

جامعة ساوة الاهلية  
كلية التقنيات الصحية والطبية  
قسم التخدير - اللجنة العلمية

# INTENSIVE CARE UNIT (ICU) -Organization, design



جامعة ساوة

كلية التقنيات الصحية والطبية

قسم تقنيات التخدير

مرحلة ثالثة عناية مركزة/الكورس الاول

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# INTENSIVE CARE UNIT

An intensive care unit (ICU), also known as an intensive therapy unit or intensive treatment unit (ITU) or critical care unit (CCU) is :

**A special department of a hospital or health care facility that provides intensive care medicine.**

## HOW INTENSIVE CARE UNITS WERE BORN?

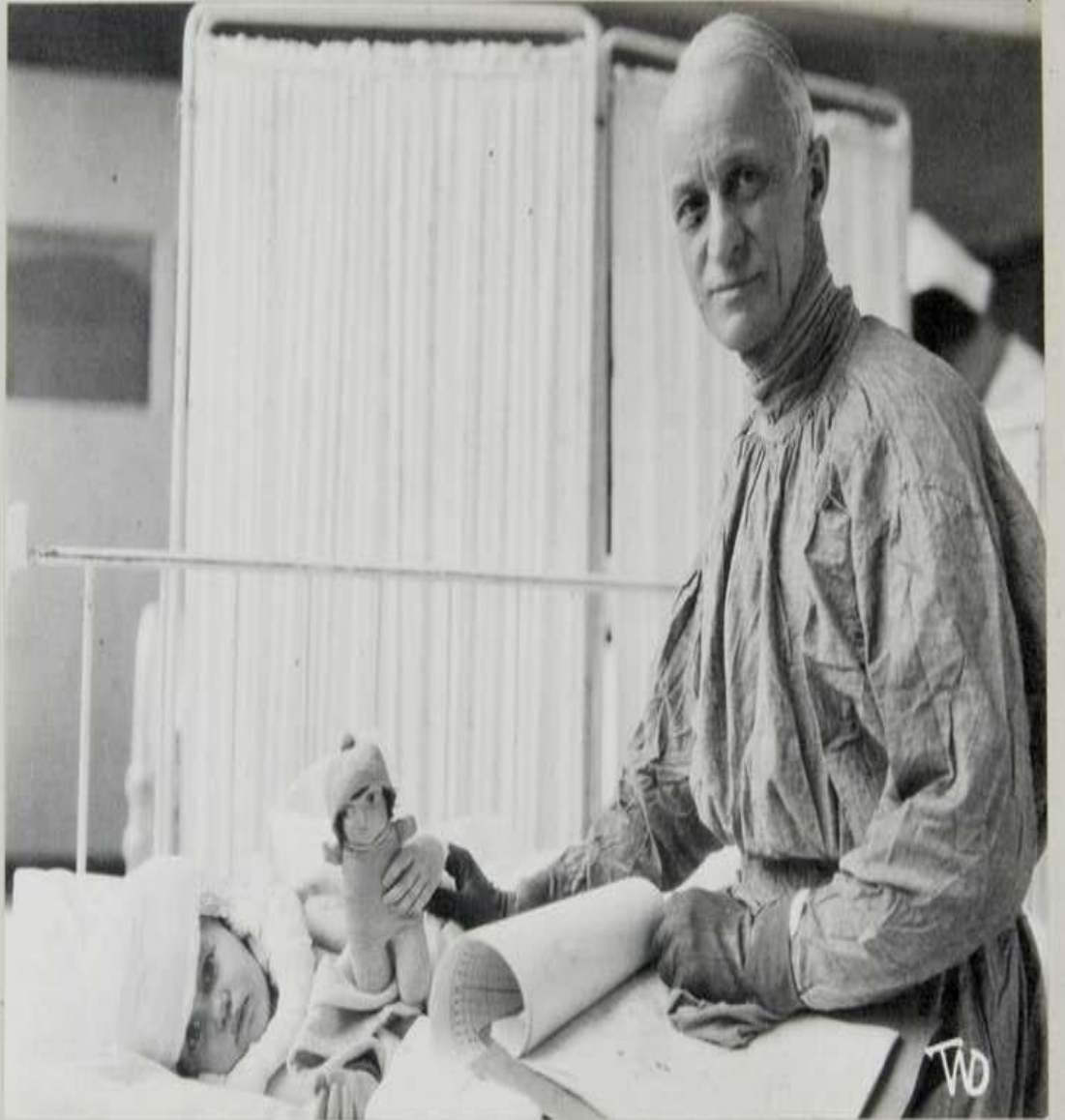
- **Harvey Cushing** was the most brilliant brain surgeon of his generation.
- His patients adored him, describing him as caring and kind.
- Before Cushing, eight out of 10 brain surgery patients died. In his hospital, the surgeon reduced mortality to just 8%.
- In a time before antibiotics, and the ever-present risk of bacterial infection killing anyone going under the knife, Cushing operated under the strictest cleanliness. He wore gloves and a mask, doing whatever he could to sterilise the wound and reduce the chance of disease.

