



MINISTÈRE DE LA SANTÉ ET
DE L'ACTION SOCIALE



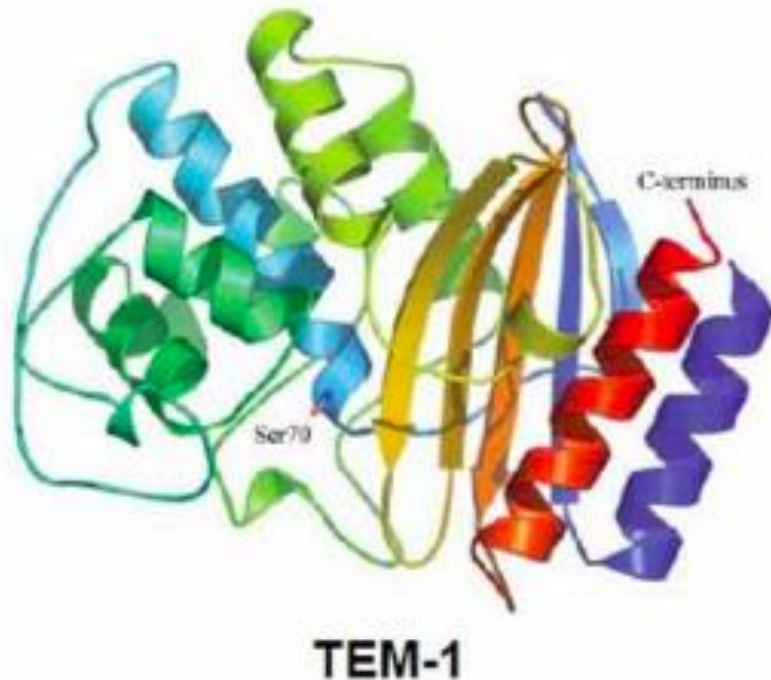
**Infections caused by Extended spectrum
beta-lactamases producing
Enterobacteriaceae:
risk factors and clinical outcomes in a
Senegalese hospital.**

Awa NDIR –Ministry of Health (Dakar-SENEGAL)

Joint IPNET-K/ICAN Conference, 6-8th November 2013, MOMBASA

β -lactamases

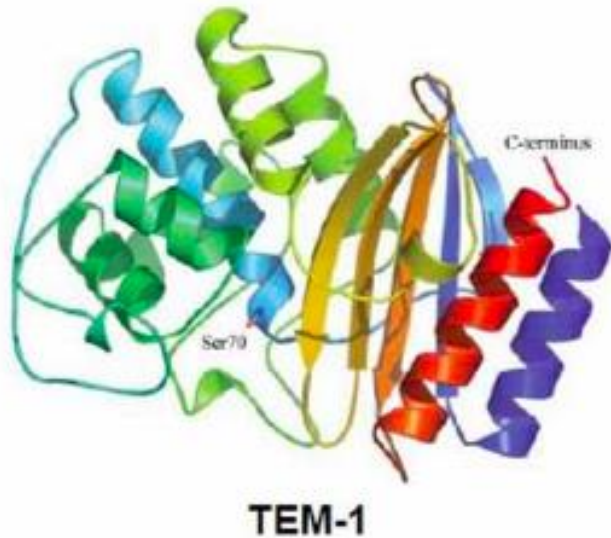
β -lactamases



- Bacterial enzymes
- Inactivate β -lactam antibiotics
- Enterobacteriaceae+++

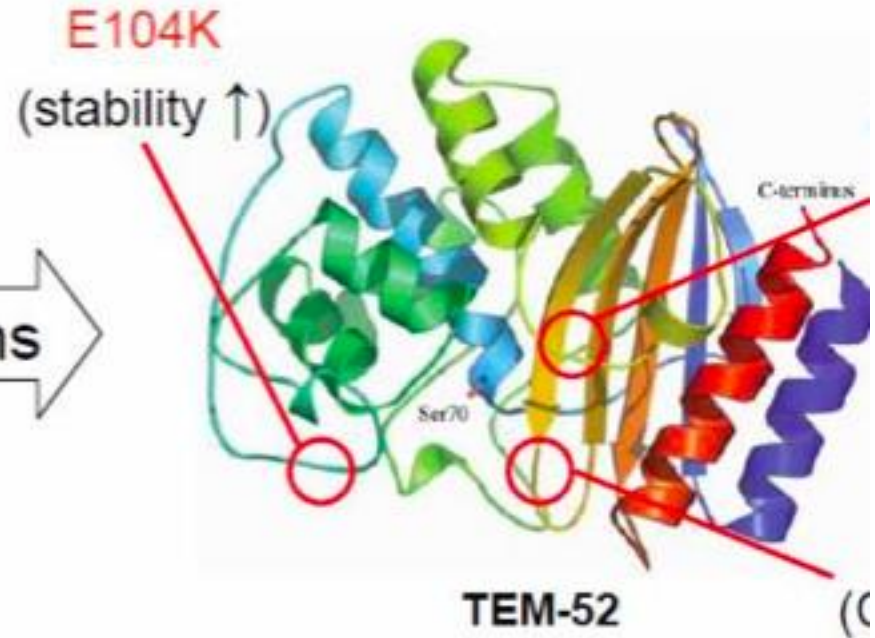
β -lactamases

β -lactamases



mutations

ESBLs



Spectrum

- Penicilline
- 1st generation cephalosporin
- 2nd generation cephalosporin

Extended spectrum

- Penicilline
- 1st generation cephalosporin
- 2nd generation cephalosporin
- **3rd generation cephalosporin**
- **Monobatam**

