

Evidence Portfolio

Everything the investigation has collected, in one place. Every exhibit except the one thing that names the organism.

COURSE Medical Interventions	DATE Thursday, September 17, 2026	EXHIBITS MI-1 to MI-6
MISSING ON PURPOSE the organism's name	USE Open beside your packet	KEEP In your notebook

YOUR CHARGE TODAY

This portfolio holds every piece of evidence in the case. The name of the organism is not in it, and that is deliberate. Five exhibits narrow the field. The sixth is the read you take to BLAST yourself.

YOU TURN IN

- Nothing. This is a reference document. Your work goes in the packet and the notebook.

Time: Open it at the start of the block and keep it open.

SEC 1 The patient record

WHY THIS MATTERS

A patient record is the first evidence in any infection, and reading one in order, rather than hunting for the alarming line, is a clinical skill that takes practice. Read all of it before you decide anything.

READ THIS

Exhibit MI-1, the index patient record. This is the first person identified in a cluster of skin and soft tissue infections reported after a weekend sports tournament.

EXHIBIT MI-1 · INDEX PATIENT, DE-IDENTIFIED

Field	Recorded value
Age band	('teenager',)
Presenting symptoms	('painful red swollen area on the forearm, spreading redness, drainage, fever',)
Onset	('3 days after a weekend tournament where equipment and towels were shared',)
Temperature	('38.6 C',)
White cell count	('elevated',)
Wound and blood culture	('both positive at 24 hours',)
Rapid viral panel	('negative for all targets tested',)
Stool ova and parasite exam	('no ova or parasites seen',)
Fungal culture	('no growth at 48 hours',)
Antibiotic susceptibility test	('SENT, result not back yet',)

READ THIS

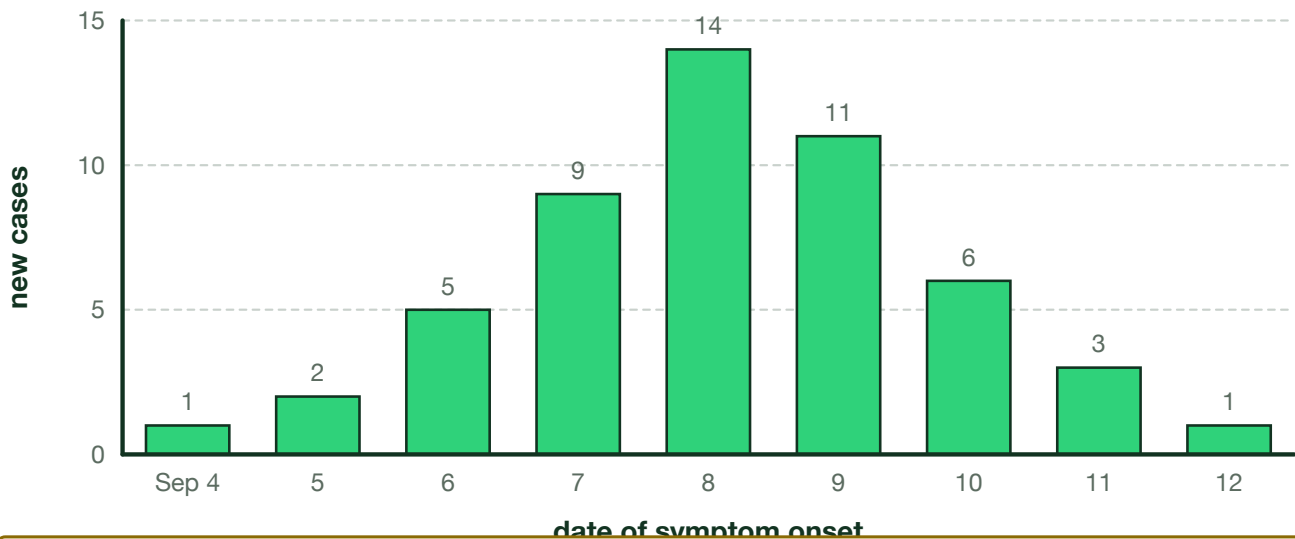
Read the last four rows again. Four of the five classes of agent have a line in this record that argues against them. Finding those four lines is mini lab 1.

SEC 2 The outbreak curve

WHY THIS MATTERS

The curve is the population's version of a patient record. It shows what happened to everybody, which is the only way to see a shared exposure.

