
The training challenges for the transformation of health and care services

The case for Anti-Microbial Resistance

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The challenge of AMR

The issue

In 2019, **4,95 million people** died for diseases where AMR microorganism had a role.

1,27 milion as a direct consequence of AMR.

There will be more AMR-related deaths than cancer by **2050**

1,5 billion euro in health care costi and lost productivity in the UE.

The needs

Improve **early diagnosis systems** to ensure a high quality care process

Measure drug resistance and virulence to improve treatment efficacy

Reduce health care cost

Rapid reporting and communication system to increase system resilience



AMR drivers & hot-spots across sectors

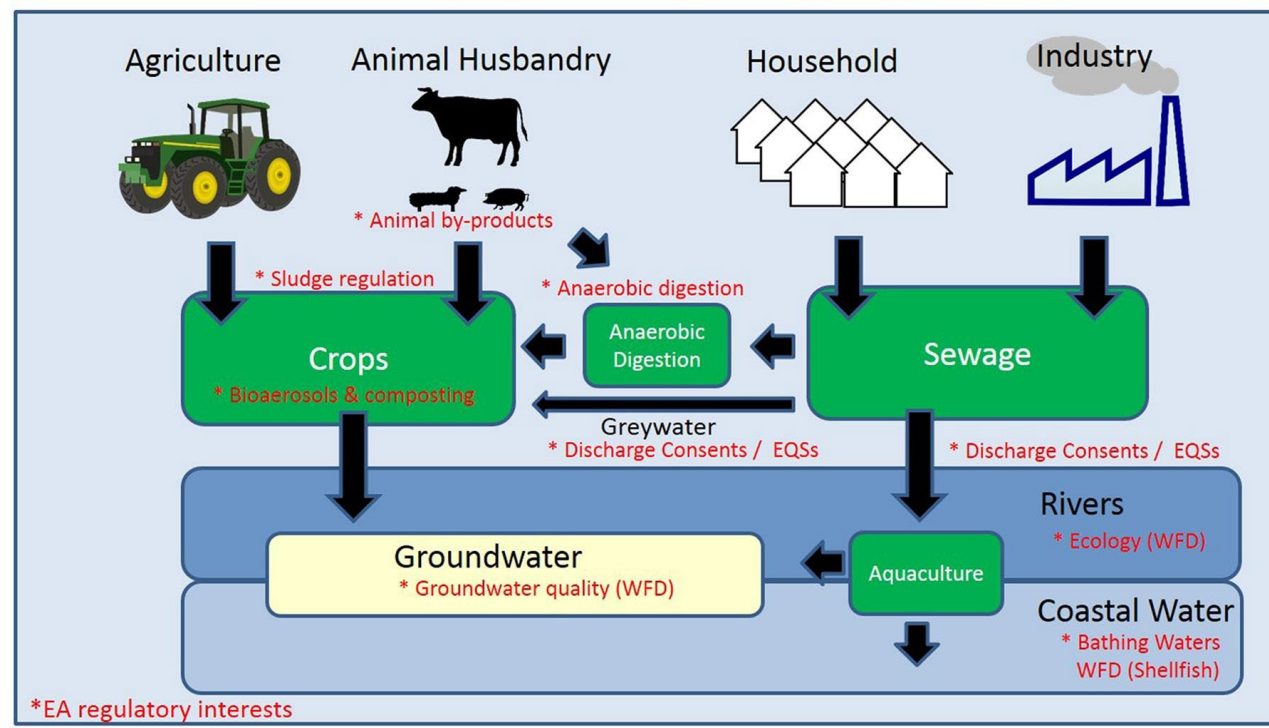
Drivers of Antimicrobial Resistance

Antibiotics

Biocides

Metals

Genes



Singer AC Front. Microbiol., 01 November 2016 Sec. Antimicrobials, Resistance and Chemotherapy <https://doi.org/10.3389/fmicb.2016.01728>



An integrated approach to AMR: why now?



