A Staffing Model Approach: VHA Administrative Staffing Model

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Topics for Today

• Brief Introduction to Office of Productivity, Efficiency & Staffing (OPES)
• OPES Modeling Framework
• Administrative Staffing Model
THE OFFICE OF PRODUCTIVITY, EFFICIENCY, & STAFFING (OPES)

The VHA Office of Productivity, Efficiency, and Staffing (OPES) is dedicated to enhancing VHA leadership decision-making through data-driven analytics. OPES develops management tools designed to monitor clinical productivity, to measure operational efficiency, and to promote the goal of clinical excellence through improved access and the provision of safe, efficient, effective compassionate care.

OPES tools supports informed decision-making by VHA leadership with the goal of aligning provider practice consistent with the demands and needs of the Veteran population. OPES analytic process emphasizes patient-centered and evidence-based processes for improving VHA health care delivery operations. For more information on OPES operational tools like the Provider Productivity Cubes and Reports and the Efficiency Opportunity Grid, please visit the OPES website.

About the Team

- Composed of Health Care Economists and Data Analysts
- Small Group (12 FTE) Working Virtually
- Highly experienced with VA Data Sets, SAS, SQL, Reporting Services, Pyramid
- Operationally Motivated
OPES Work

Patient Risk Adjustment

Productivity
- Physician Productivity & Staffing Data Base
- Advanced Practice Provider Productivity & Staffing Data Base
- Physical Medicine & Rehabilitation Productivity & Staffing Data Base
- Social Work Productivity & Staffing Data Base

Staffing
- Administrative Staffing Model
- Medicine Sub-Specialty Staffing Model
- Surgical Sub-Specialty Staffing Model
- AdHoc Models: Audiology, Compensation and Pension, Gastroenterology & Nursing

Efficiency
- Overall Cost Efficiency Model – Stochastic Frontier Analysis
- Focused Utilization/Cost Efficiency Models (Bed Days, Emerg Visits, Pharmacy, Laboratory, Radiology)
- End of Life Care Expenditures Model
- Avoidable Hospitalization Model (Ambulatory Care Sensitive Conditions)

Facility Complexity Model – Facility Characteristics
Modeling Framework

• Efficiency and staffing models use regression analysis to describe existing variation in utilization/FTE
  – Regression used to account for facility level variation in facility, patient, and geographic characteristics
  – Regression provides an objective approach to facility comparisons

• Models run at the parent facility level (i.e. Facility Director and their scope of control)
  – Models test for relationships with existing VHA datasets to identify known sources of variation
Linear Regression Modeling

- Ordinary least squares regression
  - Identifies the relationship between the dependent variable and the independent variables
  - Models use the Log-Linear regression form: $\ln(y_j) = b_0 + X_j b + \varepsilon_j$
- Model process
  - Test independent variables
  - Include statistically significant variables
  - Identify best model fit
- Expected value based on model prediction from facility independent variable values
  - Parameter estimates from regression results

VHA Administrative Staffing Model Fit (FY18)

$R^2 = 0.9510$
Portfolio of Variables

**Facility Characteristics**
- Square Footage/Acreage
- Leased Space
- Bed Counts by Type
- Residents
- Research
- Emergency Department
- Operative Complexity
- In-house Specialty Counts
- Intensive Care Units
- Long Term Care
- CBOC Count

**Patient Characteristics**
- Pro-Rated Patients
- Patient Risk
- Patient Age
- Priority Grouping
- Service Connection
- Insurance Coverage
- Patient Income
- Patient Diagnoses
- High-Cost/Risk Cohorts
- Medicare Reliance

**Geographic Characteristics**
- CMS Geographic Price Index
- Average Salary
- Travel Time
- Travel Distance
- Choice Act Eligibility
- Utility Price
- Rural Facility
- Referral Patterns
- Weather Measures
Administrative FTE Model
Objectives

