Burden of health care-associated infections

Train the trainers Hand Hygiene

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Topics

- What are health-care associated infections?
- Impacts of health-care associated infections
- Core components of Infection Prevention and Control (IPC)
- Hand Hygiene to achieve Universal Health Coverage (UHC)

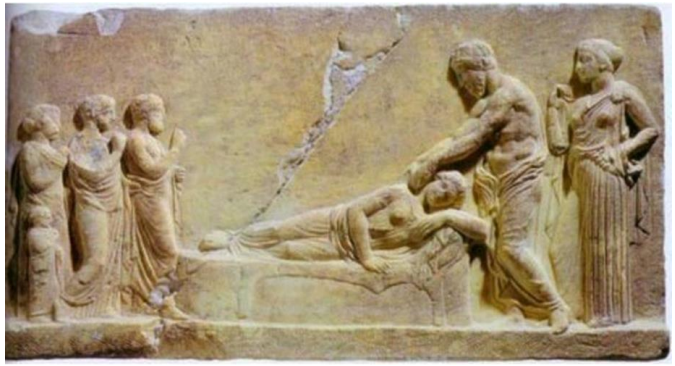
“I felt a little ill and called Dr. Symmachus.

Well, you came, Symmachus, but you brought 100 medical students with you.

One hundred ice-cold hands poked and jabbed me.

I didn't have a fever, Symmachus, when I called you–but now I do.”

Marcus Valerius Martialis



Lyons AS. Medicine in Roman times. In: Lyons AS, Petrucelli RJ II, eds. Medicine: An Illustrated History. New York: Harry N. Abrams, 1987: 230-49.

Definition:
"Health care-associated infections (HAI)"

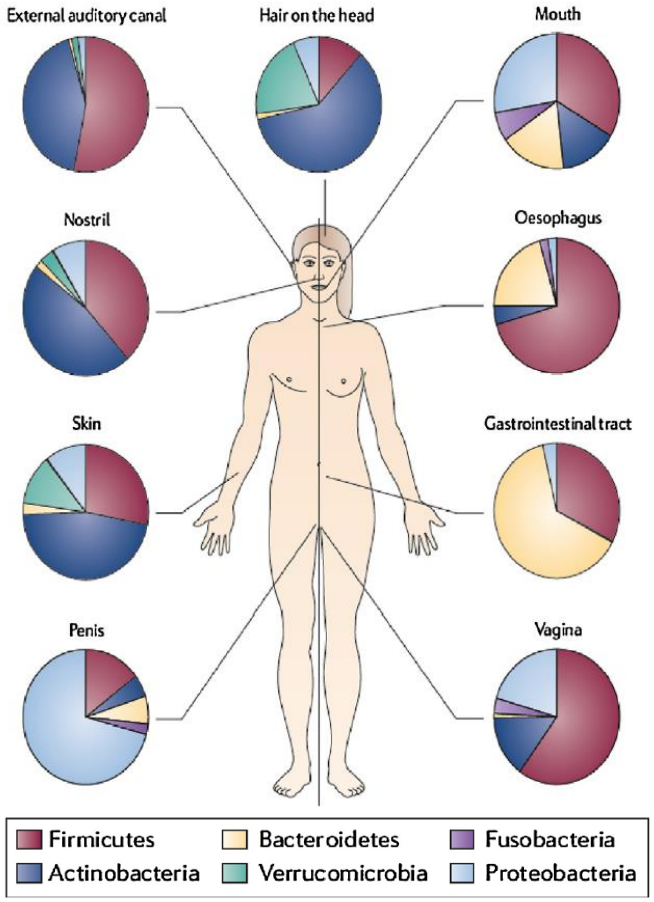
"**An infection occurring in a patient during the process of care in a hospital or other health-care facility** which was not present or incubating at the time of admission. This includes infections acquired in the hospital, but appearing after discharge, and also occupational infections among staff of the facility"

Prevention of hospital-acquired infections: a practical guide. Geneva, WHO, 2002:64.

Sources of germs responsible for HAIs

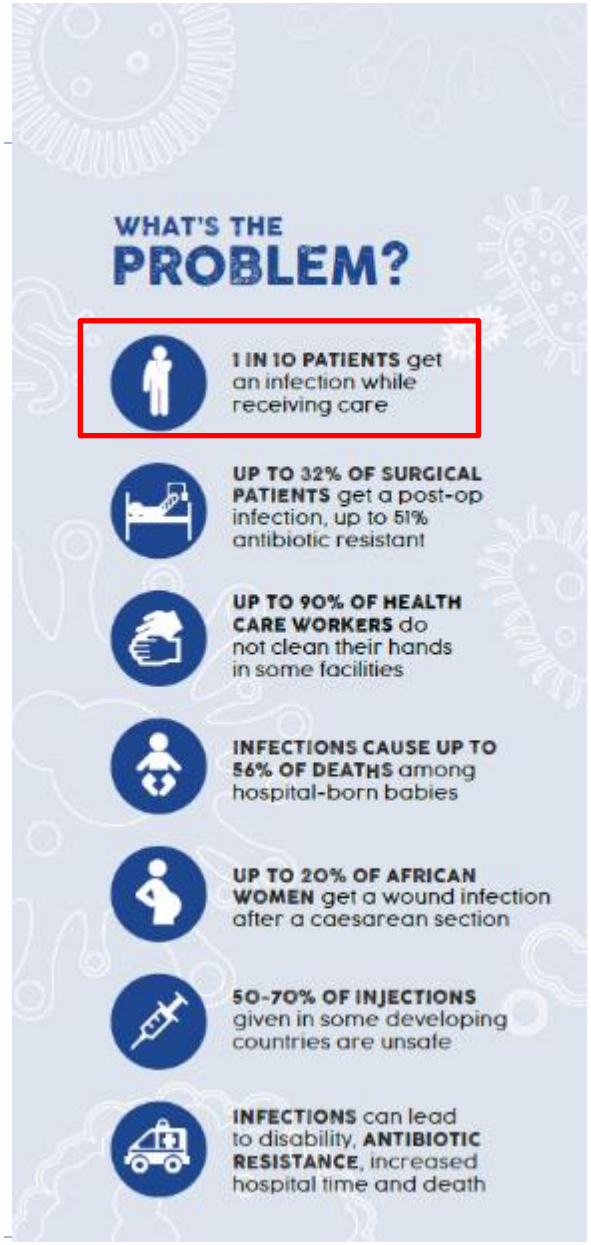
- **Endogenous** source: microorganisms present on or within the patient – microorganisms colonizing the patient

- **Exogenous** source: external to the patient, such as health workers, visitors, patient care equipment, medical devices or the health environment



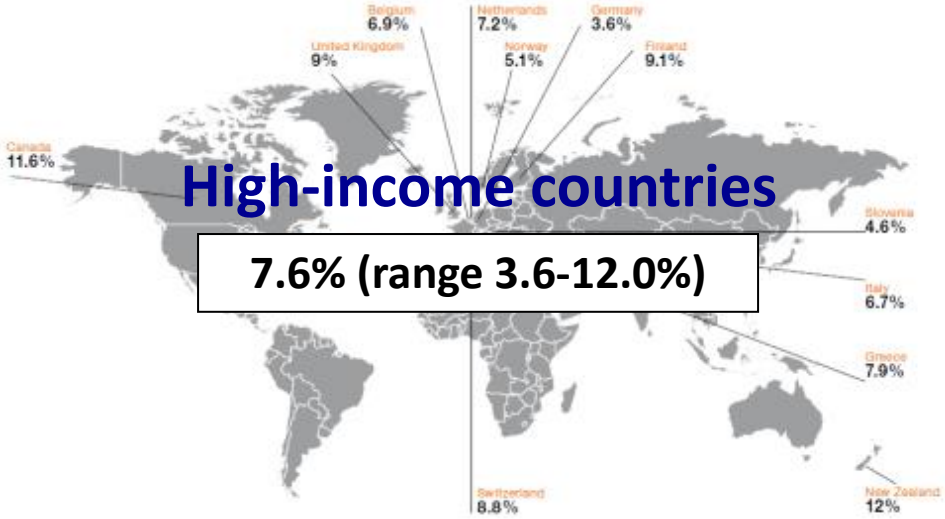
Blum HE. Advances in Medical Sciences 2017;62:414–20

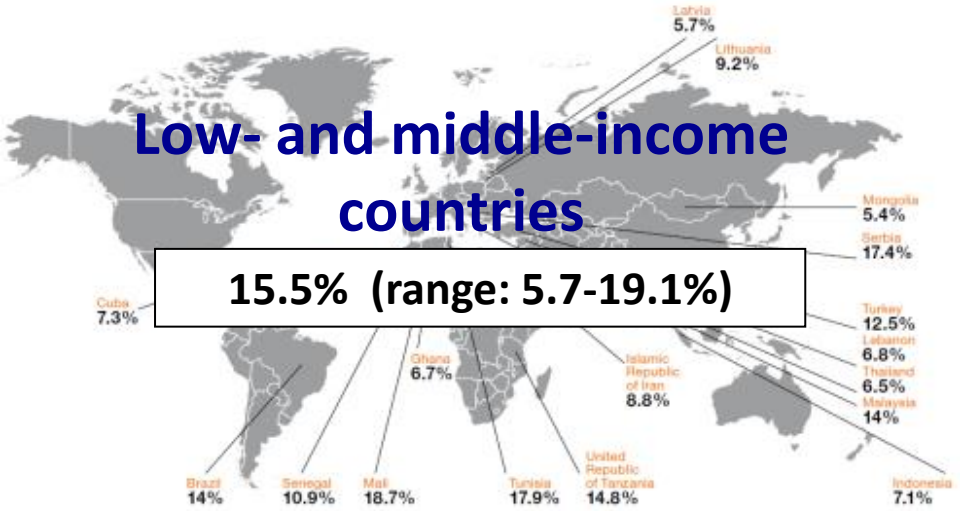
No country and no health care facility, even within the most advanced and sophisticated systems, can claim to be free of the problem of health care-associated infections.



http://www.who.int/infection-prevention/publications/core-components/en/

Globally, hundreds of millions of people every year are affected by HAIs, many of which are completely avoidable





Of every 100 hospitalized patients at any given time:

7 to 15 have a HAI in tertiary hospitals.

