

I'm Richard, a Bacteriology Lab Manager working for Public Health Wales. I am based in the Regional Lab in Singleton Hospital Swansea where we process all Microbiology samples for Singleton, Neath Port Talbot, Morriston, the Princess of Wales Hospital in Bridgend and all of the surrounding GP's. I will tell you more about that later.

Let me tell you a story about a gentleman called Tom who was sent to the Accident and emergency department following a visit to his GP. Tom arrived in A&E at around midday.

Tom is a 76-year-old male with a history of gout. On the 27th February 2023 Tom presented with an acute swollen L elbow with redness and pain. Tom was seen in triage after 2 hours where an orthopaedic consultant was present. Blood tests and an elbow aspirate were required to rule out septic arthritis or Gout. The samples were taken at triage. Tom was accompanied in A&E by his wife and daughter who over the next 12 hours tried to chase the results of the samples several times without success. The ward staff noted that the laboratory was taking a long time to turn test around.

A&E was particularly busy with many patients waiting to be seen, admitted, or were waiting on tests. After 12 hours Tom's son, who was working away in Liverpool at the time, called to see what the delay was. After a 14 hour wait Tom was discharged from A&E as the lab tests had finally come back with a diagnosis of gout recorded. Tom later went on to develop COVID for the first time, which he attributed to his visit to A&E. Tom is in a high-risk category and thankfully was able to access antivirals and made a full recovery after isolating away from his family for 14 days. Unfortunately, his wife also contracted COVID for the first time at day 16 but also went on to make a full recovery following a further 12-day isolation period.

Here is the twist! Tom's story is personal to me, as Tom is my father. Just before midday I made a telephone call to say farewell to my parents before I boarded the train to Liverpool. I heard that my parents were on their way to A&E after a visit to their GP who was concerned for my father. They hadn't informed me as they didn't want to trouble me and knew that I was going to be working away. I decided to board the train and reassess when I reached Cardiff. Whilst at Cardiff I made another call to my father who reassured me that he was OK. I boarded my connection and headed to Liverpool. Throughout the day I made contact with my father several times to see what the diagnosis

was. He hadn't been informed of the result and anecdotally was informed that the lab was taking a long time.

Being in a unique position of Son and Lab manager I knew that this was extremely unusual. I was part of the design and management of the service and was now experiencing the impact of our service on my family. Through experience, I knew that either the sample had already been processed and the result hadn't been accessed, the sample had gone missing or finally that the sample was still in A&E. After 12 hours and a conversation with my manager who was in Liverpool with me, I decided to make a few phone calls.

The first call I made was to the on-call BMS for Bacteriology to see if she had been informed of the sample or indeed processed it. I informed her that I didn't want to know the result and explained that this was my father's sample. I was reassured and was also very impressed when I was reminded by my team that under no circumstances was she able to give me the result. I was informed that the lab had received a call to process the aspirate urgently many hours ago, but after several chaser calls had been made to A&E, the sample had still not arrived.

My next call was to the Biochemistry, as this was another possible mid-transit location for the sample. It wasn't there either. The last call was to porters to see if the sample was somewhere mid-transit. It wasn't and they confirmed that they hadn't had a call about it.

My final call was to A&E. After explaining to the receptionist that I was the Lab Manager and Toms son, I asked to speak with the nurse assigned to my father. At this stage there wasn't one, so I was passed to the nurse in charge. The nurse in charge was very helpful and started the conversation by apologising many times, letting me know how busy they were with around 140 patients being seen. I explained that I wasn't calling to complain but to offer some help. I explained that the sample was either still somewhere on the ward or it had been lost, in which case, merely waiting wasn't going to help my father. I suggested that if the sample had been lost a decision likely needed to be made on the blood results which they confirmed they had received, or that orthopaedics would unfortunately need to re-aspirate my father's elbow. The nurse said that she could see a lot of samples approximately 30 had just left to go to the lab and that she would sort it. There was some miscommunication about where the sample would be processed and how it would get there. We ended our call and I started to think about what I could do to help make this

better for other patients. Within 1 hour, the BMS on call had received the sample and 40 minutes later a diagnosis led to my fatigued father being discharged at 2:30am.

