

# Vendor Neutral Archiving as an Enabler for eHealth

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# What is eHealth?

- Health services and health information accessed via ICT
  - connecting remote patients
  - interconnecting health professionals to each other and to their patients
  - sharing patient data and patient related tasks (shared workflow) in a network
- eHealth is always *cross-organizational*

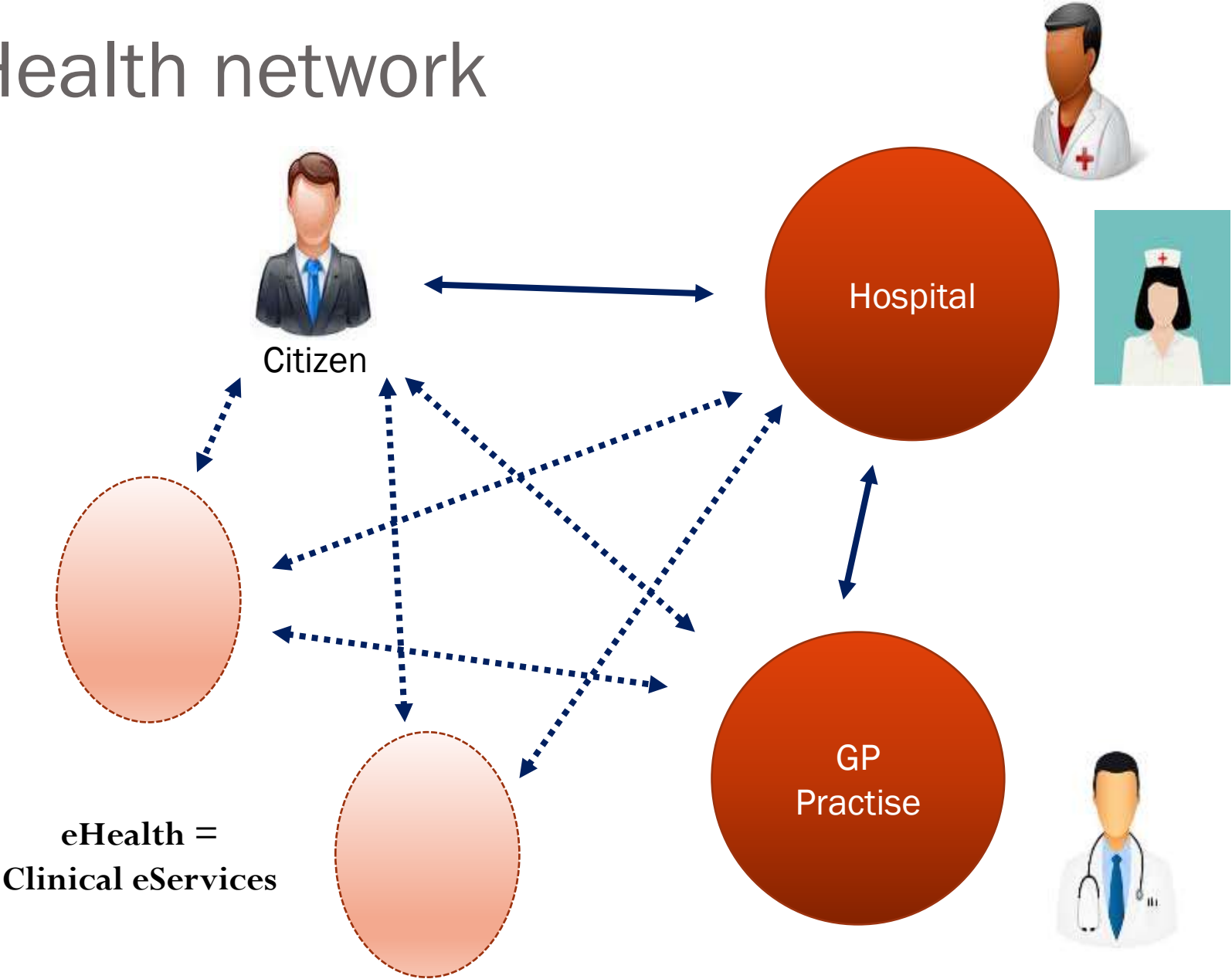
# What is vendor neutral archiving (VNA)?

