OASIS

ONE HEALTH AMR SURVEILLANCE USING INNOVATIVE SAMPLING

VU UNIVERSITY AMSTERDAM

OASIS project: surveillance antimicrobial resistance

Embark webinar

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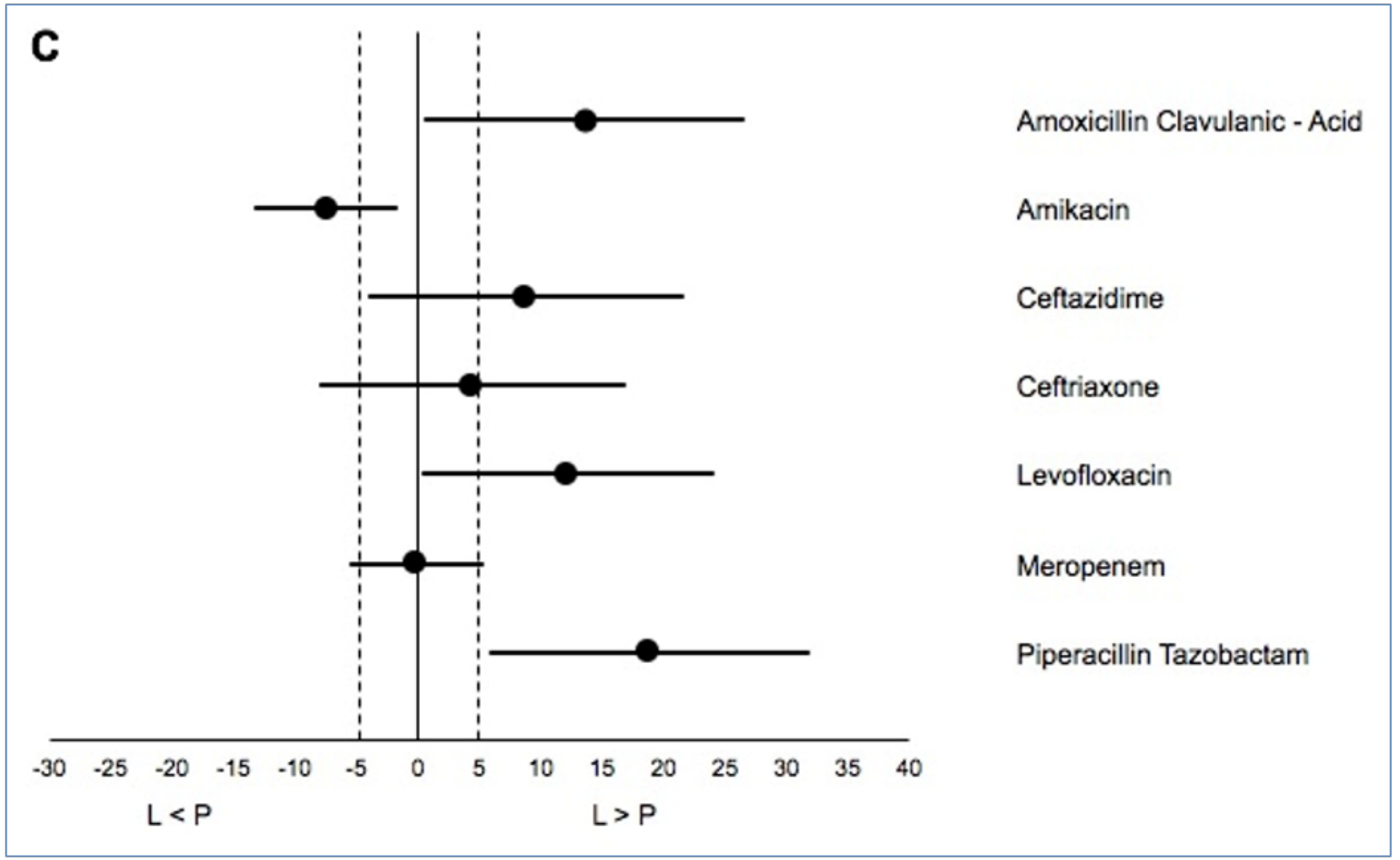
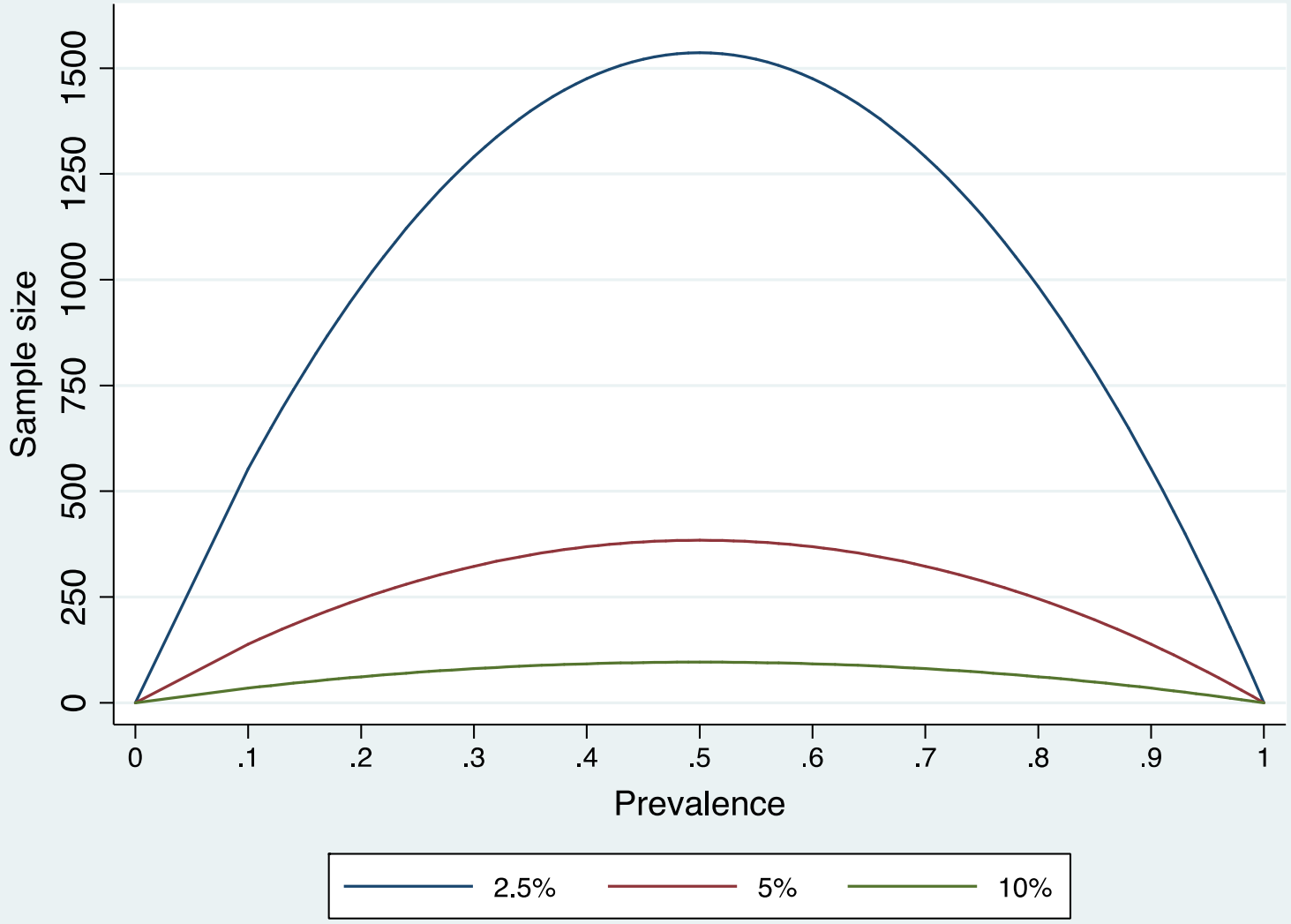
14 June 2023

