



# **TRAINING ON PREVENTION AND CONTROL OF ANTIMICROBIAL RESISTANCE (AMR) IN THE CONTEXT OF AN OVERALL “ONE HEALTH” APPROACH TO PREVENTION AND CONTROL OF INFECTIONS AND REDUCING ANTIMICROBIAL RESISTANCE**

**SESSION 1 – MALAGA, SPAIN – 25-28 NOVEMBER 2019**

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# Characteristic:

- **National reference laboratory worker** / Regional Public Health Office based in Trenčín
  - The aim is to improve better methods of prevention, control of nosocomial infections and better and rapid microbiological diagnosis.
  - I'm a Public Health Care professional with degree of Public Health and doctorate in Laboratory Medicine
- **Department of Laboratory Medicine**, Trnava University, Trnava, Slovakia – Assistant of Professor



# Situation of AMR in Slovakia:

## Problems:

- **Increase number of multidrug resistant gramnegative bacteria**
  - *Klebsiella pneumoniae*, *P. aeruginosa* and *Acinetobacter baumannii*
- Poor Cooperation of Health Care Professionals
  - Failure in communication at all level - doctors, nurses, public health professionals
- Slowly development and implementation of standards
- **Failure in Hospital Hygiene and Epidemiology of Nosocomial outbreaks**
  - **Monitoring, surveillance,.....**

# National Action Plans for Control of Infectious Diseases in Slovakia

- Goal:
  - **Improving the control of infectious diseases for all residents in Slovakia**
  - Years 2018 – 2020
- Ministry of Health of the Slovak Republic through Minister of Health of the Slovak Republic doc. MD. Andrey Kalavska, PhD., MHA, submitted a document to the government

# Areas of **strategic priorities** of the National Infectious Disease Control Plan and AMR

## Improving awareness and understanding

Communication

Development and implementation of standards

Education and behavior change

## Strengthening knowledge and gathering evidence

surveillance – AMR, alimentary, animal and nosocomial infections

laboratories, registers and databases

## Prevention and control of Infectious diseases

community, environment, and imported infections

Animals and food

Preventable and hospital infections

## Antimicrobial stewardship

Establishment of the National Commission

Improving control over the use, quality of drugs, availability and regulation of anti-infective drugs

## Support innovation, research and control

Rapid and new diagnostic

Interdepartmental , interdisciplinary cooperation at national, EU, WHO and other levels

Innovation, research and funding sustainability

# Our Research - Our experience

- **Study HOSPITAL-ENVIRO-REZ**
- Multicentre national study was performed to monitor prevalence of antibiotic resistance in bacteria isolated from hospital environment (January 2015 to December 2018).
- Overall 1951 samples from hospital environment were analysed
  - (*Klebsiella* spp., *Pseudomonas* spp., *Escherichia coli*, *Enterobacter* spp., *Staphylococcus aureus* and *Enterococcus* spp.)
- Results:
  - More than **30 %** of isolates from hospital environment was **MULTIRESISTANT!!!**
  - **Gram-positive vs. Gram-negative** – same results of MDR
- Detection of multiresistant bacteria from various sampling sites **indicated decontamination processes failures** and the surfaces in the hospitals were potential exogenous sources of nosocomial infection.
- The control of MDR bacteria in hospital environment is not only costly, but presents a significant challenge. Reliable laboratory detection is an essential first step.
  - This study was supported by a research grant from the Minister of School SR.

# Our Research - Our experience - EXAMPLE

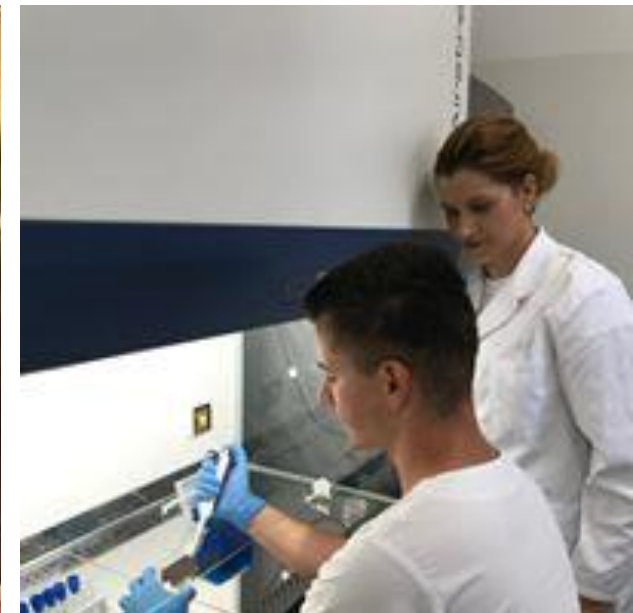
- DETECTION OF CARBAPENEMASE-PRODUCING GRAM-NEGATIVE BACTERIA FROM HOSPITAL ENVIRONMENT IN SLOVAKIA: THREE-YEARS MULTICENTRE STUDY HOSPITAL-ENVIRO-REZ