ORGANIZATIONAL
ADAPTATIONS

ENABLING
TECHNOLOGIES

EDUCATION AND
TRAINING



Addressing AMR



Rapid & accurate detection

1

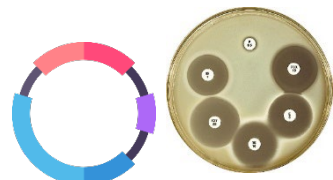
Identification of microorganism, and of its AMR genotype/phenotype

2

Setting of integration of the solutions
Outpatient/inpatient/microbiology lab/surveillance

3

Easy to integrate in the professionals routine
Easy interpretation of the results



Smart management of results & patients

1

Transfer results to the right professionals at the right time for a timely response

2

Integrate the solutions in the organizational workflows and in the current digital processes

3

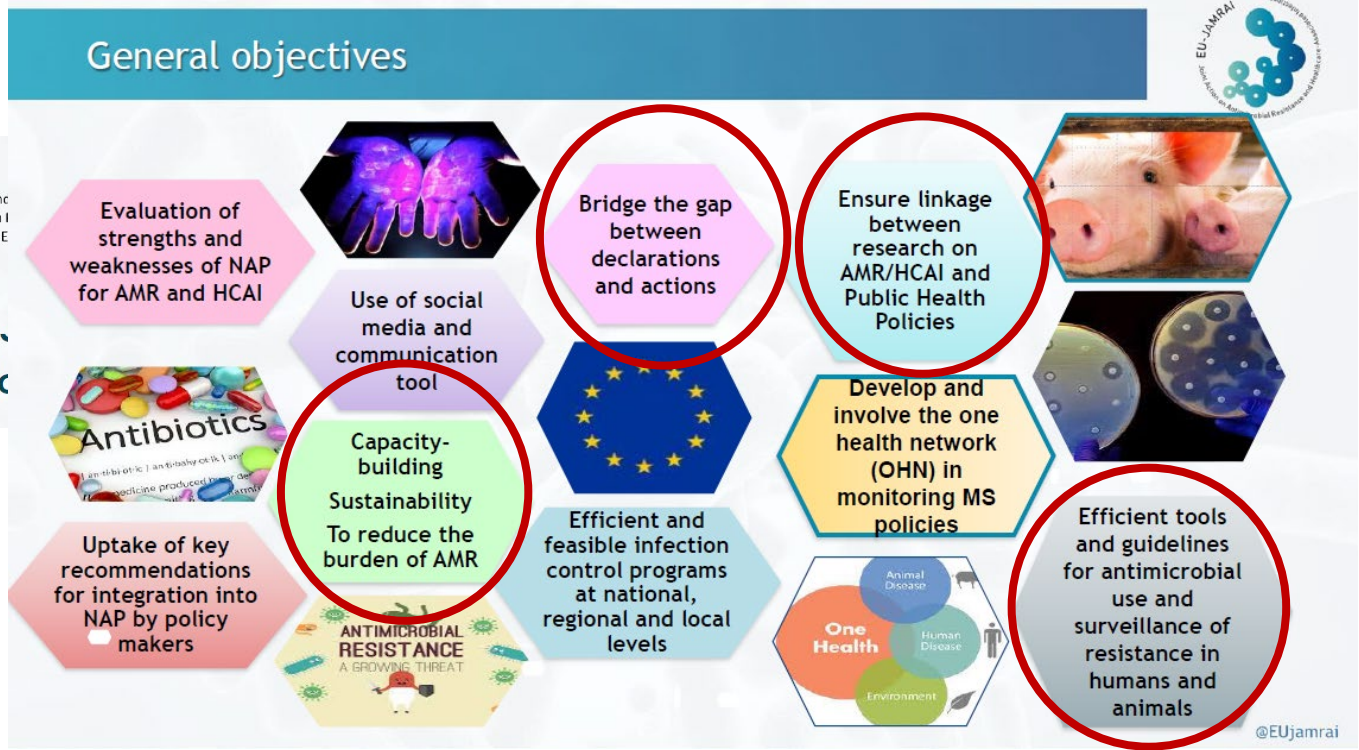
Results that are easy to interpret and store in the clinical record and health
Network system



GAP between recommendations and implementation in public health policies

GAP between capacity building & sustainability

GAP between research and health care policies



Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections

Co-funded by the European Union

Joint Action on AMR and HAI (EU-Countries) commitment to keep antibiotic...