Motivation OASIS project



Sugianli et al. PLoS One, 2020

Motivation OASIS project



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Motivation OASIS project

Thor Alvis on Unsplash

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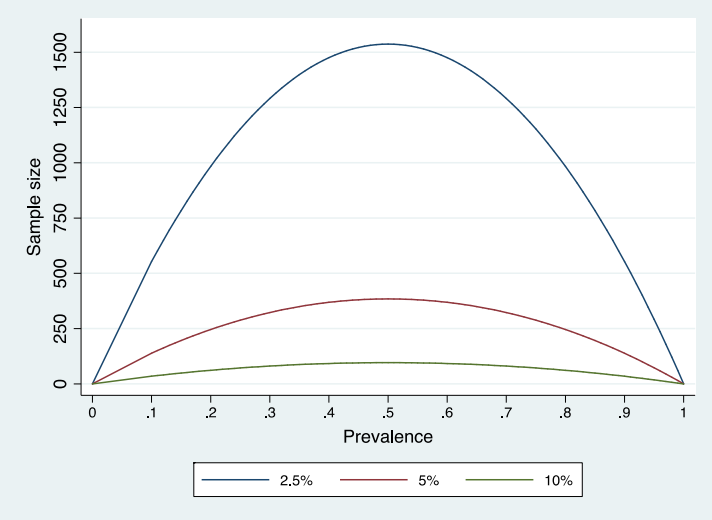

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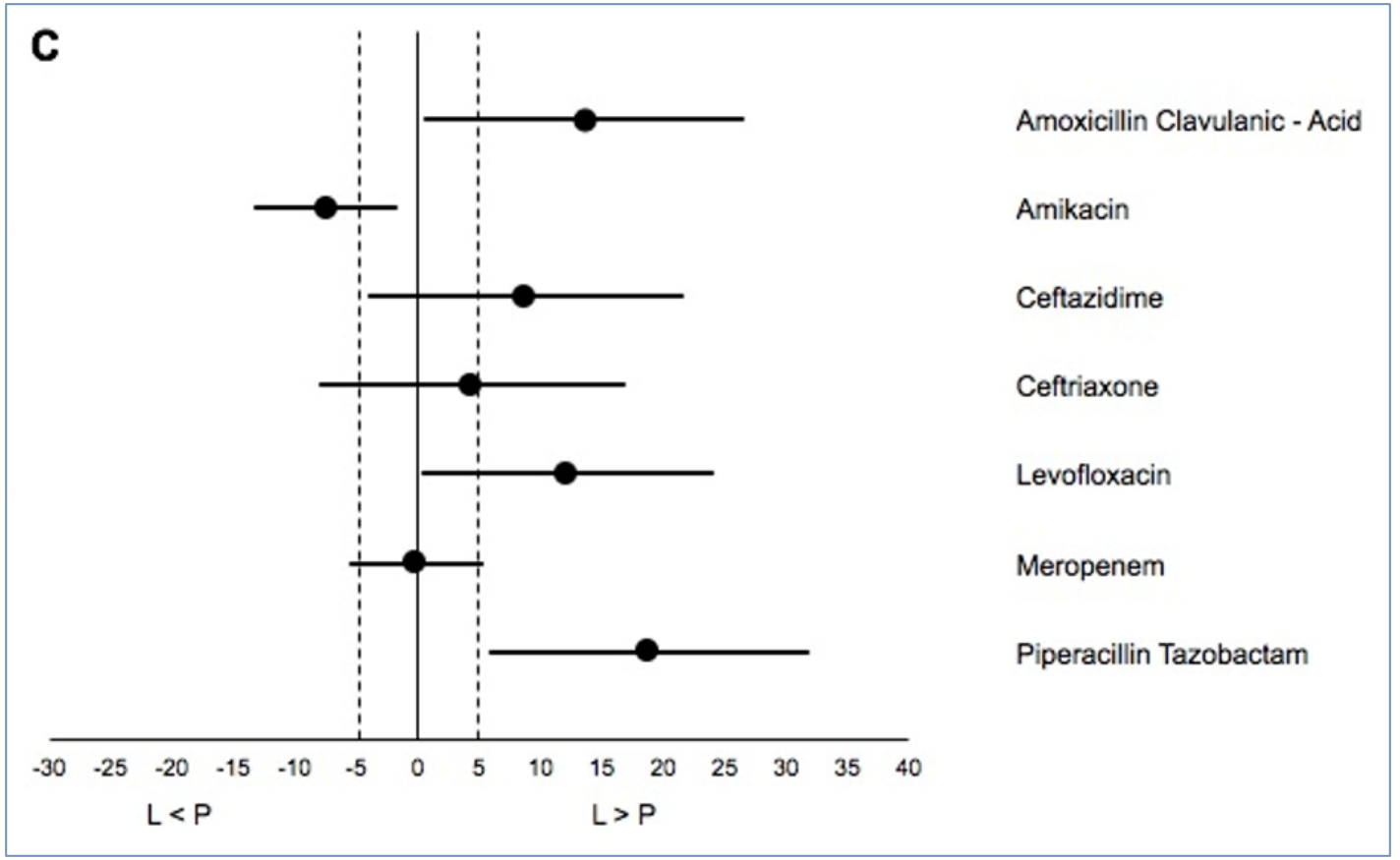

