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Functions

What does it do?

- Calculation of individual patient risk using POSSUM (all)
 - physiological and operative
 - mortality and morbidity



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Functions

What does it do?

- Calculation of individual patient risk using POSSUM (all)
 - physiological and operative
 - mortality and morbidity
- Predictions as % risk, and outcomes by O/E ratio:
 - Assessment of quality & outcomes down to individual patient & clinician level
 - celebrate successes as well as alerting problems
 - international benchmarking
 - trend as well as snapshot
 - Risk stratification for spectrum analysis of case-mix vs outcomes
 - Pre-admission facilities planning and referrals management
 - Detailed complications & root cause analysis
 - World Class Commissioning support tool



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Background

POSSUM

- Recommended methodology:
 - Royal College of Surgeons (England, Scotland & Ireland)
 - National Confidential Enquiry into Perioperative Deaths (NCEPOD)
 - Vascular Society of Great Britain and Ireland
 - Association of Coloproctology of Great Britain and Ireland
 - Association of Upper Gastrointestinal Surgeons
- In use:
 - 34 units in England
 - 47 countries world wide



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- POSSUM now fully automated, updated, with state-of-the-art web technology and more detailed data capture.
- International referential database of 600,000+ patients: largest of its kind in the world



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Benefits

Simple, secure, web-based remote access system for:

- Consultation support



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- Audit aid for individual mortality or morbidity assessment
 - Appropriate outcome?
 - Appropriateness of surgery?



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- Early intervention system
 - As an aid to resuscitation, planning care needs



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- To assess surgeon/unit performance
 - robust, clinical evidence base for identifying outliers, and causes
 - training and appraisal
 - reliable benchmarking
 - protection for good performers



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 - robust, clinical evidence base for identifying outliers, and causes
 - training and appraisal
 - reliable benchmarking
 - protection for good performers
- Board assurance on CG issues
- Negotiating tool for PBR; useful metrics for CQUIN
- Real patient choice and public accountability



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Hello Demo User

Log Off | User Profile

HOME

About CRAB | Help

General Reports

HOSPITAL OUTCOMES

Risk
Mortality >> | Complications >>

By Consultant
Mortality >> | Complications >>

By Specialty
Mortality >> | Complications >>

Surgical Outlier
Mortality >> | Complications >>

Complications
Overview >> | Detailed >>

HOSPITAL REFERRAL TOOLS

Casemix Profile
Mortality >> | Complications >>

Risk Stratified Referral Pattern
Mortality >> | Complications >>

HOSPITAL TRENDS

General
Mortality >> | Complications >>

Risk Adjusted Outcomes
Mortality >> | Complications >>

Outcome Trend Assessment
Mortality >> | Complications >>

Facilities Tools
Use of Facilities >>

ADDITIONAL REPORTS

Scheduled Reports
Samples >>

Specific Reports

SUB-SPECIALTY ANALYSES

General
Surgical Casemix >> | Activity >>

Casemix Profile
Mortality >> | Complications >>

Trend Analyses
Mortality >> | Complications >>

Need Help?

Click on any **Report Name** to learn more
or
Click on the adjacent >> symbol to get straight
to work.



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Predictive risk scoring

PHYSIOLOGICAL

| | | |
|--------------------|--|---|
| Cardiac; CXR | Raised jugular venous pressure; Cardiomegaly or pulc | ▼ |
| Resp.; CXR | Not known | ▼ |
| Blood pressure | Systolic blood pressure between 131 and 170 mmHg, | ▼ |
| Pulse | Pulse 121 beats/min or more, or 39 beats/min or less | ▼ |
| Glasgow coma score | Not known | ▼ |
| Urea | Between 7.6 and 10 mmol/litre | ▼ |
| Sodium | Not known | ▼ |
| Potassium | Not known | ▼ |
| Haemoglobin | Not known | ▼ |
| White cell count | Not known | ▼ |
| ECG | Not known | ▼ |

OPERATIVE

| | | |
|----------------------|--|---|
| Blood loss | 100 ml or less of blood lost | ▼ |
| Wound contamination | No contamination | ▼ |
| Malignancy | Nodal metastases | ▼ |
| Time of op. (Ortho.) | Elective surgery | ▼ |
| | Elective surgery | |
| | Emergency surgery > 6 hrs and < 48 hrs after admission | |
| | Emergency surgery (immediate) <= 6 hrs after admission | |



