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ANTIMICROBIAL RESISTANCE AND STEWARDSHIP:

WHAT YOU NEED TO KNOW

KATE WILLIAMS RN

DR. KAREN OUSEY

WOUND CARE TODAY

LIVE Q&A

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ANTIMICROBIAL RESISTANCE AND STEWARDSHIP – WHAT YOU NEED TO KNOW

Dr. Karen Ousey

WOUND CARE TODAY

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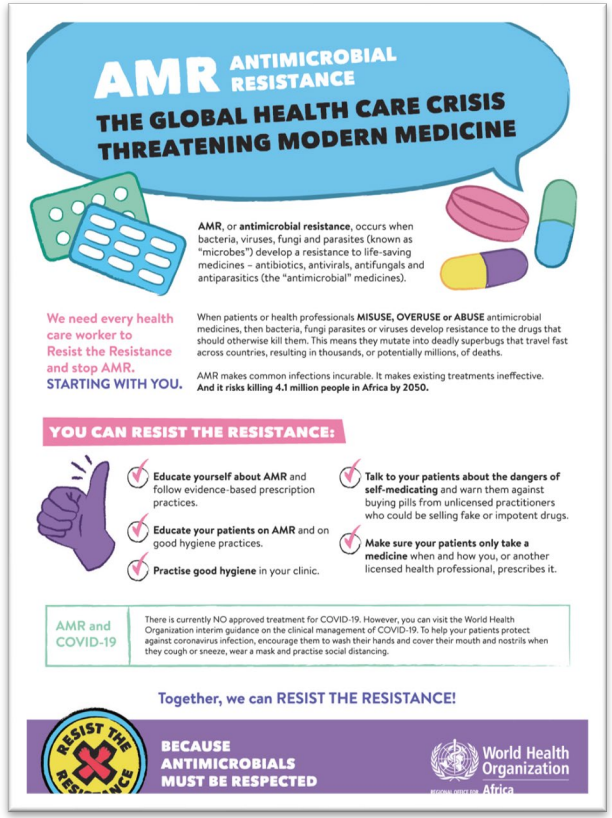
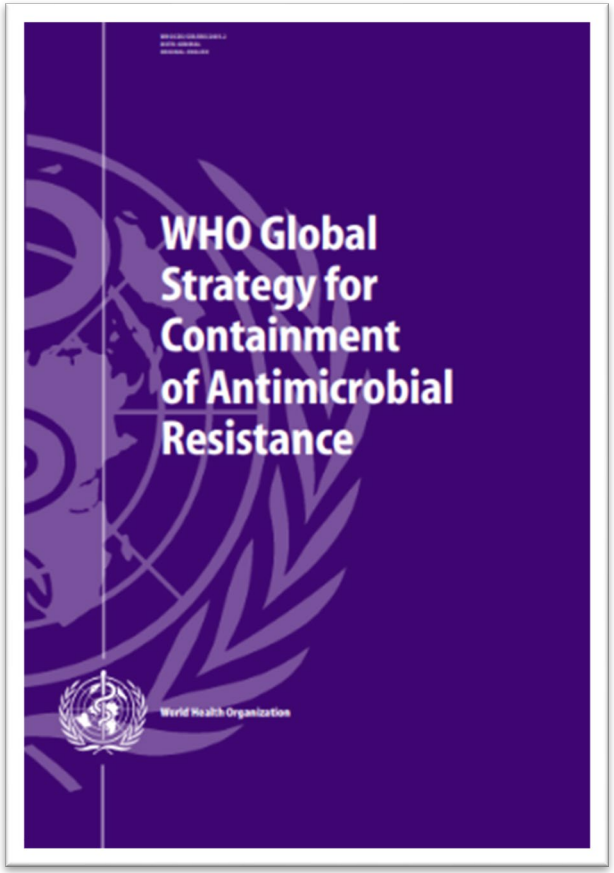
LEARNING OBJECTIVES

- Understand the role of antimicrobial resistance (AMR) in wound care
- Have an awareness of the difference between wound inflammation and wound infection
- Explore a practical solution to managing wound infection in clinical practice
- Discuss the value of ongoing clinical education and combating AMR

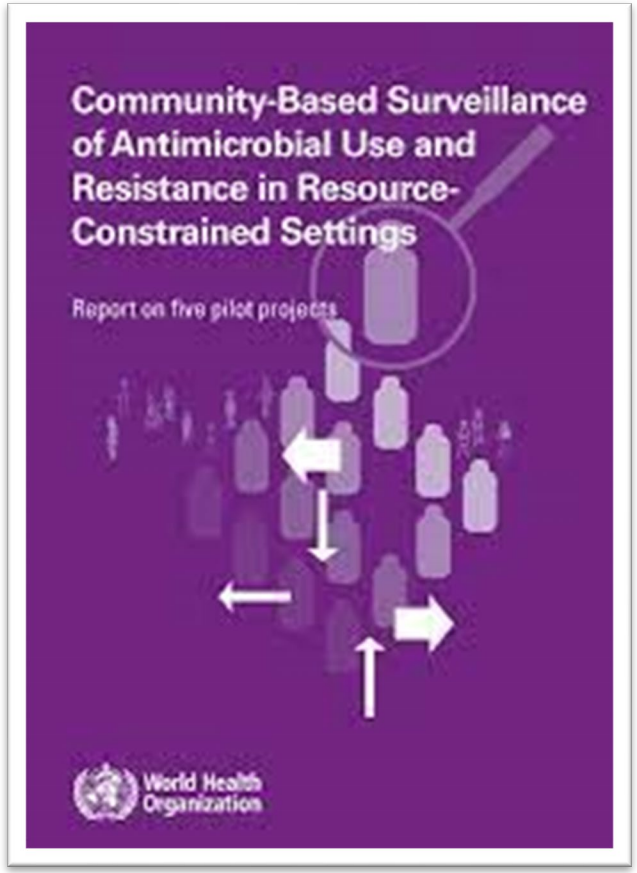
WHAT IS ANTIMICROBIAL RESISTANCE?

- Antimicrobial resistance happens when microorganisms (such as bacteria, fungi, viruses, and parasites) change when they are exposed to antimicrobial drugs (such as antibiotics, antifungals, antivirals, antimalarials, and anthelmintics)
- Microorganisms that develop antimicrobial resistance are sometimes referred to as ‘superbugs’
- Wounds can be a source of infection by allowing unconstrained entry of microorganisms into the body, including antibiotic-resistant bacteria




WHO Global Strategy for Containment of Antimicrobial Resistance
World Health Organization


Antibiotic resistance: synthesis of recommendations by expert policy groups
Alliance for the Prudent Use of Antibiotics


Community-Based Surveillance of Antimicrobial Use and Resistance in Resource-Constrained Settings
Report on five pilot projects
World Health Organization

14 | THE VOICE APRIL 2021

Feature | Health

Why antibiotics are becoming less effective

Amid a global pandemic, there is another health concern – the rise of antimicrobial resistance. ***Dr Esmita Charani*** and ***Dr Diane Ashiru-Oredope*** explain

ANTIMICROBIAL RESISTANCE (AMR) is a leading global health threat that was at the forefront before the COVID-19 pandemic even began.

According to the 2019/20 ESPAUR Report published by Public Health England, about 178 AMR infections are diagnosed daily in England.

Questions have been raised around the direct link between AMR and ethnicity – but there is yet sufficient evidence to accept these claims.

The current COVID-19 pandemic has highlighted the increased burden of infections in people from black and minority ethnic (BAME) communities. The use of antibiotics to treat individuals with COVID-19 infections may be a contributing factor to antibiotic-resistant infections worldwide.

The recent emergence of the almost untreatable gonorrhoea 'superbug' has highlighted the urgent need for new antibiotics to be developed and a need to combat AMR.

Dr Diane Ashiru-Oredope, lead pharmacist for Antimicrobial Resistance at Public Health England and Dr Esmita Charani, senior research pharmacist at Imperial College London, shared their expertise with *The Voice* on AMR as a concern among British BAME communities.

The effects of AMR within BAME communities

Many studies have demonstrated correlations between ethnicities and their effects on health. In England, ethnic minorities are amongst the group of people that are affected more by certain infections such as tuberculosis and malaria.

The highest cases of tuberculosis reported in the UK are seen in persons born in countries with high levels of the infection. This supports the conclusion that migration is a contributing factor in driving rates of AMR infections in the UK. Other factors such as one's socioeconomic status may impact their living conditions and lifestyle which subsequently make them more prone to acquiring these infections.

> "It is important to raise awareness in culturally sensitive ways"

People from BAME communities carry genetic predisposition for illnesses such as diabetes, heart disease and sickle cell disease. These existing illnesses make them more susceptible to developing more severe and longer-lasting complications from infections like COVID-19.

Dr Ashiru-Oredope and Dr Charani expressed the importance of understanding the advantages and disadvantages of health and illness in different ethnic sub-populations in relation to infections and AMR. They believe that more research is needed in relation to varying AMR burdens amongst different ethnic groups and more specifically, due to differences in lifestyle and diet.

Neisseria gonorrhoeae, the causative agent of gonorrhoea, has progressively developed resistance to the antibiotic drugs that were once able to treat it.

With almost not enough antibiotics left to treat the infection, it is crucial for public health officials to continuously monitor the emergence of antibiotic-resistant sexually transmitted infections (STIs).

Dr Ashiru-Oredope and Dr Charani said: "It is important to raise awareness about STIs in culturally and contextually sensitive ways amongst different groups to ensure that we reach all, particularly increasing sexual health knowledge among BAME youths."

STI rates were highest amongst people of Black Caribbean ethnicity between 2014 and 2019 which was also a nine per cent increase.

The largest proportional increase in new STI diagnoses was in people of Asian ethnicity, a total of 16 per cent with the highest cases being gonorrhoea and chlamydia.

THE DRUGS DON'T WORK: Drug-resistant infections are estimated to cause 700,000 deaths each year globally

Will AMR result in the next pandemic?

AMR is already a major global health concern and was ranked by the World Health Organisation as one of the top 10 global health threats among other such as air pollution and global influenza pandemics.

Dr Ashiru-Oredope and Dr Charani told *The Voice*: "AMR differs to the COVID-19 pandemic as it is more difficult to recognise and whilst it can spread, it does not spread as easily."

> "A world without antibiotics is a world without surgeries and chemotherapy"

Factors such as these could make AMR appear 'less serious' to the general public when, in fact, it is a serious issue that demands similar efforts to that of COVID-19.

Drug-resistant infections are estimated to cause 700,000 deaths each year globally. This figure is predicted to rise to 10 million, alongside a cumulative cost of $100 trillion (£72.5 trillion), by 2050.