| Year of sampling in hospital | Type of microorganism         | Type of Department               | Sampling point             | Gene Xpert Carba-R, Cepheid | NG-Test Carba 5 NG Biotech |
|------------------------------|-------------------------------|----------------------------------|----------------------------|-----------------------------|----------------------------|
|                              |                               |                                  |                            | Type of carbapenemases      |                            |
| 2015                         | <i>Pseudomonas aeruginosa</i> | Intensive Care Unit              | Switch of aspirator device | VIM                         | VIM                        |
| 2015                         | <i>Pseudomonas spp.</i>       | Department of Pulmonary Medicine | clean cloth                | VIM                         | VIM                        |
| 2015                         | <i>Pseudomonas spp.</i>       | Department of Surgery            | sink                       | VIM                         | VIM                        |
| 2016                         | <i>Pseudomonas aeruginosa</i> | Department of Internal Medicine  | sink                       | VIM                         | VIM                        |
| 2016                         | <i>Pseudomonas aeruginosa</i> | Department of Oncology           | sink                       | negat                       | IMP                        |
| 2016                         | <i>Pseudomonas aeruginosa</i> | Department of Oncology           | sink                       | negat                       | IMP                        |
| 2016                         | <i>Pseudomonas aeruginosa</i> | Department of Surgery            | aspirator device           | VIM                         | VIM                        |
| 2017                         | <i>Klebsiella pneumoniae</i>  | Department of Dialysis           | Blood pressure device cuff | NDM                         | NDM                        |
| 2017                         | <i>Klebsiella pneumoniae</i>  | Department of Dialysis           | blood pressure device cuff | NDM                         | NDM                        |
| 2017                         | <i>Klebsiella pneumoniae</i>  | Intensive Care Unit              | sink                       | NDM                         | NDM                        |
| 2017                         | <i>Pseudomonas aeruginosa</i> | Department of Orthopaedics       | Sink drain                 | negat                       | IMP                        |



# University Hospital in Trnava

- capacity: 600 patients  
– 25 000 per year
- Centre for Microbiology and Infection Prevention in Trnava
- Departure of Hospital Hygiene and Epidemiology
- Laboratory of Microbiology – rarity in Slovakia



