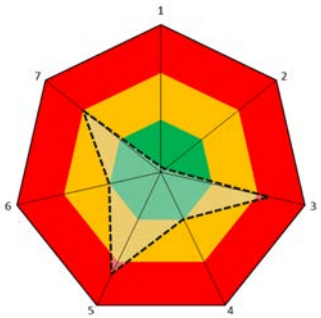
Contrain infectie preventie coach

Infection Risk Scan (IRIS):
standardisation & transparancy in infection control



Ina Willemsen

15 september 2021

Contrain infectie preventie coach

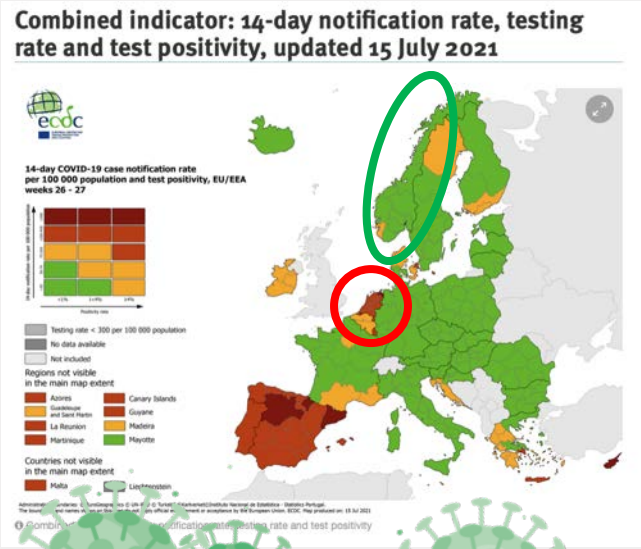
Hi, my name is Ina Willemsen

1992-1997	Analyst in a microbiology laboratory @RLM Dordrecht
1998	Traveling in south east Asia
1998-2010	Analyst and Quality manager in a microbiology laboratory @Amphia hospital Breda
2006-2010	PhD Improving Antimicrobial Use & Control of Resistent Micro-Organisms in the Hospital
2010-2020	Infection control practitioner @Amphia hospital Breda
2020-now	Infection control practitioner / Infection control coach @Contrain-infectiepreventiecoach

Contrain | Infectiepreventiecoach
For a responsible policy and effective approach

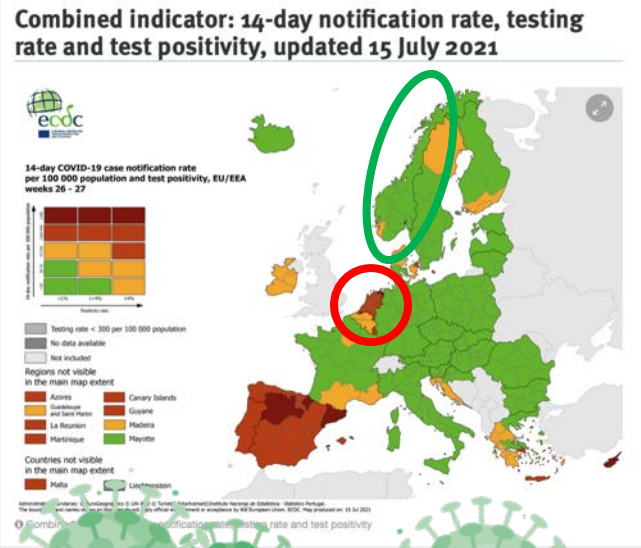
Contrain infectie preventie coach

Norway



Contrain infectie preventie coach

Norway



Contrain infectie preventie coach

Nice to meet you … online !

Outline

- **Background of the IRIS**
- **IRIS method**
- **IRIS results**

- **Applicability outside the Netherlands**

- **Questions**

Micro-organisms are everywhere….

Contrain infectie preventie coach


A PLUS

Contrain infectie preventie coach

IND

Contrain infectie preventie coach

IND

Contrain infectie preventie coach

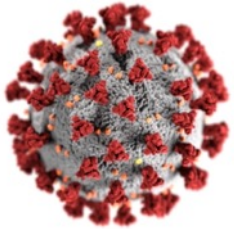
IND

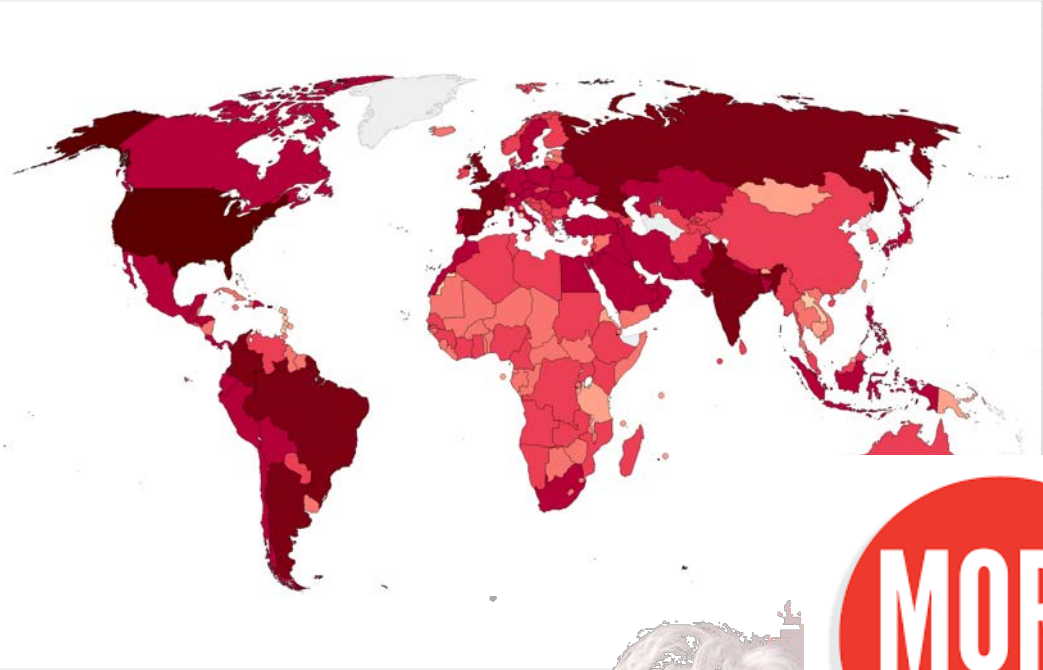
Contrain infectie preventie coach

Contrain infectie preventie coach

Perfect storm

(resistent) bacteria en virusses





Contrain infectie preventie coach

The importance of infection control

If you can’t prevent it, stop spreading it !

Contrain infectie preventie coach

The cornerstones of infection control

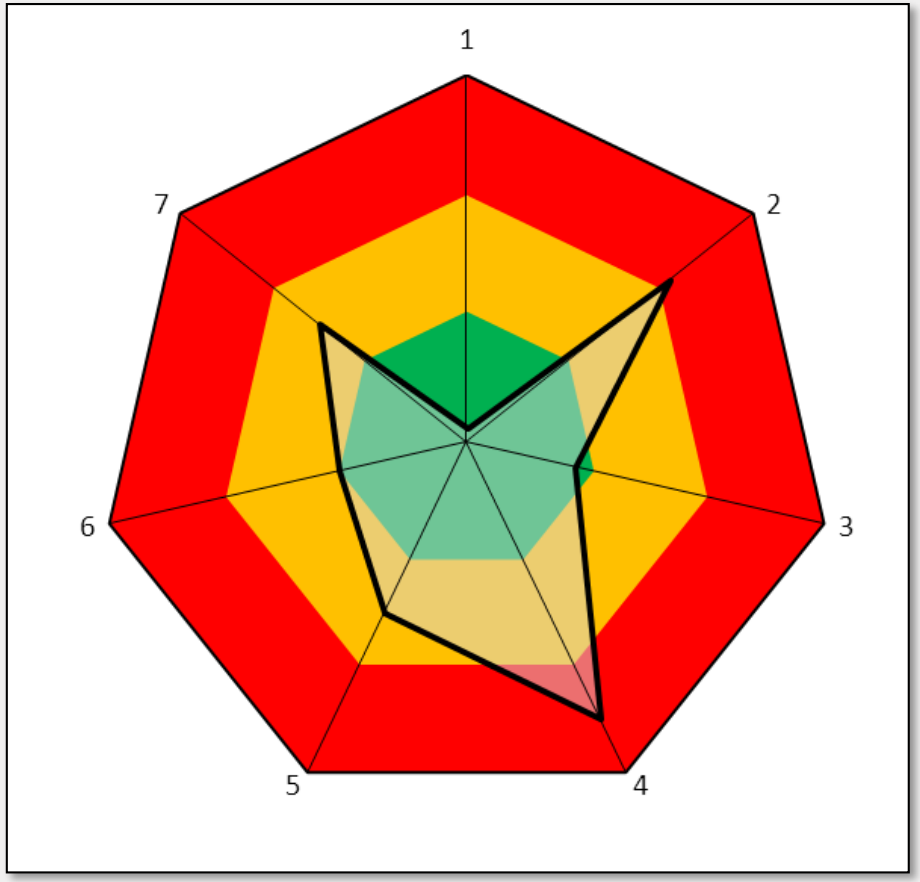
1. ....
2. ....
3. ....
4. ....
5. ....
6. ....

The cornerstones of infection control

1. Handhygiene
2. Clean environment
3. Appropriate use of indwelling medical devices (katheters)
4. Appropriate use of antimicrobials
5. Resources to provide infection control, e.g. gloves, apron
6. Personal hygiene of HCW

Contrain infectie preventie coach

Infection RIsk Scan (IRIS)



Contrain infectie preventie coach

a new tool, the Infection Risk Scan (IRIS)

The IRIS is an improvement tool that provides insight into the quality of an infection prevention program.
The goal of IRIS is to create transparancy in various risk factors, presence of antimicrobial resistance and antimicrobial use

Contrain infectie preventie coach

Before IRIS

AUDITS in the whole hospital, mostly by theme (e.g. hand hygiëne, woundcare)

- **Follow-up of improvement actions insufficient**
- **Insufficient support from the ward**
- **Themes not relevant for all ward**

IRIS consist of ….

A bundle of audits and surveillance, at one moment in time in one setting/ward.

Bundle approach in wich different outcome- and process parameters are investigated. Both patient- and care-related factors.

The collection of the data is standardized and as objective as possible.

Results are compared to reference data (tresholds) and categorized in three groups: high, intermediate, low risk or improvement potential.

