Investigation Process Improvement in a Pharmaceutical Company

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Abstract *— Manufacturing companies are subject to product incidents. These are managed by investigators to identify root causes, solutions and avoid reoccurrence. Investigation completion within time ensures that product will reach the customer. Pfizer Pharmaceuticals had an increment in investigations that exceeded the established due date. Using the Define, Measure, Analyze, Improve and Control (DMAIC) methodology, causal factors were identified and addressed by standardizing investigation planification and execution. Furthermore, controls were placed to ensure process monitoring by placing strategic meetings to discuss investigation using the improved standardize process and monthly monitoring.*

Key Terms *— continuous improvement, manufacturing and packaging investigations, product disposition, standardization*

INTRODUCTION

Pfizer Pharmaceuticals LLC is a pharmaceutical company that manufactures and packages solid dosage drug products. In this company there is an Investigation Department. The purpose of this department is to perform an evaluation of the incidents related to product lots to identify potential root causes and applicable actions to avoid reoccurrence. Currently the investigation department is facing an area of opportunity regarding the completion of investigations within the established due date (30 days from the incident discovery date).

The increment in exceeded investigations has impacted the release of product to patients. This is due to the fact that the products that are involved in the incidents are placed in Global Batch Hold status. Global Batch Hold prevents the lot for going to the next manufacturing or packaging state and prevents the lot from being dispositioned for customer usage. The disposition (approve or reject) is given based on the investigation result, recommendation, and additional testing results (when applicable).

The objective of this project is to improve and standardize the investigation process. Based on this objective, it is expected that more investigations are completed within the established due date.

LITERATURE REVIEW

In order to stay competitive, organizations need to continuously improve their processes [1]. Process improvement is nothing but the understanding of an existing process and introducing process changes to improve quality of product, reduce costs, improve overall efficiency of process or accelerate productivity [2]. Companies are measured based upon their product delivery, price and quality. By reducing or eliminating issues that arise such as but not limited to delays in product delivery the companies can have a competitive advantage.

One of the methods to perform process improvement is by performing process standardization. Standardization reduces the variations of the process and improves the quality of products and processes [3]. Standardization was used to optimize and increase the efficiency in a printing company; this resulted in cost reduction and on time deliverables [4]. It was also found that by using standard work in a manufacturing process, activities that did not add value were eliminated and the process was improved without any cost investments [5]. Based on the above-mentioned standardization is a cost-effective process improvement method that can improve processes.

ANALYSIS APPROACH

The methodology used to execute the project was Define, Measure, Analyze, Improve and Control (DMAIC). This methodology is widely used to improve and optimize different processes. This methodology includes five stages to perform the improvements, these stages are defined as the acronyms for the methodology.

Define

The first phase was to Define the problem and project objective. The problem identified was an increment in exceeded investigations. This increment has a correlation with delays in product delivery due to lots pending investigation completions and additional testing results (when applicable). As previously stated in the objective section, the goal of the project was to improve and standardize the investigation process. Based on this, it is expected that the investigations will be completed on the 30 days period.

Measure

Data was collected to have a better understanding of the current status. Multiple interviews were performed to investigators to obtain data regarding the steps required to perform the investigation process. Quality approvers were interviewed to obtain data regarding the quality requirements when performing the investigation process. A total of 30 investigations were evaluated to obtain the following data: open date, actual start date, completion date, type of investigation, additional actions, and information regarding whether the investigation was closed on time or not.

Analyze

The 30 investigations were analyzed and it was identified that a total of 17 investigations were completed within the established due date, while 13 investigations exceeded the established deadline. Figure 1 shows the percentage that represents the percentage of exceeded investigations and those investigations that were completed within time.

