



Health Protection Surveillance Centre

Healthcare-associated infections: What's happening in Irish hospitals?

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Infection Prevention & Control Course for Frontline Hospital Staff
RCSI, 9th September 2019

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Presentation overview



- 1. Recap on some important concepts**
- 2. What's a healthcare-associated infection (HCAI)?**
- 3. What are the consequences?**
- 4. What can we do to prevent HCAI?**
- 5. How can we measure HCAI?**
- 6. What do we know about HCAI in Ireland?**

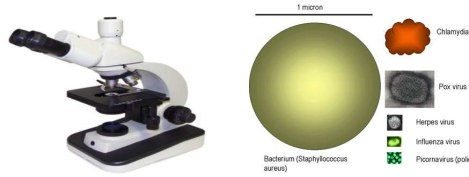
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1. Important concepts



- **Microorganisms/pathogens/bugs** = bacteria, viruses, fungi, parasites
invisible to the naked eye



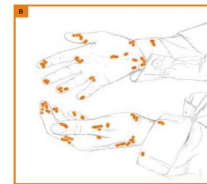
- **Bacteria:** *E. coli*, *Staphylococcus aureus*, *Enterococcus faecium*, *Clostridium difficile*
- **Viruses:** Influenza, respiratory syncytial virus (RSV), norovirus, varicella zoster virus (VZV)
- **Fungi:** *Candida albicans*, *Aspergillus fumigatus*
- **Parasites:** Scabies, *Plasmodium falciparum*

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1. Important concepts



- **Colonisation/carriage** = Person is carrying a particular microorganism, but no features of infection caused by that microorganism
- **10 times more bacteria living in and on us than cells belonging to us!** Mainly, they do us no harm and are important for our health
 - Skin
 - Bowel
 - Mouth



Source: WHO

- We check whether certain patient groups are carrying particular antimicrobial resistant organisms: e.g., screening for MRSA, CPE, VRE. While most never develop infection, it's important to know if a patient is colonised with an antimicrobial resistant organism:
 - If infection develops, the right antimicrobial can be chosen
 - Transmission-based precautions can be used to prevent spread to other vulnerable patients – Isolation, *en suite* bathroom/dedicated commode, contact precautions etc.

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1. Important concepts:



- **Infection** = A microorganism has reached a body site where its action has caused local/systemic features of infection
 - **Bacteria gains entry through a skin break** – cellulitis, phlebitis, wound infection
 - **Virus or bacteria gets into the digestive tract** – norovirus gastroenteritis, *C. difficile* infection
 - **Bacteria gets into the urinary tract** – urinary tract infection (UTI)

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2. What is a HCAI?



- **HCAI** = Infection acquired/picked up after healthcare contact; e.g., hospital, long-term care facility (LTCF) or another healthcare setting – primary care, ambulatory care/day services, dental
 - Hospital-acquired infection
 - LTCF-acquired infection
- Patients can also acquire colonisation with microorganisms while admitted to hospital – Most don't go on to develop infection, but they could be a source of onward transmission to others

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Examples



1. **Peripheral vascular catheter (PVC) inserted for IV diuretics.** Day 4 – PVC site phlebitis noted and new fever: PVC removed, blood cultures taken – *S. aureus* grown from blood cultures – Sensitive to flucloxacillin (MSSA) – Treated with IV flucloxacillin x 14 days
2. Resident in LTCF x 6 months – **Recent course of ciprofloxacin for treatment of suspected UTI. New diarrhoea** – Isolated with contact precautions and faeces sent to lab – *C. difficile* positive – Treated with oral metronidazole x 10 days
3. **Total knee replacement surgery.** Discharged home well post-op day 4 – Represents to GP post-op day 21, with pus oozing from knee wound – Swab taken, referred to ED for admission, wound washout – *S. aureus* grown from swab and theatre specimens – resistant to meticillin/flucloxacillin (MRSA) – Required prolonged course of IV vancomycin, isolation and contact precautions

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3. What are the consequences of HAI?



- Morbidity – physical, psychological, emotional
- Mortality
- Increased length-of-stay
- Increased healthcare costs
- Reduced access to healthcare
- Economic impact – delayed return to work
- Where HAI caused by AMRO:
 - All of the above +
 - More difficult to treat
 - More expensive to treat
 - Increased risk of dissemination to other vulnerable patients/residents
 - Reduced access to isolation rooms
- Distressing for patients, staff and families, erodes confidence in healthcare system

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4. What can we do to help prevent HAI?



- This course's curriculum covers key measures for HAI prevention
- What have you learned so far?

Theme: *Setting the scene*
Tuesday 3rd September 2019

Theme: *Improving compliance*
Wednesday 4th September 2019

- National acute hospital performance indicators & site visits
- Standards and monitoring
- Introduction to the bugs and how the microbiology lab can help?
- Using evidence-based practice to make a difference: standard, transmission-based precautions, wound and device management strategies

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4. Can patients help prevent HCAI?



- **Patients have an important role in HCAI prevention**
- **Patients can help protect themselves:**
 - Personal hygiene
 - Social hand hygiene
 - Minding IV lines and urinary catheters
 - Leaving wound dressings intact
 - Avoiding sitting on beds of other patients or sharing belongings
- **Patients can help us protect them:**
 - Ask healthcare workers if they've cleaned their hands, had their flu vaccine?
 - Remind healthcare workers if they've previously been colonised with CPE, MRSA or had *C. difficile* infection – we also need to ensure the patient is told, to empower them to communicate their status on future visits: **You will learn more about communication later on this morning**

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National guidance



Fact sheet 1 of 6

Subject:
Healthcare associated infections (HCAI) and Antimicrobial Resistance (AMR)

For:
Patients, relatives and healthcare workers

Discussing healthcare associated infection (HCAI) and specific antimicrobial resistant organisms (AMROs) with patients¹ who may have acquired a HCAI, become colonised with an AMRO or been exposed to a specific HCAI/AMR risk



http://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/strategyforthecontrolofantimicrobialresistanceinirelandsari/carbapenemresistantenterobacteriaceae/cr/guidanceandpublications/Dismissing%20HCAI_AMROs%20with%20patients_final_2July18.pdf

<https://www.hse.ie/eng/about/who/healthwellbeing/our-priority-programmes/hcai/resources/cpe/fact-sheet-1-healthcare-associated-infections-hcai-and-antimicrobial-resistance.pdf>

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Be infection aware

Reducing the risk of getting an infection in hospital or when you go home

Who is at risk?