Sugianli et al. PLoS One, 2020

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LOT QUALITY ASSURANCE SAMPLING

LQAS-based AMR surveillance

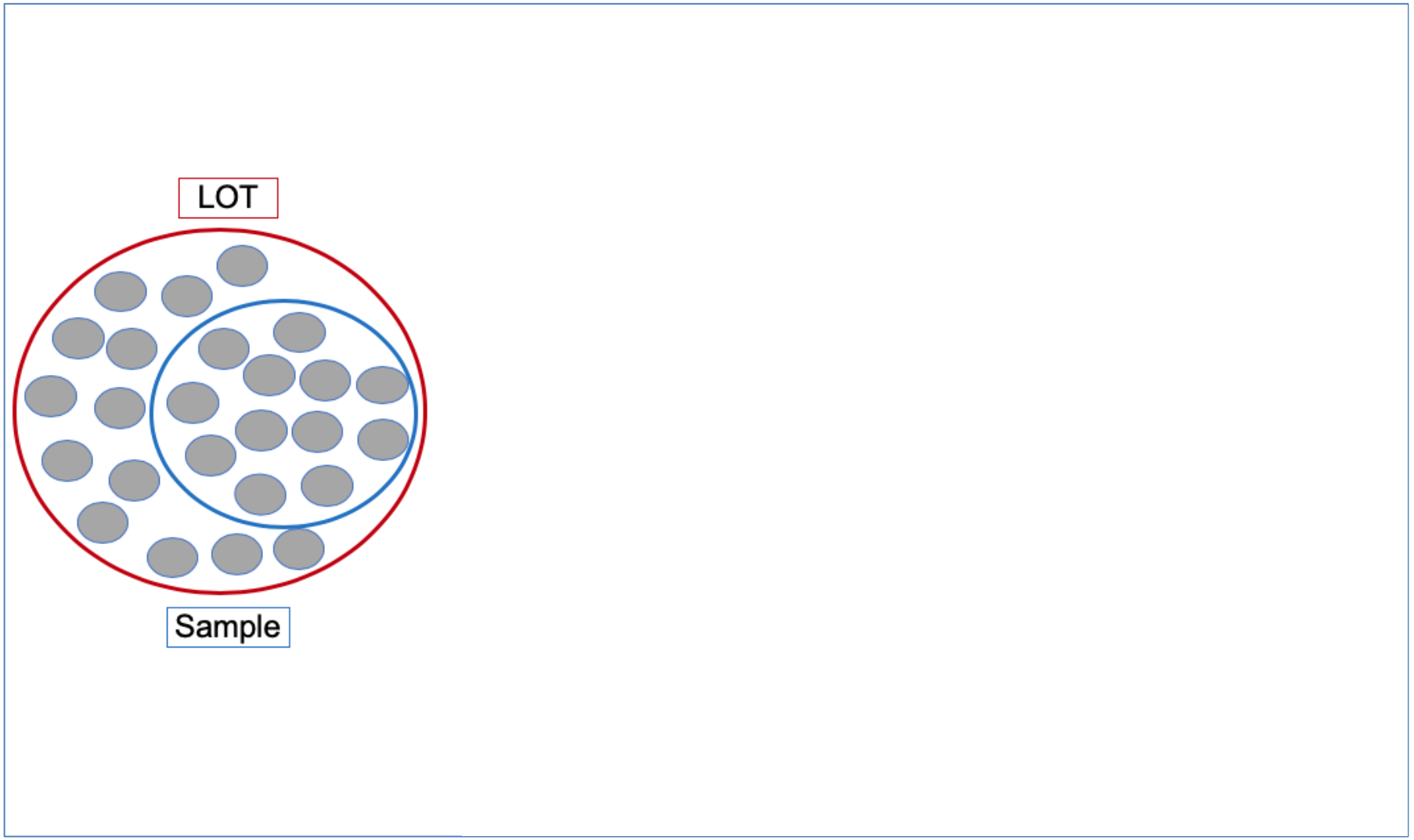
- It moves from estimation to classification

What is the prevalence of AMR in this population?

to

Is the AMR prevalence above a certain threshold?