Pondering on what had happened, I wondered how good our communication methods were between lab and wards. I had also realised that once the sample was taken, the rest of the process was little understood by staff. But how would they? Would improving that knowledge make the process better?

Our laboratories are run by teams of scientists, support workers, administrative staff and medics. Biomedical scientists are hidden professionals who work in healthcare laboratories diagnosing diseases and evaluating the effectiveness of treatments. They have been described by the institute of Biomedical Science as providing the 'engine room' of modern medicine with approximately 70% of diagnoses in the NHS based on pathology results provided by laboratory services. The Bacteriology laboratory at Singleton processes approximately ¼ million samples per year.

Every person at some point in their lives will benefit from the services of a biomedical scientist. As a professional, I feel that we need to reach out to those using our services to see if we can improve our systems by working in collaboration. Approximately 40% of emergency admissions are attributed to Bacterial infections.

I then wondered if a biomedical support worker with knowledge of the lab processes, not just Bacteriology but also cross trained in Laboratory medicine with a knowledge of the full repertoire of tests on site in A&E would make the flow of samples better. Someone with specialist knowledge of tests, sample containers and lab flow. Perhaps working in triage as a point of contact to work alongside the nursing staff. The support worker could have access to electronic test requesting, which makes the flow of the sample much more streamlined when it arrives in the laboratory. The support worker could communicate directly to see how urgent the sample was, maybe even colour code pods depending on their priority. This colour code could then dictate the flow of the sample when it reaches the laboratory. Joining up these two elements seems to make sense. At A&E the support worker could inform staff when the sample result was ready through the Laboratory Information Management System. I wondered if a sample may be ready for the first meeting between medic and patient potentially discharging patients more quickly. I wasn't aware if this had been trailed elsewhere and to my knowledge, I don't think that it has. In my

father's case, this would certainly have improved his outcome and experience. I have sourced funding to trial this approach and am currently in discussions to see if this is possible.

Laboratories are assessed and accredited by the United Kingdom Accreditation Service (UKAS) which are appointed by government. Laboratories are currently in a transition period to a new set of standards. By the end of this period, laboratories accredited to ISO 15189:2012 worldwide must have been assessed and accredited to ISO 15189:2022. Key updates to the standard include a greater focus on clinical risk and the impact of services on patients. At a laboratory level, the period before a sample is received is referred to as the pre-analytical phase. I realised that my dad's brief illness allowed me a window into the impact of the pre-analytical phase of the service.

Other areas where our laboratory is currently reaching out to make quality improvements are in processing of blood cultures and also the retrieval of Neisseria Gonorrhoea for patients attending our sexual health clinics. At our sexual health clinics, we train nurses to inoculate plates directly at the clinics. This has improved our recovery of gonococcus threefold for these patients. This allows us to monitor treatment therapy choices and respond to any resistance forming in this cohort of patients.

Our ongoing Blood Culture Pathway Improvement Project is in its infancy. According to the Sepsis Trust, every 3 seconds, someone in the world dies of sepsis. A focus on improving this pre-analytical phase is also suggested by UKAS with an aim of improved rates of detection, improved patient outcomes, reduced length of stay and improved antimicrobial stewardship. We are looking to relocate our analysers to be based nearer patients to increase the likelihood of early detection. We are also looking at ways to educate users about the best fill volume.

Value based healthcare describes the importance of stewardship of resources across the whole system. A joined-up approach allowing the pre-analytical phase of a sample to flow seamlessly into the analytical phase will allow us as guardians of those resources to get best value from our efforts. If there are any opportunities in your areas whereby involvement of Microbiology colleagues may improve outcomes, please let us know as we are keen to work with you to improve the outcomes of the patients that we serve.