



**7th HELINA Conference**  
**Yaoundé, Cameroon, 29 November 2011**

# **Health Information Systems: Scaling up solutions to transform healthcare delivery in Africa**

**Mikko Korpela, DTech, Docent**

Research Director, UEF, School of Computing, HIS R&D, Kuopio, Finland

Adjunct Prof, CPUT, Dept of IT, Cape Town, South Africa

Honorary Prof, NMMU, School of IT, Port Elizabeth, South Africa

**[www.uef.fi/his](http://www.uef.fi/his)**  
**[mikko.korpela@uef.fi](mailto:mikko.korpela@uef.fi)**





## Plot for the presentation

- **1st HELINA** Conference, Nigeria, 1993: Organizer
- **HELINA'2003**: Need for appropriate software for healthcare
- **HELINA'2007**: Situation in e-health in Africa then
  
- **HELINA'2011**: Situation in e-health in Africa now?
  
- Way forward for **scaling up solutions**?
- Way forward for **transforming healthcare**?



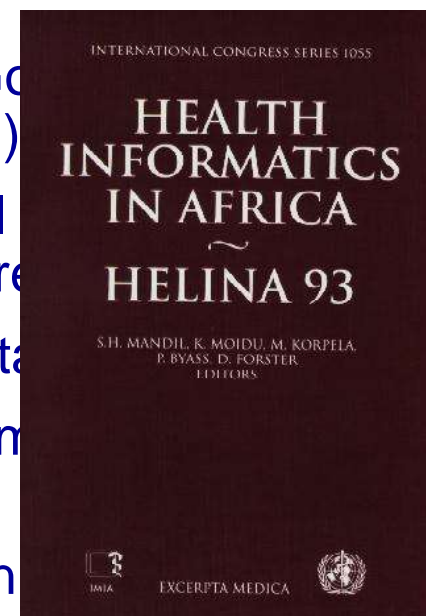
# HELINA'93, Ile-Ife, Nigeria





# Software systems in HELINA'93

- AISY: An Integrated AIDS Information System
- The Development of a Computerized Information System in the Harare City Health Department
- Developing a Medical Information System for Two Local Governments: Ijebu-Igbo (Nigeria) and Manzini Town Council (Swaziland)
- An Integrated Hospital Information System for the National Cancer Institute in Cairo, Egypt: An Experience to Be Shared
- Hospital Information System in a Nigerian Teaching Hospital
- Utilization of Computers in Onchocerciasis Control Program in West Africa
- Using Information in Clinical Management: A South African Case Study
- Expert Systems as a Useful Tool for Tropical Diseases Diagnosis: Case of Malaria





HELINA 2003, Johannesburg, 13-15 October 2003

# Preconditions for sustainable information systems development for African healthcare institutions

## The MINPHIS experience and a software industry survey in Nigeria



**Mikko Korpela**, DTech (Information Systems), [www.uku.fi/~korpela](http://www.uku.fi/~korpela)

Research Director, Healthcare Information Systems R&D Unit, University of Kuopio, Finland

Co-Organizer, 1st Health Informatics in Africa conference **HELINA'93**, Ile-Ife, Nigeria

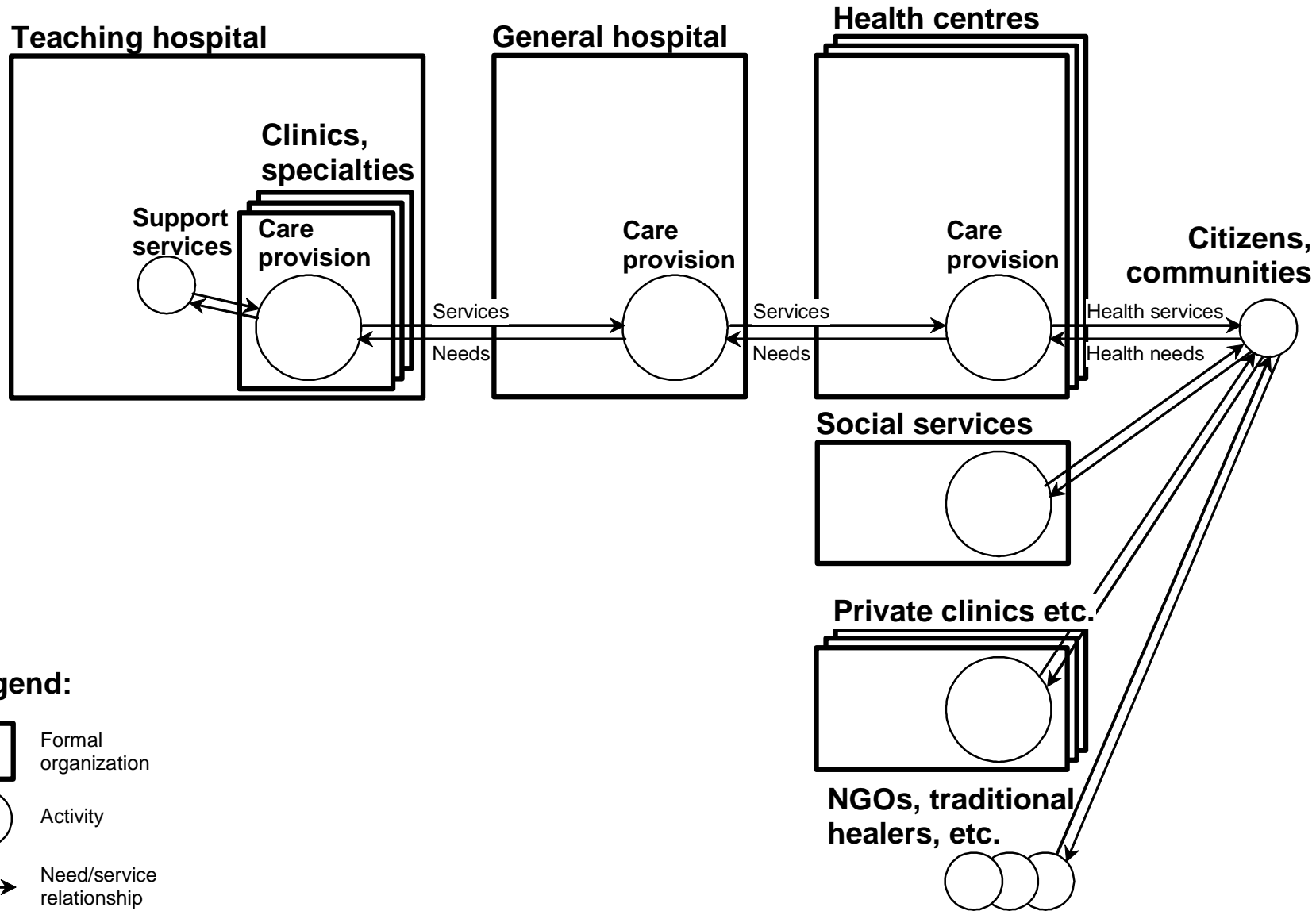
Founding Secretary, **IFIP WG 9.4** 'Social Implications of Computers in Developing Countries'