The World Bank estimates that an extra 28 million people around the world could be forced into extreme poverty by 2050 unless AMR is contained.

Unlike the COVID-19 pandemic for which vaccines are under way, drug resistant infections caused by AMR can occur due to a variety of microorganisms including bacteria, viruses or parasites causing disease in humans. Therefore, it is very difficult to find a cure through universal vaccines like we have for COVID-19.

Tackling AMR

AMR develops naturally in microorganisms usually as a result of genetic changes. However, human actions may accelerate the development and spread of this resistance.

The misuse and overuse of antibiotics; poor infection and disease control; lack of awareness and knowledge of AMR among public health professionals are the main factors that are accelerating the spread of AMR in the UK.

AMR can be prevented through immunisation where available, hand hygiene, safe food preparation, access to clean water and good sanitation practices and using antibiotics as directed by qualified healthcare professionals. One of the most effective methods of preventing AMR is by preventing infections.

"We need to advocate for the importance of preventing infections in the first instance as well as a responsible and measures use of antibiotics across the entire population regardless of ethnicity, culture or race", Dr Ashiru-Oredope and Dr Charani said.

"A world without antibiotics is a world without surgeries and chemotherapy to treat cancer. Without antibiotics, society could return to days where an infected cut could become life-threatening and the treatable pneumonia would again become a mass killer," the experts expressed. "COVID-19 has given us an example of what life is like without effective treatment for an infection could be."

The AMR specialists further stated that although AMR cannot be eradicated completely, there are a number of actions that the public and all health and social care staff can take to help reduce its spread.

"Now, more than ever, we need to continue working together to prevent all infections – including COVID-19, as well as to ensure we protect the antimicrobials we have available, especially for life-threatening infections such as sepsis and meningitis."

Dr Ashiru-Oredope and Dr Charani encourage the public to visit the Antibiotic Guardian website (antibioticguardian.com) where they can find out more about antibiotic resistance and what they can do to help keep these vital medicines working.

Dr Diane Ashiru-Oredope is the lead pharmacist for the Antimicrobial Resistance and Healthcare Associated Infections at Public Health England. She is also the global antimicrobial resistance lead for the Commonwealth Pharmacists Association. In 2015, Diane was awarded Public Health Pharmacist of the year and in 2016 Outstanding Woman in the Public Sector at the 10th PRECIOUS awards. Dr Esmita Charani is a senior research pharmacist within the faculty of Medicine at Imperial College London at the NIHR Health Protection Research Unit for Healthcare Associated Infections and Antimicrobial Resistance. Her work in AMR has been recognised through the Academy of Medical Sciences UK-India AMR Visiting Professor award.

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8 · MARCH 2013 AN INDEPENDENT SUPPLEMENT BY MEDIAPLANET TO USA TODAY

NEWS

An evolutionary arms race

The ongoing cycle of drug development and bacterial evolution

TIP 3 PRACTICE GOOD HAND HYGIENE

Thanks to an ever-increasing crop of drug-resistant bacteria, our best defenses against many, often deadly, infections are no longer working.

It is often described as an evolutionary arms race. Humans develop antibiotics and bacteria evolve that can survive them. Humans develop better antibiotics, and the cycle continues. If it is a race, humans are losing. Hospitals are increasingly breeding grounds for drug-resistant bacteria. More people now die each year of hospital acquired infections than of car crashes, breast cancer, or AIDS.

> "More people now die each year of hospital acquired infections than of car crashes, breast cancer, or AIDS."

Infection protection

"If you are going to the hospital to visit a friend, forget the flowers," says Betsy McCaughey, PhD, founder of the Committee to Reduce Infection Deaths. "Bring a canister of bleach wipes. Wiping the surfaces around the patient's bed could save their life."

Surgical site infections are another potential problem for hospital patients. William Robb, MD, chairman of the patient safety committee of the American Academy of Orthopaedic Surgeons, suggests:

- Practice good hygiene—with soap and water, not antibacterial agents.
- Use antibiotics exactly as prescribed.
- Never insist on antibiotics if your doctor says they aren't necessary, and they often aren't. "While there is a real benefit to using antibiotics to treat diagnosed bacterial infections, these drugs will not help viral infections, such as colds," says Stuart B. Levy, MD, President of APUA.

Antibiotics (APUA) suggests:

AVERY HURT

COMMENT

PALAEONTOLOGY How teeth, diet and environment shaped human evolution p.26

MICROBIOLOGY A life of Frederick Novy, forgotten bacteriology and education pioneer p.28

PUBLISHING A call for one submission system to rule them all p.30

SUSTAINABILITY Restore earthworm workforce to rebuilt topsoil p.30

RAJESH KUMAR SINGH/REX/SHUTTERSTOCK

A physician examines a man with TB. Like the bacteria behind other common infections, *Mycobacterium tuberculosis* has become increasingly resistant to drugs.

Antibiotic resistance has a language problem

A failure to use words clearly undermines the global response to antimicrobials' waning usefulness. Standardize terminology, urge **Marc Mendelson** and colleagues.

Clinicians have long known that microbes such as bacteria, viruses and fungi are becoming alarmingly resistant to the medicines used to treat them. But a global response to this complex health threat — commonly termed 'antimicrobial resistance' — requires engagement from a much broader array of players, from governments, regulators and the public, to experts in health, food, the environment, economics, trade and industry.

People from these disparate domains are talking past each other. Many of the terms routinely used to describe the problem are misunderstood, interpreted differently or loaded with unhelpful connotations.

On 16 March, the United Nations formed an interagency group to coordinate the fight against drug resistance[1]. We urge that, as one of its first steps, this group coordinate a review of the terminology used by key actors. Such an effort could improve understanding across the board and help to engender a consistent and focused global response.

BLINDED BY SCIENCE

A 2015 survey by the World Health Organization (WHO) in 12 countries highlighted people's unfamiliarity with the language of antibiotic resistance[2]. Fewer than half of the nearly 10,000 respondents had heard of the term 'antimicrobial resistance'. Only one-fifth were aware of its abbreviated form 'AMR'.

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Drug resistance The Observer

'Antibiotic apocalypse': doctors sound alarm over drug resistance

The terrifying prospect that even routine operations will be impossible to perform has been raised by experts alarmed by the rise of drug-resistant genes

Bugs resistant to antibiotics 'will kill more than cancer'

BUGS that are resistant to antibiotics are expected to kill more people than cancer within decades, George Osborne said last night.

Without new drugs, common infections will be responsible for ten million deaths a year around the world by 2050, he claimed – more than the eight million a year who die from cancer now.

As well as disastrous consequences for health, the Chancellor warned that a lack of effective antibiotics may have an enormous economic cost over the same period, slashing global economic output by 3.5 per cent – or £70trillion.

He highlighted the potentially catastrophic toll as he called for a global effort to develop new antibiotics. In a speech at the International Monetary Fund in Washington DC, he called for countries to offer multi-billion-pound 'prizes' for firms that develop new drugs.

Huge cash rewards should also be given to companies that come up with new ways of diagnosing exactly which infection a person has – and which drugs will be most effective, he said.

Widespread over-prescribing weakens drugs' effectiveness as bacteria become more resistant.

Medical experts have warned of a catastrophic future in which common infections are deadly, as they were before the discovery of penicillin in the Twenties. It could lead to slight scratches or a routine operations becoming fatal.

It is nearly two decades since the last discovery of a new class of antibiotic.

The huge cost of creating them – and their limited use before they become worthless – deters pharmaceutical firms from research.

Sally Davies, the Chief Medical Officer, has warned that the threat from antibiotic resistance is as severe as terrorism.

Mr Osborne said existing drug markets were 'broken', adding: "Unless we take global action, antimicrobial resistance will become an even greater threat to mankind than any terrorist act.

"It is not just a health problem, it is a global economic issue.

"The cost of doing nothing, both in terms of lives lost and money wasted, is too great, and the world needs to come together to agree a concerted approach.

"My message is that we need the world's governments and industry leaders to work together in radical new ways."

Ministers have commissioned the economist Lord O'Neill to review the issue, and his recommendations are expected next month.

Last year, British doctors were warned they faced being struck off if they handed out too many antibiotics. Prescription rates are spiralling, and GPs have being referred to regulators if they continue to dole out antibiotics like sweets.

Doctors have been found prescribing them for coughs, colds and hayfever. In some GP practices, up to 70 per cent of patients who ask for antibiotics get them.

Around 45million antibiotic prescriptions were issued on the NHS in 2013 – up 14 per cent on 2003.

Professor Colin Garner, of Antibiotic Research UK, said: "Effective antibiotics underpin all modern medicine. We are in danger of going back to a pre-antibiotic era unless we quickly find significant funds to find new antibiotics, as well as safeguarding our current ones."

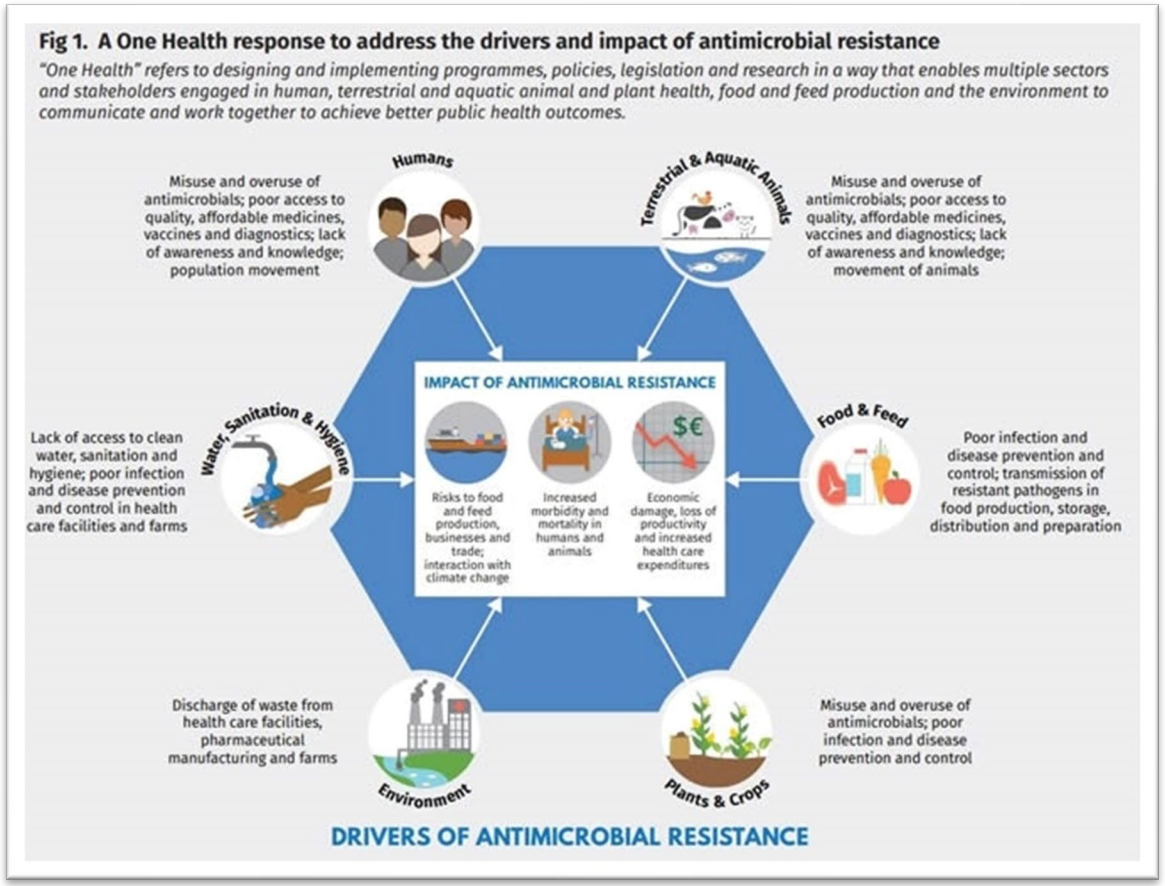
'Threat to mankind'

SHOULD WE BE CONCERNED?