• To develop an apples-to-apples model for monitoring Administrative FTE across facilities and VISNs
• To reveal the trends in Administrative FTE in the VHA
• To identify rates of administrative staffing for Title 38 employees (clinical staff serving as administrators)
• To monitor variation in a key cost driver (administrative staffing)
Administrative FTE Model
National Trends

ARC PATIENTS (PRP) GROWTH VS. ADMIN FTE GROWTH

<table>
<thead>
<tr>
<th></th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17</th>
<th>FY18</th>
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<tbody>
<tr>
<td>ARC PRP</td>
<td>5,891,325</td>
<td>6,011,798</td>
<td>6,175,399</td>
<td>6,296,054</td>
<td>6,362,377</td>
<td>6,391,576</td>
<td>6,455,655</td>
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<tr>
<td>Admin FTE</td>
<td>63,409</td>
<td>67,316</td>
<td>69,615</td>
<td>70,557</td>
<td>73,401</td>
<td>76,337</td>
<td>79,396</td>
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</tbody>
</table>
Administrative FTE Model
Dependent Variable

**Dependent variable:** Administrative FTE

**Data sources**
- FMS 830 Cube (BOC 1001, 1002 FTE)
- ALBCC Cube (Labor Mapping for Title 38 staff)

**Dependent variable cost logic (BOC 1001/1002)**
- Exclude non-VHA funds, VACO station numbers, non-operational VA cost centers (using the cost logic from the stochastic frontier analysis (SFA))
- Include BOC 1001, 1002
- Redistribute VISN and 8652 FTE
- Adjust BOC 1002 by standardizing BOC 1002 employees to the cost of BOC 1001

**Dependent variable cost logic (Title 38 FTE)**
- MCA Extract #1
  - Clinical staff (identified by BOC)
  - In an admin cost center (400, 500, or 600 series)
  - Doing admin, research or training work (identified by costs mapped to those three MCA production units)
- MCA Extract #2
  - Clinical staff (identified by BOC)
  - In clinical cost centers (200, 300)
  - With time mapped to an admin cost center (400, 500)

**Final dependent variable**
- Sum of BOC 1001, adjusted BOC 1002, VISN redistribution, Title 38 FTE
Administrative FTE Model
Independent Variables

ARC PRP
CPM Risk Score
LTC ADC
Residents
Multiple ED/UGC
Patients from Other Facilities

R² = 0.95
79,396 Total FTE

Rural Core Patient %
### Patient Population Measures

#### Workload Measure
**Allocation Resource Center (ARC) PRP**
- ARC uses PRPs for assigning patients to facilities in the Veterans Equitable Resource Allocation (VERA) model
  - This is the gold standard for weighted workload within VHA
  - Veterans are pro-rated based on their cost to parent facilities
- [ARC website](#)
- Data based on End of FY16 (prior year)

#### Patient Risk Measure
**Facility Risk Model Score (CPM Risk)**
- OPES annually develops a risk model at the patient level that adjusts for the relative cost of patients
- Risk score is aggregated to the facility level to identify relative patient severity
- [OPES risk website](#)
- Data based on FY16 (prior year) age and diagnosis information
## FY18 Model Results

<table>
<thead>
<tr>
<th>VISN</th>
<th>Observed FTEs</th>
<th>Expected FTEs</th>
<th>ARC PRP</th>
<th>FTEs per 1,000 PRP</th>
<th>Expected FTEs per 1,000 PRP</th>
<th>Observed over Expected Ratio (O/E)</th>
<th>Observed Minus Expected (OME)</th>
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<tr>
<td>1V02</td>
<td>4,310</td>
<td>4,622</td>
<td>299,336</td>
<td>14.4</td>
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<td>1V04</td>
<td>3,590</td>
<td>3,821</td>
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<td>2,859</td>
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<td>2V09</td>
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<td>1V06</td>
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<td>3,508</td>
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<td>5V21</td>
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<td>13.1</td>
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<td>VHA Total</td>
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<td>79,396</td>
<td>6,455,653</td>
<td>12.3</td>
<td>12.3</td>
<td>1.00</td>
<td>0</td>
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</table>
Administrative FTE Model
Turning the Model into Action - Operations

What does this mean?