People who need treatment in a hospital or clinic are often more vulnerable to infection than most other people. This may be because the illness they have or the treatment they need has weakened their resistance.

A 'healthcare-associated' infection is an infection that you pick up after having contact with a healthcare service. Most often, this happens if you have had treatment in a hospital. It can also happen after treatment in outpatient clinics, nursing homes and other healthcare settings.

Any patient in any hospital or healthcare facility in the world is at risk of picking up a new infection when they are there.

What causes the bugs and infections?

Some of these new healthcare-associated infections are caused by your own bacteria (bugs). They are usually harmless for healthy people. Others are caused by antibiotic-resistant hospital bugs – 'superbugs'. You can pick them up in hospital from contact with other patients, or from contact with hospital staff and equipment. In a big hospital looking after very sick people, about 1 in 20 patients has a healthcare associated infection.



Your Urinary Catheter

What is a urinary catheter?

A urinary catheter is a tube that is passed into your bladder. The catheter is put in to allow urine (pee) from your bladder to drain out into a bag. You could have a catheter put in for many different reasons.

Sometimes it is done because you can't pass urine for some reason, (This is called 'retention').

Another reason could be that urine is leaking out all the time (This is called 'incontinence').

Sometimes a catheter is put in for a short time to manage the flow of urine during surgery. In some cases, it can be put in to measure how much urine you are making when you are very sick. If you are not sure why you have a catheter, please ask your nurse or doctor. They will be happy to talk to you about it.

Can I get an infection from a urinary catheter?

Having a urinary catheter put in means that there is a tube with one end inside your bladder and the other end hanging outside your body going into a bag. As long as this tube is in place there is a risk that bacteria (bugs) can travel along the tube and get into your bladder. If the catheter has to stay in for a few weeks or longer, it is almost certain that bacteria will get into your bladder. If the bugs just stay in your bladder, this will often do no harm. Sometimes you might have discomfort or pain in the lower part of your tummy. Sometimes you can get some inflammation or infection near where the tube comes out. This can cause discomfort or pain and there can be pus or blood.

The main risk of infection with a urinary catheter is if the bugs growing in the bladder spread up to the kidneys or into the blood. This can make you very sick and you may feel shivery, have a temperature and feel very weak. If this happens, tell your nurse or doctor straight away.

Can you protect me from urinary catheter infection?



Learn about your IV Line (Drip)

What is an IV cannula (tube)?

An IV cannula is a small plastic tube that passes through your skin into a vein. We will refer to it as a tube in this leaflet. It is often called an IV line or a drip. A needle is used to put the tube in through the skin. After the tube is in place the nurse or doctor takes away the needle and leaves the tube in place. There is a cap or lid on the end of the tube outside the body.

The tube can be used to give you fluids or blood or medicines and some can be used to take blood samples. The tube means that you do not need to have a needle jab every time you get a medicine that is given into the vein. Usually the tube goes through the skin into one of the arm veins.

Sometimes the tube goes through the skin on the chest wall or the neck and into one of the big veins inside the chest. A tube that goes into one of the big veins in the neck is called a central venous catheter or central line. It can be uncomfortable when one of these tubes is being put in place but after that is done most have no trouble from it.

What can go wrong with an IV cannula (tube)?

The tube leaves a small hole in your skin and it sits in that hole with one end outside on the skin and the other end inside your vein. As long as there is a tube in place and a little hole in the skin there is a risk that bacteria (bugs) can track along the tube to get under your skin or into your vein. If this happens you can get an infection.

Infection from an IV cannula (tube)

Infection is sometimes just at the place where the tube is placed. This local infection can cause soreness or pain near the tube and the skin may get red and hot. Sometimes there is crusting or small scabs at the place where the tube goes through the skin. If you notice any of these things tell your nurse or doctor right away.

Infection from an IV cannula (tube) can sometimes be very serious with spread of bacteria into the blood (septicaemia). When this happens the person usually feels very sick and may have shivering, temperature and feel very weak. If this happens to you tell your nurse or doctor right away.

What can be done to protect you from IV cannula (tube) infection?

<https://www.hse.ie/eng/about/who/healthwellbeing/our-priority-programmes/hcai/hcai-amr-information-for-patients-and-public/patient-leaflets/patient-leaflets.html>

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5. How can we measure HCAI?



Let everyone decide for themselves?

- We *don't have a problem* with CDI on our ward - We only had 10 cases last month, there were 12 the month before that
- My patients *never* get surgical site infections (SSI)
- Our ICU *rarely* has patients with central venous catheter (CVC) associated blood stream infections (BSI)

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HCAI surveillance = How are we doing?



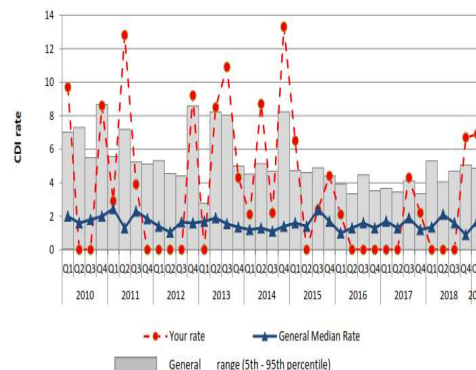
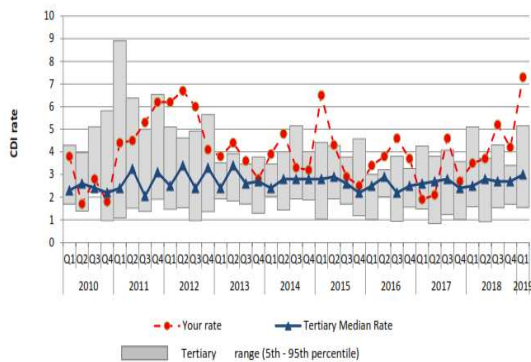
- **You can't manage it if you're not measuring it**
- **Everyone needs to measure it in the same way for meaningful comparison**
- **Surveillance = information for timely action**
- **Surveillance is not the same as audit**
- Two main types:
 - **Incidence** Making a movie = recording performance over time
 - Can be resource-intensive
 - Need local and national coordination
 - Can follow the patient throughout their journey e.g., ICU admission, surgery and post-op period
 - **Prevalence** Taking a snapshot at a point in time, repeating that snapshot at defined intervals = recording performance over time
 - Can also be resource intensive, but for a shorter period
 - Need to take the snapshot in a very similar way each time for valid comparison
 - Doesn't lend itself to capturing outcome information, e.g., length-of-stay, associated morbidity or mortality

