

D-924-2022

ICU patient care in an isolation room

An interoperability concept for the improved

treatment of isolated patients

The joint showcase by Dräger, Ascom, OR.NET and Epic demonstrates how open interoperability technology based on the ISO/IEEE 11073 SDC standards can enable the manufacturer-independent aggregation of data for decision support, remote control of device functions to increase efficiency as well as safety and secure distribution of alarms for timely interventions. This solution could increase efficiency, save costs on parts of the personal protective equipment (PPE) and, most importantly, increase the safety of medical staff when taking care of infectious patients.

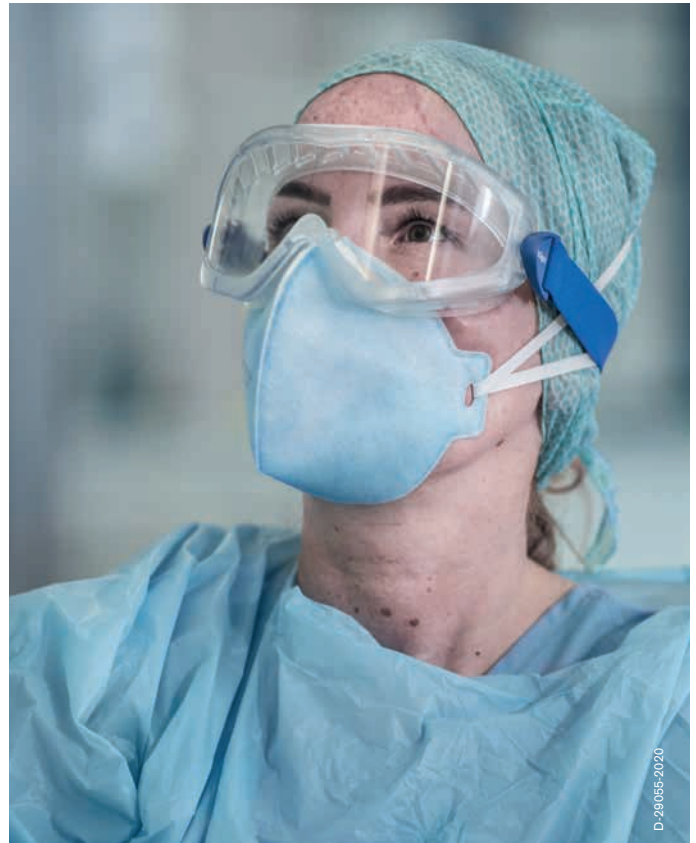
Disclaimer: The information about the solution in the showcase is preliminary. The solution is under development and for demonstration purposes only. It is not for clinical use and is not commercially available. Its future availability cannot be ensured. This solution is not cleared nor approved by the FDA and has not been submitted for FDA 510k clearance.

Containing infectious diseases – A major effort in acute care delivery

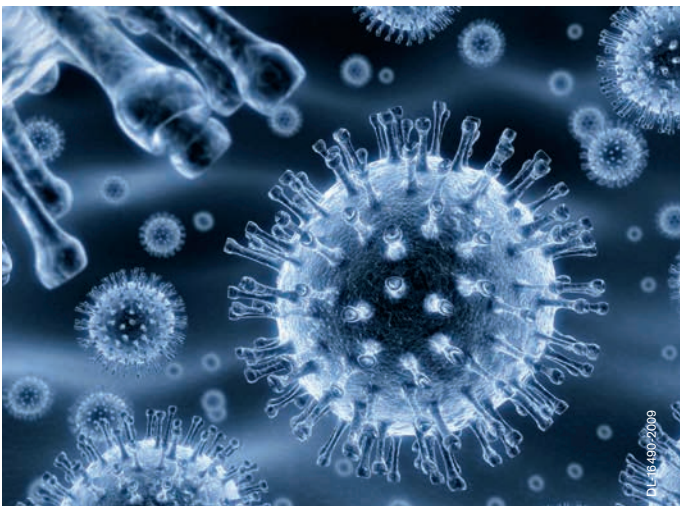
Infectious patients treated in intensive care units (ICUs) are usually in critical condition. The treatment of isolated, infectious patients can be very stressful for health workers, as seen in the Ebola epidemic and Covid-19 pandemic. Hospitals have strict infection control protocols to avoid cross-contamination of other patients and staff in healthcare facilities.

