Infection Control and Antibiotic Resistance

Xenia Bray

Learning Objectives

- Explain why antimicrobial resistance is considered to be one of the greatest public health risks in the UK and globally
- Apply the principles of antimicrobial stewardship to your everyday practice
- Increase confidence in discussions with prescribers on the appropriate and inappropriate use of antibacterial therapy, optimise prescribing practice

- Why is antibacterial resistance such an important public health issue?

- What effect does it have on the public and the health economy?

"Antimicrobial resistance poses a catastrophic threat. If we don't act now, any one of us could go into hospital in 20 years for minor surgery and die because of an ordinary infection that can't be treated by antibiotics."

Professor Dame Sally Davies, Chief Medical Officer, March 2013

"No action today means no cure tomorrow."

Dr Margaret Chan, WHO Director-General 2011

Is it appropriate?

- Have a look at the prescriptions, and discuss whether you think the medication is appropriate

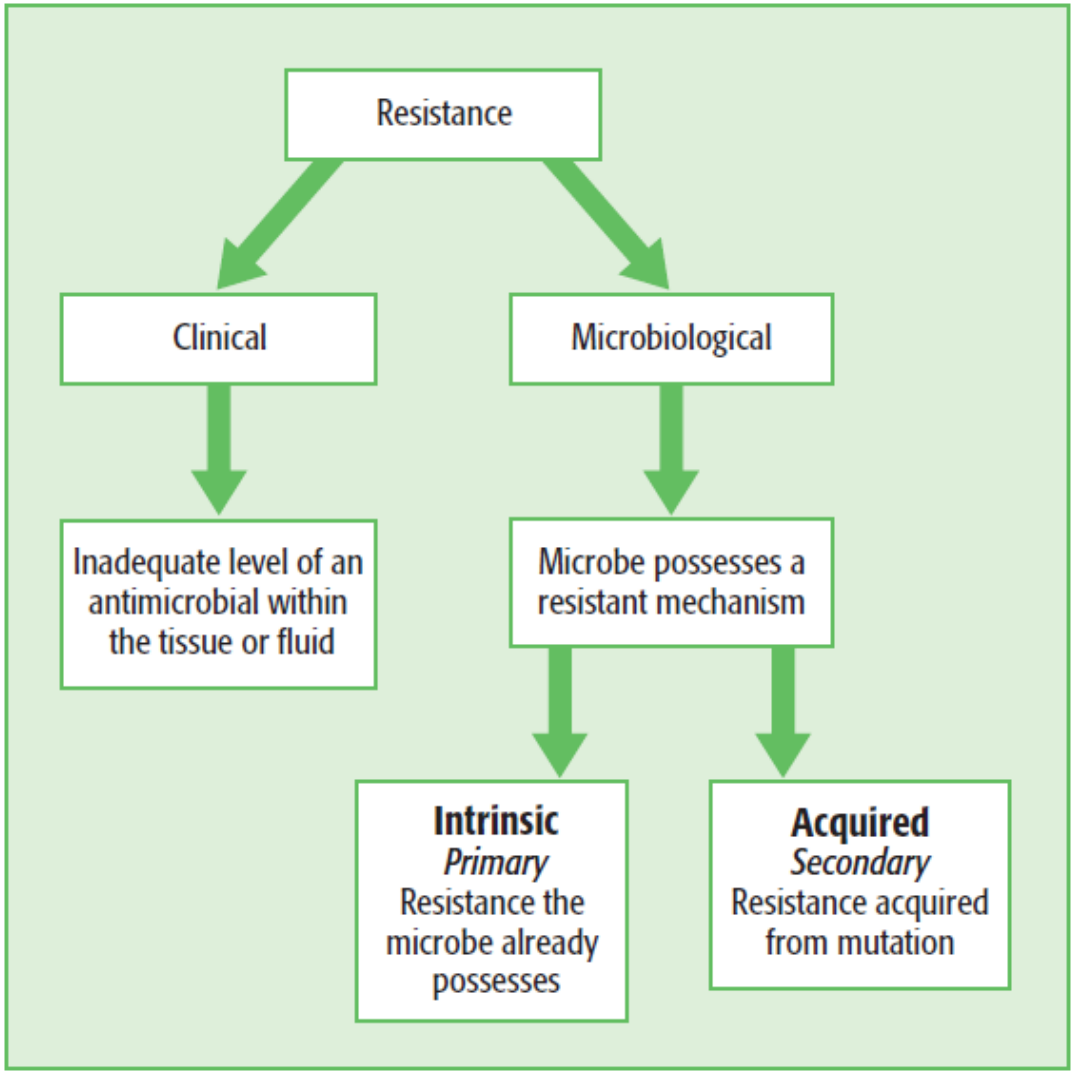
Centor criteria

CRITERIA	POINTS
Absence of cough	1
Swollen and tender anterior cervical nodes	1
Temperature greater than 38 C	1
Tonsillar exudates or swelling	1
Age 3 – 14 years 15 to 44 years 45 years or older	1 0 -1
Cumulative score	

Score= -1 - 0	Score = 1	Score = 2	Score = 3	Score = 4
Risk of strep pharyngitis 1 – 2 %	Risk of strep pharyngitis 5 - 10 %	Risk of strep pharyngitis 11 - 17 %	Risk of strep pharyngitis 28 - 35 %	Risk of strep pharyngitis 51 - 53 %
No further testing or antibiotics	No further testing or antibiotics			Consider empiric antibiotic treatment
	Option: Perform throat culture or rapid antigen detection testing	Perform throat culture or rapid antigen detection testing	Perform throat culture or rapid antigen detection testing	
	Negative : no antibiotics Indicated Positive: treat with antibiotics	Negative : no antibiotics Indicated Positive: treat with antibiotics	Negative : no antibiotics Indicated Positive: treat with antibiotics	