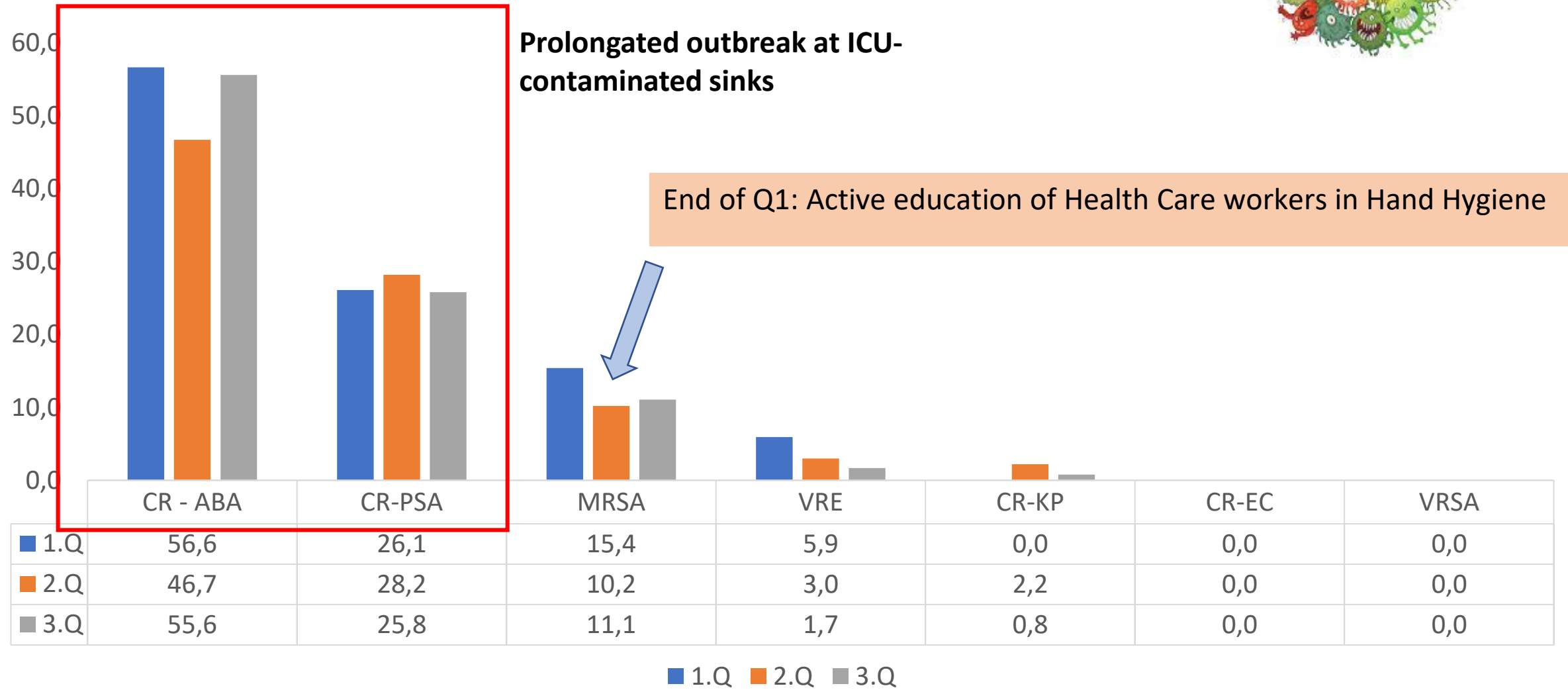


# Analyse of Antibiotic resistance in University Hospital

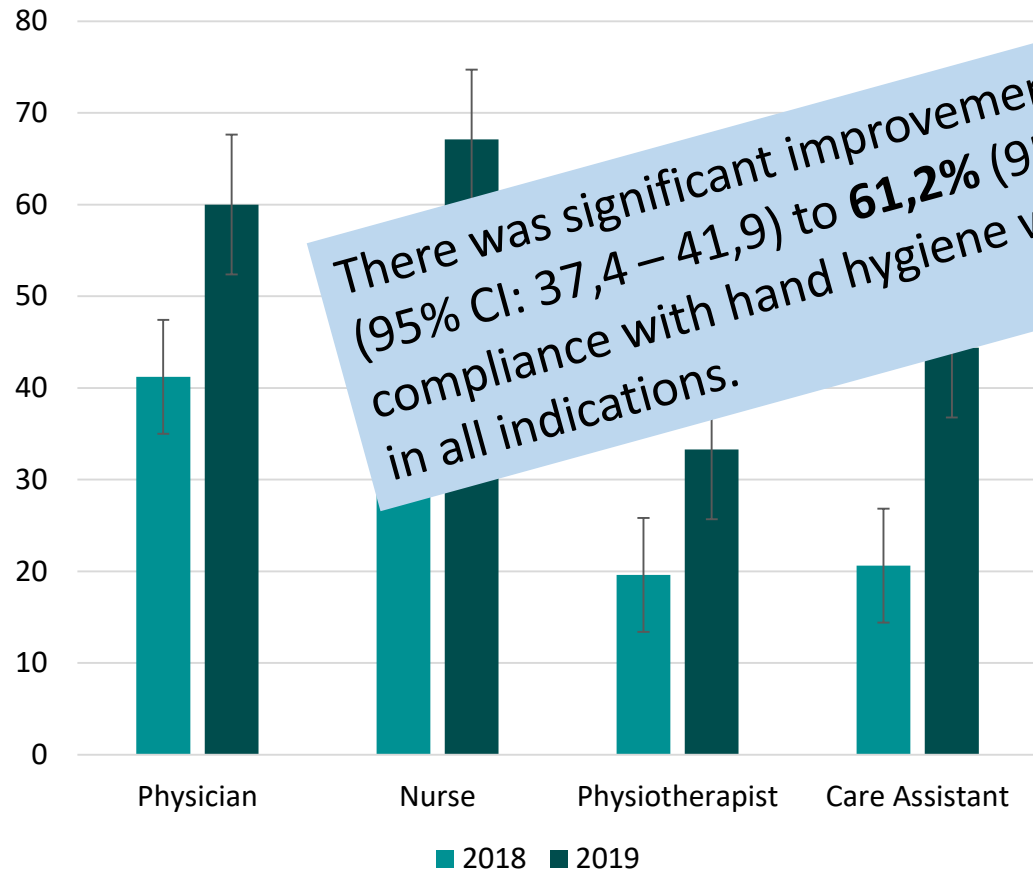
| MO       | Number of positive hemoculture<br>N = 347 |      | Number of positive urine sample<br>N = 1222 |      | Number of positive zo sputum/BAL<br>N = 682 |      | Number of positive cultivation from decubits<br>N = 415 |      |
|----------|---|------|---|------|---|------|---|------|
|          | N   | %    | N   | %    | N   | %    | N   | %    |
| MRSA     | 54/3                                      | 5,6  | 23/2  | 8,7  | 35/6  | 17,1 | 87/11   | 12,6 |
| VRSA     | 54/0                                      | 0,0  | 23/0  | 0,0  | 35/0  | 0,0  | 87/0  | 0,0  |
| VRE      | 19/0                                      | 0,0  | 149/2                                       | 1,3  | 20/1  | 5,0  | 49/1  | 2,0  |
| CR-KP    | 12/0                                      | 0,0  | 223/1                                       | 0,4  | 109/1                                       | 0,9  | 44/1  | 2,3  |
| CR-EC    | 37/0                                      | 0,0  | 438/0                                       | 0,0  | 34/0  | 0,0  | 51/0  | 0,0  |
| CR-PSA   | 22/8                                      | 36,4 | 88/19                                       | 21,6 | 96/30                                       | 31,3 | 50/13   | 26,0 |
| CR - ABA | 2/0                                       | 0,0  | 16/10                                       | 62,5 | 61/26                                       | 42,6 | 11/6  | 54,5 |



