

Surgical Expert Systems:

# Postoperative Pneumonia

Postoperative pneumonia (POP) is one of the most common complications and is defined as hospital-acquired pneumonia or ventilator-associated pneumonia in post-surgical patients. The complication includes risk factors such as advanced age, chronic obstructive pulmonary disease (COPD), emergency surgery, and prolonged ventilation<sup>1</sup>.

*Postoperative pneumonia has the highest incidence of hospital-acquired pneumonia in the world, with a rate of 1.5 to 15.8%<sup>1</sup>.*

Postoperative Pneumonia risk scores provided by Stream Care™ are selected based on a thorough and extensive review of existing literature, incorporating:

- ✓ 31 Peer Reviewed Papers
- ✓ 2 Systematic Reviews
- ✓ 6 Textbooks



## Impact

Postoperative pneumonia occurs in 1-4% of colorectal patients, while incidence in bariatric populations sits at 0.25%<sup>2,3</sup>.

Pulmonary complications, primarily pneumonia, are the most common complications after esophageal procedures and can occur in up to 40% of patients, with the rate of postoperative pneumonia being 16.2%<sup>4,5</sup>.

Postoperative pneumonia can adversely affect the outcomes of surgical patients and may even threaten their lives<sup>1</sup>. Mortality related to postoperative pneumonia among surgical patients has been reported to range from 20 to 50%, and the mortality rate varies by the type of surgery<sup>6</sup>. Furthermore, postoperative pneumonia negatively affects the patients' early postoperative recovery and late quality of life. The complication can significantly prolong the hospital stay of surgical patients and significantly increase their postoperative ICU occupancy rate, readmission rate, and reoperation rate<sup>6,7</sup>, which greatly aggravate the burden of medical expenses of patients and leads to an average increase by approximately 2-10 times of additional medical expenses<sup>7,8</sup>. Overall, this results in a 75% mean increase in total hospital charges, which translates to approximately \$28,000 USD<sup>9</sup>.

# Risk prediction for postoperative pneumonia that improves recovery planning and informs early clinical intervention.

## Static Risk Scores

### Gupta Postoperative Pneumonia Risk Score

Gupta Postoperative Pneumonia Risk Score **predicts the risk of pneumonia following surgery**<sup>10</sup>.

#### Source

The Gupta Postoperative Pneumonia Risk Score was developed by [Gupta et al.](#)

#### Patient Population

The Gupta Postoperative Pneumonia Risk Score was developed using patients who underwent anorectal, aortic, bariatric, and brain operations<sup>10</sup>.

#### Data Set

The American College of Surgeons' National Surgical Quality Improvement Program (ACS NSQIP)<sup>10</sup>

#### Sample Size

211,410<sup>10</sup>

#### Inputs

- Smoking
- Type of Procedure
- COPD
- Age
- ASA Class
- Functional Status
- Preoperative Sepsis

## Performance Metrics

Risk Score	Cited By	Reference	Validation Type	AUC	Specificity	Sensitivity	NPV	PPV
Gupta Postoperative Pneumonia Risk	167	<a href="#">Gupta et al.</a>	Internal	0.855	-	-	-	-

## References

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