Adapted with permission from McIsaac WJ, White D, Tannenbaum D, Low DE.
A clinical score to reduce unnecessary antibiotic use in patients with sore throat. .

Development of resistance



Mechanisms of resistance

1. Reducing drug accumulation
    - Mutations in pump efflux mechanisms
    - Changes in cell permeability
2. Antimicrobial deactivation
3. Alterations in target site
4. Alteration of metabolic pathway

The Scope of the Problem

- Major public health problem
- Resistance starts to develop within a couple of years from launch of new microbial
- Inappropriate use affects resistance pattern
- Lack of novel anti-bacterials being developed
- Resistant infections increase severity and duration of illness
- Increase in healthcare costs

Best way to avoid resistance

- Use narrowest spectrum agent possible
- Appropriate choice of antibacterial
- Duration appropriate

UK Five year antimicrobial resistance strategy 2013 - 2018

- Improve the knowledge and understanding of antimicrobial resistance
- Converse and steward the effectiveness of existing treatments
- Stimulate the development of new antibiotics, diagnostics and novel therapies

- Antibiotic Action

- What is appropriate antimicrobial use?
- Discuss some examples of inappropriate antimicrobial use that you see most often?
- What factors result in inappropriate antimicrobial use?

Appropriate antimicrobial use

- World Health Organisation:

‘’The cost-effective use of antimicrobials which maximises clinical therapeutic effect while minimising both drug-related toxicity and the development of antimicrobial resistance’’

Inappropriate antimicrobial use

- Prescribing antibacterials for non-bacterial infections
- Not prescribing antimicrobials for infections that require treatment
- Use of broad spectrum agent over the use of a narrow spectrum agent
- Too long or too short a duration
- Incorrect dose
- Inappropriate route
- Unnecessary duplication

Factors that could result in or influence inappropriate prescribing

- Patient expectation
- Ethnic origin
- Demographics and the experience of prescribers

