Number of mechanically ventilated patients during 2012

Question

What was the total number of mechanically ventilated patients in the UK in 2012?

Background to the ICNARC Case Mix Programme

The Intensive Care National Audit & Research Centre (ICNARC) was established in 1994 on a two-year (1994-1995), pump-priming grant from the Department of Health (England) and Welsh Health Common Services Authority (Wales). ICNARC became an independent Registered Charity in July, 1994 (Registered Charity Number: 1039417).

ICNARC’s aim is to foster improvements in the organisation and practice of adult critical care (intensive and high dependency care) to improve patient care and outcomes. Towards achieving part of this aim, ICNARC coordinates a national, comparative audit of patient outcomes from adult critical care units in England, Wales and Northern Ireland known as the Case Mix Programme (CMP).

The CMP is a voluntary, performance assessment programme using high quality clinical data to facilitate local quality improvement through routine feedback of comparative outcomes and key quality indicators to clinicians/managers in adult critical care units.

The CMP recruits predominantly adult, general critical care units. Adult, general critical care units are defined as either standalone intensive care units (ICUs) or combined intensive care/high dependency units (ICU/HDUs). Participation in the CMP is entirely voluntary. Currently, 96% of adult, general critical care units in England, Wales and Northern Ireland are participating in the CMP.

CMP specified data are recorded prospectively and abstracted retrospectively by trained data collectors according to precise rules and definitions - set out in the ICNARC Case Mix Programme Dataset Specification. Data collectors from each unit are trained prior to commencing data collection with retraining of existing staff, or training of new staff, also available. CMP training courses are held at least four times per year. CMP specified data are collected on consecutive admissions to each participating critical care unit and are submitted to ICNARC quarterly. Data are validated locally, on data entry, and then undergo extensive central validation, for completeness, illogicalities and inconsistencies, with data
validation reports returned to units for correction and/or confirmation. The validation process is repeated until all queries have been resolved and then the data are incorporated into the CMP Database (CMPD).

Participating units receive comparative data analysis reports on outcomes and key quality indicators, in which they can identify their own unit data and compare with all units participating in the CMP. In addition, staff at units can interrogate the CMPD by submitting analysis requests which are provided free-of-charge.

Data collected for the CMP include alphanumeric unit/admission identifiers, demographics (e.g. age, sex, ethnicity), case mix (e.g. acute severity, comorbidity, surgical status, reason for admission), outcome (e.g. unit/acute hospital survival) and activity (e.g. unit/acute hospital length of stay) for each admission to each critical care unit.

Available data for report

156,474 admissions to 227 adult critical care units in England, Wales and Northern Ireland 1 January 2012 – 31 December 2012

Selection of Cases

All admissions to all adult (general and specialist) critical care units that were participating in the Case Mix Programme (CMP) from 1 January 2012 to 31 December 2012 were included in the analysis.

Definitions for variables included

Mechanical ventilation was identified by the recording of advanced respiratory support on at least one calendar day in the field Advanced respiratory support days from the NHS Critical Care Minimum Data Set. Please refer to Appendix A for full definition.

Results

Of 156,474 admissions to 227 adult critical care unit in England, Wales and Northern Ireland participating in the Case Mix Programme during 2012, 69,606 (44.5%) were mechanically ventilated during the critical care unit stay.

Based on the database coverage during 2012, we can extrapolate this figure to estimate the total number of mechanically ventilated admissions in all adult critical care units in England, Wales and Northern Ireland during 2012. This extrapolation was performed separately according to the unit type (general ICU or ICU/HDU, specialist neurosciences unit, specialist cardiothoracic unit, liver unit, HDU) based on the numbers of beds in units participating in the
Case Mix Programme compared against the most recent critical care bed numbers for England reported by the Department of Health\(^1\) plus bed numbers for Wales and Northern Ireland based on ICNARC records. Note that coverage of HDUs in the Case Mix Programme is very low, but as very few admissions to HDU are ventilated the inaccuracy in this extrapolation will have little impact on the total figure. The estimated total number of mechanically ventilated admissions, following extrapolation, was 116,000.