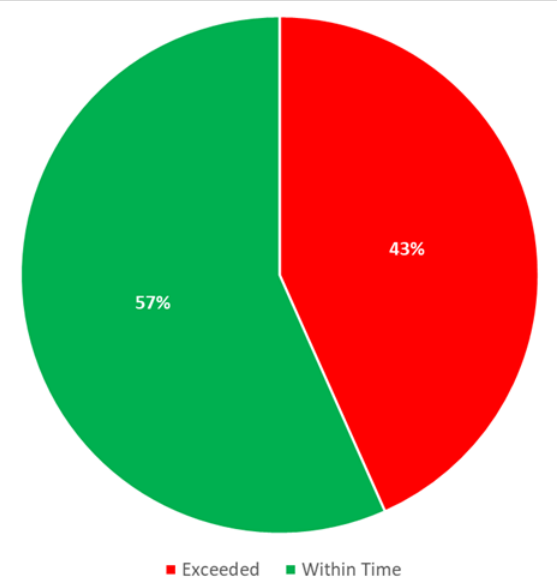

Figure 1
Comparison of Exceeded vs Completed Within Due Date

A further analysis was performed to understand how much time the investigator took to complete the investigation. Figure 2 shows how many days were taken to complete the investigation. Even though there are 17 investigations that were completed in within time, they were near the 30-day due date.

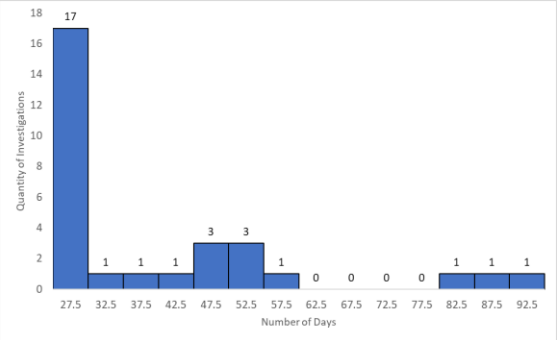

Figure 2
Days Taken to Complete Investigation

The data taken was analyzed to have a better understanding when the investigations were started and compare this information with the date that they were completed. From the evaluation it was identified that there was no correlation between these elapsed times. Figure 3 shows a comparison of the elapsed times.

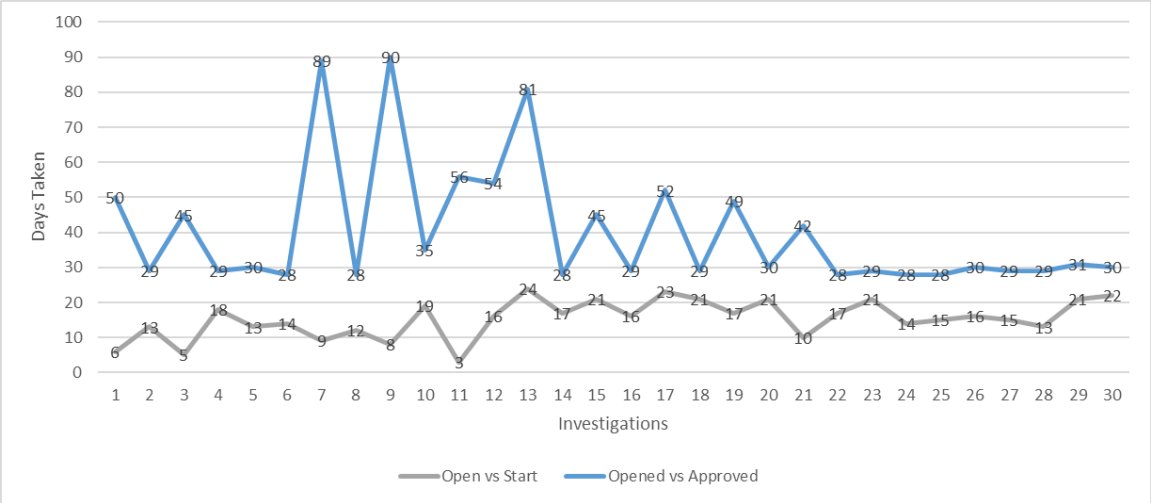

Figure 3
Comparison of Elapsed Times

The investigation data gathered was also evaluated to identify if there was a relationship between investigations that required additional testing and exceeded investigations. From the evaluation it was identified that eight of the 30 investigations required additional testing. Two of the investigations that required additional testing were completed within time but six exceeded the established due dates.

