Polio (Oral)	Polio (Oral)	Polio (Oral)	Polio (Oral)
	Hepatitis B	Polio (Inactiv)	Polio (Inactiv)
		Hepatitis B	Hepatitis B
		Hib	Hib
		Rubella	Rubella
		Mumps,	Mumps,
		PCV	PCV
			Hepatitis A
			Varicella



Turkey MoH investment in vaccines



1.3 Million cohort/year

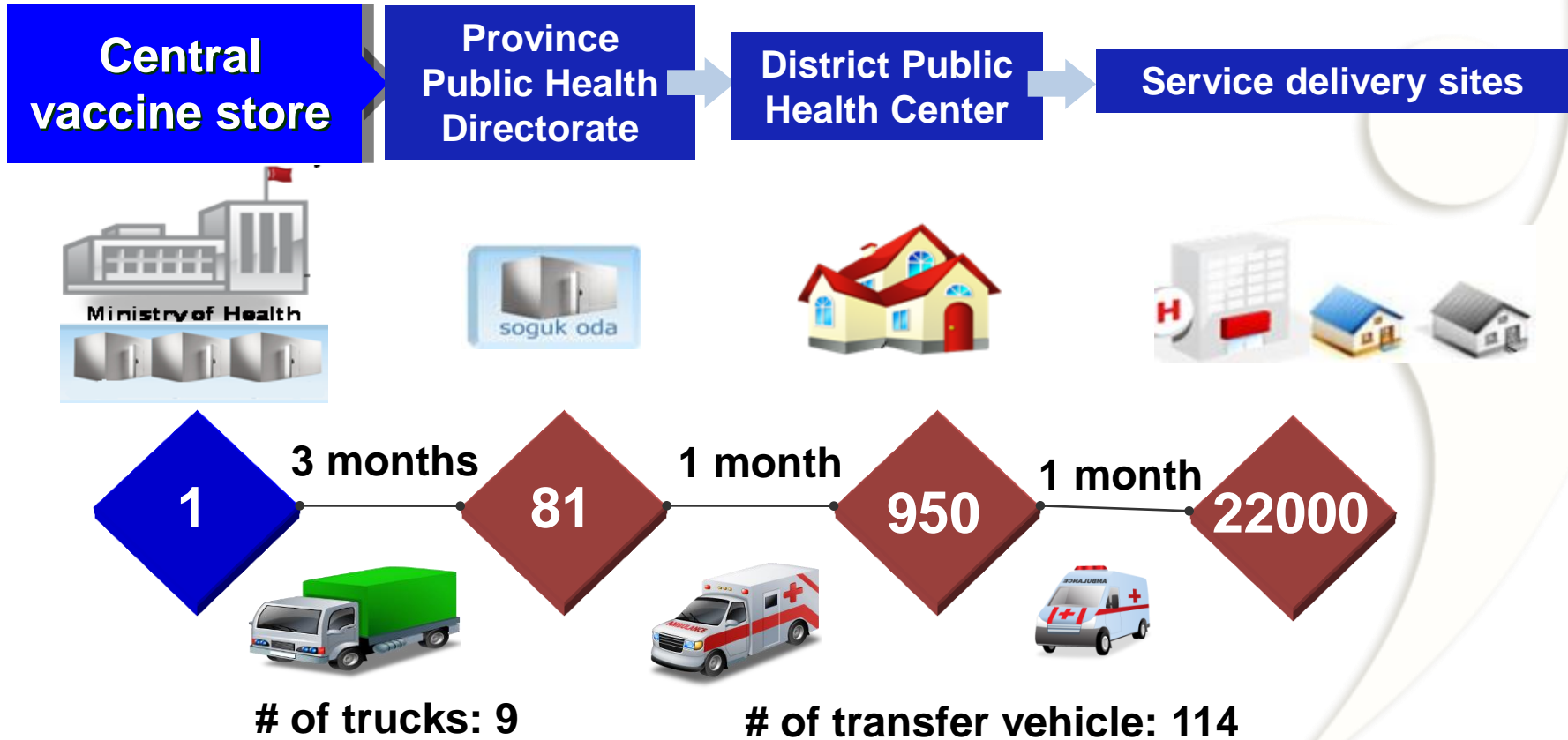
50 Million doses/year
(Vaccine and Antisera)