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TWO

# HOW INTENSIVE CARE UNITS WERE BORN?

- **Cushing** continued the care after he had finished his operations – the period when patients were at greatest risk of dying.
- He often tended to patients' wounds himself, ensuring they were kept free of infection.
- He introduced strict observation systems and record keeping – and the first widespread use of x-rays and blood pressure monitoring.
- Each individual patient was the focus of care by a team of specialist staff.
- Cushing's whole ward was more like an intensive care unit than other surgeons

# HOW INTENSIVE CARE UNITS WERE BORN?

- As operations became more complex through World War Two and into the 1950s – with, for example, the first **open heart surgery** – Cushing's pioneering post-operative care became widespread, saving countless lives.
- In August 1952, the Blegdam Hospital in the Danish capital Copenhagen was overwhelmed by hundreds of seriously ill polio patients.
- Without assistance to help them breathe, most would die.
- The only treatment available was a **mechanical respirator system**, known as an **iron lung**.



- The polio epidemic in Copenhagen resulted in 316 patients developing respiratory muscle paralysis and/or bulbar palsy, with subsequent respiratory failure and pooling of secretions.
- The Blegdam Hospital, the hospital in Copenhagen for communicable diseases, had only one tank respirator and six cuirass respirators at the time.
- This was completely inadequate to support the hundreds of polio patients with respiratory failure and bulbar palsy.
- The mortality rate from polio with respiratory failure and bulbar involvement was historically 85–90% and, as the epidemic progressed, the situation looked desperate.