20 have a HAI in intensive care units.

WHO. Report on the Burden of Endemic Health Care-associated Infection Worldwide. 2011

Global burden of HAI: Regional disparities

Maternal infection	**UMICs:**	**106 per 1000** live births
	HICs:	**39 per 1000** live births

UMICs: upper-middle-income countries; HICs: high-income countries; LMICs: low- and middle-income countries; LICs: low-income countries; SMO: severe maternal outcome.

Caesarean section *is the most important risk factor for maternal infection*

Maternal infections, including sepsis, are important complications for many women during and after pregnancy, and most of are preventable. Good IPC measures are key for the prevention of infections.

Global report on the epidemiology and burden of sepsis: current evidence, identifying gaps and future directions. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO

Kluytmans JAJW and Veenemans J. Infection control in obstetrics. Guide to Infection Control in the Healthcare Setting, 2018.

Global burden of HAI: Regional disparities (2)

- **Neonatal care**

- The incidence of HAI is reported to vary between 15.2 and 62.0 per 1000 patient-days in neonatal ICUs

- Among **hospital-born babies**, infections are responsible for **4% to 56% of all causes of death** globally in the neonatal period (3/4 in South-East Asia and sub-Saharan Africa).

- **Neonatal sepsis** occurs in 6.5–38 of every 1000 live hospital-born babies in low- and middle-income countries.

Global report on the epidemiology and burden of sepsis: current evidence, identifying gaps and future directions. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO

Overall incidence of healthcare- and device-associated infections

High-income countries

- **Overall HAI: 17.0/1000 pt-days**
- CR-BSI: 3.5/1000 cath-days
- CR-UTI: 4.1/1000 cath-days
- VAP: 7.9/1000 vent-days

Low- and middle-income countries

- **Overall HAI: 42.7/1000 pt-days**
- CR-BSI: 12.2/1000 cath-days
- CR-UTI: 8.8/1000 cath-days
- VAP: 23.9/1000 vent-days

at least x 2-3 times

up to 13 times higher in some countries

HAI: healthcare associated infection
CR-BSI: catheter related blood stream infection
CR-UTI: catheter related urinary tract infection
VAP: ventilator associated pneumonia

WHO. Report on the Burden of Endemic Health Care-associated Infection Worldwide. 2011

Drag each numbered words and drop them on corresponding places in the sentence

The risk of HAI in _____ countries is _____ than in _____ countries

1. developed
2. developing
3. to 2-3 times higher
4. is less than 1%

Why HAIs are more frequent among low- and middle-income countries?

- Inadequate hygiene conditions
- Poor infrastructure
- Inadequate / insufficient equipment
- Lack of microbiological information
- Understaffing
- Overcrowding
- Lack of knowledge and low staff preparedness
- Inappropriate use of antibiotics
- More diseased population
- Unfavorable social background
- Lack of national policies and programs
- Costs falling on individual patients

Allegranzi B, Pittet D. Infect Control Hosp Epidemiol 2007;28:1323-27

Please indicate whether the following statements are true or false

HAI statements	T	F
The definition of HAI does not include infections acquired in the hospital but appearing after discharge		
HAI can be caused by microorganisms already present on the patient's skin or mucosa (endogenous microorganisms)		
Understaffing and inadequate hygiene/ equipment cause higher HAI rates in low- and middle-income countries		

HAIs – a threat to patient safety in Europe

On any given day:

1 / 15

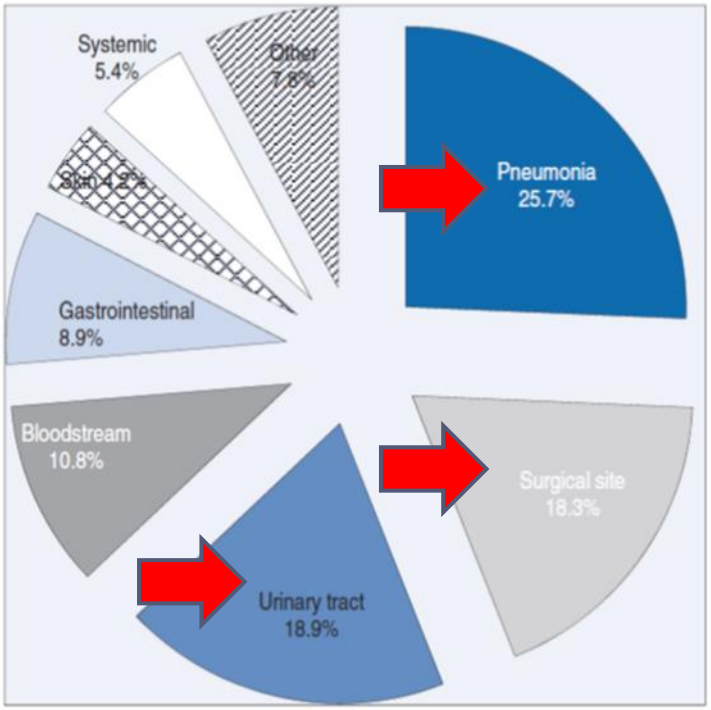
hospital patients have at least one HAI.

98 000

patients have at least one HAI.

https://www.ecdc.europa.eu/sites/default/files/documents/healthcare-associated-infections-threat-patient-safety-infographic.pdf

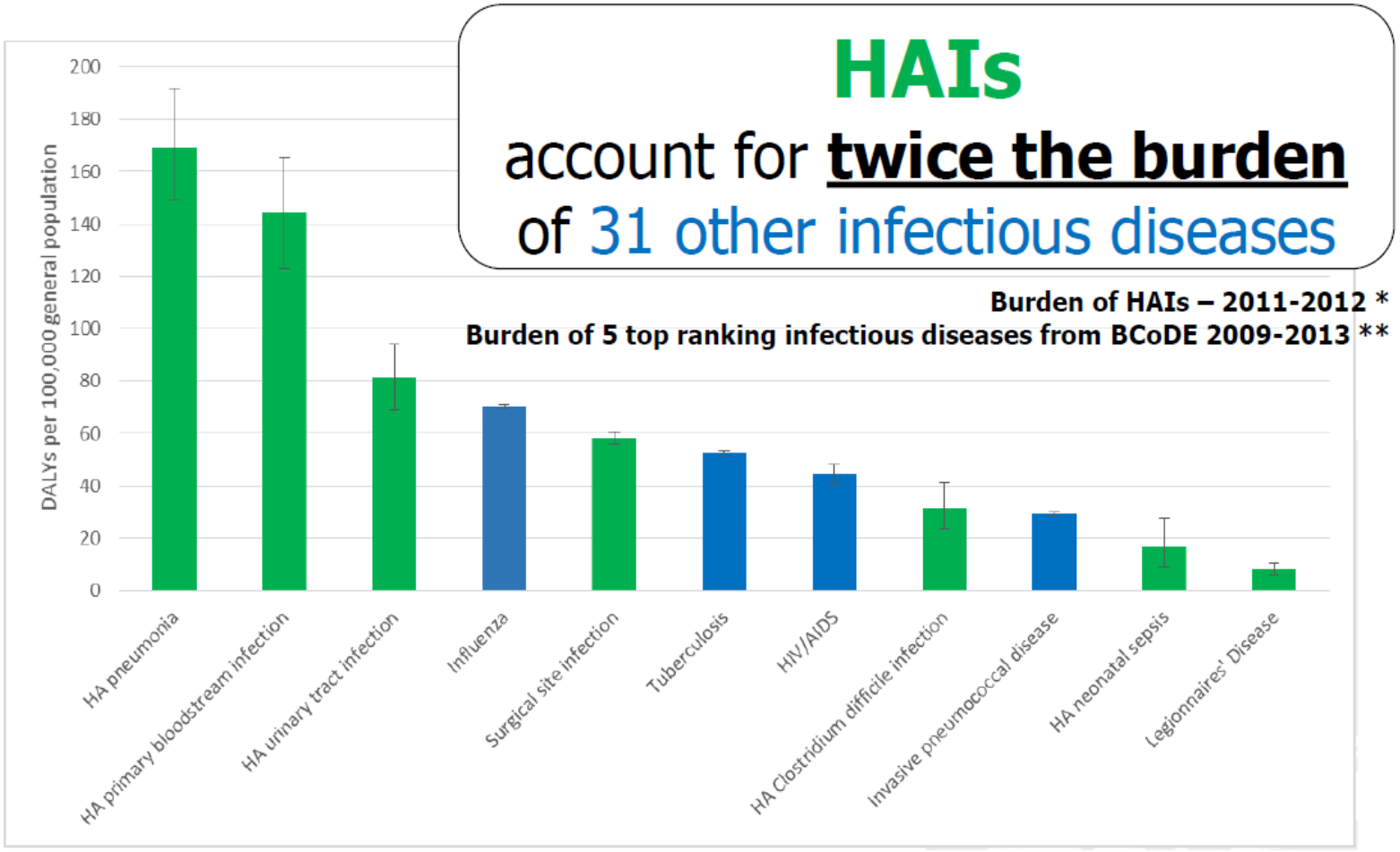
6.30. Healthcare-associated infections by type of infection across EU countries, 2016-17



Source: ECDC 2016-17 Point prevalence survey.