Antimicrobial resistance (AMR) is a leading cause of death globally, higher than HIV/AIDS or Malaria.

Globally, AMR is responsible for at least 1.27 million deaths per year – one in five of them occurring in children under the age of five.

United Nations Environment Programme (2022) *Environmental Dimensions of Antimicrobial Resistance: Summary for Policymakers*.



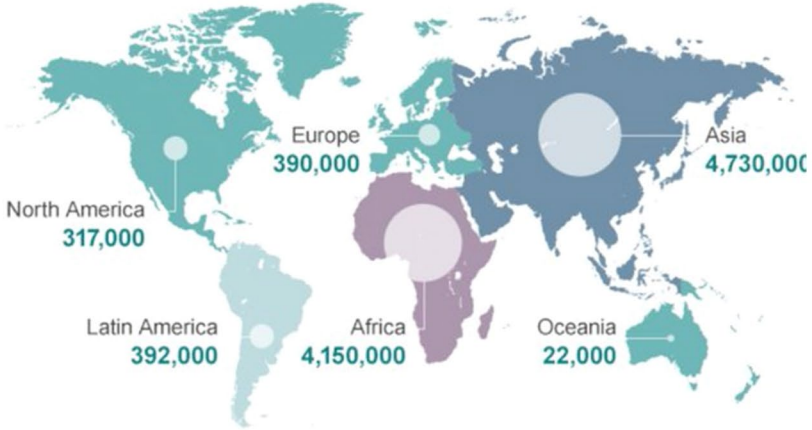
The future if we do not act now

GLOBAL **A failure to address the problem of antibiotic resistance could result in:**

10m deaths by 2050

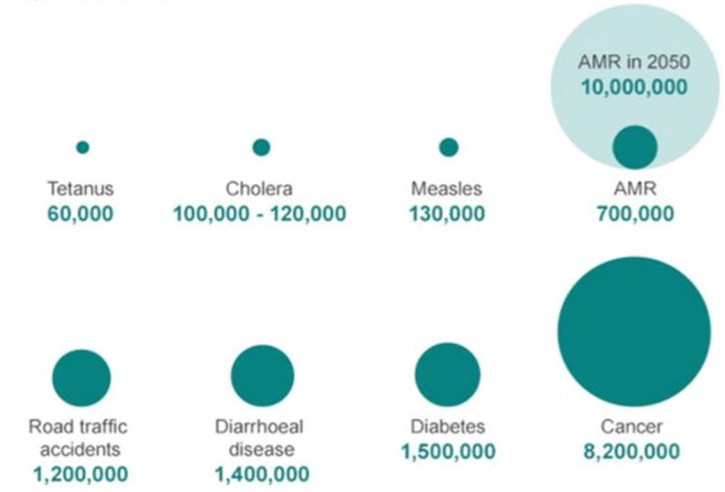
Costing £66 trillion

Deaths attributable to antimicrobial resistance every year by 2050



Source: Review on Antimicrobial Resistance 2014

Deaths attributable to antimicrobial resistance every year compared to other major causes of death



Source: Review on Antimicrobial Resistance 2014

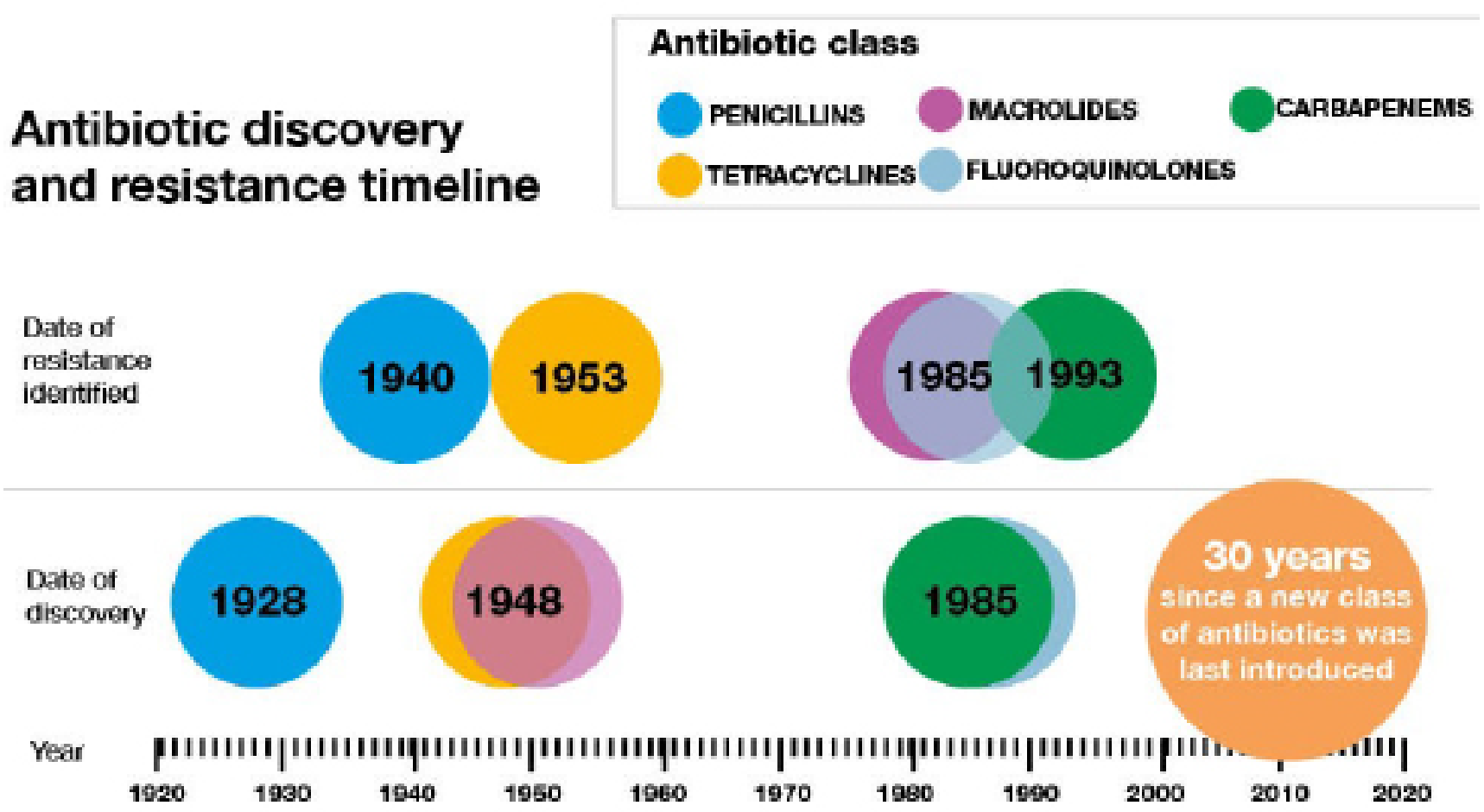
By 2050: more deaths from resistant infections compared to e.g. cancer

http://amr-review.org/

Review on Antimicrobial Resistance

Tackling drug-resistant infections globally

SHOULD WE BE CONCERNED?



ANTIMICROBIAL STEWARDSHIP

Defined as 'an organisational or healthcare system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness'.

TOOLS

- Education
- Antibiotic lists
- Local guides for diagnostics of infections, including microbiology laboratory
- Local guides for initial antimicrobial therapy
- Local guides for pathogen-specific antimicrobial therapy
- Local guides for surgical prophylaxis
- Tools for controlling antibiotic consumption
- Tools for controlling antimicrobial resistance

BEFORE YOU IMPLEMENT AMS

- Can you identify an infection?
- When do you prescribe antimicrobials?
- Is the wound infected or inflamed?
- Where can you get help?