One dose package
Except BCG and OPV

Immunization Programmes
Childhood
Adult
Pregnant
Risky Groups



Immunization supply chain





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 °C

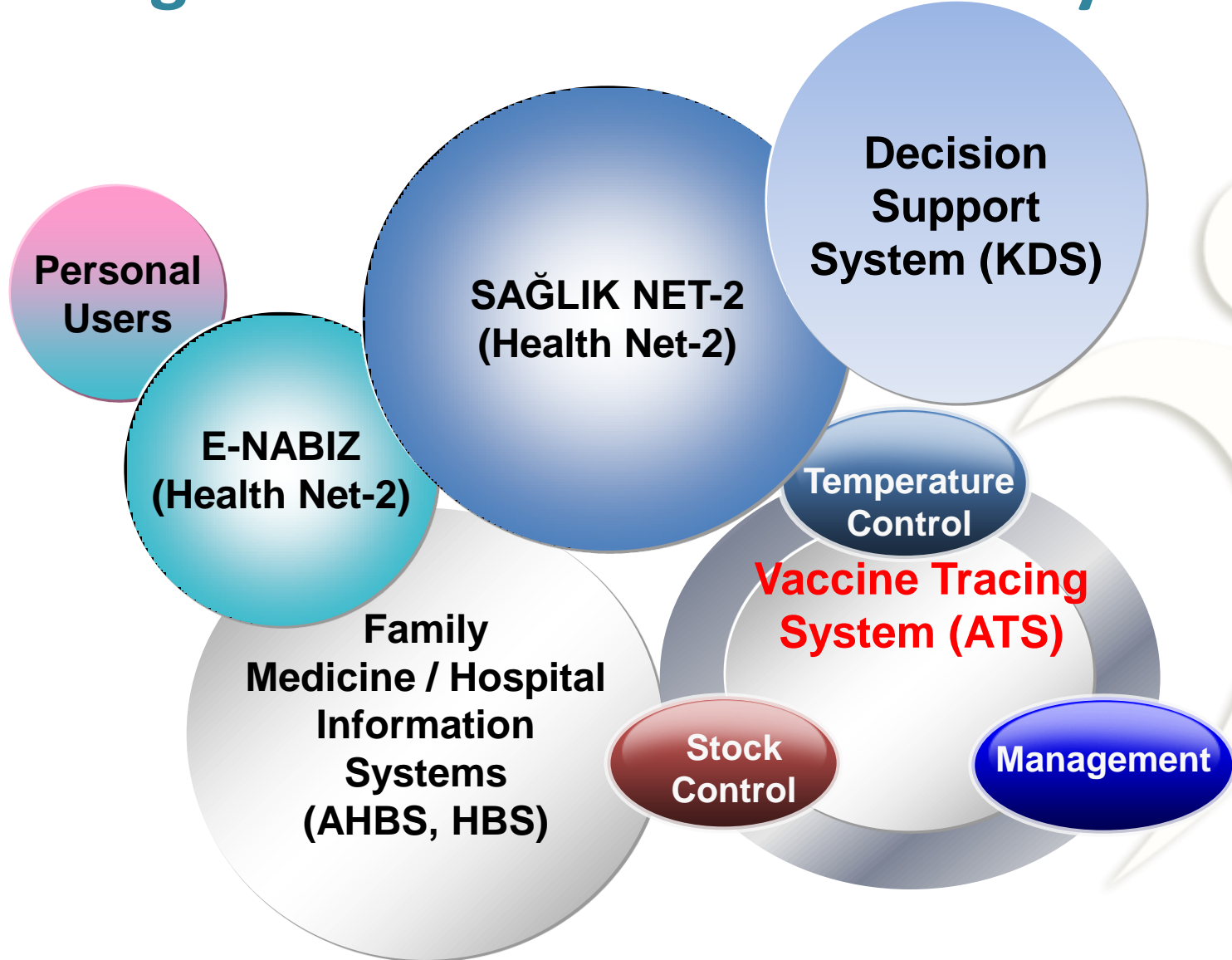
Mostly **domestic refrigerators** used