# IRON LUNG

TLE





# IRON LUNG (icu)

Paul Alexander  
1946-2024





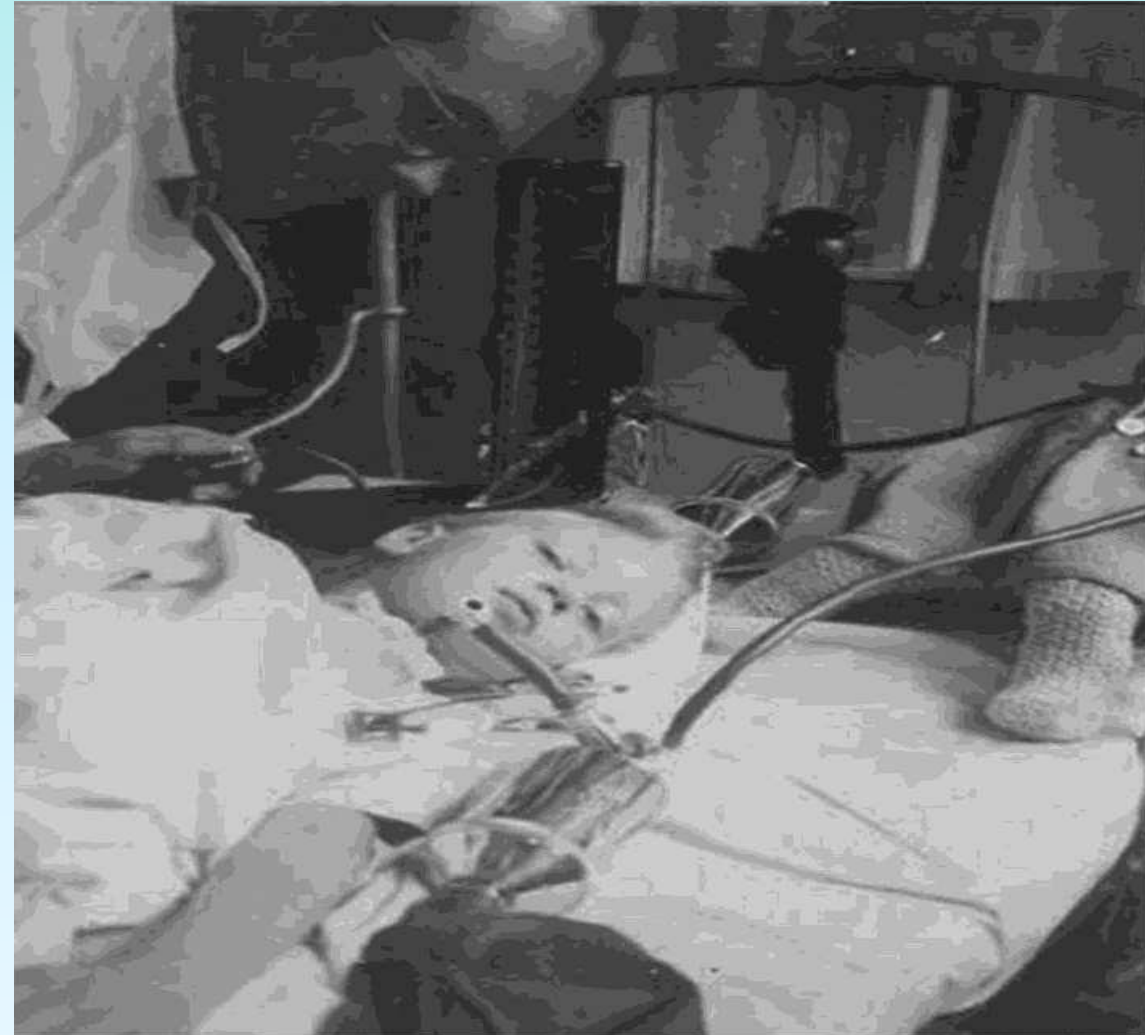
# PORTABLE IRON LUNG



- **Professor Lassen**, chief physician at the Blegdam Hospital, had a strong desire to provide treatment for all polio victims, despite insufficient respirators, and therefore consulted with **Dr Bjorn Ibsen**, a Copenhagen **anaesthetist**.
- Professor Lassen hoped that positive pressure ventilation, as used in modern anaesthesia at that time, might be a solution. Two days later, a 12-year-old girl with polio and resultant respiratory failure and bulbar palsy had a tracheostomy formed just below the larynx: a rubber cuffed tracheostomy tube was inserted and positive pressure ventilation successfully delivered manually with a rubber bag.
- **Dr Ibsen** had the idea of caring for all such patients in a dedicated ward, where each patient could have their own nurse. **Thus, in December 1953, the specialty of intensive care was born**

# Intensive Care

undergone enormous change since the establishment of the specialty more than 65 years.