- https://www.youtube.com/watch?v=PkYQJettZVo&feature=youtu.be

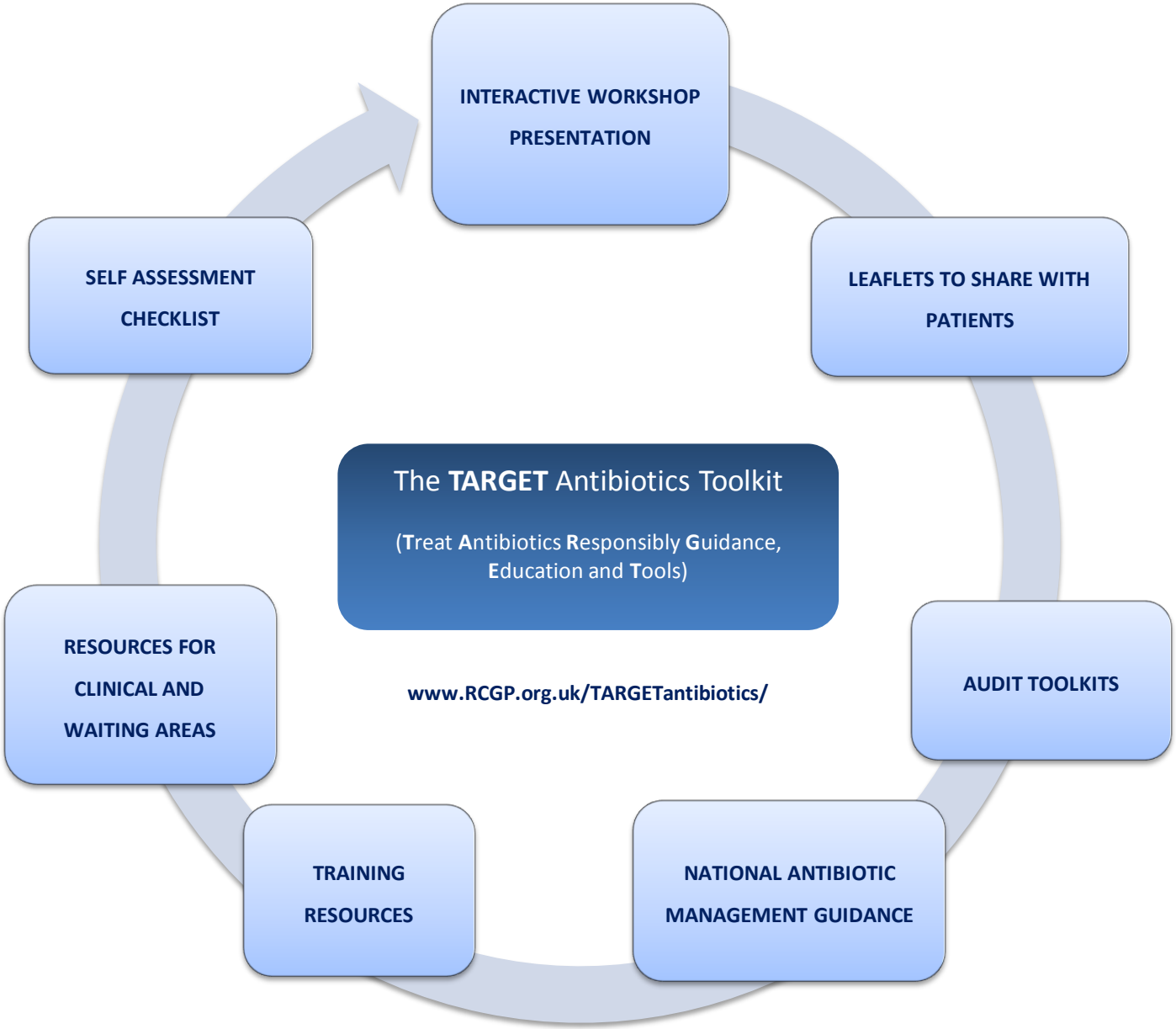
Optimising prescribing practice

TARGET antibiotics toolkit

Treat Antibiotics Responsibly: guidance and education tools

Royal College of General Practitioners (RCGP) and the Antimicrobial Stewardship in Primary Care (ASPIC) collaboration

www.rcgp.org.uk


INTERACTIVE WORKSHOP PRESENTATION
LEAFLETS TO SHARE WITH PATIENTS
AUDIT TOOLKITS
NATIONAL ANTIBIOTIC MANAGEMENT GUIDANCE
TRAINING RESOURCES
RESOURCES FOR CLINICAL AND WAITING AREAS
SELF ASSESSMENT CHECKLIST
The TARGET Antibiotics Toolkit
(Treat Antibiotics Responsibly Guidance, Education and Tools)
www.RCGP.org.uk/TARGETantibiotics/

Approaches for Prescribers

- Delayed prescriptions
  - Potential for future misuse
  - Perceived lack of knowledge of prescriber
  - Patient less likely to revisit with similar illness in future
- No prescription, just information
- Non-prescription pad – healthcare advice and information

Public Health England

Treating Your Infection – Respiratory Tract Infection (RTI)