Ex-Chair, Finnish Social and Health Informatics Association **FinnSHIA**

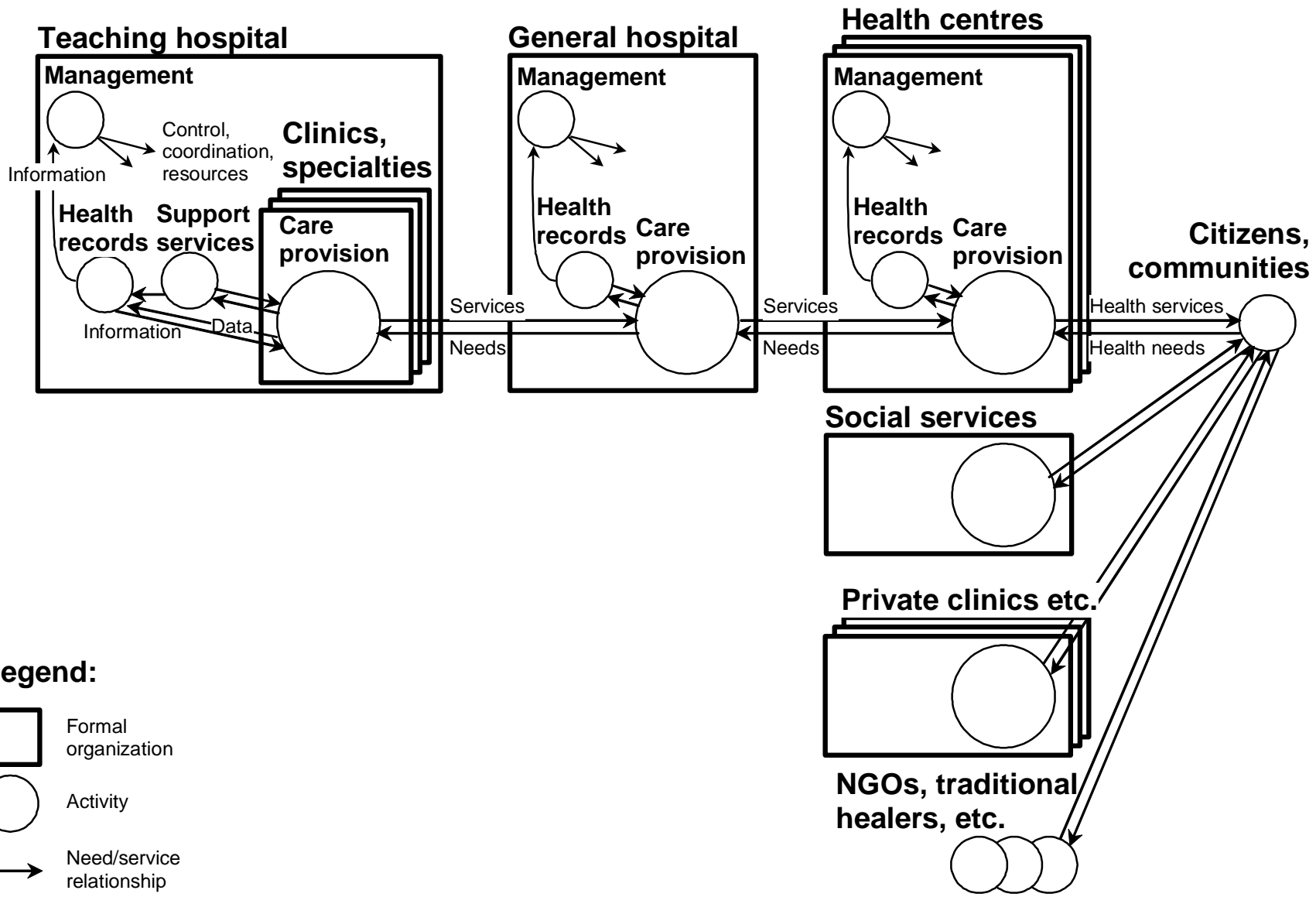
**H. Abimbola Soriyan**, Obafemi Awolowo University, Nigeria

**Anja Mursu**, University of Kuopio, Finland

# Generic model of the healthcare delivery system: What is your country's specific system?



# Information activities for healthcare delivery



# Information systems for healthcare delivery




Information system for inter-organizational networking in healthcare = "IOHIS"

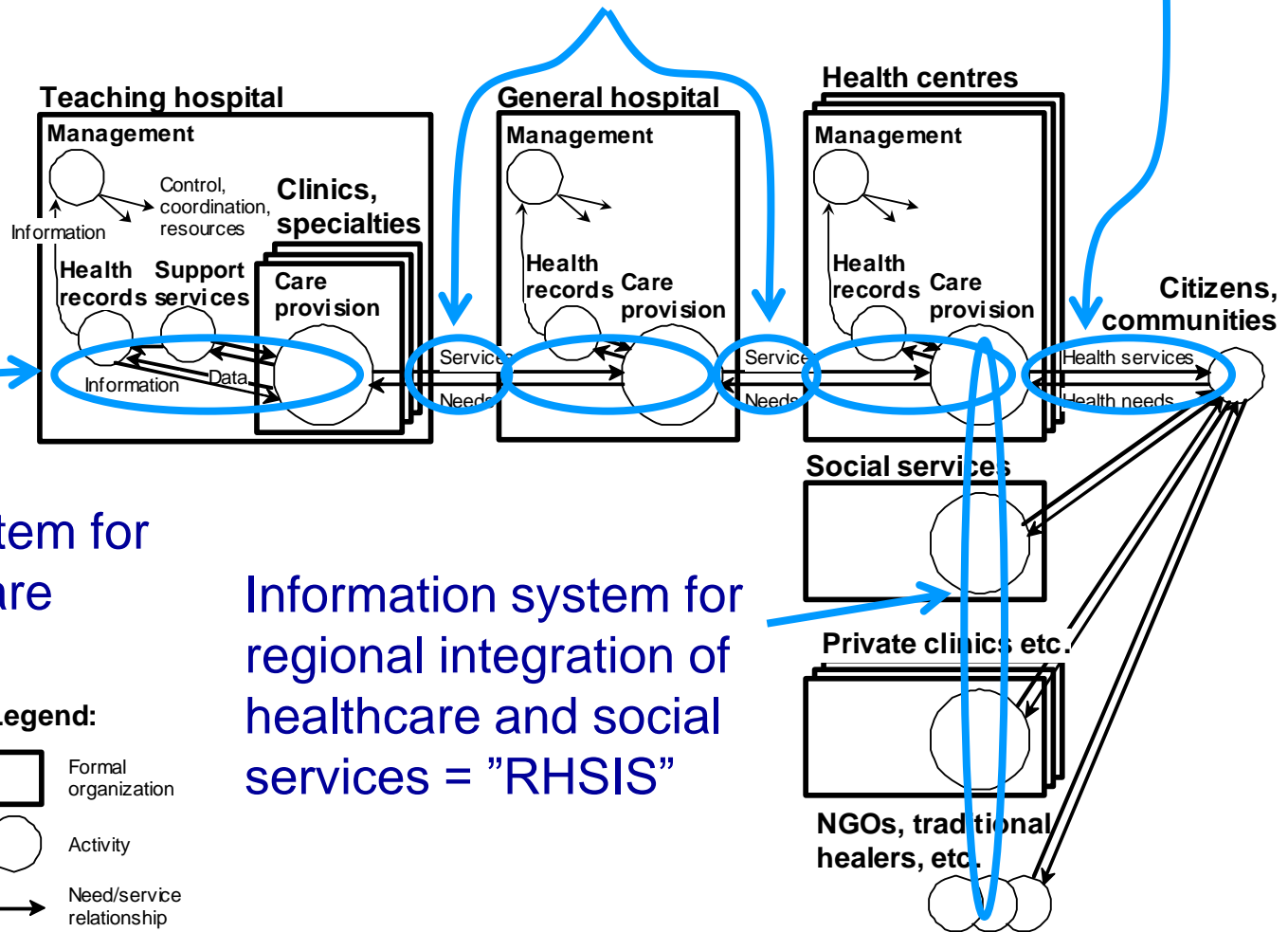
Information system for citizen-to-healthcare linkages = "eHealth"