Suetens, C. et al. 2018; Eurosurveillance,23 1800516.

High burden of HAIs



from ECDC data

One DALY= one year of healthy life lost

Cassini A, et al. PLoS Med 2016;13:e1002150

HAI at the times of COVID-19
CDC Data

In comparison to 2019, significant increases were observed in the CLABSI, CAUTI, VAE, and MRSA bacteremia SIRs* in the 2020-Q3 and 2020-Q4

	2020 Q1	2020 Q2	2020 Q3	2020 Q4
CLABSI	↓ −11.8%	↑ 27.9%	↑ 46.4%	↑ 47.0%
CAUTI	↓ −21.3%	No Change[1]	↑ 12.7%	↑ 18.8%
VAE	↑ 11.3%	↑ 33.7%	↑ 29.0%	↑ 44.8%
SSI: Colon surgery	↓ −9.1%	No Change[1]	↓ −6.9%	↓ −8.3%
SSI: Abdominal hysterectomy	↓ −16.0%	No Change[1]	No Change[1]	↓ −13.1%
Laboratory-identified MRSA bacteremia	↓ −7.2%	↑ 12.2%	↑ 22.5%	↑ 33.8%
Laboratory-identified CDI	↓ −17.5%	↓ −10.3%	↓ −8.8%	↓ −5.5%

Fig. 1. Changes in the 2020 national healthcare-associated infection (HAI) standardized infection ratios (SIRs) for acute-care hospitals, compared to respective 2019 quarters. Note. CLABSI, central-line–associated bloodstream infection; CAUTI, catheter-associated urinary tract infection; VAE, ventilator-associated event; SSI, surgical site infection; MRSA, methicillin-resistant *Staphylococcus aureus*; CDI, *Clostridioides difficile* infection. Interpretation: Unless otherwise noted, the results of the significance tests comparing consecutive annual pairs of quarterly SIRs are based on a 2-tailed test $P \leq .05$; however, the directional percentage change is based on the relative change in magnitude. An arrow pointing down, and a negative percentage change value, indicate that the 2020 SIR is lower than the 2019 SIR for the same quarter. An arrow pointing up, and a positive percentage change value, indicate that the 2020 SIR is higher than the 2019 SIR for the same quarter. Note. 1. "No change" signifies that the change in SIR was not statistically significant.

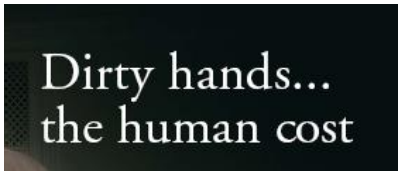
CLABSI: Central line associated blood stream infection
CAUTI: Catheter associated urinary tract infections
VAE: Ventilator associated events
***SIRs (standardized infection ratios): Reported infections/predicted infections**

Weiner-Lastinger LM, et al. Infection Control Hospital Epidemiology 2022; 43:12-25

Why do we care so much?

It's a major patient safety and health care quality problem

- HAIs cause:
  - more serious illness
  - prolonged stay in health care facilities
  - long-term disability
  - excess deaths
  - high additional financial burden
  - high personal costs for patients and their families
- HAIs are complicated by Antimicrobial resistance (AMR)
- The need for IPC programmes nationally and at the facility level is clearly reinforced within the WHO 100 Core Health Indicators list.



Storr J, et al. J Res Nurs 2016; 21:39–52

2015 Global Reference List of 100 Core Health Indicators. World Health Organization.

Please indicate whether the following statements are true or false

HAI statements	T	F
Burden of HAIs accounts twice than other infectious diseases like Influenza, Tuberculosis, and HIV		
Covid-19 pandemic did not have an impact on the rate of CLABSI		
HAI cause higher morbidity and mortality rates than patients without HAI		

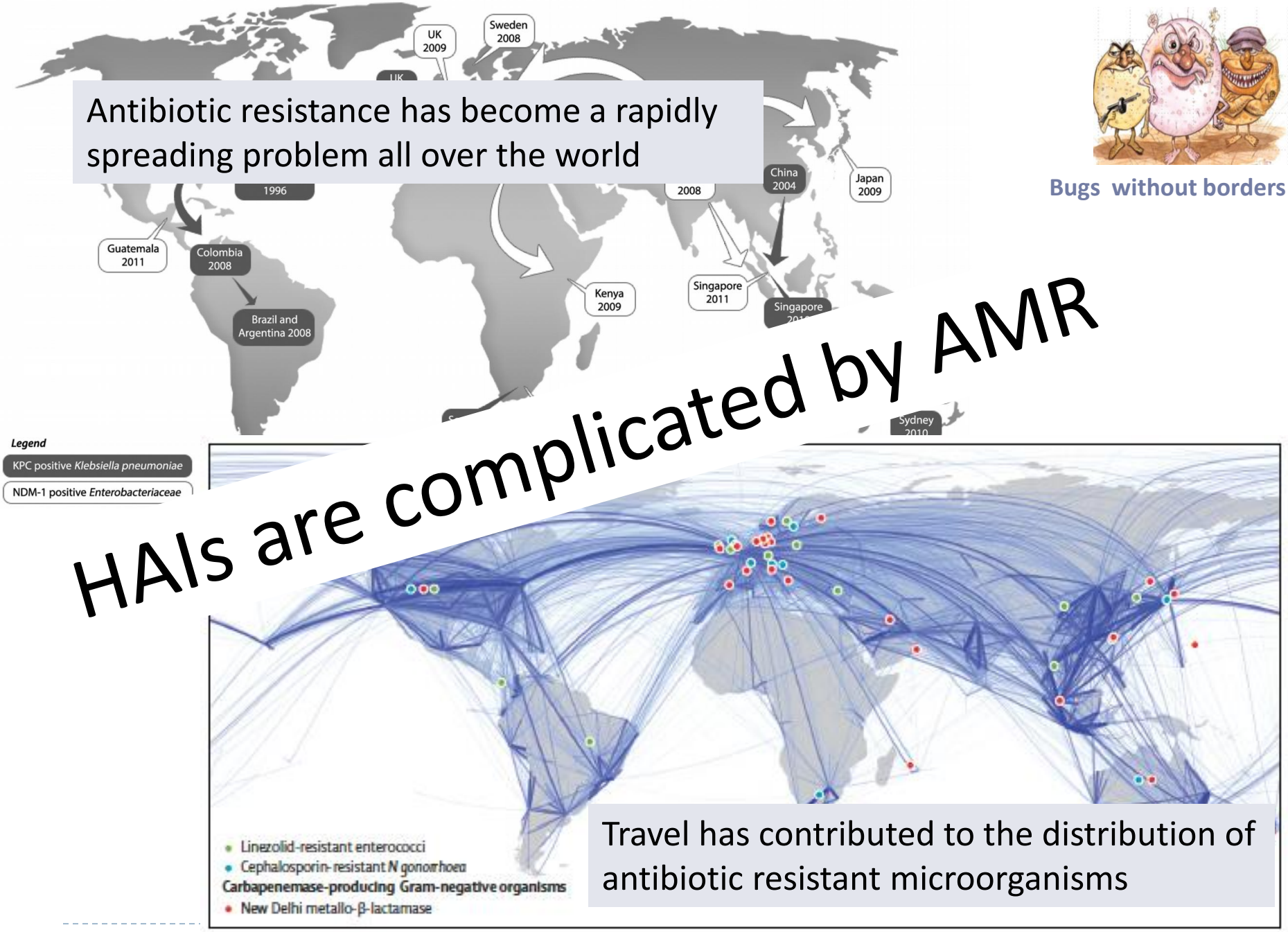
Summary- HAI

- Burden of HAIs is high
- HAIs cause higher morbidity, mortality and cost
- HAI affects all hospitals in the world, but prevalence is 2 times higher in low- and middle-income countries (LMICs) than high income countries (HICs)
- The difference in the incidence of HAI between HICs and LMICs is more striking in maternal and neonatal care
- Covid-19 caused approximatively a 50% increase in HAIs, specifically for central line associated blood stream infection and ventilator associated events