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



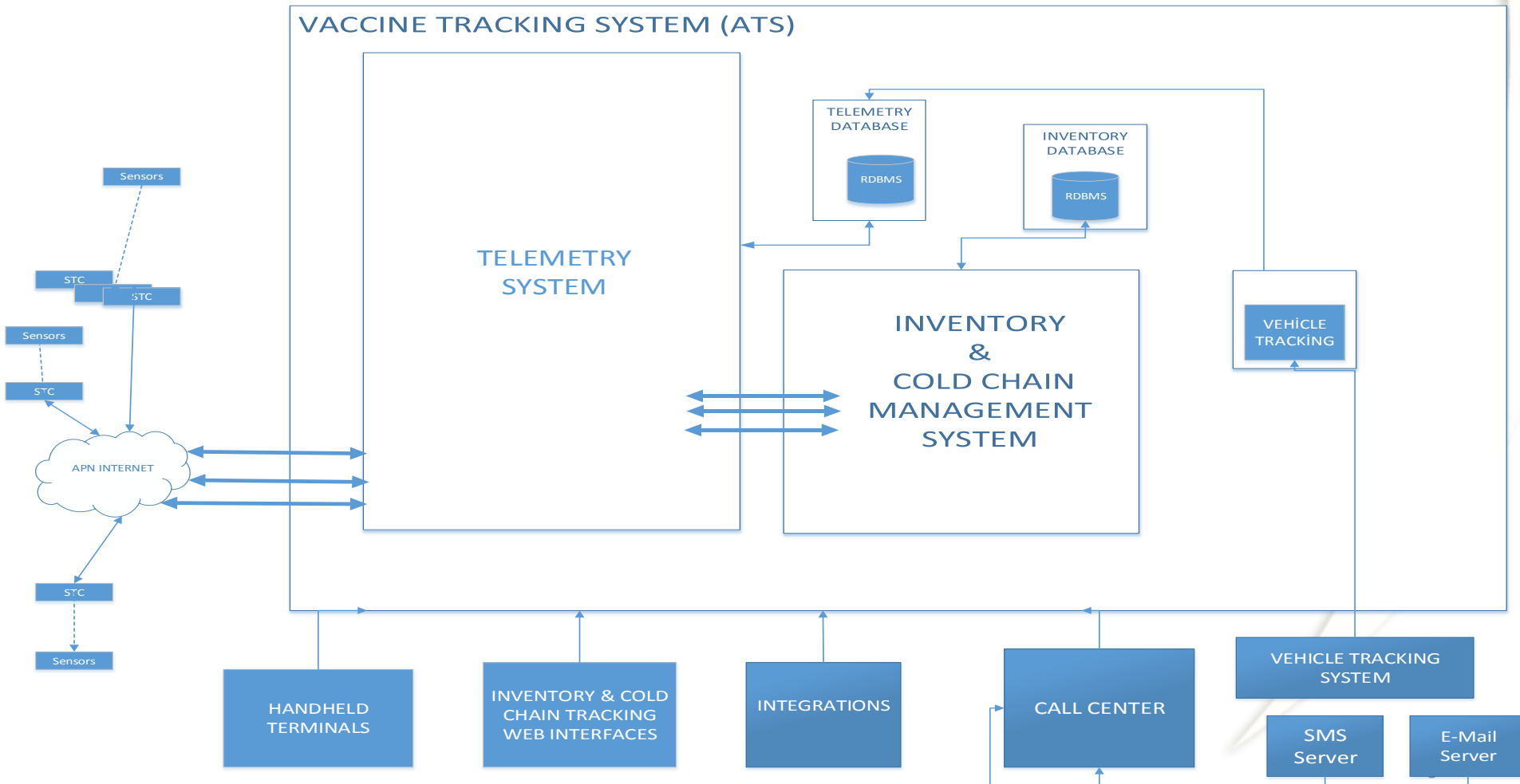


PROJECT HISTORY

- 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 implamentation
- 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**