LQAS approach



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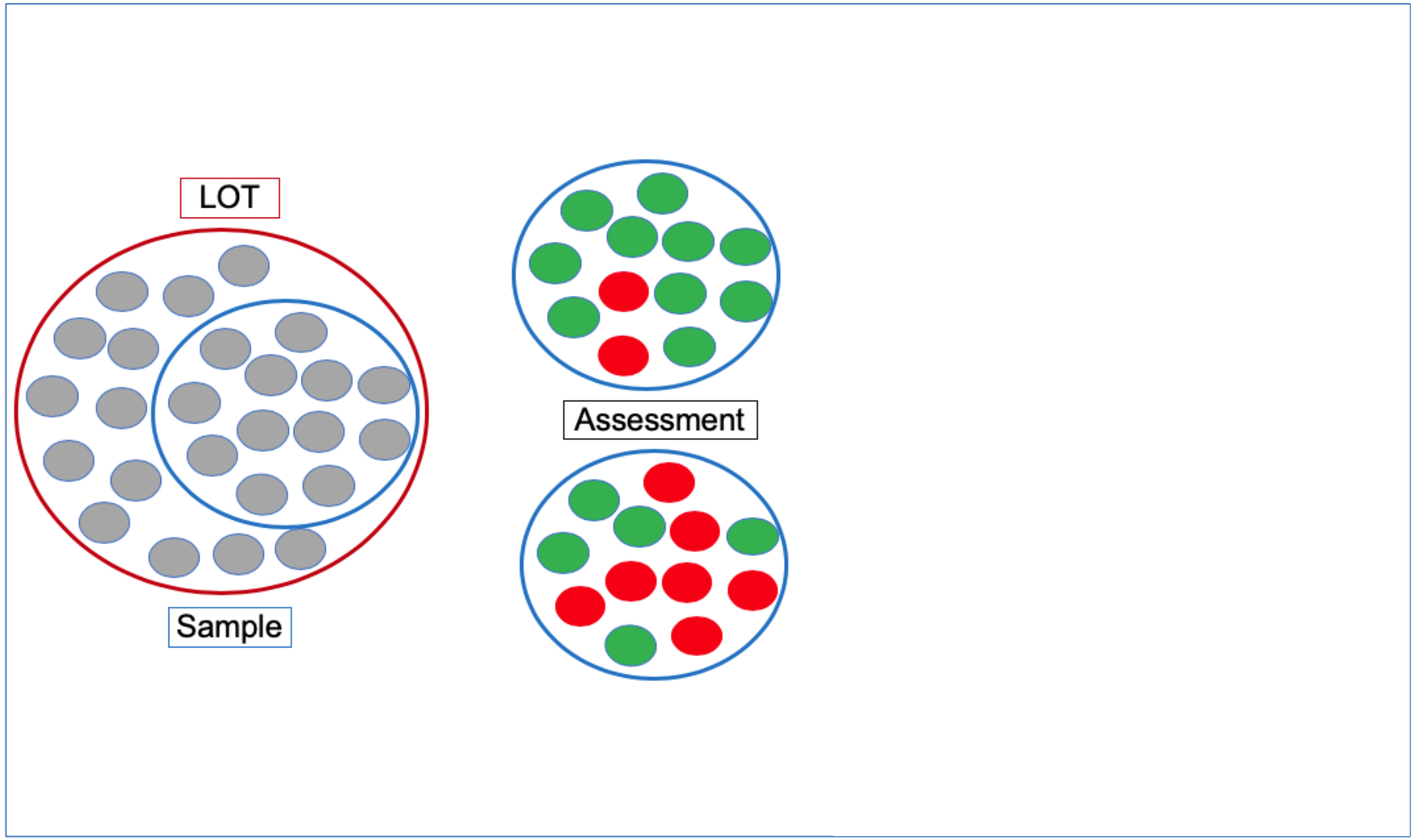
LQAS approach



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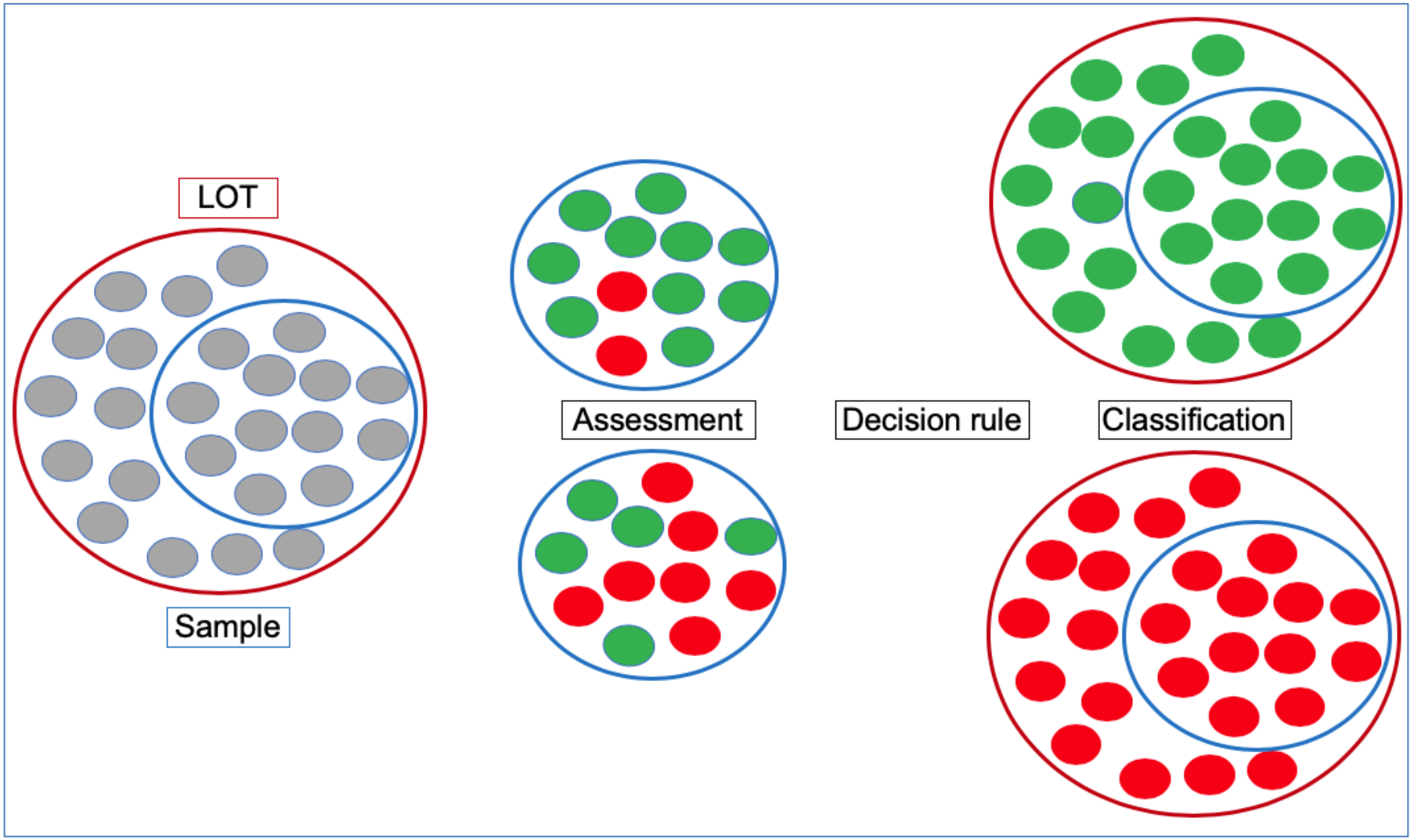
LQAS approach