TARGET NHS Crystal Mark 20454 Clarity approved by Plain English Campaign

Patient Name _____ **It is recommended that you self-care** ☐

Your infection	Without antibiotics, most are better by	How to look after yourself and your family	When to get help
☐ Middle-ear infection	8 days	• Have plenty of rest. • Drink enough fluids to avoid feeling thirsty. • Ask your local pharmacist to recommend medicines to help your symptoms or pain (or both). • Fever is a sign the body is fighting the infection and usually gets better by itself in most cases. You can use paracetamol if you or your child are uncomfortable as a result of a fever. • Use a tissue and wash your hands well to help prevent spread of your infection to your family, friends and others you meet. • Other things you can do suggested by GP or nurse:	**The following are possible signs of serious illness and should be assessed urgently:** 1. If your skin is very cold or has a strange colour, or you develop an unusual rash. 2. If you feel confused or have slurred speech or are very drowsy. 3. If you have difficulty breathing. Signs that suggest breathing problems can include: o breathing quickly o turning blue around the lips and the skin below the mouth o skin between or above the ribs getting sucked or pulled in with every breath. 4. If you develop a severe headache and are sick. 5. If you develop chest pain. 6. If you have difficulty swallowing or are drooling. 7. If you cough up blood. 8. If you are feeling a lot worse. **If you or your child has any of these symptoms, are getting worse or are sicker than you would expect (even if your/their temperature falls), trust your instincts and seek medical advice urgently from NHS 111 or your GP. If a child under the age of 5 has any of symptoms 1-3 go to A&E immediately or call 999.** **Less serious signs that can usually wait until the next available appointment:** 9. If you are not starting to improve a little by the time given in the 'Most are better by' column. 10. In children with middle-ear infection: if fluid is coming out of their ears or if they have new deafness. 11. Mild side effects such as diarrhoea, however seek medical attention if you are concerned. 12. Other .....
☐ Sore throat	7 - 8 days		
☐ Sinusitis	14 – 21 days		
☐ Common cold	14 days		
☐ Cough or bronchitis	21 days		
☐ Other infection:	..... days		

Back-up antibiotic prescription to be collected after ☐ days only if you are not starting to feel a little better or you feel worse.

Collect from: ☐ Pharmacy ☐ General practice reception ☐ GP, nurse, other

- Colds, most coughs, sinusitis, ear infections, sore throats, and other infections often get better without antibiotics, as your body can usually fight these infections on its own.
- Taking antibiotics encourages bacteria that live inside you to become resistant. That means that antibiotics may not work when you really need them.
- Antibiotics can cause side effects such as rashes, thrush, stomach pains, diarrhoea, reactions to sunlight, other symptoms, or being sick if you drink alcohol with metronidazole.
- Find out more about how you can make better use of antibiotics and help keep this vital treatment effective by visiting www.nhs.co.uk/keepantibioticsworking

Never share antibiotics and always return any unused antibiotics to a pharmacy for safe disposal. Leaflet developed in collaboration with professional medical bodies.

PharmacyVoice · Become an Antibiotic Guardian · Royal Pharmaceutical Society · BSAC The British Society for Antimicrobial Chemotherapy · HSC Public Health Agency · Royal College of Nursing · UKCPA Clinical Pharmacy Association · RCGP Royal College of General Practitioners · BIAM British Infection Association · IPS Infection Prevention Society · GIG NHS Wales Iechyd Cyhoeddus Cymru Public Health Wales · NHS Scotland · Keep Antibiotics Working

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- How can you and your pharmacy team improve antimicrobial use?

Pharmacy Team Role

- Provision of public / patient information and education
- Involvement in audit
- Development of local antimicrobial guidelines
- Assessing every prescription for appropriateness – are local antibacterial guidelines being followed?

Tools for patients

- https://www.youtube.com/watch?v=oMnU6g2djm4

- E-Bug
- http://www.e-bug.eu/

Case Study

Jane Qualtrough, has attended an appointment with her GP, hoping to get a prescription for some antibiotics for a lower urinary tract infection

a) What further information or investigations would be required before a decision to prescribe treatment would be made?