Results are visualized in an easy-to-read plot, providing targets for quality improvement

…

Contrain infectie preventie coach

IRIS: risks

Contrain infectie preventie coach

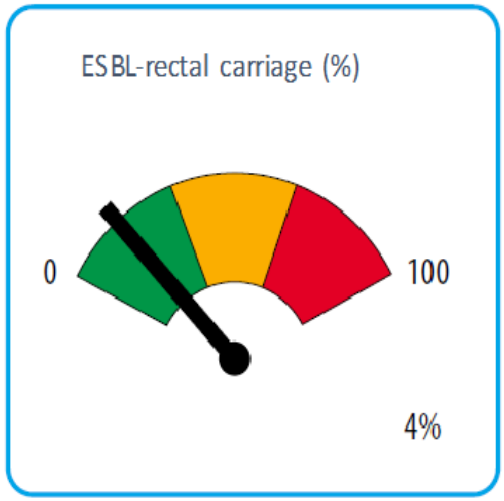
Risk Profile

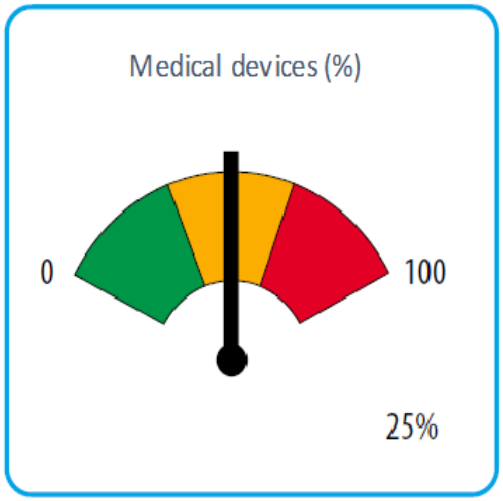
Improvement plot

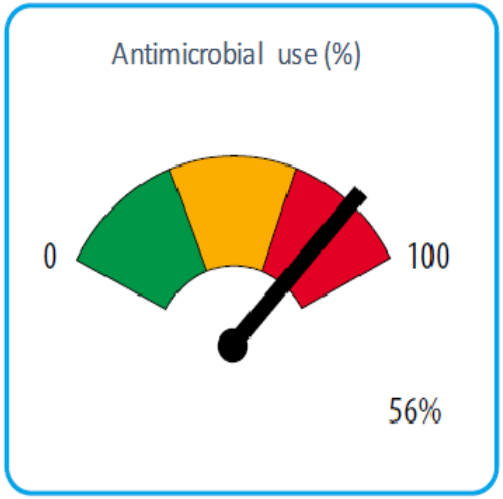
#ESBL = Extended Spectrum Beta-Lactamase; &HCW = Healthcare Worker; ^IP = Infection Prevention

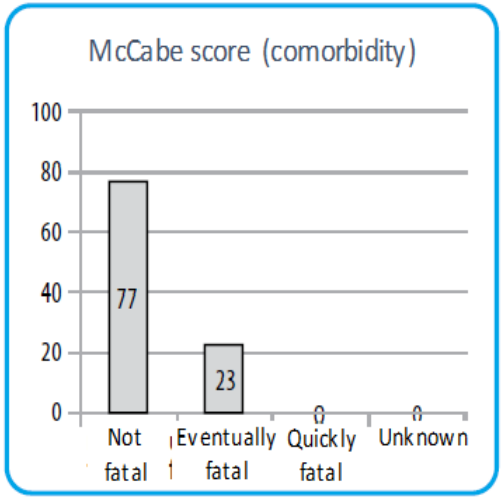
Contrain infectie preventie coach

Risk Profile







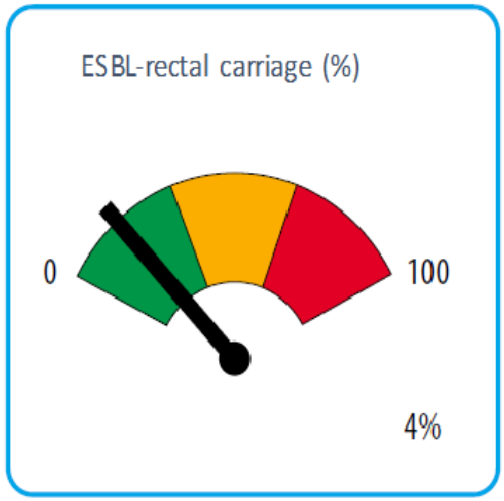


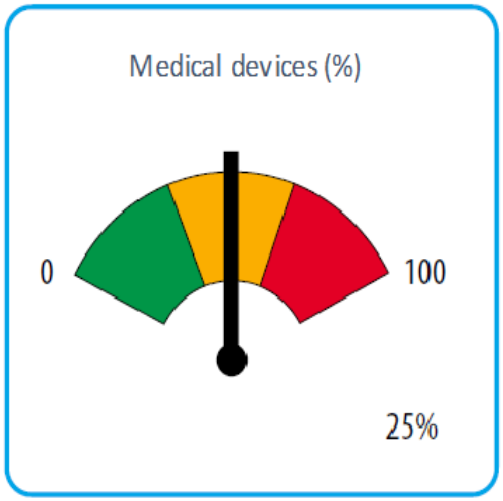
Improvement plot

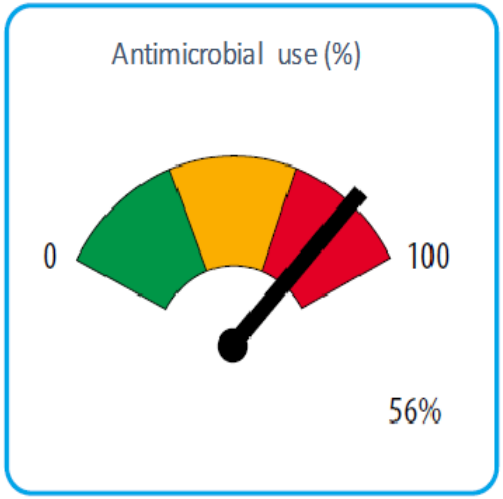
#ESBL = Extended Spectrum Beta-Lactamase; &HCW = Healthcare Worker; ^IP = Infection Prevention

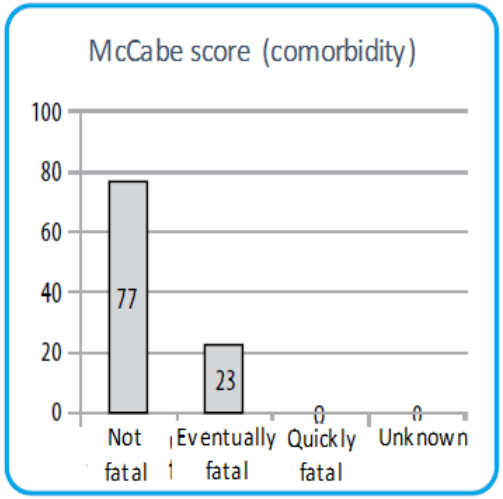
Contrain infectie preventie coach

Risk Profile

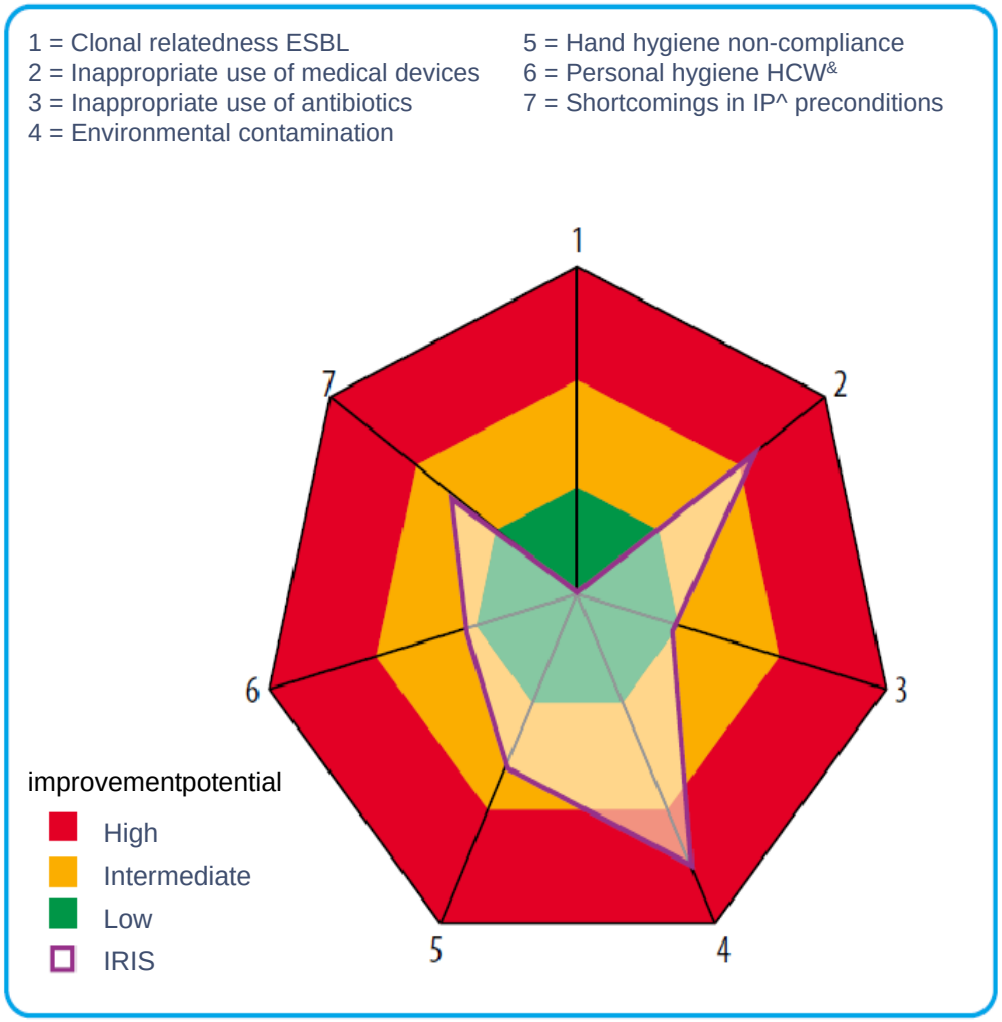








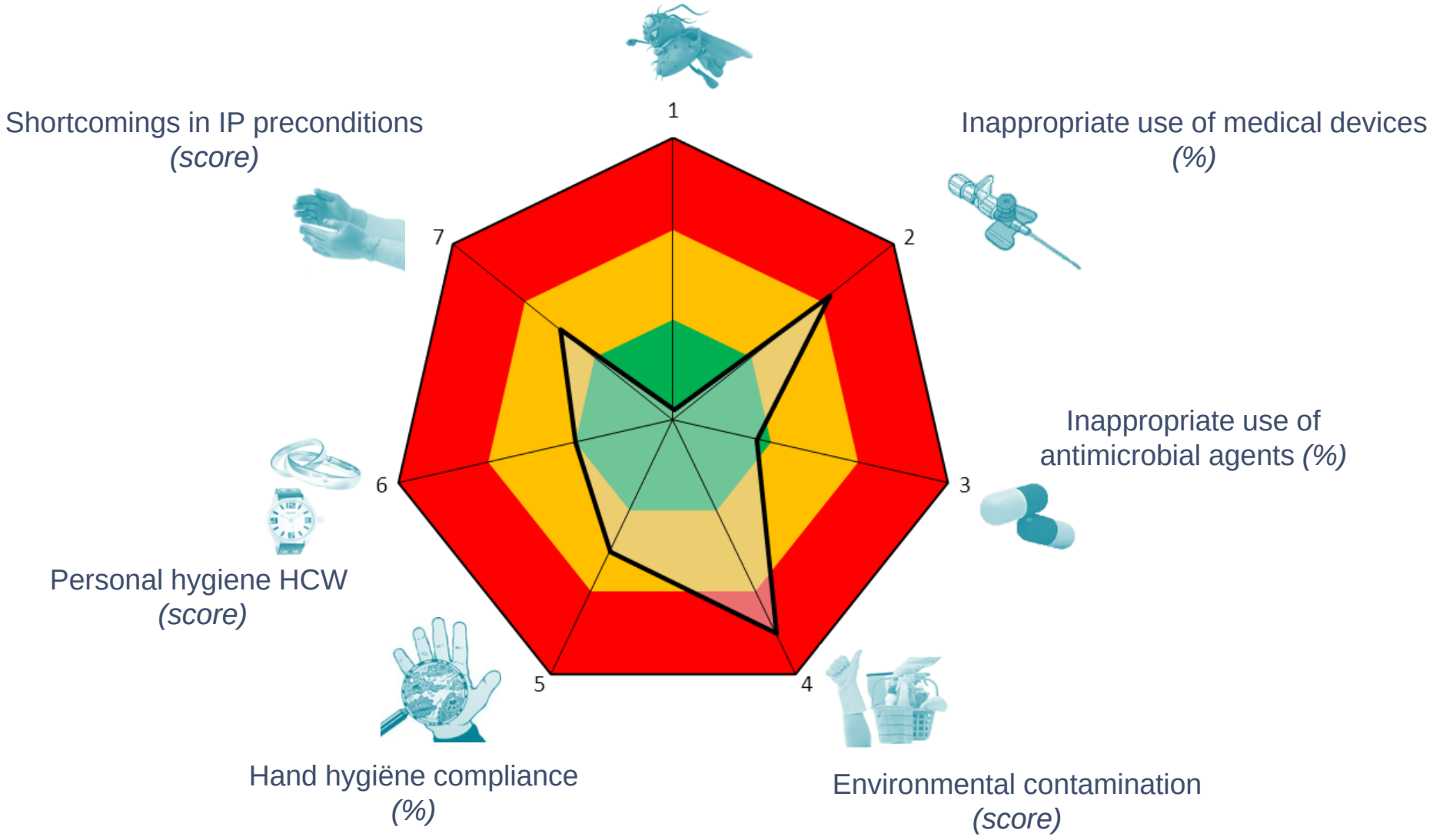
Improvement plot



#ESBL = Extended Spectrum Beta-Lactamase; &HCW = Healthcare Worker; ^IP = Infection Prevention