Antibiotic resistance has become a rapidly spreading problem all over the world

Bugs without borders

HAIs are complicated by AMR

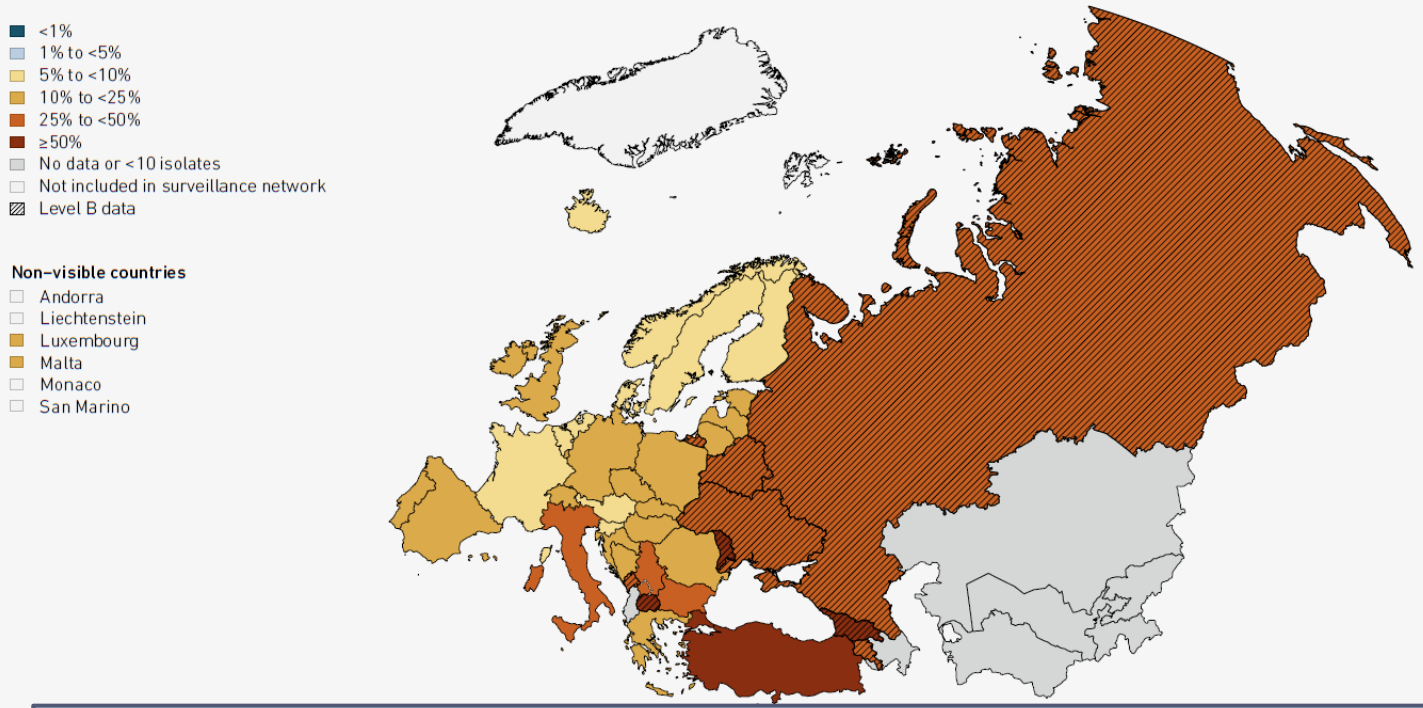


Travel has contributed to the distribution of antibiotic resistant microorganisms

Figure 2: **Worldwide travel routes and emergence of antimicrobial resistance**

Molton JS et al.Clin Infect Dis. 2013;56:1310-8
Holmes A. et al. Lancet. 2016 ;387:176-87.

Percentage of invasive *E. coli* isolates resistant to third–generation cephalosporins in the WHO European Region (EARS–Net and CAESAR), by country or area, 2019



Resistance rates are over 50% in the E and S part of Europe, whereas the Scandinavian countries, and the N part of Europe reported the lowest resistance rates (5-10%)

Level B data: the data provide an indication of the resistance patterns present in clinical settings in the country or area, but the proportion of resistance should be interpreted with care. Improvements are needed to attain a more valid assessment of the magnitude and trends of AMR in the country or area. See section 5.2 for more information about levels of evidence, which are only provided for CAESAR countries and areas.

EARS–Net countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.
CAESAR countries and areas: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, Montenegro, North Macedonia, the Republic of Moldova, the Russian Federation, Serbia, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan and Kosovo[1]. Data for Serbia and Kosovo[1] were combined for this map.
[1] All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999).

Data sources: 2019 data from the Central Asian and European Surveillance of Antimicrobial Resistance (CAESAR, ©WHO 2020) and 2019 data from the European Antimicrobial Resistance Surveillance Network (EARS–Net, ©ECDC 2020). Data for Slovenia were obtained from the Slovenian National Institute of Public Health.
Map production: Public Health Information and Geographic Information Systems (GIS), World Health Organization.

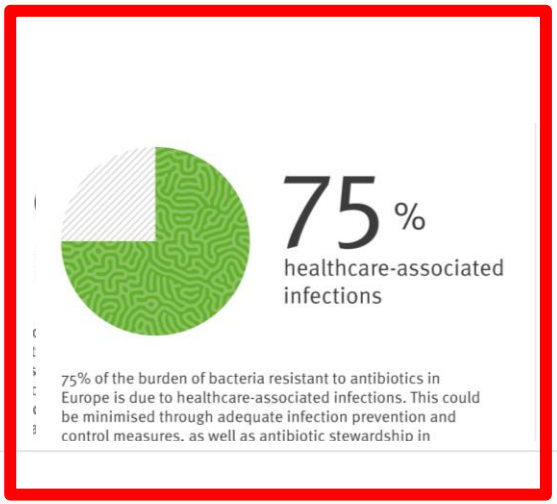
The resistance rates should be interpreted with caution for countries/areas with level B data (striped patterns)
(Assessment of AMR prevalence needs to be improved to be more valid)

Central Asian and European Surveillance of Antimicrobial Resistance. Annual report 2020

Antibiotic resistance – an increasing threat to human health

Antibiotic resistance is the ability of bacteria to combat the action of one or more antibiotics. Humans and animals do not become resistant to antibiotics, but bacteria carried by humans and animals can.

The burden of infections with bacteria resistant to antibiotics on the European population is comparable to that of influenza, tuberculosis and HIV/AIDS combined.



Increasing burden

Between 2007 and 2015, the burden of each of the 16 antibiotic-resistant bacteria under study has increased in particular for *Klebsiella pneumoniae* and *Escherichia coli*:

Klebsiella pneumoniae

The number of deaths attributable to infections with *Klebsiella pneumoniae* resistant to carbapenems – a group of last-line antibiotics – increased six-fold.

Escherichia coli

The number of deaths attributable to infections with third-generation cephalosporin-resistant *Escherichia coli* increased four-fold.

Escherichia coli

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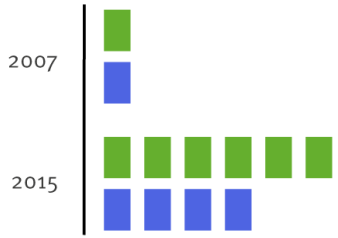
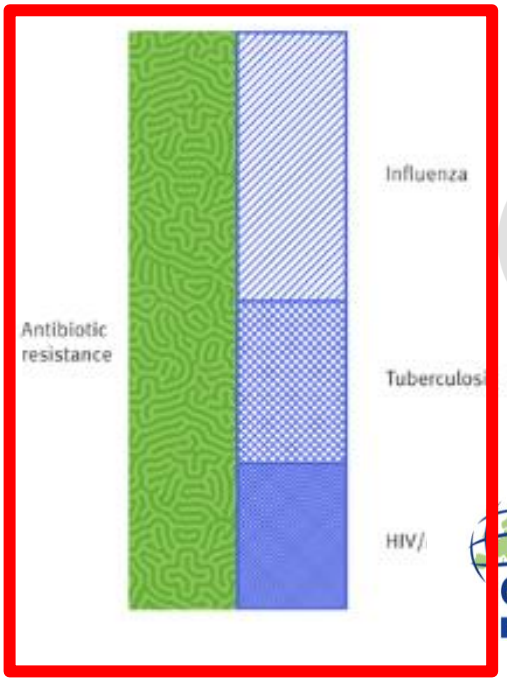




Solutions

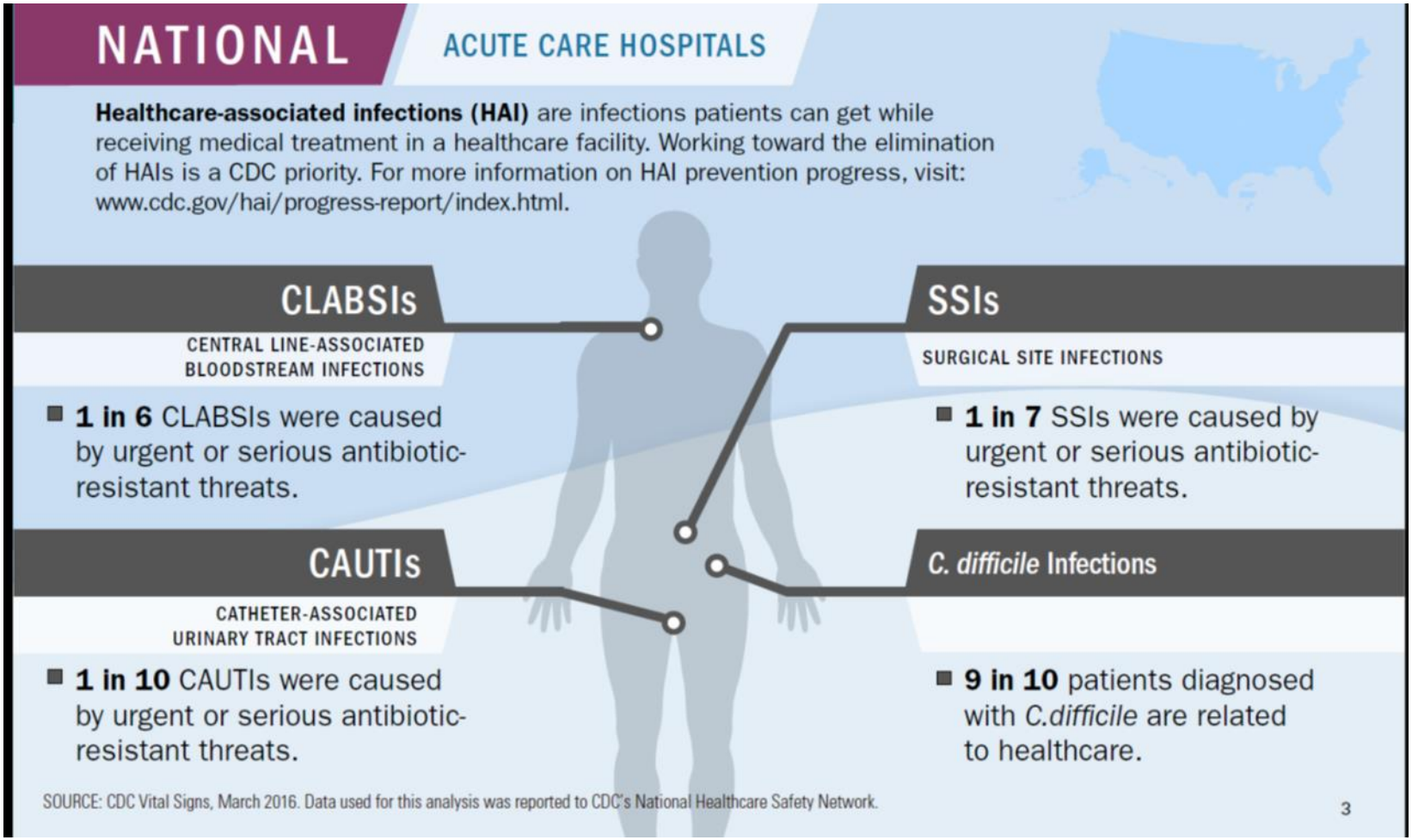
There is still time to turn the tide of antibiotic resistance and ensure that antibiotics remain effective in the future by:

Using antibiotics prudently and only when they are necessary.