Jane Qualtrough

- Age 77
- Low grade fever
- Pain on urination
- Increased frequency
- Increased urge

- Reports allergy to penicillin (rash, developed after 2 days of a previous course of flucloxacillin)
- 2 previous episodes in last 12 months
- eGFR 40ml/min

Jane Qualtrough

- Jane brings in the following prescription into your pharmacy:

Rx: Pivmecillinam 200mg tablets

sig: 200mg tds for three days

mitte: 10

b) Do you think this treatment is appropriate? Justify your answer

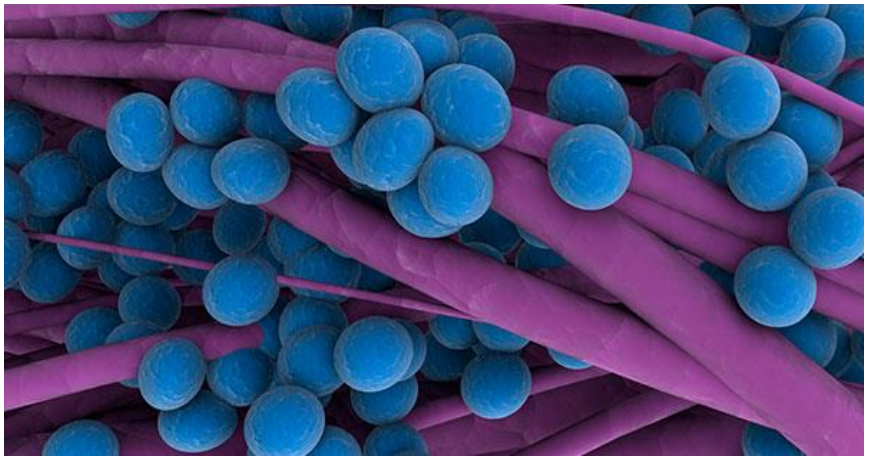
c) How would you respond to an inappropriate prescription for antibiotics?

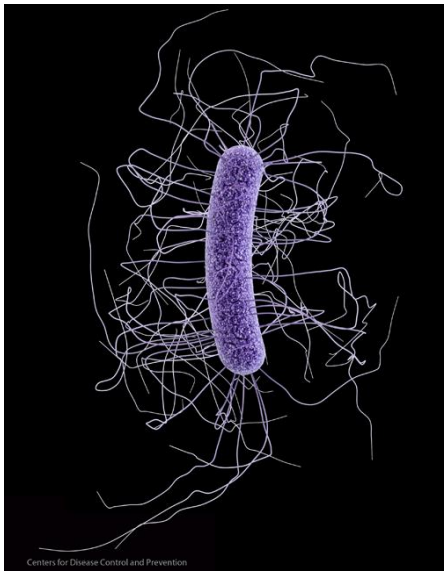
What hints and tips do you have for discussions with

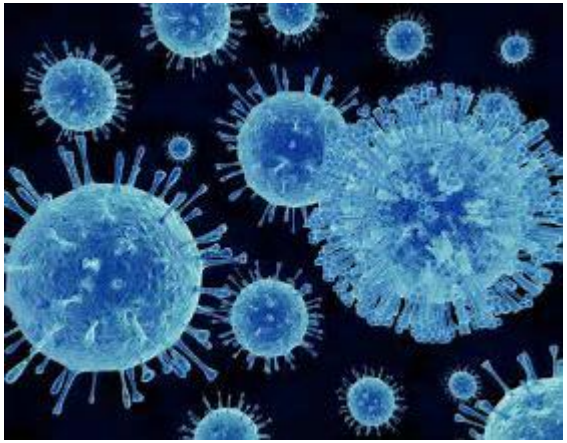
a) Patient
b) Prescriber

Infection prevention and control

- Crucial component of safe systems providing health and social care
- Inextricably linked to antimicrobial resistance