Information system for clinical healthcare delivery = CIS

Information system for regional integration of healthcare and social services = "RHSIS"

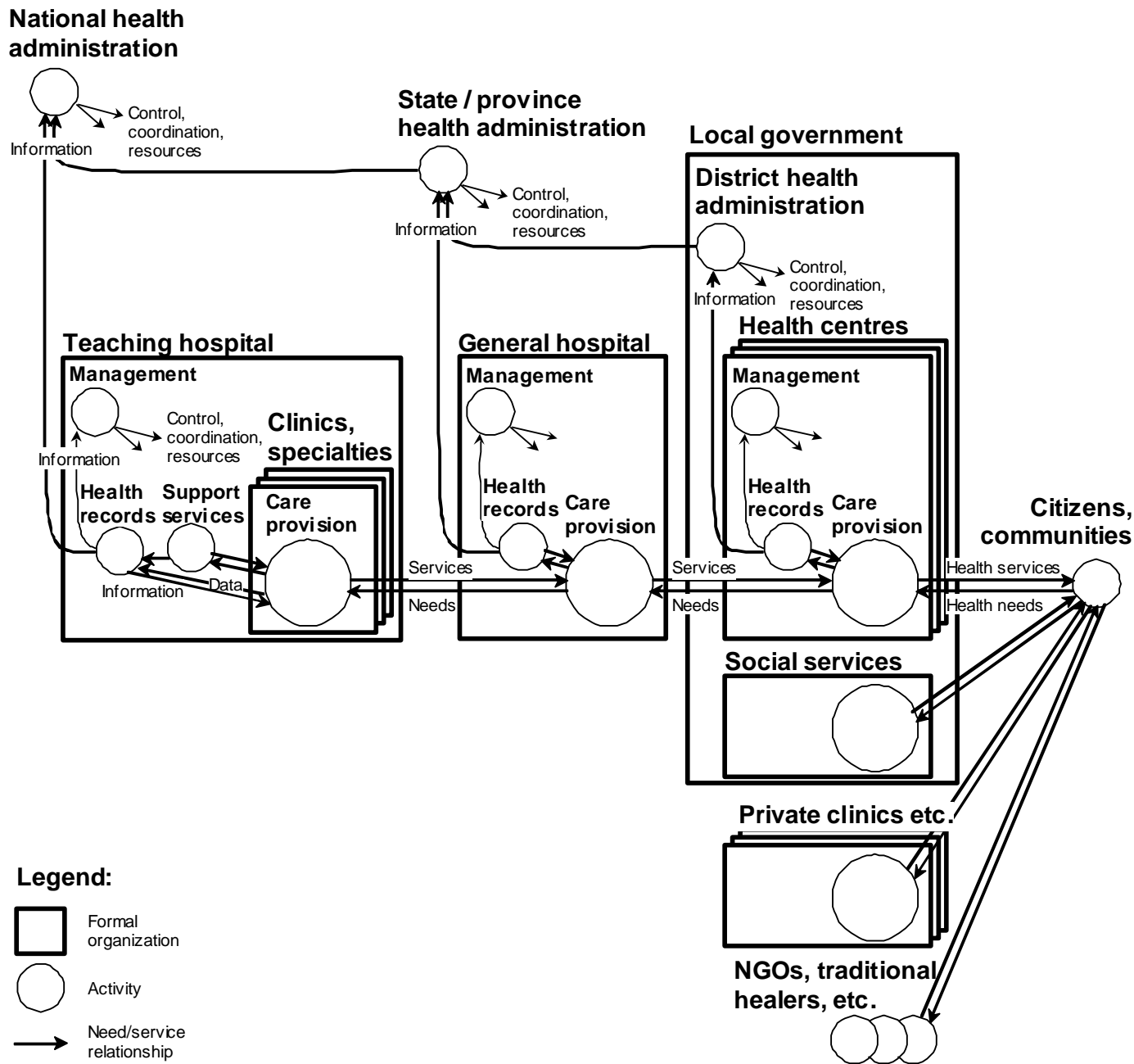
**Legend:**

-  Formal organization
-  Activity
-  Need/service relationship





# Generic healthcare management system

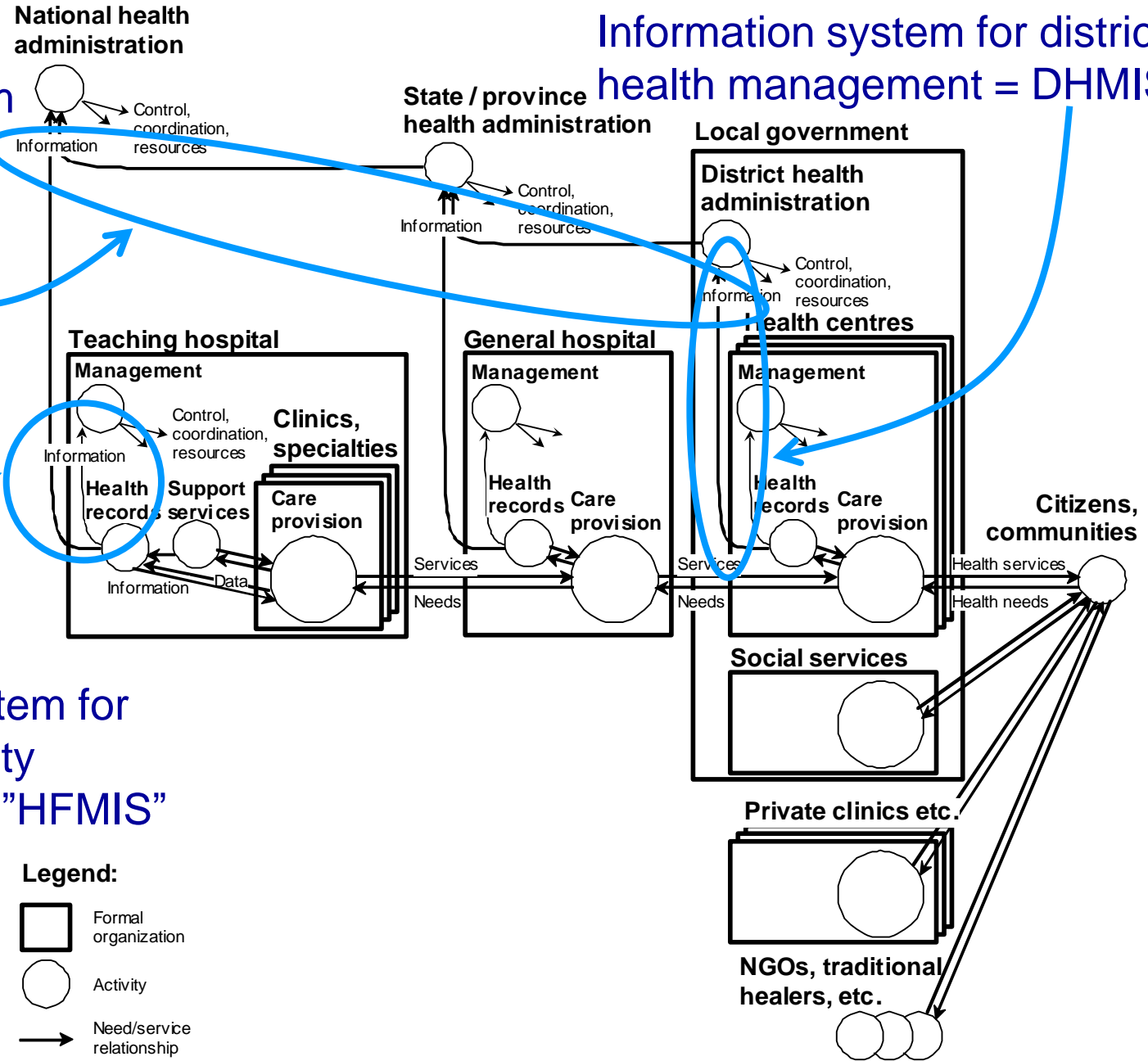


# Information systems for healthcare management

Information system for district health management = DHMIS

Information system for national healthcare management = NHMIS

Korpela et al., HELINA'2003: Preconditions for



Information system for healthcare facility management = "HFMIS"

# Need for appropriate software for healthcare – priorities in Africa?

NHMIS software

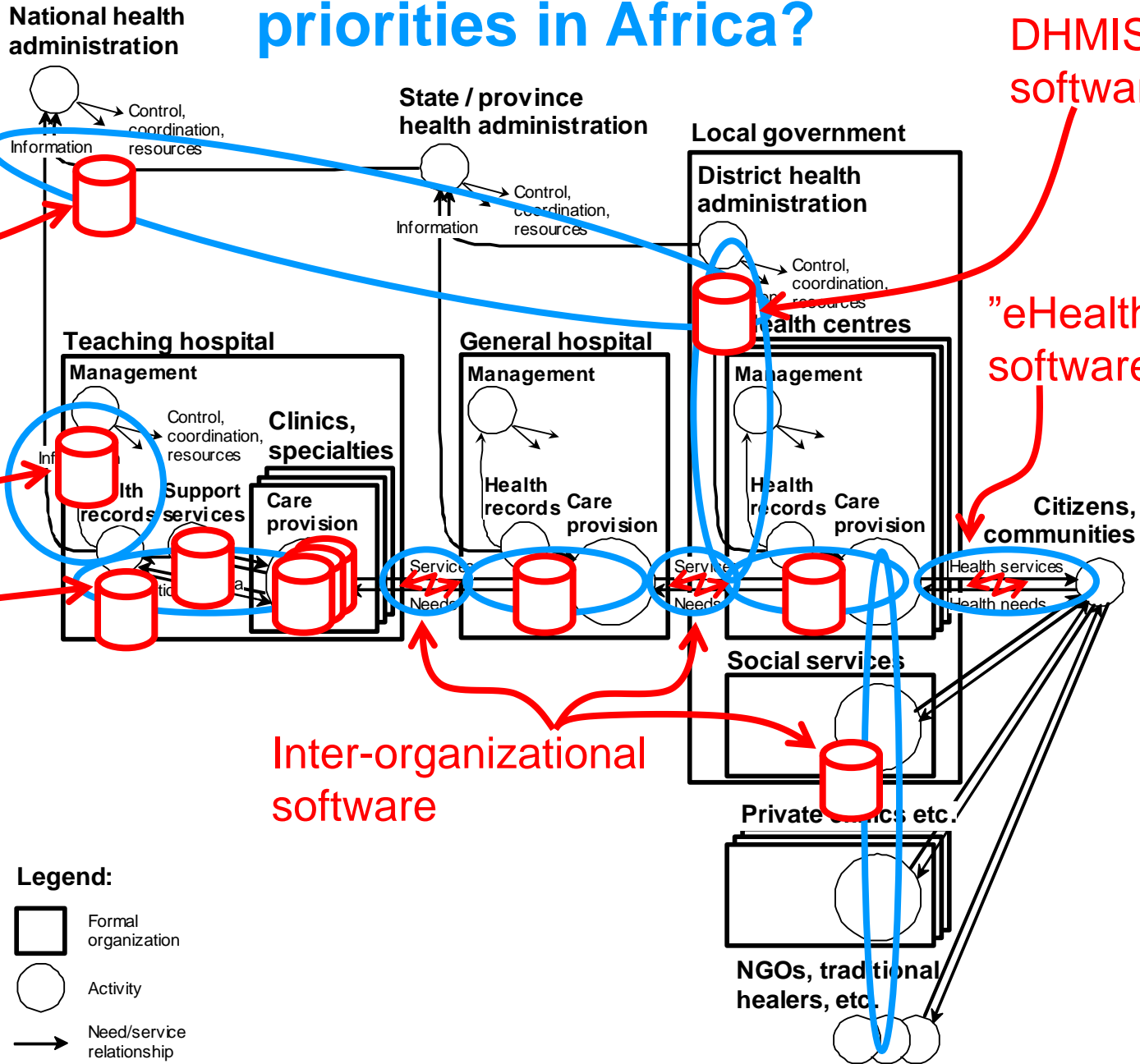
HFMIS software

CIS software for hospitals and PHC

DHMIS software

"eHealth" software

Inter-organizational software



# Recommendations

1. **Local software development capacity** is the key to appropriate healthcare software in Africa – find your software professionals, trust them, educate them, fund them!
2. Foreign aid and government support are needed for **seed funding** to local developers, until they can fund themselves.
3. International organizations should organize and fund a clearing house of **useful open source bits and pieces** (applications, components, platforms, interfaces, information models) that African software developers can build upon and add to.
4. Open platforms (e.g. Linux), open standards (e.g. HL7) and open source applications (e.g. WorldVistA) are needed, but they are only materials for local adjustment and development.
5. Healthcare professionals and software professionals must apply **collaborative design methodologies**, and be educated in such methodologies.