Everyone is responsible

Everyone is responsible for addressing this threat to human health: patients, doctors, nurses, pharmacists, veterinarians, farmers, policy makers.

Cassini A, et al. Lancet Infect Dis 2019;19:56-66



CDC Vital Signs, March 2016
https://www.cdc.gov/vitalsigns/protect-patients/infographic.html#graphic-b

High burden of AMR HAIs

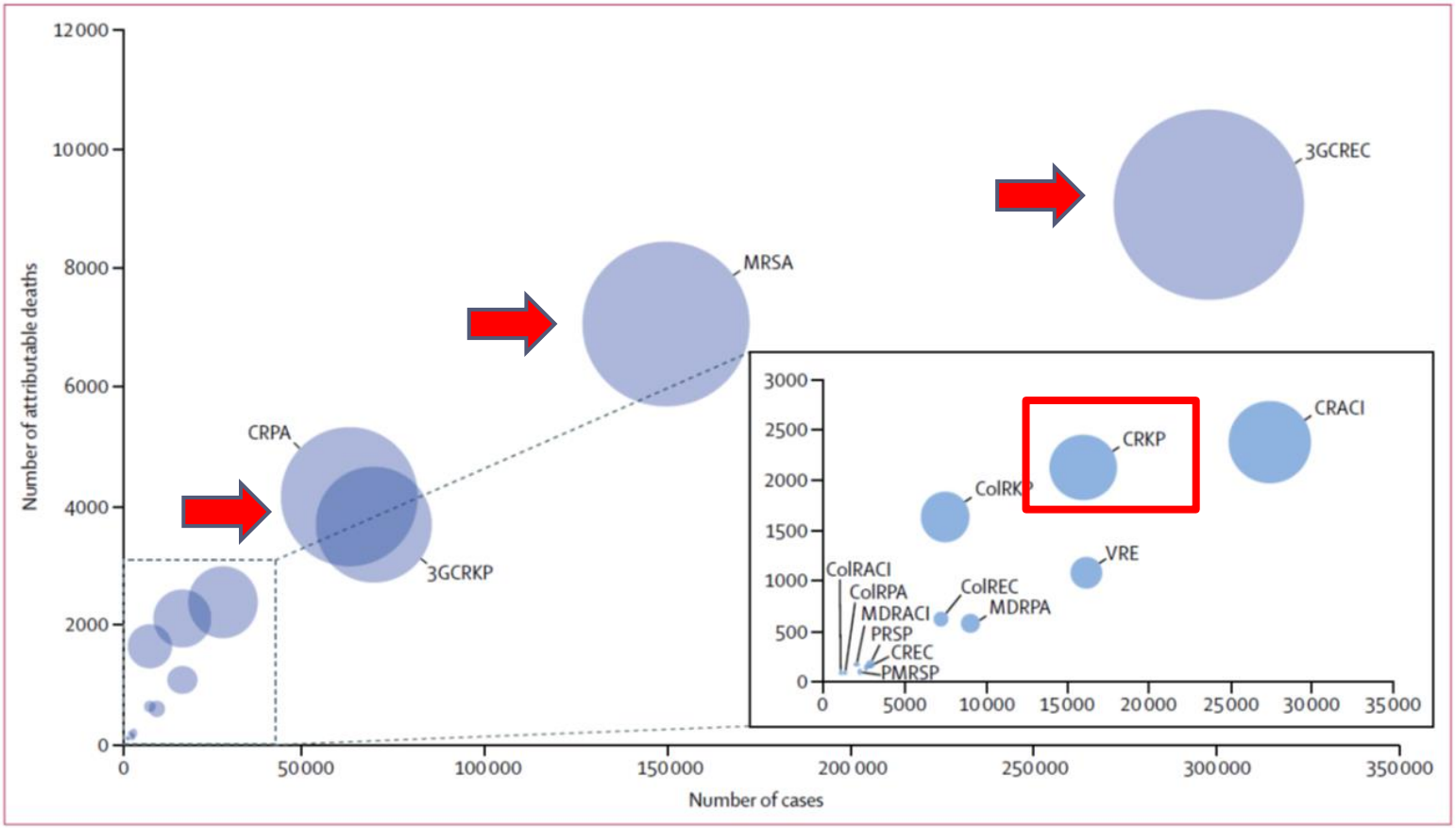


Figure 1: **Infections with antibiotic-resistant bacteria, EU and European Economic Area, 2015**
Diameter of bubbles represents the number of disability-adjusted life-years. ColRACI=colistin-resistant *Acinetobacter* spp. CRACI=carbapenem-resistant *Acinetobacter* spp. MDRACI=multidrug-resistant *Acinetobacter* spp. VRE=vancomycin-resistant *Enterococcus faecalis* and *Enterococcus faecium*. ColREC=colistin-resistant *Escherichia coli*. CREC=carbapenem-resistant *E coli*. 3GCREC=third-generation cephalosporin-resistant *E coli*. ColRKP=colistin-resistant *Klebsiella pneumoniae*. CRKP=carbapenem-resistant *K pneumoniae*. 3GCRKP=third-generation cephalosporin-resistant *K pneumoniae*. ColRPA=colistin-resistant *Pseudomonas aeruginosa*. CRPA=carbapenem-resistant *P aeruginosa*. MDRPA=multidrug-resistant *P aeruginosa*. MRSA=meticillin-resistant *Staphylococcus aureus*. PRSP=penicillin-resistant *Streptococcus pneumoniae*. PMRSP=penicillin-resistant and macrolide-resistant *S pneumoniae*.

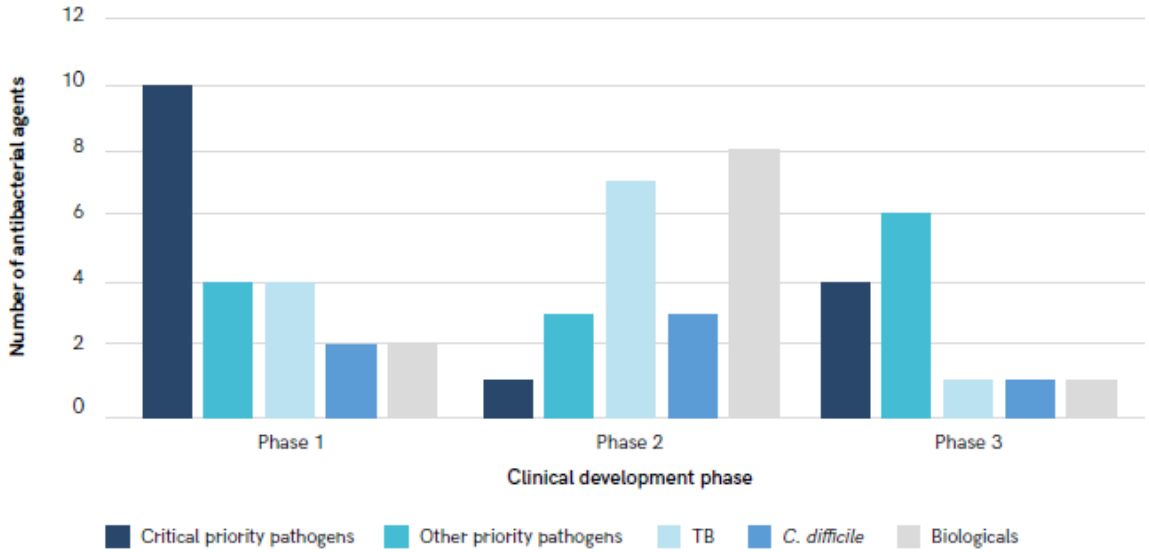
from ECDC data

Cassini A, et al. Lancet Infect Dis 2019;19:56-66

Antibiotic pipeline is running dry

50 agents being studied currently

32 for WHO priority pathogen list
12 have a Gram-negative rod coverage
12 antibiotics targeting TB
6 for treatment of *C. difficile* infections



From phase I until approval:
Average development time
= approx 7 years.

2019 Antibacterial agents in clinical development: an analysis of the antibacterial clinical development pipeline. Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO.

Questions 2

- Which of the following statements is false
  - Spread of MDR bacteria is a global problem
  - There are many new strong antibiotics for MDR bacteria on the pipeline
  - 75% of the total burden of infection with AMR bacteria in Europe is associated with HAI.
  - The mortality rate of HAI is higher when it is caused by MDR bacteria.

Summary-AMR

- AMR

- is a growing problem all around the world

- Has a great impact on health care systems in terms of morbidity, mortality and cost

- The combination of growing antimicrobial resistance with a drying antibiotic pipeline is a major concern for treatment of HAI

PREVENT INFECTIONS SAVE LIVES IN HEALTH CARE

HANDLE ANTIBIOTICS WITH CARE

WHAT'S THE PROBLEM?