BURDEN OF ESBL

- ESBLs confer resistance to bacteria to all β -lactamases
- **Carbapenem**: drug of choice for the treatment of severe infections due to ESBL-producing *Enterobacteriaceae* (ESBL-PE)



Emergence of resistance reported

- Co-resistance to other antibiotics: **fluoroquinolones**

BURDEN OF ESBL

- Infections caused by ESBLs-PE are an increasing concern in clinical practice
- Limited therapeutic options available
- are associated with an increase
 - ... in length of stay
 - ... in hospital costs
 - ... in mortality

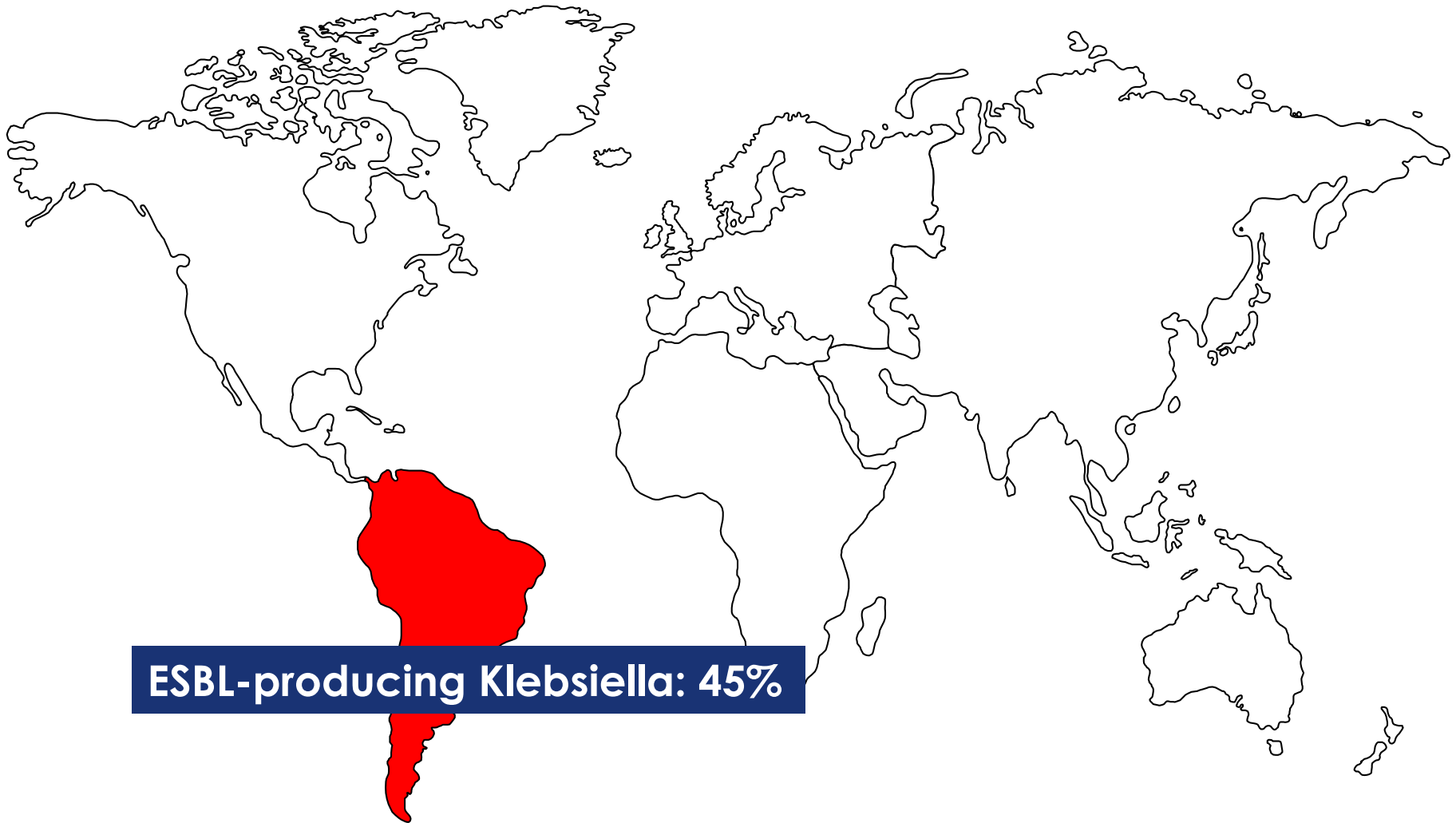
ESBL WORLDWIDE

The epidemiology of ESBL-PE varies across countries



ESBL WORLDWIDE

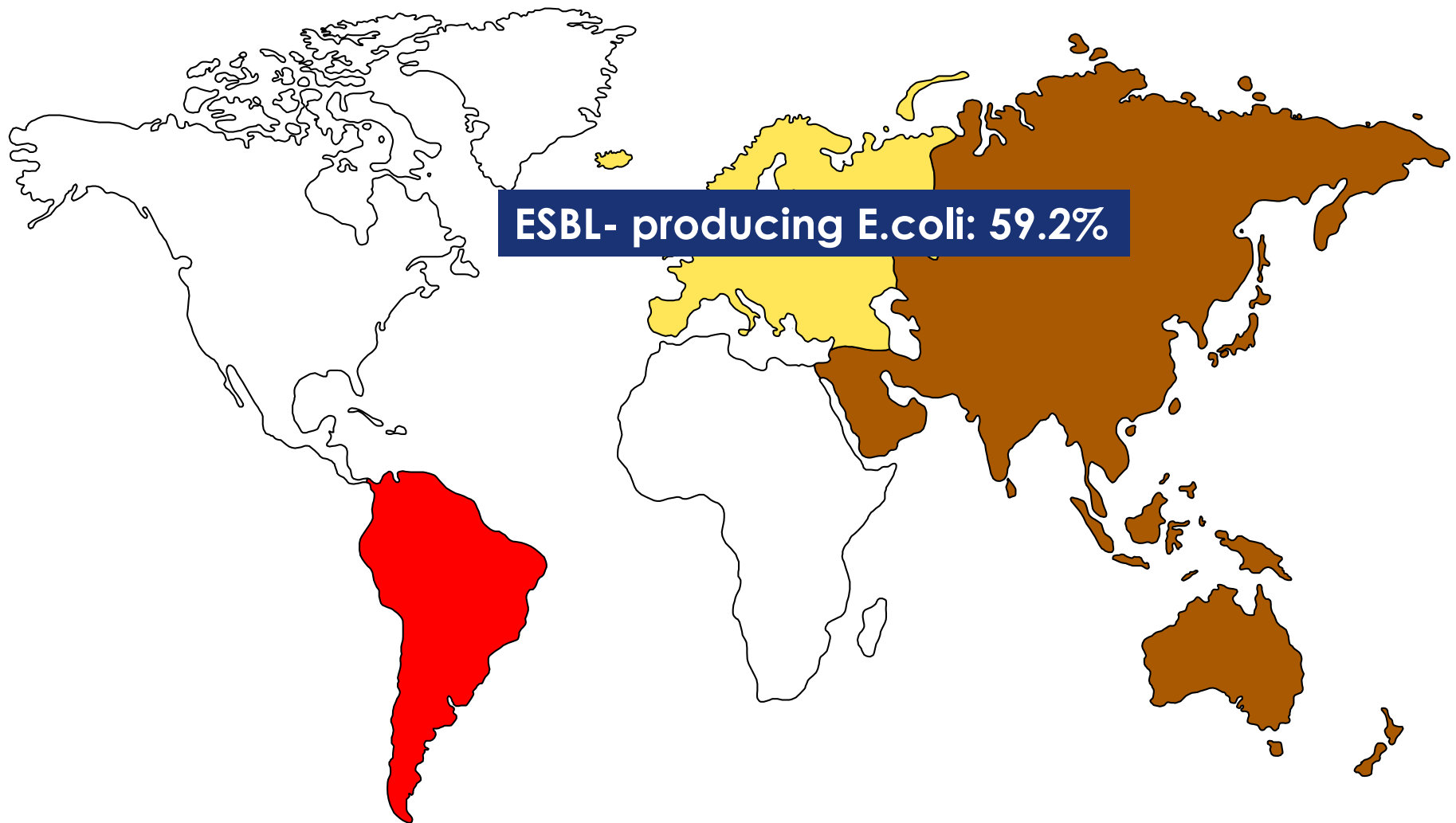
TEST SURVEILLANCE (2004-2006) Coque et al. Eurosurveillance 2008