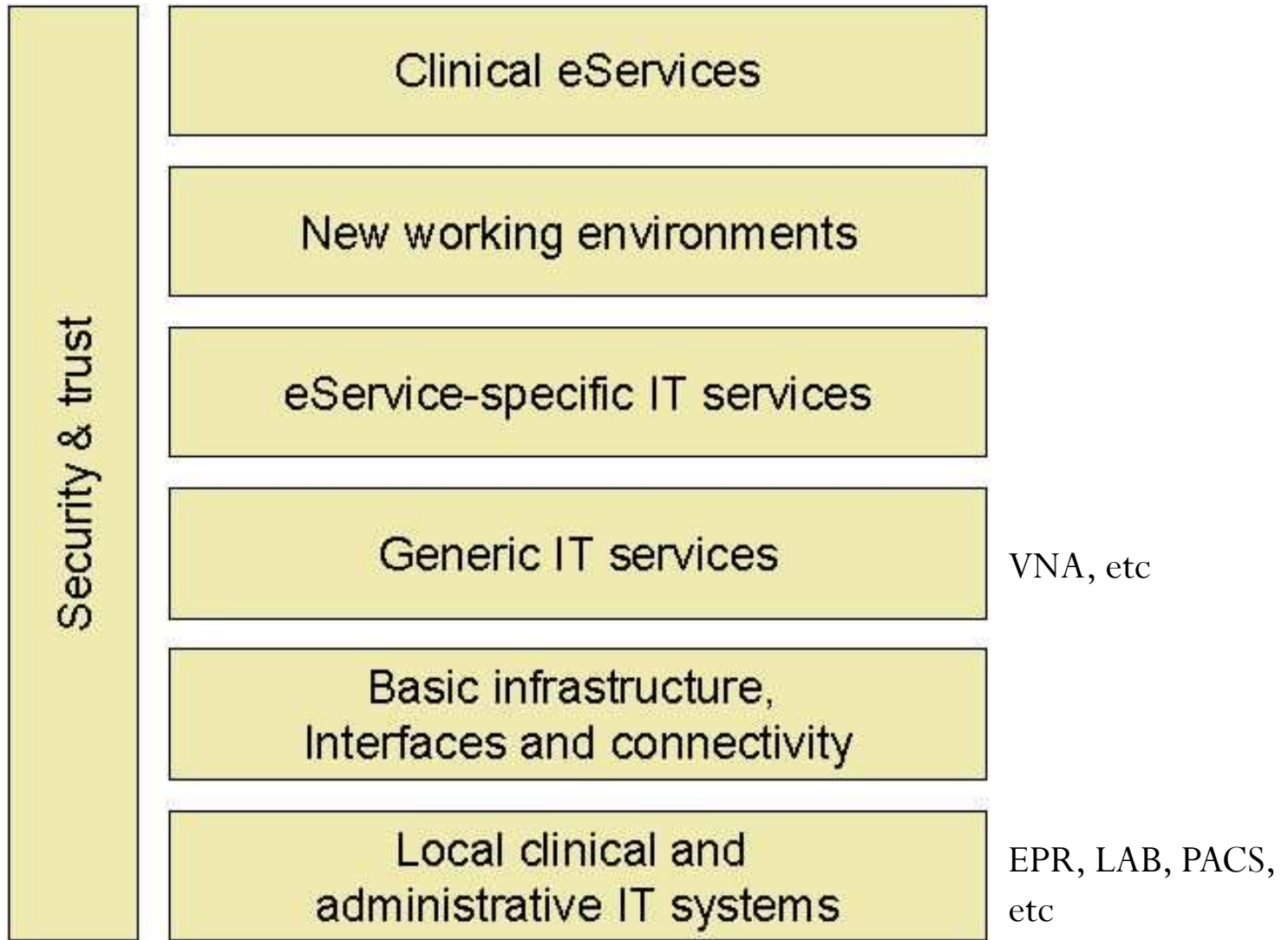
- Data can be stored from multiple systems from different vendors.
- Data can be accessed by multiple systems from different vendors.
- VNA stores documents and their metadata in a non-proprietary format
- Data can be accessed even without the VNA database.
- Archiving and management of data utilises rich metadata – both clinical and technical- and various storage plans and ILM policies can be built in order to meet clinical, legal, economical and organizational needs.

