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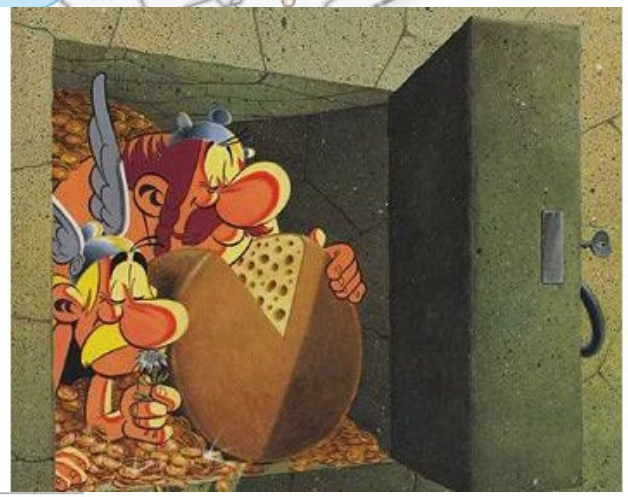
Commander of the
British Empire

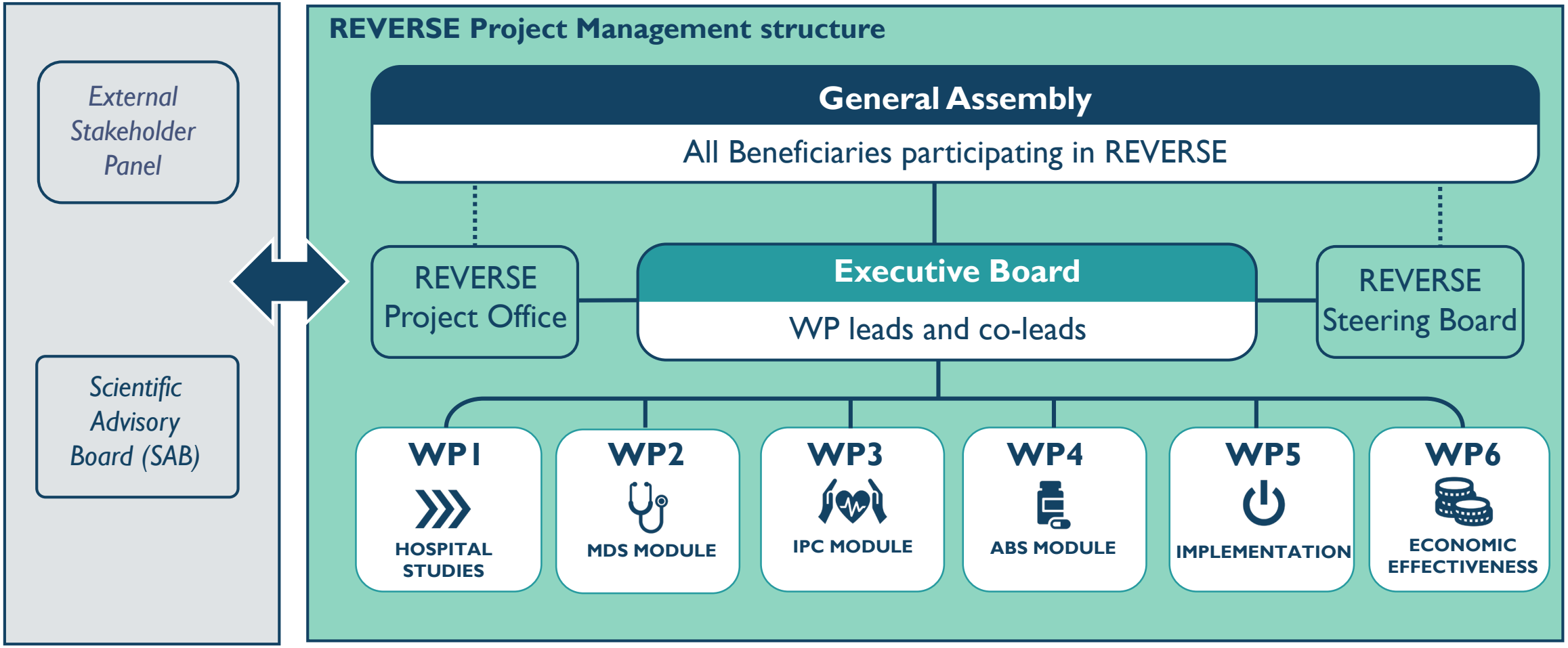


Strong visible message of commitment to good hand hygiene – University Hospitals, Geneva