<https://eu-jamrai.eu/>

<https://eu-jamrai.eu/videoblog/>





Key Pillars to contrast AMR

Integrated surveillance and monitoring of antibiotics, healthcare-associated infections, and **environmental monitoring**

Prevention of Healthcare-Associated Infections in **hospitals and communities** and infectious diseases and zoonoses

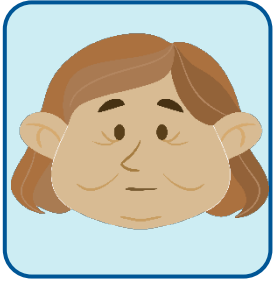
Appropriate use of antibiotics in both human and veterinary settings and proper management and disposal of antibiotics and contaminated materials

Training

Information, communication

Research Innovation, Bioethics

National and international cooperation



Future scenario Federico II



Co-funded by the COSME programme of the European Union



Name: Rosa

Hospital: AOU Federico II

Medical history di AMR



Age: 75

Department:

Prescribed antibiotics



Initial diagnosis:

(IAI)

Microorganisms Gram



Before the new patient are admitted, RaDAR determines the environmental absence of microorganisms of particular epidemiological and clinical significance. RaDAR POC detects that the patient is infected or colonized with *Klebsiella pneumoniae*, and generates an automatic microbiological alert in the patient's medical record. The patient's medical history is accessed and it is noted that he or she has been referred from another hospital where an outbreak of carbapenemase-producing *Klebsiella pneumoniae* has been declared. Health care providers apply multiresistance prevention and isolation protocols. The patient receives ceftazidime-avibactam + metronidazole therapy in the geriatrics department. Intraoperative cultures are required during surgery because the surgeons have been trained. After admission to the ICU, blood cultures and cultures from the BAL are processed with rapid microbiology because an alert is sent to Microbiology that the patient is in septic shock despite active therapy against KPC. The filmarray on the BAL fluid and MALDI-TOF show *Acinetobacter baumannii*. Knowing the ecology of the ICU (all isolates with XDR profile), antibiotic therapy is changed to colistin+phosphomycin after 48 hours after the onset of shock. After *Acinetobacter* cultures show sensitivity to cefiderocol, colistin is replaced with cefiderocol 2 g TID to prevent colistin toxicity. The microbiology laboratory immediately communicates the result to infection control teams, and the result is automatically entered into the patient's medical record. Targeted RaDAR technology is applied to assess AMR indicators in other patients on the same unit. The patient improves and is discharged after 10 days of intensive care for rehabilitation. The rehabilitation facility is aware of KPC colonization and places the patient in a single room with contact precautions.

Results achieved according to needs met: :

- (1) Environmental and patient-based PoC detection system - Microorganisms are detected in "real time".
- (2) There is an automatic alert from the RaDAR detection system.
- (3) Epidemiological information is available.
- (4) Microbiology results are automatically entered into the patient's medical record.
- (5) Within 12 hours, resistance results are available and the targeted antibiotic can be prescribed.

