# Multidisciplinary approach to AMR surveillance: European Experience and Lessons Learned

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European strategic action plan on antibiotic resistance (2011 – 2020)

- WHO European action plan adopted by all 53 Member States

- Recognizing
  - AMR neglected in many countries of the region
  - No systematic AMR surveillance in large part of the Region
  - Need for intersectoral coordination
  - International spread through travel and trade
  - Need for international standards and data sharing
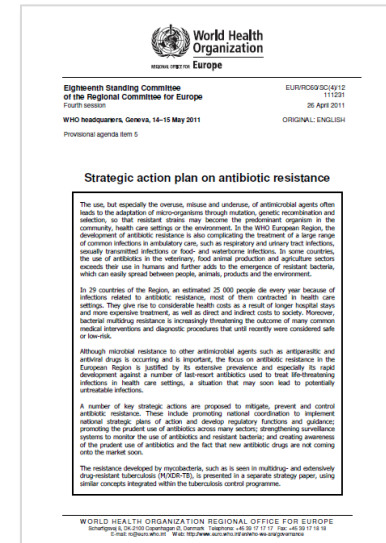
WHO/Europe vs global action plan

European Action Plan (2011-2020)	Global AMR Action Plan (2015)				
	Awareness	Knowledge	Prevention	Optimize use	Business case
Coordination	X	X	X	X	X
Surveillance		X			
Rational use		X	X	X	X
Prevention	X	X	X	X	
Agriculture	X	X	X	X	
Innovation		X	X	X	X
Awareness	X	X	X	X	

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Implementation activities (2011-2016)

- Country situation analysis
  - Briefing at Ministry of Health
  - Visit key institutions, agencies, laboratories
  - Debrief at Ministry of Health
    - Observations
    - Recommendations
    - Follow-up activities
    - WHO commitment

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Implementation activities (2012-2019)

- Policy support
  - National stakeholder meetings
  - Intersectoral Coordination Mechanism
  - National AMR action plans
  - Evidence-informed policy briefs
  - FAO/OIE/WHO One Health policy meetings
- Resources
 - Protocols, templates, tools, videos
  - Consultants/experts

A correct inoculum and satisfactorily streaked plates should result in a confluent lawn of growth evenly distributed over the plate.

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Implementation activities (2012-2019)

- Training/capacity building
    - Antimicrobial stewardship
    - Infection prevention and control
    - Standardized laboratory methods
    - Data management and analysis
    - Behaviour change campaigns
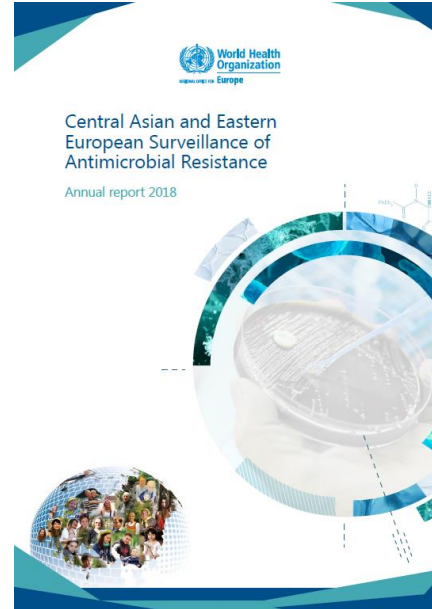- Research/projects
- Surveillance network activities