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Examples of incidence surveillance of HCAI



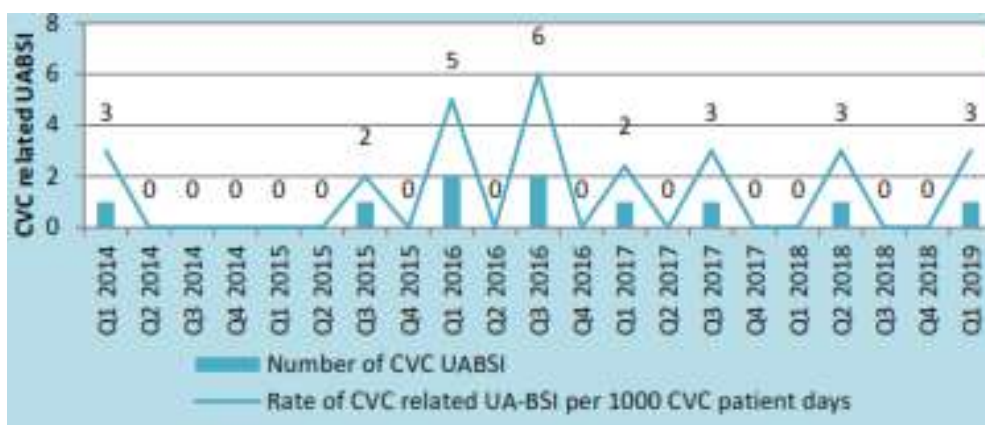
- Enhanced surveillance of new cases of hospital-acquired CDI per 10,000 bed days used (BDU)



Source: HPSC

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Example of local incidence surveillance of ICU acquired CVC-related bloodstream infection



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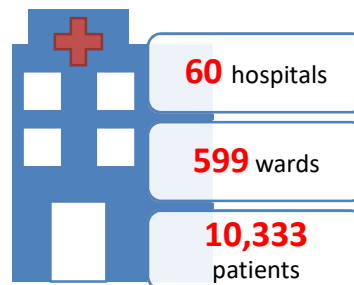
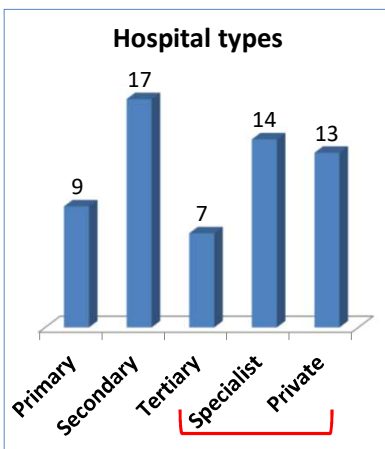
Point prevalence surveys (PPS) – Acute Hospitals



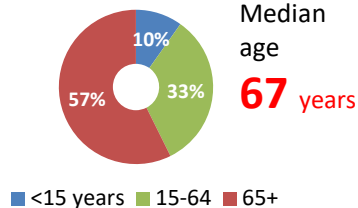
- Periodic national PPS of hospital acquired infections (HAI) and antimicrobial use done every five years
 - Last done in May 2017, as part of European PPS
 - Coordinated by HPSC
- A snapshot of all types of HAI and antimicrobials prescribed on the PPS date

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What did PPS 2017 tell us about our hospitals and patients?



Age groups



Average length of stay
4.3 days



ICU Patients
3.0 %


<https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/infectioncontrolandhai/surveillance/hospitalpointprevalencesurveys/2017/nationalppsreports/>

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Participating Hospitals



		May 2017
Hospitals (n)		60
	<i>Public</i>	46 (77%)
	<i>Private</i>	14 (23%)
Mean acute beds (n)		196
Beds in single rooms (%)		28*
Of single rooms % with <i>en-suite</i>		76*


Single rooms as % of total acute beds

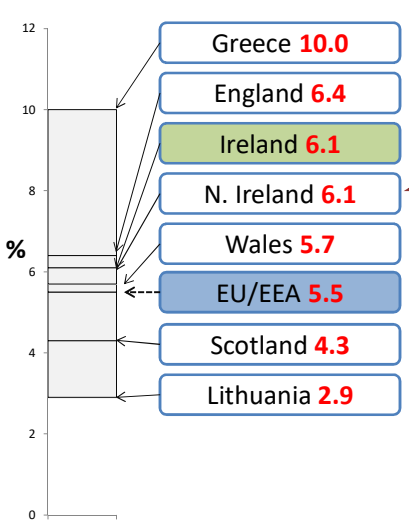
Primary	15
Secondary	20
Tertiary	29
Specialist	23
Private	52

*Scottish PPS reported 37% of beds in single rooms, of which 85% were *en-suite*
<https://www.hps.scot.nhs.uk/resourcedocument.aspx?id=5964>

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HAI % prevalence compared to other EU countries






633 (6.1%) patients met a HAI case definition in Ireland in 2017

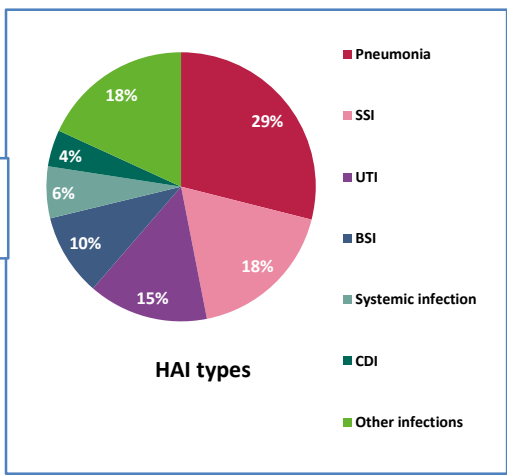
5.2 in 2012 IE

41 had ≥2 HAI:

678 HAI detected



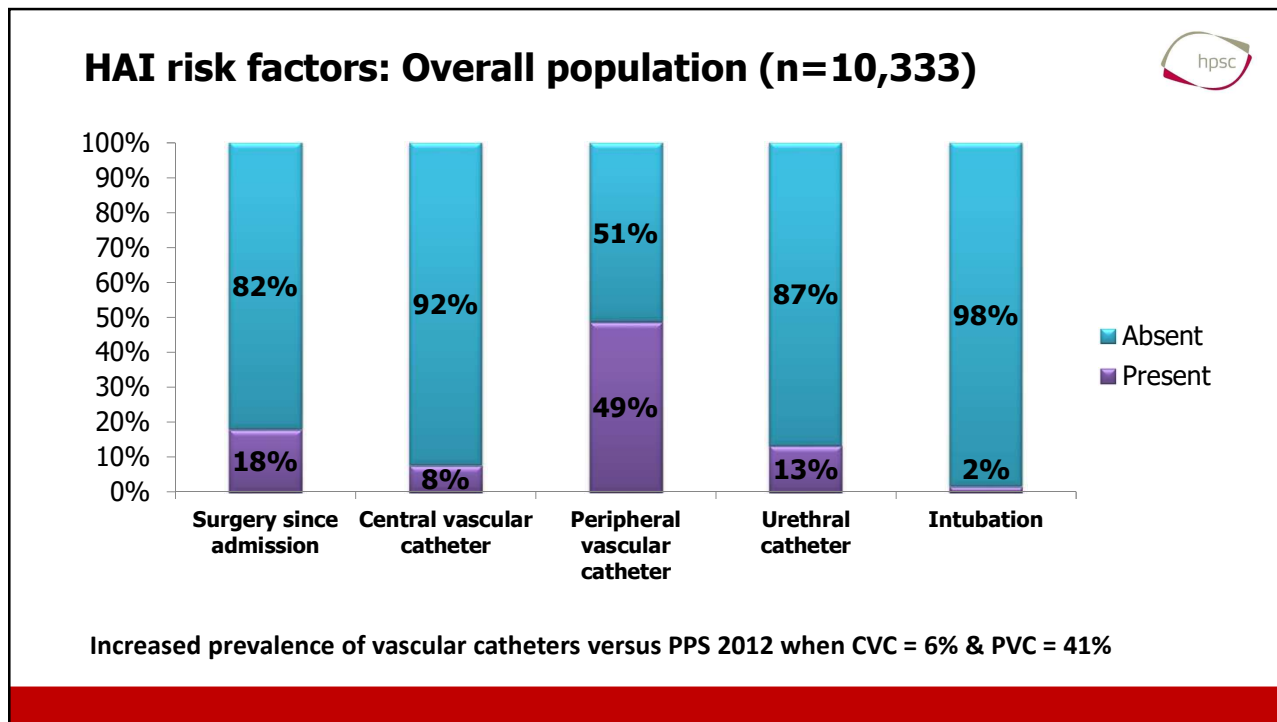
Approx. **1 in 16**



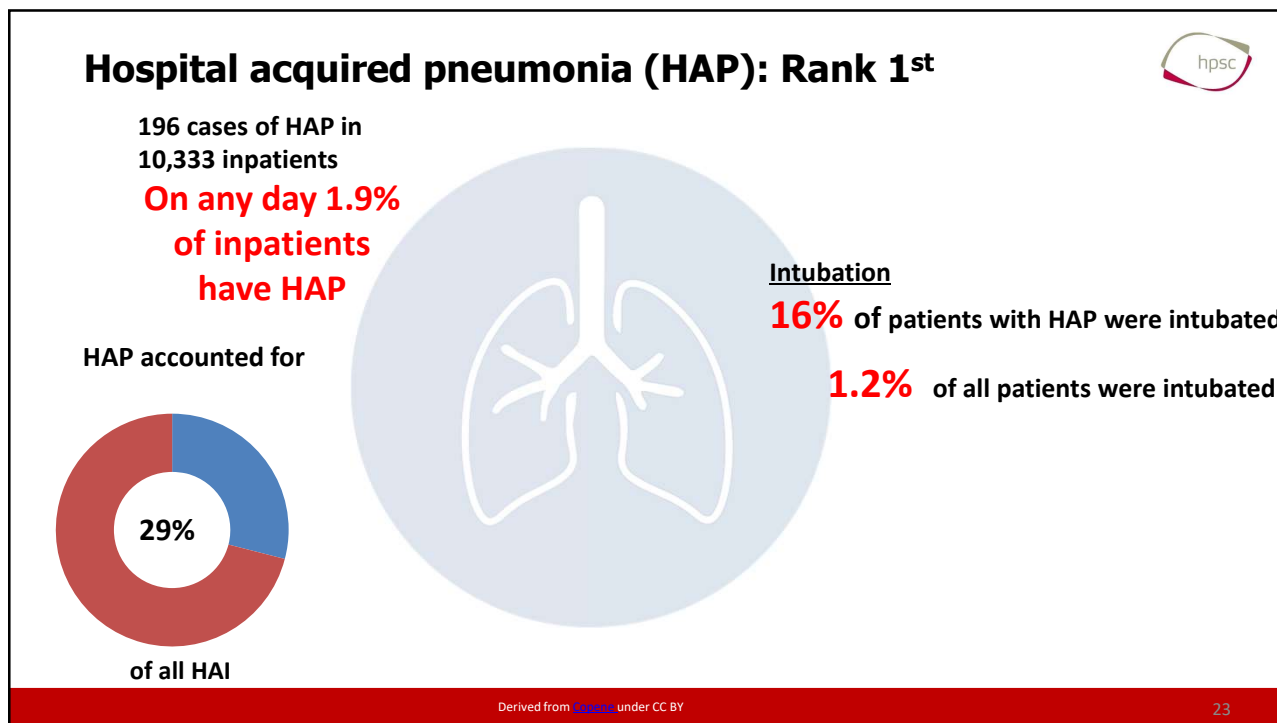
HAI types

Suetens C. et al 2018

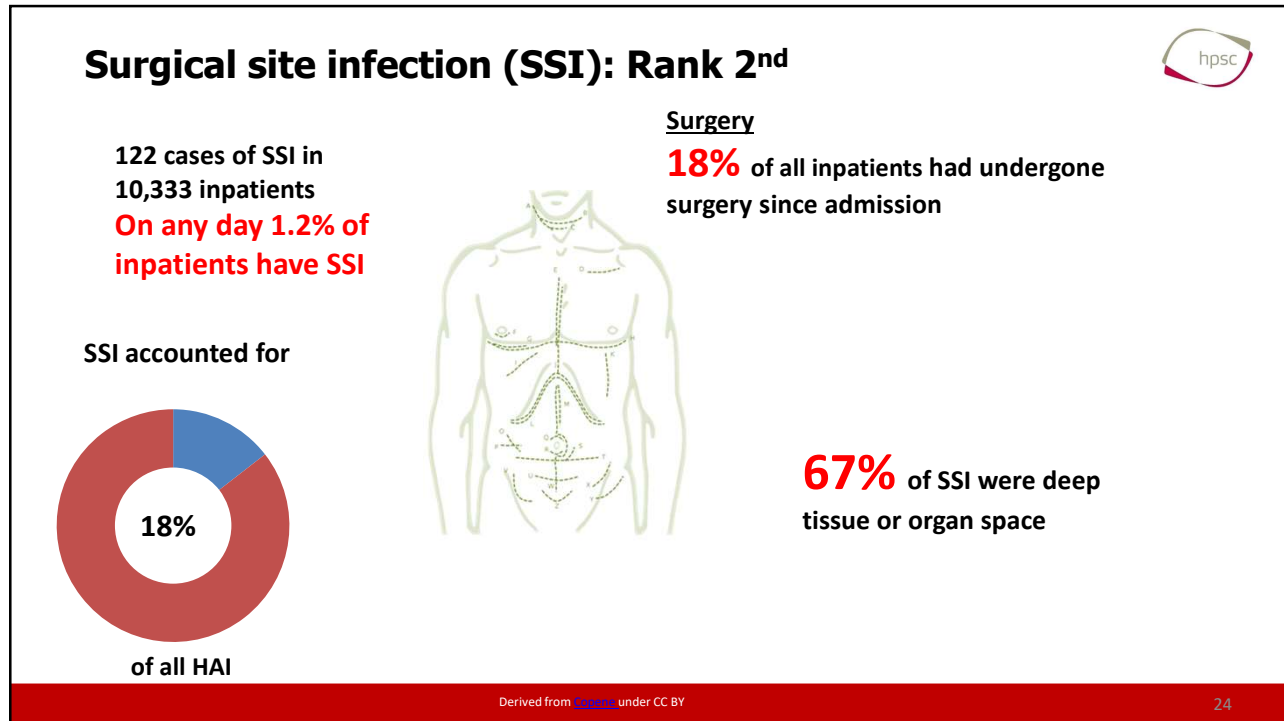
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