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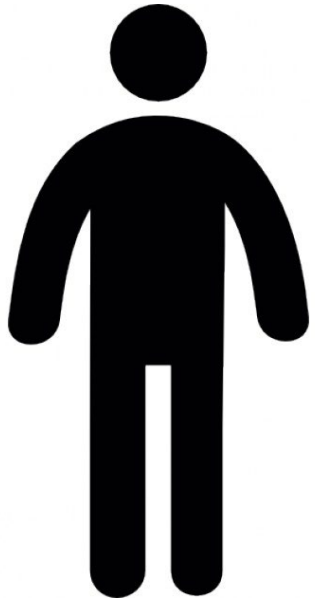
LQAS-BASED SURVEILLANCE IN OASIS

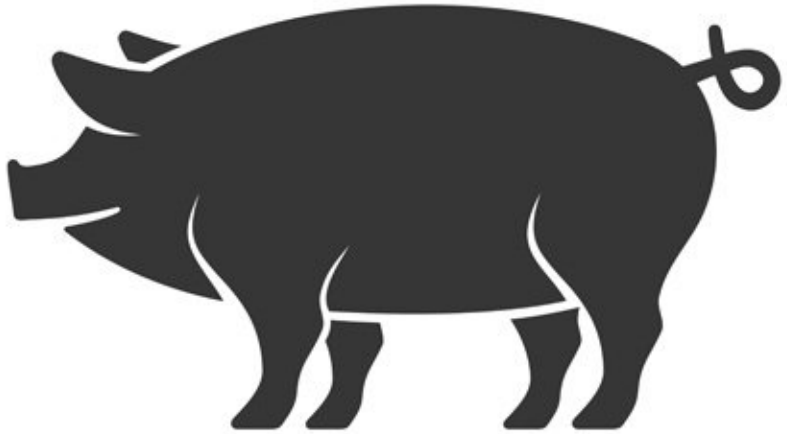
Surveillance source and sites



Patients suspected UTI

Outpatient setting

Burkina Faso / Togo



Broiler chicken

Routine Salmonella surveillance

Germany

Fattening pigs

Manure trucks slaughterhouse

Germany

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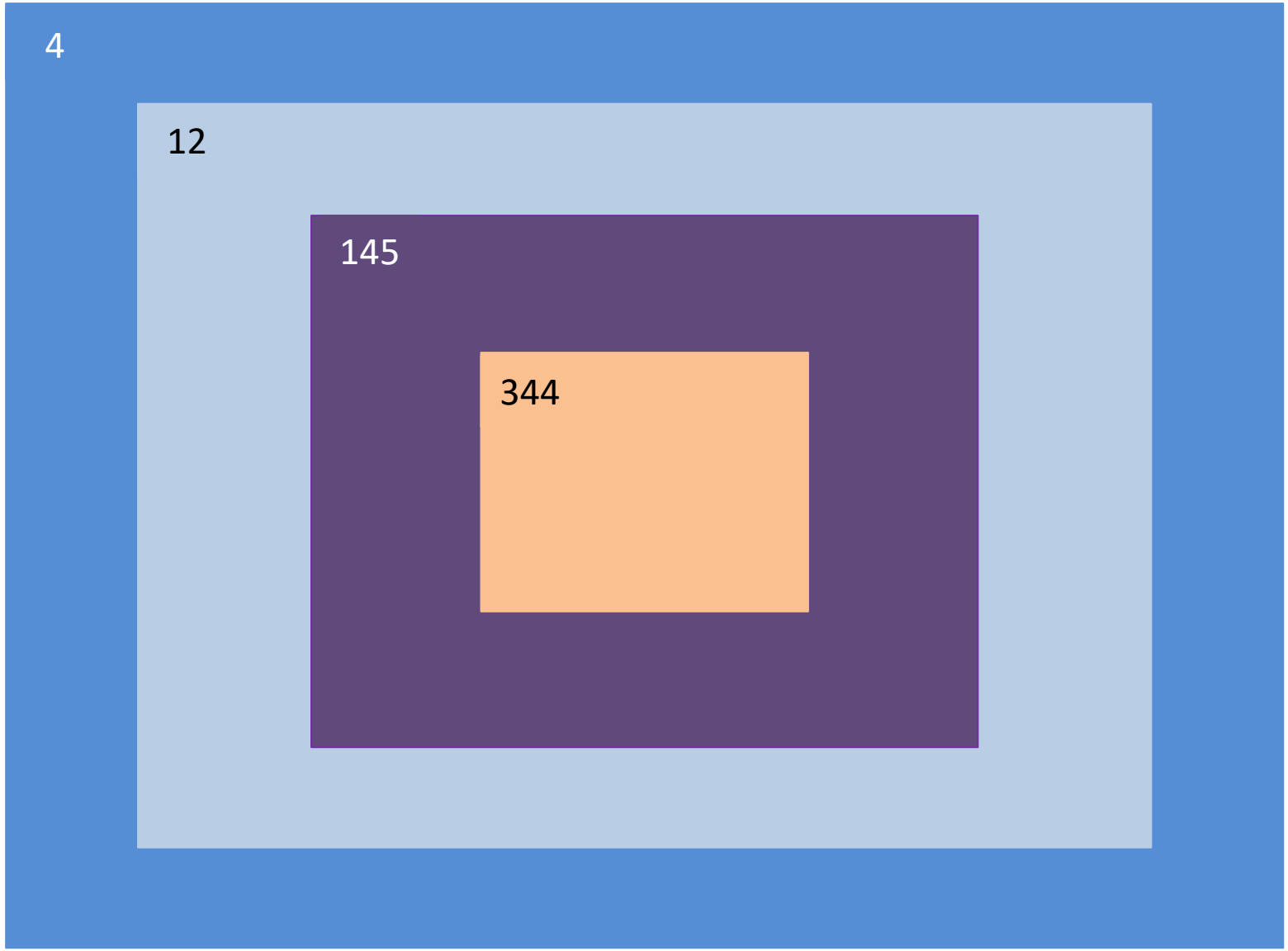
Data structure surveillance chicken



