



REGIONAL OFFICE FOR

**World Health  
Organization**

**Europe**

country  
vignette

**DENMARK**

# **INFLUENZ-ER: RETHINKING EPIDEMIC PREPAREDNESS AND RESPONSE**

## BACKGROUND



Denmark's Digital Health Strategy 2018–2022, *A coherent and trustworthy health network for all*, aims to support all health-care actors (hospitals, municipal health services and primary care) to connect patient pathways across the health-care sector and enable more tasks to be performed close to patients in a personalized and coherent health system.

Against this backdrop, the Nordsjællands Hospital (North Zealand University Hospital), the largest specialist and acute-care hospital in Denmark's Capital Region, developed an innovative new hospital-at-home model to promote patient safety and relieve pressure on hospitals during emergency situations such as the COVID-19 pandemic.

This new model is part of the wider project Influenz-er: Rethinking Epidemic Preparedness and Response. Influenz-er is a cross-disciplinary scientific project funded partly by Innovation Fund Denmark and partly by the North Zealand University Hospital, evaluating the direct and indirect impacts of the hospital-at-home model on health care and on society more broadly. Prior to the pandemic, home-based hospitalization solutions for epidemic patients had not been available or systematically tested, evaluated and scientifically documented in Denmark.

## THE TECHNOLOGY



The hospital-at-home model provides continued care at home for patients through two technical solutions: a mobile app for patients, and the case management system Modulus Care for clinical staff.

The mobile app allows home-admitted patients to report self-monitoring data such as blood pressure, heart rate, body temperature, respiratory frequency and oxygen saturation. The patients monitor their condition with certified medical equipment including a pulse oximeter, electronic blood pressure monitor and thermometer provided by the Centre of Science for Telemedicine in the Capital Region.

The clinical staff of the Virtual Epidemic Centre (VEC) at the North Zealand University Hospital monitors patients during home admissions and performs clinical assessments via a video link. All gathered data are filtered through the built-in, personalized early warning score (EWS) algorithm that assigns each patient to a green, yellow or red category. Various scores prompt well defined, targeted

actions by the staff, including contacting patients immediately. Furthermore, patients can request to be contacted by the VEC staff via the mobile app.

The clinical assessment system used in the VEC is based on regulatory requirements and approval procedures for medical trials. Approval for the VEC was given by the Danish Scientific Ethics Committee and the Danish Medicines Agency, and the Cen-

tre adheres to Denmark's Good Clinical Practice standards. These Danish Authorities responded fairly quickly to approve the technology, meeting narrow deadlines and working with a collaborative mindset to ensure patient safety during the COVID-19 pandemic. The Danish Society of Patient Safety was part of the advisory team and continues to be engaged in joint research projects.

## IMPACT

The hospital-at-home model at North Zealand University Hospital involves the implementation of complex algorithmics and alarms to support the daily clinical work. Upon CE approval, the developed hospital-at-home medical monitoring system will be available for use by other hospitals and health systems nationally and internationally, thus contributing to wider health systems transformation.

Future research will assess the cost-effectiveness of the hospital-at-home model for epidemic patients, as this could have substantial policy consequences if the intervention is found to reduce the need for hospital beds during public health emergencies.

## MORE INFORMATION

Denmark's Digital Health Strategy 2018–2022:  
<https://sum.dk/publikationer/2018/januar/a-coherent-and-trustworthy-health-network-for-all>

## KEY LEARNING

- **The hospital-at-home model allows hospitals to safely attend to a large number of epidemic patients in their own homes, decreasing pressure on the health system.**
- **The hospital-at-home model provides the health system with a simple, flexible and scalable solution which can be widely used during epidemics/pandemics to ensure that the system will not be overloaded beyond its capacity.**
- **The model is highly sustainable and developed with future health-care transformation in mind, particularly the transition from patients being admitted at hospitals to being admitted at home.**
- **Further research needs to be done to evaluate the direct and indirect impacts of the hospital-at-home model on the health system and on society more broadly.**