WP3: IPC module

Stephan Harbarth

UniGe


External Stakeholder Panel
Scientific Advisory Board (SAB)
REVERSE Project Management structure
General Assembly
All Beneficiaries participating in REVERSE
REVERSE Project Office
Executive Board
WP leads and co-leads
REVERSE Steering Board
WP1
HOSPITAL STUDIES
WP2
MDS MODULE
WP3
IPC MODULE
WP4
ABS MODULE
WP5
IMPLEMENTATION
WP6
ECONOMIC EFFECTIVENESS

Partners

- Geneva
- Tel Aviv
- Firenze

Objectives

- To determine the effects of an IPC programme to enhance basic and advanced infection prevention and control measures to decrease the incidence density of healthcare-associated CRE, CRPA and CRAB as well as the prevalence of CRE in repetitive prevalence surveys

Specific Aims

1. To perform a scoping exercise of available evidence on recommendations and successful IPC interventions for AMR control in high-prevalence settings;

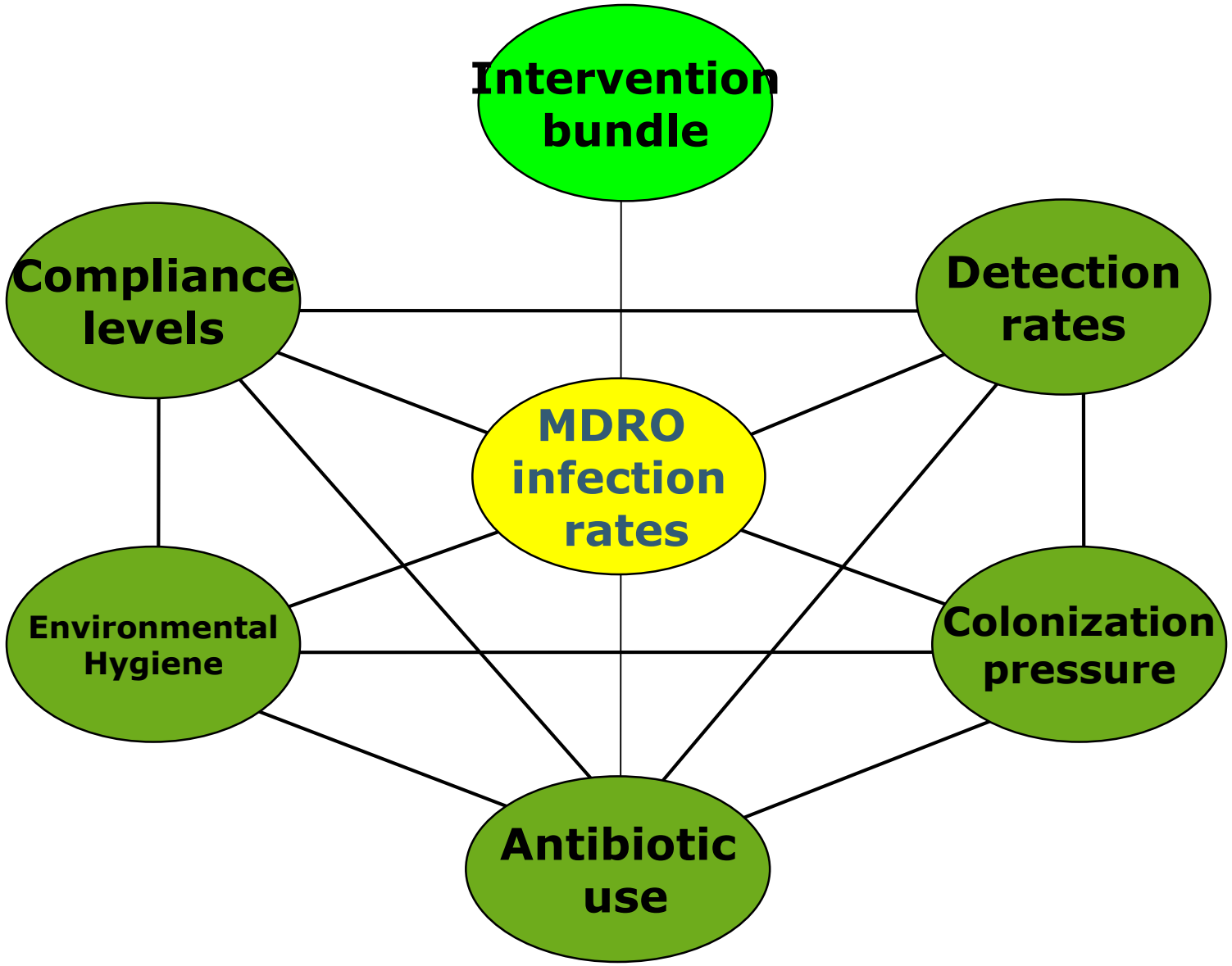
2. To produce bundles for successful IPC interventions;