# Modern eHealth community

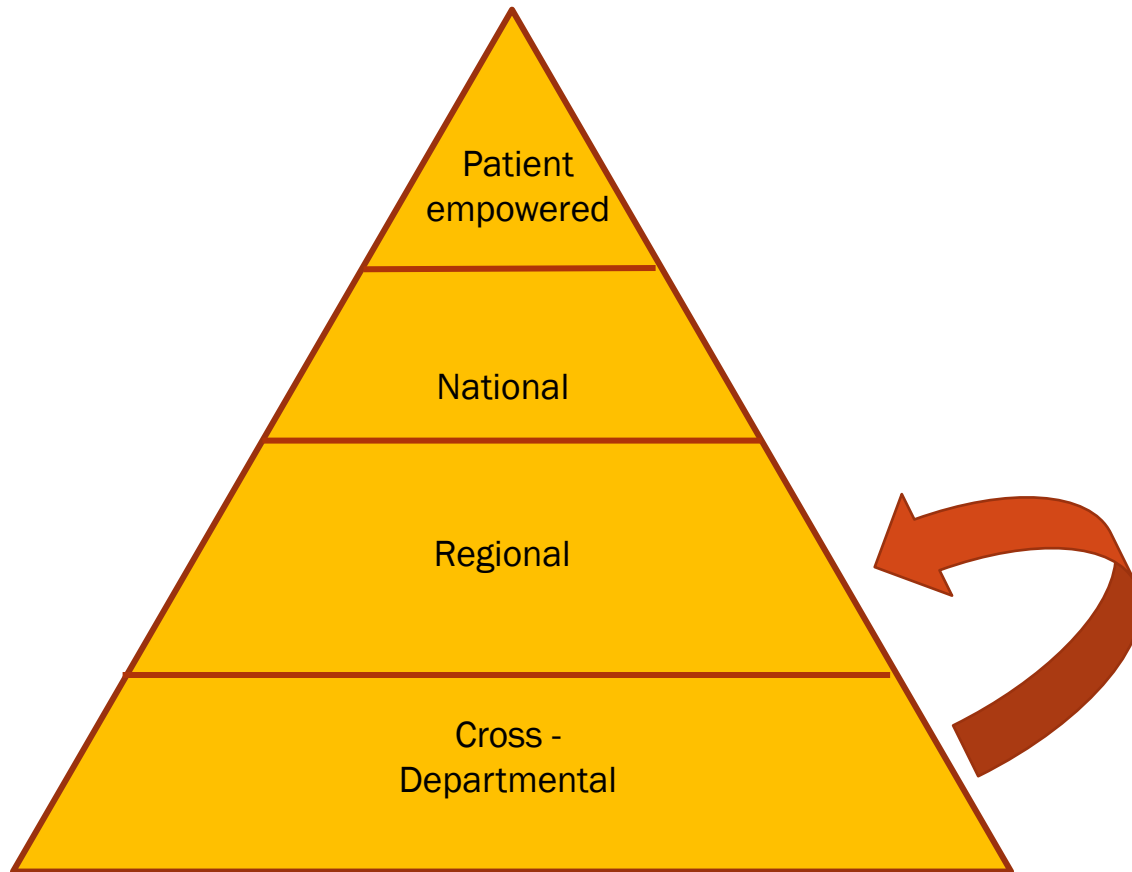
- Various clinical eServices
  - 1) for professionals and 2) for patients/citizens
- Technological/IT services necessary to deploy modern eHealth across the community
  - Incl VNA
- Keywords and benefits:
  - patient/citizen-centric, seamless, shared, secure and trusted, preventive, independent of time and place, networked, cross-organizational, cross-border
  - modular, interoperable
  - sustains competition and innovation