EXHIBIT MI-2: new skin infections by date of symptom onset

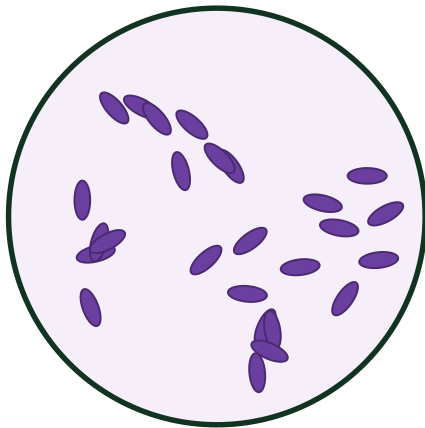


One sharp peak about one incubation period after a shared event points to a single common exposure.
Several successive peaks would point to spread from person to person. Read the shape, not the height.

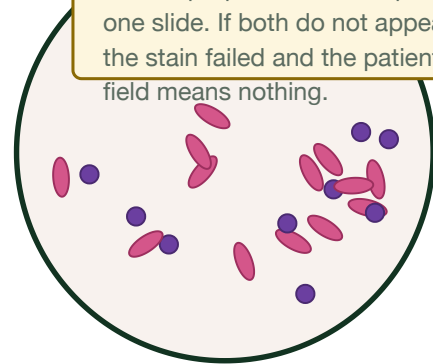
Exhibit MI-2. It does not supply the exposure date or the meaning of the shape.

WHY THIS MATTERS

A Gram stain costs pennies and still changes the first antibiotic a hospital gives. That is why it is run before almost anything else.

EXHIBIT MI-3: Gram stain, patient isolate and the stain control

PATIENT ISOLATE
1000x, oil immersion

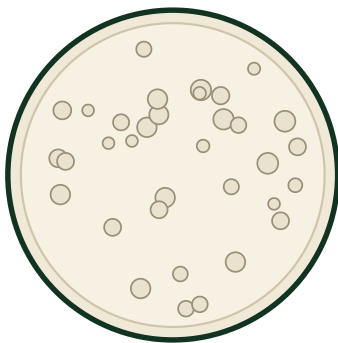


STAIN CONTROL, known organisms
1000x, oil immersion

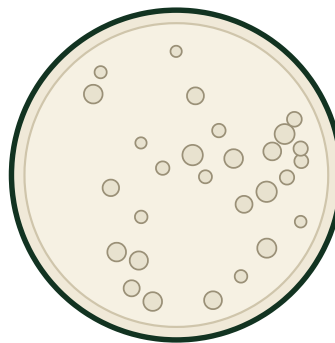
WHY THE CONTROL IS HERE

Known purple and known pink on one slide. If both do not appear, the stain failed and the patient field means nothing.

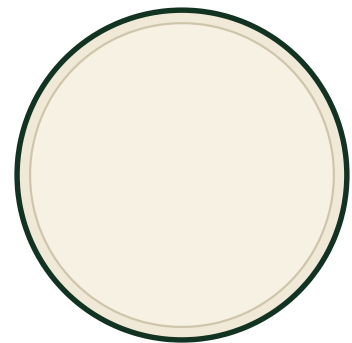
Exhibit MI-3. It does not supply the Gram result in words.

EXHIBIT MI-4: culture at 24 hours, 37 degrees Celsius

PATIENT SAMPLE
count and describe in your table



POSITIVE CONTROL
growth, as it should be



STERILE CONTROL
no growth, as it should be

Exhibit MI-4. It does not supply a colony count or a conclusion.

SEC 4 The gel

WHY THIS MATTERS

A gel turns an invisible molecule into a distance you can measure with a ruler, and a distance anyone else can check is what makes a laboratory result evidence.