Nevertheless, doctors and nurses will inevitably enter the isolation room from time to time to provide direct or indirect care to patients and to operate diagnostic and therapeutic equipment. The following challenges can be observed when caring for contagious patients:

- **Inefficient processes:** Adequate personal protective equipment (PPE) such as special clothing and gloves, masks, face shields or goggles are required before entering the patient room. Putting on PPE and decontamination after exposure are time-consuming activities and might delay response times to critical situations and complicate even simple tasks, like documentation of vital signs.
- **Staff contagion:** A direct exposure of staff to virus particles in the air or on surfaces can lead to infections. Pathogenic agents might be carried out of the patient's room and lead to further cross-contamination. It was estimated that at least 90,000 healthcare workers have been infected just within the first four months of the Covid-19 pandemic.¹⁾
- **Incomplete data records:** Studies indicate that the documentation quality for isolated patients is significantly lower than non-isolated patients. 14% have an incomplete history of vital signs in the patient record, while 5% even miss vital sign recordings for entire days.²⁾



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The solution: Interoperability of medical systems

Interoperability of medical systems allows access to information and devices from outside the isolation room and can help streamline workflows and protect staff. The value of such interoperability concepts was demonstrated at the HIMSS (Healthcare Information and Management Systems Society) show in 2022 through the »ICU Patient Care in an Isolation Room« showcase.

New opportunities to treat infectious patients in isolation

A critically ill patient often requires continuous monitoring with physiological monitors and therapeutic support with ventilators and infusion pumps. Medical devices that support open interoperability technology can enable remote access to alarms, display of parameters and adjustment of settings, increase efficiency, save costs on parts of the PPE and, most importantly, increase medical staff safety.

The joint showcase by Dräger, Ascom, OR.NET and Epic puts these new capabilities into practice through three use cases:

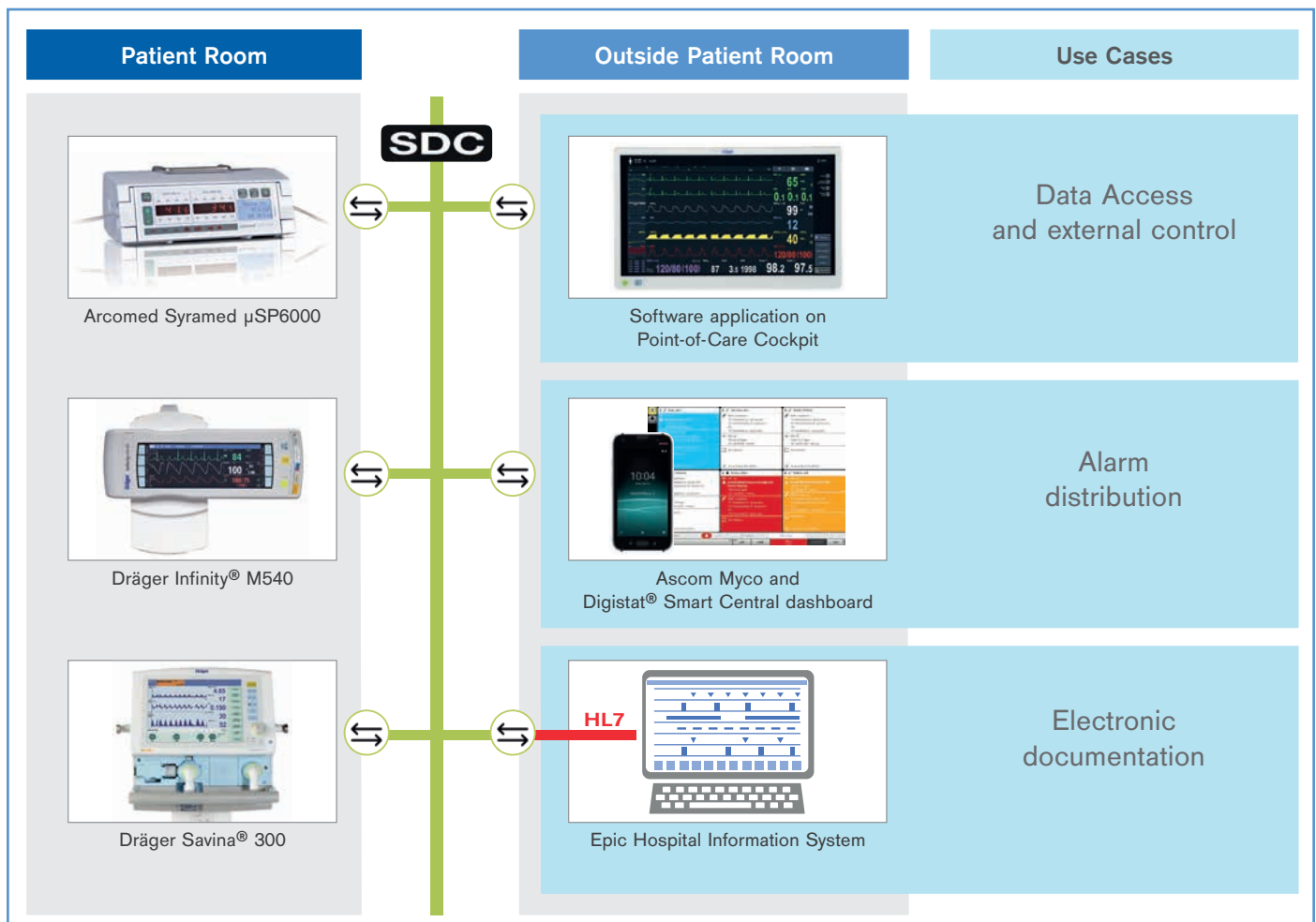
- (1) data access and external control, (2) alarm distribution and (3) documentation.

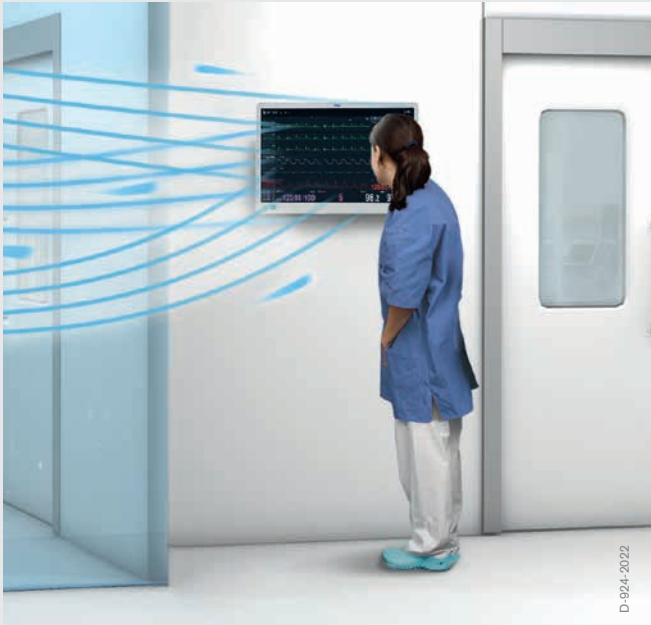
New possibilities with ISO/IEEE 11073 SDC for point-of-care connectivity

SDC (Service-oriented Device Connectivity) is a web services-based architecture that enables interoperability amongst point-of-care medical devices and as well with HL7 compatible hospital information systems. It enables a hospital's medical technologies from various manufacturers to...

