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Background



Oxygen cylinders are routinely used in the hospital settings. Since 2016, CGH has been working at improving the process and management of oxygen cylinder delivery and had implemented the digital integrated oxygen cylinders hospital wide in 2017.

A review of the current process using the digital integrated oxygen cylinder was carried out:

- a) Wards would check and key into the Central Express (CE) portering system for the exchange of empty oxygen cylinders
- b) Each ward would issue a Store Issue Voucher(SIV) request for the oxygen cylinder exchange
- c) Central Express (CE) Porters would be deployed to collect the empty cylinders for exchange from the wards to SCM and back

As different wards would be requesting the oxygen cylinders for exchange at different timing, SCM would need to perform these ad-hoc requests from the various wards for processing. Nurses, staff from CE and SCM felt that the process is time-consuming and inefficient.

Aim



This project is aimed to streamline the process of oxygen cylinders exchange across all wards and to ensure adequate supply of oxygen cylinder in clinical settings.

Methodology



Step 1

- Multiple staff engagement sessions and refresher training on the functions of the digital integrated cylinders were conducted.
- Briefing to include the function of new digital cylinders which have the capability to calculate the remaining treatment at the selected flow, thus allowing staff to plan their journey before transferring patients.
- Par levels of oxygen cylinders in all departments was reviewed by Nursing Team.

Step 2

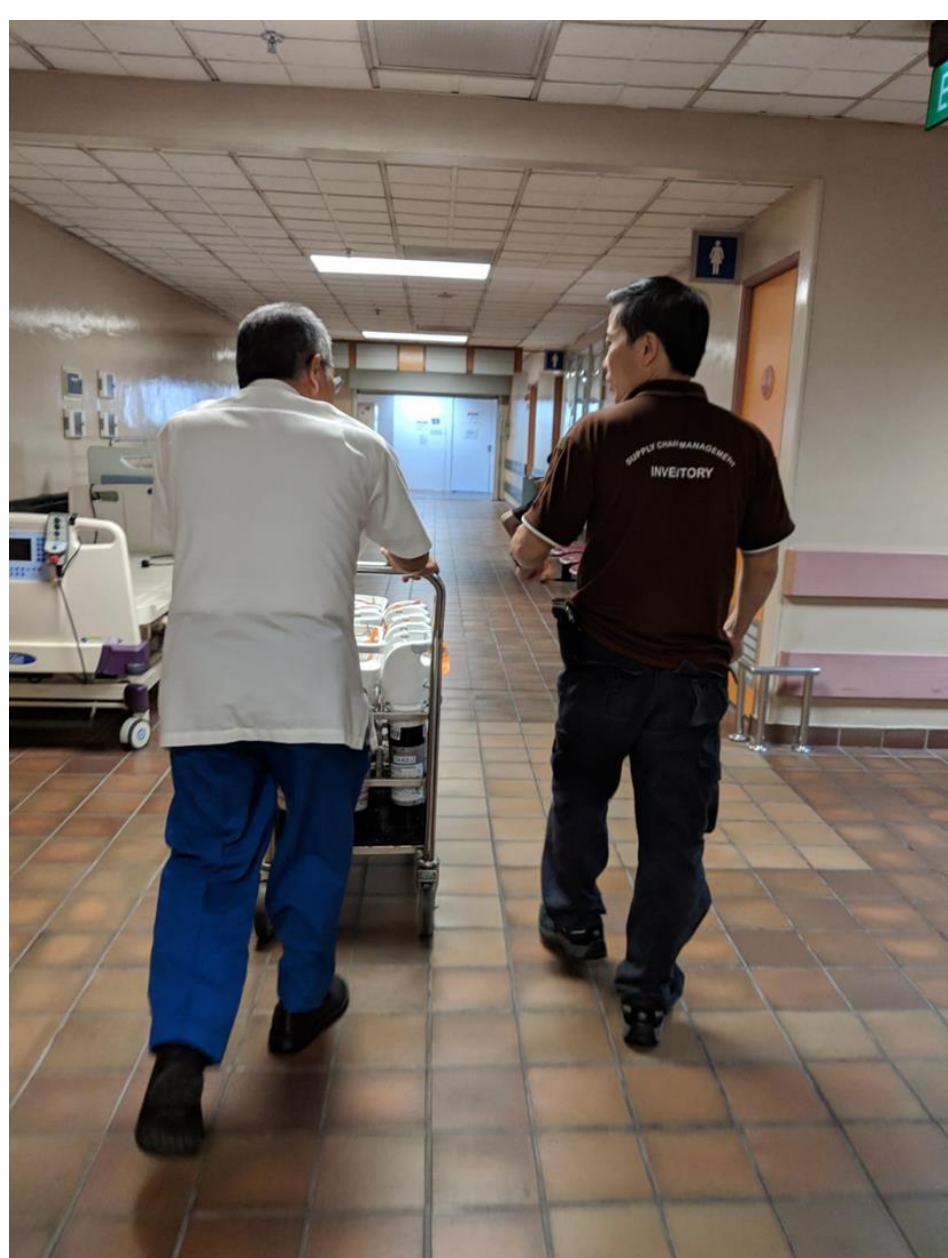
- Baseline Time and Motion Study was conducted on 7 October 2019 revealed that the entire process for a single oxygen cylinder exchange from ward to SCM and vice versa took approximately 45 minutes.
- Collaboration with Supply Chain Management to do collective processing to save time required for oxygen cylinders exchange.