EXHIBIT MI-5: PCR product against four candidate references

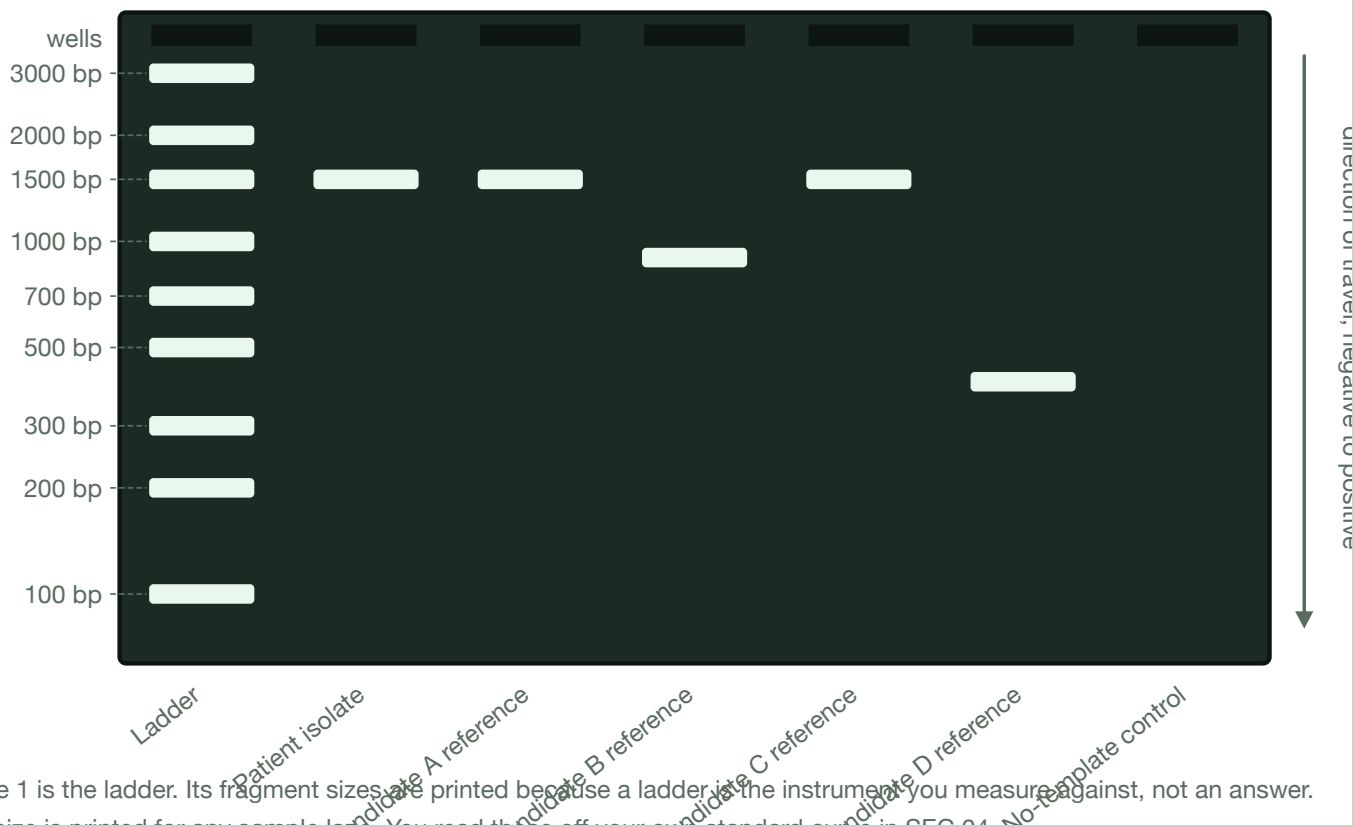


Exhibit MI-5. It does not supply the size of the patient band.

SEC 5 The isolate read

WHY THIS MATTERS

This read is the only exhibit that can name the organism, and it will only do it through a tool you drive yourself. That is not a trick. It is how identification actually works now.

READ THIS

Exhibit MI-6, one 500 base read of the 16S rRNA gene from the patient isolate.

```
>S2_practice_isolate 16S rRNA gene, one read of 500 bases
GGCTCAGGATGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAGCGAACGGACGAGAAGCTTGCTTCTCTGATGTTAGCGGCGGACGGGTGAGTAACACG
TGGATAACCTACCTATAAGACTGGGATAACTTCGGGAAACCGGAGCTAATACCGGATAATATTTGAACCGCATGGTTCAAAAGTGAAAGACGGTCTTGCTG
TCACTTATAGATGGATCCGCGCTGCATTAGCTAGTTGGTAAGGTAACGGCTTACCAAGGCAACGATGCATAGCCGACCTGAGAGGGTGATCGGCCACACTGG
AACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCGCAATGGGCGAAAGCCTGACGGAGCAACGCCGCGTGAGTGATGAAGGTCTT
CGGATCGTAAAACTCTGTTATTAGGGAAGAACATATGTGTAAGTAAGTGTGCACATCTTGACGGTACCTAATCAGAAAGCCACGGCTAACTA
```

CONTROL GROUP · ALREADY SET UP FOR YOU

The organism this read belongs to is not named in this portfolio, in the packet, in the notebook, or on the portal. Run it through BLAST in SEC 06 of your packet.