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Predictive risk scoring

PHYSIOLOGICAL SCORE: 65

| | | |
|--------------------|--|---|
| Age | 61 - 70 years | 2 |
| Cardiac; CXR | Anti-coagulants, peripheral oedema; borderline cardiomegaly | 4 |
| Resp.; CXR | Short of breath at rest; pulmonary fibrosis, consolidation | 8 |
| Blood pressure | 90 - 99 or 171 or more mmHg | 4 |
| Pulse | 39 or less, or 121 or more bpm | 8 |
| Glasgow coma score | GCS 8 or less | 8 |
| Urea | 10.1 - 15.0 mmol/litre | 4 |
| Sodium | 125 or less mmol/litre | 8 |
| Potassium | 3.5 - 5.0 mmol/l | 1 |
| Haemoglobin | 9.9 or less, or 18.1 or more g/100ml | 8 |
| White cell count | 3.1 - 4.0 or 10.1 - 20.0 x10 ⁹ /l | 2 |
| ECG | 91 or more bpm, arrhythmia, >4/min ectopics, ST/T wave changes | 8 |

OPERATIVE SCORE: 23

| | | |
|--------------------|--|---|
| Severity | Moderate operation | 2 |
| No. of ops | Two operations within 28 days | 4 |
| Blood loss | 501 - 999 ml | 4 |
| Peritoneal soiling | Local pus only | 4 |
| Malignancy | No malignancy present | 1 |
| Time of op. | 6 or less hrs after admission; immediate with resus. | 8 |

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| |
|--|
| Elective surgery |
| Emergency surgery > 6 hrs and < 48 hrs after admission |
| Emergency surgery (immediate) <= 6 hrs after admission |



Mortality Risk

REPORT

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Denver, 13/03/2006 to 31/12/2008.

| Date of Op. | Case | Consultant | D.O.B. | D.O.D. | Risk |
|-------------|---------|---------------|------------|------------|-------|
| 26/03/2006 | 16582 ▼ | Epsilon, Mr E | 20/09/1926 | | 5.6% |
| 05/04/2006 | 16644 ▼ | Tau, Mr T | 17/10/1925 | | 1.7% |
| 30/04/2006 | 17659 ▼ | Pi, Mr P | 27/11/1927 | | 21.9% |
| 11/05/2006 | 16738 ▼ | Tau, Mr T | 12/08/1941 | | 81.2% |
| 24/05/2006 | 17596 ▼ | Pi, Mr P | 28/11/1944 | | 71.7% |
| 30/05/2006 | 16876 ▼ | Epsilon, Mr E | 16/03/1930 | | 25.7% |
| 14/06/2006 | 16874 ▼ | Gamma, Mr C | 07/10/1940 | | 72.7% |
| 13/07/2006 | 17070 ▼ | Pi, Mr P | 16/01/1936 | 17/01/2006 | 2.8% |
| 14/07/2006 | 17119 ▼ | Gamma, Mr C | 07/02/1917 | 30/01/2006 | 48.5% |
| 01/08/2006 | 17598 ▼ | Pi, Mr P | 15/03/1930 | 10/02/2006 | 20.8% |

Change page: < Prev 1 2 3 4 5 6 7 8 9 10 ... Next > | Displaying page 1 of 43; items 1 to 10 of 425

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[< BACK](#) to DATES



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Case-mix adjustment

| PHYSIOLOGICAL SCORE: | | 65 |
|----------------------|--|----|
| Age | 61 - 70 years | 2 |
| Cardiac; CXR | Anti-coagulants, peripheral oedema; borderline cardiomegaly | 4 |
| Resp.; CXR | Short of breath at rest; pulmonary fibrosis, consolidation | 8 |
| Blood pressure | 90 - 99 or 171 or more mmHg | 4 |
| Pulse | 39 or less, or 121 or more bpm | 8 |
| Glasgow coma score | GCS 8 or less | 8 |
| Urea | 10.1 - 15.0 mmol/litre | 4 |
| Sodium | 125 or less mmol/litre | 8 |
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| Haemoglobin | 9.9 or less, or 18.1 or more g/100ml | 8 |
| White cell count | 3.1 - 4.0 or 10.1 - 20.0 x10 ¹² /l | 2 |
| ECG | 91 or more bpm, arrhythmia, >4/min ectopics, ST/T wave changes | 8 |
| OPERATIVE SCORE: | | 23 |
| Severity | Moderate operation | 2 |
| No. of ops | Two operations within 28 days | 4 |
| Blood loss | 501 - 999 ml | 4 |
| Peritoneal soiling | Local pus only | 4 |
| Malignancy | No malignancy present | 1 |
| Time of op. | 6 or less hrs after admission; immediate with resus. | 8 |