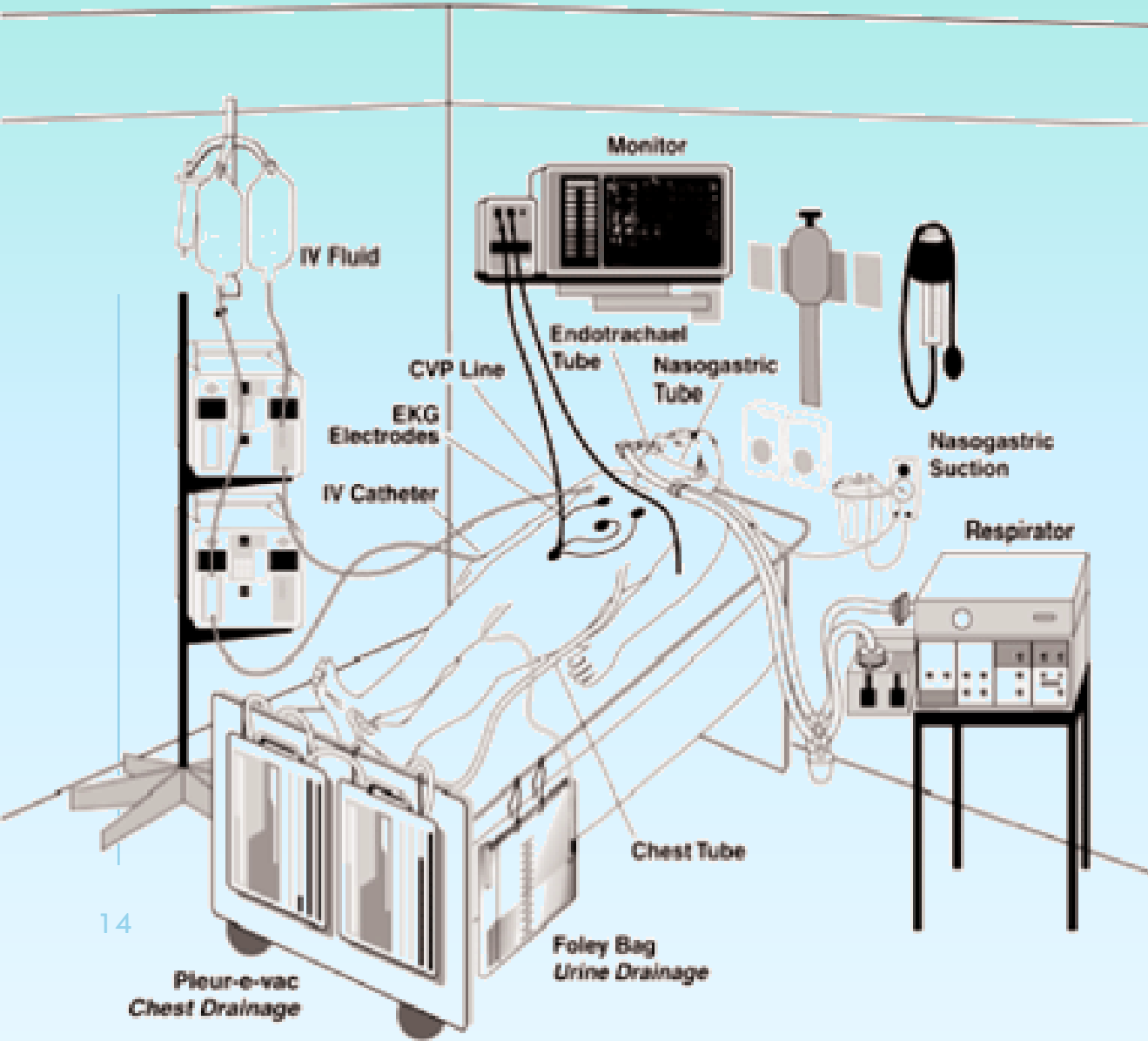
# Intensive care medicine

Intensive care medicine, also called critical care medicine is:

- ❖ A medical specialty that deals with seriously or critically ill patients who have, are at risk of, or are recovering from conditions that may be life-threatening. It includes providing **life support, invasive monitoring techniques, resuscitation, and end-of-life care.**
- ❖ Patients may be referred directly from an **emergency department** or from **a ward** if they rapidly deteriorate, or **immediately after surgery** if the surgery is very invasive and the patient is at high risk of complications.