Surveillance of antimicrobial use and resistance

Antimicrobial Medicines Consumption network (AMC)
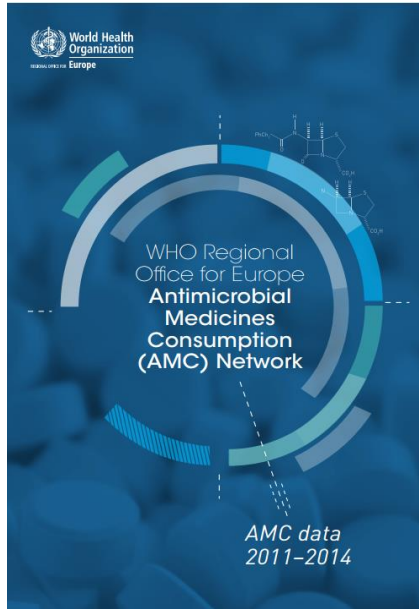
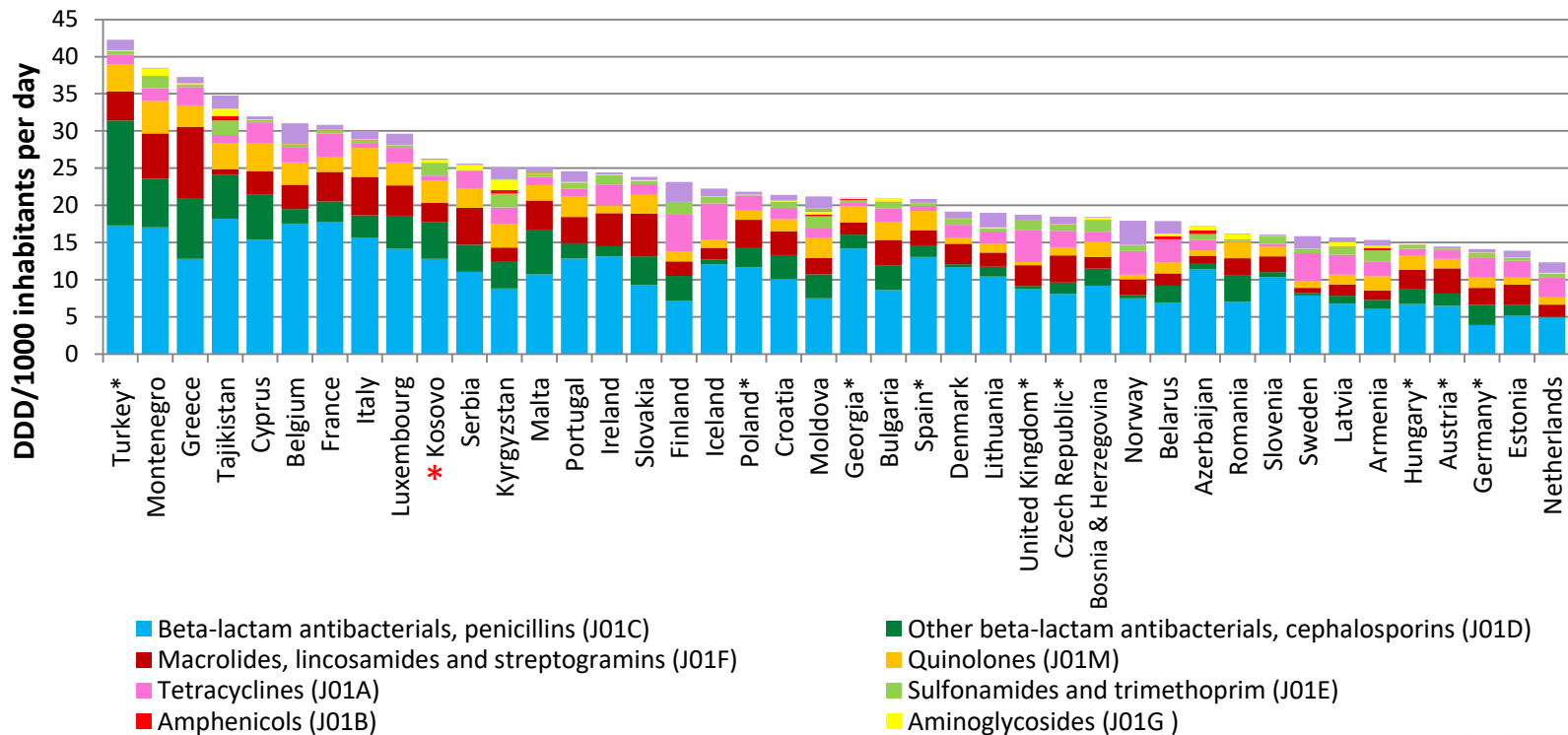Central Asian and European Surveillance of Antimicrobial Resistance network (CAESAR)

