Quality – Importance of Making Quality Products

Your Objectives:

At the end of the lesson, you should be able to accurately assess the impact of a lack of quality in the biotech industry and thereby understand the importance of quality assurance systems and the key role of documentation.

But first, a **case study** from January 1999 (Brussels BELG / Melsungen DE):

When Health Minister Marcel Colla announced that two preterm infants had died in a Belgian hospital after being poisoned due to an incorrectly labelled infusion solution there was much trepidation. Authorities swiftly informed clinics across Europe. The German pharmaceutical company B. Braun Melsungen Inc., which had supplied the ampoules, reacted in dismay to the incident calling back their product.

In the meantime, the Belgian judiciary launched a criminal investigation into B. Braun and found that as many as 135,000 wrongly labelled ampoules had been put into circulation in September 1997 in Belgium, Germany, Luxembourg and Slovakia. They cited **human error** in the packaging of the product as the probable cause of the fatal accident. The babies had been injected with the supposed sugar solution directly; the ampoules contained **potassium chloride*** instead of a **glucose solution**.** Potassium chloride is sometimes administered intravenously in adults for regulating the iron content in the blood.

A preterm, weighing less than one kilogram at birth, died. In the same week, another girl born seven weeks prematurely. According to spokesperson Christine Verheyden (University Clinic in Leuven), under normal procedure, “[they] would have had a good chance of survival.” Instead, they died of cardiac arrest. The doctors treating her were initially not suspicious, however. It goes without saying, "for a baby, the dose that was in the vial was far too high." In the hospital, three other incorrectly identified ampoules containing the toxic solution were found in a large package. The vials came from a package that B. Braun had delivered to the clinic. A company spokesman in Melsungen said he “[had] no reason to believe" that the deaths in Belgium were due to misconduct by medical personnel. The company said that the most likely cause of the tragic incident was "human error in the assembly area of production." A technical error in the production itself can be excluded.

The life sciences industry is seeing increasing demands and therefore it requires absolute control over product quality. **Quality costs*** ** already make up close to 30 percent of total costs in the pharmaceutical industry, making it one of the biggest spenders in this area. (Investopedia, 2018-2019) The impact of quality issues on total costs has doubled over the past five years. Therefore, the optimization of quality systems is essential to reduce costs and ensure greater system efficiency.

The biggest challenge for a quality system is to ensure patients' safety while keeping in compliance with applicable regulatory requirements. Companies are faced with the challenge of integrating into the **quality assurance systems** regulatory requirements under the legislature as well as their own compliance guidelines, with the aim of reducing the number of errors at all levels of the **value stream chain**.

Both manufacturing processes and quality systems themselves have changed constantly over the past 25 years due to frequent changes to the regulatory requirements and the expansion of sales to other international markets with varying requirements. As a result, quality systems in the pharmaceutical industry must be more and more effectively designed to ensure efficient risk management at all levels of pharmaceutical manufacturing.

On average, of the current manufacturing processes, 75 percent of the deviations (one or two deviations per batch) are due to human error. Most companies currently have a right-first-time rate at operator level of close to nil in connection with the batch record and the release procedure. The consequences are increased scrap, more deviations, fewer batch releases, delivery bottlenecks, etc.

The complexity and intricacies involved in these "regulatory" documents have consequences for quality assurance within any pharmaceutical company. The operators regard documentation as a necessary evil, though it does not allow autonomy. Meanwhile, proper training and adequate standardization of working methods is very difficult to manage. Having said that, a predominantly oral culture will likely be more prone to uncoordinated and inconsistent behaviours, deviations, human error or to batches that cannot be released. Moreover, maintaining the document system is becoming more and more expensive: Declining efficiency despite great efforts at following documentation systems, and continuous improvement of R&D, is a burden. Finally, some existing errors remain undetected and resolved, which can result in performance losses (fewer batch releases, further deviations, human error, etc.).

*** Potassium chloride** is used to prevent or to treat hypokalemia, or low blood levels of potassium.

** **Antenatal corticosteroids** (ACS)—is also used for patients with diabetes

*** **Quality costs**: preventing, detecting, and remediating product issues related to quality.