ESBL WORLDWIDE

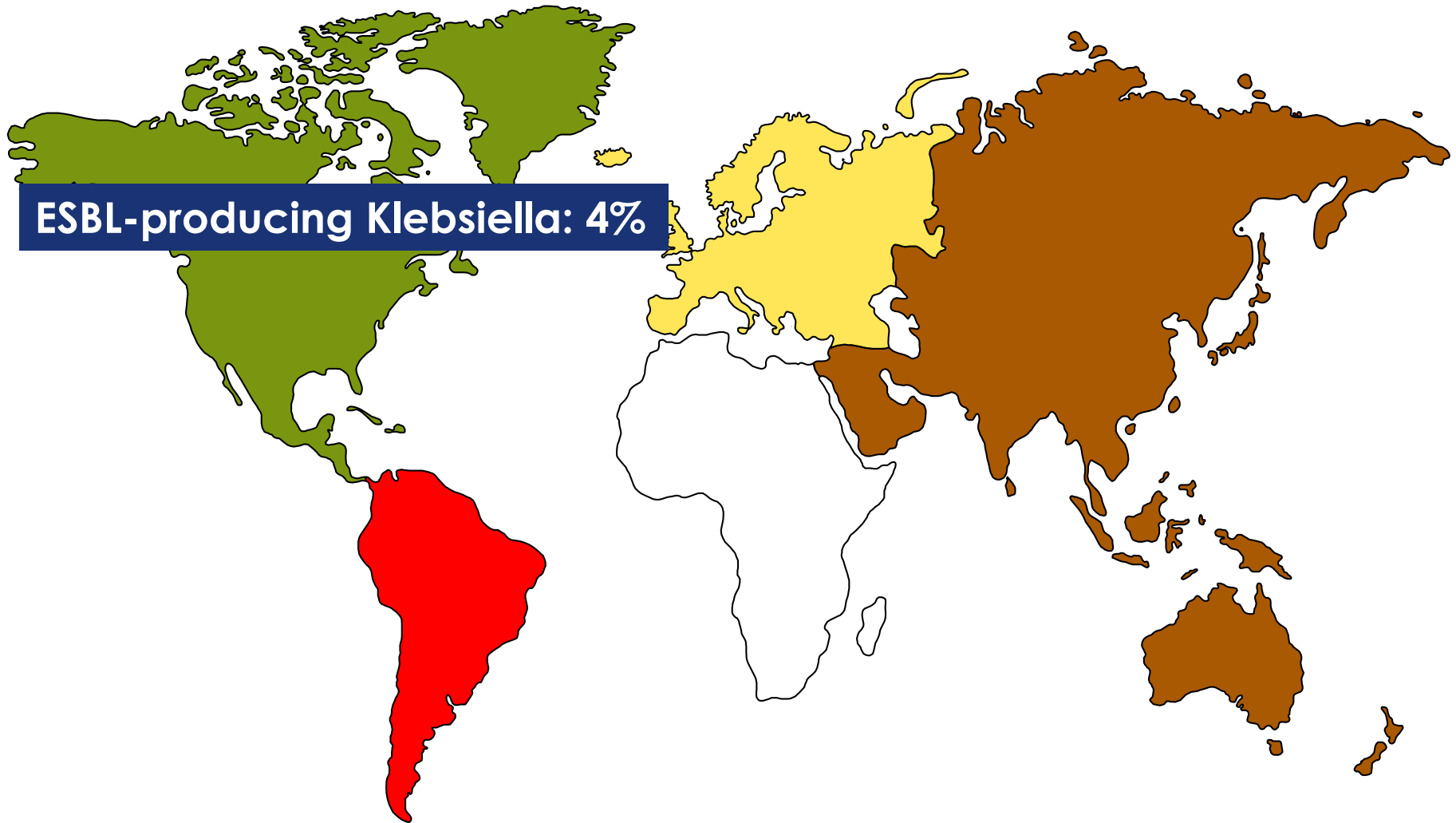


ESBL WORLDWIDE

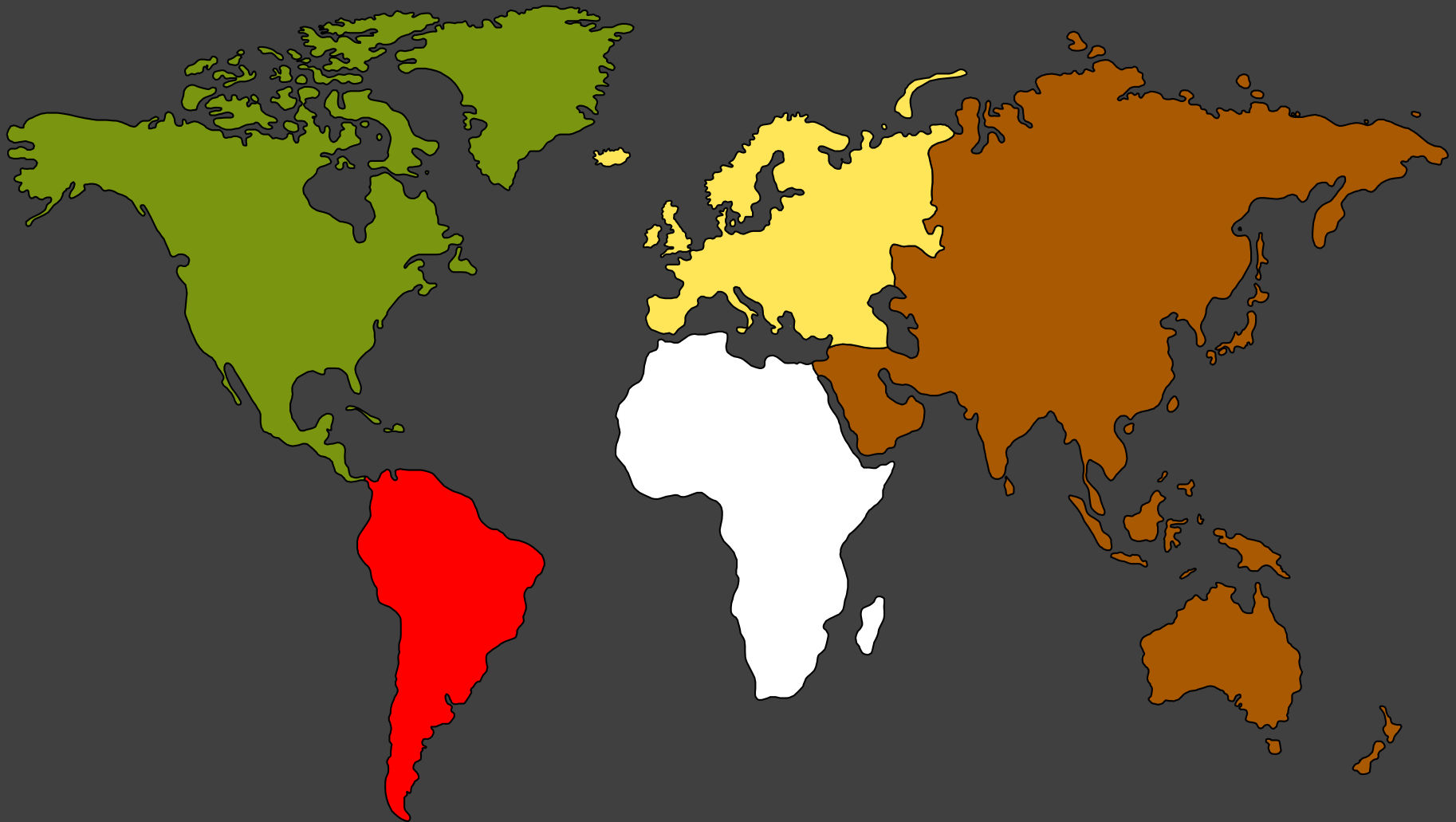


ESBL- producing E.coli: 59.2%

ESBL WORLDWIDE



ESBL WORLDWIDE




ESBL IN AFRICA



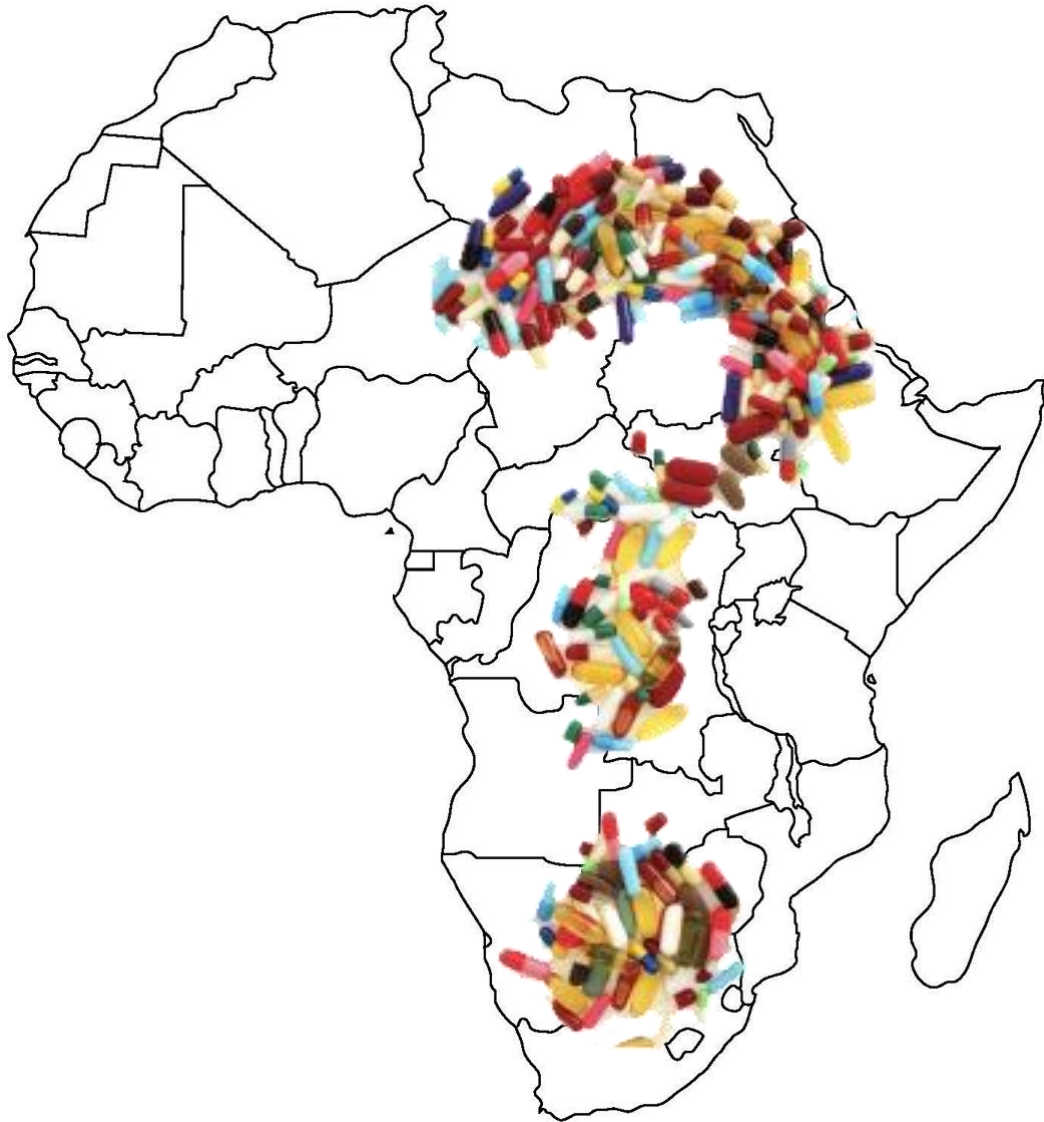
Few published data

- **Ghana: blood culture isolates in Children (community) *Klebsiella* spp: 77.8% of ESBL-producers** Huenger F et al 20th ECCMID Abstract 0395
- **Cameroun (prevalence=55.3% of pts colonized with ESBL)** Lonchel CM et al 2011