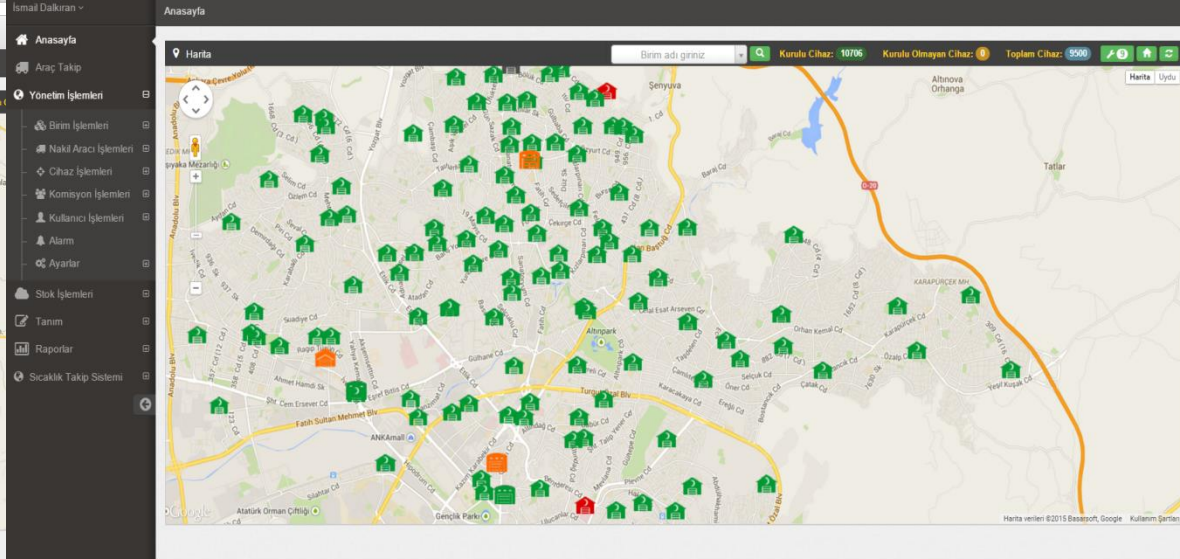
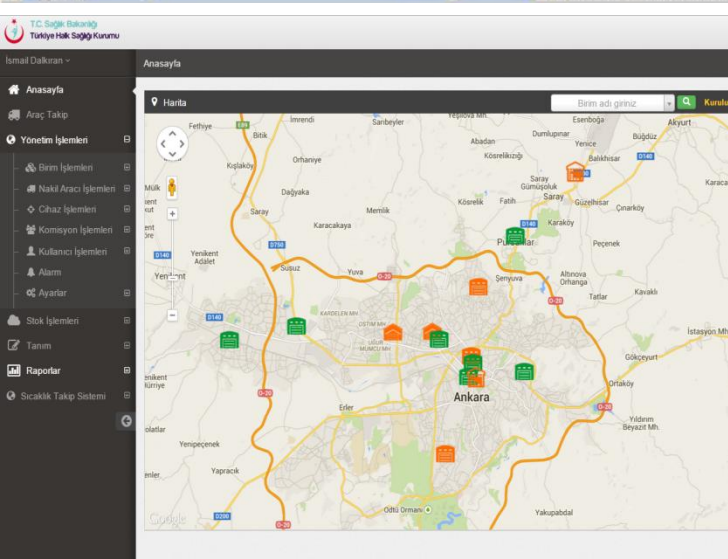
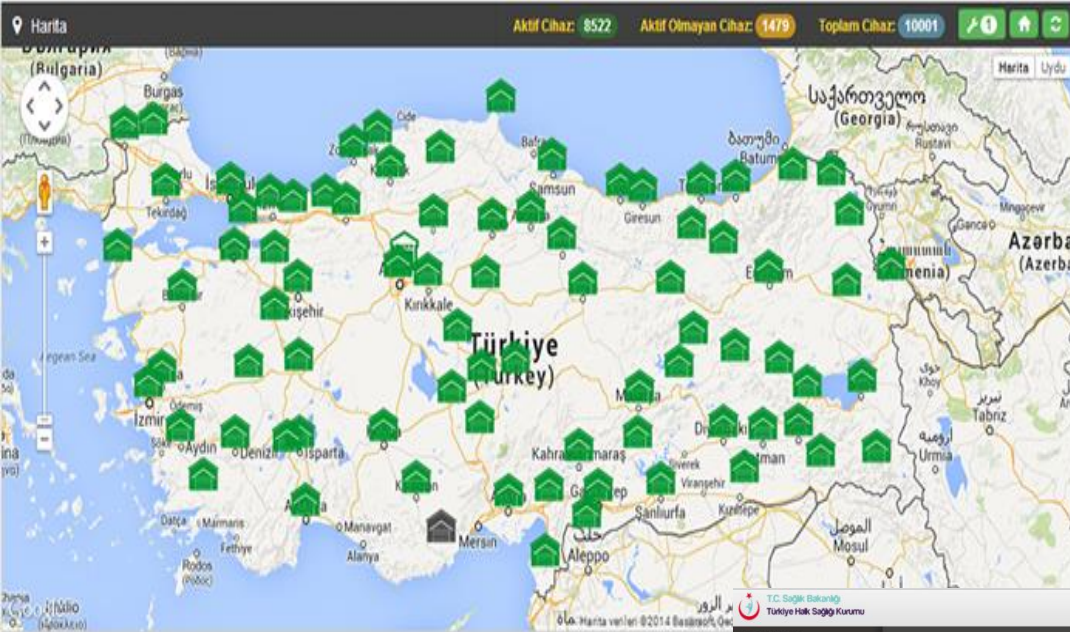
ATS – Temperature View Three zoom levels