A further evaluation was performed to identify causal factors that could have been related to the exceeded investigations. In this evaluation a meeting was held with a multidisciplinary team including area manager, investigators and quality representatives. During this meeting a fishbone cause and effect diagram was used to identify the causal factors. Refer to Figure 4 for fishbone diagram.

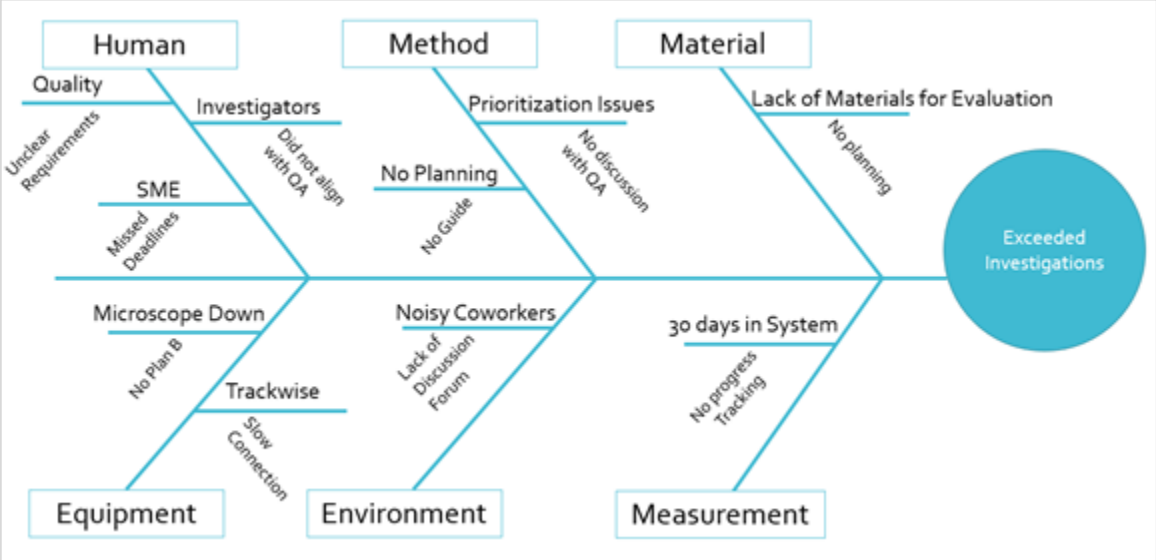

Figure 4
Fishbone Diagram

After the analysis performed it was identified that the root cause of the exceeded investigation was related to planification issues since there was no guide to aid in the investigation process. Furthermore, there was no discussion forum to address roadblocks in the investigation process. These unclear requirements and lack of forum caused different delays in the investigation process and rework near the closure of the investigations.

Improve

To reduce the delays related to lack of planification regarding investigators not aligning to QA requirements a checklist was provided to the investigators. This checklist included two sections. The first section included a list of information required to be reviewed by the investigator prior to conduct the investigation plan. This included: incident report, relevant procedures, photos, initial interviews, logbooks, samples, training evidence and supporting documentation. The second section included questions that will guide the discussion of the investigator and quality approver of the investigation execution an effective manner to ensure that the investigation will be complete and priorities are addressed. Refer to Table 1 for second section checklist.

Table 1
Investigation Plan Discussion Checklist

Investigation Plan Discussion Guidance	Check
Discuss Pre-work	
Additional Interviews Required?	
What is the scope?	
Is characterization needed?	
Is additional testing required?	
Is a supplier investigation required?	
Is a walkthrough required?	
Are experiments required?	
Is this a data integrity issue?	
Is a field alert required?	
Who can help (SME)?	
Is there a potential roadblock?	
What information is needed for the closure?	
Is the root cause known?	

