Summary of the relevant literature

Patients with asthma and COPD are prescribed inhalers in hospital, whether they are admitted with an acute exacerbation of their underlying lung disease or whether they are represcribed their home maintenance inhalers while admitted for an unrelated indication. Best practices for inpatient medication dispensing recommend a Unit-Dose system in which sufficient medications are dispensed for a 24-hr period, which increases patient safety and cost efficiency of care.[1] This approach isn't possible with inhalers, where each inhaler device dispensed can contain up to 200 doses.[2]

In 2020-2021, the average length of stay in an acute care hospital in Canada is 7.1 days,[3] which means that only a small percentage of the doses contained within the inhaler device will be used by the time of discharge.[4-6] Once the patient is discharged, the inhaler can no longer be reused for another patient due to the risk of cross-contamination;[7,8] inhalers are considered single-use devices and the BC Ministry of Health advises against reusing inhalers.[9]

This leads to a substantial amount of unused inhaler doses. The amount of wasted doses varies with inhaler type, starting at 76% of fluticasone-salmeterol doses wasted[5] at the lower end, up to a staggering 98% of salbutamol doses wasted.[4]

This incurs substantial costs to the hospital and Health Authority, with Canadian studies estimating a yearly loss of $212,000 for wasted ipratropium[6] and over $176,000 for wasted salmeterol-fluticasone[5] in the Fraser Health Authority. These studies do not take into account increased medication disposal costs, which is reported to be up to $2.70 per inhaler.[10] The financial cost and the environmental cost of trucking pharmaceutical waste long distances for licensed incineration are not insignificant, especially when considering the hundreds of thousands of inhalers dispensed in BC on a yearly basis.[11]

The environmental impact of wasting inhaler devices is significant; studies to quantify yearly carbon footprint impact of inpatient inhaler waste are underway at Island Health.[15]

Even more salient than the financial and environmental impacts is the impact of wasted doses on patients' wellbeing. At hospital discharge, the inhaler used in the inpatient setting is discarded and an outpatient prescription is provided to the patient who must then purchase a new, identical inhaler at a community pharmacy. Many inhalers, particularly combination maintenance inhalers, can be expensive and purchasing inhalers in the community can lead to financial hardship and cost-related nonadherence among Canadians.[12] Cost-related nonadherence in turn has been associated with an increase in serious adverse events including death, hospital admissions, and emergency department visits.[12,13]

At a systemic level, we are increasingly aware of the fragility of our medication supply chain, with many inhalers having had intermittent shortages throughout the pandemic.[14] In the context of possible scarcity, medication sparing strategies such as minimizing waste are becoming increasingly important.[14]

For scenarios where the inhaler is prescribed to continue after discharge, one potential solution is to provide patients with their remaining inhaler doses on hospital discharge. In addition to decreasing

hospital disposal costs, providing the patient with their previously dispensed inhaler(s) at hospital discharge has been shown to improve adherence to treatment and to decrease readmission rates.[10]

A survey of nursing practices at Island Health revealed nearly half of respondents describing they rarely or never provide inhalers at the time of discharge, whereas 20% of respondents always provide inhalers.[14] This heterogeneity in practice among respondents is likely related to the lack of formal guidance from the Health Authority; there are currently no policies in place to support multidose medication management on hospital discharge.

With this in mind, we set out to develop a policy and associated procedure at Island Health to support staff in providing previously dispensed multidose medication products[1] at hospital discharge. The goal is to improve patient outcomes, decrease carbon footprint and decrease costs to the Health Authority while facilitating compliance with medication dispensing best practices and minimizing added workload for staff.

[1] The Critical Air Project focuses on decreasing inhaler-related carbon footprint. However, we realized we could expand this policy to include other multidose medication products (such as ophthalmic solutions, nitroglycerin sprays, creams, etc) by minor adjustments in the language used to write the policy. Doing so will further decrease unnecessary medication waste. For the remainder of the change idea, we will use multidose medication product to refer to such medications that are dispensed in hospital containing more than one dose.

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