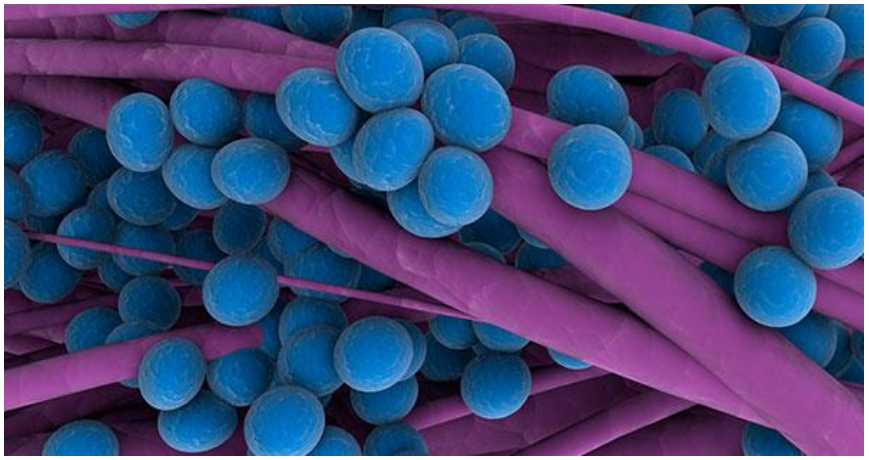


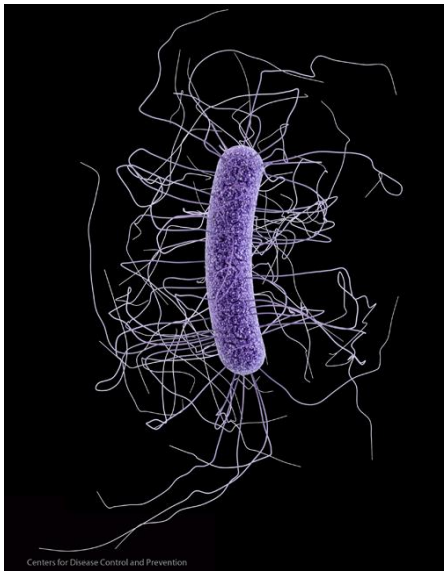

Centers for Disease Control and Prevention



MRSA

- Nose, groin, arm pits – warm bits
- Environment, dust, skin
- Will sit in environment for months
- Wounds – longer to heal
- Antibiotics – lots of resistance

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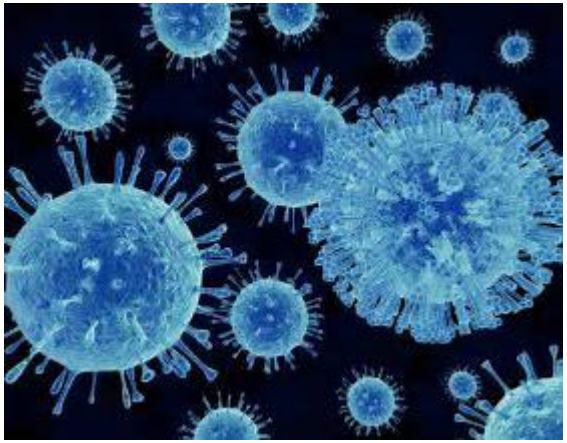
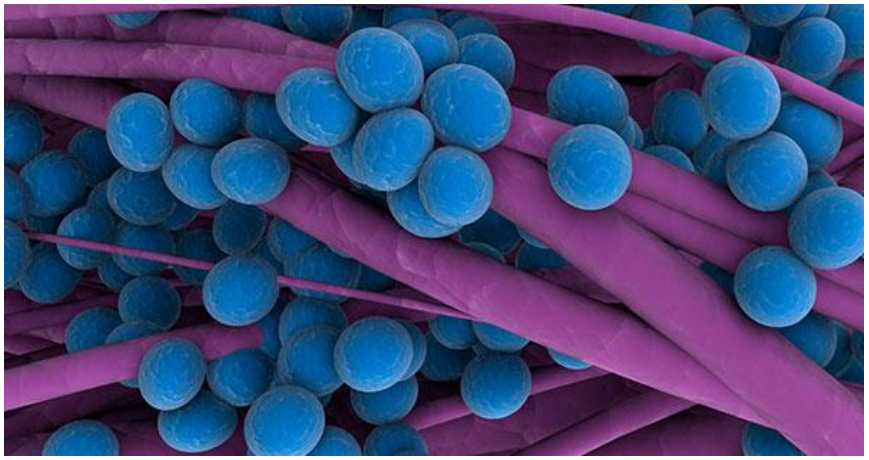
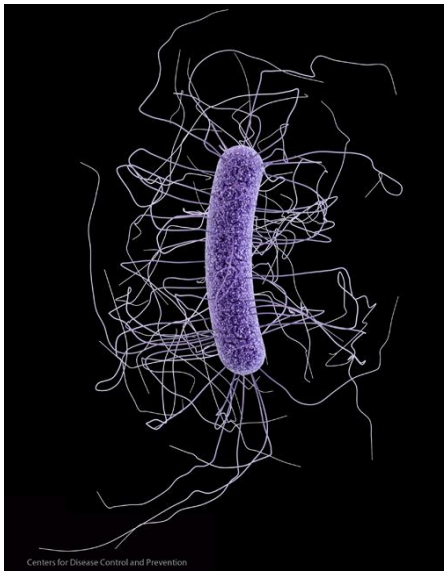