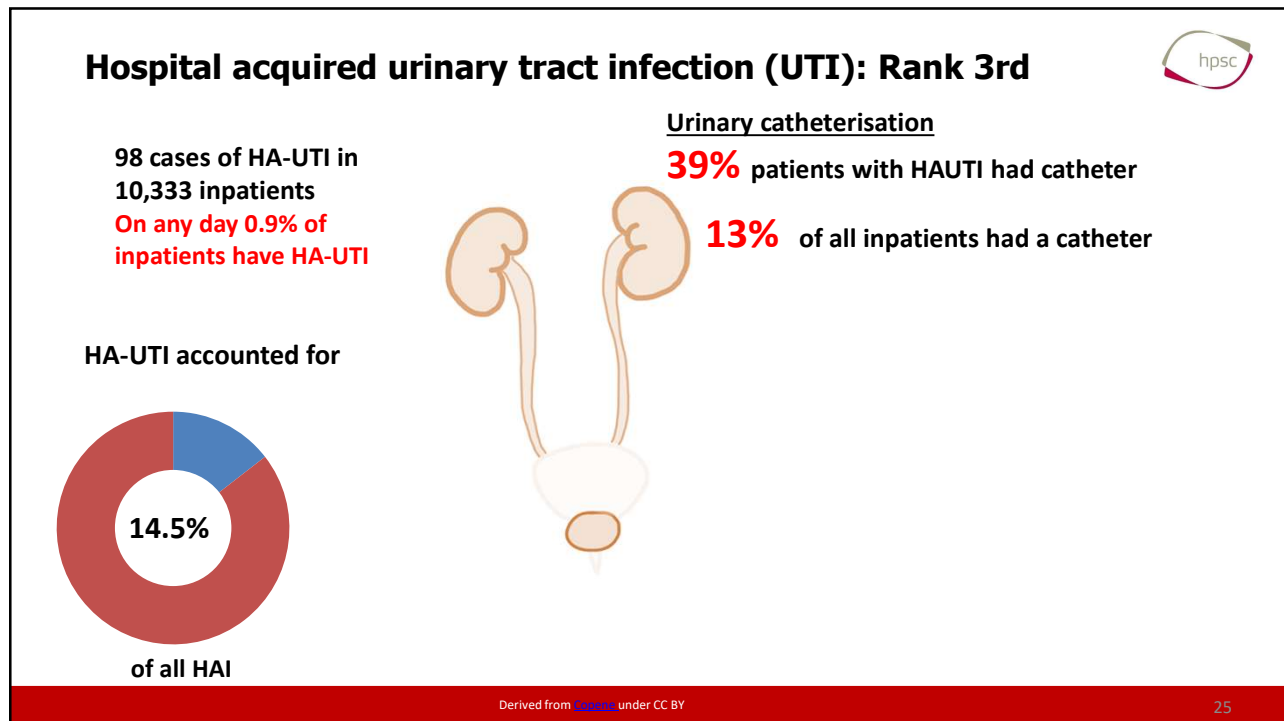
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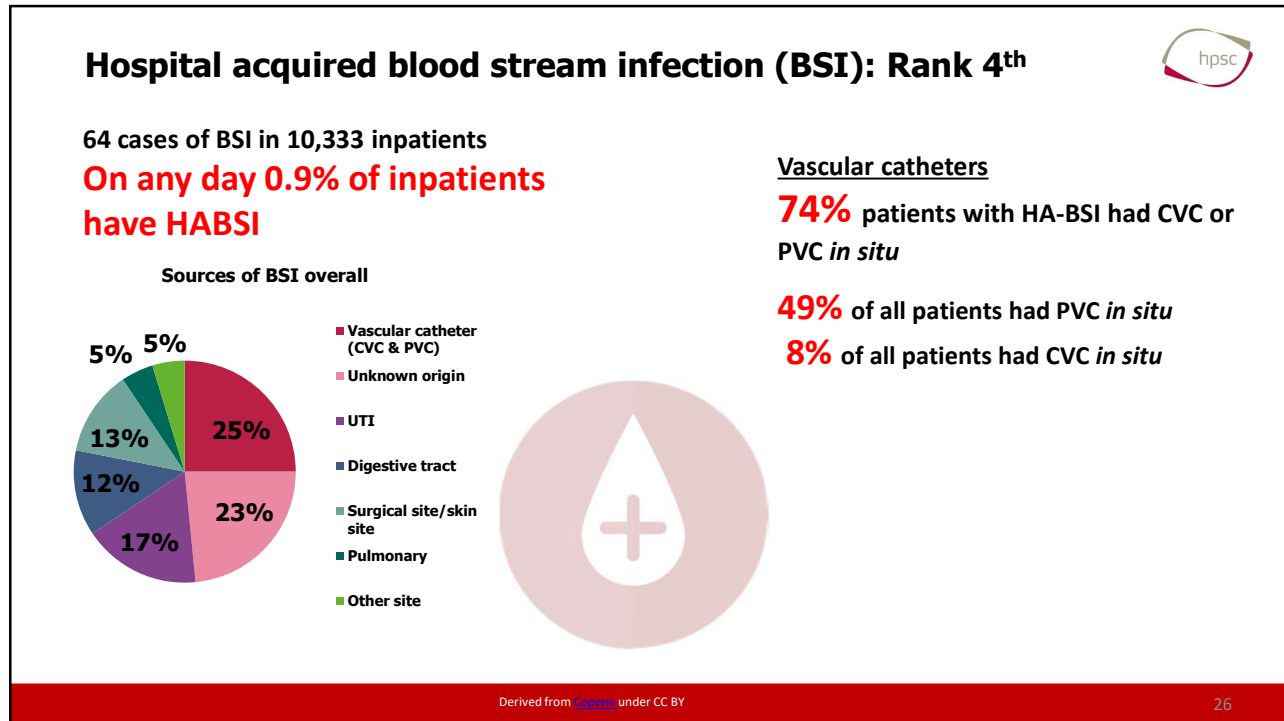
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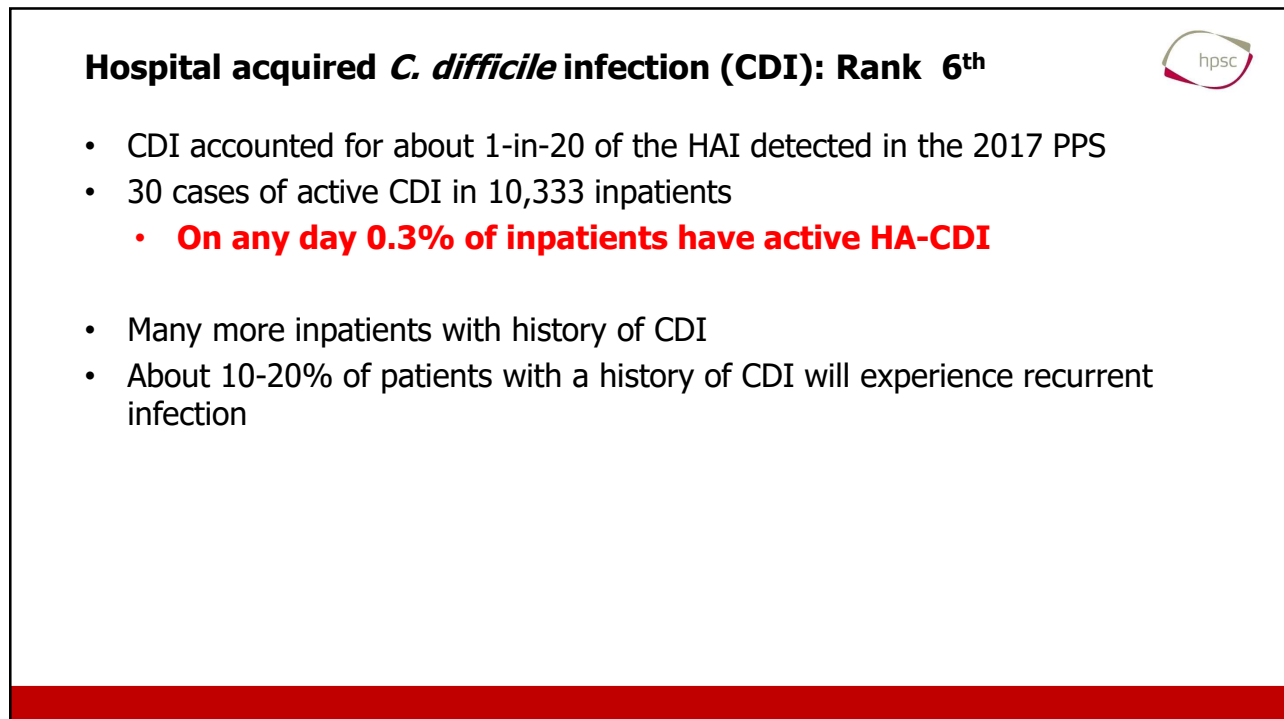