- **1 IN 10 PATIENTS** get an infection while receiving care
- **UP TO 32% OF SURGICAL PATIENTS** get a post-op infection, up to 51% antibiotic resistant
- **UP TO 90% OF HEALTH CARE WORKERS** do not clean their hands in some facilities
- **INFECTIONS CAUSE UP TO 56% OF DEATHS** among hospital-born babies
- **UP TO 20% OF AFRICAN WOMEN** get a wound infection after a caesarean section
- **50-70% OF INJECTIONS** given in some developing countries are unsafe
- **INFECTIONS** can lead to disability, **ANTIBIOTIC RESISTANCE**, increased hospital time and death

HEALTH CARE WITHOUT AVOIDABLE INFECTIONS

INFECTION PREVENTION AND CONTROL CONTRIBUTES TO ACHIEVING SUSTAINABLE DEVELOPMENT GOALS and could save millions of lives

3 GOOD HEALTH AND WELL-BEING

6 CLEAN WATER AND SANITATION

World Health Organization

WHAT'S THE SOLUTION?

- **HAVE ACTIVE INFECTION PREVENTION AND CONTROL PROGRAMMES** and target antibiotic resistance
- **USE CLEAN PRACTICES** and asepsis for interventions
- **PRACTICE HAND HYGIENE** to prevent infections and reduce the spread of antibiotic resistance
- **HAVE ENOUGH STAFF,** a clean and hygienic environment and don't overcrowd health care facilities
- **MONITOR INFECTIONS** and make action plans to reduce their frequency
- **NEVER RE-USE** needles and syringes
- Only dispense antibiotics when **TRULY NEEDED** to **REDUCE THE RISK OF RESISTANCE**

http://www.who.int/infection-prevention/publications/core-components/en/

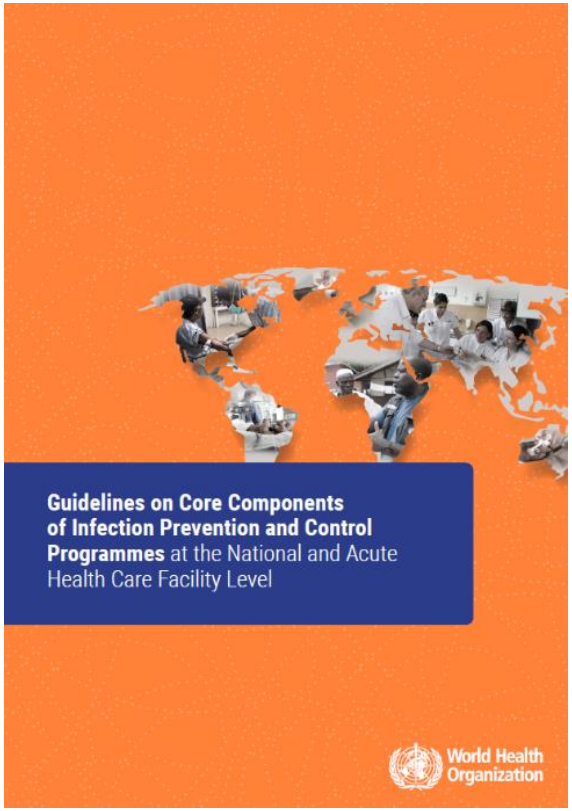
Why hand hygiene and infection prevention and control (IPC) are important for patient outcomes

Health care without avoidable infections

>30% Reduction	Effective IPC programmes lead to more than a 30% reduction in HAI rates
25-57% Reduction	Surveillance contributes to a 25-57% reduction in HAIs
50% Reduction	Improving hand hygiene practices may reduce pathogen transmission in health care by 50%
13-50% Reduction	Strong IPC plans, implemented across the USA between 2008 and 2014, reduced central line-associated bloodstream infections by 50%, surgical site infections (SSIs) by 17% and MRSA bacteraemia by 13%
56% Reduction	MRSA declined by 56% over a four-year period in England in line with a national target
44% Reduction	A safety culture and prevention programme reduced SSI risk in African hospitals by 44%
80% Compliance	Between 2010 and 2015 Australia achieved and sustained 80% hand hygiene compliance in hospitals nationwide

WHO. Health care without avoidable infections: the critical role of infection prevention and control. 2016. http://www.who.int/infection-prevention/about/en/

IPC core components to tackle HCAIs



- IPC programmes
- IPC guidelines
- IPC education and training
- Surveillance
- Multimodal strategies
- Monitoring, auditing and feedback
- Workload, staffing, and bed occupancy
- Built environment, materials and equipment

Zingg W. et al. Lancet Infect Dis 2015; 15: 212–24.
WHO Guidelines on Core Components of IPC

Surveillance activities: Essential tool to reduce HAI

1st step in identifying proble priorities

Prospective surveillance is considered the gold standard

can be:

- **assive** – low sensitivity
- **Active** – higher sensitivity and specificity and needs expertise and resources
- **Retrospective** – Recorded data after discharge
- **Prospective** – Monitors predefined indicators

WHO. Report on the Burden of Endemic Health Care-associated Infection Worldwide. 2011

Surveillance activities

Hard to do,

- Need for expertise, time, and funds
- Use of standardized definitions
- Distinction between infection/colonization/contamination
- Establishing the association with health care
- Evaluation of clinical evidence

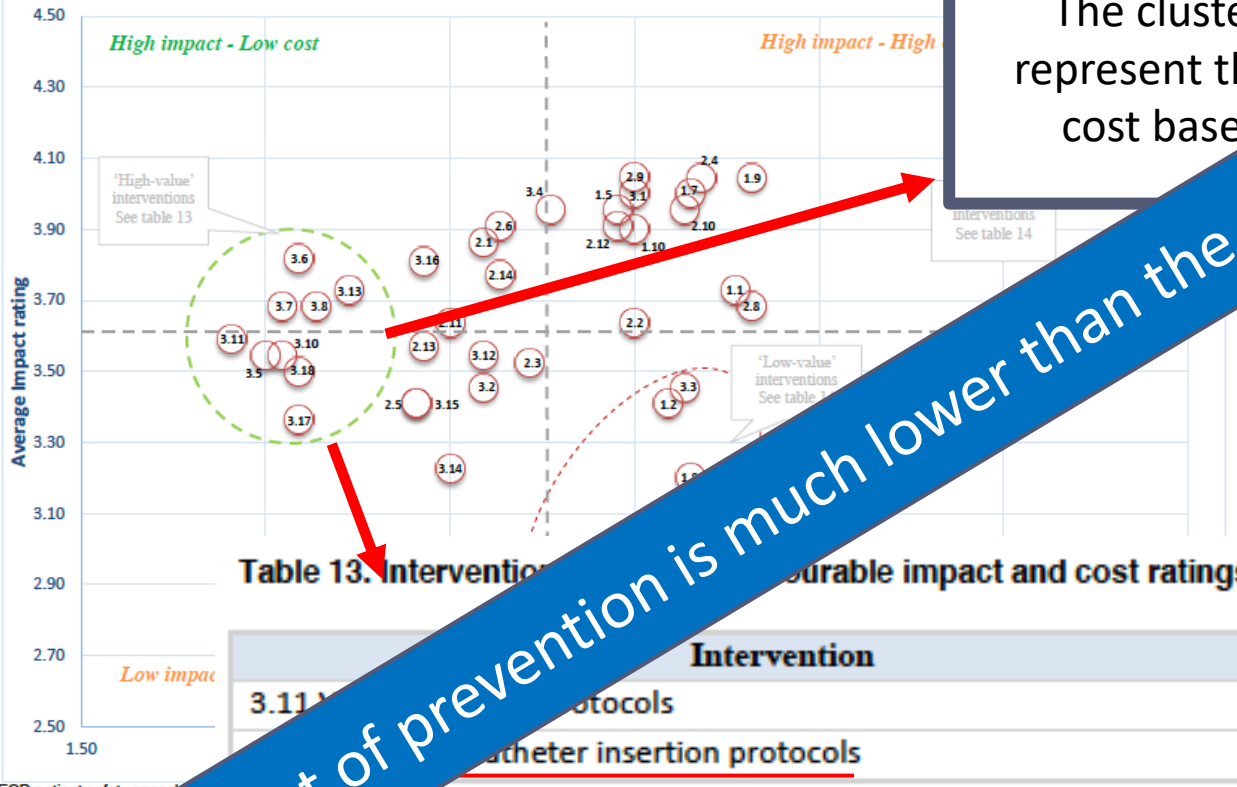
    - direct observation of infection sites
    - review of the patient records
    - performance of microbiological tests

hard to interpret!