Clostridium difficile

- Gut
- Anaerobic – coats itself when excreted to protect from oxygen, remains so for months
- Light switches, door knobs
- 3-5% have C.diff spores in gut
- No adverse effects until it gets a chance (e.g. broad spec antibiotic)
- Smell – eats away at gut, stools soft- green liquid
- Hand gels ineffective

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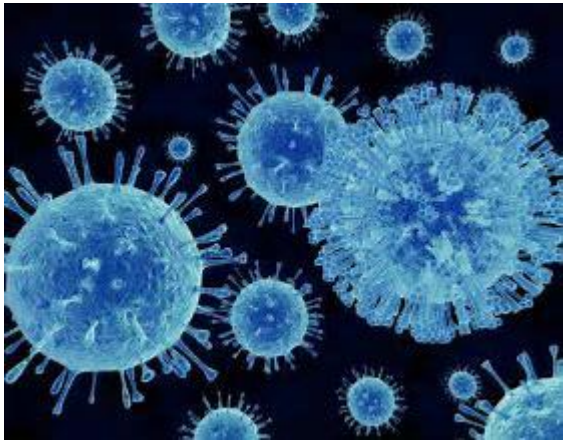
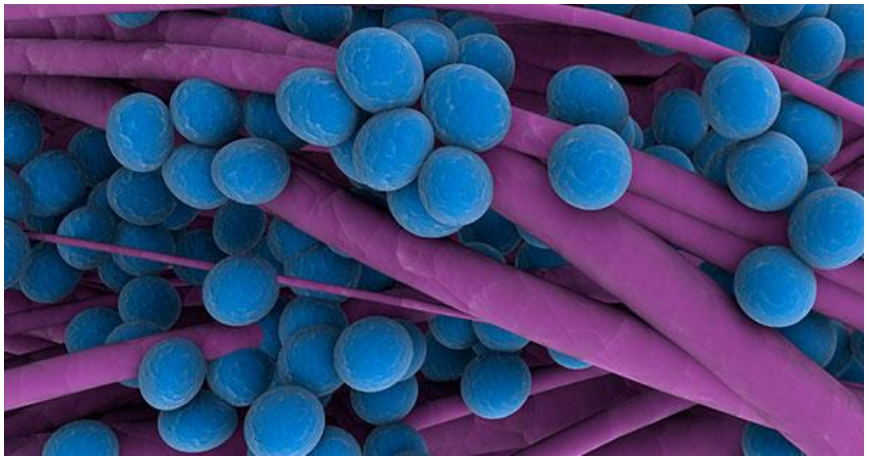
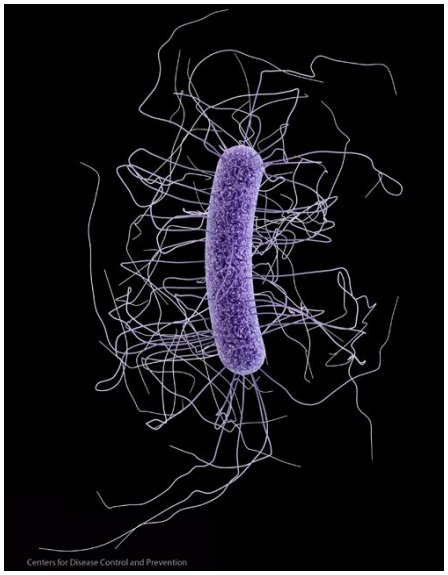


Pseudomonas

- Lives in soil, plants and water, sink areas etc.
- Can cause chest infections e.g. Pneumonia
- Usually in patients with weakened immune systems
- 3 Baby deaths in neonatal unit in Irish hospital - not using separate sinks for cleaning equipment

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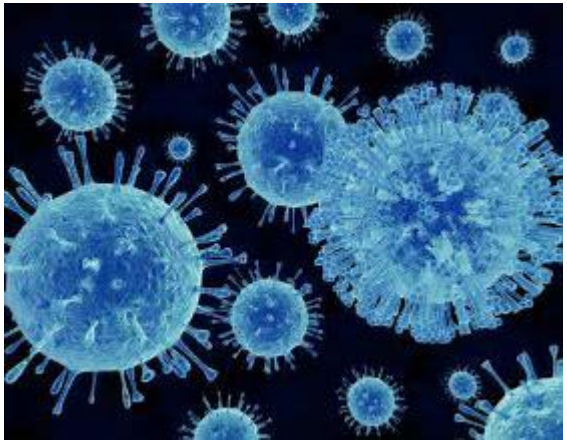