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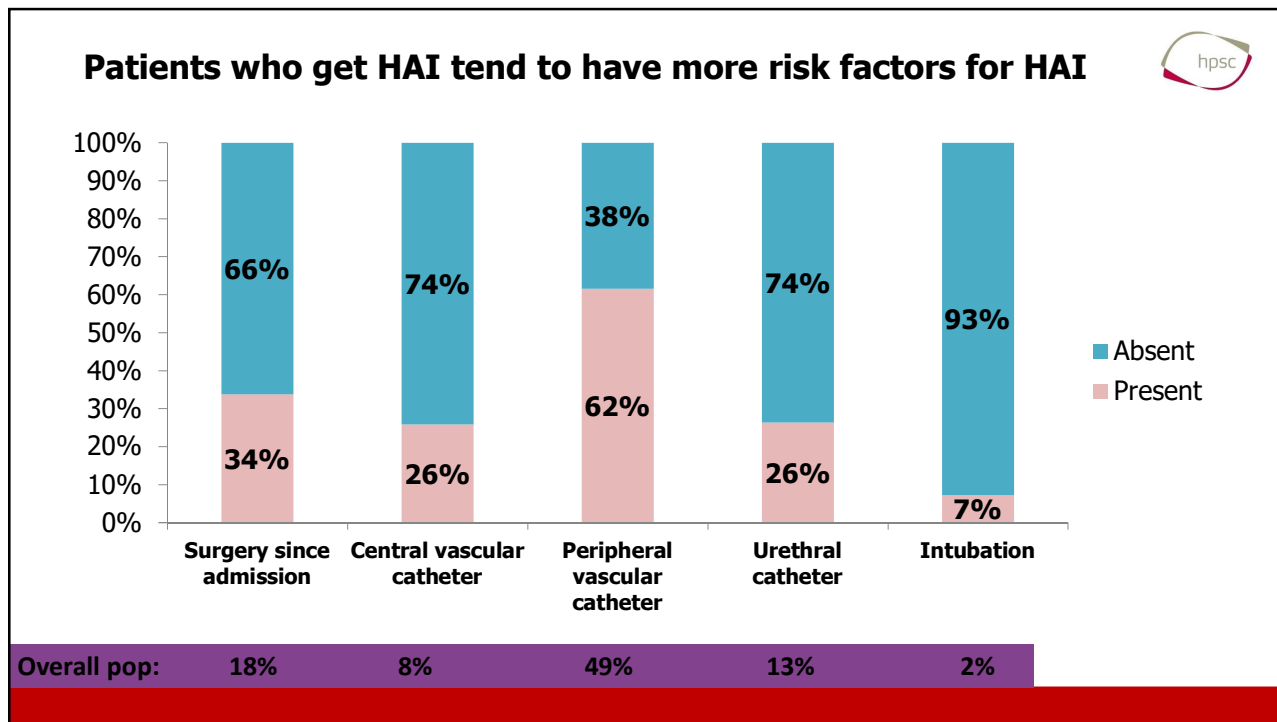
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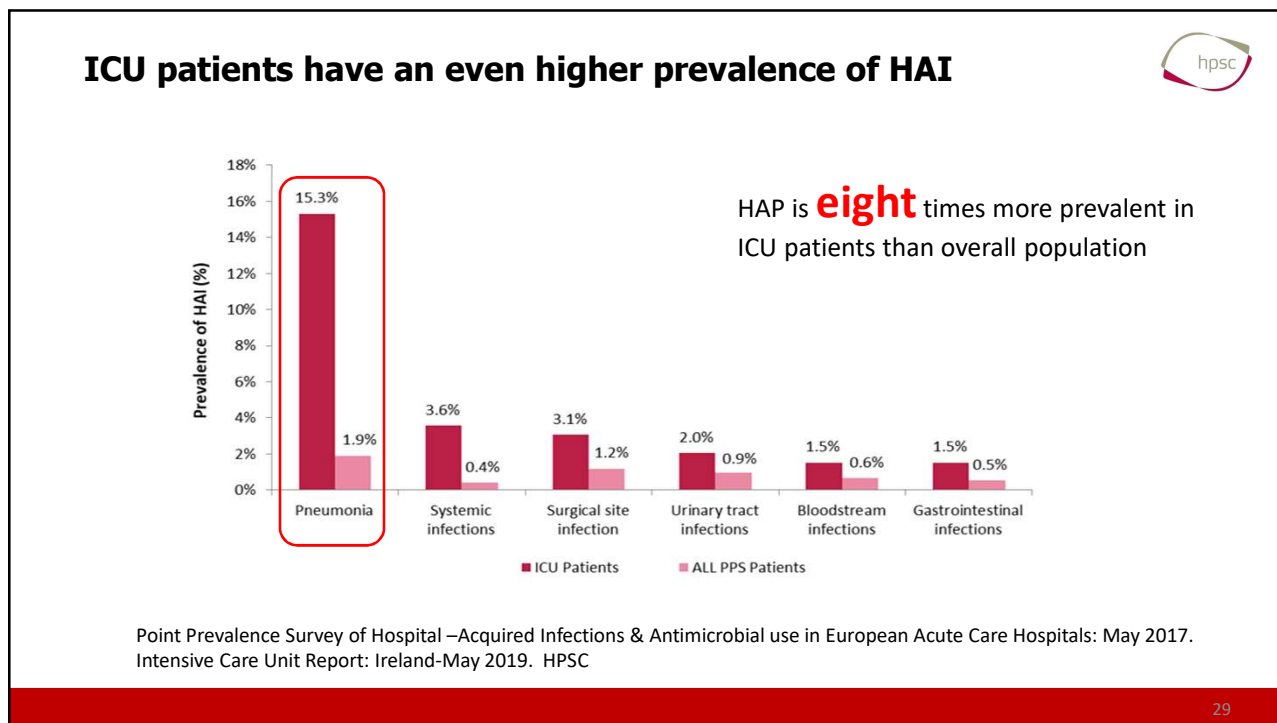
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PPS May 2017 – Key points