# Antimicrobial resistance from

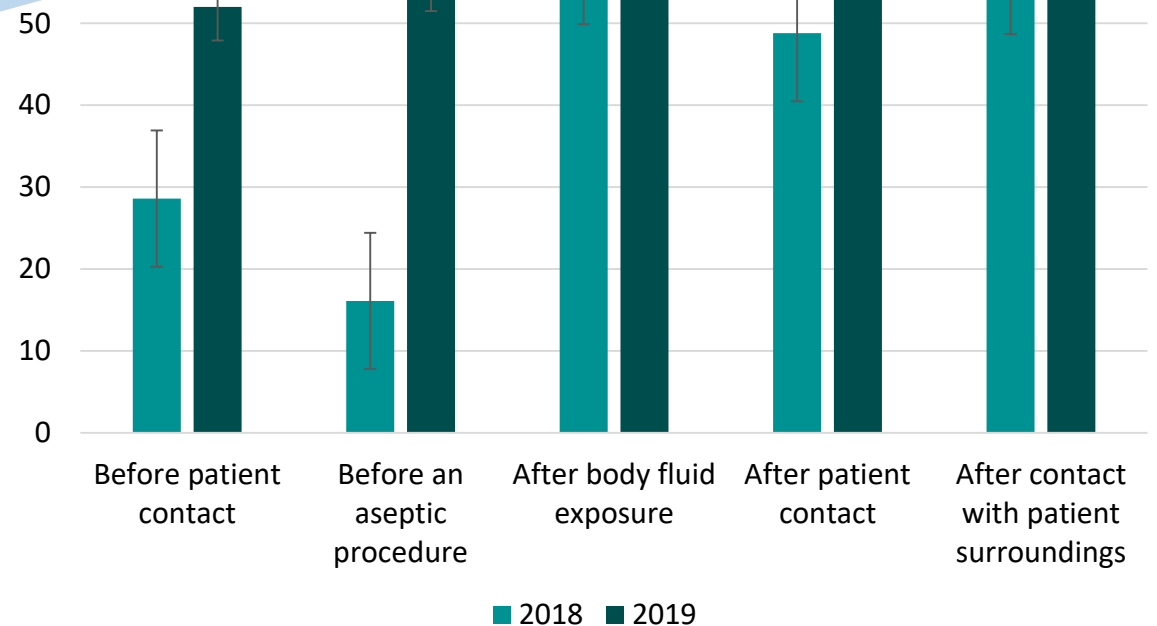


# Implementation of Hand Hygiene Program in Trnava University Hospital during 2018-2019



Graph 1: Compliance of hand hygiene among healthcare workers

There was significant improvement of hand hygiene compliance from **39,9%** (95% CI: 37,4 – 41,9) to **61,2%** (95% CI: 58,2 – 65,4%), ( $p > 0.05$ ). The increase in compliance with hand hygiene was consistent across professional categories and in all indications.



Graph 2: Compliance of hand hygiene depending on indications

Results of antibiotic resistance in University Hospital are **essential for local practices** on prudent use of antimicrobials and **understanding the emerging outbreak**

Thank you for attention...