ESBL IN AFRICA

- 
- **Despite cases reported, true incidence is likely to be underestimated**
 - **As in many LMI countries crowded hospitals, poor or inadequate hand hygiene adherence, uncontrolled use of broad-spectrum ATB, lack of IPC program may worsen dramatically the epidemiologic situation**
 - **A previous travel in India and Africa : risk factors for ESBL colonization (Sweden study, 2013)**
→ **high prevalence of ESBL in LMI?**

ESBL IN AFRICA



- **Surveillance of MDR pathogens is crucial to be aware of the magnitude of the situation**

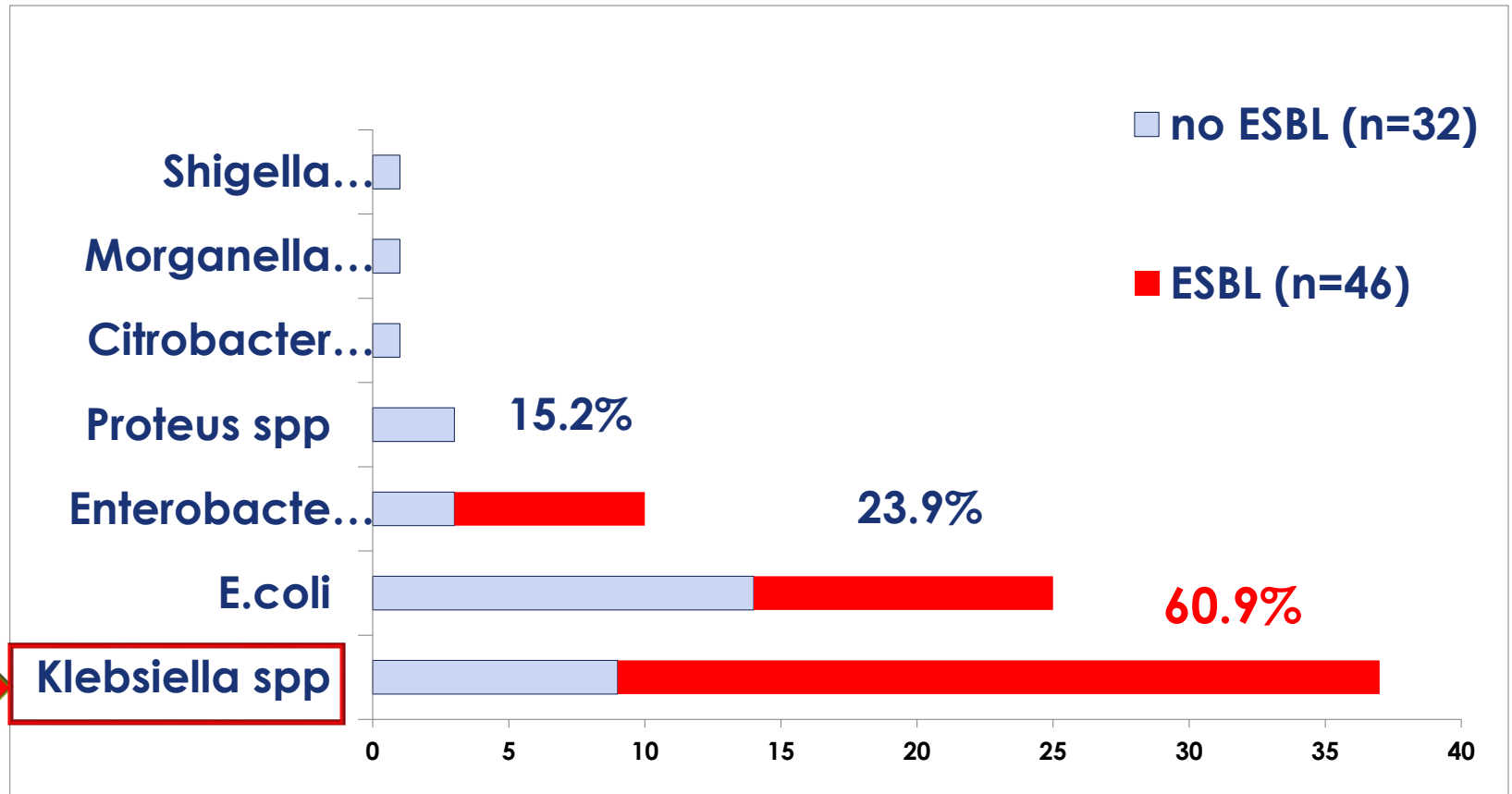
ESBL IN SENEGAL



- No data on MDR pathogens
- Surveillance of MDR based on laboratory hospital
 - Pilot surveillance in 2 tertiary care hospitals
 - 6 months in 2012 and in 2013
- **88.6%** of MDR bacteria isolated were ESBLs