# eHealth network





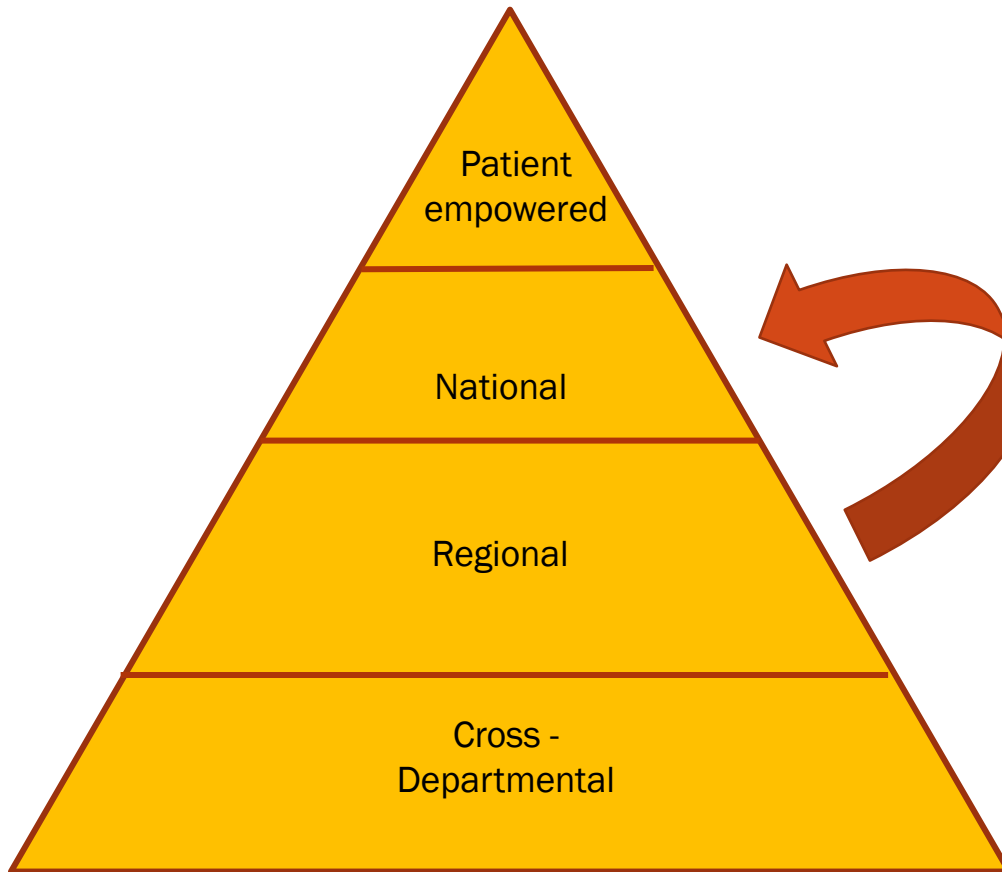
# Different levels of eHealth



## **Barriers:**

- Level of digitalization
- Technical (adoption of standards, integrations, interfaces)
- Organizational change issues
- Workflow management