WHO. Report on the Burden of Endemic Health Care-associated Infection Worldwide. 2011

IPC and patient safety

Figure 11. Average impact and cost ratings for all 42 interventions (n=23)



Source: OECD patient safety snapsh

The cluster of nine int ntions represent the high lowest cost based sponses

The cost of prevention is much lower than the cost of harm

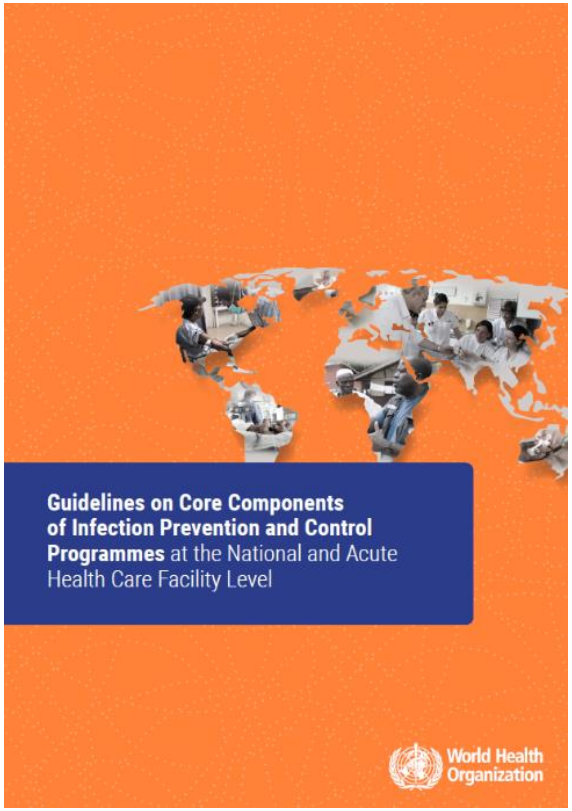
Table 13. Interventio urable impact and cost ratings by average impact/cost ratio (n=23)

Intervention	Avg. impact/cost ratio
3.11 V otocols	1.88
atheter insertion protocols	1.83
or-associated pneumonia minimisation protocols	1.80
rinary catheter use and insertion protocols	1.77
3.10 Peri-operative medication protocols	1.73
3.8 Procedural / surgical checklists	1.72
3.18 Patient identification and procedure matching protocols	1.67
3.13 Pressure injury (ulcer) prevention protocols	1.67
3.17 Patient hydration and nutrition standards	1.61

OECD. The economics of patient safety. 2017

IPC core components to ta HAIs

All these related to Hand Hygiene!



- IPC programmes
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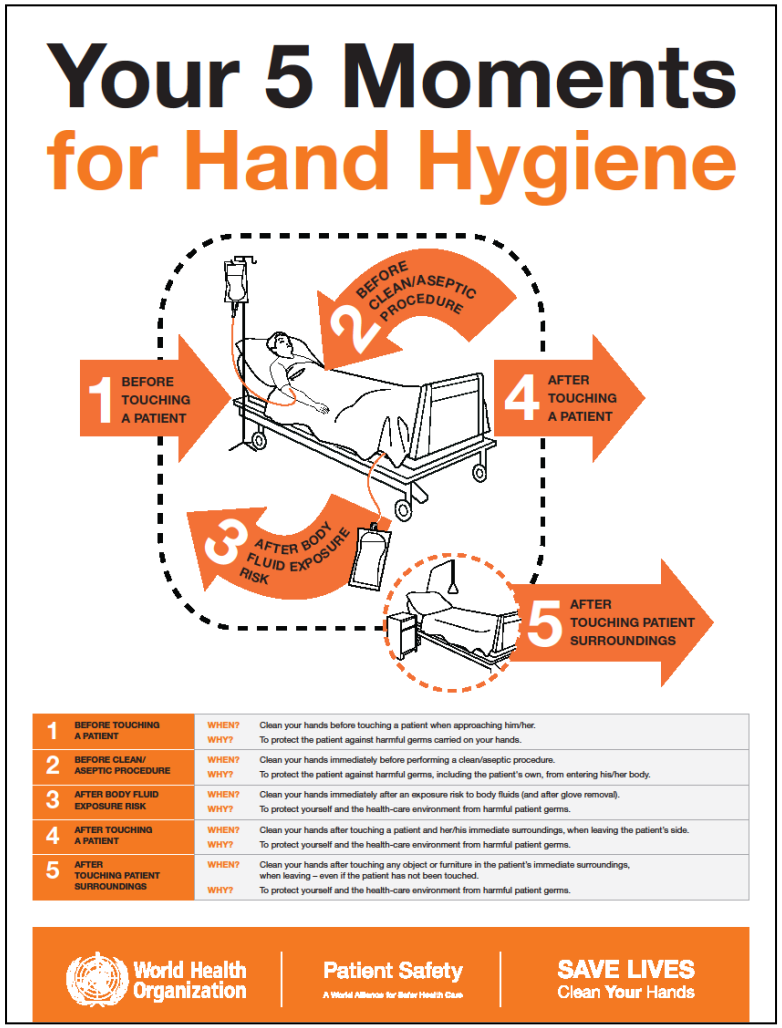
Zingg W. et al. Lancet Infect Dis 2015; 15: 212–24.
WHO Guidelines on Core Components of IPC

of transmission

Hand Hygiene is the most important measure to prevent HAIs

on and Promotion (Public Health Ontario).
control in personal service settings. 3rd ed.,
Printer for Ontario; 2019.

it's all about **WHEN** and **HOW**!



Your 5 Moments for Hand Hygiene

1	BEFORE TOUCHING A PATIENT	WHEN?	Clean your hands before touching a patient when approaching him/her.
		WHY?	To protect the patient against harmful germs carried on your hands.
2	BEFORE CLEAN/ ASEPTIC PROCEDURE	WHEN?	Clean your hands immediately before performing a clean/aseptic procedure.
		WHY?	To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	AFTER BODY FLUID EXPOSURE RISK	WHEN?	Clean your hands immediately after an exposure risk to body fluids (and after glove removal).
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
4	AFTER TOUCHING A PATIENT	WHEN?	Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
5	AFTER TOUCHING PATIENT SURROUNDINGS	WHEN?	Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.

World Health Organization | Patient Safety | SAVE LIVES Clean Your Hands

How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds

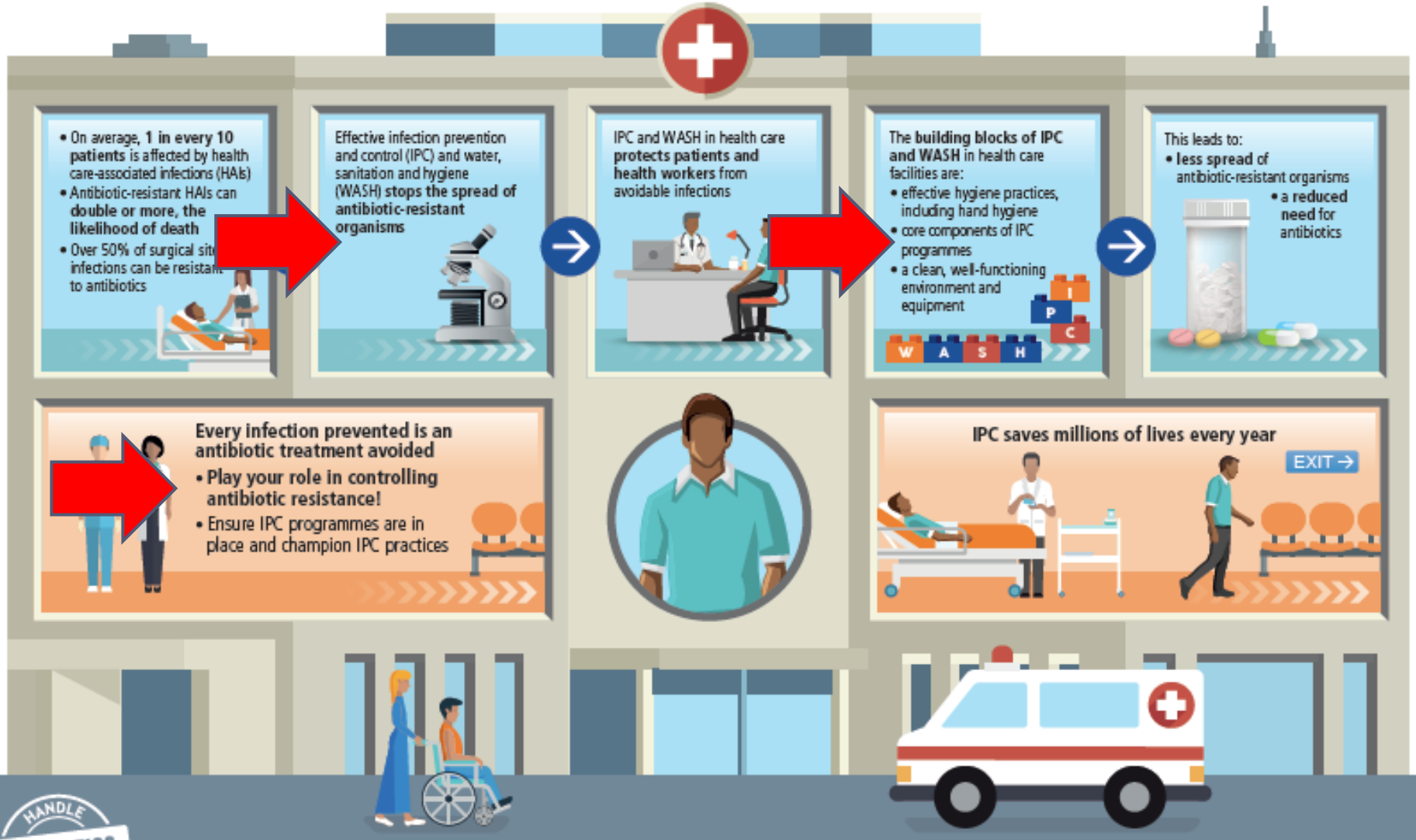
World Health Organization | Patient Safety | SAVE LIVES Clean Your Hands

https://www.who.int/gpsc/5may/Hand_Hygiene_Why_How_and_When_Brochure.pdf

Questions 3

- Which statement is false?
  - Surveillance is one of the key components of IPC
  - IPC programmes are costly and need a higher technologic support
  - 50% of HAI is preventable by HH
  - IPC is also essential to prevent dissemination of antimicrobial resistance

THE ROLE OF INFECTION PREVENTION AND CONTROL IN PREVENTING ANTIBIOTIC RESISTANCE IN HEALTH CARE



Sources: World Health Organization. Infection prevention and control. Available at: http://www.who.int/infection-prevention/ | World Health Organization. Water sanitation and hygiene. Available at: http://www.who.int/water_sanitation_health/