Farm

District

State

Zone

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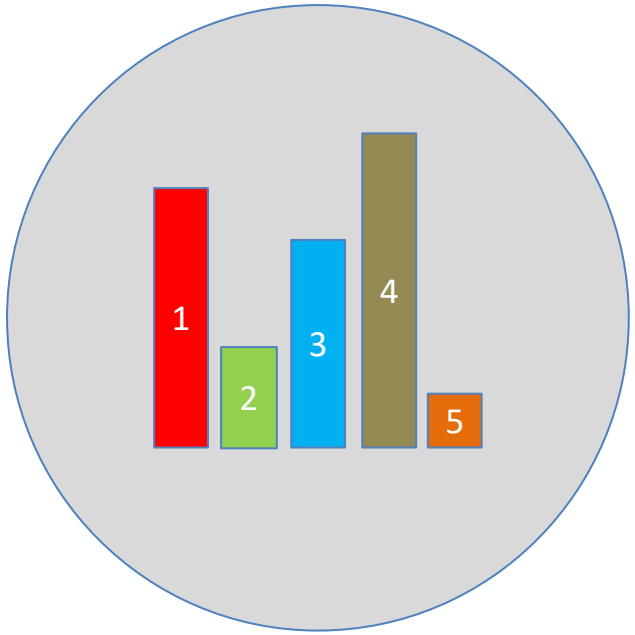
Conventional surveillance veterinary domain chicken



> 1400 isolates E-coli

Resistance profile 14 antibiotics

"True resistance" in population

Amikacin
Amoxicillin/Clavulansäure
Ampicillin
Cefotaxim
Ceftazidim
Colistin
Enrofloxacin
Florfenicol
Gentamicin
Piperacillin/Tazobactam
Spectinomycin
Sulfamethoxazol
Tetracyclin
Trimethoprim