1. Versus 2012, increased number of participating hospitals and patients, with fewer mean hospital beds and shorter mean LOS
2. Evidence for inpatient population increasing in age, with increased prevalence of vascular catheter use
3. Population with increasing risk factors – not all risk factors sought in PPS;
 - Frailty, nutritional status
4. HAI present in 6.1% of hospital inpatients versus 5.2% in 2012
5. ECDC estimated on any day Irish hospitals had nearly 500 inpatients with HAI
 - Infection types with high potential preventability; HAP, SSI, CA-UTI, vascular catheter related BSI, CDI
 - PPS done in May – Influenza, norovirus activity low at that time of year

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Local multi-modal strategies for HAI prevention



% availability of local guidelines

Urinary tract infection (UTI) prevention	67
Bloodstream infection (BSI) prevention	53
Surgical site infection (SSI) prevention	47
Pneumonia prevention <i>Hospital-wide</i> <i>ICU</i>	23 53

% use of care bundles

UTI prevention	68
BSI prevention	44
SSI prevention	30
Pneumonia prevention <i>Hospital-wide</i> <i>ICU</i>	5 61

(n=57 of 60 hospitals provided data & n= 36 of 37 ICUs provided data)

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Local multi-modal strategies for HAI prevention



% local surveillance programme

Bloodstream infection (BSI)	77
Surgical site infection (SSI)	54
Urinary tract infection (UTI)	39
Pneumonia	
<i>Hospital-wide</i>	5
<i>ICU</i>	36

% provision of local education

UTI prevention	49
BSI prevention	47
SSI prevention	30
Pneumonia prevention	
<i>Hospital-wide</i>	5
<i>ICU</i>	50

(n=57 of 60 hospitals provided data & n= 36 of 37 ICUs provided data)

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HALT point prevalence surveys (PPS) – Long-term care facilities



- Periodic national PPS of long-term care acquired infections (HAI) and antimicrobial use (HALT)