AMC trends and cross-national comparisons

Table 11.12 The 10 most consumed agents – oral formulation (2014)

Agent	DDD/1000 inhabitants per day[a]									
	Top 10	Top 9	Top 8	Top 7	Top 6	Top 5	Top 4	Top 3	Top 2	Top 1
Amoxicillin	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80
Cefalexin	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	
Amoxicillin and enzyme inhibitor	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73		
Doxycycline	2.05	2.05	2.05	2.05	2.05	2.05	2.05			
Azithromycin	1.79	1.79	1.79	1.79	1.79	1.79				
Ciprofloxacin	1.39	1.39	1.39	1.39	1.39					
Sulfamethoxazole and trimethoprim	1.07	1.07	1.07	1.07						
Pipemidic acid	0.91	0.91	0.91							
Ampicillin	0.83	0.83								
Clarithromycin	0.81									
Total consumption for this group of agents	24.82	24.01	23.18	22.26	21.19	19.80	18.01	15.96	13.23	9.80
Total consumption for all oral J01 antibacterials	27.82	27.82	27.82	27.82	27.82	27.82	27.82	27.82	27.82	27.82
Proportion (%) of total consumption for oral J01 antibacterials	89.2%	86.3%	83.3%	80.0%	76.2%	71.2%	64.7%	57.4%	47.5%	35.2%

ESAC-Net and AMC data
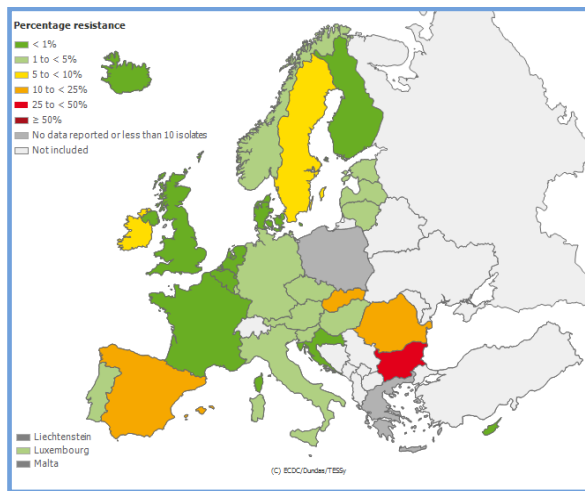
* Kosovo: In accordance with UN Security Council Resolution 1244, 1999.

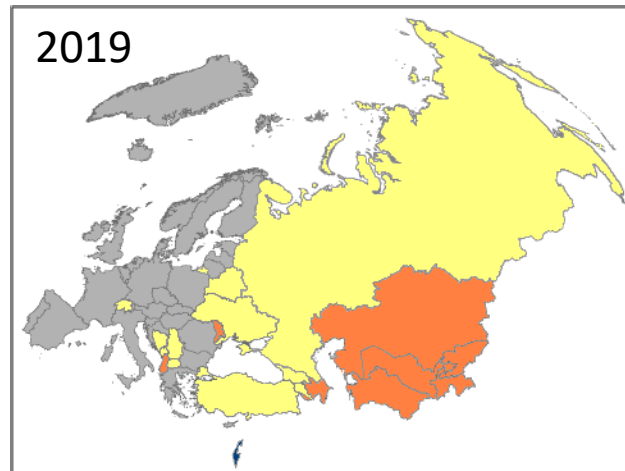# Expanding AMR surveillance throughout Europe

European Antimicrobial Resistance Surveillance Network (EARS-Net)