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Detailed Complications - by Complication Category / Type

REPORT

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Denver, 01/01/2006 to 31/12/2008.

Drill Down:

| Complication Category / Type | Complications | % of Total | % of Operations |
|--|---------------|------------|-----------------|
| Anastomotic leak / Major ▼ | 20 | 0.7 | 0.1 |
| Anastomotic leak / Minor ▼ | 56 | 2.1 | 0.3 |
| Cardio-respiratory / Arrythmia ▼ | 39 | 1.4 | 0.2 |
| Cardio-respiratory / Cardiac failure ▼ | 296 | 10.9 | 1.8 |
| Cardio-respiratory / Hypotension ▼ | 19 | 0.7 | 0.1 |
| Cardio-respiratory / Other cardiac ▼ | 1 | 0.0 | 0.0 |
| Cardio-respiratory / Other respiratory ▼ | 4 | 0.1 | 0.0 |
| Cardio-respiratory / Pulmonary collapse ▼ | 36 | 1.3 | 0.2 |
| Cardio-respiratory / Respiratory failure ▼ | 62 | 2.3 | 0.4 |
| Death / Death in hospital ▼ | 275 | 10.1 | 1.7 |
| Total | 2710 | 100.0 | 16.7 |

Change page: < Prev 1 2 3 4 5 6 Next > | Displaying page 1 of 6; items 1 to 10 of 55

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Mortality Surgical Outlier

WHAT OUTLIERS WOULD YOU LIKE TO IDENTIFY?

Denver, 01/01/2006 to 31/12/2008.

1. Choose Outlier Type

| | |
|----------------------------------|--|
| <input checked="" type="radio"/> | Unexpected Favourable Outcomes (Above Outlier Threshold) |
| <input type="radio"/> | Unexpected Adverse Outcomes (Below Outlier Threshold) |

2. Set Outlier Threshold

 %

[CREATE REPORT >](#)

Need Help?

Click the on-screen button to choose the report you would like. (Clicking on one button automatically deselects the other.) Then, set the value of the Outlier Threshold.

Click [CREATE REPORT](#) to display the report.

The threshold is the risk of an unfavourable outcome calculated using POSSUM and expressed as a percentage. The higher the number, the greater the risk of an unfavourable outcome.

The report shows all cases that meet the selected criteria.

Mortality Rate (%)



Mortality Rate (POSSUM O/E Ratio)