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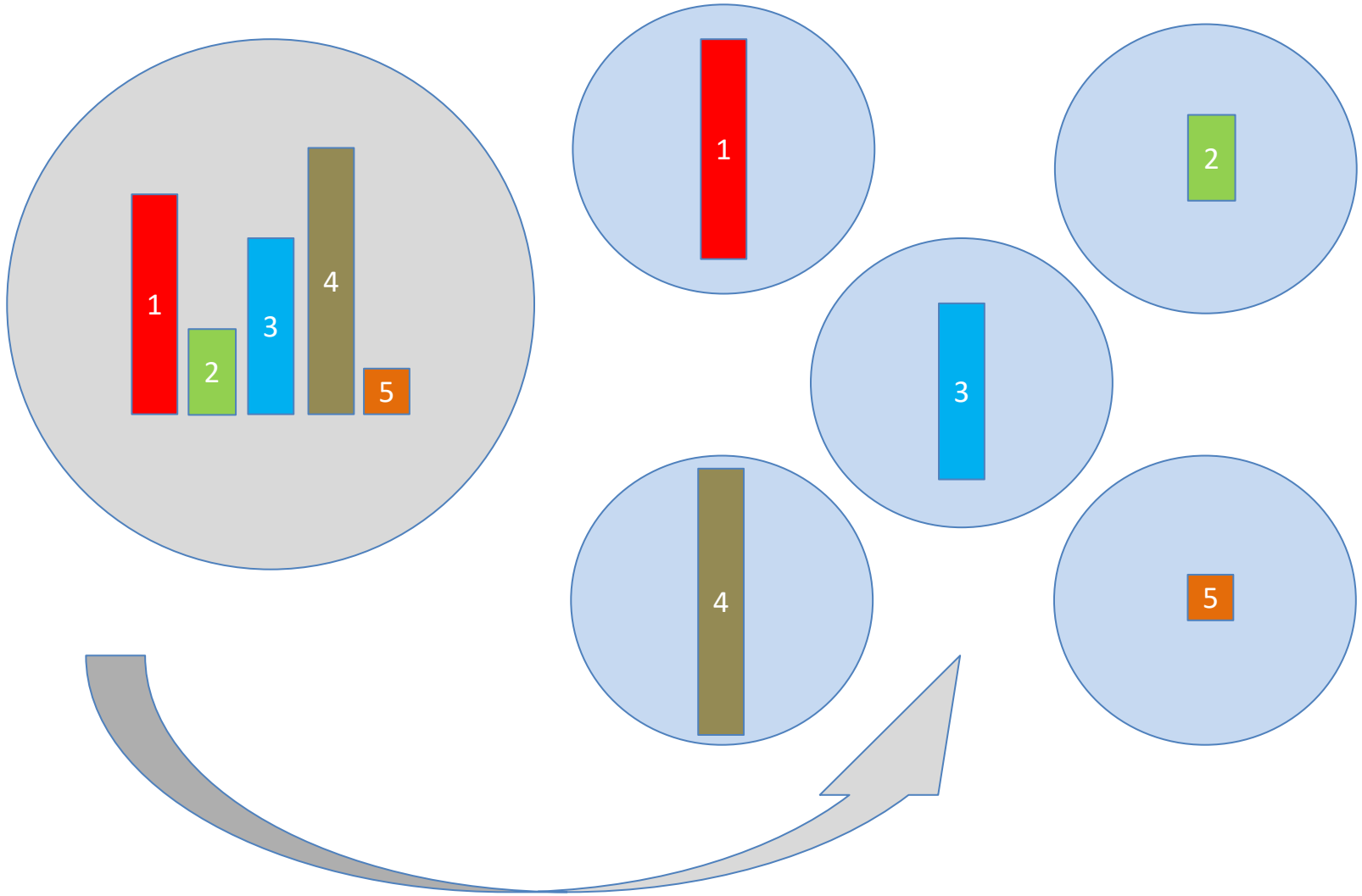
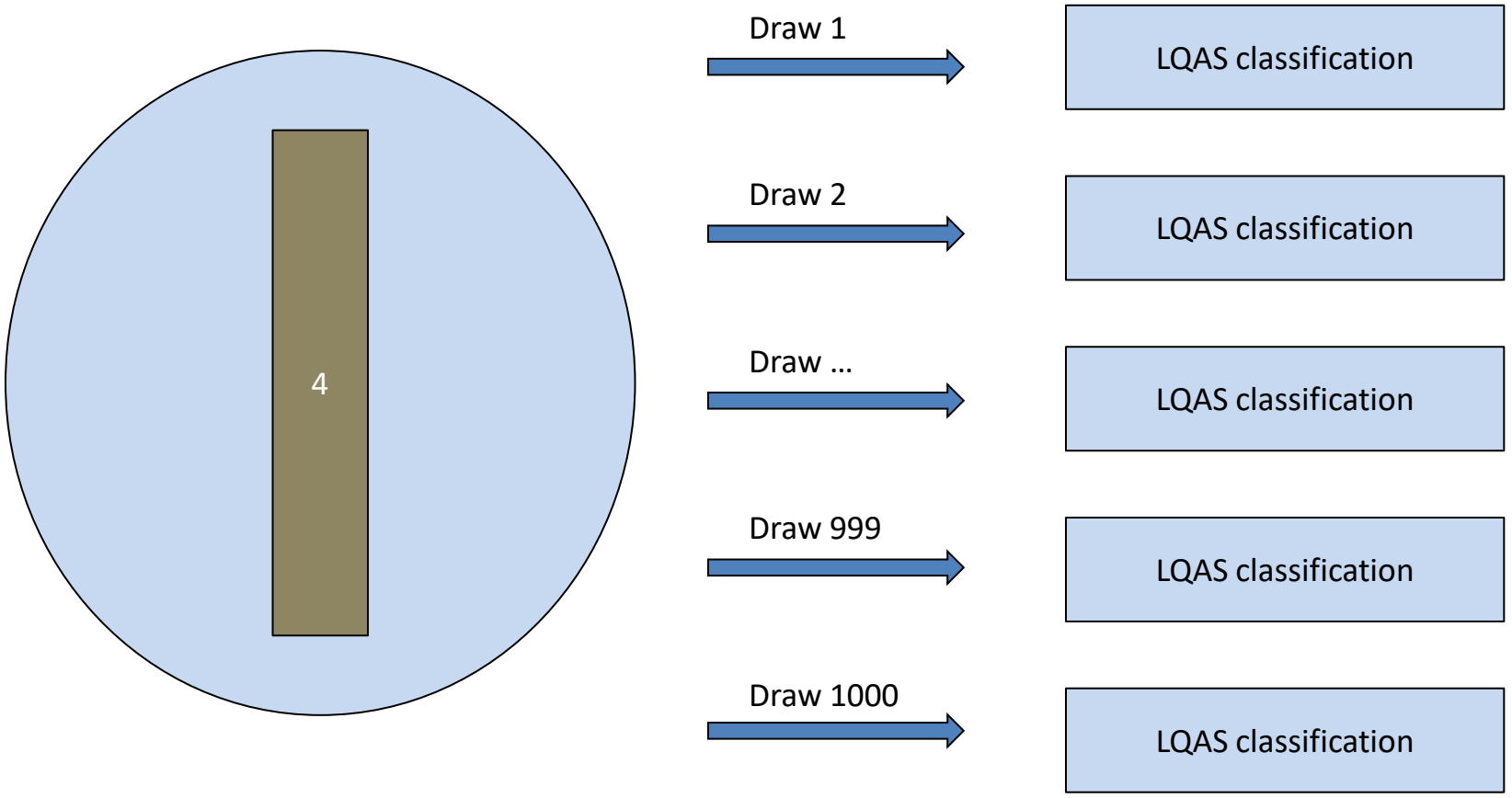
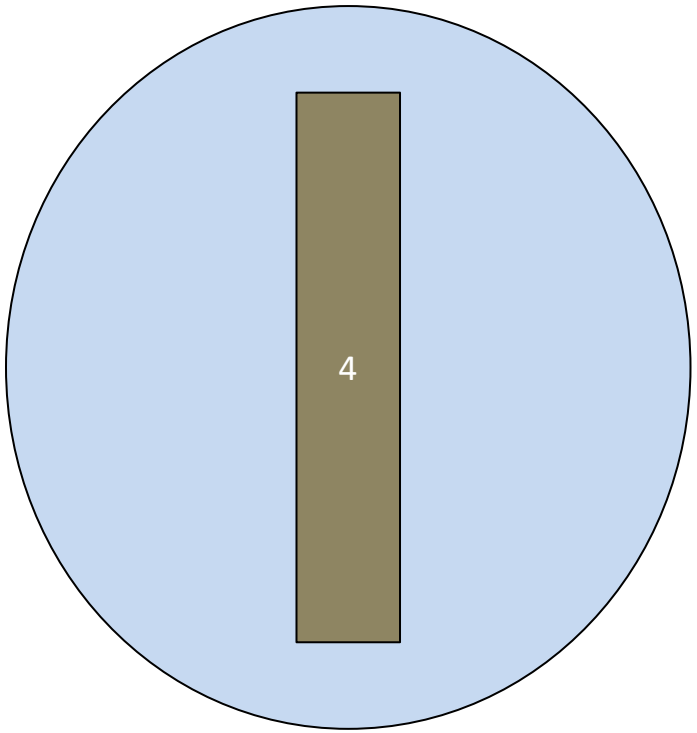
Theoretical lots from conventional surveillance