- share data bi-directionally, encrypted and reliably,
- provide data in high medical-grade quality and
- exchange data openly in a standardized format.

Multi-modality system concept of the showcase ICU patient care in an isolation room





Use Case 1: External control and data access

A holistic overview of the patient status is displayed outside the isolation room on a point-of-care cockpit. A Dräger software application installed there provides the nursing staff with an aggregated view of the data coming from the point-of-care devices, including the Arcomed Syramed μ SP6000 infusion pump, the Dräger Savina® 300 ventilator and the Dräger Infinity® M540 patient monitor. In addition, selected functions of the Dräger Infinity® M540 patient monitor can be controlled remotely. These include starting or stopping an NIBP measurement, changing alarm limits, pausing audible alarms, and configuring the patient's ADT data. By enabling caregivers to view data and make device adjustments remotely, potentially dangerous exposure and inefficient entries into the isolation room can be reduced.

Use Case 2: Alarm distribution

Patient alarms and technical alarms originating from the Arcomed Syramed μ SP6000 infusion pump, the Dräger Savina® 300 ventilator and the Dräger Infinity® M540 patient monitor are distributed outside of the isolation room. Nursing staff are informed via the stationary Ascom Digistat® Smart Central dashboard and the mobile Ascom Myco 3 devices. As a result, nursing staff could receive immediate situational awareness with contextual information about the patient status and respond to the alarms in a timely manner.



Use Case 3: Documentation

Data, such as vital signs from the point-of-care devices in the isolation room, are exported in a standardized HL7 format and documented electronically in the Epic electronic medical record (EMR). The task of manually documenting vital signs is hereby fully automated. Staff exposure to the infectious patient can be limited while vital sign records are available in a timely manner, complete and error-free in the EMR.

Incorporated standards and profiles

The communication between devices and systems in the showcase is leveraging the IHE Devices' "Services-oriented Device Point-of-care Interoperability" (IHE-SDPi) profile. This includes the following standards of the IEEE 11073 SDC standards family:

SDC

- IEEE 11073-20702-2016 (MDPWS)
- IEEE 11073-10207-2017 (BICEPS)
- IEEE 11073-20701-2018 (SDC)

The architecture defined in the SDC standard is built on the principles of a clinical workplace Service-Oriented Medical Device Architecture (SOMDA). The Medical Device Profile for Web Services (MDPWS), as well as the Basic Integrated Clinical Environment Protocol Specification (BICEPS) are IEEE 11073 standards for the communication inside a SOMDA system.

In addition, the medical device to IT communication uses IHE-PCD-DEC (Device Enterprise Communication) profiles that send HL7v2 messages between Device Observation Reporters and Consumers (DOR/DOC).

The incorporated standards enable the bidirectional transfer of standardized data between systems in medical-grade quality, remote control of device functions, and a high level of cybersecurity, which are limited in today's solutions on the market.



About HIMSS Interoperability Showcases™

Interoperability showcases from the HIMSS are offered as interactive, educational presentations of concepts that "display the exchange, access and use of healthcare data through profiles and standards in real-time." In a combined effort, various market participants such as medical systems manufacturers, healthcare providers and standards development organizations "demonstrate the power of standards-based healthcare interoperability by showcasing systems exchanging and using data in real-time to improve care, outcomes and experience."³⁾ The demonstrated solutions might be prototypes, approved products or a mix of both.

Do you want to learn more about SDC?