AMR process

HOSPITAL PROFESSIONALS

Hospital clinicians:

- Medical doctors
- Pediatricians
- Infectologists
- Hospital assistants

- Hospital nurses
- Infection control nurses

- Clinical Microbiologists
- Laboratory technicians

- Pharmacy
- Clinical Microbiologists
- Infection Control nurses
- Infection disease specialists
- Clinical Microbiologists

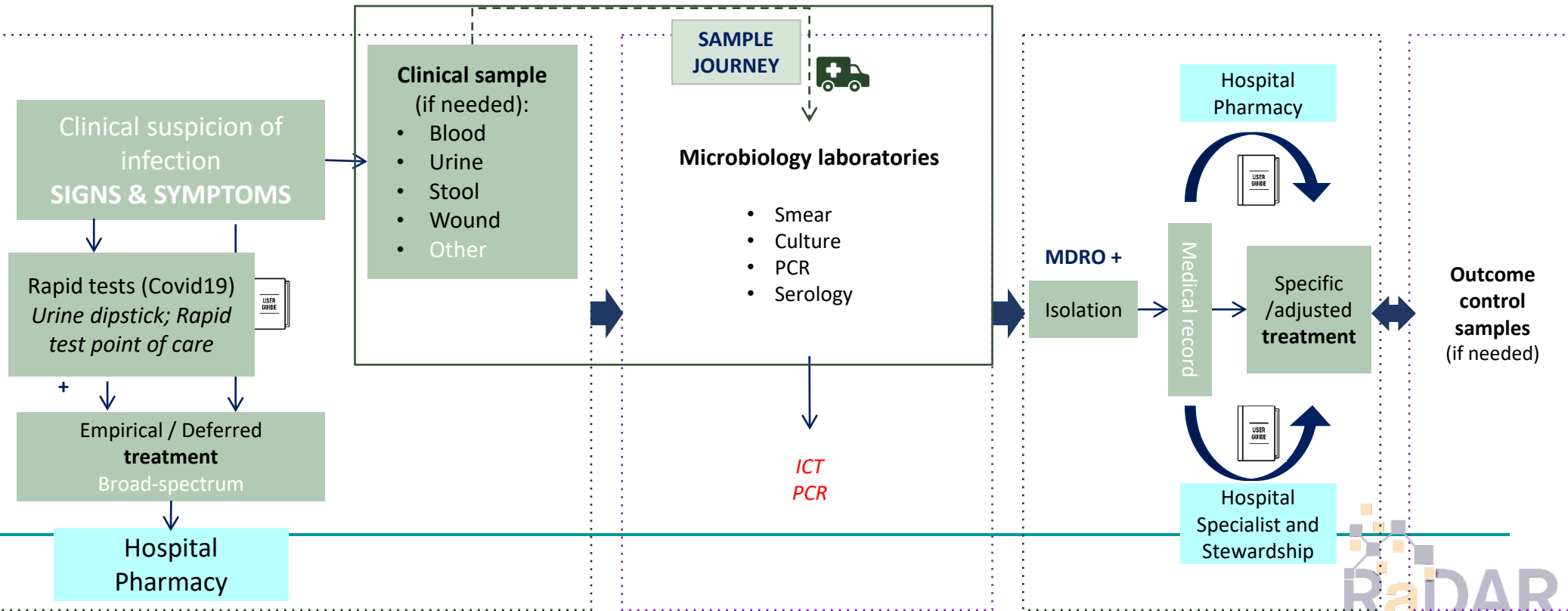
COMMON STEPS



Hospitalized

Home hospitalized

Outpatients





NURSES

From different settings

CLINICIANS

From different specialties

Microbiology lab

POCT are in the clinics NOT in the lab

<p>OBIECTIVE</p>	<p>Harmonize the know-how of the actors involved in the implementation of AMR surveillance procedures in the units participating in the RADAR pilots, through the retraining of company procedures for the prevention of the transmission of healthcare-associated infections (HAI).</p>					