European Centre for Disease Prevention and Control

## Central Asian and European Surveillance of AMR (CAESAR)

2019

World Health Organization Regional Office for Europe

- ■ Countries submitting data to CAESAR
- ■ Countries building capacity for CAESAR participation
- ■ Countries invited for CAESAR participation
- ■ Countries participating in EARS-Net

CAESAR Methodology

- Routinely collected blood isolates
- Pathogens under surveillance
  - *S. aureus* (MRSA)
  - *S. pneumoniae* (Pen R)
  - *E. coli* (ESBL, Carbapenemases)
  - *K. pneumoniae* (ESBL, Carbapenemases)
  - *E. faecium* and *E. faecalis* (VRE)
  - *P. aeruginosa* (MDR)
  - *Acinetobacter* spp.
  - *Salmonella* spp.

- International standards - EUCAST/ CLSI guidelines
  - MIC/Zone diameter/Etest and SIR interpretations of Patient characteristics
  - Gender, Age, ICU
- Denominator information
  - Patient days to calculate incidences
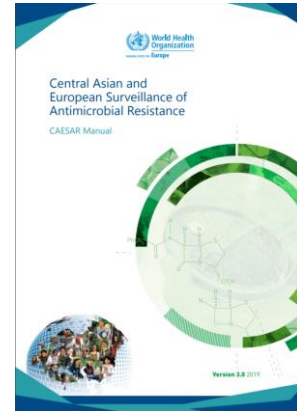
Challenges

- Sampling issues
  - Low blood sampling frequency
  - After repeated treatment failure
  - Limited laboratory capacity for AST*
  - Clinical microbiology not valued
- Data issues
  - Paper-based records
  - No laboratory information system
- Quality issues
  - Experience and expertise
  - Availability of materials

* Antimicrobial susceptibility testing
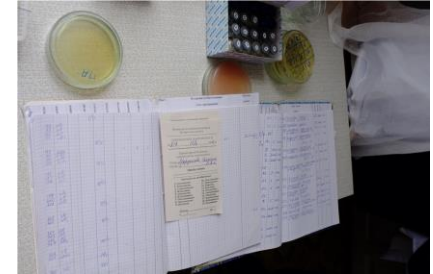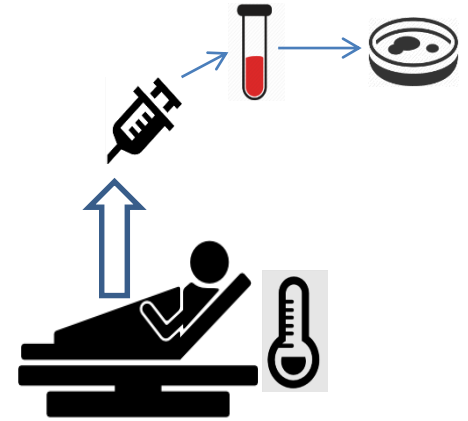
Challenges