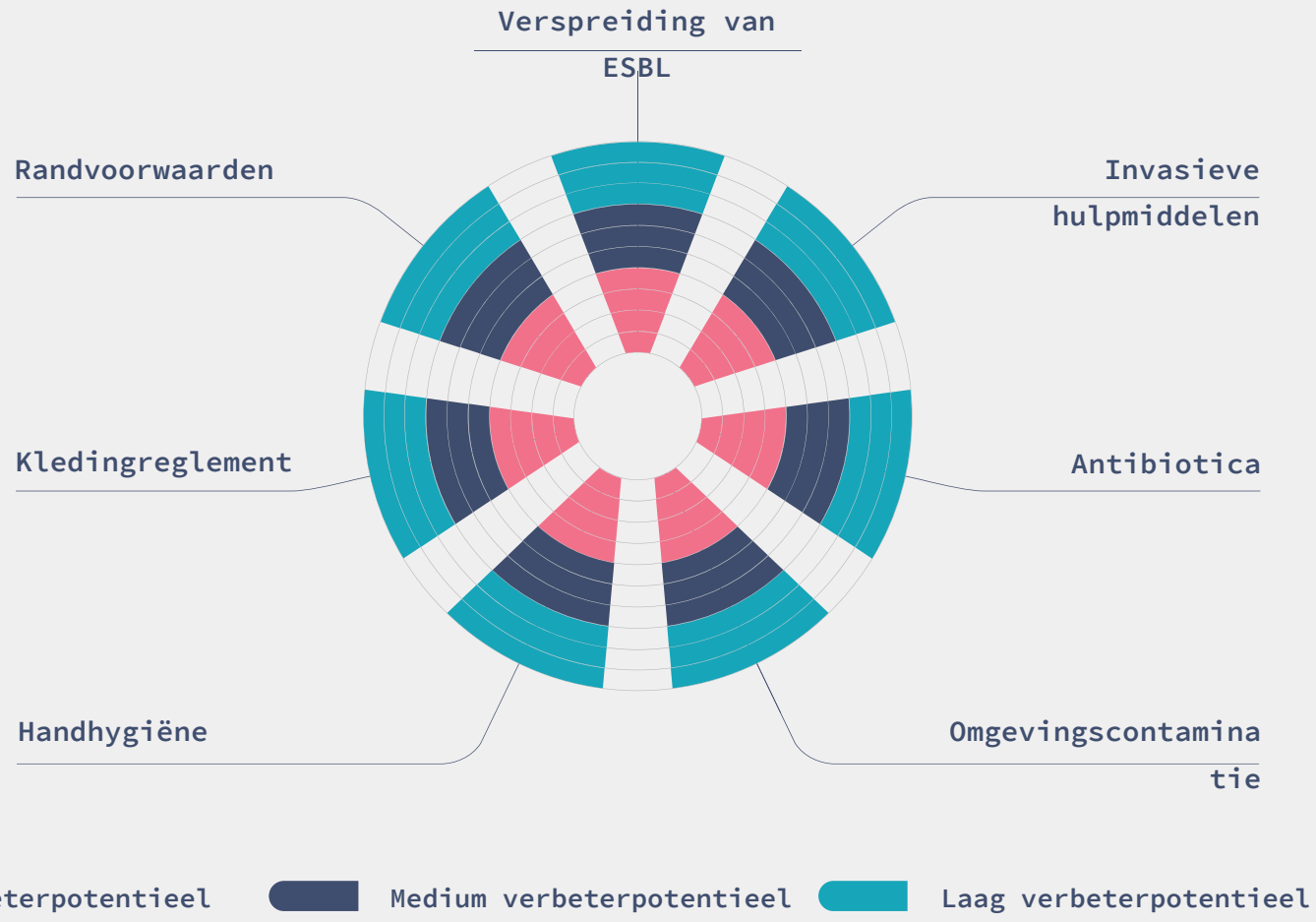
Contrain infectie preventie coach

Clonal relatedness of ESBL-E/CPE



Contrain infectie preventie coach

Score Infectie Risico Scan



Contrain infectie preventie coach

Patient-related risk factors







Method – patient related factors (1)

Various point prevalence surveys are performed (depending on the size of the ward)

- **Prevalence of indwelling medical devices**
  Urinary catheters, peripheral and central venous katheters

- **Appropriateness of use**
  - **Using a standardized flowchart based on the national surveillance system**
  - **Judgment against local guidelines**

Method – patient related factors (2)

- **Prevalence of antimicrobial agents**
- **Appropriateness of use**
  - **Is there an indication for antimicrobials?**
  - **Is the choice according to the guideline?**
  - **Insufficient information**

  - **Using a standardized flowchart based on the Global PPS survey**
  - **Judgement against local guidelines**

Method – patient related factors (3)

- **Prevalence of multidrug resistant micro-organisms**
  - **Extended Spectrum Beta-Lactamase producing Enterobacteriaceae (ESBL-E)**
  - **Carbapenemase Producing Enterobacteriaceae (CPE)**

...

- **Clonal relatedness of all ESBL-E and CPE**

  ≥ 2 ESBL-E or CPE strains, with identical ESBL genes, in 2 or more patients within the same epidemiological setting = indication for transmission

Contrain infectie preventie coach

Ward-related risk factors




Contrain infectie preventie coach

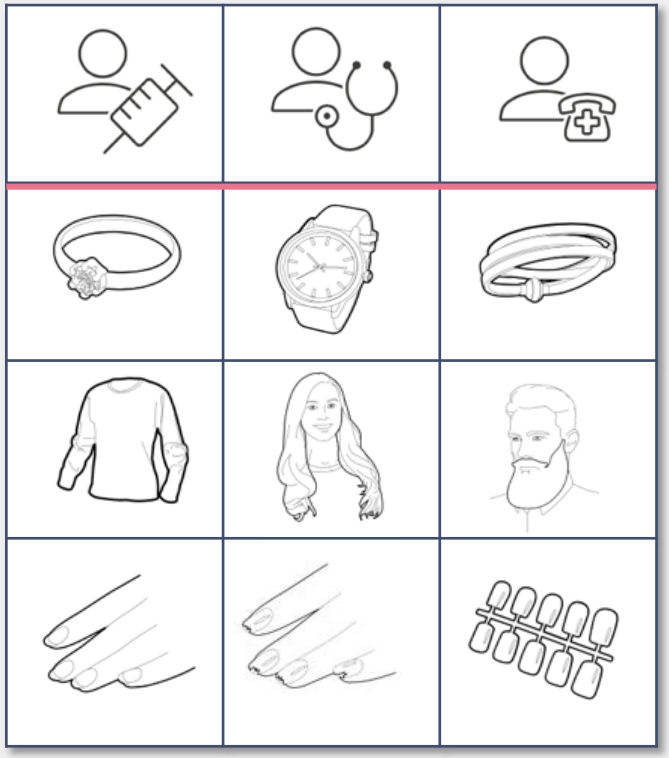
Method – Environmental contamination

- **Quality of Cleaning**
  - **Based on the level of Adenosine Tri Phosphate (ATP) (Clean-Trace TM Surface ATP, 3M)**
  - **20 test points in 4 categories, tested at midday**:

Contrain infectie preventie coach

Method – Personal hygiene of healthcare workers

- **20 healthcare workers were monitored**

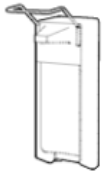


Contrain infectie preventie coach

Method – Shortcomings of IP preconditions

- **Shortcomings in infection prevention preconditions, e.g.**
  - **Surgical mask are present at the ward**
  - **Non-sterile gloves are present in every patient room**
  - **Hand alcohol is present in every room and at point of care**
  - **Bed-pan washer meets the following requirement: disinfection with steam or hot water of 80°C. (for at least 60 sec.)**






Contrain infectie preventie coach

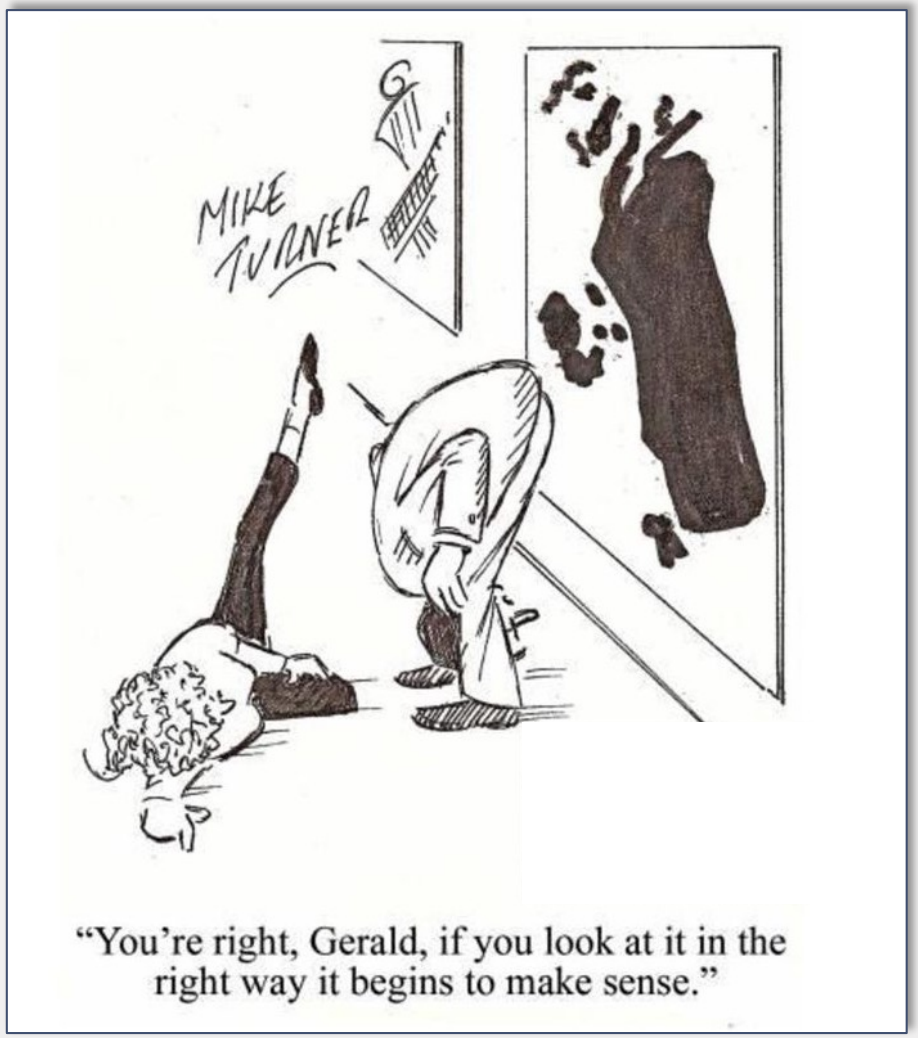
Method – Hand hygiene (HH)

- **Use of handdesinfectants / patient day**

- **1 hand hygiene moment = 2.5 ml handdesinfectants**
- **Assumption of 30 HH moment / day / patient**

- **HH indicator = 100% * ((consumption / patientday) / 2,5ml) / 30**

How to interpret the results?



"You're right, Gerald, if you look at it in the right way it begins to make sense."