3. To coordinate the setup, development and implementation of IPC interventions in the participating institutions;

4. To test conventional and innovative IPC bundles for endemic AMR control including various tools and toolkits;

5. To analyse and evaluate the effects and identify the most successful AMR control interventions.

Potential biases



Tasks

- ***Task 3.1 Final preparation of the evidence-based IPC bundles, with adequate MDRO surveillance (month 1 – 12)***

- ***Task 3.2 Sequential implementation and coordination of the IPC bundles (month 12 –51)***

Preparation of the evidence-based IPC bundles, with adequate MDRO surveillance

- Current guidelines, recommendations and evidence-based bundles aimed at the control and prevention of MDRO will be identified and collected to produce a narrative synthesis.

- Possible contradictions and discrepancies between international, national and local recommendations will be documented. In close collaboration with the participating institutions, a final selection of evidence-based bundle elements will be performed and distributed.

Preparation of the evidence-based IPC bundles, with adequate MDRO surveillance (2)

- Local audits will be performed to establish current standards, as well as barriers and challenges related to MDRO control in the participating hospitals.

- A manual for accurate MDRO surveillance will be developed in collaboration with WP1 and WP2.

IPC bundles

- Onsite investigators will be trained in best practice guidelines (e.g. WHO multimodal hand hygiene improvement strategy) and will be provided with hands-on experience with the 3 bundle intervention packages.
- Overcoming noncompliance and power distance will be trained using realistic situational reenaction. This will empower the participating hospitals in their capacity to implement intervention packages in their own hospital among medical and nursing staff.

IPC bundles (2)

- In close interaction and collaboration with WP5, WP2 staff will instruct hospital staff in the standardized implementation of the intervention packages.
- It is planned to initiate the intervention modules as campaigns with the full endorsement and support of the clinical director or chief executive in the hospital to get the necessary support for the intervention.
- Time will be dedicated in particular for monitoring the compliance and instructing and stimulating the adherence to the intervention bundles.

Deliverables

- **D3.1** Summary report with study protocol of planned bundle interventions (Month 12)
- **D3.2** Regular audit reports from participating hospitals (Months 24, 42)
- **D3.3** Intermediate and final analysis reports (Months 42, 60)

Actions so far

- Split of tasks & budget between ZRH and GVA
- Refining organizational issues and budgetary details
- Hiring of research fellow
- First informal meetings
- Preliminary review of IPC interventions

‘Coming together is a beginning,
staying together is progress,
and working together is success’

- **Henry Ford**

Controlling the spread of carbapenemase-producing Gram-negatives: therapeutic approach and infection control

Y. Carmeli[1], M. Akova[2], G. Cornaglia[3], G. L. Daikos[4], J. Garau[5], S. Harbarth[6], G. M. Rossolini[7,8], M. Souli[9] and H. Giamarellou[9]

TABLE 1. Suggested action plan for rapid implementation of infection control measures in settings with sporadic occurrence or complete absence of carbapenemase-producing Gram-negatives

Screening of all patients in contact with an index case
Epidemiological investigation with root cause analysis in cases of nosocomial cross-transmission events with more than two secondary cases
Measures to keep staff and hospital administration informed
Stringent infection control aimed at containment and ultimate eradication of nosocomial clusters
Coordination and supervision by public health authorities

Carmeli Y et al. Microbiol Infect. 2010;16(2):102-11

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TABLE 2. Suggested control measures for countries with ongoing carbapenemase-producing Gram-negative (CPGN) outbreaks or endemic CPGNs