- Limited manufacturers and companies present in the local market
  - Only one company is registered to provide lab supplies
  - Quality of lab supplies questionable yet expensive
- Low demand for lab supplies for susceptibility testing
  - Low interest of producers to enter the market
- Quality criteria for laboratory consumables not included in tendering process for state procurement
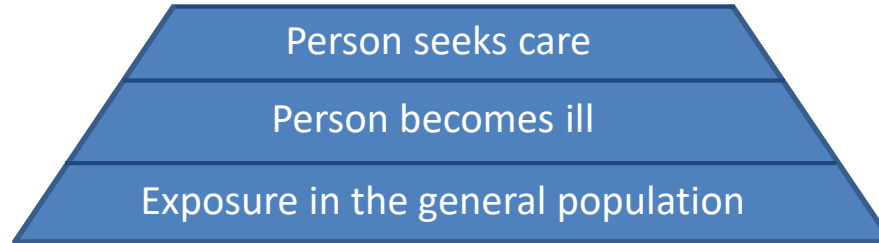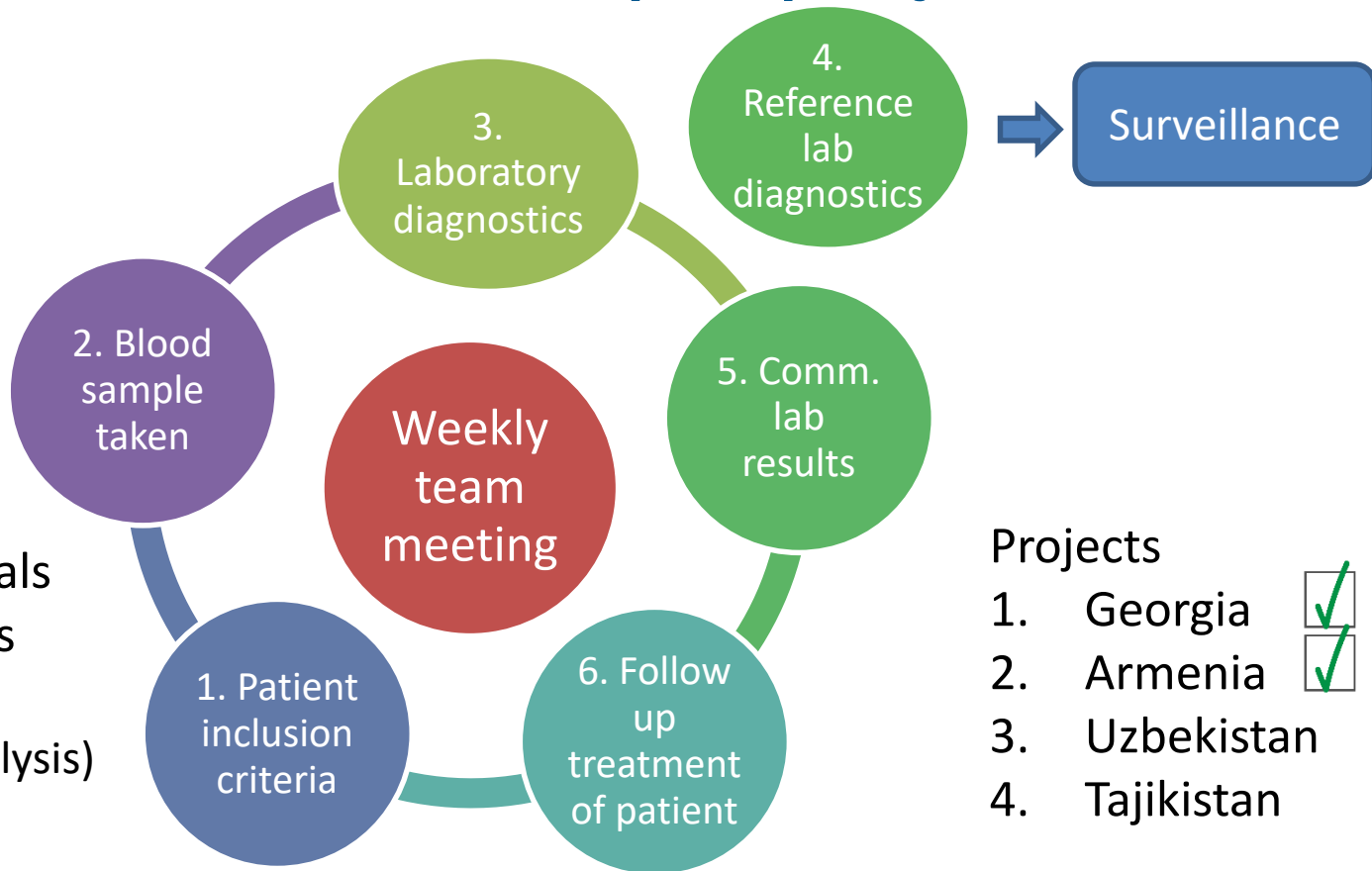
The surveillance pyramid

No samples

⬇

No data

⬇

No surveillance

Person seeks care

Person becomes ill

Exposure in the general population

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Steps of Proof-of-Principle project (PoP)