<p>TARGET</p>	<p>Each clinical unit hosting the pilot (and related Point of Care technology) will provide a list of subjects (Doctors, Nurses & specialists) who will be involved in the Pilot Radar</p>					
<p>DURATION</p>	<p style="text-align: center;">3 meetings of 2 hours</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; padding: 10px;"> <p>Introductory meeting to present RADAR and the units involved, including microbiology lab</p> </td> <td style="width: 33%; padding: 10px;"> <p>Sharing procedures of the Federico II Hospital in relation to the prevention of infections</p> </td> <td style="width: 33%; padding: 10px;"> <p>Sharing pilot procedures integrated with PoC & AntiMO Platform</p> </td> </tr> </table>			<p>Introductory meeting to present RADAR and the units involved, including microbiology lab</p>	<p>Sharing procedures of the Federico II Hospital in relation to the prevention of infections</p>	<p>Sharing pilot procedures integrated with PoC & AntiMO Platform</p>
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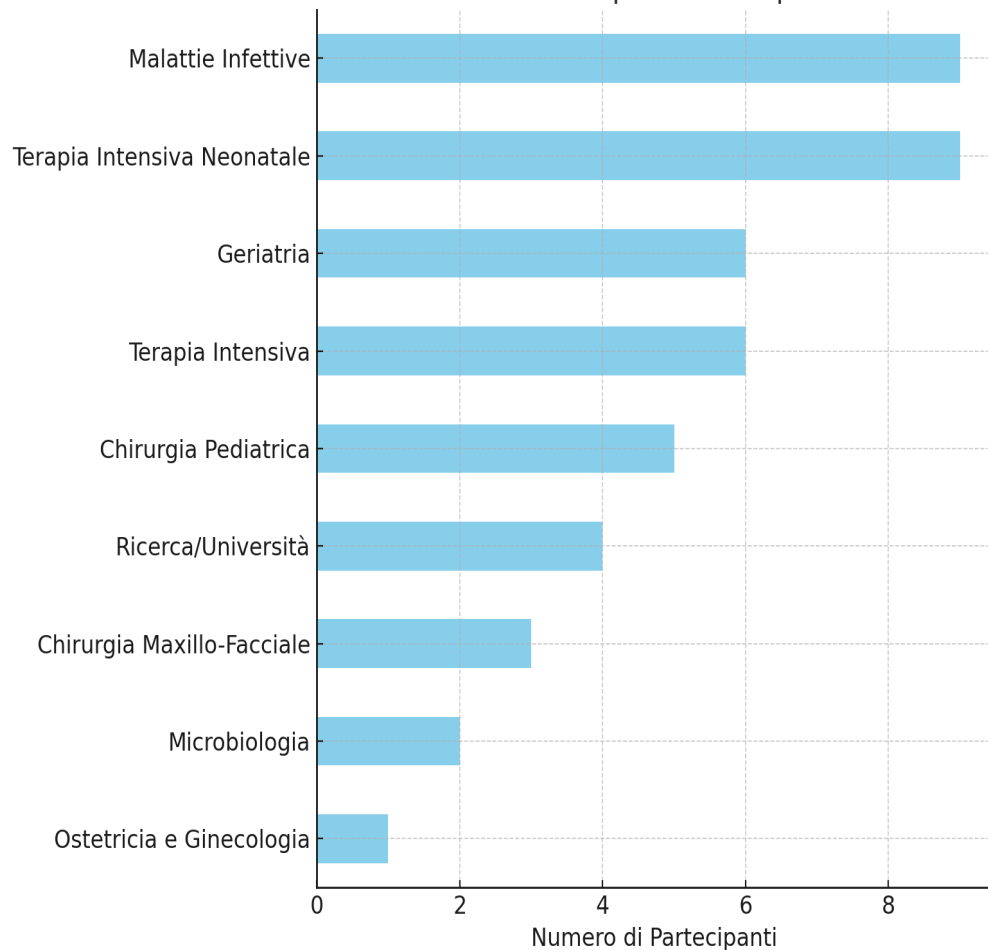