At the national level
Establishment of a national task force, supported by the Ministry of Health
Isolation guidelines for carriers—required for all acute-care hospitals
Monthly progress reports about CPGN control for concerned institutions
Evaluation of concerned hospitals and identification of problem areas by a public health agency with competence in infection control
At the hospital level
Physical separation of carriers from non-carriers
Dedicated staff
Active surveillance of high-risk patients
Training and measures to keep staff and hospital administration informed
Ongoing CPGN surveillance with prospective data collection and daily census of CPGN carriers

Carmeli Y et al. Microbiol Infect. 2010;16(2):102-11

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TABLE 3. National organizations and their priorities for action in countries with ongoing carbapenemase-producing Gram-negative (CPGN) outbreaks or endemic CPGNs

National task force
Policy-making and communication with hospital administrations
Development of stringent and detailed CPGN control guidelines
Preparation of intervention tools
Supervision of control measures and preparation of corrective actions in the case of ongoing institutional outbreaks without adequate preventive measures
Active surveillance with rapid feedback at a regional level and national level
Reference laboratories
Confirmation of suspected CPGN cases
Evaluation of molecular epidemiology and establishment of clonality
Detection of new resistance mechanisms
Development of laboratory manuals with descriptions of adequate methods
Quality assurance for clinical microbiology laboratories

Carmeli Y et al. Microbiol Infect. 2010;16(2):102-11

Clinical Infectious Diseases

SPECIAL SECTION/INVITED ARTICLE

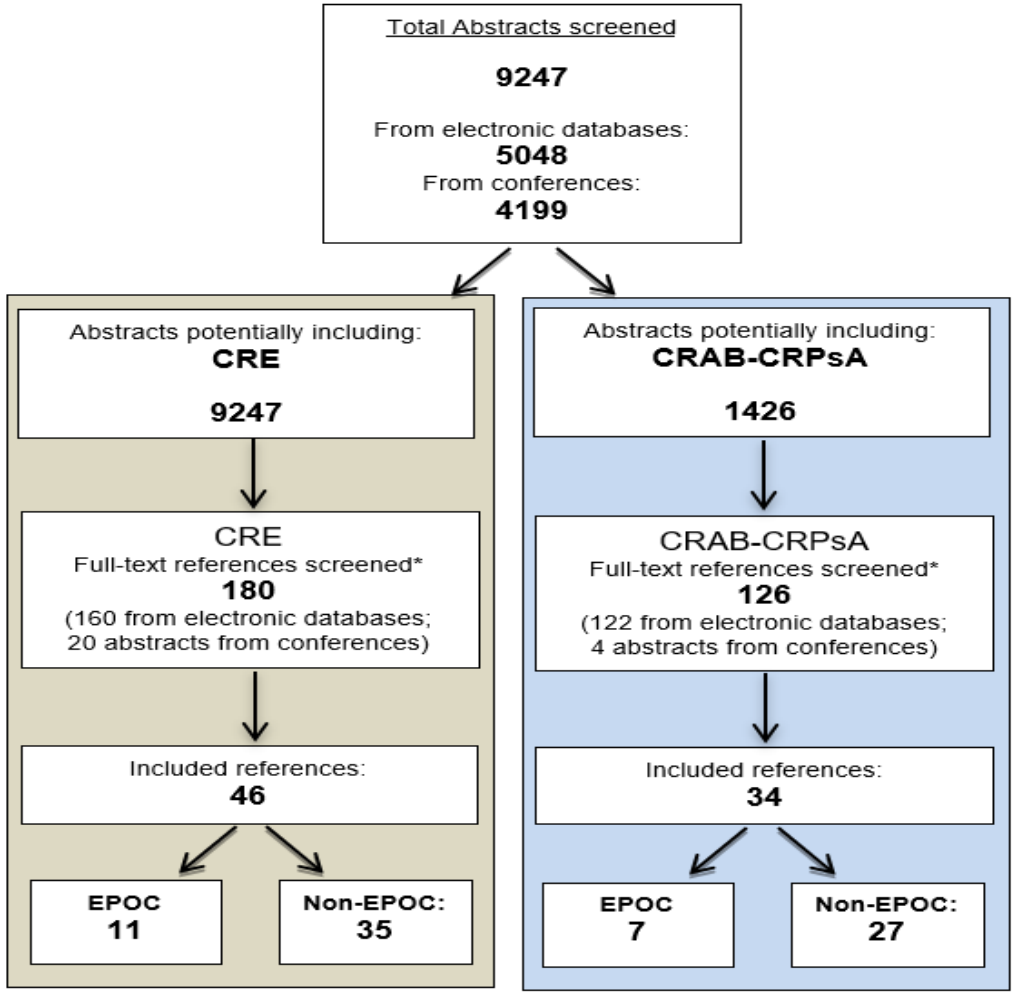
HEALTHCARE EPIDEMIOLOGY: Robert A. Weinstein, Section Editor