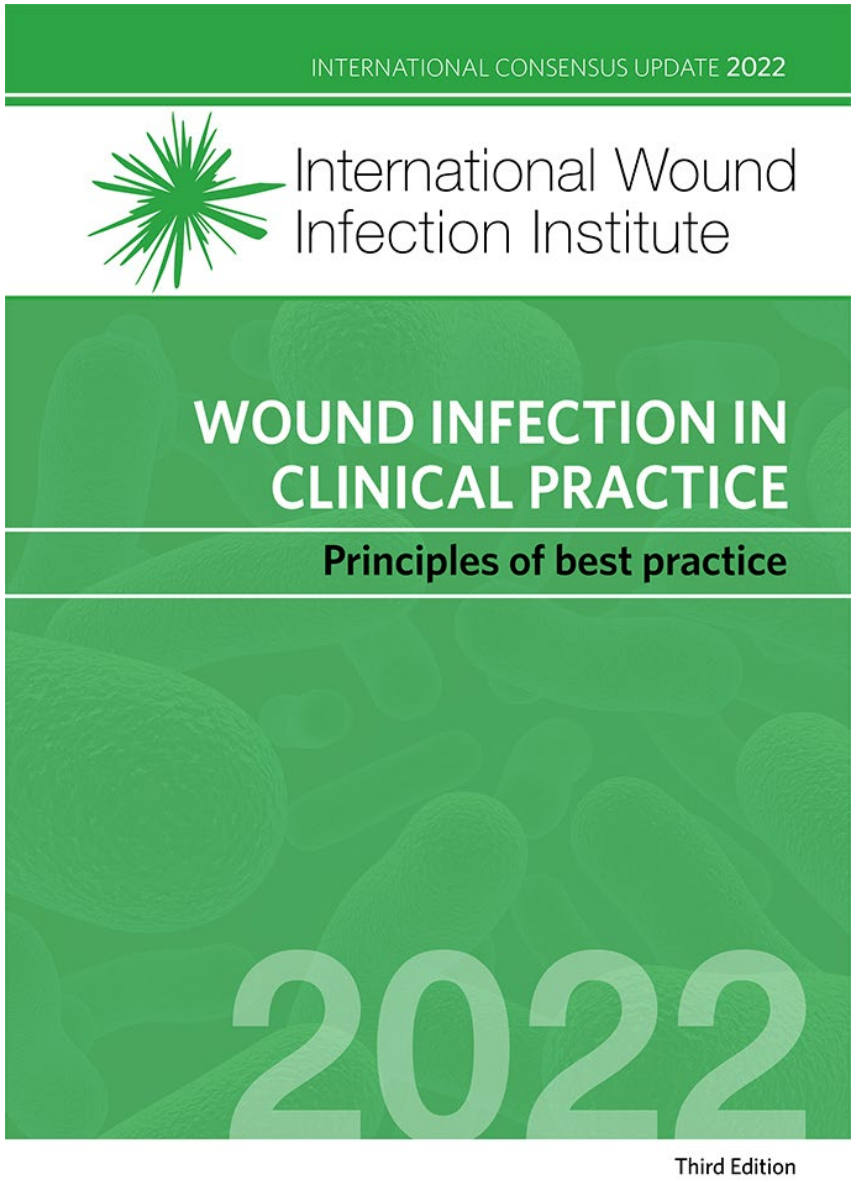
EFFECTIVE IDENTIFICATION OF WOUND INFECTION

Table 4. Examples of local indicators of improvement/deterioration of chronic wounds and may indicate infection (adapted from Wounds UK, 2018)

Parameter	Change that may indicate:	
	Improvement	Deterioration
Wound bed	■ Increased amount of granulation tissue ■ Decreased amount of slough/ necrotic tissue ■ Reduction in wound area/volume*	■ Increased amount of slough/necrotic tissue ■ Decreased amount of granulation tissue ■ Granulation tissue is friable ■ Increase in wound area/volume
Exudate	■ Levels usually decrease as the wound heals ■ Changed to clear if previously cloudy	■ Increased level ■ Changed from clear to discoloured ■ Change in consistency, e.g. thinner to thicker
Periwound skin	■ Reduction, if present, of: - Maceration/excoriation - Erythema - Swelling	■ Development, or increase in extent, of: - Maceration/excoriation - Erythema - Swelling
Odour	■ Less noticeable or resolved if previously an issue	■ Development, change in or worsening of unpleasant odour
Wound-related pain†	■ Reduced level or frequency	■ Development, change in nature and/ or increase in level of pain†

*N.B. Changes in wound area/volume may not be noticeable from one dressing change to the next, and a wound may increase in size when necrotic tissue and slough are removed. Taking photographs and measuring the wound helps to identify if the wound is improving.
†Patients with a diabetic foot ulcer and neuropathy may not experience pain; a patient with sudden onset of pain should be referred urgently

(Wounds UK, 2020)


INTERNATIONAL CONSENSUS UPDATE 2022
International Wound Infection Institute
WOUND INFECTION IN CLINICAL PRACTICE
Principles of best practice
2022
Third Edition

MICROBIAL BURDEN

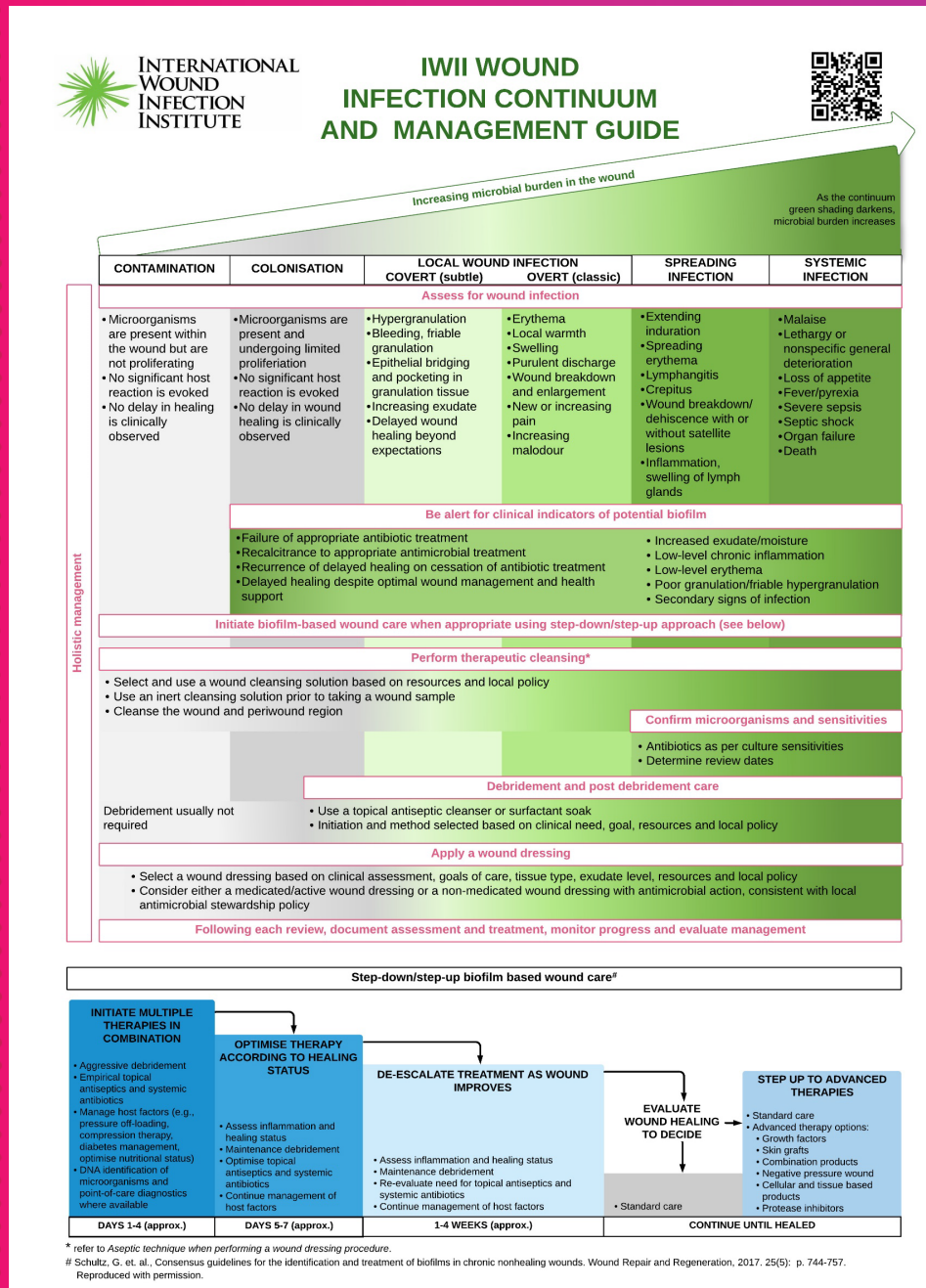
IWII WOUND INFECTION CONTINUUM

INTERNATIONAL WOUND INFECTION INSTITUTE

CONTAMINATION	COLONISATION	LOCAL WOUND INFECTION COVERT (subtle)	LOCAL WOUND INFECTION OVERT (classic)	SPREADING INFECTION	SYSTEMIC INFECTION
• Microorganisms are present within the wound but are not proliferating • No significant host reaction is evoked • No delay in healing is clinically observed	• Microorganisms are present and undergoing limited proliferiation • No significant host reaction is evoked • No delay in wound healing is clinically observed	• Hypergranulation • Bleeding, friable granulation • Epithelial bridging and pocketing in granulation tissue • Increasing exudate • Delayed wound healing beyond expectations	• Erythema • Local warmth • Swelling • Purulent discharge • Wound breakdown and enlargement • New or increasing pain • Increasing malodour	• Extending induration • Spreading erythema • Lymphangitis • Crepitus • Wound breakdown/ dehiscence with or without satellite lesions • Inflammation, swelling of lymph glands	• Malaise • Lethargy or nonspecific general deterioration • Loss of appetite • Fever/pyrexia • Severe sepsis • Septic shock • Organ failure • Death

(Reproduced with kind permission of the IWII)

Microbial burden is the number of micro-organisms in a wound, the pathogenicity of which is influenced by the microorganisms present (i.e. the species/strain), their growth and their potential virulence mechanisms.



Wound infection continuum and management

(Reproduced with kind permission of the IWII)

LANCET, 2022

Greater action to monitor and control infections, globally, nationally and within individual hospitals

Accelerate support for infection prevention and control, as well as expand access to vaccines, clean water and sanitation

Optimise use of antibiotics unrelated to treating human disease, such as in food and animal production, taking a One Health approach and recognising the interconnection between human and animal health

Be mindful of antimicrobial treatments

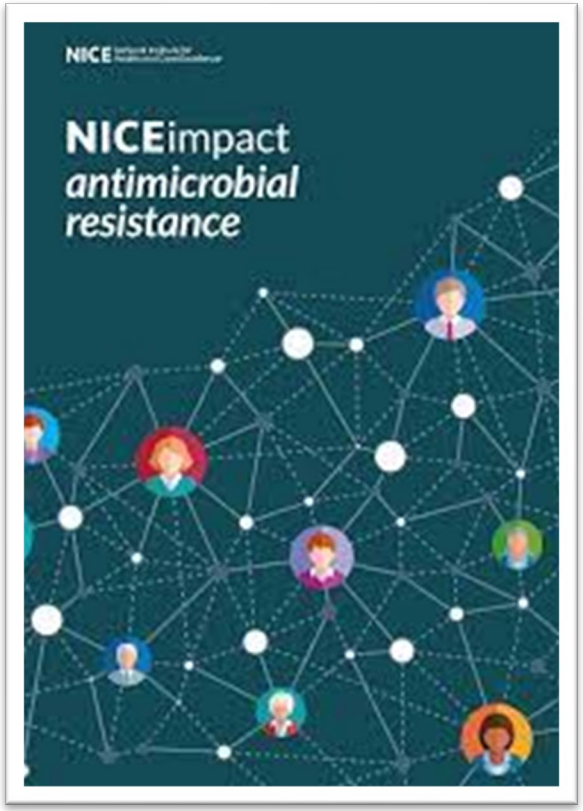
Expanding access to lifesaving antibiotics where needed minimising use where they are not necessary to improve human health