**HELINA 2007, Bamako, Mali, 10 Jan 2007**



# **Towards re-usable efforts in healthcare software for Africa**

**Mikko Korpela** (a.k.a. Omowale, 高明)

Research Director, Adjunct Professor

HIS R&D Unit, University of Kuopio, Finland

Academy of Finland grant 104776, INDEHELA-Context

Finnish Agency for Technology and Innovation Tekes grant 40437/04, SerAPI

Tekes grants 40140/06 and 70030/06, e-Health Partners Finland



# National health administration

# State / province health administration

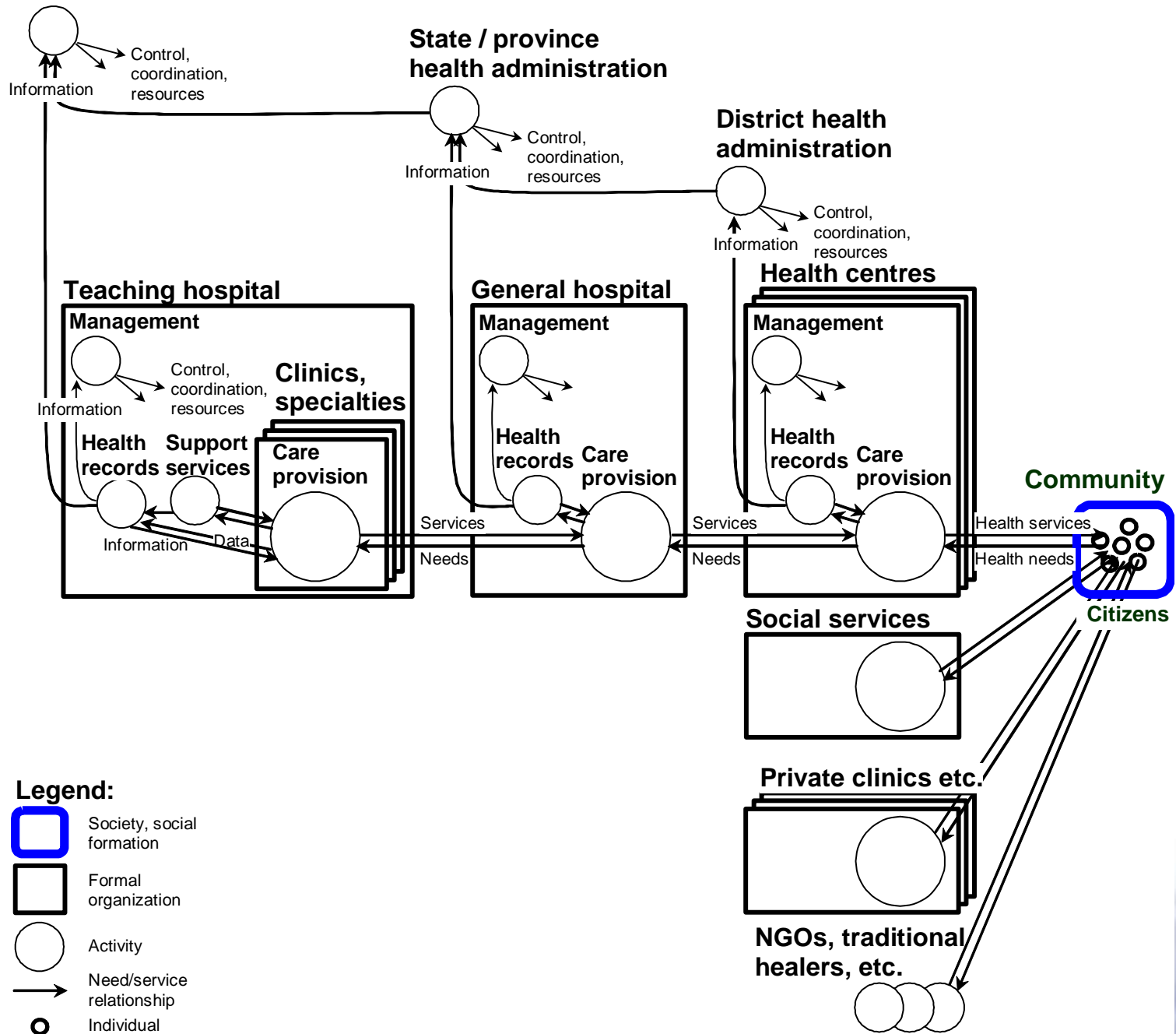
# District health administration

## Teaching hospital






## General hospital

## Health centres

## Community



### Legend:

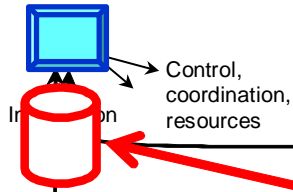
-  Society, social formation
-  Formal organization
-  Activity
-  Need/service relationship
-  Individual

Where is IT used currently in Africa?

Schematic picture of a health care system

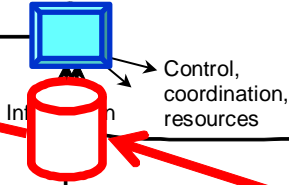


## National health administration



## National HMIS

## State / province health administration

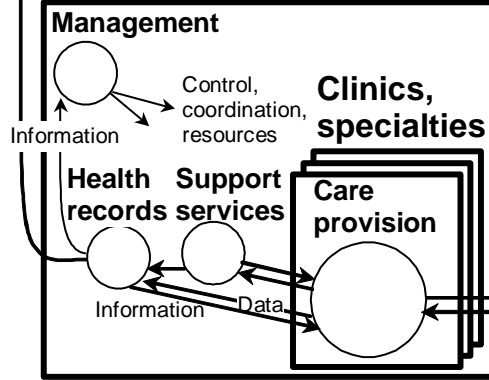


## District health administration

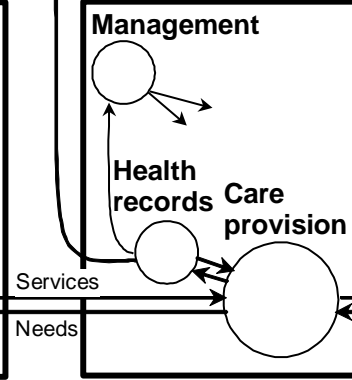


## Local HMIS

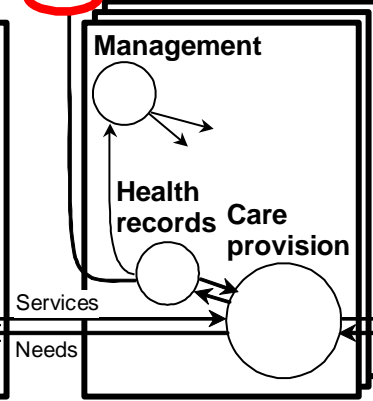
## Teaching hospital



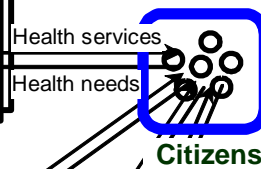
## General hospital



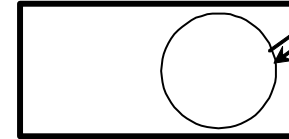
## Health centres



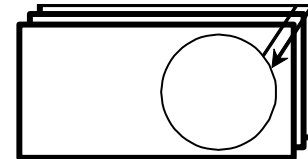
## Community



## Social services



## Private clinics etc.



## NGOs, traditional healers, etc.



### Legend:

- Society, social formation
- Formal organization
- Activity
- Need/service relationship
- Individual