RADAR TRAINING

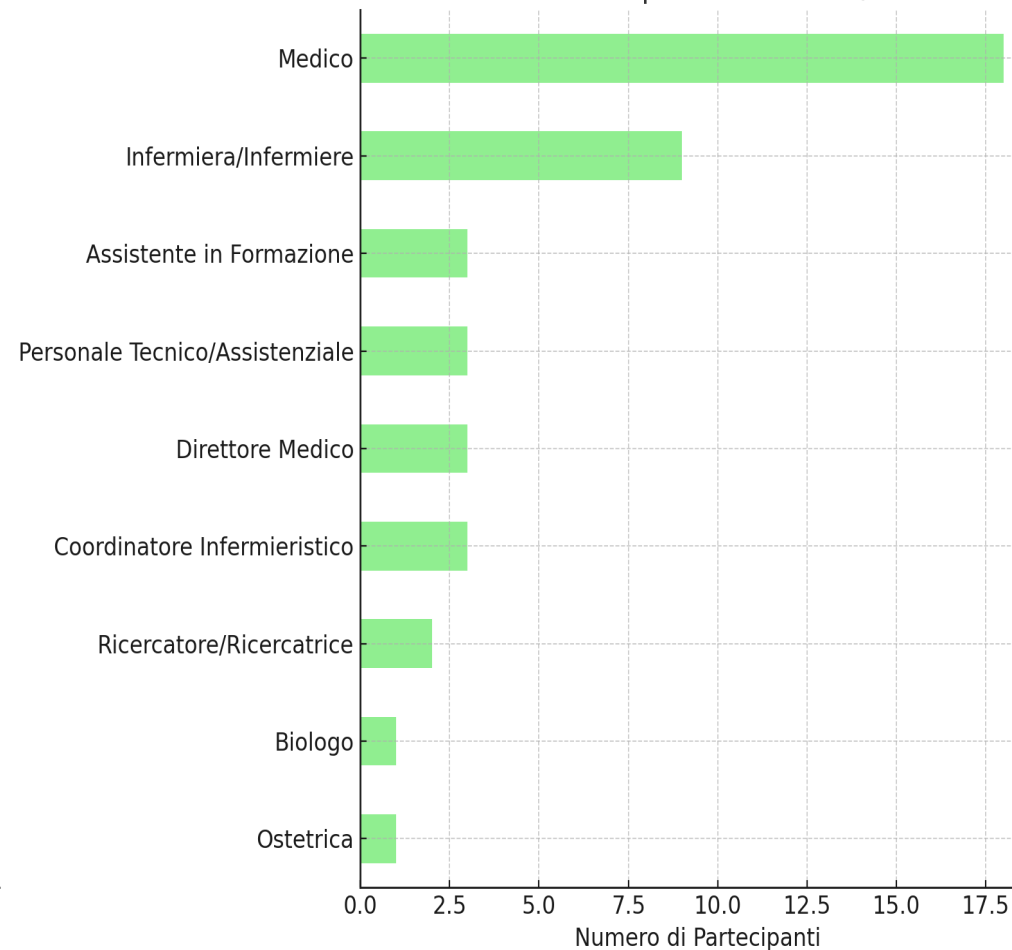
More than 90 professionals from 12 different clinics including nurses, technicians, doctors involved in high complexity care processes



Distribuzione per Unità Operativa



Distribuzione per Professione/Ruolo



Functional vs. process organization

Functional organization	Process organization
Complex flux	Simple flux
Personnel with restricted roles	Work Team – Process Owner
Hard to exchange roles	Easy to exchange roles
Empty spaces between functions	Horizontal processes through functions, strong integration
Focus on the boss	Focus on the client

The 6 areas (and sub-areas) of the Integrated Framework of Competences for *Community Based Interprofessional Teams* (**CBIT**)