Norovirus

- Winter vomiting bug

Chain of Infection

Germs
(Agent)
- Bacteria
- Viruses
- Parasites

Where Germs Live
(Reservoir)
- People
- Animals/Pets (dogs, cats, reptiles)
- Wild animals
- Food
- Soil
- Water

How Germs Get Out
(Portal of Exit)
- Mouth (vomit, saliva)
- Cuts in the skin (blood)
- During diapering and toileting stool)

Germs Get Around
(Mode of Transmission)
- Contact (hands, toys, sand)
- Droplets (when you speak, sneeze or cough)

How Germs Get In
(Portal of Entry)
- Mouth
- Cuts in the skin
- Eyes

Next Sick Person
(Susceptible Host)
- Babies
- Children
- Elderly
- People with a weakened immune system
- Unimmunized people
- Anyone

Breaking the Chain of Infection

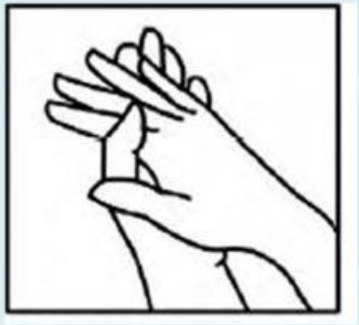
- WHO Standard Precautions
  - Hand hygiene
  - Personal protective equipment
  - Respiratory etiquette
  - Disposal of sharps
  - Correct disposal of waste
  - Environmental cleaning

Hand hygiene

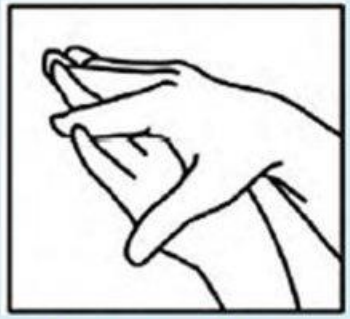
- https://www.nhs.uk/Livewell/homehygiene/Pages/how-to-wash-your-hands-properly.aspx
- Most effective way to reduce health acquired infection
- NICE Quality Standard QS61:

  Hand decontamination is the use of handrub or handwashing to reduce the number of bacteria on the hands

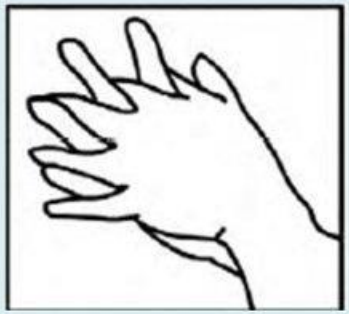
The 6 Steps of Hand Washing



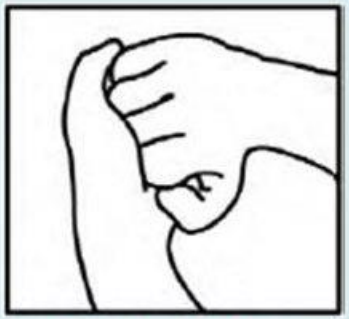
Palm to palm



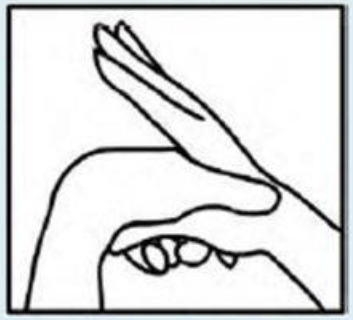
The back of the hands



In between the fingers



The back of the fingers



The thumbs

The tips of the fingers

Become an Antibiotic Guardian

- http://antibioticguardian.com/
- **What we want you to do**: To slow resistance we need to cut the unnecessary use of antibiotics. We invite the public, students and educators, farmers, the veterinary and medical communities and professional organisations, to become Antibiotic Guardians.
- **Call to action**: Choose one simple pledge about how you'll make better use of antibiotics and help save these vital medicines from becoming obsolete

Patient Quiz

- https://surveys.phe.org.uk/antibioticquiz#