Infection Risk Scan – Ward A

Patient profile

ESBL carriage

4 %

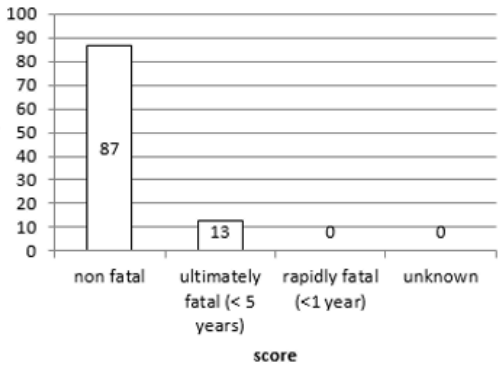
Medical devices

70 %

Antimicrobial use

35 %

McCabe score

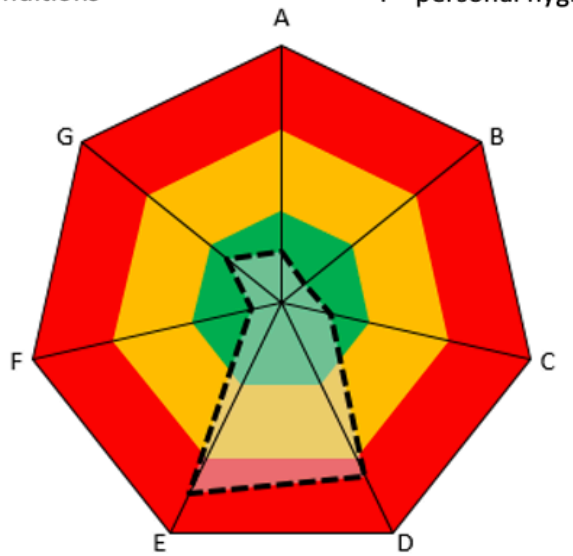


high risk
intermediate risk
low risk

parameters	LIMIT VALUES Low	Intermediate	High
ESBL carriage (%)	≤ 7	> 7 en ≤ 11	> 11
Medical Devices (%)	≤ 15	> 15 en ≤ 50	> 50
Antimicrobial use (%)	≤ 15	> 15 en ≤ 50	> 50

Improvement plot

A= clonal relatednes of ESBL (%)
B= inappropriate use of medical devices (%)
C= inappropriate us of antimicrobials (%)
D= environmental contamination (RLU)
E= handhygiene non-compliance (%);
F= personal hygiene HCW
G= IP preconditions



parameters	LIMIT VALUES low	intermediate	high	score
clonal relatednes of ESBL (%)	none	clonal related	clonal related	no
inappropriate use of medical devices (%)	≤ 15	>15 en ≤ 25	> 25	0
inappropriate us of antimicrobials (%)	≤ 15	> 15 en ≤ 25	> 25	6
Environm. contamination (score)	≤ 6	>6 en ≤ 18	> 18	23
Handhygiene 'non-compliance' (%)	≤ 40	> 40 en ≤ 60	> 60	82
personal hygiene HCW (score)	≤ 1	> 1 en ≤ 4	> 4	0
IP preconditions (score)	≤ 1	> 1 en ≤ 3	> 3	1

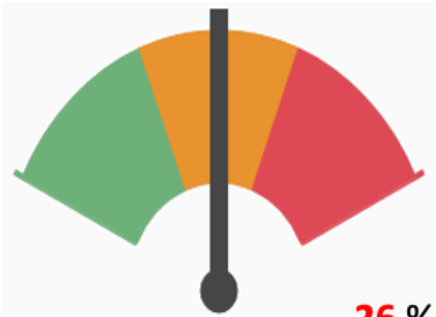
Infection Risk Scan – Ward B

Patient profile

ESBL carriage

26 %

Medical devices

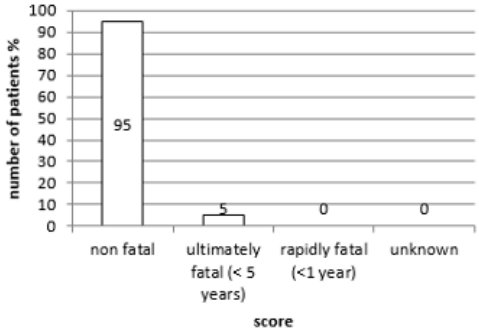


26 %

Antimicrobial use

18 %

McCabe score



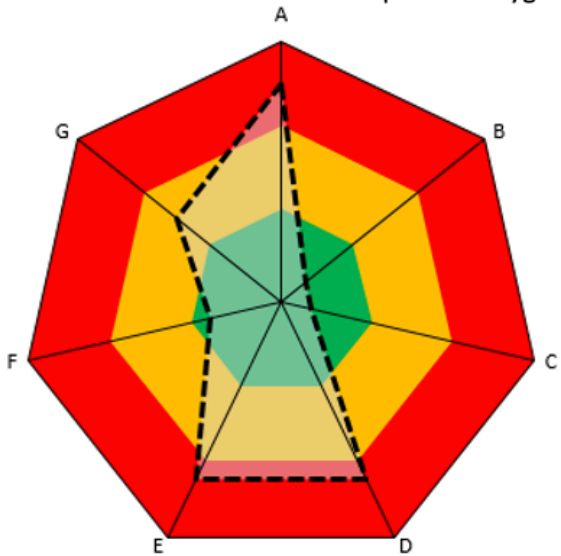
IRIS

- high risk
- intermediate risk
- low risk

parameters	LIMIT VALUES Low	Intermediate	High
ESBL carriage (%)	≤ 7	> 7 en ≤ 11	> 11
Medical Devices (%)	≤ 15	> 15 en ≤ 50	> 50
Antimicrobial use (%)	≤ 15	> 15 en ≤ 50	> 50

Improvement plot

A= clonal relatednes of ESBL (%)
B= inappropriate use of medical devices (%)
C= inappropriate us of antimicrobials (%)
D= environmental contamination (RLU)
E= handhygiene non-compliance (%);
F= personal hygiene HCW
G= IP preconditions

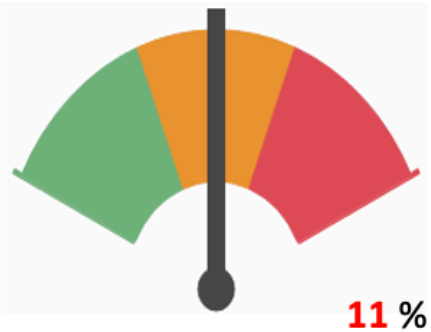


parameters	LIMIT VALUES low	intermediate	high	score
clonal relatednes of ESBL (%)	none	clonal related	clonal related	yes
inappropriate use of medical devices (%)	≤ 15	>15 en ≤ 25	> 25	0
inappropriate us of antimicrobials (%)	≤ 15	> 15 en ≤ 25	> 25	0
Environm. contamination (score)	≤ 6	>6 en ≤ 18	> 18	19
Handhygiene 'non-compliance' (%)	≤ 40	> 40 en ≤ 60	> 60	66
personal hygiene HCW (score)	≤ 1	> 1 en ≤ 4	> 4	1
IP preconditions (score)	≤ 1	> 1 en ≤ 3	> 3	2

Infection Risk Scan – Ward C

Patient profile

ESBL carriage



11 %

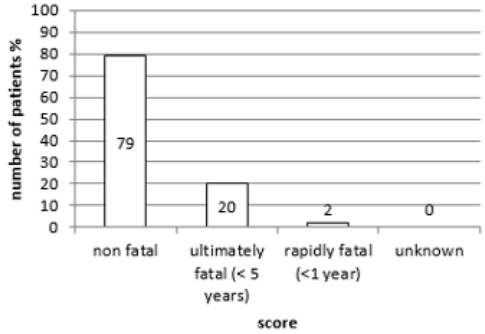
Medical devices

70 %

Antimicrobial use

33 %

McCabe score

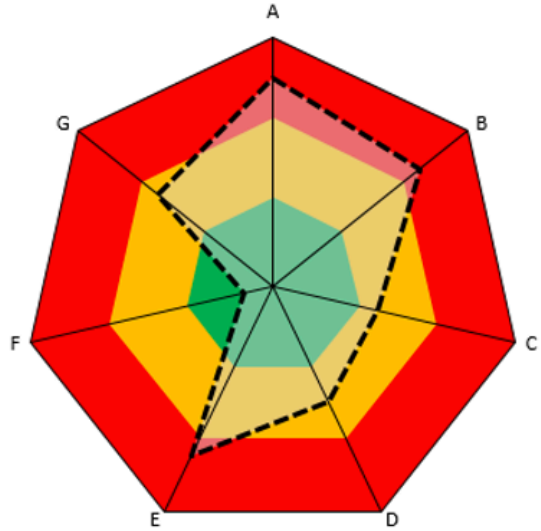


high risk
intermediate risk
low risk

parameters	LIMIT VALUES Low	Intermediate	High
ESBL carriage (%)	≤ 7	> 7 en ≤ 11	> 11
Medical Devices (%)	≤ 15	> 15 en ≤ 50	> 50
Antimicrobial use (%)	≤ 15	> 15 en ≤ 50	> 50

Improvement plot

A= clonal relatednes of ESBL (%)
B= inappropriate use of medical devices (%)
C= inappropriate us of antimicrobials (%)
D= environmental contamination (RLU)
E= handhygiene non-compliance (%);
F= personal hygiene HCW
G= IP preconditions



parameters	LIMIT VALUES low	intermediate	high	score
clonal relatednes of ESBL (%)	none	clonal related	clonal related	Yes
inappropriate use of medical devices (%)	≤ 15	>15 en ≤ 25	> 25	46
inappropriate us of antimicrobials (%)	≤ 15	> 15 en ≤ 25	> 25	18
Environm. contamination (score)	≤ 6	>6 en ≤ 18	> 18	11
Handhygiene 'non-compliance' (%)	≤ 40	> 40 en ≤ 60	> 60	73
personal hygiene HCW (score)	≤ 1	> 1 en ≤ 4	> 4	0
IP preconditions (score)	≤ 1	> 1 en ≤ 3	> 3	3

Questions so far?

Contrain infectie preventie coach

RESULTS - IRIS in AMPHIA Hospital

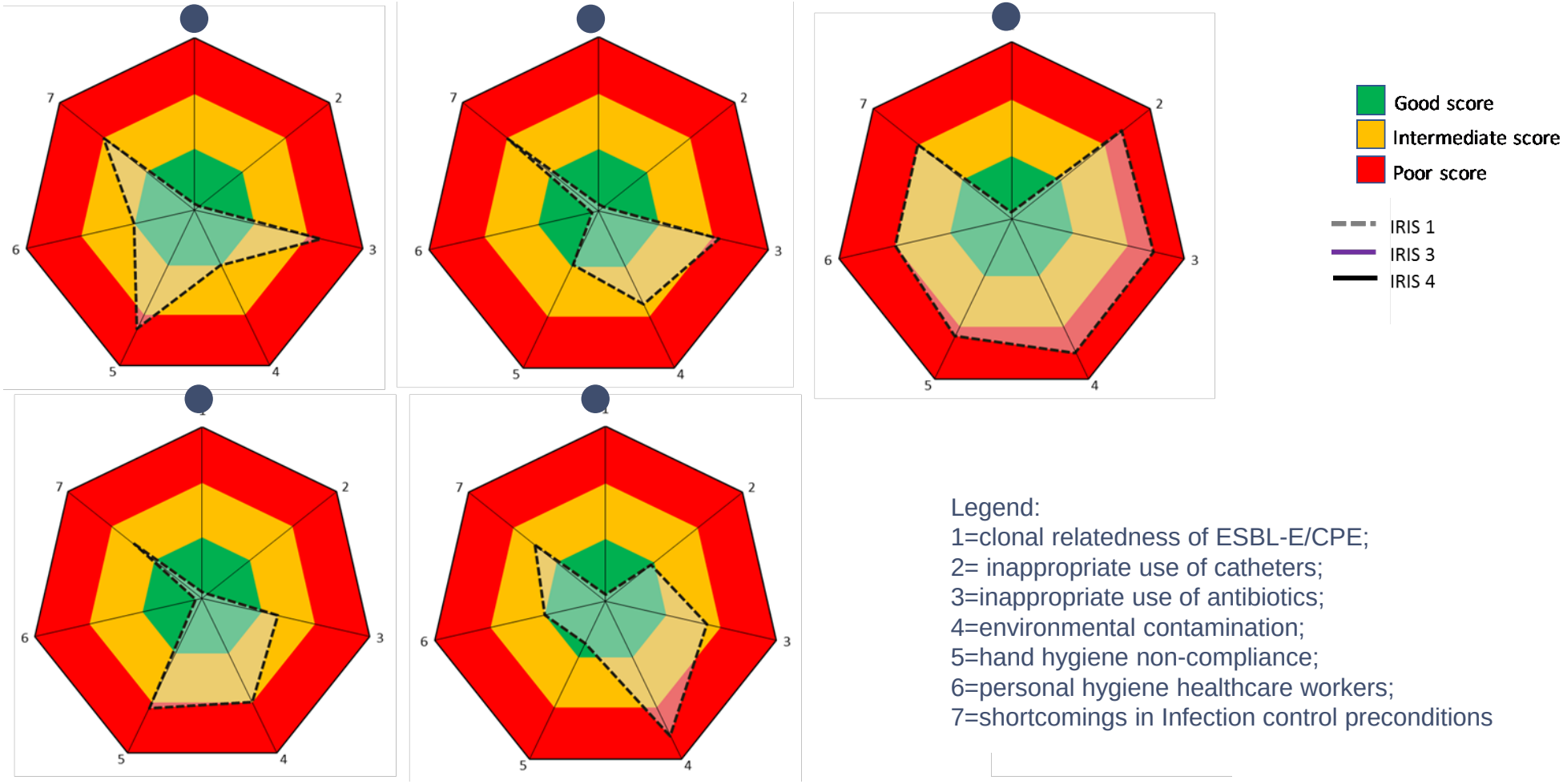
IRIS has been performed 4 times, in 5 different medical specialties:

IRIS-1	IRIS-2	IRIS-3	IRIS-4
Nov-Dec	June-July	April-May	Sept-Oct
2013	2014	2015	2016

- **Feedback was given after each IRIS**
- **Targeted interventions were started by the ward**
- **Coaching by the department of infection control**

Contrain infectie preventie coach

IRIS 1 – AMPHIA Hospital

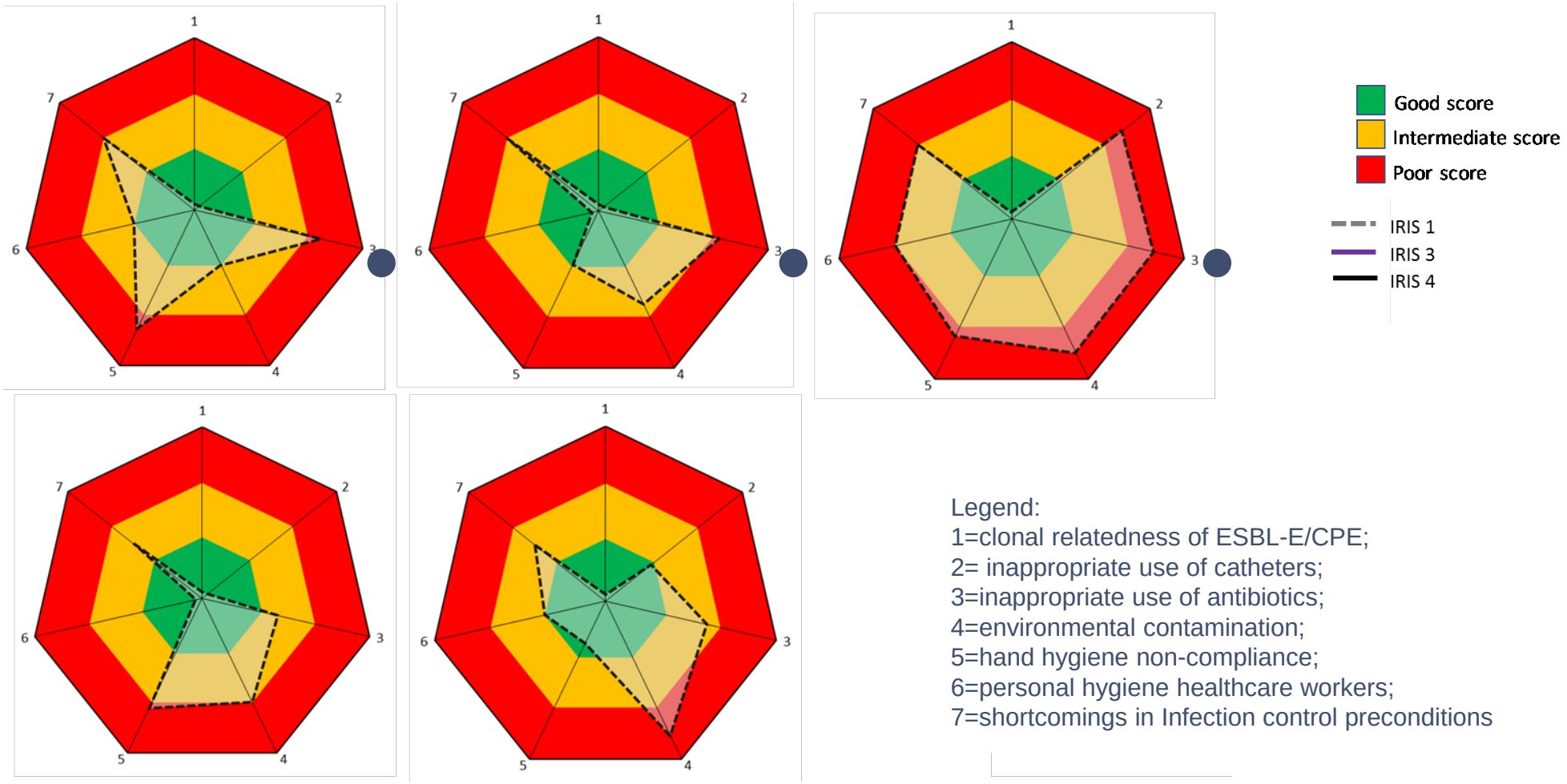


Legend:
1=clonal relatedness of ESBL-E/CPE;
2= inappropriate use of catheters;
3=inappropriate use of antibiotics;
4=environmental contamination;
5=hand hygiene non-compliance;
6=personal hygiene healthcare workers;
7=shortcomings in Infection control preconditions

Willemsen I, Kluytmans J.Antimicrob Resist Infect Control. 2018 Mar 9;7:38

Contrain infectie preventie coach

IRIS 1 – AMPHIA Hospital

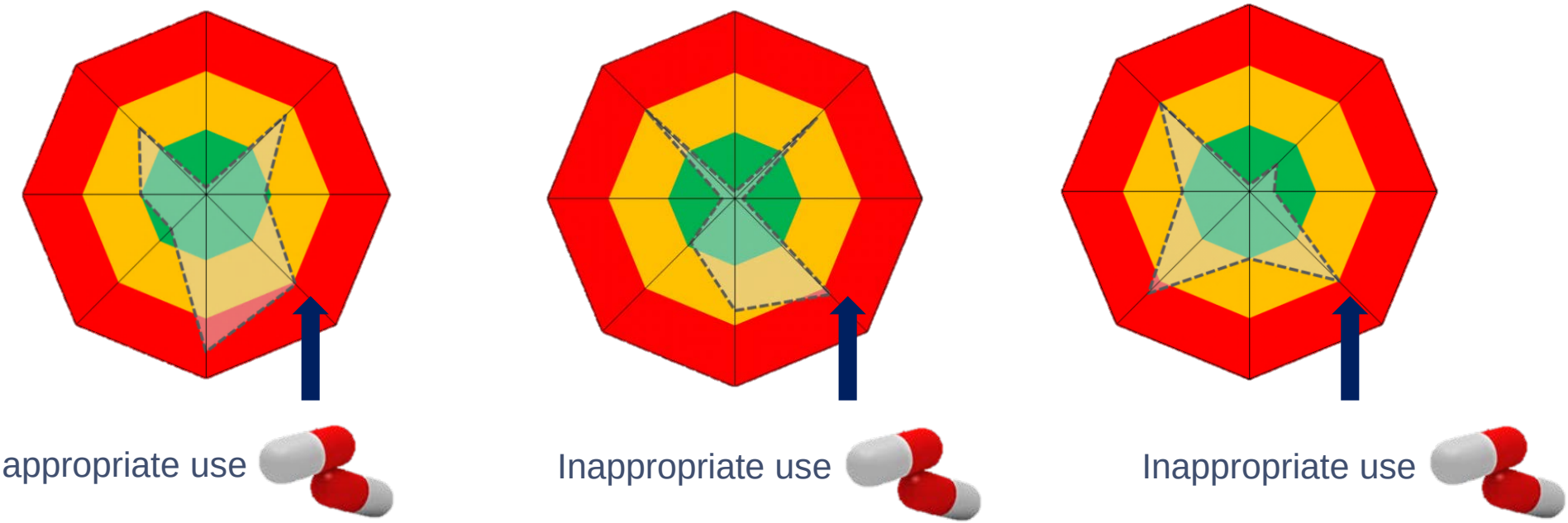


Legend:
1=clonal relatedness of ESBL-E/CPE;
2= inappropriate use of catheters;
3=inappropriate use of antibiotics;
4=environmental contamination;
5=hand hygiene non-compliance;
6=personal hygiene healthcare workers;
7=shortcomings in Infection control preconditions

Willemsen I, Kluytmans J.Antimicrob Resist Infect Control. 2018 Mar 9;7:38

Contrain infectie preventie coach

IRIS 1 – ANTIMICROBIAL USE



Unjustified broad spectrum

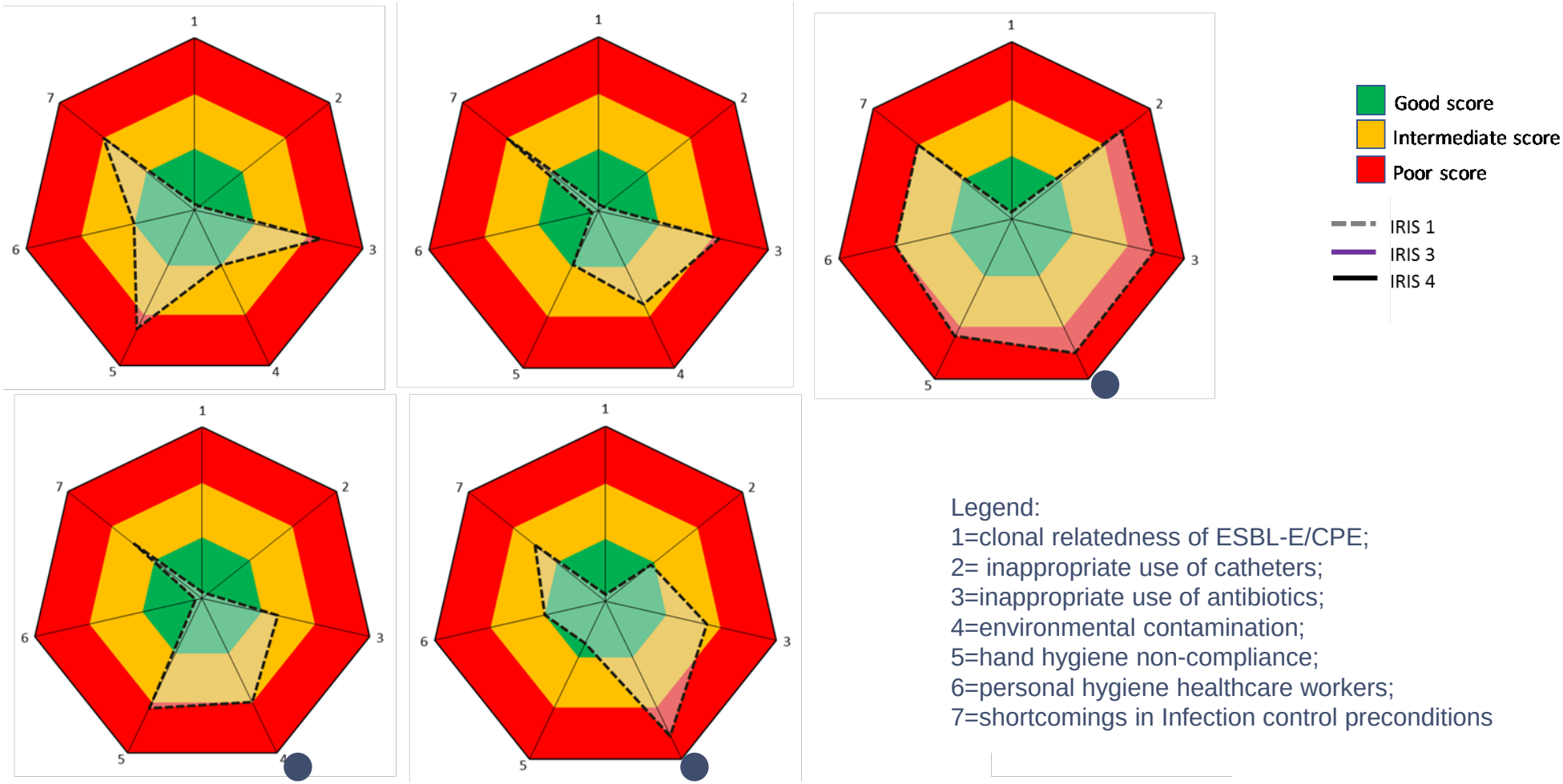
IA prophylaxis

Multiple IA choices / knowlegde?

