SMART COMPOUNDERS

Organising Components to Improve Workflow when using Chemo Compounder by SmartCompounders BV

Chemotherapy or chemo is a treatment using drugs to treat patients with cancer. These are typically prescribed and applied to patient differently depending on the type of cancer and the possible side effects that comes from it. There are various means to apply the drug such as IV or injectable, or oral or topical which are given accordingly based on the patient's needs [1]. In order for the patient to receive the drugs, pharmacists/operators are required to continuously prepare and produce the drugs based on the requests they received in a form of a batch[1]. However, throughout the whole procedure, there are bound to encounter risks that could harm the patient or the pharmacists/ operators such as microbial contamination or manipulation or overdosed drugs. Therefore, safety guidelines such as assembling, preparation, IV workflow software, etc. are taken into account meticulously and should be produced in a special room called cleanroom which is then further worked on in a Laminar Airflow (LAF) cabinet to prevent contamination [2], [3].

SmartCompounder BV is a small company in Enschede that specialises in making pharmaceutical drug compounding machines to assist pharmacists and the operators involved to produce chemo drugs effectively, accurately, and safely for patients who suffer from cancer. Due to its compact size, it allows to be placed within any existing LAF cabinet. Making it easier to fit in pharmacies with existing clean room at a lower cost (Figure 1). However, with the vast brands of drugs, IV bags, and components needed to prepare the machine before starting to compound the drugs, SmartCompounder BV has encountered a concern regarding the organisation of the components within the LAF cabinet – the workstation of the operators. This disorganization could lead to less efficient production of chemo drugs.

[1] *Batch: preparing a number of non-patient-specific doses with the intention to use based on future patient need*