Act according to WHO Global Action Plan and AWaRe guidelines

Increase funding at every stage of the development pipeline for new antimicrobials, targeting priority pathogens

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE (NICE, 2018)

Organisations establishing AMS teams should ensure that the team has core members, including an antimicrobial pharmacist and a medical microbiologist



NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE (NICE, 2018)

- The NICE quality standard on antimicrobial stewardship highlights that:
  - It is best practice to take appropriate microbiological samples before antibiotics are used in hospital
  - Where it is appropriate to prescribe antibiotics before the type of infection is confirmed, such as when sepsis is suspected, microbiological samples should be taken before administering the antimicrobial and, when the results are available, used to review the antimicrobial prescription

DEVELOPING A WOUND INFECTION FRAMEWORK

Kate Williams

WOUND CARE TODAY

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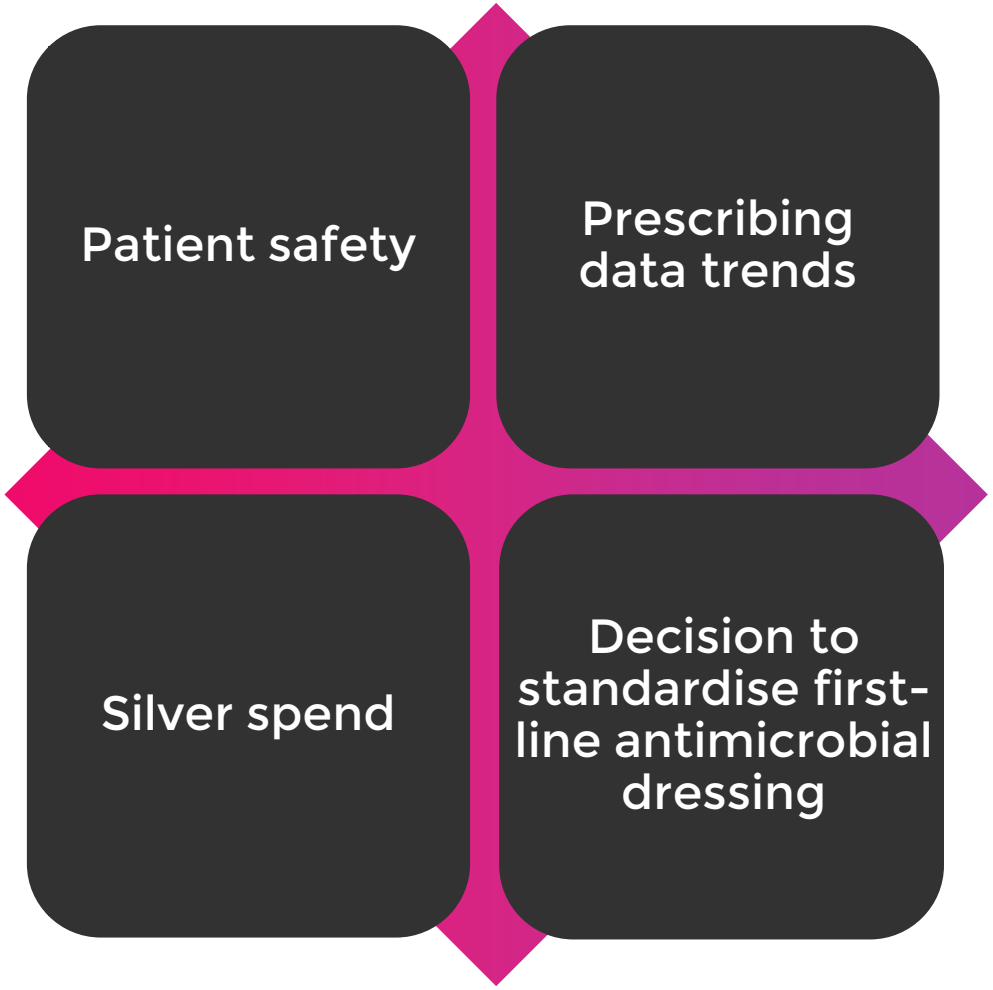
WHY HAVE A FRAMEWORK?

Why have a framework?

- Standardise practice
- Reduce variation in treatment
- Improve the quality of care
- Support the practitioner to make informed decisions relating to the management of patients, in accordance with individual professional competence and patient wishes

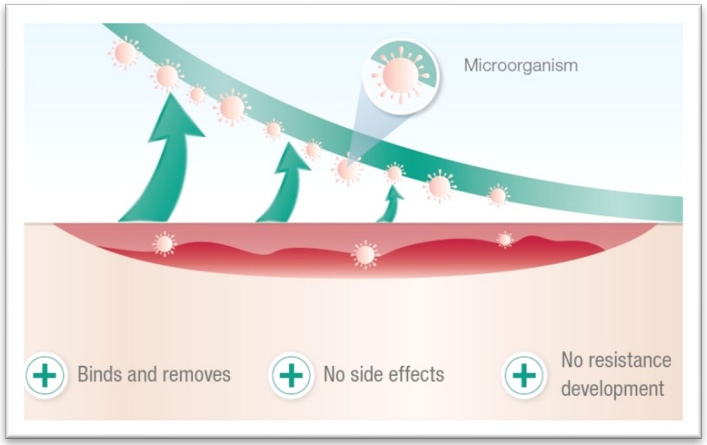
WHY A WOUND INFECTION FRAMEWORK?



Williams (2022)

CHOOSING A FIRST-LINE INFECTION MANAGEMENT ***DRESSING***

- The product needed to be suitable for all patients
- Products that offer an alternative approach to the management of increasing bacterial load in chronic wounds, such as dressings with a physical mode of action are effective in wound bio-burden management as there is no risk of bacteria developing resistance (Chadwick and Ousey, 2019)



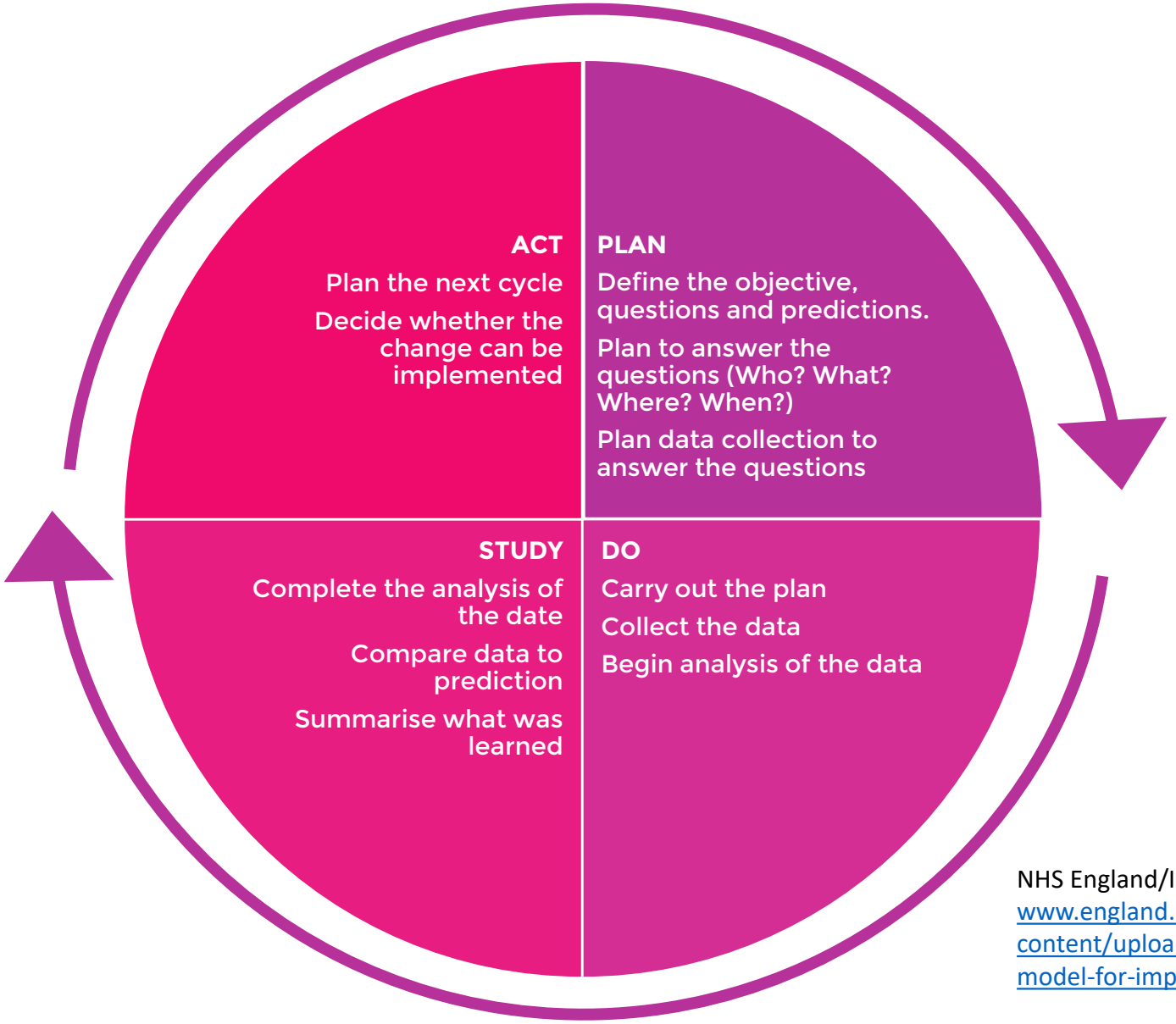
- Based on the ‘International Wound Infection Institute (IWII) Wound Infection in Clinical Practice. 2016’
- There is more evidence now around biofilms, but at that time there were still many questions
- If we change too many things, how would we know what worked?

Questions/ debate

Do we add an irrigation solution/surfactant?