Control of Carbapenem-resistant Enterobacteriaceae, *Acinetobacter baumannii*, and *Pseudomonas aeruginosa* in Healthcare Facilities: A Systematic Review and Reanalysis of Quasi-experimental Studies

Sara Tomczyk,[1,2] Veronica Zanichelli,[3] M. Lindsay Grayson,[4,5,6] Anthony Twyman,[1] Mohamed Abbas,[3] Daniela Pires,[3,7] Benedetta Allegranzi,[1] and Stephan Harbarth[3]

Tomczyk S et al. Clin Infect Dis (2019)

CPE control review -- Flowchart



Cochrane Effective Practice and Organization of Care (EPOC)

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WHO review: CPE control

- No RCT or controlled study
- All EPOC-studies from CPE-endemic countries: Israel, USA, Italy and Brazil
- All describe multi-faceted interventions

- EPOC: 11 interrupted time series studies
- Non-EPOC (N=35)
    - 16 Non-controlled before-after studies
    - 14 Before-after case-counts
    - 3 Modeling studies
    - 2 Longitudinal studies

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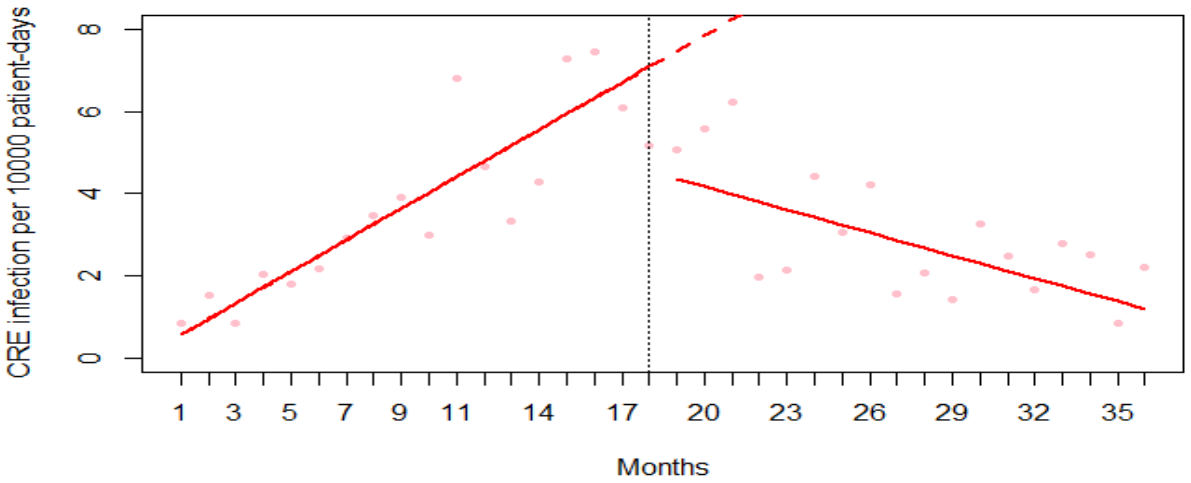
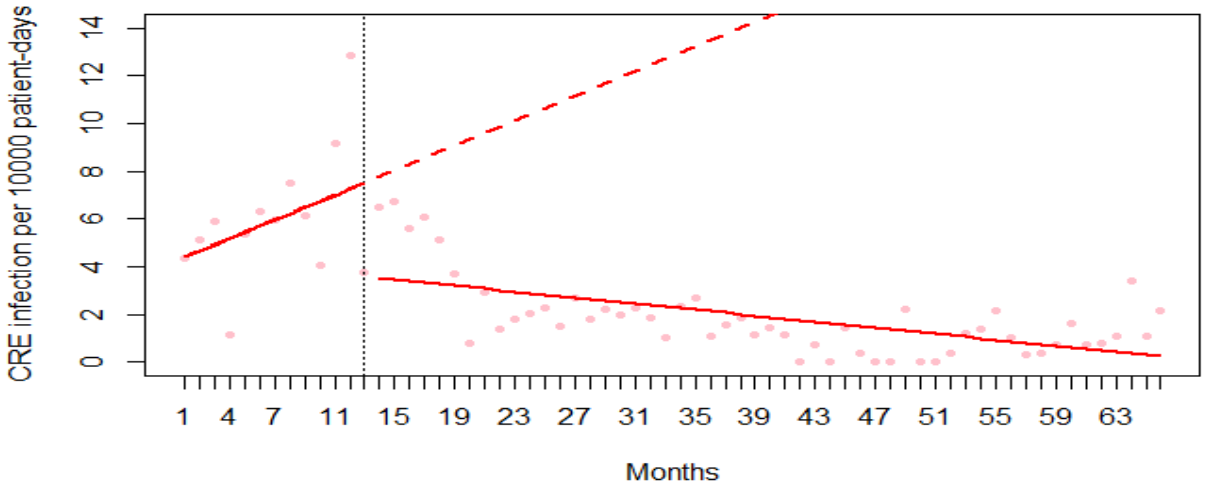
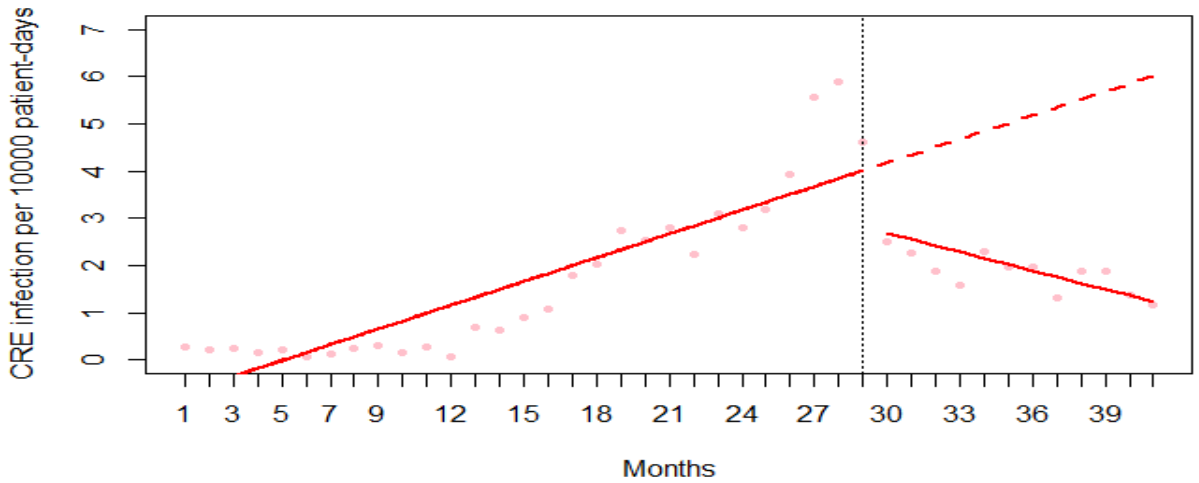
Ben David et al