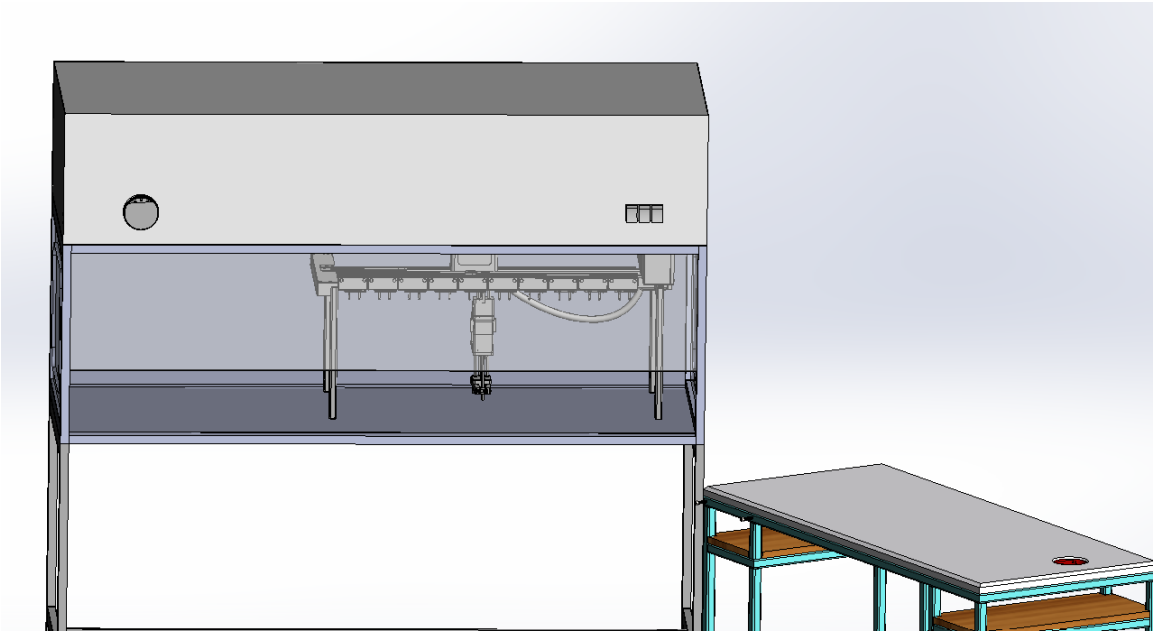

Figure 1: Layout with the Chemo Compounder

Within this project, an intensive analysis of the workflow intended by the company as well as the observations through in-person observations and time study on the actual scenarios shines light upon the stages of workflow where arrangements of the components affect the effectiveness of the overall workflow. These stages include assembly, preparation, scanning, and loading. When 'improving workflow' was considered within the research question, finding methods which could improve and maintain the organization of workflow was researched within the literature study. This is, then, further ideated upon and tested using rough prototypes, narrowing towards the final solution product. The final design chosen was reflected and adjusted upon using rough prototyping and detail prototyping to reach the final design that is manufacturable. Additionally, the improvements in the effectiveness that the solution brings would become an added value to the users. Hence, validation of the product through user-testing and time study comparison from the initial and after the integration of the product were analysed.

The product that emerged through this research is Hold-On (Figure2-4). Hold-On is a simple product that supports the users in organising the IV adapters to improve the efficiency of the stages mentioned above. This final design has proven to validate the requirements and improve the efficiency of the overall workflow. However, as it is still a relatively new idea, further improvements and recommendations still need to be explored.

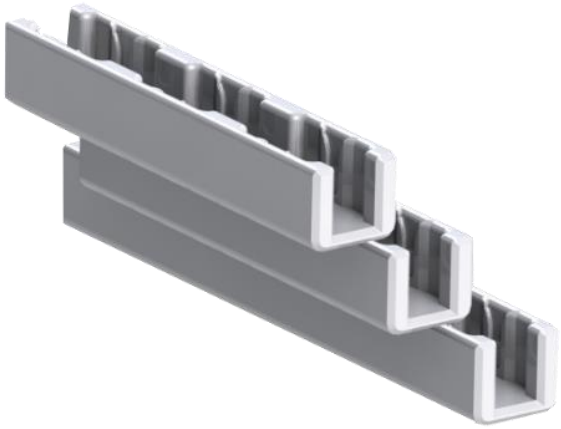

Figure 2: Final render of Hold-On

Figure 3: Stacked Hold-On concept

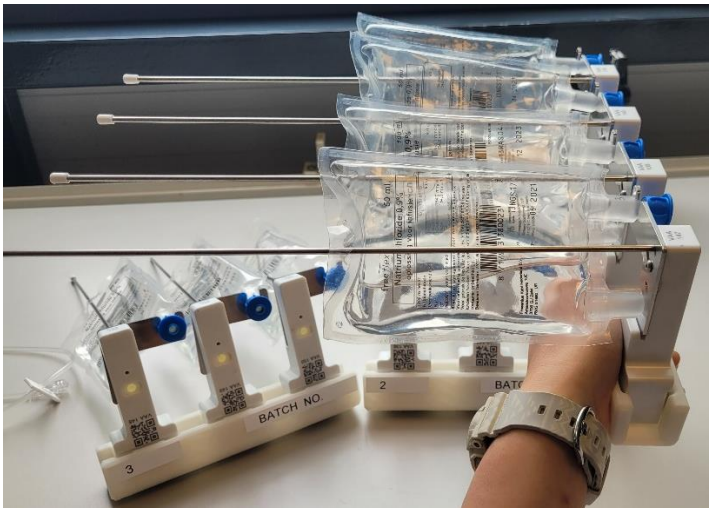

Figure 4: Interaction of the concept. Carrying the holder to scan adapters

REFERENCES

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[2] D. S. Rich, M. P. Fricker, M. R. Cohen, and S. R. Levine, 'Guidelines for the Safe Preparation of Sterile Compounds: Results of the ISMP Sterile Preparation Compounding Safety Summit of October 2011', *Hosp. Pharm.*, vol. 48, no. 4, pp. 282–301, Apr. 2013, doi: 10.1310/hpj4804-282.

[3] F. Boom and A. Beaney, 'Aseptic Handling', in *Practical Pharmaceutics*, P. Le Brun, S. Crauste-Manciet, I. Krämer, J. Smith, and H. Woerdenbag, Eds., Cham: Springer International Publishing, 2023, pp. 749–765. doi: 10.1007/978-3-031-20298-8_31.