I. Select 3-5 hospitals
II. Setup local teams
III. Provide training
(sampling, lab, analysis)
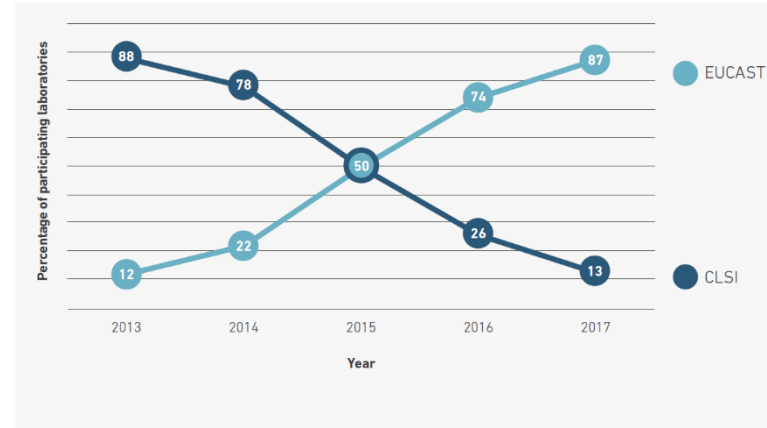IV. Evaluate

Surveillance

Projects
1. Georgia ✓
2. Armenia ✓
3. Uzbekistan
4. Tajikistan

CAESAR activities

- Strengthen National AMR reference laboratories
  - Wet-lab / dry-lab training
  - Quality control and management
  - Introduce EUCAST methodology
  - Introduce WHONet
  - Support national laboratory network
  - Feedback on submitted data
- Data management and analysis training
- Provide External Quality Assessment
- Organize annual regional and national network meetings

Fig. 9.3 Trends in AST guidelines used by CAESAR EQA participating laboratories, 2013–2017

EUCAST: 12 (2013), 22 (2014), 50 (2015), 74 (2016), 87 (2017)
CLSI: 88 (2013), 78 (2014), 50 (2015), 26 (2016), 13 (2017)

Percentage of participating laboratories — Year

CAESAR data - Levels of evidence

- Level A
  - Data is representative of target population
  - Laboratory results seem reliable

- Level B
  - Data is not representative of target population
  - Laboratory results seem reliable

