# Reinventing common canister protocol for safe usage on patients during COVID-19.

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## *Introduction*

With the recent COVID-19 pandemic and its primary pathology involving the respiratory system, many healthcare institutions soon observed the surge usage of bronchodilators in the treatment of suspect or at risk  COVID-19 patients. As aerosolizing procedures were strongly discouraged due to its high risk for cross transmission, administration of bronchodilators via Metered Dose Inhaler (MDI) was the preferred choice of treatment.

Despite incorporating established protocol of wipe down process into the common canister protocol in Children's Emergency (CE), hard-to-reach corners inside the MDI actuator remain as one of the indisputable pitfalls that could give users a false sense of security that these wiped down MDIs were safe for re-use.

Single-patient use MDIs is the gold standard for MDI administration, in terms of infection control, prevention of disease transmission and patient's safety. The uncertainty of MDI supply chain, especially with the surge in demand during this COVID-19 pandemic, had made this a wish list item for our institution.

## *Aim*

While working towards our goal of securing a healthy supply of MDIs to meet our needs for single-patient use MDI, this project aims to enhance the disinfection process through the introduction of autoclaving the actuators and sourcing of single patient-use actuator for common canister protocol in CE.

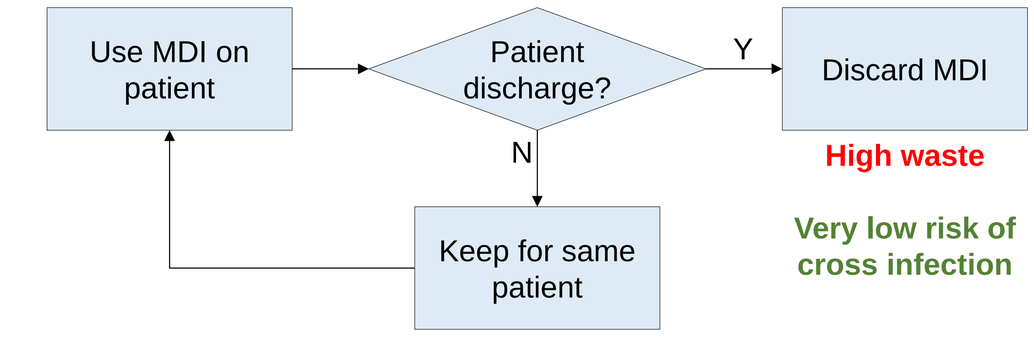
## *Methodology*

The KKH 3-Step Quality Improvement (QI) methodology was used in this study. Our team also used the Plan, Do, Check and Action (PDCA) cycle to monitor, analyse and evaluate the effectiveness of the implemented initiatives.

### Step 1: Understanding current system and identification of problems

During the initial phase of COVID-19 outbreak where its disease transmission was unclear, used MDI by suspect or at risk COVID-19 patients were discarded upon discharge.

**Background and Problem of Discarding MDI**




### Step 2: Identify root cause with data

With the high average monthly count of 675 MDI administration in CE, this process of discarding used MDI was not sustainable. Hence adopting the common canister protocol and reusing wiped-down MDIs was the only workable option to ensure sustainability of hospital stockpile.

Thou this approach had enable the hospital to conserve stockpile, the hard-to-reach corners in the actuator (figure 1) makes the wipe down disinfection process laborious. The re-using of single-patient device will also inevitably increase risk of cross infection.

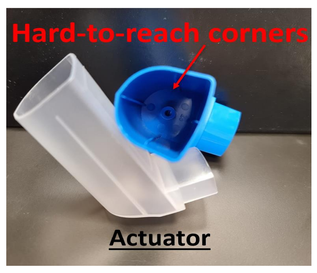
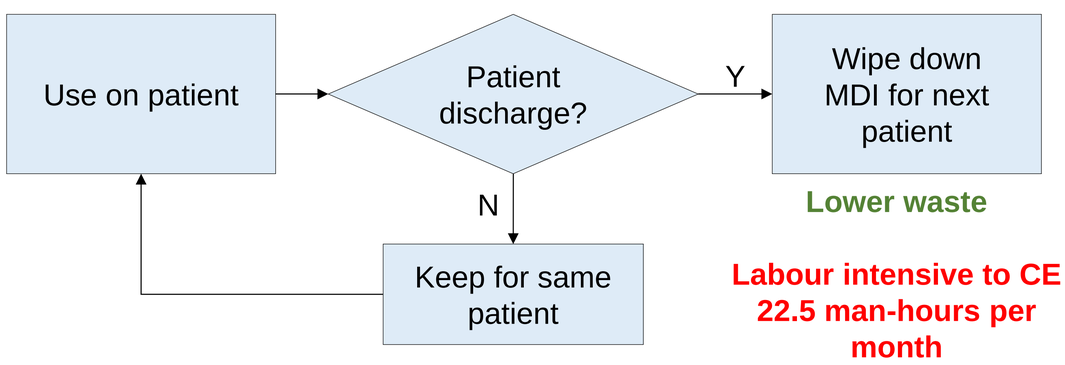