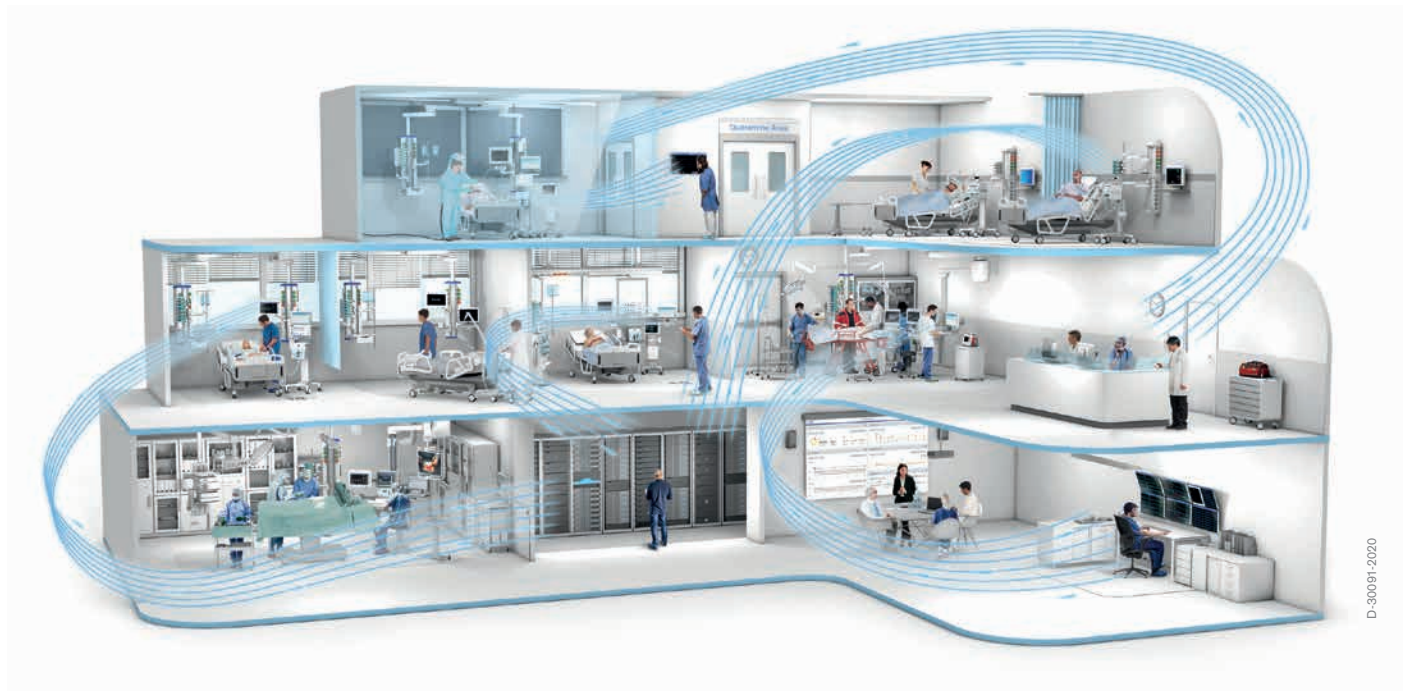
Watch our webinar where industry experts discuss new approaches on standards-based medical device interoperability for high acuity areas.

Scan the QR-Code or [click this link](#) to watch the webinar recording.



We envision a future of acute care where medical devices effectively support clinicians and caregivers in their daily challenge of efficiently achieving the best possible outcomes for patients. We believe that interoperable medical devices can contribute to this and are passionate about developing new clinical applications based on open data exchange technology.

Interested to learn more about our vision of medical device interoperability and our available connected solutions? Please get into contact with your local Dräger representative or go to www.draeger.com/contact



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Sources

- 1) International council of nurses (2020). ICN calls for data on healthcare worker infection rates and deaths.
- 2) Abad et al. (2010). Adverse effects of isolation in hospitalised patients: a systematic review. *Journal of Hospital Infection* 76, pp. 97-102.
- 3) HIMSS (2022). HIMSS Interoperability Showcase. Connections That Transform Health. <https://www.himss.org/what-we-do-initiatives/himss-interoperability-showcase>.

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