Willemsen I, Kluytmans J.Antimicrob Resist Infect Control. 2018 Mar 9;7:38

Contrain infectie preventie coach

IRIS 1 – AMPHIA Hospital

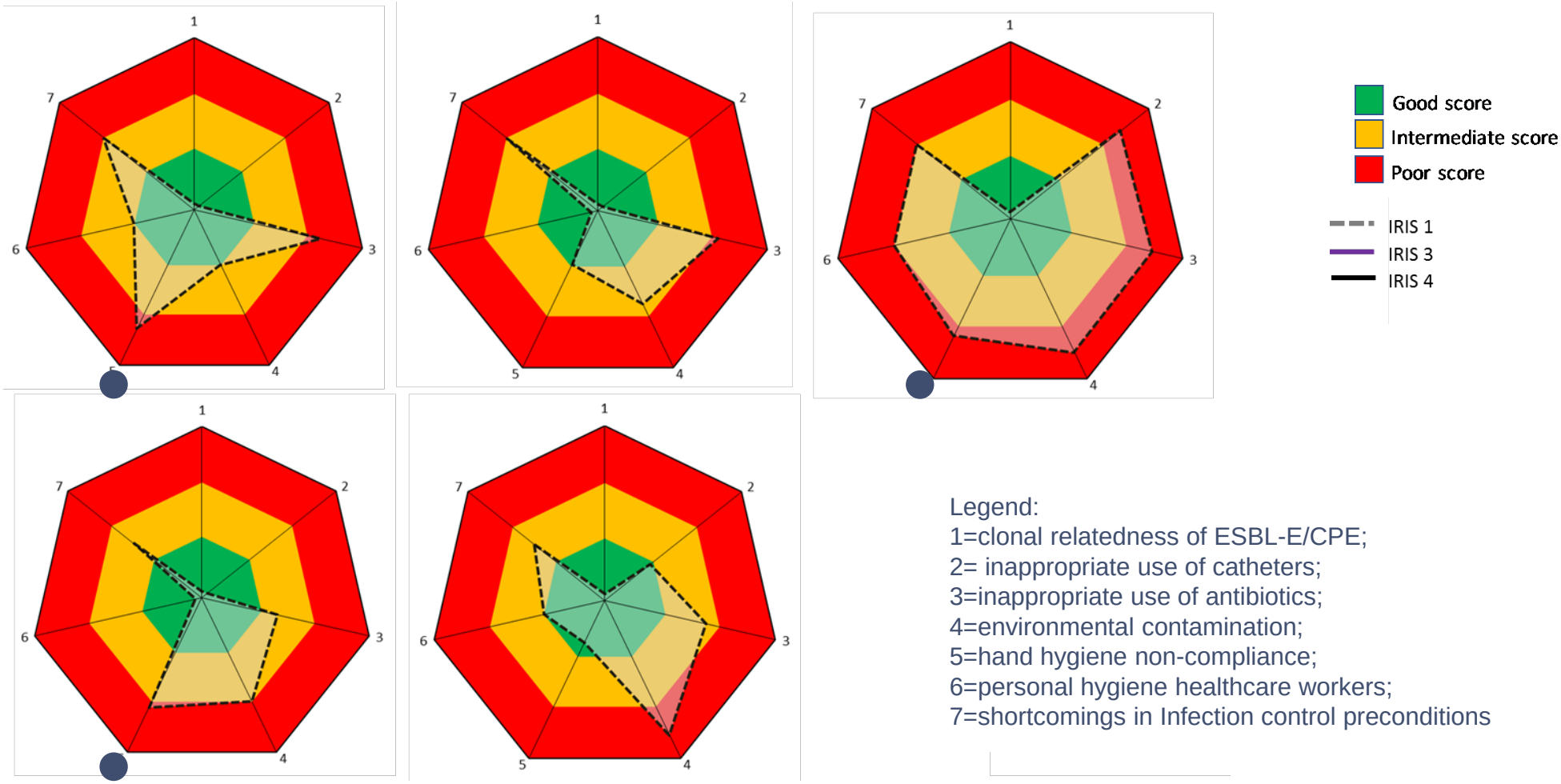


Legend:
1=clonal relatedness of ESBL-E/CPE;
2= inappropriate use of catheters;
3=inappropriate use of antibiotics;
4=environmental contamination;
5=hand hygiene non-compliance;
6=personal hygiene healthcare workers;
7=shortcomings in Infection control preconditions

Willemsen I, Kluytmans J.Antimicrob Resist Infect Control. 2018 Mar 9;7:38

Contrain infectie preventie coach

IRIS 1 – AMPHIA Hospital

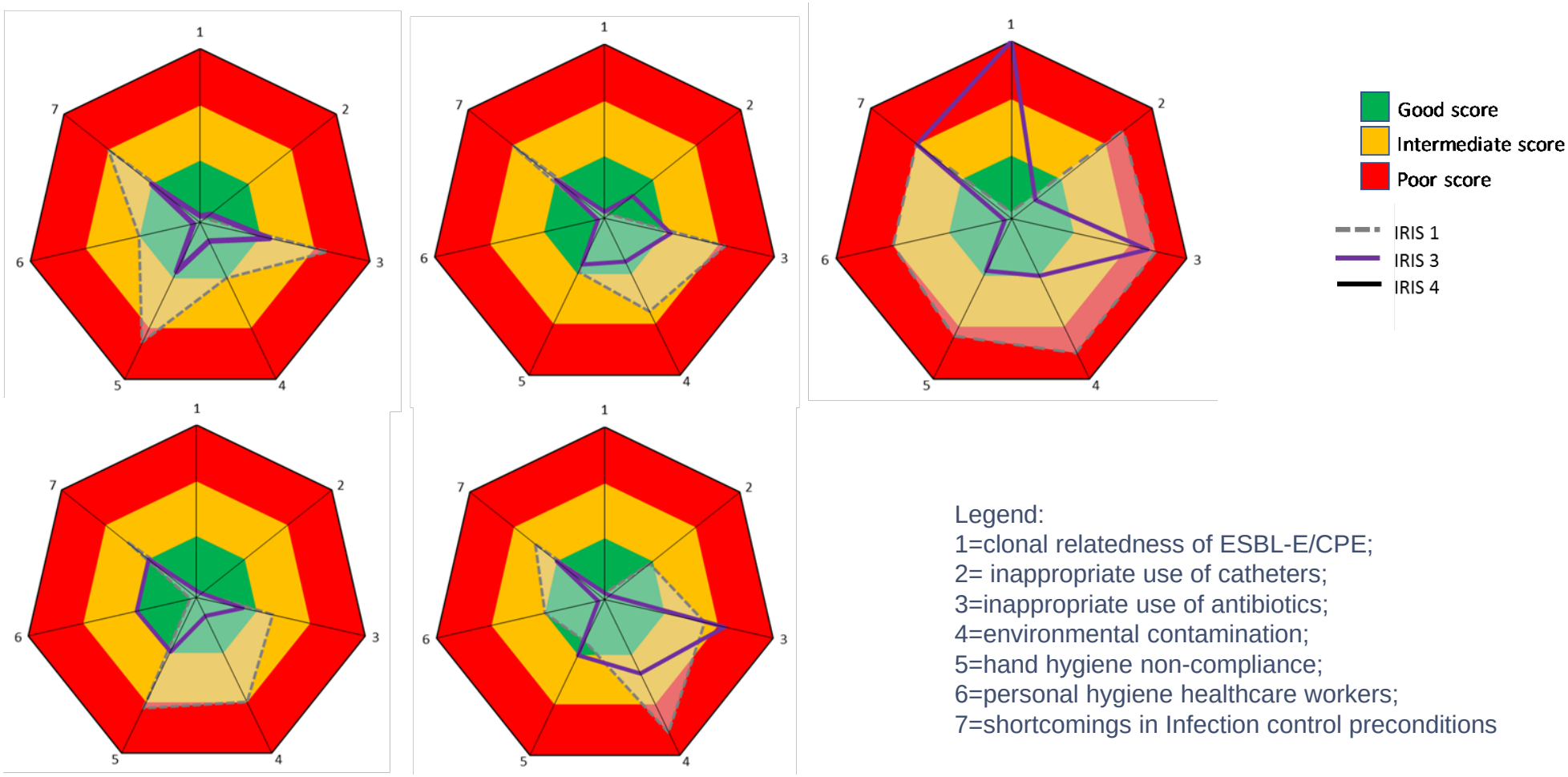


Legend:
1=clonal relatedness of ESBL-E/CPE;
2= inappropriate use of catheters;
3=inappropriate use of antibiotics;
4=environmental contamination;
5=hand hygiene non-compliance;
6=personal hygiene healthcare workers;
7=shortcomings in Infection control preconditions

Willemsen I, Kluytmans J.Antimicrob Resist Infect Control. 2018 Mar 9;7:38

Contrain infectie preventie coach

IRIS 3 – AMPHIA Ziekenhuis

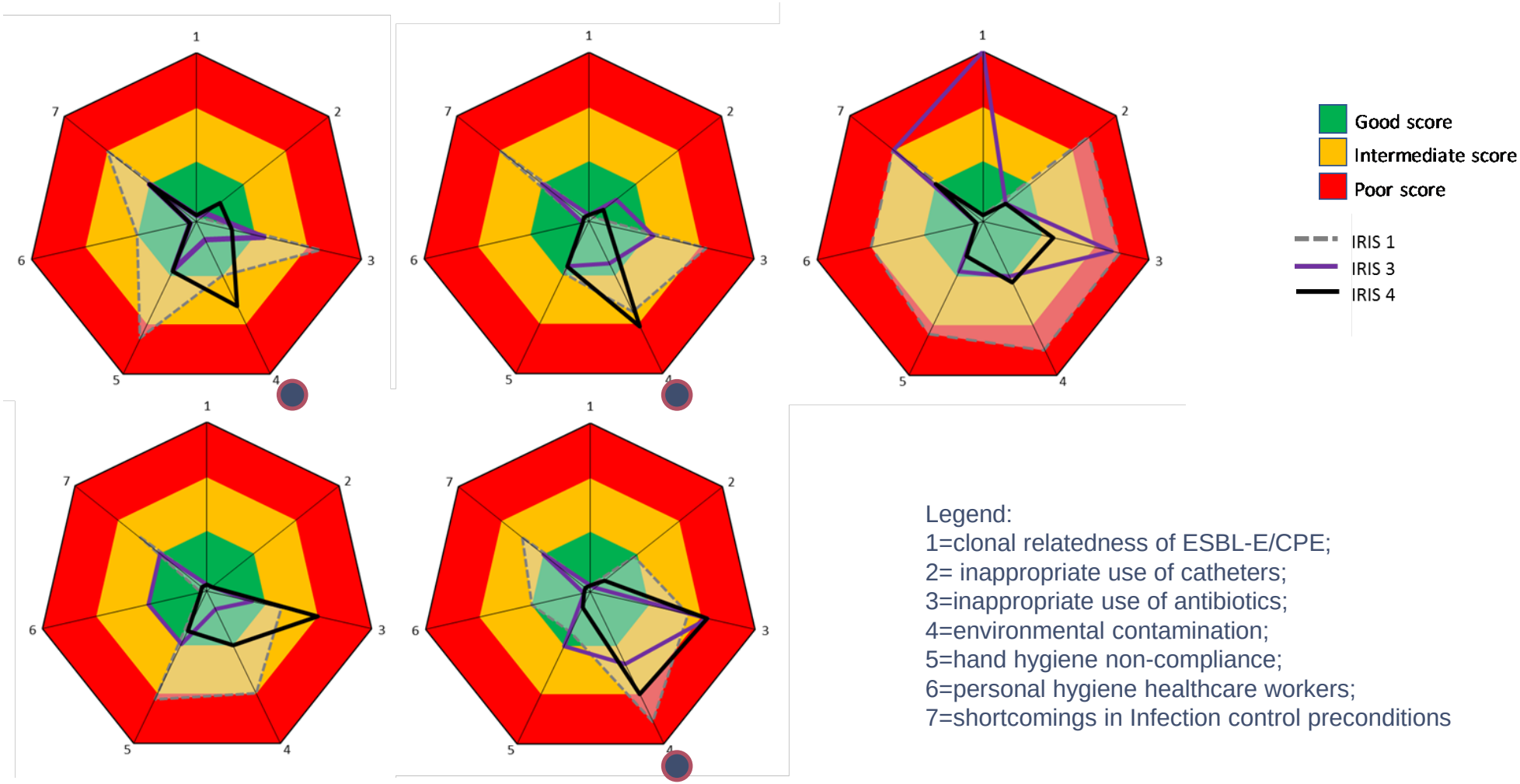


Legend:
1=clonal relatedness of ESBL-E/CPE;
2= inappropriate use of catheters;
3=inappropriate use of antibiotics;
4=environmental contamination;
5=hand hygiene non-compliance;
6=personal hygiene healthcare workers;
7=shortcomings in Infection control preconditions