# Different levels of eHealth

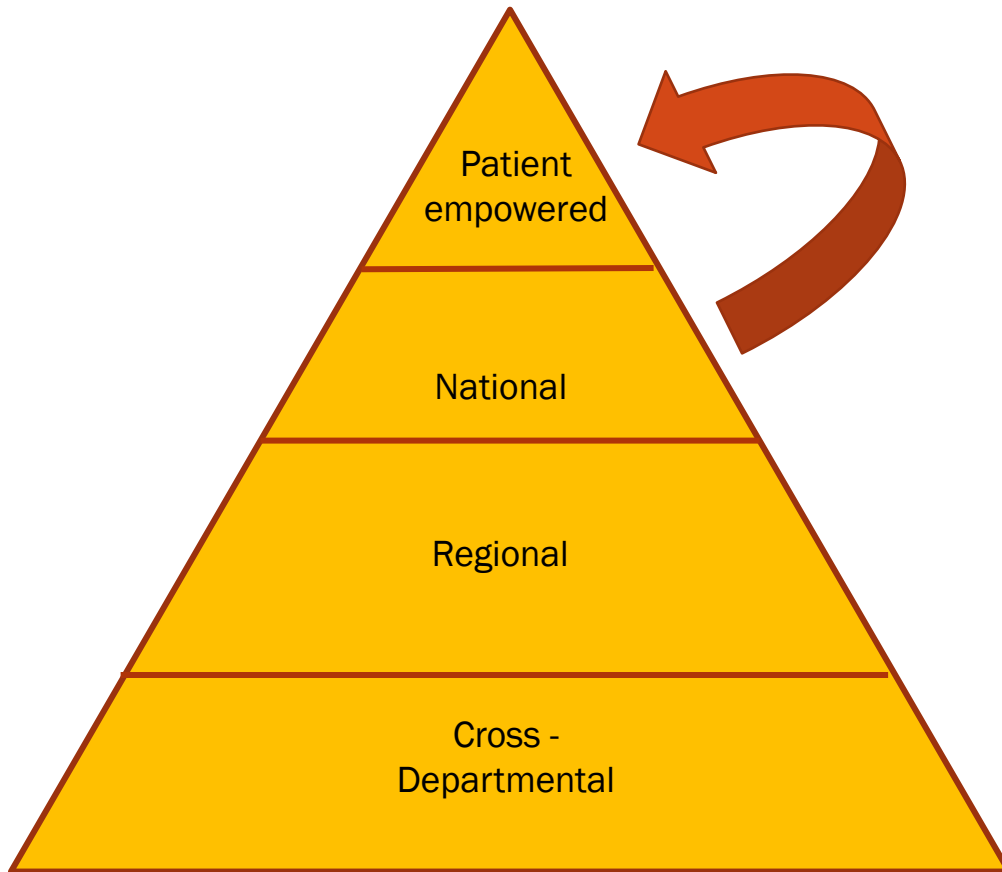


## Barriers:

- Semantic (common codes, classifications)
- Politics
- Trust between hc professionals
- Quality control