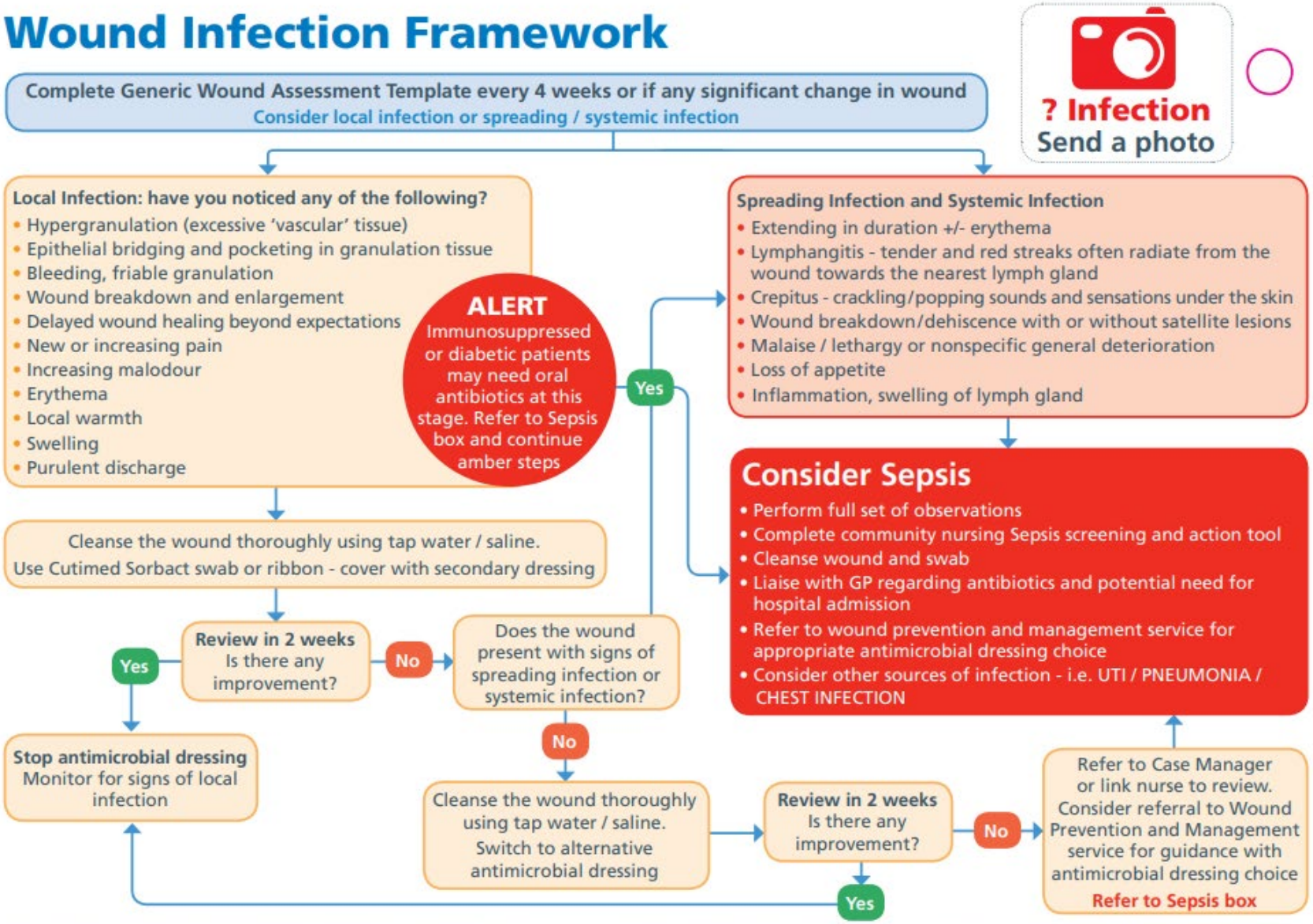
Do we add a debridement pad/cloth?

Despite the science, we knew that in practice wounds were not being cleansed thoroughly, sometimes not at all!



NHS England/Improvement
www.england.nhs.uk/wp-content/uploads/2022/01/qsir-pdsa-cycles-model-for-improvement.pdf

Wound Infection Framework



Framework produced in reference to 'International Wound Infection Institute (IWII) Wound Infection in Clinical Practice. Wounds International 2016.

CONCURRENT CHANGES

- Issuing of camera phones to unregistered staff
- Move to direct purchase and included first-line antimicrobial dressing
- Monthly face-to-face, then online training from Essity

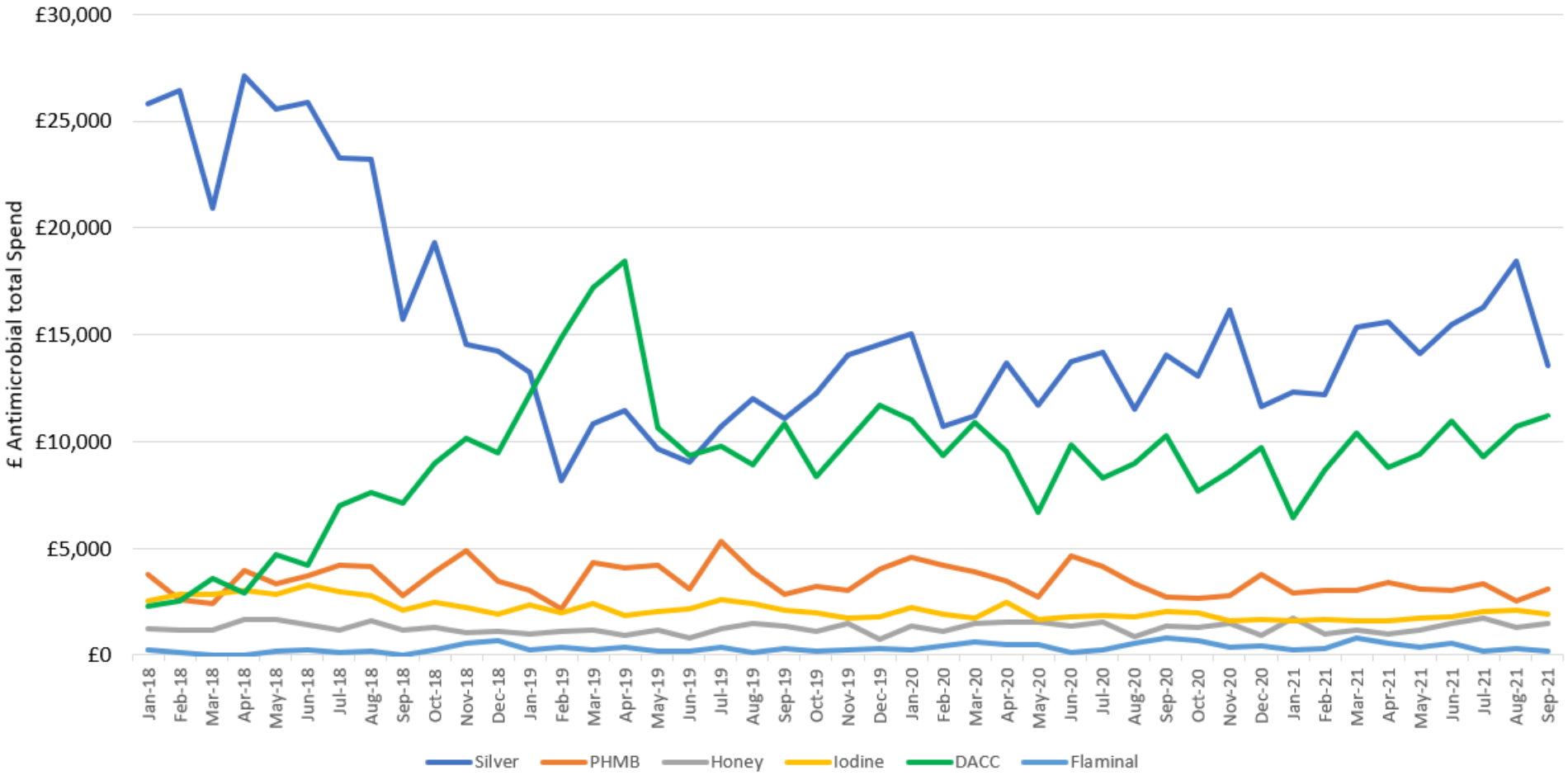
OUTCOMES

- Silver reduction spend for first 12 months = £124,894.54 = 47.67%
- Total antimicrobial reduction spend for first 12 months = £61,058 = 14.34%
- Only a small reduction in swabbing- 664 over 12 months (approx £12,000 saving)

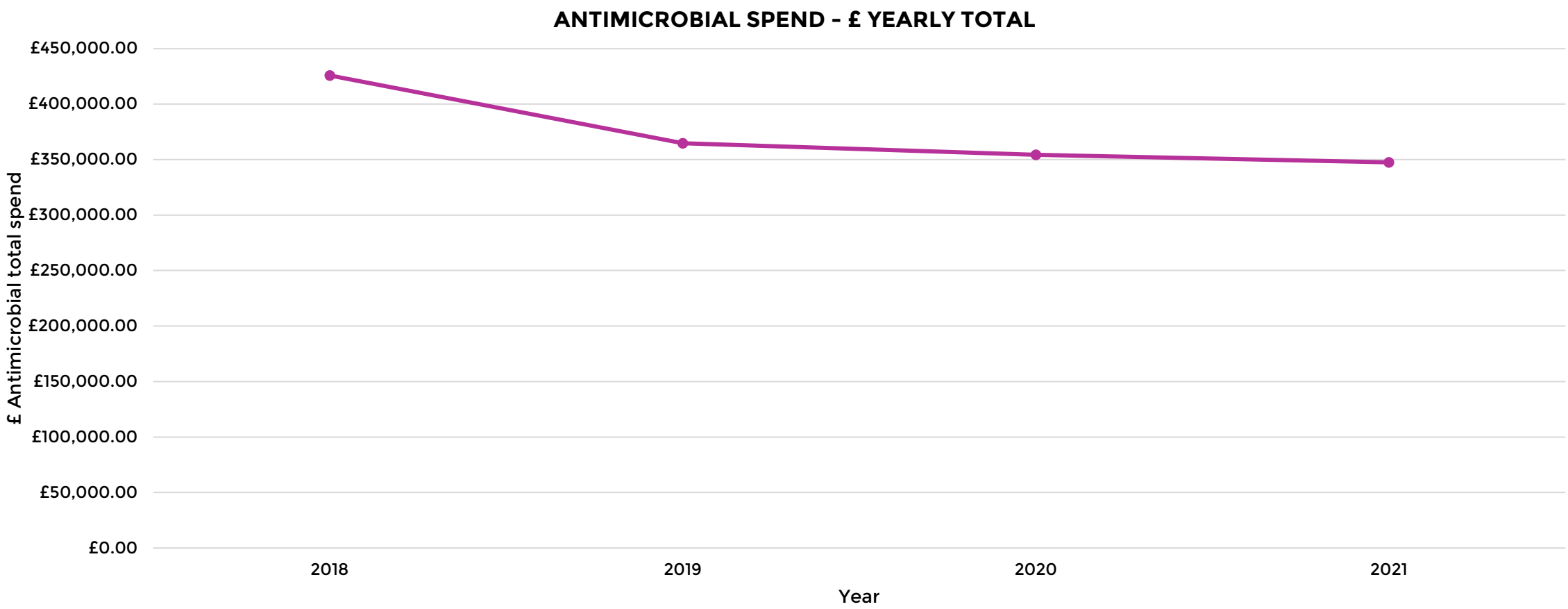
Antibiotic prescribing can be difficult to measure. ***Chose two outcome measures:***