Willemsen I, Kluytmans J.Antimicrob Resist Infect Control. 2018 Mar 9;7:38

Contrain infectie preventie coach

IRIS 4 - AMPHIA Ziekenhuis



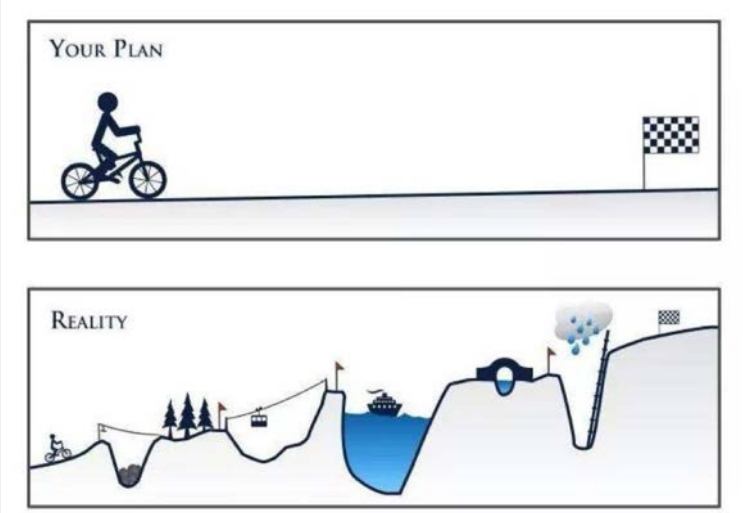
Legend:
1=clonal relatedness of ESBL-E/CPE;
2= inappropriate use of catheters;
3=inappropriate use of antibiotics;
4=environmental contamination;
5=hand hygiene non-compliance;
6=personal hygiene healthcare workers;
7=shortcomings in Infection control preconditions

Contrain infectie preventie coach

Conclusion IRIS (1)

- Using the IRIS method substantial improvement was achieved and transparancy was created
- Hand hygiene compliance increased significantly
- Environmental contamination levels improved
- Aspects that were already good maintained at this level

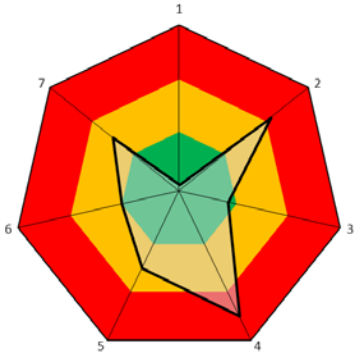
- However, continous attention for improvement actions and repeated IRIS' are needed to monitor progress



Contrain infectie preventie coach

Conclusion IRIS (2)

1. Back to basics (the cornerstones of infection control)
2. Measurable (objective & uniform)
3. Visualization (transparancy & easy to read)
4. Targeted interventions
5. PDCA cyclus to monitor improvements



Contrain infectie preventie coach

Can the IRIS bij implemented in other countries?

Willemsen I, Jefferson J, Mermel L, Kluytmans J.Am J Infect Control. 2020 Apr;48(4):391-397

Contrain infectie preventie coach

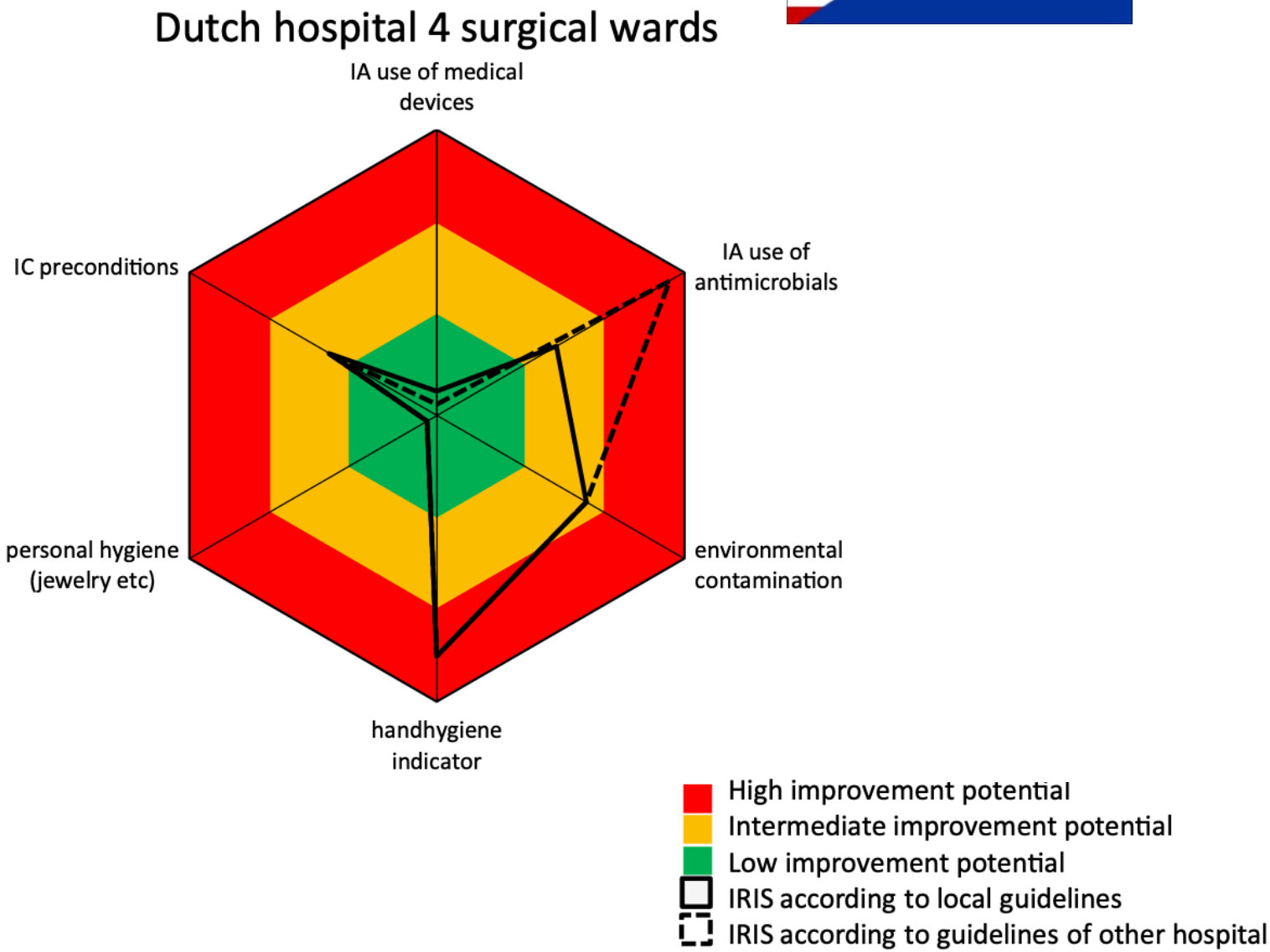


Fig. 2. Improvement plots of the Dutch and US hospital judged against the local guidelines and the guidelines of the other hospital. *IA*, inappropriate; *IC*, infection control; *IRIS*, infection risk scan.

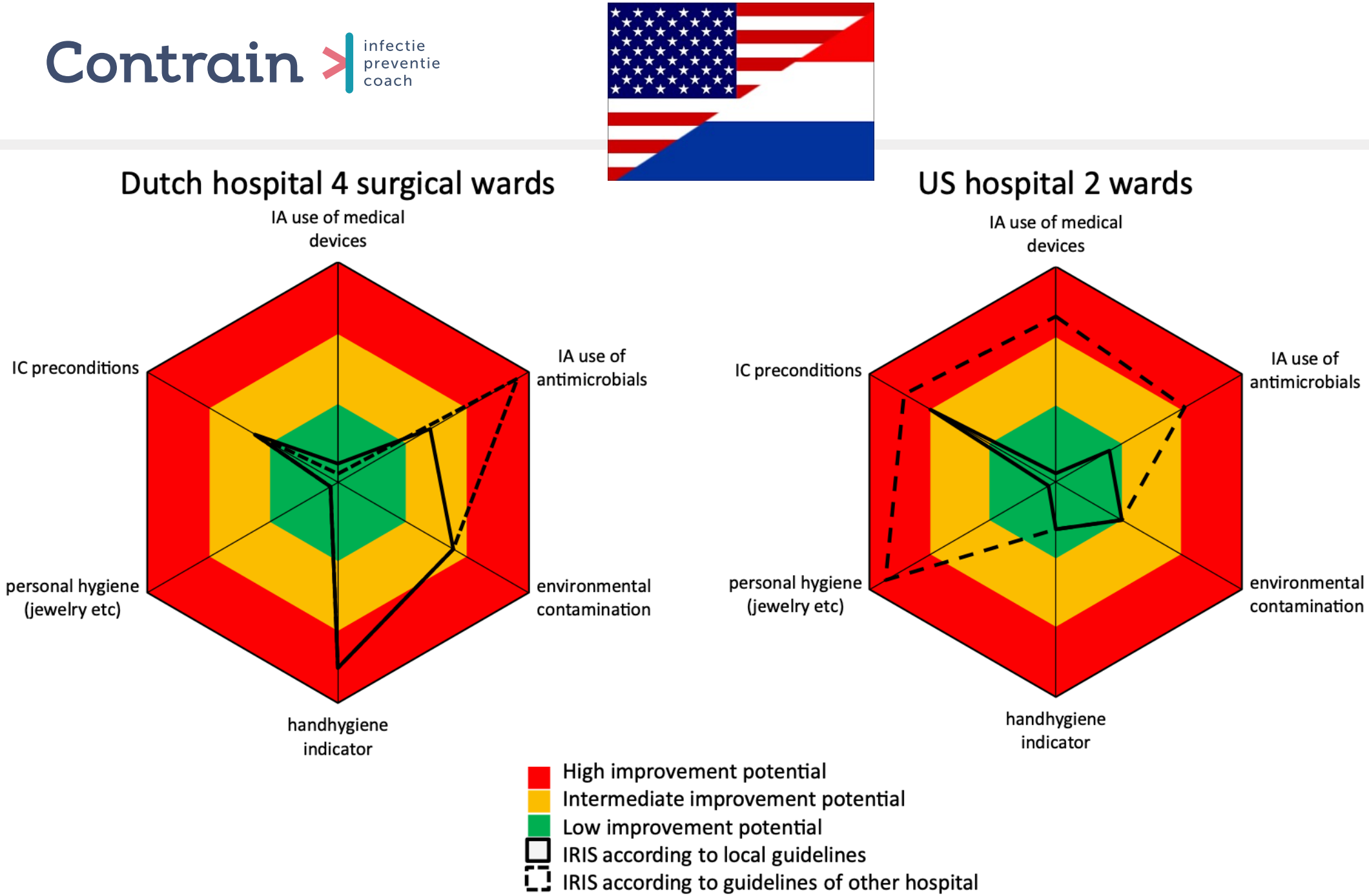


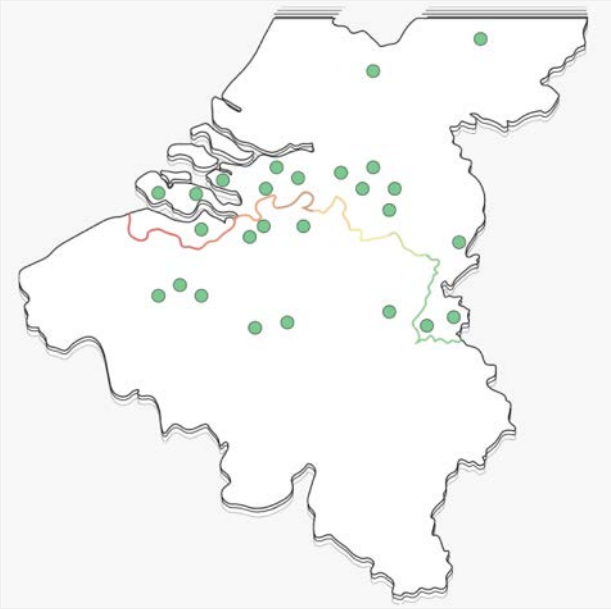
Fig. 2. Improvement plots of the Dutch and US hospital judged against the local guidelines and the guidelines of the other hospital. *IA*, inappropriate; *IC*, infection control; *IRIS*, infection risk scan.

