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Assessment of a Digital Medical Gas Management Platform: Insights from Healthcare Professionals on Workflow Efficiency, Safety, and Healthcare Resource Optimization in Italy

Roberto Tessari, MD;[1] Alessandra Piemontese, MSc;[2] Bo Ren Long, MSc;[3] Lorenza Cipriano, MD[1]

[1]IRCCS Ospedale Sacro Cuore Don Calabria, Negrar di Valpolicella, Italy; [2]Air Liquide Healthcare, Milan, Italy; [3]EVERSANA®, Burlington, Ontario, Canada.

INTRODUCTION

- Continuous availability of medical gases is essential for safe patient care.
- Manual cylinder management can create inventory, tracking, and distribution challenges. Limited visibility of cylinder location and stock levels may reduce operational efficiency.
- Sacro Cuore Don Calabria Hospital implemented a digital cylinder management solution to improve tracking, utilization, and supply availability.

OBJECTIVE

- This study evaluated the perceived operational and healthcare resource impact of implementing a digital medical gas cylinder management platform in a hospital setting.

METHOD

- Pre-post study in a 550-bed Italian acute-care hospital evaluating implementation of a digital medical gas cylinder management platform.
- Workflow redesign, task reassignment, and staff training were conducted across pharmacy, technical services, and clinical wards.
- Healthcare professionals (pharmacy leadership [n=2], technical services [n=1], nursing staff [n=4]) completed a structured questionnaire assessing the perceived impacts on resource allocation, inventory management, emergency response, FIFO adherence, and interdepartmental collaboration.

Figure 1. Key hospital statistics†,‡,§

- 2,200 Employees
- ~550 Acute-care hospital beds*
- 1.45M Outpatient services annually

*Allowing 33K hospitalizations and 22K surgeries annually.

RESULTS

- Categories were rated on a scale of 1 to 5:

Very negative — 1 — 2 — 3 — 4 — 5 — Very positive

- Survey results showed that implementing a digital medical gas cylinder management platform, had a **positive impact** on hospital gas supply and distribution, with average scores per question ranging from 4 to 5.

Resource allocation and workflow efficiency

- Driven by real-time visibility of cylinder inventory and distribution activities.

1 — 2 — 3 — 4 — 5.0

Supply and inventory management

- Driven by increased confidence in inventory.

1 — 2 — 3 — 4.3 — 5

Expiry management and drug conformity

- Driven by access to real-time cylinder data.

1 — 2 — 3 — 4.0 — 5

Confidence in emergency planning and response

- Driven through improved monitoring of cylinder location and filling status.

1 — 2 — 3 — 4.4 — 5

Interdepartmental communication

- Supporting efficient distribution planning and stock control across hospital departments.

1 — 2 — 3 — 4.0 — 5

> ***"The platform has improved timing of procurement [of medical gas] with objectivity"***
>
> *– Vice Director of Pharmacy*

- Additionally, staff reported **substantial reductions** in time spent on cylinder deliveries following implementation

Figure 2. Staff-reported time savings

- -50% Time spent on routine cylinder delivery tasks
- -45% Time spent on emergency delivery tasks

CONCLUSIONS

Implementation of a digital cylinder management platform improved inventory visibility and workflow efficiency.

Real-time tracking reported time savings, enhanced confidence in cylinder availability and facilitated interdisciplinary coordination.

The demonstrated operational benefits led to adoption of the platform as a permanent solution at the study hospital.

Reduced staff time and optimized stock management may provide operational and economic benefits for hospitals.

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Presenting author: Alessandra.piemontese@airliquide.com
Hospital Pharmacy: roberto.tessari@sacrocuore.it; lorenza.cipriano@sacrocuore.it

†. IRCCS Ospedale Sacro Cuore Don Calabria. https://www.sacrocuore.it/en/. ‡. Alleanza Contro il Cancro. (n.d.). IRCCS Sacro Cuore Don Calabria. https://alleanzacontroilcancro.it/en/istituto/irccs-sacro-cuore-don-calabria/. §. European Society for Medical Oncology (ESMO). (n.d.). IRCCS Ospedale Sacro Cuore Don Calabria. https://www.esmo.org/designated-centres/irccs-ospedale-sacro-cuore-don-calabria.