

## Making Clinical Financial Estimations

Estimating nursing costs is a challenging process. Traditionally, nursing costs have been simply based on time spent. Recently, however, nursing researchers have been looking at models that recognize the value of nursing care beyond the minutes and hours spent in care. This approach, called relative value units (RVU), multiplies the nursing time by a factor derived to reflect time, skill required, risk to the patient, risk to the provider, and severity of illness.<sup>1, 2</sup> While this approach is being used to reimburse physicians, the nursing models are not yet fully developed.

For our purposes, to be conservative in our estimates, and since the models haven't been validated, we used straight time estimates. To standardize the times, we used the Nursing Interventions Classification (NIC). In 1987, a group of University of Iowa nursing researchers constructed a standardized terminology to describe the activities nurses carry out, the NIC. The NIC defines an intervention as "any treatment, based upon clinical judgment and knowledge, that a nurse performs to enhance patient/client outcomes."<sup>3</sup> The list includes interventions that nurses do on behalf of patients; those that the nurse carries out independently and in collaboration with other members of the healthcare team; and those that are done directly with and for patients as well as interventions that support patient care. Over the years, the list has expanded and been revised through additional research. Each of the 554 interventions has a name, a definition, and a list of activities that the nurse might do to carry out the intervention.<sup>4</sup> In the NIC book's 6<sup>th</sup> edition, the authors include estimated time range and the educational level necessary to perform the interventions.<sup>4</sup>

The formulas that follow can be modified based on your own hospital data.

### Data Sources

These are the data sources for the financial analysis in the Evidence-Based Care of Patients with Chest Tubes presentation.

### Nursing Activity Time

Nursing Interventions Classification 6<sup>th</sup> edition,<sup>4</sup> Time and Education Level Necessary to Perform NIC Interventions. We used the mean of the range provided for our calculations.

- Embolus precautions is "reduction of the risk of an embolus in a patient with thrombi or the risk of thrombus formation"<sup>4</sup> and includes 22 activities: 23 minutes
- Incision site care is "cleansing, monitoring, and promotion of healing in a wound closed with sutures, clips or staples"<sup>4</sup> and includes 19 activities including dressing changes: 38 minutes



- Tube care, chest is “management of a patient with an external device exiting the chest cavity”<sup>4</sup> and includes 38 activities: 7 minutes
- Health Information Exchange is sharing patient information with other health professionals<sup>4</sup> OR Surveillance, which is “purposeful and ongoing acquisition, interpretation, and synthesis of patient data for clinical decision making”<sup>4</sup>: shortest time is 10 minutes

### Nursing Salary and Benefit

Nursing salary and benefit for registered nurse from the Bureau of Labor Statistics, U.S. Department of Labor, data for December 2014, reported in March 2015 (Available at <http://www.bls.gov/ect/>)

- Mean registered nurse hourly wage: \$33.55 + benefits \$10.40 = \$43.95/hr (73 cents/min)

### Postoperative Hospital Length of Stay

Length of stay values are from the Society of Thoracic Surgeons Adult Cardiac Surgery Database and research presented at the Society of Thoracic Surgeons’ annual conference<sup>5</sup>. Other types of cardiac surgery, including single and multiple valve replacements and repair, and valve replacements or repairs combined with CABG all have longer LOS than CABG alone. We are using CABG LOS to be as conservative as possible.

- Coronary artery bypass graft surgery mean LOS: 7 days
- Thoracic surgery mean LOS: 4 days

### Hospital Costs

#### Hospital Supplies

Chargemaster data is from San Francisco General Hospital 2014 (Available at <https://communities.socrata.com/Health/OSHPD-San-Francisco-General-Hospital-SFGH-Hospital/bqcq-fa6h> )

#### Cost per Day

Cost per day of hospitalization 2012 (baseline, no added services) \$2090

From the Kaiser Family Foundation whose mission is “to build an institution that plays a special role as a trusted source of information in a health care world dominated by vested interests.” They adapt data from the American Hospital Association into user-friendly accessible formats. Most recent data available is 2012, online at: <http://kff.org/other/state-indicator/expenses-per-inpatient-day>

#### Imaging Costs and Reimbursement

From study of use and costs of “routine” imaging in trauma care<sup>6</sup>; note differences between costs to the hospital (what it costs to provide the service) versus charge or reimbursement

Cost to the hospital for single-view chest radiograph = \$103, cost of interpretation = \$25



Nursing labor under health information exchange and surveillance, 10 minutes x 73 cents = \$7.30 to assist with diagnostics and track down and report results

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### Derived From Data Sources

NIC time x 73 cents per minute mean nursing wage

Embolus precautions mean duration is 23 minutes, \$16.79

Incision Site Care mean duration is 38 minutes, \$27.74

Petroleum gauze, each \$10.00

### Assumptions

- Incisions / dressings: 2 chest tube, 1 surgical incision for both CABG and thoracic surgery, CABG chest tubes removed after 2 days; thoracic after 3 days
- Postoperative dressing change (incision site care) of surgery site and chest tube insertion sites can be accomplished in 38 minutes total
- Baseline is daily dressing changes

### CABG Surgery Calculations

CABG LOS 7 days

Daily dressing change labor: 7 days x \$27.74 per dressing care episode = \$194.18

Daily dressing change supplies: 2 chest tubes x 2 days petroleum gauze = \$ 40.00

Total nursing labor and supplies at baseline = \$234.18

### Thoracic Surgery Calculations

Thoracic surgery LOS 4 days

Daily dressing change labor: 4 days x \$27.74 per dressing care episode = \$110.96

Daily dressing change supplies: 2 chest tubes x 3 days petroleum gauze = \$ 60.00

Total nursing labor and supplies at baseline = \$170.96

## Potential Financial Benefits: Dressings

### CABG

Reduce dressing changes by 3 days, save 3 x \$27.74 labor per dressing = \$ 83.22 savings

Alternatively,

Use no petroleum gauze and ones half nursing care time = \$ 97.09 cost

*Savings = (234.18 original nursing labor and supplies) – (97.09 above) = \$137.09 TOTAL SAVING*

### Thoracic surgery

Use no petroleum gauze and ones half nursing care time = \$ 55.48

*Savings = (170.96 original nursing labor and supplies) – (55.48 above) = \$115.48 TOTAL SAVING*

## References

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4. Bulechek GM, HK Butcher, JM Dochterman, CM Wagner, eds. Nursing Interventions Classification (NIC). St. Louis, MO: Elsevier Mosby; 2013; 6<sup>th</sup> edition.
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6. Ziegler K, JM Feeney, C Desai, et al.: Retrospective review of the use and costs of routine chest x rays in a trauma setting. Journal of Trauma Management and Outcomes 2013;7(1):2.

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