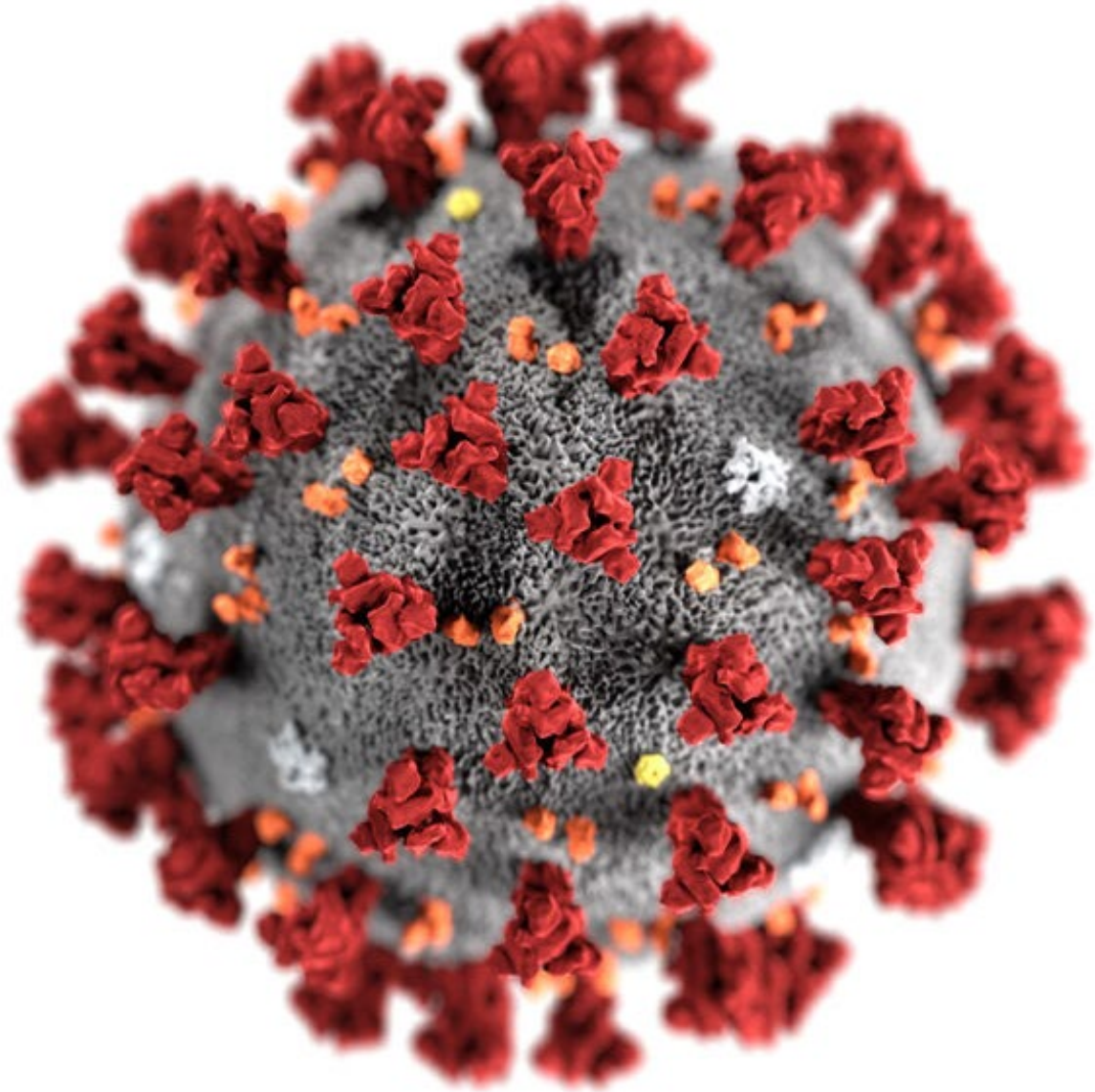
1. **Number of items of Flucloxacillin**
2. **Number of antibiotic prescriptions issued to the S1 read code for wound infection**