# Typical icu



## Organization of icu:

- It requires intelligent planning located in a calm, quiet surrounding environment of the hospital
- One ICU may not cater to all needs.
- Can be under separate management: medical ICU, surgical ICU, CCU, burns ICU, trauma ICU, etc.
- The number of ICU beds in a hospital ranges from 1 to 10 per 100 total hospital beds.
- Multidisciplinary requires more beds than single specialty.
- ICUs with fewer than 4 beds are not cost effective and over 20 beds are unmanageable

# Critical care unit layout

ICUs should be easily accessible to departments from which patients are usually admitted and close to departments where patients are transferred to for diagnostics Proximity to the :

- **Operating theaters.**
- **Emergency unit.**
- **Laboratories.**
- **Imaging suites.**

## The design/Patient area

- ❑ Must provide unobstructed passage around the bed with a floor space of 26m<sup>2</sup> per bed.
- ❑ Curtains or screens are required for privacy
- ❑ Floors and ceilings must be constructed to support heavy equipment(>1000kg)
- ❑ Doors must allow for passage of bulky equipment as well as wide beds
- ❑ Entry and exit door to the ICU should be same and single to control access to the ICU and to prevent the ICU from being used as thoroughfare





- ❑ The bed areas should have natural daylight , and patients and staff should ideally have an outside view.
- ❑ Telecommunication systems include an adequate number of telephones, intercom systems to allow bed-to-bed communication, and a system to control entry into the department
- ❑ Computer network should allow communication with central hospital administration, laboratory systems, and the internet



□ There should be:

- isolation cubicles with Air pressure control systems
- stable water supply
- stable electricity + adequate sockets
- Oxygen outlets
- Medical air outlets
- High pressure suction outlets
- Low pressure suction outlets
- functional ventilation + heating + cooling + lighting systems

# ***MOST COMMON TYPES OF ICU***

- Neonatal intensive care unit (NICU).
- Pediatric intensive care unit (PICU).
- Coronary care unit (CCU).
- Neurological Intensive Care Unit (NeuroICU).
- Post-anesthesia care unit (PACU).
- High dependency unit (HDU).

# NEONATAL INTENSIVE CARE UNIT (NICU)

This specialty unit cares for neonatal patients who have not left the hospital after birth.

Common conditions cared for include:

- ❖ **prematurity and associated complications**
- ❖ **congenital disorders such as congenital diaphragmatic hernia**
- ❖ **complications resulting from the birthing process.**

# Pediatric intensive care unit (picu)

Pediatric patients are treated in this intensive care unit for **life-threatening conditions** such as:

- Asthma**
- Influenza,**
- Diabetic ketoacidosis,**
- Traumatic neurological injury.**



# CORONARY CARE UNIT (CCU)

Also known as Cardiac Intensive Care Units (CICU) or Cardiovascular Intensive Care Unit (CVICU).

This ICU caters to patients specifically with:

- congenital heart defects or**
- life-threatening cardiac conditions such as a myocardial infarction (MI) or a cardiac arrest.**

# Neurological intensive care unit (neuroicu)

Patients are treated for **brain aneurysms, brain tumors, stroke, and post surgical patients** who have undergone various **neurological surgeries** performed by experienced neurosurgeons require constant neurological exams.

Nurses who work within these units have **neurological certifications**.

# Post-anesthesia Care Unit (Pacu)

Also known as the **post-operative recovery** unit, or **recovery room**, the PACU provides immediate **post-op. observation** and **stabilization of patients following surgical operations and anesthesia**

## High dependency unit ( HDU)

Most acute hospitals have a **transitional** high dependency unit (HDU) for patients who require **close observation, treatment and nursing care** that cannot be provided in a general ward, but whose care is not at a critical stage to warrant an **ICU** bed

*Thank  
you*





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