- Level C
  - Data is not representative of target population
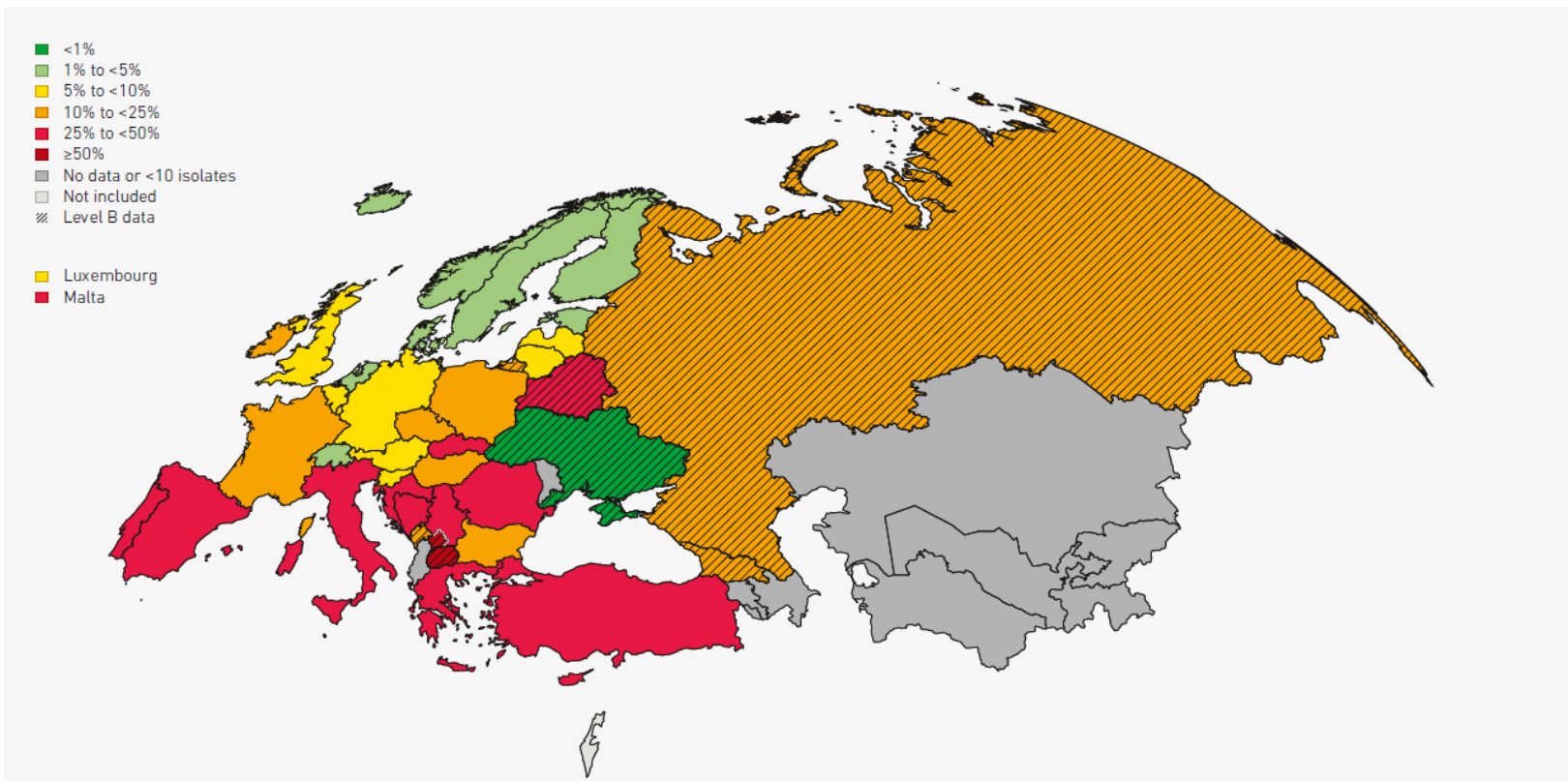 - Laboratory results seem not entirely reliable

CAESAR data - Levels of evidence

Sources of error and bias		Belarus	Bosnia and Herzegovina	Georgia	Montenegro	Russian Federation	Serbia	Switzerland	The former Yugoslav Republic of Macedonia	Turkey	Ukraine	Kosovo[a]
Level of evidence		B	(A)	B	B	B	(A)	A	B	A	B	B
Surveillance system	Geographic coverage	+	+	+	+	+	+	+	+	+	+/−	+/−
	Hospital types	+	+	+	+	−	+	+	+	+	−	−
Sampling procedures	Selection of patients	−	+/−	−	−	−	+/−	+	−	+/−	−	−
	Sample size	+	+	−	−	−	+	+	−	+	−	−
Laboratory procedures	AST methods	+/−	+	+	+	+	+	+	+	+	+/−	+
	AST breakpoints	+/−	+	+/−	+	+	+	+	+	+	+/−	+

a In accordance with United Nations Security Council resolution 1244 (1999).

AMR surveillance data in the European region

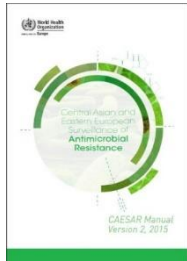MRSA in the European Region (EARS-Net and CAESAR), 2017

Legend:
- <1%
- 1% to <5%
- 5% to <10%
- 10% to <25%
- 25% to <50%
- ≥50%
- No data or <10 isolates
- Not included
- Level B data
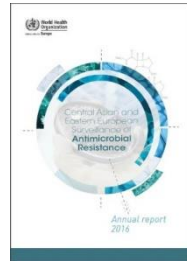
- Luxembourg
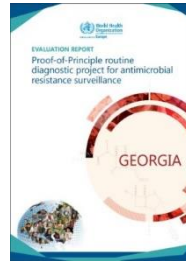- Malta