As a guide for the investigator to perform the investigation process in an efficient standardized way a role card was created using the platform Microsoft Teams and information gathered in the measurement stage. Refer to Figure 5 for standardized role card in Teams.

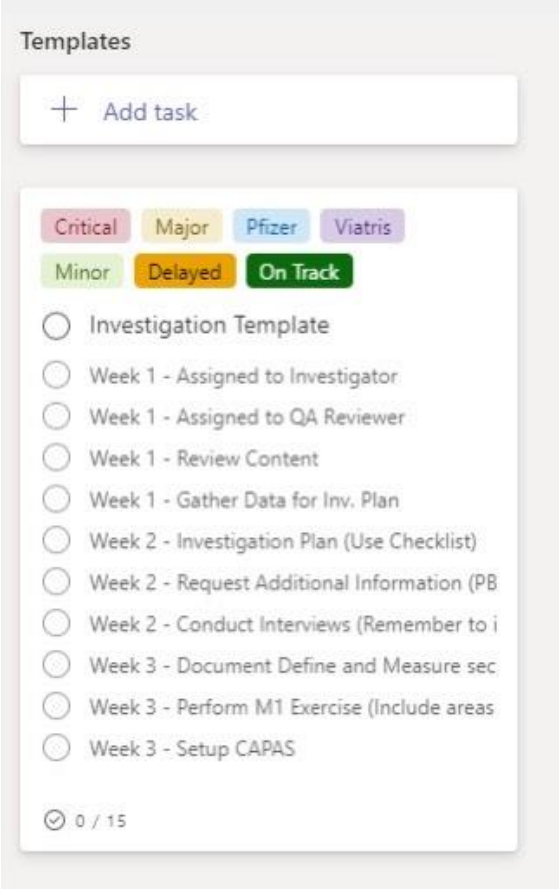

Figure 5
Standardize Role Card

The platform allows the user to document the start date, the due date, whether it requires additional approvers, the type of investigation, it also has the steps required to perform the investigation by week (4 weeks as base) and the investigator selects whether it is on track or delayed. In addition, the platform allows the user to upload attachments that the quality reviewer can access, and it also allows the user to upload comments such as but not limited to a roadblock. The platform also provides alert to the user with the assigned tasks (lead investigator) when the selected due date is approaching.

Control

Controls were placed to ensure that the standardize process created is maintained. For the Investigation Plan Checklist, the control placed was an update to the Investigation Standard Operational Procedure (SOP) with the checklist. Therefore, it is a requirement to perform the investigation plan as established. In the case of the Investigation Team Standardize Role Card, a bi-weekly meeting is being held with the investigators, quality approvers, managers, and area representatives (ad hock). In this meeting the Microsoft Teams Planner of the investigations department is shared (role cards per investigation) and the investigations are discussed.

A monthly meeting will be held to present quantity of investigations were closed in time and compare with previous months for trend analysis. This forum will be also used to present concerns regarding the investigation process and identify areas of opportunity for continuous improvement of the department.

CONCLUSION

The investigation department was facing an area of opportunity regarding the completion of investigations within the established due date. One of the methods to perform process improvement is by performing process standardization. To reduce the delays related to lack of planification regarding investigators not aligning to quality approver requirements a checklist was provided to the investigators that included a pre-work to perform prior the discussion, and a checklist to guide the investigator and quality approver in the investigation plan. Furthermore, to guide the investigator into performing the investigation process in an efficient standardized way a role card was created using the platform Microsoft Teams. Finally, controls were placed to ensure that the standardize process created is maintained

Future Endeavors

Continuous improvement is an important factor in maintaining a competitive advantage. Future projects should include reducing the 30-days due date. This could aid to accelerate the disposition of products placed in Global Batch Hold and patients could receive their products without major delays.

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