**Information use**  
**Data transfer between systems**  
**Data storage**

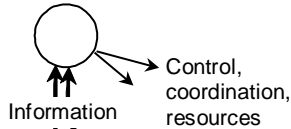


Managing a healthcare system:

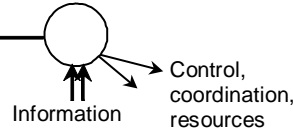
HISP / DHIS



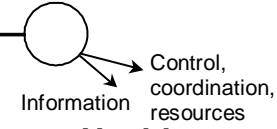
# National health administration



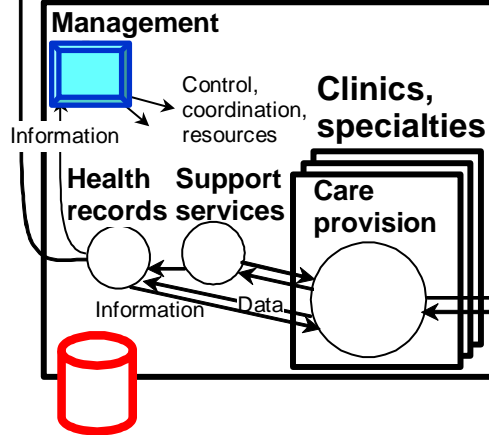
# State / province health administration



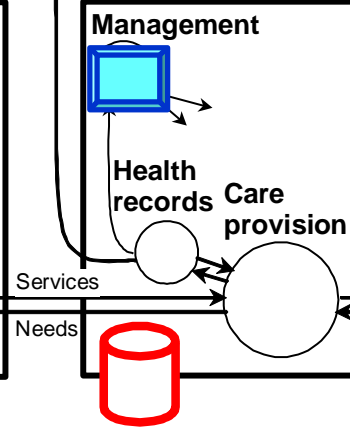
# District health administration



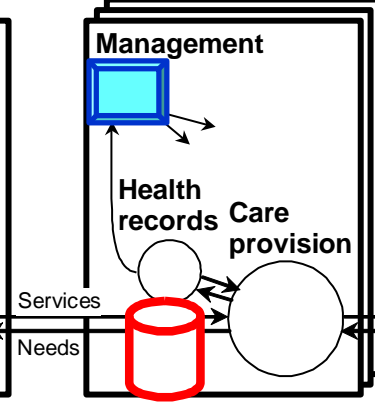
## Teaching hospital



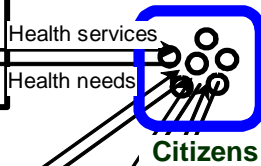
## General hospital



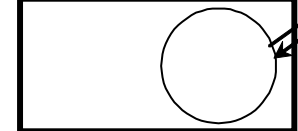
## Health centres



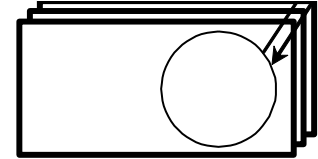
## Community



## Social services



## Private clinics etc.



## NGOs, traditional healers, etc.



Managing a health facility:

HISP @ Zanzibar

- Legend:**
- Society, social formation
  - Formal organization
  - Activity
  - Need/service relationship
  - Individual

- Information use
- Data transfer between systems
- Data storage

Korpela, HELINA'2007:

10 Jan 2007





# National health administration

# State / province health administration

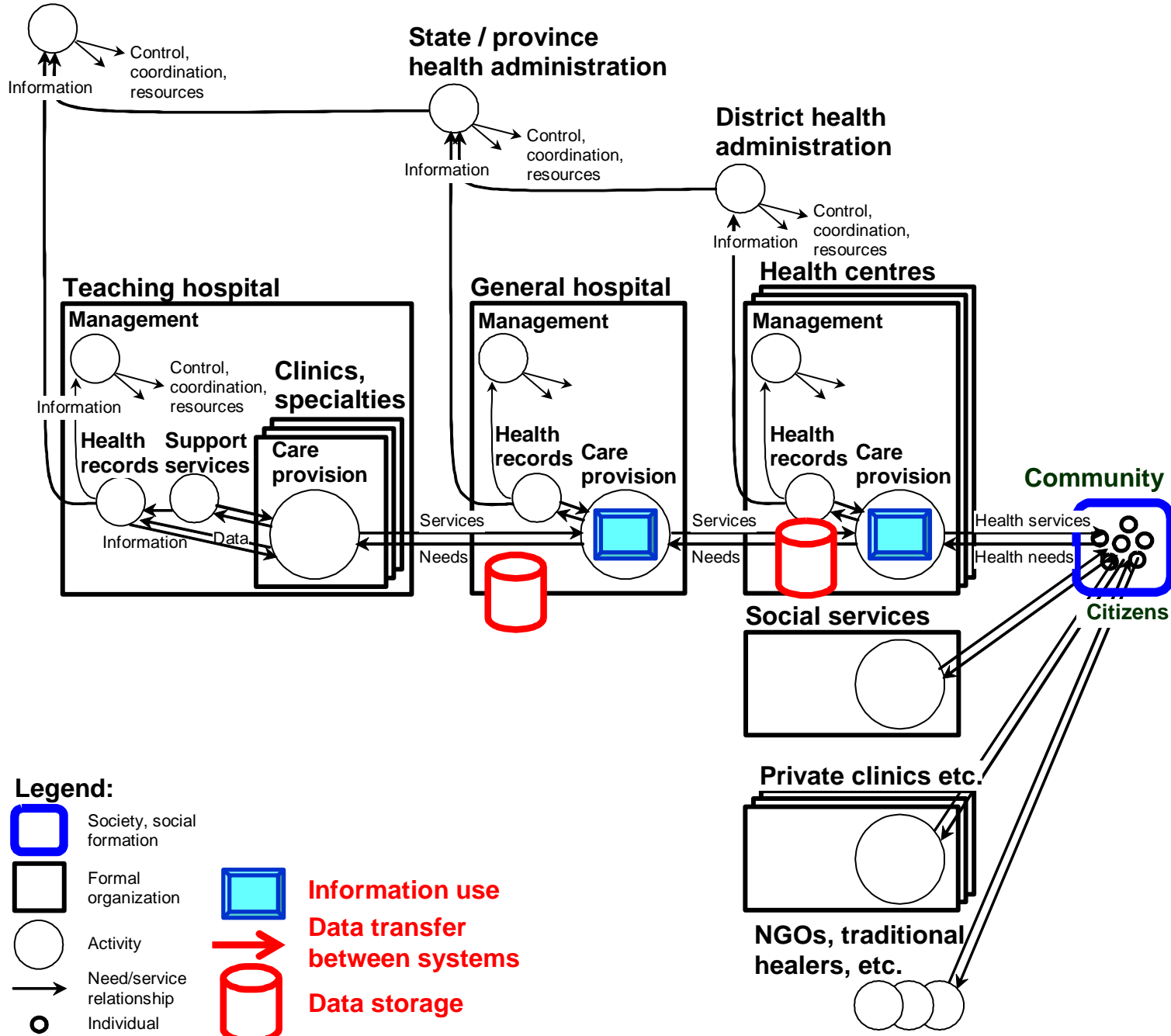
# District health administration

## Teaching hospital

## General hospital

## Health centres

## Community



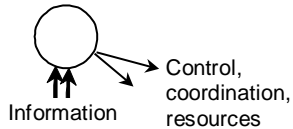
Outpatient encounters:  
OpenMRS

- Legend:**
- Society, social formation
  - Formal organization
  - Activity
  - Need/service relationship
  - Individual

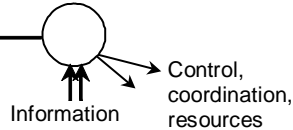
- Information use
- Data transfer between systems
- Data storage



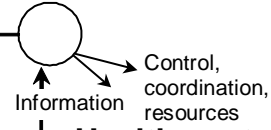
# National health administration



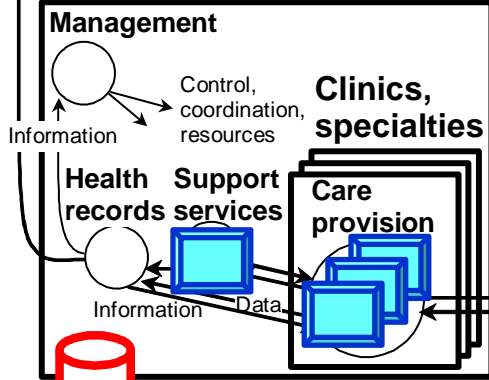
# State / province health administration



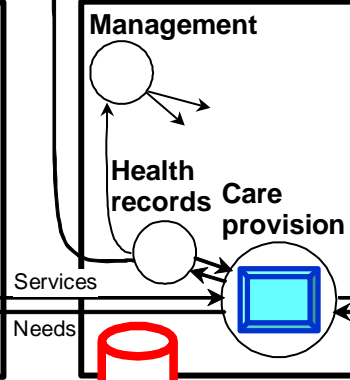
# District health administration



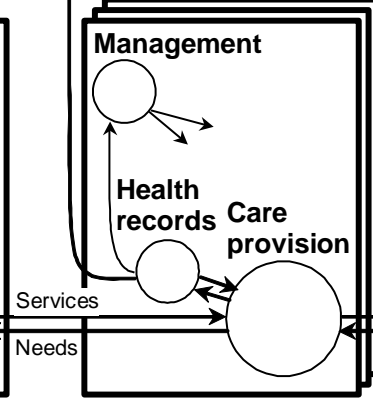
## Teaching hospital



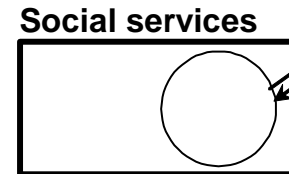
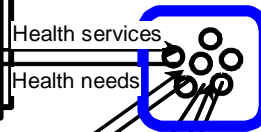
## General hospital



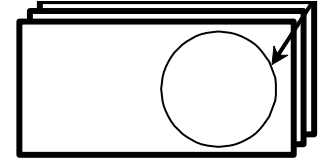
## Health centres



## Community



## Private clinics etc.











## NGOs, traditional healers, etc.



**Patient admin core, gen. record**

### Legend:

-  Society, social formation
-  Formal organization
-  Activity
-  Need/service relationship
-  Individual

-  Information use
-  Data transfer between systems
-  Data storage

**Inpatient care:**

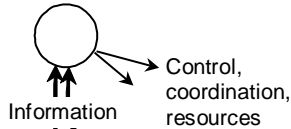
**MINPHIS, Care2X**

Korpela, HELINA'2007: Tow

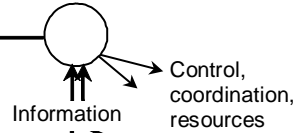
10 Jan 2007



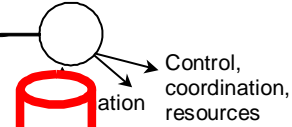
# National health administration



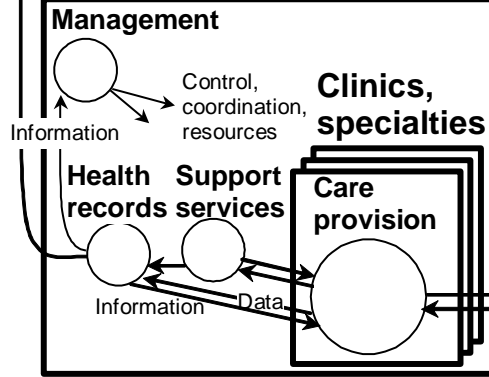
# State / province health administration



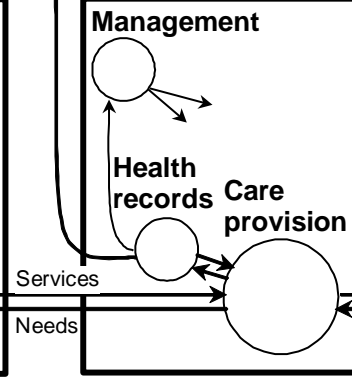
# District health administration



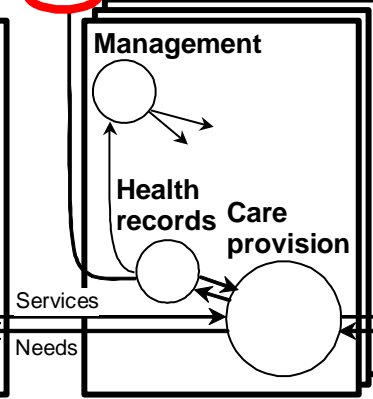
## Teaching hospital



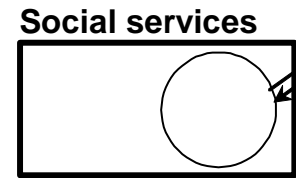
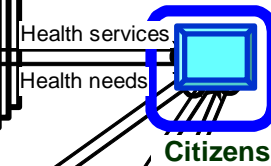
## General hospital