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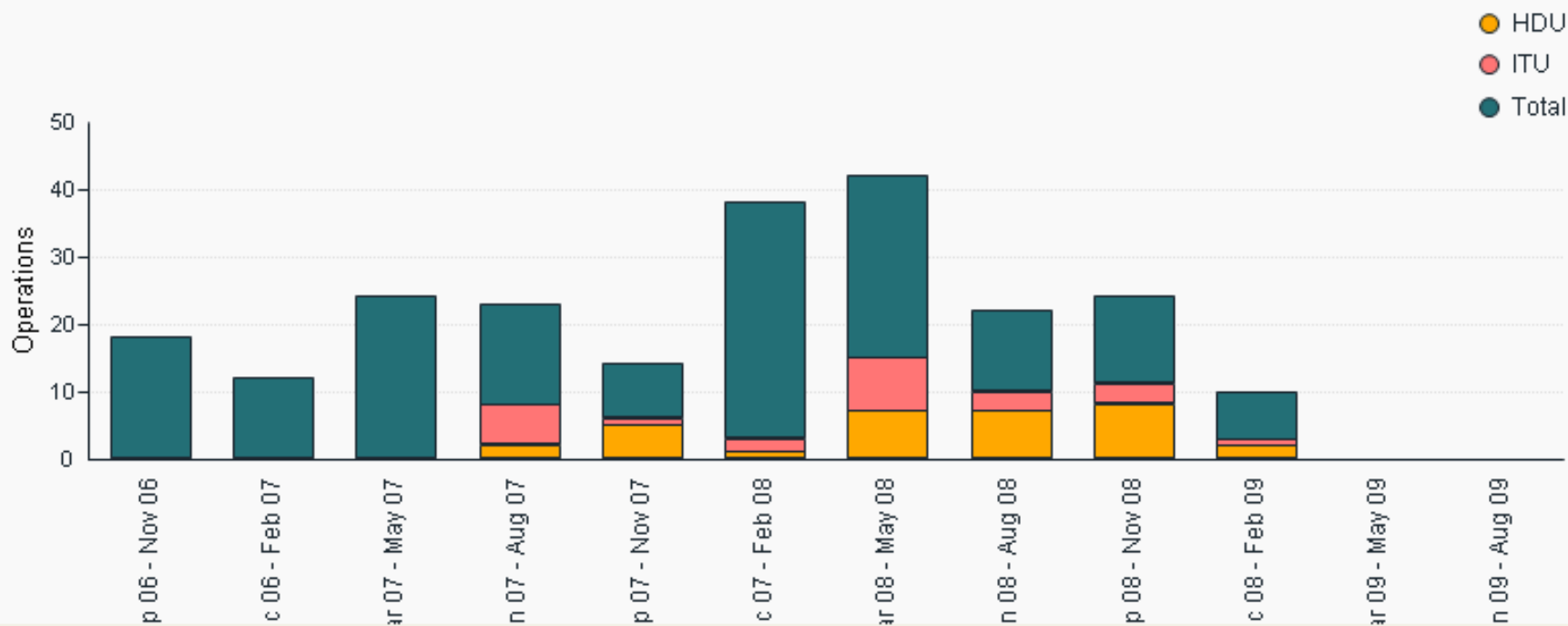
See the whole picture.

Critical care management

Denver, 3 month intervals over a 3 year period, 01/09/2006 to 31/08/2009.

| Period | Sep 06 - Nov 06 | Dec 06 - Feb 07 | Mar 07 - May 07 | Jun 07 - Aug 07 | Sep 07 - Nov 07 | Dec 07 - Feb 08 | Mar 08 - May 08 | Jun 08 - Aug 08 | Sep 08 - Nov 08 | Dec 08 - Feb 09 | Mar 09 - May 09 | Jun 09 - Aug 09 |
|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Total | 18 | 12 | 24 | 23 | 14 | 38 | 42 | 22 | 24 | 10 | 0 | 0 |
| HDU | 0 | 0 | 0 | 2 ▼ | 5 ▼ | 1 ▼ | 7 ▼ | 7 ▼ | 8 ▼ | 2 ▼ | 0 | 0 |
| ITU | 0 | 0 | 0 | 6 ▼ | 1 ▼ | 2 ▼ | 8 ▼ | 3 ▼ | 3 ▼ | 1 ▼ | 0 | 0 |

Mortality Risk >20%





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| Period | Jan 06 - Mar 06 | Apr 06 - Jun 06 | Jul 06 - Sep 06 | Oct 06 - Dec 06 | Jan 07 - Mar 07 | Apr 07 - Jun 07 | Jul 07 - Sep 07 | Oct 07 - Dec 07 | Jan 08 - Mar 08 | Apr 08 - Jun 08 | Jul 08 - Sep 08 | Oct 08 - Dec 08 |
|-------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Total | 45 | 37 | 21 | 31 | 188 | 175 | 172 | 179 | 168 | 168 | 45 | 0 |
| Fatalities | 0 | 4 ▼ | 4 ▼ | 1 ▼ | 10 ▼ | 9 ▼ | 10 ▼ | 4 ▼ | 8 ▼ | 4 ▼ | 1 ▼ | 0 |
| Raw % | | 10.8 | 19.0 | 3.2 | 5.3 | 5.1 | 5.8 | 2.2 | 4.8 | 2.4 | 2.2 | |
| POSSUM O/E Ratio | | 1.25 | 2.08 | 0.84 | 1.34 | 1.03 | 1.15 | 0.49 | 0.83 | 0.76 | 1.21 | |

Mortality Rate (POSSUM O/E Ratio)