ANTIMICROBIAL DRESSING SPEND

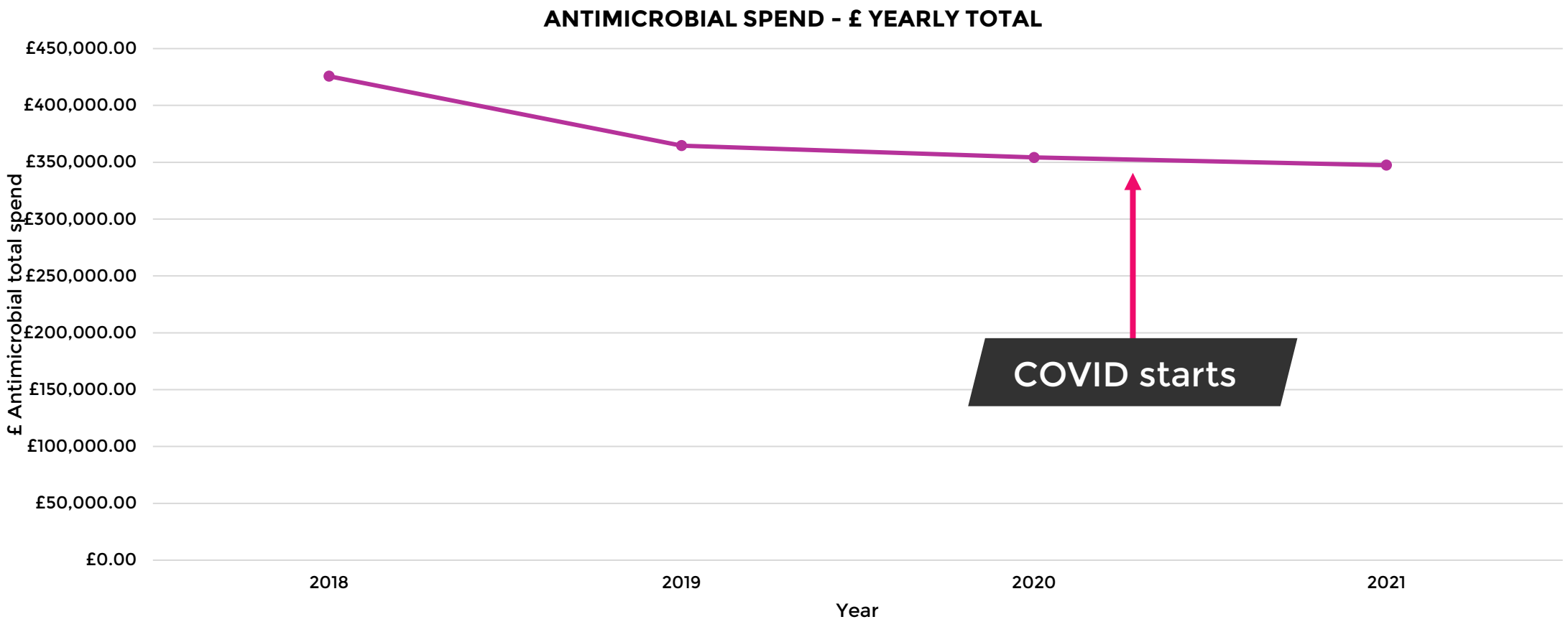


TOTAL ANTIMICROBIAL DRESSING SPEND

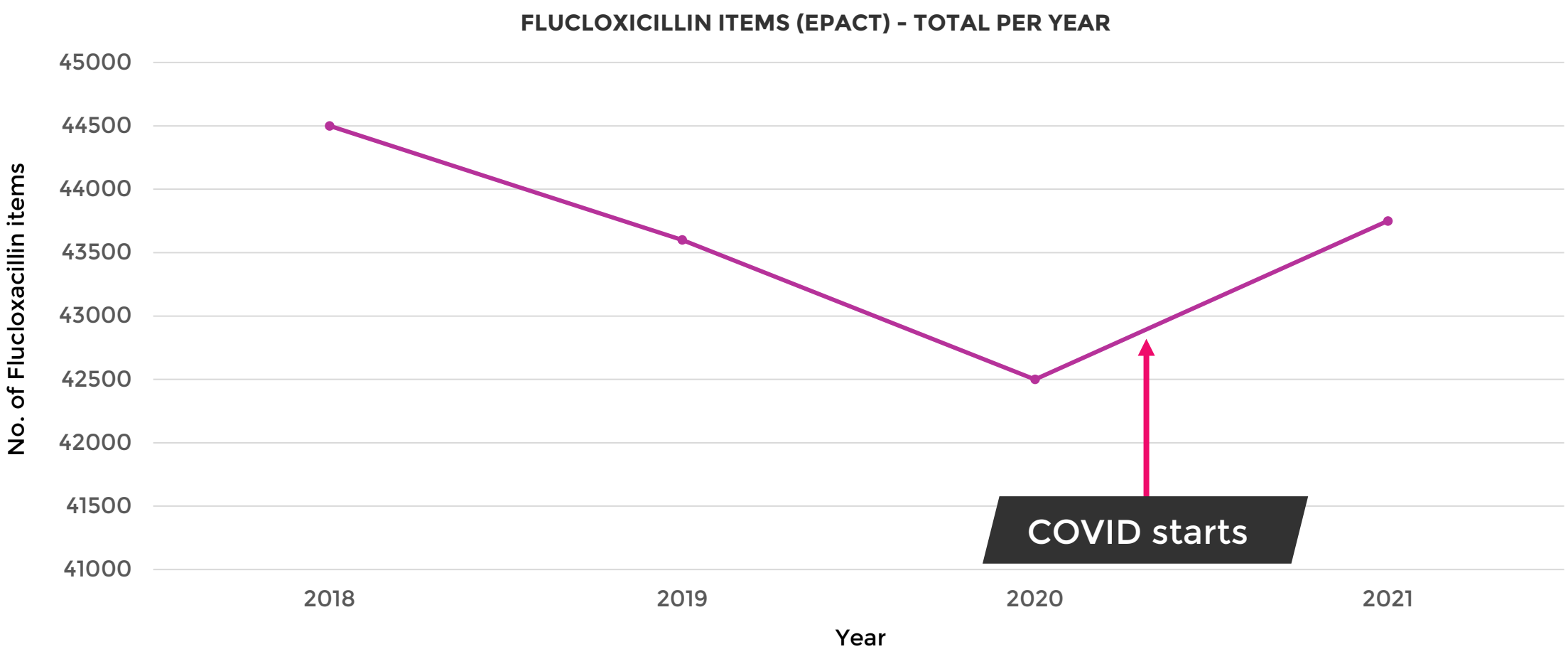




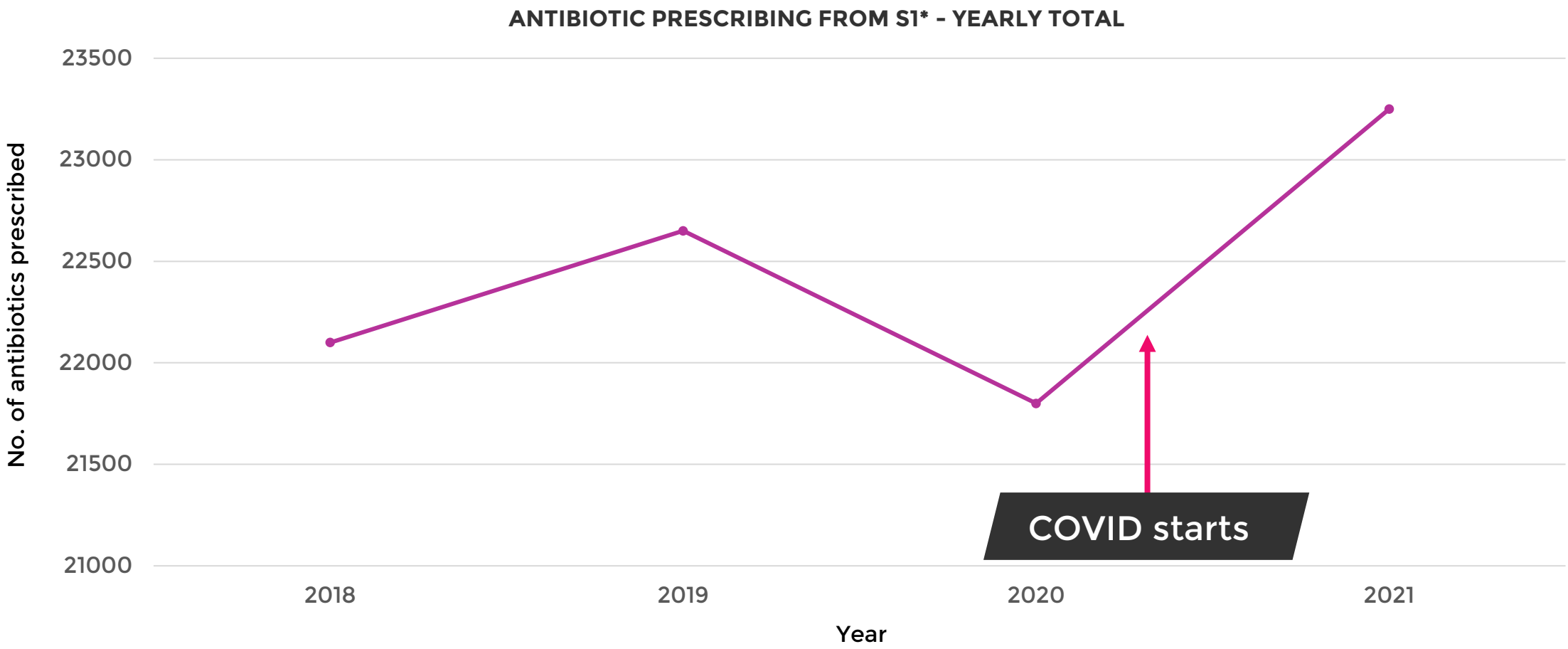
TOTAL ANTIMICROBIAL DRESSING SPEND



FLUCLOXACILLIN PRESCRIBING

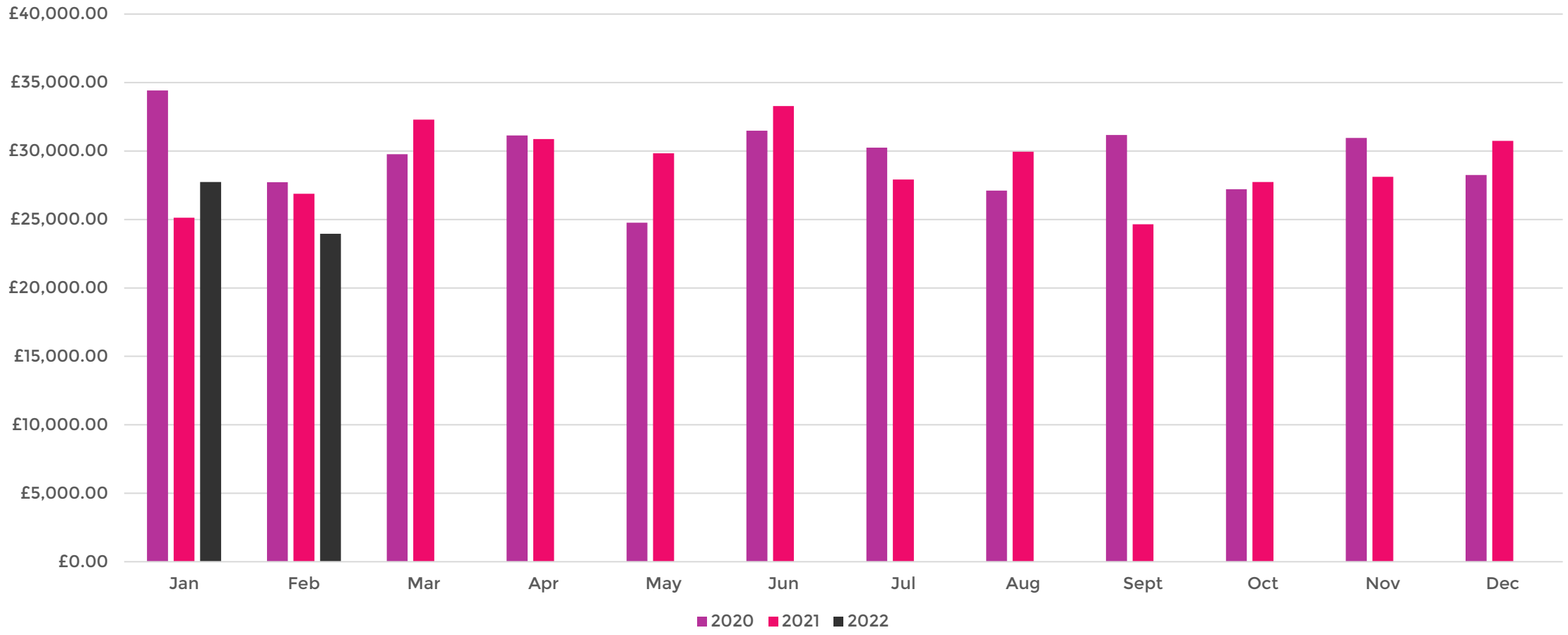


ANTIBIOTIC PRESCRIBING *linked to the wound infection read code



*All antibiotics prescribed with the S1 read code for wound infection OR cellulitis

TOTAL ANTIMICROBIAL SPEND SINCE COVID-19



NEXT STEPS

Fresh debate

- New IWII document in March 2022 – growing evidence on biofilm
- Anecdotally we still see and hear of wounds not being cleansed thoroughly
- Do we add in a surfactant? If so, which one?
- Do we add a debridement pad/cloth? If so, which one?
- Restart regular training?

CONVERSATIONS NEEDED OUTSIDE OF THE TISSUE VIABILITY TEAM

Are staff overwhelmed by a library of frameworks?

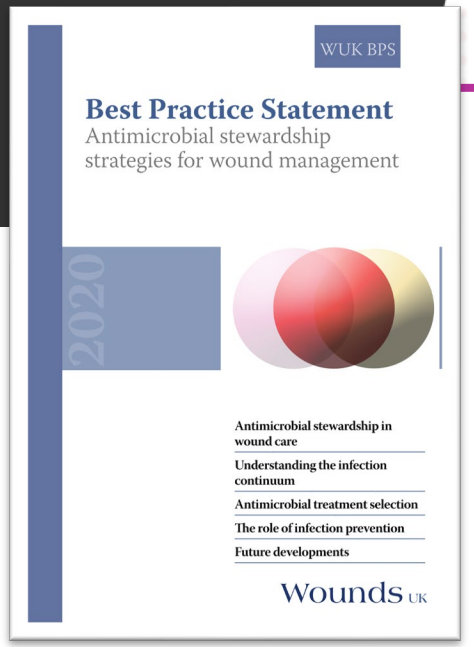
Do they value them?

Do the leadership in the teams value them? How will they embed them in their teams?

For us – this is well embedded and any changes would just be an amendment but… minor amendments in huge cities can be impossible to embed without structure and engaged leadership

Williams (2022)

CALL TO ACTION

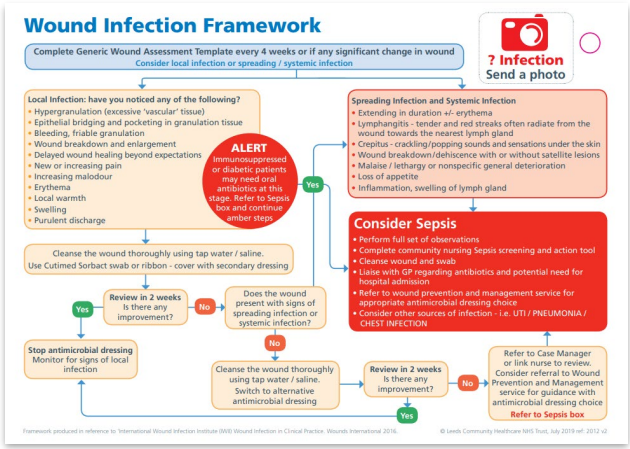


Essity has many support and educational tools including:

- PATH education
- Bitesize learning
- Support with pathway development

To find out more about Cutimed® Sorbact®, the dressing used in the framework, and our value- added services, contact concierge.service@essity.com or your local Essity Account Manager

You can also obtain a copy of the Best Practice Statement: Antimicrobial stewardship strategies for wound management



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