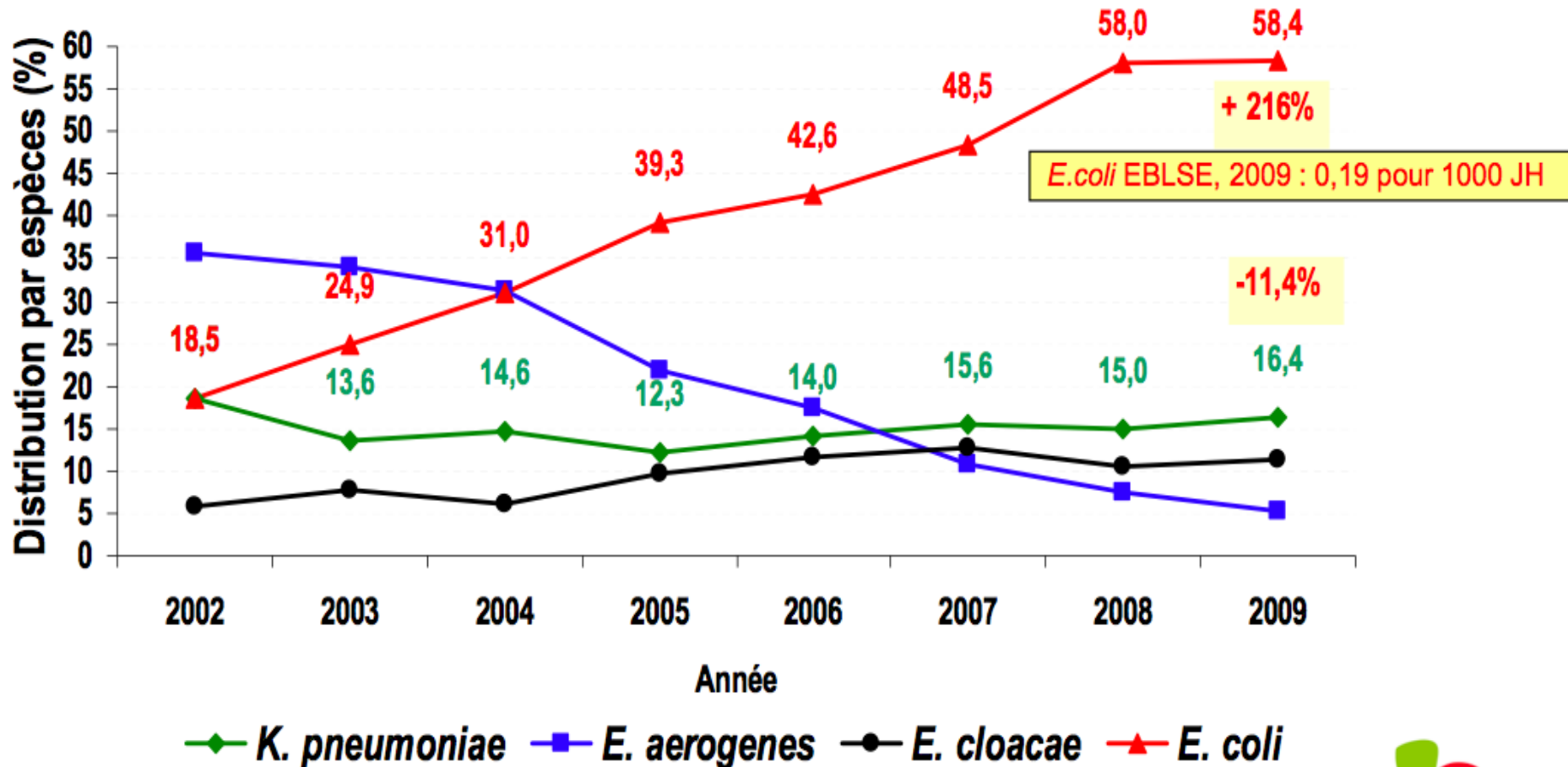
ESBL IN SENEGAL

Graph1: Proportion of ESBL among Enterobacteriaceae strains isolated



SOME COMPARISON...

Graph2: Proportion of ESBL among Enterobacteriaceae strains isolated



IN SUMMARY...