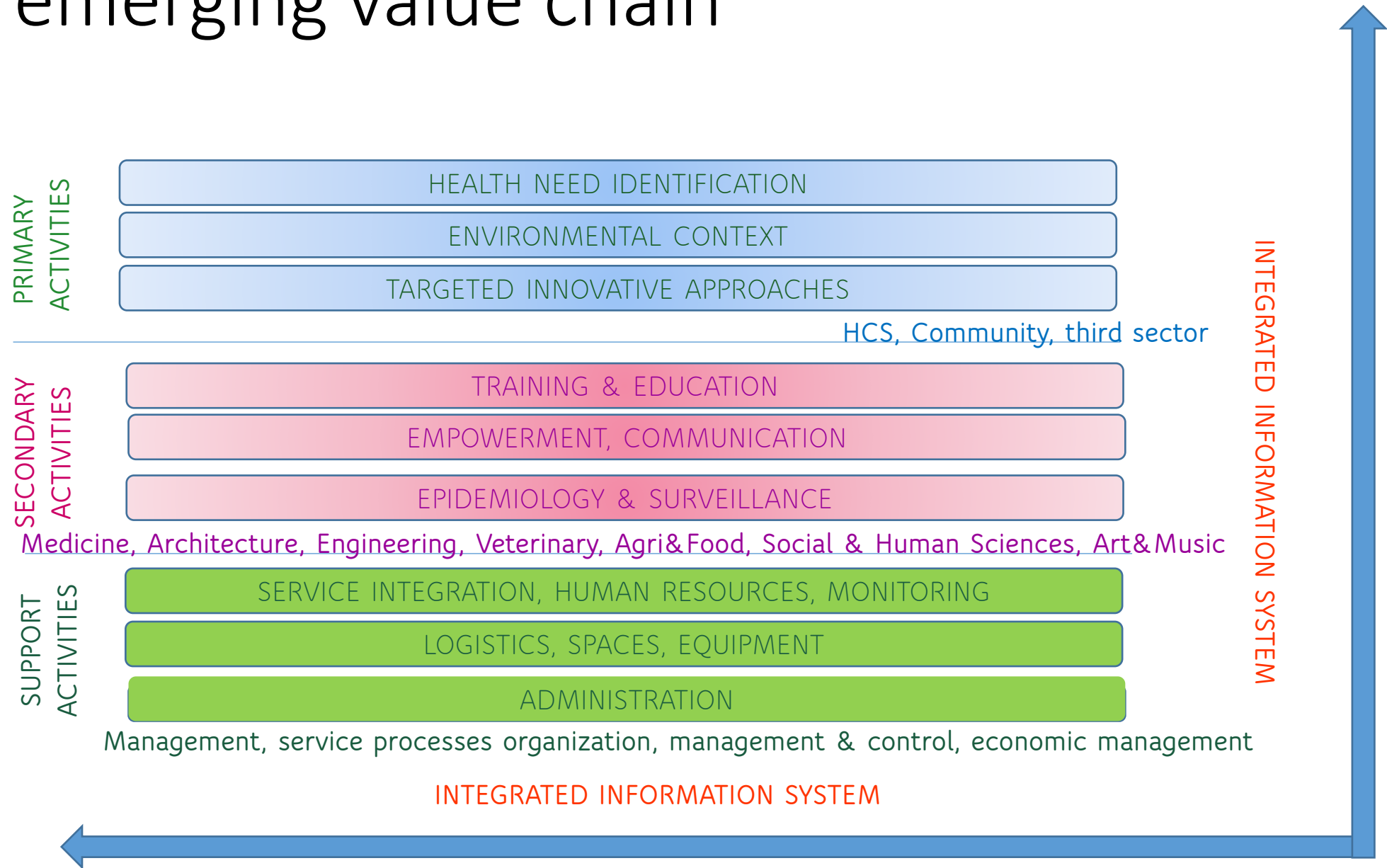


The approach to interdisciplinary training: insights from a new syllabus



- Collective leadership & interprofessional decision-making
- Team collaboration, performance and dynamics
- Interprofessional conflict management and resolution
- Interprofessional communication, roles and professional conduct
- Shared vision and approach to healthcare
- Planning and coordination of integrated care services: care management across levels of care
- Digital skills and literacy
- Digital records, registries, data management, data security, and GDPR
- Telemedicine and remote monitoring
- Resources & tools

The emerging value chain





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