Normal

Suspicious case

Not allowed-

waiting for upper level confirmation





ATS – Temperature View Listing Graphing Exporting - Printing

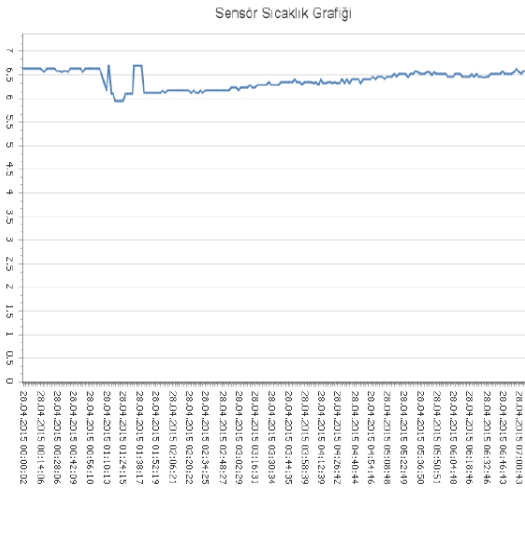
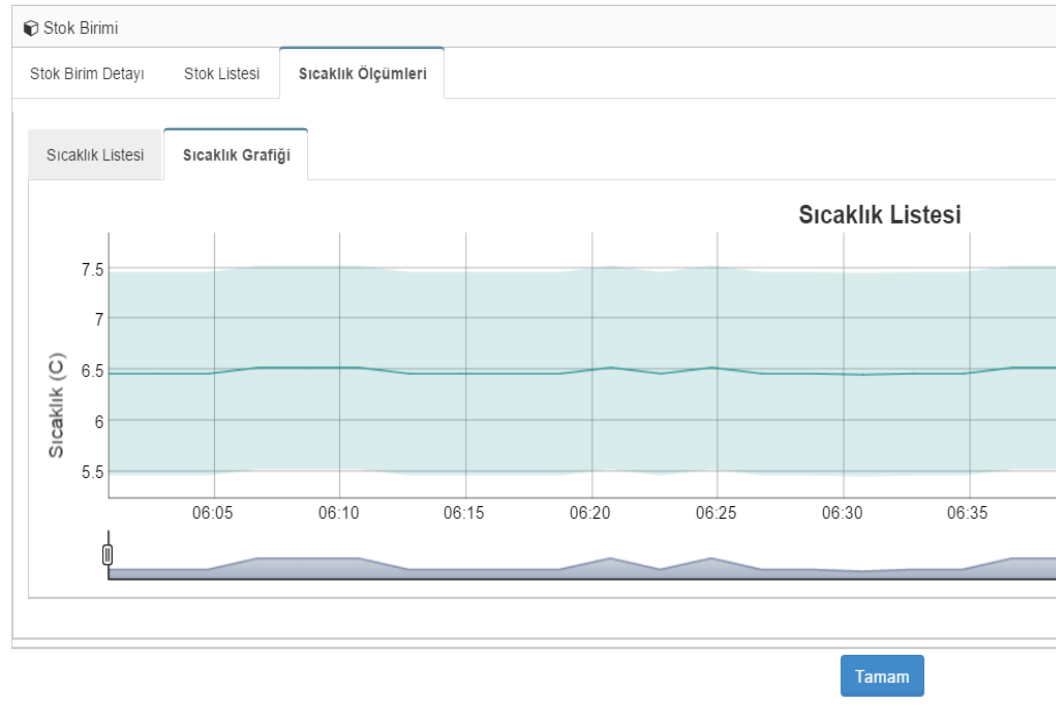
Stok Birimi