SENEGAL

- ESBL Klebsiella +++
- Incidence rate =
2.59/1000 hospital days

SURVEILLANCE

- Differences on MDR epidemiology
- High burden of ESBL colonization/
infection in SENEGAL

France

- ESBL E.coli +++
- Incidence rate =
0.25/1000 hospital days



OBJECTIVES

- **To identify risk factors for hospital- acquisition of ESBL infections**
- **To evaluate clinical outcomes related to ESBL infections**

METHODS

- **Design study: case-control study**
 - ❖ Patients were identified from the laboratory-based surveillance of MDRO (2012)
 - ❖ All patients with an *Enterobacteriaceae* isolated from clinical samples were included in the study
 - Cases= patients infected by ESBL+
 - Controls= patients infected by non ESBL-
- **Statistical analysis**
 - ❖ Descriptive analysis
 - ❖ Univariate and multivariate analysis to identify risk factors
 - ❖ Univariate analysis to evaluate the clinical outcomes related to infections

RESULTS

Population study:

- 78 patients
- with an hospital acquired infection caused by an Enterobacteriaceae

Table 1: Site of infections

Site of infection	N	%
Urine	55	70.5
Blood	16	20.5
Wound	4	5.1
Others	3	3.9
TOTAL	78	100



UTIs

RESULTS

Table 2 Independant risk factors for ESBL-PE infection acquisition (multivariate analysis)

Variable	Adjusted OR	95% CI	P
Urinary catheter	3.4	1.17-10.60	0.028
Mechanical ventilation	3.3	1.10-10.92	0.041
At least 2 comorbidites	4.0	1.35-12.41	0.015

RESULTS

Table 3: Clinical impact of ESBL-PE infections (univariate analysis)

Variable	ESBL+	ESBL-	P
Length of stay (min-max)	32.45 days	21.56 days	0.009
Mortality	22(47.8%)	9(28.4%)	0.102

- **ESBL-PE infected patients stayed 11 extra days in hospital**

RESULTS

Table 4: Clinical impact of ESBL-PE infections (univariate analysis)

Variable	ESBL	Non- ESBL	P
Empiric antibiotherapy			
Penicillin	16 (34.8%)	4 (12.5%)	0.035
3rd generation cephalosporins	29 (63%)	11 (34.4%)	0.021
Fluroquinolone	17 (36.9%)	4 (12.5%)	0.020

- **Resistance to 3rd GC (100%) and fluoroquinolone (90%)**
- **Inadequate of empiric antibiotherapy in treating ESBL infections**

SURVEILLANCE OF MDRO

- **Surveillance of MDRO is crucial**

- Helps HCW to be aware of the epidemiology of bacterial infections

- Helps guiding empirical antibiotherapy

- Highlights the need to adapt therapeutic strategies to the current local epidemiology

- **Points out the importance of the role of the laboratory in IPC: quick identification of germ associated to infections and their current susceptibility**

- **adapt empiric therapies**

INFECTION CONTROL MEASURES

Our study helps to identify:

- Patients at risk of ESBL-PE infection who need ESBL targeted antibiotherapy
 - Carbapenems: for severe ESBL-PE infections
- **Interventions** we should implement to reduce acquisition and dissemination of pathogens

1) Monitoring of invasive devices (protocols)

2) Antimicrobial stewardship: rigorous restriction of cephalosporins +FQ (only use in susceptible pathogen)

3) Promotion of hand hygiene

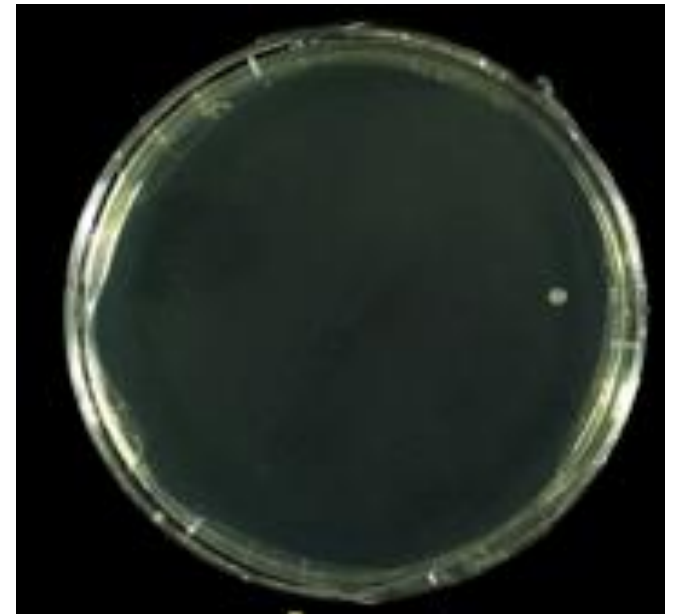
INFECTION CONTROL MEASURES

A- HANDRUBBING

ALCOHOL BASED HANDRUB (ABHR)



BEFORE



AFTER

INFECTION CONTROL MEASURES

HANDRUBBING- IN PRACTICE IN FANN HOSPITAL



- **Local production of ABHR**
- **African Partnership for Patient Safety Program (WHO)**
- **Helps to increase hand hygiene compliance among HCW (experience of Kenya)**

INFECTION CONTROL MEASURES

B- HANDWASHING



- As in many LMI, sinks are not always available in the patient environment
- No running water sometimes...
- Innovative device **CANACLA**



INFECTION CONTROL MEASURES

HANDWASHING- IN PRACTICE IN FANN HOSPITAL



INFECTION CONTROL MEASURES

THE CANACLA



- **CANACLA:** « canary with valve »
- **Canary=**water jug

INFECTION CONTROL MEASURES

THE CANACLA



THANK YOU