World Health Organization

Summary

- Appropriate HH is simple yet effective way to prevent HAI, and is the cornerstone of IPC programmes
- Performing HH with correct technique and proper indication is also important
- Surveillance is a key element for identifying problems and priorities for an effective IPC programme
- IPC is essantial and cost effective for patient safety and preventing of AMR dissemination

“One health” concept

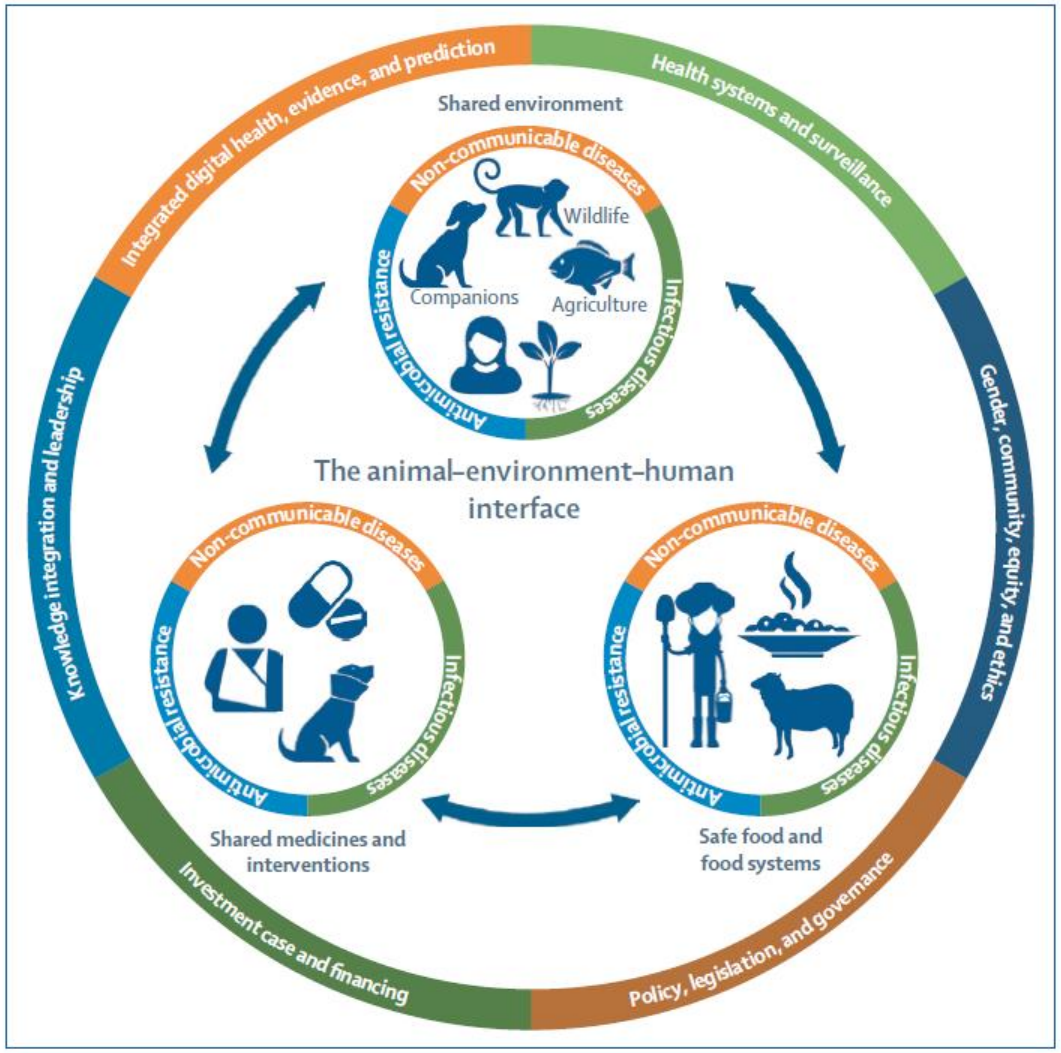
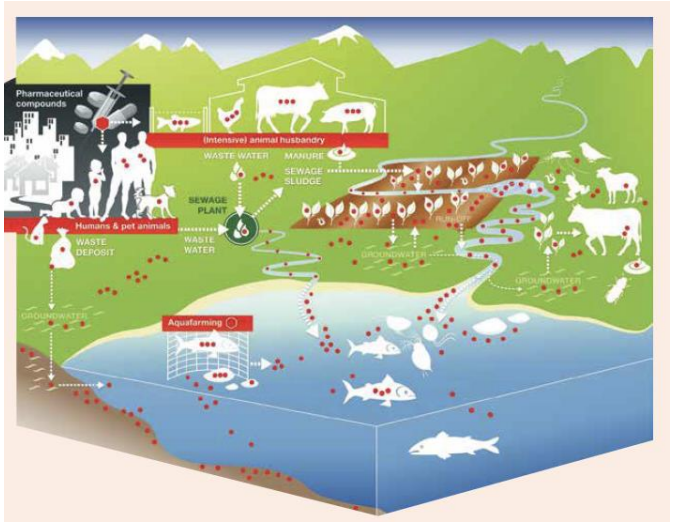


Figure: Approach of *The Lancet* One Health Commission

It is a collaborative, multisectorial, and transdisciplinary approach — working at the local, regional, national, and global levels.

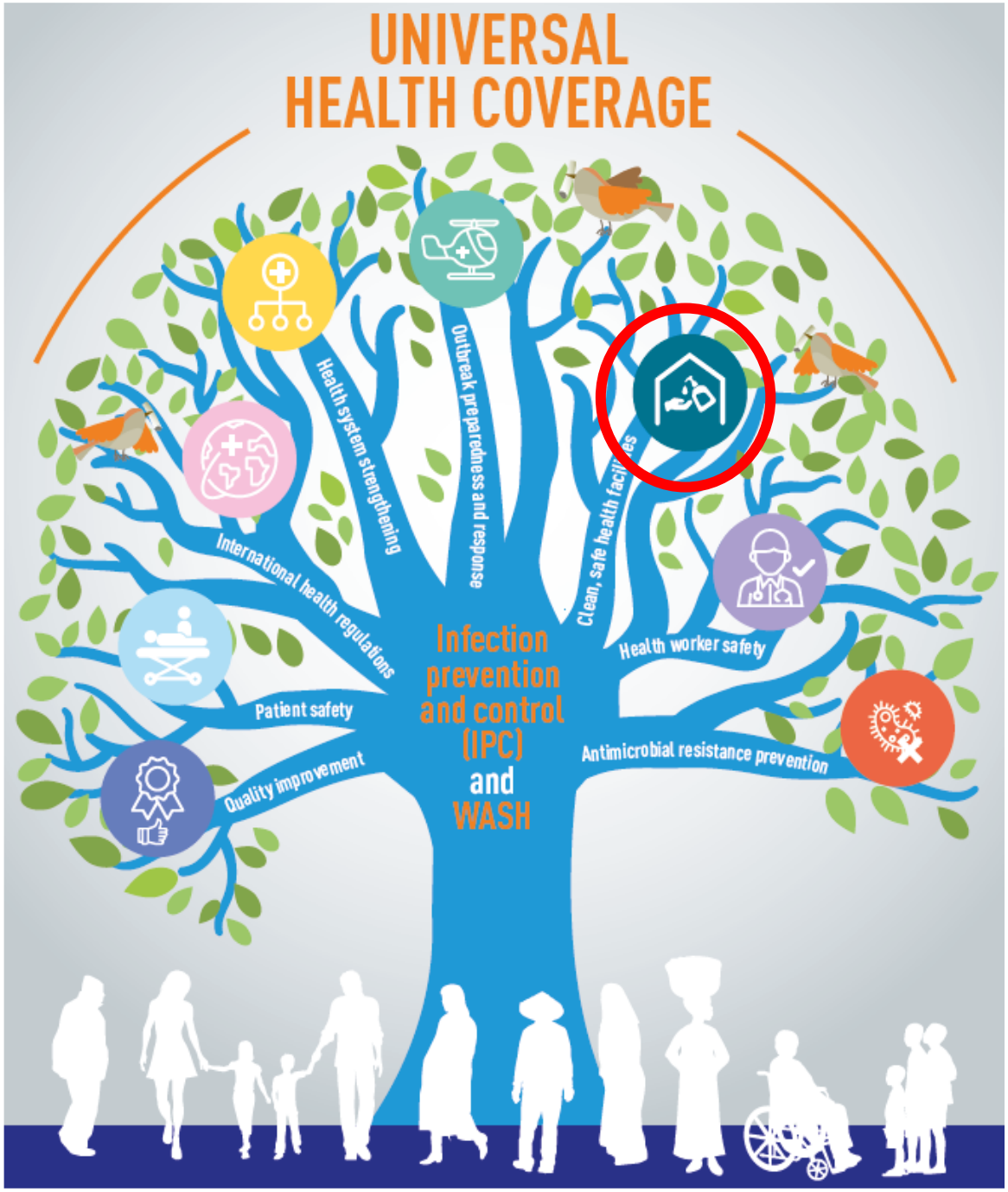


It recognizes that the health of people is closely connected to the health of animals and our shared environment.

Amuasi JH et al. Lancet. 2020; 395:1471-69
CDC, National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) Last reviewed: November 5, 2018
FAO. 2016. Drivers, dynamics and epidemiology of antimicrobial resistance in animal production

HH and IPC to achieve UHC

All people have access to the health they need,
WHEN and **WHERE** they need them, without financial hardship



Take home message

- HAIs are a major problem for patient safety
- AMR further complicates the issue and is associated with HAIs
- Hand hygiene and IPC are central to HAI prevention
- **Hand hygiene is the most important preventive measure to reduce HCAIs**

Thank you