Incorporating published data from the Paediatric Intensive Care Audit Network (PICANet)\(^2\) for paediatric intensive care units and the Scottish Intensive Care Society Audit Group (SICSAG)\(^3\) for adult intensive care units in Scotland, we estimate the total number of ventilated admissions in all adult and paediatric critical care units in the UK during 2012 was approximately 136,000.

Based on a mean duration of ventilation of 6 days in neurosciences units, 2 days in cardiothoracic units or HDUs, and 5 days in other unit types, this figure corresponds to an average of approximately 1,500 ventilated patients at any point in time.

These figures are for a total UK population of 63.7 million (Office for National Statistics mid-year population estimate for 2012).\(^4\)

Note that these figures do not include mechanical ventilation taking place in the following locations:

- Neonatal intensive care units
- Operating theatres and recovery units
- General hospital wards (invasive ventilation on general wards would be very unusual in UK practice)
- Non-NHS hospitals


Please acknowledge the source of these data in all future presentations (oral and/or written), as follows:

“These data derive from the Case Mix Programme Database. The Case Mix Programme is the national, comparative audit of patient outcomes from adult critical care coordinated by the Intensive Care National Audit & Research Centre (ICNARC). These analyses are based on data for 156,474 admissions to 227 adult critical care units based in NHS hospitals geographically spread across England, Wales and Northern Ireland. For more information on the representativeness and quality of these data, please contact ICNARC.”
Appendix A – Definition of Respiratory support days

Taken from the ICNARC Case Mix Programme Dataset Specification, Version 3.1

Respiratory support days

Fields: Basic respiratory support days
       Advanced respiratory support days

Number of data items: Two
Units of measurement: Calendar days

Definition for collection:

- a calendar day is defined as any complete calendar day (00:00-23:59) or part thereof e.g. a patient admitted on 1 January 2006 at 23:45 and discharged on 3 January 2006 at 00:10 would be recorded as having received three calendar days of care
- specifies the number of calendar days during which the admission received any basic or advanced respiratory support whilst on your unit
- record 1, 2, 3 etc for one, two, three etc calendar days; record 998 for 998 or more calendar days; record 999 for support occurring but number of days not known
- Advanced Respiratory - indicated by one or more of the following (see diagram):
  - admissions receiving invasive mechanical ventilatory support applied via a trans-laryngeal tube or applied via a tracheostomy
  - admissions receiving BiPAP (bilevel positive airway pressure) applied via a trans-laryngeal tracheal tube or applied via a tracheostomy
  - admissions receiving CPAP (continuous positive airway pressure) via a trans-laryngeal tracheal tube
- admissions receiving extracorporeal respiratory support
- admissions receiving mask/hood CPAP or mask/hood BiPAP is not considered advanced respiratory support

**Basic Respiratory** - indicated by one or more of the following (see diagram):

- admissions receiving more than 50% oxygen delivered by a face mask (except those receiving short-term increases in FiO₂, e.g. during transfer, for physiotherapy, etc.
- admissions receiving close observation due to the potential for acute deterioration to the point of requiring advanced respiratory monitoring and support e.g. severely compromised airway, deteriorating respiratory muscle function, etc.
- admissions receiving physiotherapy or suction to clear secretions, at least two hourly, either via a tracheostomy, a minitracheostomy or in the absence of an artificial airway
- admissions recently (i.e. within 24 hours) extubated after a period of intubation
- admissions recently (i.e. within 24 hours) extubated after a period (i.e. more than 24 hours) of mechanical ventilation via an endotracheal tube
- admissions receiving mask/hood CPAP or mask/hood BiPAP or non-invasive ventilation
- admissions receiving CPAP via a tracheostomy
- admissions intubated to protect their airway but receiving no ventilatory support and who are otherwise stable.

**Note:** If advanced and basic respiratory monitoring and support occur simultaneously, then only advanced respiratory monitoring and support should be recorded.

**The following diagram may aid categorisation to advanced or basic respiratory support**
Justification

This field is part of the NHS Critical Care Minimum Data Set (CCMDS) approved by the Department of Health and supported by the Intensive Care Society (DSCN: 25/2008 Version 1.1). These data support local, regional and national analysis, commissioning and Payment by Results (PbR). Level of care definitions are based on ICS Standards and Guidelines 2009