Contrain infectie preventie coach

Interreg Vlaanderen-Nederland Europees Fonds voor Regionale Ontwikkeling

i-4-1 HEALTH

4 i's: Innovation, Integration, Intelligence, IRIS & One Health

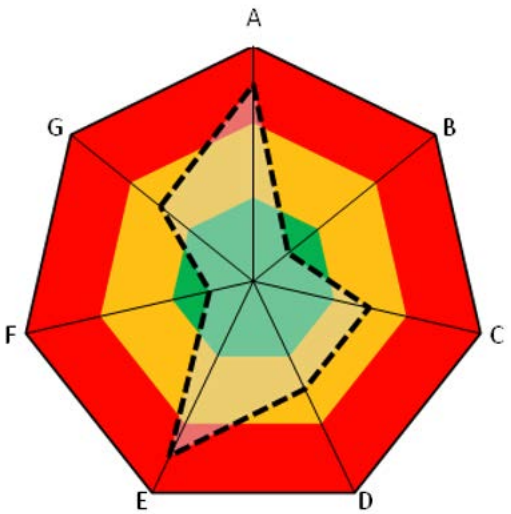


Goal WP6:
Implementing the IRIS in 9 hospitals
3 in Belgium
6 in the Netherlands)

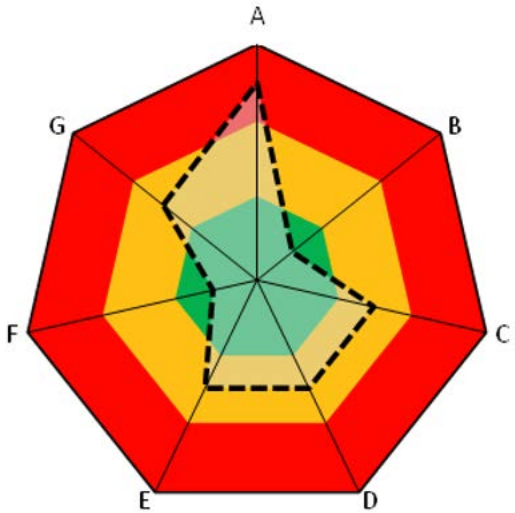
In IRIS-1:
1598 included patiënts
998 in the Netherlands
600 in Belgium

Contrain infectie preventie coach

Netherlands



Belgium



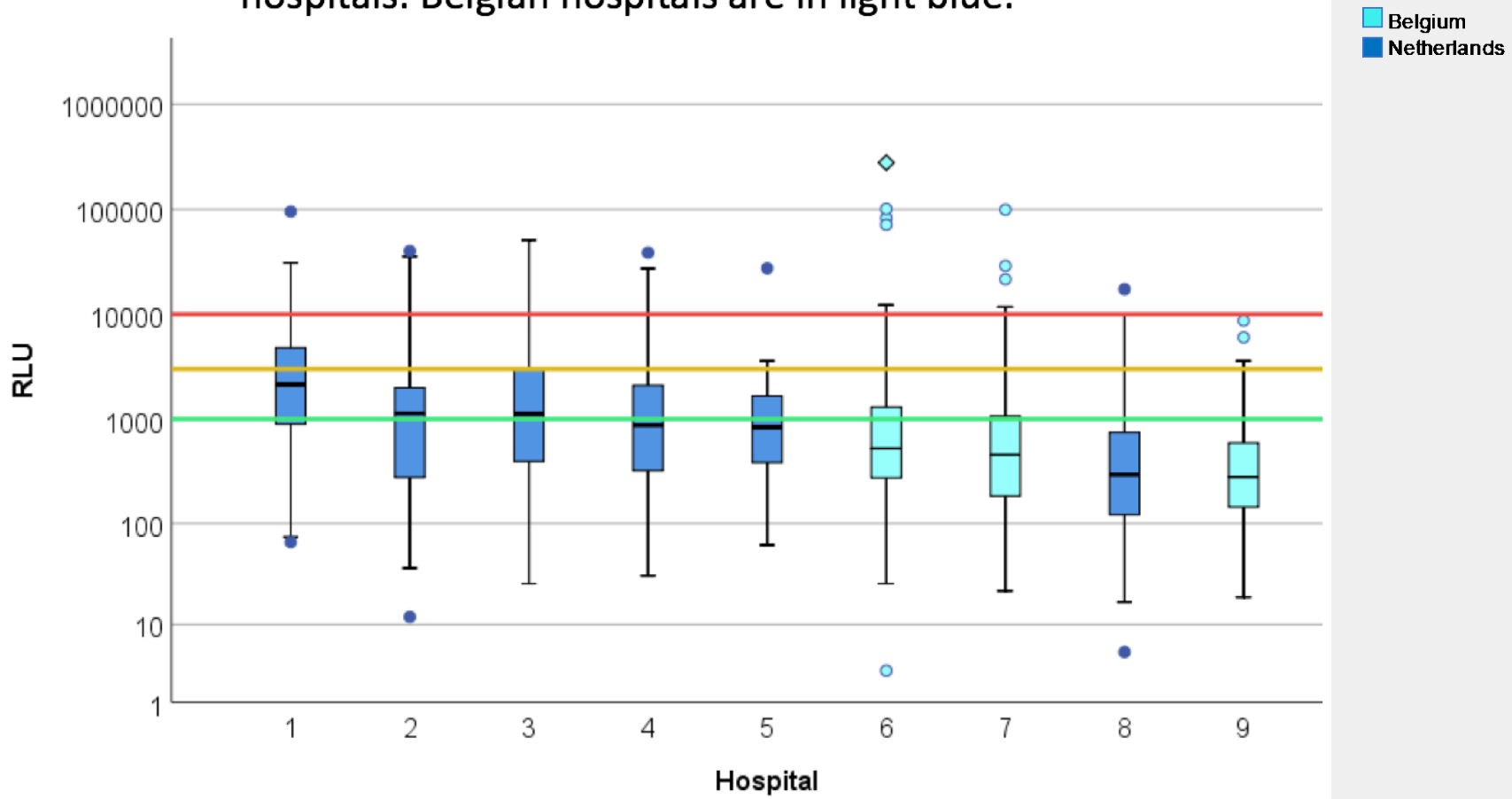
improvementpotential

- High
- Intermediate
- Low
- IRIS

A= clonal relatedness of ESBL-E
B= appropriate use of indwelling medical devices (%)
C= appropriate use of antimicrobial therapy (%)
D= environmental contamination
E= hand hygiene non compliance (%)
F= personal hygiene
G= IC preconditions

Contrain infectie preventie coach

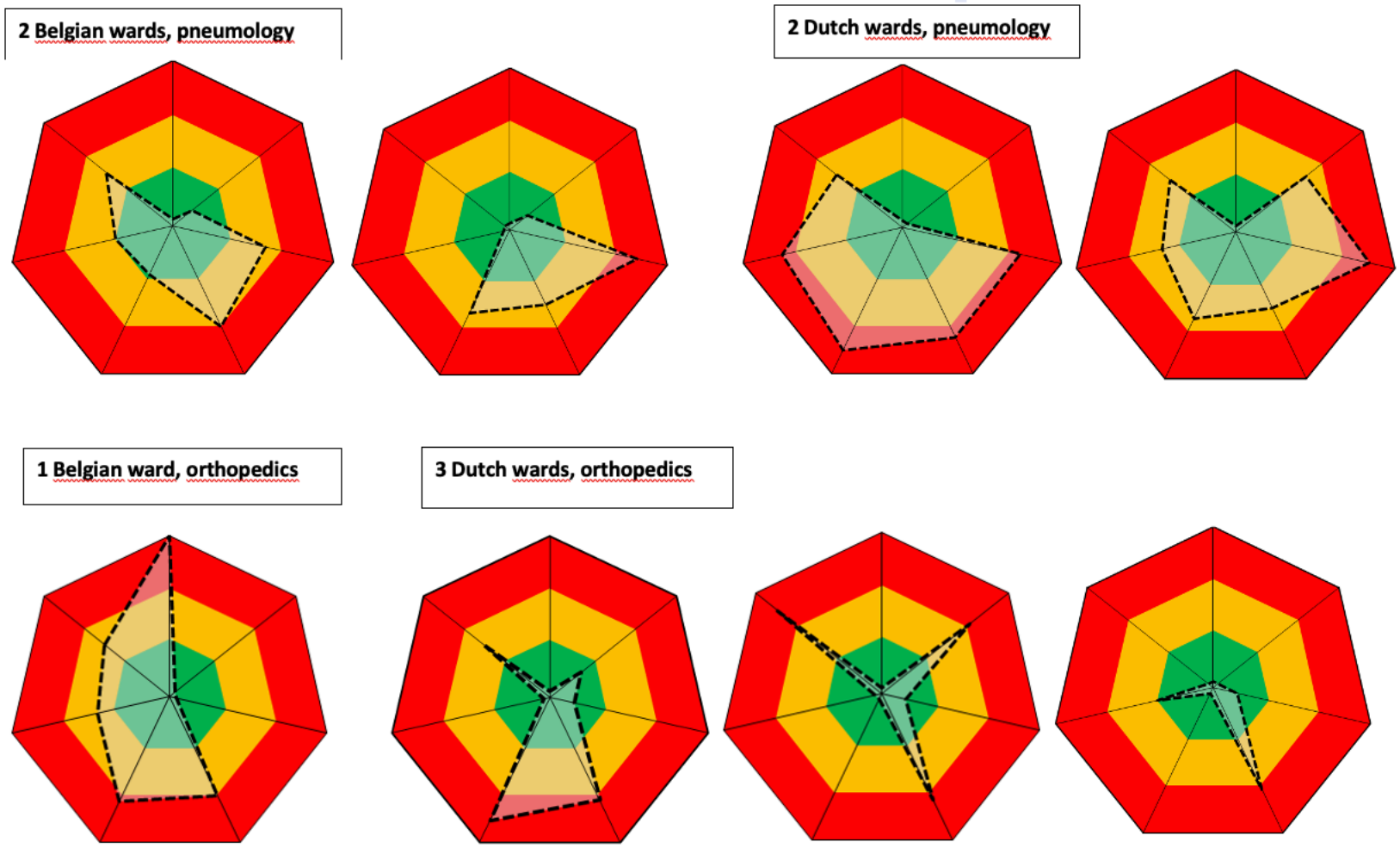
Figure 1. Boxplots visualizing differences in RLU between hospitals. Belgian hospitals are in light blue.



Van Arkel et al, Antimicrob Resist Infect Control. 2020 May 28;9(1):77

Contrain infectie preventie coach

Comparing different wards (IRIS-1 both Dutch as Belgium wards)



Would the IRIS be a usefull tool in Norway?

If so… in which medical specialty / ward?

who would you involve in this project?

Would it be useful to compare regional differences and similarities

Contrain
infectie
preventie
coach

Dr. Ina Willemsen
Infectiepreventiecoach
T 06 27 11 96 66

Contrain info@contrain-ipc.nl www.contrain-ipc.nl