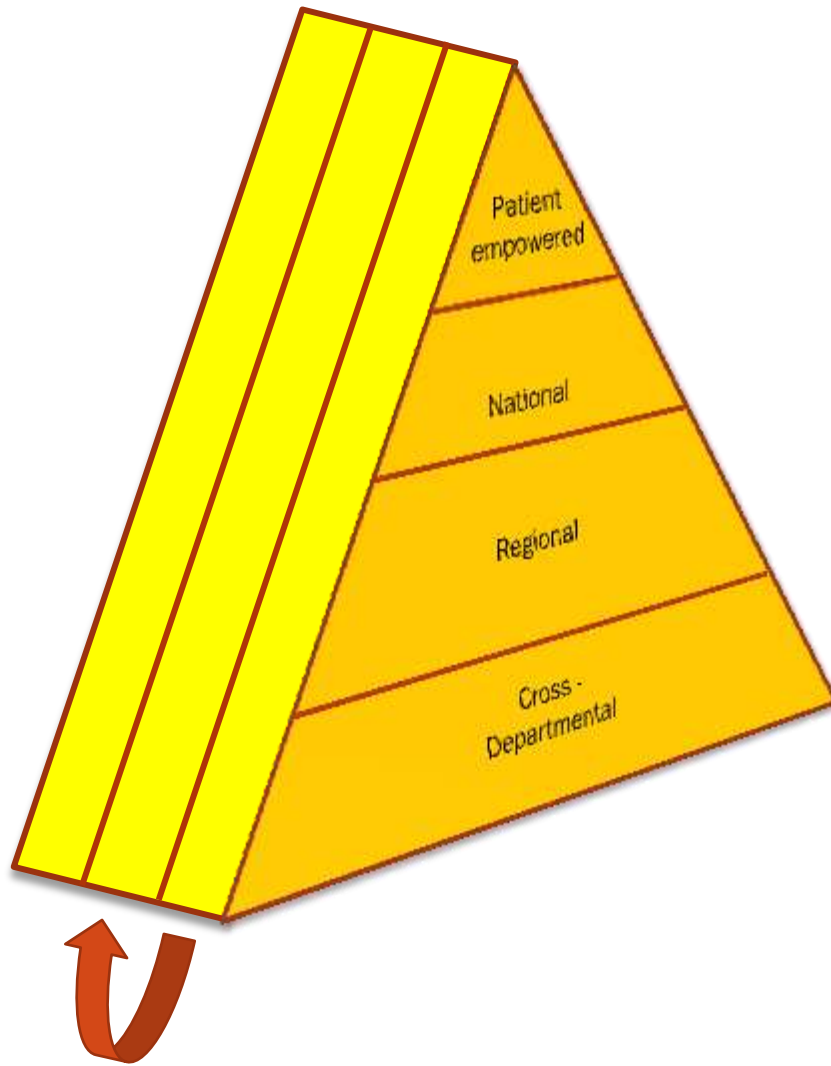
# Different levels of eHealth



## Barriers:

- Technical (secured access)
- Privacy and security (identification)
- What to share/how to share/when to share?
- Trust between hc professionals and patients
- Awareness of the services

# Different levels of eHealth: cross-border



## Drivers:

- Mobility of citizens
- Cross-border healthcare directive
- Distributed skills and workforce
- epSOS

## Barriers:

- Trust between hc professionals
- Quality control
- Semantics incl language
- Legal clarity, EU/non-EU
- Reimbursement
- Accreditation

# Different levels of eHealth

	Estonia	Benelux	Nordics	UK	Ireland	Italy	Eastern market	Southern market, Middle E
Patient empowered	X	(x)	(x)	(x)				
National	X	X	X	X	X			
Regional	X	X	X	X	X	X		
Cross - Departmental	X	X	X	X	X	X	X	X

# EU eHealth initiatives & action plans 2004 ->

- -> Large-scale regional and national projects
- -> Driven by high-level decision makers
- National projects for data sharing (Health Information Exchange, HIE, virtual EHR):
  - Sweden, Finland, Norway, Denmark, Estonia, Ireland, England, etc
  - epSOS to connect
  - Connecting private and public as well
  - Use cases: hospital discharges, GP summaries, lab results, imaging reports, images, ....
- In common:
  - High expectations, big investments, rapid deployment plans
  - Data sharing (XDS), shared workflow (optimization of resources across organizations), empowered citizen
  - VNA as an essential element to enable data sharing
- -> Cross-border healthcare directive

# Governance models – int. examples

- Technical infrastructures not necessarily follow the same model, very often however
- Top-down
  - National co-ordination/budget, common goal for all
    - England (now bottom-up/hybrid)
    - Estonia
    - Ireland
- Bottom-up
  - Regional independent projects, separate budgets, region-specific goals and features
    - Denmark (now some hybrid-like features as well)
- Hybrid
  - Combination of the two: maximize the benefits, minimize the weaknesses
    - Finland
    - Canada

# Top -> down – SWOT analysis

## Strengths

- One common goal
- Usually clear decision making
- One common budget
- Reasonably priced contracts
- Clear instructions regarding content, standards etc
- Service provider often between the end customer and the solution provider(s) (one stakeholder responsible for the whole project)

## Weaknesses

- Slow to change direction, user input not taken into account?
- National/governmental project management; difficult to engage professionals and citizens
- Difficult to take into account regional status and specific functional needs (one size has to fit all)
- Service provider often between the end customer and the solution provider(s) (slow communication)

## Opportunities

- The national solution is an enabler, on top of which value added services can be built (e.g. shared workflow)

## Threats

- Kills innovation
- The right business drivers are not found (archiving not enough)
- Focus often in centralised components -> there is a threat that local integration will be forgotten and information is not moving

# Bottom -> up – SWOT analysis

<b>Strengths</b> <ul style="list-style-type: none"><li>• Region-specific features, priorities and background can be taken into account</li><li>• Citizen buy-in (it is natural to share data regionally)</li><li>• Professional buy-in (supports the regional workflow)</li><li>• Pragmatic</li></ul>	<b>Weaknesses</b> <ul style="list-style-type: none"><li>• Every region needs to get financing themselves</li><li>• Skills and knowledge vary region by region</li><li>• Who will take care of common prerequisites like content, standards, codes etc?</li><li>• Who will take care of interaction between the regions?</li><li>• Who will take care of the national network, security etc?</li></ul>
<b>Opportunities</b> <ul style="list-style-type: none"><li>• It is natural to get organised regionally; the need exists</li></ul>	<b>Threats</b> <ul style="list-style-type: none"><li>• Regional budgets vary</li><li>• Tailored data models</li><li>• Non-interable regional information systems</li><li>• There is no interaction between the regions</li><li>• There is no interaction between the private and public sectors</li><li>• Citizen data are tied to a specific region</li></ul>