Step 3

- Collaboration with Central Express department, the designated porters were trained on safe management of oxygen cylinders. They were empowered to check and ensure sufficient supply of oxygen cylinders within each department.
- Daily central portering rounds were initiated on 4 November 2019.

Step 4

- Using the PDCA method, central portering rounds were reviewed, and a reduction was made from 5 days to 3 days a week; coincides with vendor exchange of cylinders from 27 November 2019.



Motion study of the portering rounds



Single Porter on rounds 3 times/week

Results



Staff Satisfaction:

Nurses were satisfied as they do not need to key in the system to call for porters. This lightened their load, and the time savings could be better utilised for patient care.

Porters were satisfied as a single dedicated porter is now required to support the inpatient wards three times a week, instead of attending to the ad-hoc request throughout the week. They were motivated as they were given the opportunity to be upskilled and entrusted with the new task.

SCM staff were satisfied with the central processing as SCM staff favoured the collective central processing compared to ad-hoc requests.

Time Savings:

With the implementation of central portering rounds, the process was streamlined. This saved the team *0.6 FTE per annum*, which translates to manpower savings of **\$27 941.76 per annum**.

Cost Savings:

A total of 91 cylinders were removed from the CGH par level since April 2019. This yields savings of **\$7 480.20 per annum**.

Year	No of cylinders issued	Cost + Delivery Charge	Remarks
2016	8620	\$71 546.00	0.4m3
2017	7555	\$62 707.50	0.4m3 + Digital
2018	5391	\$44 745.30	Digital
2019	4743	\$39 366.90	Digital + Oxygen rounds
2020	4402	\$36 536.60	Digital + Oxygen rounds

There has been a steady decrease of oxygen cylinders issued from 8620 in 2016, to 4402 in 2020. This reduction (48.9%) is because of implementation of digital integrated oxygen cylinders, par level review and central portering rounds.

This translates to savings of **\$35 009.40 per annum**.

**Total cost savings:
\$ 70,431.36 per annum**

Conclusion



The implementation of the digital integrated oxygen cylinders has resulted in many benefits such as greater satisfaction from nurses, porters and SCM staff. In addition to a more efficient utilisation of oxygen, the new oxygen exchange workflow is a more streamlined process with the various stakeholders and there have been significant cost savings.