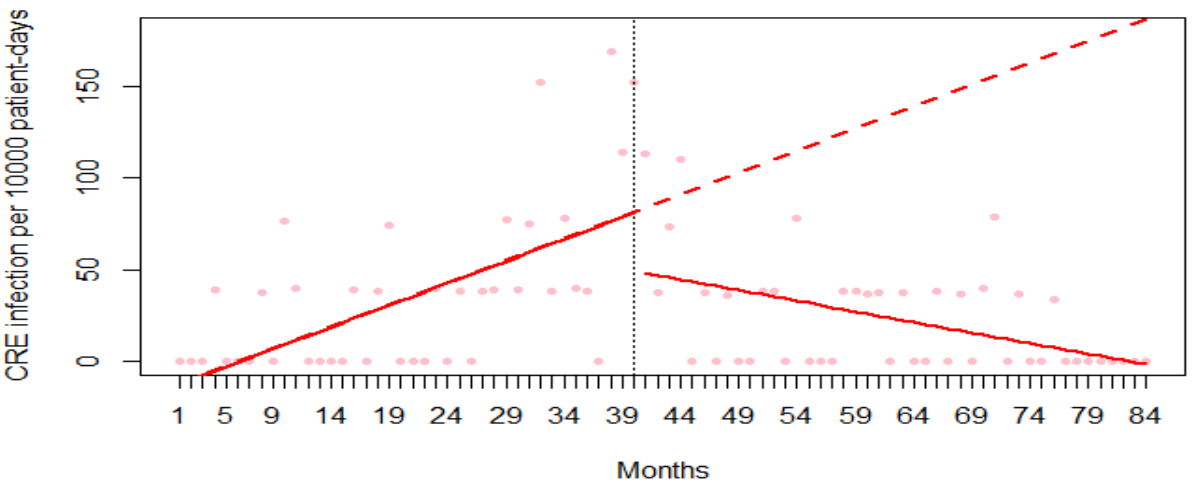


Borer et al





Schwaber et al



Kim et al.

Tomczyk S et al. Clin Infect Dis (2019)

EPOC studies (change in slopes & rates of CPE)

Study	Slope change (95% CI)*	Level change (95% CI)*
Ben-David et al.[34]	**-0.57 (-0.58, -0.55)**	**-2.56 (-2.77, -2.33)**
Borer et al.[35]	**-0.32 (-0.58, -0.06)**	**-3.93 (-5.95, -1.91)**
Campbell et al.[36]	-0.09 (-1.04, 0.87)	**7.23 (1.89, 12.57)**
Ciobotaro et al.[37]	**-0.91 (-0.97, -0.85) ¥**	Not calculated
Gagliotti et al.[38]**	**-0.01 (-0.02, -0.002)**	0.17 (-0.18, 0.51)
Hayden et al.[39]		
Facility 1	-0.13 (-2.70, 2.43)	-17.43 (-42.29, 7.43)
Facility 2	**-2.39 (-3.13, -1.66)**	-5.71 (-13.99, 2.60)
Facility 3	0.55 (-1.89, 2.99)	**-25.33 (-38.27, 12.40)**
Facility 4	-0.38 (-2.33, 1.57)	**-20.94 (-37.60, -4.28)**
Kim et al.[40]	**-3.55 (-4.25, -2.86)**	**-31.80 (-52.77, -10.84)**
Schwaber et al.[41]	**-0.30 (-0.45, -0.15)**	**-1.19 (-1.95, -0.44)**
Enfield et al.[42]	9.11 (-2.80, 21.02)	-10.69 (-108.14, 86.77)
Hayden et al.[39]		
Facility 1	**-1.00 (-1.71, -0.29)**	**-17.72 (24.91, -10.53)**
Facility 2	**-0.91 (-1.13, -0.70)**	**-4.80 (-7.40, -2.20)**
Facility 3	0.28 (-0.73, 1.30)	-4.95 (-12.64, 2.75)
Facility 4	-0.21 (-1.25, 0.83)	-5.46 (-14.32, 3.39)
Viale et al.[43]	**-0.09 (-0.12, -0.06)**	1.20 (0.86, 1.55)
DalBen et al.[44]	0.63 (-0.01, 1.26)	**-17.89 (-20.12, -15.65)**

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Infection control measures in high-quality CPE control studies
-- Systematic WHO review & meta-analysis --

Intervention	EPOC studies
Active surveillance	10/11
Contact precautions	10/11
Cohorting	9/11
Monitoring, audit and feedback	9/11
Patient isolation	9/11
Hand hygiene education & monitoring	6/11
Education	4/11
Antibiotic stewardship	4/11
Enhanced environmental cleaning	3/11
Daily chlorhexidine gluconate baths	3/11
Flagging positive patients in medical record (alerts)	3/11
Environmental surveillance	1/11
Temporary ward closure	1/11

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WHO: Essential action items for the prevention and control of CPE

1	Implementation **of multimodal IPC strategies**
2	Importance of **hand hygiene** compliance for the control of CPE
3	**Surveillance** of CPE infection & surveillance cultures for asymptomatic CPE colonization (need for high-quality lab support)
4	**Contact precautions**
5	**Patient cohorting**

WHO Guidelines (2017)

https://www.who.int/infection-prevention/publications/guidelines-cre/en/

WHO Implementation Manual (2019)

https://apps.who.int/iris/bitstream/handle/10665/312226/WHO-UHC-SDS-2019.6-eng.pdf?ua=1