# Hybrid model – SWOT analysis

## Strengths

- One common goal
- Clear instructions regarding content, standards, architectures etc
- Financially reasonable framework contracts with multiple vendors (e.g. the national stakeholder negotiates, the regional one buys)
- Region-specific features, priorities and background can be taken into account
- Easier to gain citizen and professional buy-in than in the top-down model
- National steering, but regional input also taken into account

## Weaknesses

- Two-level budgeting
- Who will take care of the integrations between national and regional solutions?
- Skills and knowledge vary region by region, not necessarily required skills, big enough regions needed

## Opportunities

- Combination of the two: maximize the benefits, minimize the weaknesses

## Threats

- There is no interaction between the regions



# Common trends in HIE projects

- Utilization of international standards and standard profiles (HL7, Dicom, IHE XDS, IHE BPPC, etc)
- Separation of operational IT systems from archiving and management of the contents (vendor neutral archiving, VNA)
- Separation of communication (industry standards) from data formats (application/healthcare specific formats) (XDS)

# Common trends in data sharing projects

- The future VNA archiving service is for all medical data – not only for a specific data type like images or lab.
  - Avoidance of separate data silos or application attached archiving
  - Patient-centric approach
- The future VNA archive is a clinical repository – not an archive for legal purposes only
  - A seamless part of the clinical workflow
- A clinical portal/viewer, one window to view all *relevant* contents
  - XDS consumer for professionals and citizens
  - Document access control to restrict views (incl. BPPC, XUA)

