

Pathology – Engineering Support under the Microscope



Pathology -

- “Make quality our primary concern”
 - NHS Pathology Services in England employ around 33,000 people in over 150 organisations, responding to approximately 200 million requests a year, representing involvement in around 80% of patient interactions within the NHS.

Pathology Biomed Support

- ☐ What is the present involvement and support offered by NHS EBME departments?
- ☐ What's in it for Pathology, the Trust and EBME?
- ☐ We've got enough to do already!
- ☐ They look after their own engineering issues!
Would we be welcome?

Areas within Pathology

- ❑ Biochemistry - Chemical pathology, the study of chemicals in the blood and other fluids.
- ❑ Immunology - study of an organism's defence (immune) system.
- ❑ Histopathology (Cellular Pathology)
- the study of disease in human tissue.
- ❑ Medical Microbiology - the study of infection.
- ❑ Haematology - the study of disorders of the blood, often incorporates blood transfusion services.

Areas within Pathology

Biochemistry

- Studying of components like proteins, lipids and electrolytes.
- Diseases such as diabetes, thyroid problems, infertility, heart attacks and renal failure can be diagnosed by the analysis of body fluids such as blood, urine and CSF (Cerebrospinal fluid).
- Large automated analysers and specialist dedicated equipment.

Areas within Pathology

Immunology

- Malfunctions of the immune system in immunological disorders such as autoimmune diseases, hypersensitivities, immune deficiencies, transplant rejection and allergies.
- Rheumatoid arthritis, multiple sclerosis (MS).
- Monitoring and treatment of HIV infection



Areas within Pathology

Histology (Cell Path)

- The study of disease (including, but not exclusively, cancer) in human tissue by taking biopsies, dehydrating, mounting on wax and then slicing (microtome machine) into small $\sim 3\mu\text{m}$ thick sample.
- They are then stained, mounted on a glass slide and examined under a microscope by a Histopathologist.
- Cellular change can be observed indicating the presence of disease.

Areas within Pathology

Histology/Cytology

- The most common cytological specimen is cervical smears.
- Non-gynaecological cytology consists of other fluids for cellular examination.
- Centrifuge is used to separate the heavy cells which are then smeared onto a glass plate stained with specialist stains and examined under a microscope.

Areas within Pathology

Microbiology

- ALWAYS follow safety protocols in this area.
- The study of infection due to micro-organisms such as bacteria, viruses, fungi and parasites and establishing antibiotic treatment
- Bacteria and fungi are grown in the lab on Petri dishes within incubators (anaerobic cabinets).
- The use of analysers and microscopes for the diagnosis of e.g TB, food poisoning, sepsis and Clostridium difficile etc.

Areas within Pathology

Haematology & Blood Bank

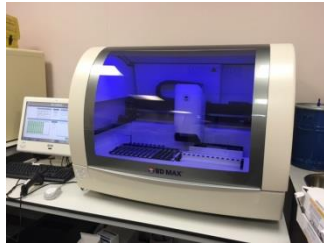
- Just a few of the tests undertaken in Haematology
 - The FBC (Full Blood Count).
 - INR (International Normalised Ratio) is a test used to monitor a person's coagulation / clotting mechanism.
 - Sickle cell anaemia.
 - Issuing blood for transfusion following compatibility testing (or cross match).
 - Blood Group and antibody profile:
 - A, B, AB and O

Pathology Quality Assurance

- Internal quality assessment and quality management systems.
- UKAS – Pathology Accreditation Scheme. External assurance of its pathology services.
- ISO 15189 Medical Laboratories – requirements for quality and competence standard that UKAS uses to assess and accredit:
 - Quality Management system Calibration and traceability to National Standards.
 - Measurement uncertainty (Intra & Intro variability).
 - Verification of methods and equipment.
- Equipment maintenance record keeping:
 - Inventory.
 - Service and repair records.
 - Maintenance Schedules and Service procedures.

Pathology Equipment Technology levels

- High – Analysers, Track systems, Blood fridges, Freezers



- Medium – Centrifuges, Balances, Fume cabinets



- Low – Mixers. Stirrers, Re-agent Fridges, Incubators



Service Contract Management

- Many and varied
 - Co-operation and co-ordination when arranging service visits with pathology staff.
 - Ensuring that equipment is serviced on time, to defined service protocols.
 - Almost all repairs to high and medium level devices are urgent as there are only single devices on site and productivity can be impacted.
 - A lot of analysers are on managed service contracts

Thank you for listening

Are there any Questions?