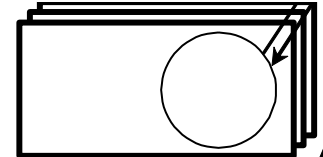
## Health centres



## Community



## Private clinics etc.



## NGOs, traditional healers, etc.



### Legend:

- Society, social formation
- Formal organization
- Activity
- Need/service relationship
- Individual



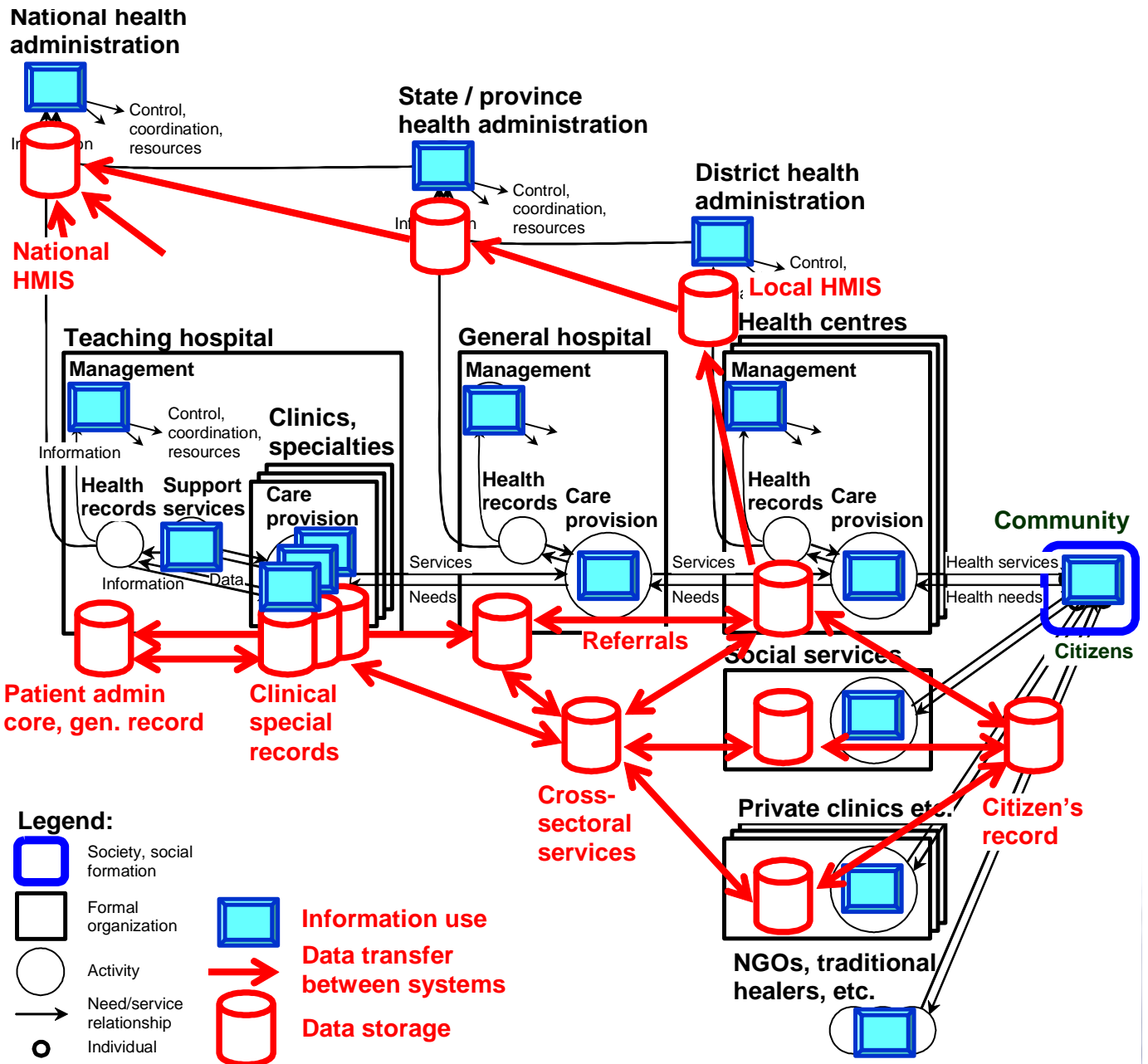
**Information use**  
**Data transfer**  
**between systems**

**Data storage**

**Empowering communities:**  
**cf. Byrne**

# Possible elements for national e-health architecture

- Use situations
- Information storages
- Data transfer
- For action!



Korpela et al. (2005): Software architectures for digital healthcare CHINC'2005 Conference, Beijing, 3-5 July 2005

Korpela, HELINA'2007: Toward





## Problem: Lack of re-use of efforts

- Ideally: Combine OpenMRS, MINPHIS, DHIS, RAFT, ...
- But in practise cannot add "alien" modules
- Different data models
- Different technological architectures and platforms
- Not always fully "internationalized" for localization
- Local modification leads to incompatibility for ever
  
- So same functionality is re-developed all the time
- Overlap of efforts while development capacity is scarce!



# HELINA'2011:

## Situation in e-health in Africa now?

- Managing the (national) healthcare delivery system:
  - DHIS going strong
- Managing a healthcare facility (hospital):
  - Not yet there – something about process optimization?
- Inpatient care (hospital information systems):
  - Cinz@n is it !!!
- Outpatient encounters (electronic records):
  - OpenMRS going strong
- New: Integrating specialized clinical systems/modules:
  - RIS
- New: Vertical / disease-wise systems:
  - Psychiatry, neurology, ophthalmology, diabetes,
- Empowering communities (community health IS):
  - Not yet there – Kenya and home-based care getting close to it



# Way forward for scaling up solutions?

- Health informatics / e-health for Africa has grown amazingly from 1993!
- In success stories, the recommendations of 2003 seem to be valid:
  - Local development capacity
  - Seed funding
  - International collaboration
  - Collaborative design
- But the importance of **champions** should be noted! There is no "Anglophone RAFT"!
- In 2011 maybe less fragmentation than in 2007, but the conclusion in 2011 is still the same as 2007 (next slide)



# Conclusion: Call for action

## Who will do it in and for Africa?

- Group of research & development projects together – OpenMRS, HISP / DHIS, iPath, MINPHIS, ...
- As a “HELINA Framework” project
- Action research on collaborative software development – solving the problems of distributed development of internationalized, configurable, locally extendable software
- Cooperate with similar initiatives worldwide
- Needs-driven! Study actual activities and work flows
- Start in HELINA’2007, continue as WITFOR’2007 project
- Raise funding from EU FP7 ICT or INCO, or from ...



# Way forward for transforming healthcare?

- Do we really know what is the **impact** of e-health / health informatics / telemedicine on people's health?
- Is there **evidence-based** health informatics for Africa?
- Or do we rely on anecdotal evidence?
  
- **Evaluation of the health services** from community viewpoint, before and after an intervention, should be a standard part of e-health implementation projects
- Methods for e-health impact assessment needed!