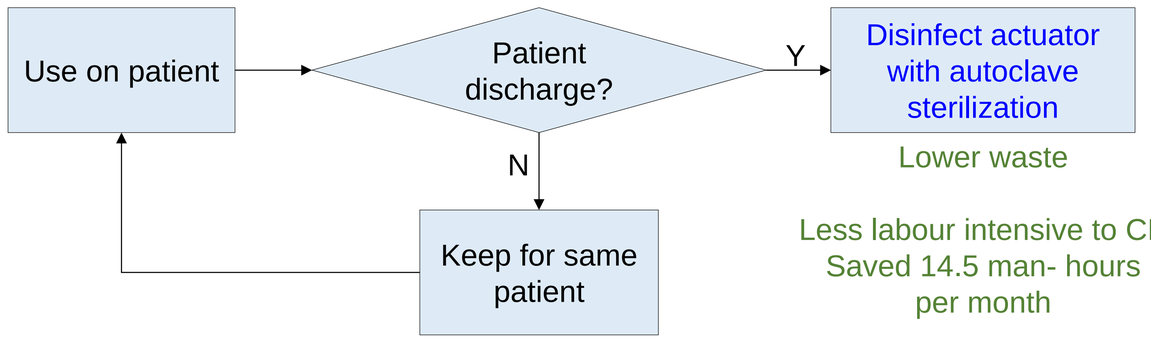

*Figure 1*

**Background and Problem of Wiping Down MDI**




### Step 3: Develop and implement solutions to solve problems

Autoclaving of MDI actuator in Central Sterile Supply Department (CSSD)




The actuators were placed under 30-cycles of high heat sterilization, with integrity check at constant intervals by the nursing team.
Robust processes, including counter checkers, actuator batch labels and pictorial guide (figure 2) were introduced to ensure that autoclaved actuators were fitted with the correct canisters and were safe for re-use.

**Decontamination of Used MDIs**

| MDI Canister (Wipe Down) | |
|---|---|
| Step 1: Remove canister from the holder<br>Step 2: Wipe down of the canister using the mikrozid wipe<br>Step 3: Leave to air dry in clean plastic bag (at least 2 minutes) |  Step 1  Step 2 |

| MDI Plastic Holder + Cap (CE → CSSD) | |
|---|---|
| Step A: Collate all dirty MDI plastic holder + cap into a single plastic bag *(**NOTE: Ventolin and Atrovent in separate bag)*<br>Step B: Double bag the plastic bag with a Biohard bag<br>Step C: Handover to CSSD staff during collection |  Step B |

| MDI Plastic Holder + Cap (CSSD → CE) | |
|---|---|
| Step I: Inspect MDI holder + cap for visible cracks<br>Step II: Assemble **clean canister to correct holder** with a counter-checker<br>Step III: Fill up all information in MDI sticker<br>Step IV: Place assembled MDIs into the clean plastic bag and label bag with completed MDI sticker accordingly | Assembling of MDI<br>Date: _____ Time: _____<br>Prepared by: _____ Checked by: _____<br>Step III  Step IV |

*Figure 2*

Sourcing of single-patient use actuator

To further decrease the risk of cross infection, the team explored the use of single-patient use actuator.

Traditionally, MDI actuator and canister were always associated as a single drug preparation, and not meant to be sold separately. Hospital's Material Management Department and Pharmacy purchasing team facilitated in the actualization of this sourcing event from an overseas manufacturer. A prototype was sent to the team for trial to ensure proper fit with our existing MDI canisters.

## *Result*

Autoclaving of MDI actuator in Central Sterile Supply Department (CSSD)

The autoclaved actuators were structurally intact and were safe for repeated use. As no wipe down process was required,14.47 man-hours were saved monthly.

Sourcing of single-patient use actuator

An 18-month supply of actuator was secured with delivery and logistic arrangement. In the midst of purchasing these actuators, the hospital had managed to secure adequate supply of MDIs for us to embark on single-patient use MDI from July 2021 onwards.

## *Conclusion*

Despite being challenged with the uncertainty of pharmaceutical stock supplies during the COVID-19 pandemic, the team had adopted safe and innovative approaches in resolving the shortage of MDI supplies, while meeting the demands in prevention of disease transmission.

The proactive engagement with nursing, medical and non-medical stakeholders and our relentless hard work had allowed the hospital to prevent any possible supply chain disruption of this critical life-saving drug. It has successfully resolved the root cause to our problems and meet our eventual goal of single-patient use MDI with sustainable supply chain.