# Dynamic filtering for data privacy



## Patient:

- Informed consents
- Denials

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Laws and regulations



## Healthcare professional:

- Organization
- Role
- Purpose for use

BPPC

XUA

Document Access Control

XDS registry

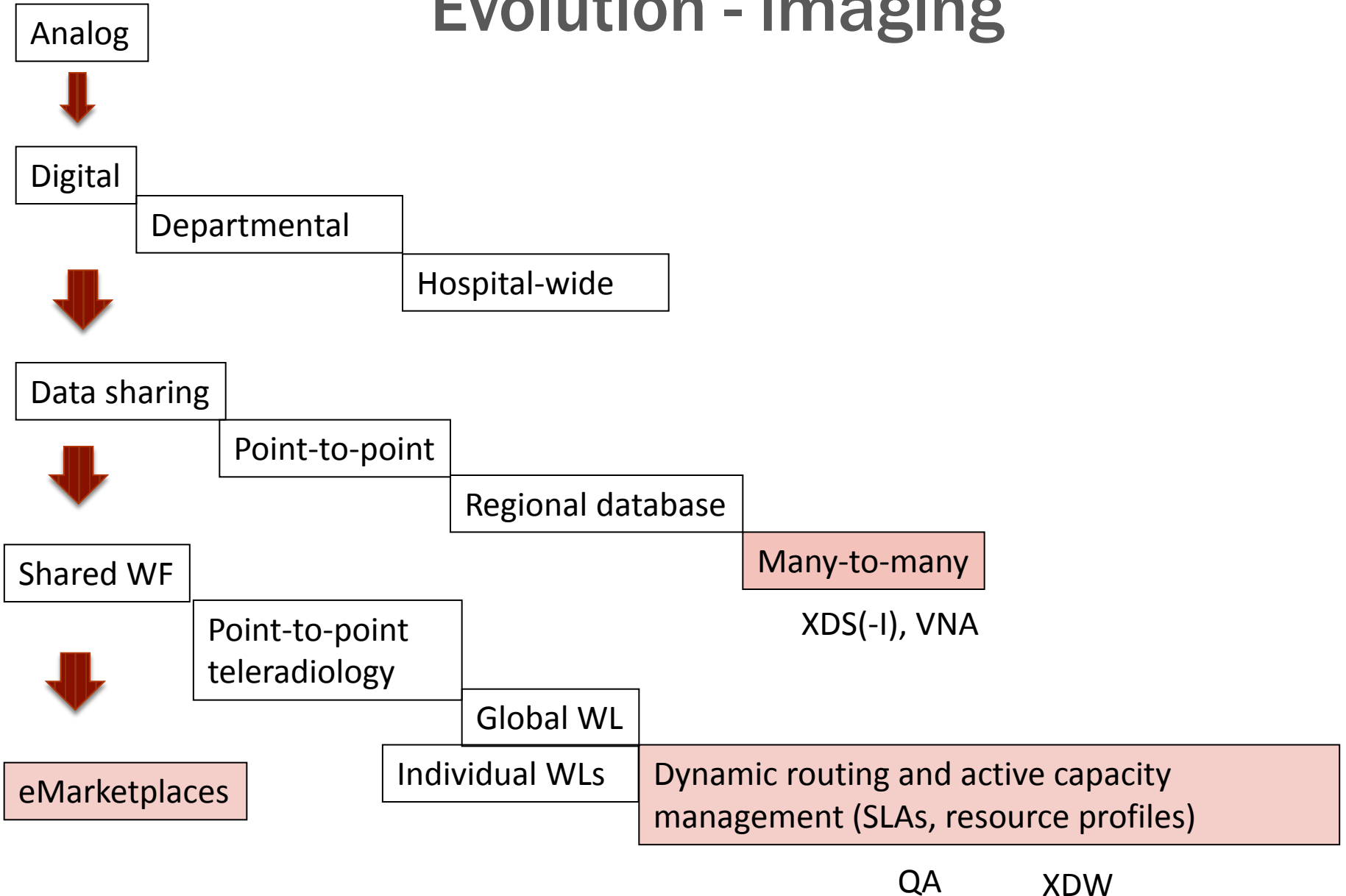


Sensitivity

# How this differs from the USA

Europe	USA
VNA introduced only in recent years	Established market for VNA
VNA for all medical data	VNA for imaging
A common VNA for multiple legal entities	A dedicated VNA for a provider
XDS enabled VNA (EU as a driver for sharing)	XDS used in some RHINs
Patient centric care regardless of the provider	Provider based care
ILM requirements driven mainly by law and value of data	ILM used only in few cases
An VNA attached general viewer	Data viewed mainly by applications (PACS)

# Evolution - imaging



# Lessons learnt I

- Hybrid as the trend both in governance and technical architectures
  - XCA as an enabler
  - National level: semantics, security and privacy, services for the citizen
- The right harmony = a successful project
- A successful project =?
  - Buy-in, business drivers: citizen, professional, national stakeholder
  - How will success be measured? What kind of expectations do different stakeholders have? What are the net benefits for them? (PENG model)

# Lessons learnt II

- Quick wins and project champions needed
- Innovation! One step ahead. Be prepared for the future add-ons.
- Be flexible, dare to change the direction in-time
  - There will be changes in technology, law, standards, etc
  - Functional innovations
- No tailoring! Your country has hardly any specific features you cannot solve with standards/standard profiles.
- Be active in IHE. The profiles will be developed based on feedback.

# Future driven by empowered citizens

- Personal prediction of risks for a disease incidence → preventive actions → new analysis/prediction
  - Full medical records in VNAs
  - Medical records of the family
  - Behavioral data
  - Environmental data (based on location data of your mobile phone)
  - Population data
  - Genetic information
- eMarketplaces for the citizens – second opinion services/advisory services
  - Loading of test & background data or giving temporary consent for viewing from national sources
  - Already emerging in Asia



# Future driven by

- European level data sharing
  - Population level real-time prediction of expansion of acute diseases
    - Precautions, capacity management
  - Identification of target groups for prevention
- Cross-organizational workflow management
  - Automatic patient data analysis based on various sources
  - Citizen input incl. measurement data
  - Identifying automatically the right professionals to choose from (citizen choice)
    - Expertise, availability, location, benchmarking data etc
- Bridging eMarketplaces for professionals
  - Broker network, alliances (compare to airline industry)
  - Work load balancing
  - Navigating rare subspecialities
  - Language skills

Thank You!

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