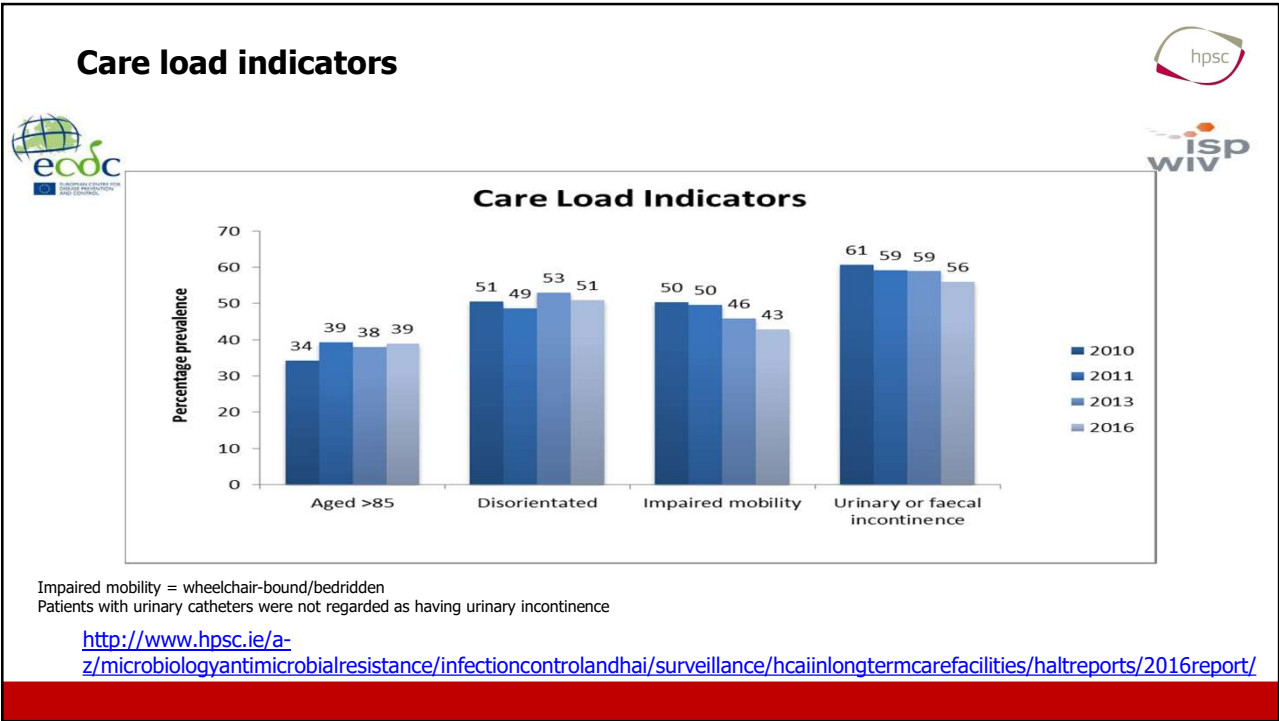
Key Results	2010	2011	2013	2016
Number of Participating LTCF	69	108	190	224
Public (HSE) Ownership	61	84	128	136
Private Ownership	8	24	39	54
Voluntary Ownership	0	0	23	34
Median LTCF size (beds)	47	50	46	42
Range	10-382	10-226	5-203	5-176
Number of eligible residents	4,170	5,922	9,318	10,044



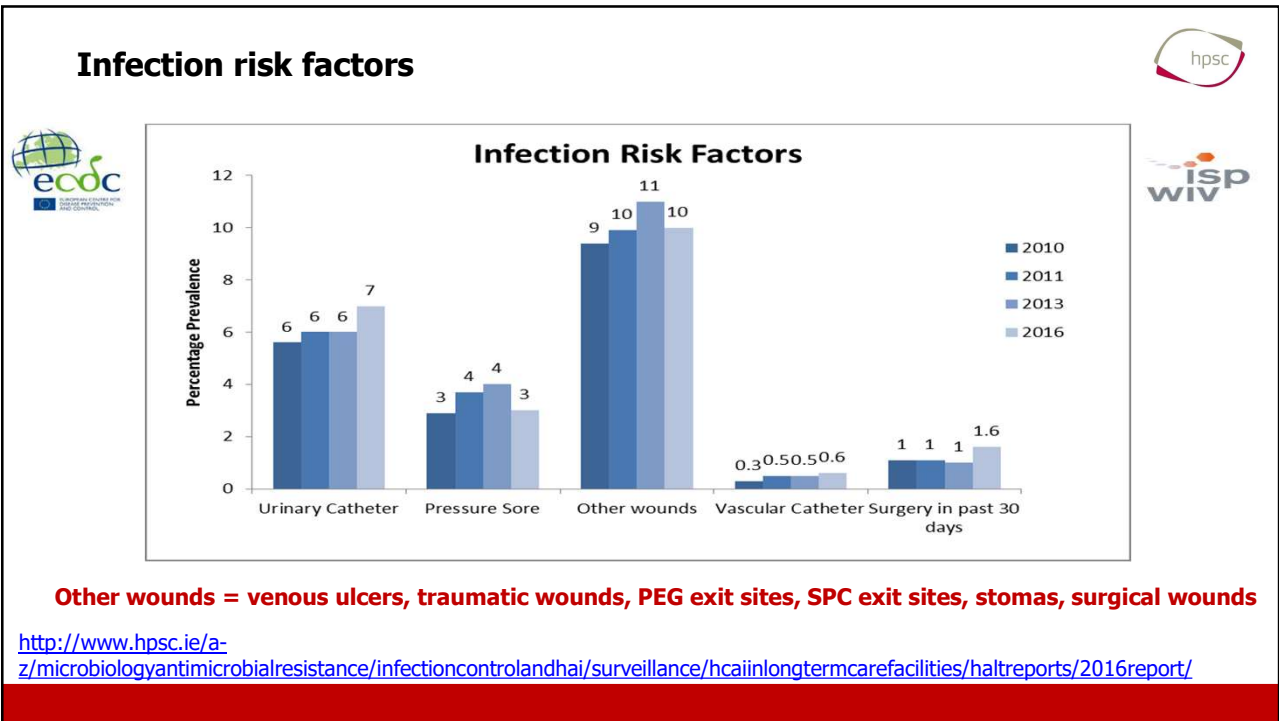
<http://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/infectioncontrolandhai/surveillance/hcaiinlongtermcarefacilities/haltreports/2016report/>

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What were the key results from HALT surveys in Ireland?



Key Results	2010	2011	2013	2016
Number of eligible residents	4,170	5,922	9,318	10,044
No. of eligible residents meeting HCAI surveillance definitions	149*	242*	497*	441*
Crude prevalence of HCAI	3.6%	4.1%	5.3%	4.4%



***A resident could have had more than one active infection type on survey date**

<http://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/infectioncontrolandhai/surveillance/hcaiinlongtermcarefacilities/haltreports/2016report/>

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Conclusion



- HCAI are common
- There are different types of HCAI
- There are many risk factors for HCAI – some we can't control **BUT** a big proportion of HCAI are preventable
- HCAI have a big impact on patients, staff, resources, families, confidence in our system
- We all have a role to play in prevention of HCAI

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Thank you for your attention