Stok Birim Detayı Stok Listesi Sıcaklık Ölçümleri

Sıcaklık Listesi Sıcaklık Grafiği

Sıcaklık Ölçüm Listesi 2015/04/28 06:00 2015/04/28 07:06

Sıcaklık	Ölçüm Zamanı	Sensör ID
6.58	28.04.2015 07:04:42	5014
6.52	28.04.2015 07:02:42	5014
6.57	28.04.2015 07:00:43	5014
6.63	28.04.2015 06:58:43	5014
6.57	28.04.2015 06:56:43	5014
6.62	28.04.2015 06:54:44	5014
6.52	28.04.2015 06:52:42	5014
6.52	28.04.2015 06:50:43	5014
6.52	28.04.2015 06:48:43	5014
6.58	28.04.2015 06:46:43	5014



Birim THSK
Depo Merkez Aşır Aritennum ve İlaç Deposu
Stok Birimi S-5260 (20 Nönl Depo)
Başlangıç Tarihi 28.04.2015 00:00
Bitiş Tarihi 28.04.2015 07:12



ATS – INVENTORY TRACKING

T.C. Sağlık Bakanlığı
Türkiye Halk Sağlığı Kurumu

İsmail Dalkıran v Stok İşlemleri / Stok

Q Arama

Ürün: Seçiniz Birim: THSK

Durum: Seçiniz Taşınmaz Depo: Merkez Aşı Antiserum ve İlaç Deposu

Son Kullanma Tarihi: Seçiniz Son Kullanma Tarihini Seçiniz

Parti No: Parti No Giriniz

Stok Birimi: S-5276 - (13 Nolu Depo)

Taşıma Birimi Tipi: Seçiniz

Listele

Stok Listesi

Seri No	Parti No	Ürün	Taşıma Birimi Tipi	Doz	Birim	Stok Birimi	Durum	Son Kullanma Tarihi	İşlem
UPLT10000069Y2	411001	PREVENAR 13 0,5 ml	Palet	2880	THSK	S-5276	✓	31/10/2017 23:59:59	İşlem
UPLT10000072Y2	411001	PREVENAR 13 0,5 ml	Palet	2880	THSK	S-5276	✓	31/10/2017 23:59:59	İşlem
UPLT10000077Y2	411001	PREVENAR 13 0,5 ml	Palet	2880	THSK	S-5276	✓	31/10/2017 23:59:59	İşlem
UPLT10000078Y2	411001	PREVENAR 13 0,5 ml	Palet	2880	THSK	S-5276	✓	31/10/2017 23:59:59	İşlem
UPLT10000079Y2	411001	PREVENAR 13 0,5 ml	Palet	2880	THSK	S-5276	✓	31/10/2017 23:59:59	İşlem
UPLT10000080Y2	411001	PREVENAR 13 0,5 ml	Palet	2880	THSK	S-5276	✓	31/10/2017 23:59:59	İşlem
UPLT10000081Y2	411001	PREVENAR 13 0,5 ml	Palet	2880	THSK	S-5276	✓	31/10/2017 23:59:59	İşlem

Toplam Doz : 662969 13827

100 / 139

Aşı Takip Sistemi © 2015

Birim : THSK | Depo : Merkez Aşı Antiserum ve İlaç Deposu



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

- ☉ Administrators, consultants and engineers gather at least once a week
- ☉ Discuss user habits, critics and suggestions, forthcoming issues
- ☉ Analysis the system by the automated reports
- ☉ Check the progress of the project
- ☉ Feedbacks from users and call center
- ☉ Refine the system
- ☉ Define time table for next levels
- ☉ 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 (Standard 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
- Synchronisation 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