CAESAR publications

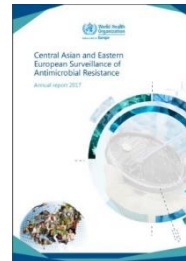Annual Report 2014

Manual 2015

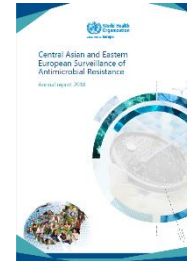Annual Report 2016

WHO CC Activities 2016

Proof of Principle Georgia 2017

Annual Report 2017

Proof of Principle Protocol 2018

Annual Report 2018

Manual 2019

Phases towards national AMR surveillance

Phase 1
- Situation: Limited routine laboratory diagnostics/health system
- Support: PoP project/Basic capacity building/Quality Assessment

Phase 2
Situation: No national AMR surveillance, but a basis to built on
Support: Reference Lab support, setting up national AMR network

Phase 3
Situation: National surveillance system in place
Support: Strengthen national AMR surveillance: **CAESAR → GLASS**

Antimicrobial stewardship

- Online course: "Antimicrobial Stewardship: A competency-based approach" (https://www.openwho.org/)

- Stewardship courses

- Pilot projects

Evidence-informed Policy Network (EVIPNet)

- Global WHO initiative promoting systematic use of health-research evidence in policy-making

- Workshops to build country capacity to develop policy briefs
  - training in acquiring, assessing, adapting and applying research evidence

- Policy dialogue meetings

- Policy briefs on AMR
  - Completed: Hungary (2017), Slovenia (2018)
  - Ongoing: Bulgaria, Kazakhstan, Lithuania, Moldova, Montenegro, North Macedonia, Romania, Serbia

Core components of infection prevention and control programmes at the national and acute health care facility level

Core Component 1
IPC Programme

Core Component 2
IPC Guidelines

Core Component 3
IPC Training/Education

Core Component 4
HAI Surveillance

Core Component 5
Multimodal Strategies

Core Component 6
Monitoring, audit & feedback

Core Component 7
Workload, staffing & bed occupancy

Core Component 8
Built environment, materials & equipment for IPC

Awareness Week

Materials

- Infographs
- Websites
- Videos
- Press releases
- Presentations

Activities

- Country events (press conferences, seminars, workshops)
- Social media

Tailoring AMR Programmes (TAP)

- Knowledge alone not enough to change behaviour
- Methods/tools to design targeted behaviour change campaigns
- Based on behavioural science & social marketing
- Pilot projects
  - Ongoing: Sweden, England, Hungary, Kazakhstan, the former Yugoslav Republic of Macedonia
- Guidance document
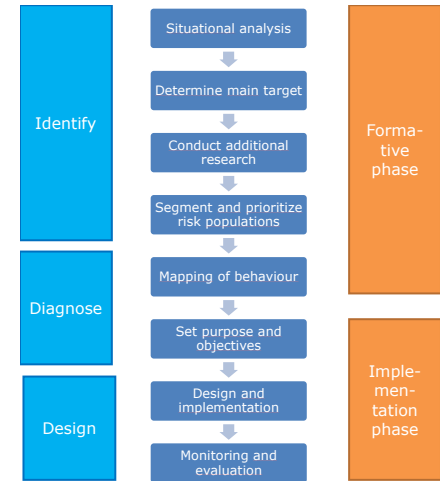
Making progress

- Progressing on all strategic objectives
- Broad collaboration
  - Within WHO (Global – Regional – National)
  - With International Organizations (FAO, OIE)
  - With external partners (international, national)
  - With donors (countries, foundations)
- Supporting materials /tools developed and distributed
- Pool of experts/consultants

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Thank you for your attention