Table 1: characteristics of the five classes of infectious agent

Class	What it is	Size	Seen on a Gram stain?	Grows on standard agar?	What it responds to	Typical onset	Example illnesses
Bacteria	One cell, no nucleus (prokaryote)	0.5 to 5 micrometres	Yes, Gram stain shows them	Yes, on standard agar	Antibiotics, chosen by susceptibility	Hours to a few days	Strep throat, listeriosis, tuberculosis
Viruses	Genetic material in a protein coat, not a cell	20 to 300 nanometres	No, far too small for a light microscope	No, they need living host cells	Antivirals. Antibiotics do nothing	One to fourteen days	Influenza, measles, COVID-19
Fungi	Cells with a nucleus and a chitin cell wall	2 to 10 micrometres (yeasts), longer threads (moulds)	Poorly. A KOH prep or a fungal stain is used	Yes, on fungal media such as Sabouraud agar	Antifungals	Days to weeks	Thrush, athlete's foot, histoplasmosis
Protozoa	One cell, with a nucleus (eukaryote)	10 to 50 micrometres	Not by Gram. Seen on a stained smear or wet mount	Special media only, often not cultured at all	Antiprotozoal drugs	Days to weeks	Malaria, giardiasis, amoebic dysentery
Parasitic worms	Many cells, a whole animal (helminth)	Millimetres to metres	No. Eggs are found in stool under a microscope	Not cultured	Antiparasitic (anthelmintic) drugs	Weeks to months	Tapeworm, hookworm, roundworm

Table 2: treatment and prognosis for the realistic candidates

Organism	Class	First-line treatment	Prognosis and what it depends on	How it usually reaches people
Listeria monocytogenes	Bacterium	Ampicillin, often with gentamicin for severe or invasive disease	Dangerous in pregnancy, in newborns, over 65, and with a weakened immune system. Invasive disease is serious and treated in hospital.	Food-borne, including deli meats, soft cheeses and unwashed produce

Staphylococcus aureus	Bacterium	Depends entirely on the susceptibility test. Methicillin-sensitive strains take a beta-lactam such as cefazolin; MRSA does not, and is treated with drugs such as vancomycin	Ranges from a minor skin infection to life-threatening bloodstream infection. The susceptibility result changes the drug, so the lab result changes the prognosis.	Skin and nose carriage, wounds, healthcare contact
Streptococcus pyogenes	Bacterium	Penicillin or amoxicillin. Still reliably sensitive	Good with treatment. Untreated infection can lead to rheumatic fever, which is why a sore throat gets cultured.	Person to person by droplets
Pseudomonas aeruginosa	Bacterium	An antipseudomonal drug such as piperacillin-tazobactam or ceftazidime. Many ordinary antibiotics do not work	Often affects people already in hospital or with weakened defences. Resistance is common, so treatment follows the susceptibility test.	Water, moist surfaces and equipment
Salmonella enterica	Bacterium	Usually fluids and supportive care. Antibiotics are reserved for severe or invasive illness	Most healthy people recover. Antibiotics are not automatic, because they are not always helpful.	Food-borne, including poultry, eggs and produce
Escherichia coli, Shiga toxin-producing	Bacterium	Fluids and supportive care. Antibiotics are generally avoided, because they may raise the risk of a serious kidney complication	A case where the reflex answer is the wrong answer. This is why naming the organism matters before choosing a drug.	Food-borne, including undercooked beef and produce
Bacillus subtilis	Bacterium	Rarely causes disease in healthy people. Usually treated as an environmental or laboratory contaminant	A hit on this organism is more often a contamination question than a diagnosis. Check your controls before you check the drug chart.	Soil, dust and laboratory surfaces

Claim ceiling. This table is a classroom reference for naming and reasoning. It is not a prescribing guide, it is not medical advice, and no one in this room diagnoses or treats anybody.

Links you need today

- **NCBI Nucleotide BLAST (blastn):** blast.ncbi.nlm.nih.gov, choose Nucleotide BLAST.
- **NCBI Taxonomy Browser:** look your organism up by name to see its classification.
- **CDC health topics A to Z:** cdc.gov, search the organism for the disease it causes.
- **MedlinePlus:** medlineplus.gov, for plain-language descriptions of an illness.

Where these tables come from

Table 1 is standard microbiology: cell structure, size ranges, staining behaviour, culture requirements and drug classes as described by the CDC and the National Library of Medicine. Table 2 follows CDC treatment guidance and standard clinical references for each named organism. Both are printed here as reference, not derived by students, which is why they sit in the index and not in a work section.

The isolate read in SEC 06 is a real 16S rRNA sequence. The identification it produces is produced by you, in BLAST, on the day. It is recorded nowhere in this packet.