

## **Project Title**

Transforming the Process of Safe and Efficient Management of Oxygen Cylinders

## **Project Lead and Members**

Project lead: Hiew Swee Him

Project members:

- Lau Soy Soy
- Yu Liang Fang
- Tan Yun Hann
- Edward Ignatius Tjiptanata
- Chia Lee Seng
- Phan Fou Chin

## **Organisation(s) Involved**

Changi General Hospital

## **Project Period**

Start date: 2016

Completed date: 2019

## **Aims**

- To ensure a lean and healthy supply of oxygen cylinders in various departments
- To review and reduces wastages and smoothen the process of oxygen exchange

## **Background**

See poster appended/ below

## **Methods**

See poster appended/ below

## **Results**

See poster appended/ below

## **Lessons Learnt**

The team met a number of road blocks in the initial stages of the project when bringing in the digital integrated cylinder. However, through the years of working together, the bonds formed made this subsequent venture of portering rounds a quick success.

If we could start over, Nursing would engage the various stakeholders even earlier in the planning of the project.

## **Conclusion**

See poster appended/ below

## **Additional Information**

There is an African Proverb “If you want to go fast, go alone. If you want to go far, go together.” This truly depicts our experience in the journey to transform oxygen care delivery. When we collaborated, we could do so much more than before, reaching better outcomes than planned.

It is also very evident through our whole journey in transforming the oxygen delivery, the team is resilient and has continuously looked at ways to improve care. Outcomes and success may not be achieved instantly. It is important to remain patient and continue to persevere to reach the goals you want to achieve.

The project first started out to explore safe oxygen delivery to the patient, and has evolved to safe management of oxygen cylinders and oxygen exchange. However the time saved from oxygen exchange is also passed back to the patient. It truly feels like we came full circle.

## **Project Category**

Workforce Transformation

**Keywords**

Workforce Transformation, Job Redesign, Operational Management, Supply Chain, Resource Management, Healthcare Administration, Nursing, Changi General Hospital, Porterage, Digital Integrated Cylinders, Oxygen Delivery

**Name and Email of Project Contact Person(s)**

Name: Hiew Swee Him

Email: [Swee\\_Sim\\_Hiew@cgh.com.sg](mailto:Swee_Sim_Hiew@cgh.com.sg)



# Transforming the process of safe and efficient management of oxygen cylinders

S. S. Hiew, S. S. Lau, L. F. Yu, Y. H. Tan, E. I., Tjiptanata, L. S. Chia, F. C. Phan

## Background

Oxygen cylinders are routinely used in the hospital everyday. Since 2016, CGH has been working at improving the process and management of oxygen delivery.

In 2019, with the implementation of digital integrated oxygen cylinders, par level reviews and portering rounds were implemented to help maintain a lean and healthy supply of oxygen cylinders for various departments without taxing on nurses. This is done through reviews and upskilling of porters to take on the new task.

## Aim

- To ensure a lean and healthy supply of oxygen cylinders in various department
- To review and reduces wastages and smoothen the process of oxygen exchange

## Implementation

Nursing first reviewed the par levels of all departments, leading to a reduction of 91 cylinders from the CGH par level since April 2019. The reduction of cylinders was done after engagements with the ground staff and education on the functions of the digital integrated cylinders.

The new digital cylinders have the capability to calculate accurately the amount of time left before the oxygen empties, thus allowing staff to plan their journey when transferring patients. Existing infrastructure planning allows oxygen cylinders to be placed at multiple areas. This means that should the staff need oxygen in an emergency, there is always one in the vicinity, thus allow the team to decrease the par level.



## Implementation

Nursing, Central Express (portering) and Supply Chain Management (SCM) then collaborated to pilot portering rounds. This was after a time and motion study revealed the entire process for a single oxygen cylinder exchange takes approximately 45minutes. This translates to approximately 0.8FTE per year.

Porters were given training and upskilled to help in managing the inventory of oxygen cylinders. The porters would make rounds to collect and exchange used cylinders for the various department at SCM store. The portering rounds was reviewed twice after getting feedback and was subsequently reduced from 5 days a week to 3 days. This coincides with the day vendor comes by to collect the cylinder, ensuring quicker turnaround.

## Results

### Staff Satisfaction:

Nurses are 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 passed on to patient care.

## Results (continued)

### Staff Satisfaction:

Porters are 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 are also encouraged to be upskilled and entrusted with the new task.

SCM staff are satisfied with the central processing as it could be done all at a go, rather ad-hoc request throughout the week.

### Time Savings:

With the implementation of portering rounds, certain task has been eliminated or concise. This saves the team *0.5FTE per annum*, which translates to manpower savings of **\$27,941.76 per annum**.

### Cost Savings:

Par level review done in April 2019 yield savings of **\$7,434.70 per annum**.

Year	No of cylinders issued	Cost + Delivery charge	Remarks
2016	8620	\$71,546	0.4m3
2017	7555	\$62,706.50	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 since the implementation of digital integrated oxygen cylinders from 8620 in 2016, to 4402 in 2020. This reduction (48.9%) is because of changes in policy, par level and the implementation of oxygen rounds. This translates to savings of **\$35,009.40 per annum**.

**Total cost savings: \$70,385.86 per annum**



## Conclusion

It is evident through our whole journey in transforming the oxygen delivery, that the team is resilient and has continuously looked at ways to improve care. The project first began to focus on safe oxygen delivery to the patient, leading to the implementation of digital integrated oxygen cylinders.

The team then continue to work and examine ways to improve the management of oxygen cylinders. They identified wastages and collaborated with various departments to do better. Porters took up the challenge to upskill and help to ease the load off nurses, so that time savings could be passed back to patient care.

It has been four years into our journey to transform the care of oxygen delivery, and it appears to have reached full circle where ultimately, any process and time savings is passed on back to the patient.