



The Good, The Bad & The Ugly - Microbes Student's work sheet

MRSA Outbreak!

Mrs Edna Green, a pensioner from a large city in the north west, was admitted to her local hospital for a routine hip replacement operation. The orthopaedic ward she was in has the old-fashioned dormitory style layout. There was not much space between each of the bed bays, which meant that the patients were all in living in close proximity. Edna's ward was full. Some of the patients had been admitted for emergency surgery following accidents. Others like Edna had come in for elective procedures.

Prior to the operation Edna was screened for Methicillin-resistant *Staphylococcus aureus* (MRSA) and she had a negative result, which meant that she was not a carrier of the microbe. Prior to the surgery she was given the antibiotic Cefuroxime prophylactically (preventative medicine) to prevent post-operative infection. Cefuroxime is a type of antibiotic called a cephalosporin and is related to penicillin.

The surgery went well and Edna was quickly returned to the care of the nurses on her ward following a brief stay on the recovery ward. The nurses caring for Edna used alcoholic hand gel before and after dressing her wound, wore gloves and used aseptic technique. However they were extremely short staffed and busy and Edna could remember a couple of incidences when, due to an emergency, they had left her mid-treatment to help another patient.

The surgeon, supported by his clinical team, visited the ward every day to see how his patients were progressing. He rapidly assessed each patient before moving on to the next. Edna could not be sure that either he or his team had used the alcoholic gel after visiting her and inspecting the wound.

Visitors were allowed to call anytime after 10 am and could stay all day. They were supposed to use the alcohol gel before entering the ward but many forgot to do so – probably because it wasn't in a prominent position. Nobody checked how compliant visitors were at carrying out this procedure.

Cleaning was difficult due to the number of visitors that streamed in and out of the ward throughout the day. Also many patients had cluttered lockers and tabletops, which also hampered the cleaning process as the cleaning staff didn't like to interfere with a patient's property. During her stay Edna noticed that there didn't seem to be any procedure for removing soiled linen on a regular basis.

A microscopic view of several rod-shaped bacteria with long, thin flagella extending from their ends. The bacteria are illuminated with a blue and green light, giving them a glowing appearance. They are scattered across the page, with some in the foreground and others in the background.

The Good, The Bad & The Ugly - Microbes Student's work sheet

It was piled into a plastic bin at the end of her ward. During a busy period the bin was soon overflowing.

Three days after her operation Edna started to feel unwell, the area around her hip became so swollen, it started to leak fluid and the stitches pulled apart.

A nurse took a sample from Edna's wound with a sterile swab which she then put in a sterile tube and sealed before sending to the microbiology laboratory for analysis. The microbiologist identified the micro-organism growing in the wound and causing the infection as the bacterium *Staphylococcus aureus*. He carried out an antibiotic assay and discovered that the only antibiotic that the organism was susceptible to was vancomycin. The organism that had been isolated from Edna was the 'super-bug' MRSA.

Treatment was started immediately. The antibiotic could only be administered intravenously which meant that Edna's stay in hospital was extended. Edna responded well to treatment the infection cleared up and the wound healed.

Five other patients on the ward all developed wound infections post surgery. The table on the following page outlines their case details.

The hospital closed the ward and launched a full enquiry, which was led by the infection control team, to see what measures they could introduce to prevent an outbreak of the 'superbug' MRSA occurring again.

The Good, The Bad & The Ugly - Microbes

Student's work sheet

Case histories

Patient	Type of surgery	Pre op screening for MRSA	Results from screening	Post op infection at site of wound	Swab results	Treatment i/v vancomycin	Outcome
Edna elderly female routine hip replacement	Elective	Yes	Negative for MRSA	Yes	MRSA	Yes	Patient made full recovery
Patient 1 young female admitted with broken femur following motorbike accident	Emergency	No	Not applicable	Yes	MRSA	Yes	Patient made full recovery
Patient 2 elderly female admitted with broken hip and shoulder following fall at home.	Emergency	No	Not applicable	Yes	MRSA	Yes	Patient died of MRSA bacteraemia
Patient 3 middle aged female routine knee replacement	Elective	Yes	Negative for MRSA	Yes	MRSA	Yes	Patient still being treated as wound is not healing
Patient 4 middle aged female reconstructive jaw surgery following chemotherapy	Elective	Yes	Negative for MRSA	Yes	MRSA	Yes	Patient died of MRSA bacteraemia
Patient 5 elderly female routine partial knee replacement	Elective	Yes	Negative for MRSA	Yes	MRSA	Yes	Patient died of pneumonia