Introduction:
Bacterial zoonotic infections associated with fish are well-documented, causing diseases ranging from skin and soft tissue infection to gastroenteritis. Yet development of invasive infection remains infrequent, tending to affect only severely immunocompromised individuals. We present a case-series of patients who acquired invasive infection caused by opportunistic pathogens all sharing common exposure to fish.

Case 1
A 78-year-old man presented to A&E with a short history of new-onset ataxia, left-sided neglect and unilateral intention tremor. In remission from chronic lymphocytic leukaemia, he had received chemotherapy and ibrutinib (a protein kinase inhibitor) in the past but was not currently receiving immunosuppression. The patient was haemodynamically stable and was not neutropenic. CT imaging revealed a right occipital ring-enhancing lesion with surrounding oedema (see Figure 1).
Following urgent drainage the patient was commenced empirically on intravenous (IV) ceftiraxone and metronidazole for suspected bacterial cerebral abscess. Abscess fluid culture yielded Scedosporium apiospermum (see Figure 2) and he was commenced on IV voriconazole. The patient’s symptoms improved on anti-fungal therapy and he completed 12 weeks of treatment. On further questioning the patient revealed he regularly cleaned a large fishpond in his garden.

Learning Point 1
Scedosporium apiospermum (and its sexual state Pseudallescheria boydii) is a ubiquitous filamentous fungus found in stagnant and polluted water. Whilst it can cause disease ranging from skin and soft tissue infections, keratitis or infections associated with drowning the development of invasive disease is typically associated with immunosuppressed patients. Voriconazole is considered treatment of choice but treatment can be challenging due to varying susceptibility.

Case 2
A 82-year-old man with localised squamous cell carcinoma of the right pinna presented with a two-month history of right ear pain, purulent discharge and fevers. The patient was haemodynamically stable, was not neutropenic and following blood cultures he was commenced on IV Co-amoxiclav. An urgent MRI head revealed localised destruction of the auditory canal. Blood cultures yielded Erysipelothrix rhusiopathiae (see Figure 3) and his treatment was rationalised to IV benzyl penicillin. He underwent further investigations, including echocardiography, and no secondary site infections were identified. On further questioning he mentioned he was a Japanese Koi carp enthusiast (see Figure 4) and had a large pond at home. A course of four weeks of IV therapy was planned but a decision was made to palliate after 10 days due to irreversible clinical decline.

Learning Point 2
E. rhusiopathiae is a fastidious Gram positive rod which colonises fish and livestock. While cutaneous infections can be seen in those with occupational exposures, subsequent invasive infections are rare and traditionally manifest as endocarditis in those with multiple co-morbidities. While being highly susceptible to penicillin this organism is intrinsically resistant to vancomycin.

Case 3
A 94-year-old man presented to A&E with fevers and lethargy following a recent transcatheter aortic valve implantation (TAVI) and pacemaker insertion. Initial blood tests showed raised inflammatory markers. Urgent trans-thoracic echocardiogram revealed a suspicious lesion on the aortic side of the TAVI (see Figure 5). Blood cultures taken at admission yielded Lactococcus garvieae. He was treated with IV high dose IV amoxicillin. On further questioning he stated he regularly prepared fresh and saltwater fish from a local fish shop. He went on to develop renal impairment requiring haemodialysis and subsequently passed away.

Learning Point 3
Lactococcus species are facultative anaerobic, Gram positive cocci (see Figure 6). Morphologically and biochemical similar to enterococci, this group of organisms were previously called Group D streptococci. Whilst an important pathogen in fish, L. garvieae infrequently causes disease in humans. To date there have been few case-reports of intra-abdominal, urinary tract and bloodstream infections in humans usually afflicting immunosuppressed patients. Penicillins and cephalosporins appear effective in L. garvieae infections. Interestingly the source of infection is frequently challenging to identify, however contact with raw fish is a common theme.

References:

Conclusions:
- We present three cases of invasive infection caused by pathogens associated with fish exposure.
- Zoonotic diseases associated with fish are infrequent causes of invasive infection, usually affecting severely immunosuppressed individuals.
- Whilst patients were older and held multiple co-morbidities it is striking that severe immunosuppression was not a common feature.
- On-going surveillance is required to determine whether fish-borne zoonoses reflect an emerging group of invasive pathogens.