LQAS classifications from repeated draws



LQAS classifications from repeated draws



Draw 1

Draw 2

Draw …

Draw 999

Draw 1000

LQAS classification

LQAS classification

LQAS classification

LQAS classification

LQAS classification

Correct classification high resistance

Sensitivity

Correct classification non-high resistance

Specificity

Test characteristics

LQAS definition	Sensitivity (Correct classification high resistance)	Specificity (Correct classification non-high resistance)
2 - 10	100	91.2
5 - 20	100	99.7
10 - 20	100	100
10 - 30	99.7	99.8
20 - 50	98.1	80.5
30 - 50	98.9	85.7

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Classification veterinary units: titration

id	AMC	AMK	AMP	CAZ	COL	CTX	ENR	FLL	GEN	PIT	SMO	SPT	TET	TRP	cut
10															>20
10															>50
11															>20
11															>50
13															>20
13															>50
30															>20
30															>50

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Challenges

- Data structure chicken not deep enough
  - Routine surveillance adequate source?
- Dealing with manure animals multiple farms single truck
- Interpretation findings veterinary domain
  - Carrier vs diseased animals
- Clinics human domain widely different patient profiles
  - Some very low yield culture
    - Counters efficiency LQAS-based surveillance

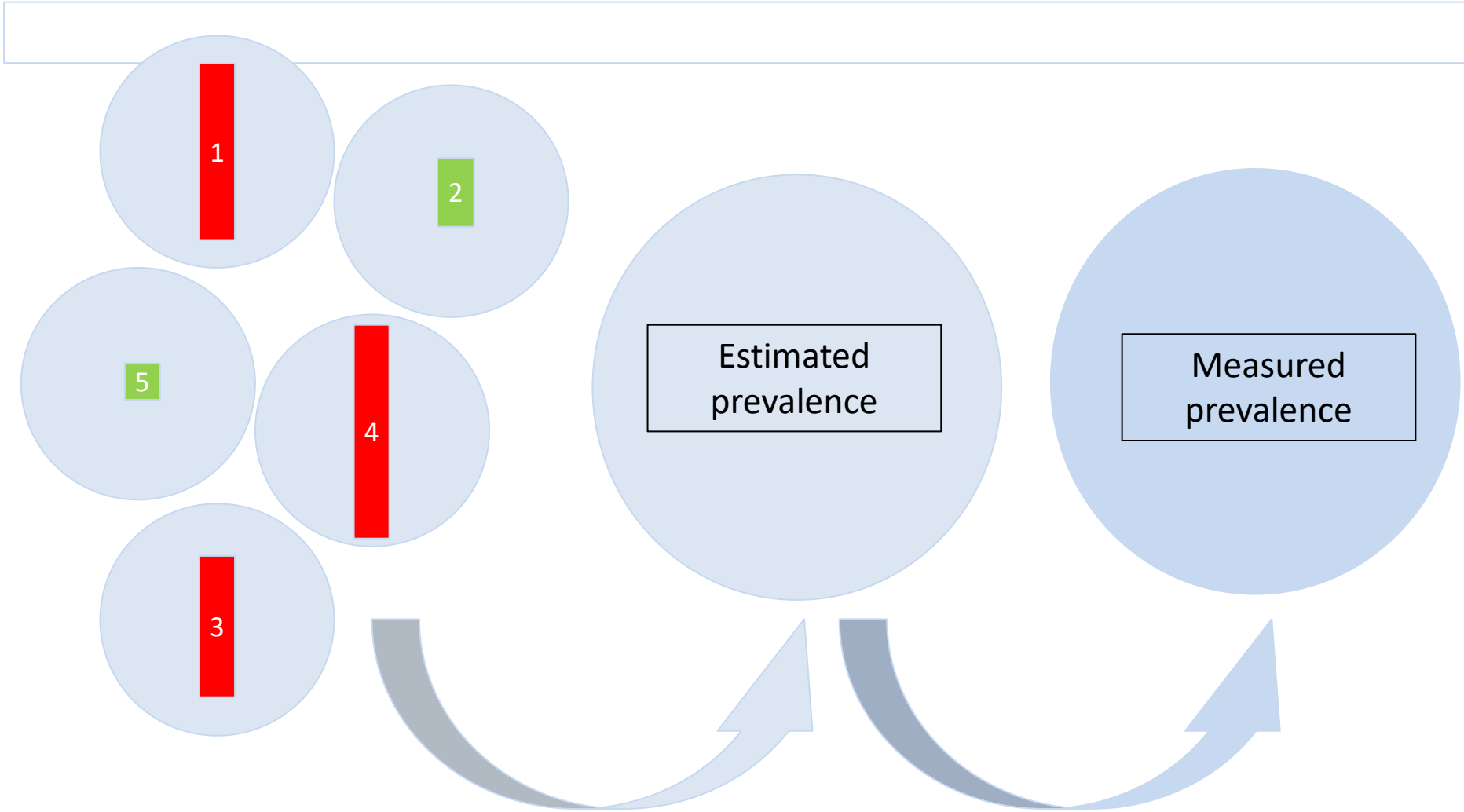
Conclusions LQAS-based AMR surveillance

- Provides locally relevant information
- Requires limited number of isolates
- Feasible to repeat to monitor trends and impact of interventions

To do

- Finalize data collection human domain
- Finalize analyses
  - Including stakeholder interviews in both domains
- Dissemination
  - Together with other JPI-AMR projects?

Validation: combine lots in conventional estimate



FURTHER WORK

Wish list

- Extend LQAS-based surveillance other areas
  - Setting / syndrome
- Incorporate further surveillance work in Marie-Curie Doctoral training network
  - Application is open
  - Looking for partners (contact me if interested)

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Funders


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ANR
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SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
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