- Sites with O/E above 1.0 have higher than expected Administrative FTE after adjusting for relevant facility variation
- Variation can be explained by:
  - Data validity issues
  - Random variation
  - Controllable variation
  - Model incompleteness
- An O/E above 1.0 is an indicator that a particular area may have more opportunity for efficiency gains than other areas of focus

What now?

- Sites should complete a detailed focus on the model:
  - Ensure validity of dependent variable
    - Identify errors
    - Fix errors in relevant data systems
  - Look at variation in dependent variable
    - Complexity (MCG) Group
    - Peer sites
    - Year over year
    - Internal variation
Administrative FTE Model
VISN Observed to Expected Ratio
Administrative FTE Model
Facility Observed to Expected Ratio

FY2019 Admin FTEE Model
Facility Observed to Expected (OE) Values

Quintile
1=Most Efficient to 5=Least Efficient

ChooseVA
Administrative Staffing Model
Using the Administrative FTE Drill Down Tool

Select Model Year and Fiscal Period
(Real Time Data)

Use Hyperlinks to Drill into Facility and Cost Center Detail

• National and facility level detail uses FMS as data source

• Contains name level detail for specific cost centers
Administrative FTE Model

Data Validation

How to get the biggest bang for your buck when validating data:

• Look for the biggest raw numbers:
  – Cost centers with small numbers of FTEs will not impact the overall model in the same way as large ones

What am I looking for?

• Any costs (FTE) that are not costs attributable to your site.
  – VISN costs, VACO costs, non-operational costs (research, etc.)

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<table>
<thead>
<tr>
<th>Cost Center</th>
<th>VSSC Unique Patients FY13 thru SEP</th>
<th>PMIS 10K Admin FTE FY13 thru SEP</th>
<th>DSS Admin FTE FY13 thru SEP</th>
<th>Total Admin FTE FY13 thru SEP</th>
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<tr>
<td>(8411) BUSINESS OFFICE OPERAT</td>
<td>65,486</td>
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<td>3.18</td>
<td>168.38</td>
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<tr>
<td>(8413) CONTRACTUAL &amp; FEE SERV</td>
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<td>18.15</td>
<td>1.00</td>
<td>19.15</td>
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<tr>
<td>(8419) QUALITY &amp; SYSTEMS INFR</td>
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<td>1.00</td>
<td>1.00</td>
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<tr>
<td>(8419) QUALITY ASSURANCE &amp; CAR</td>
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<td>9.04</td>
<td>9.13</td>
<td>18.17</td>
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<td>58.54</td>
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<td>68.34</td>
<td>0.00</td>
<td>68.34</td>
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<td>37.72</td>
<td>10.44</td>
<td>48.15</td>
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<td>(8479) INFORMATION RESOURCES M</td>
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<td>1.00</td>
<td>1.00</td>
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<tr>
<td>(8511) DFC OF CHEF ENGINEERN</td>
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<td>14.08</td>
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<td>19.08</td>
<td>1.00</td>
<td>20.08</td>
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<td>16.41</td>
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<td>65,486</td>
<td>13.67</td>
<td>0.00</td>
<td>13.67</td>
</tr>
</tbody>
</table>

VACC with over 50 FTE
Administrative FTE Model

Data Validation

**Are costs/FTE aligned correctly?**

- Remember that costing errors within your own site will not change the Admin FTE model
  - If an Admin FTE is mistakenly classified in VACC 8241 instead of 8421, the net impact on the model will be zero.
- But non-site costs in the incorrect VACC will have an impact:
  - Admin FTE classified in a operational cost center when actually a VACO employee
  - VISN FTE where FTE not cost transferred to other sites

**Data Reliability:**

- Data Inconsistencies
- Corroborate with independent data sets
- Data Sources
Administrative FTE Model
Finding Areas of Variance

Variance can be from peer groups,

- The Admin FTE Drill Down Report highlights cost centers where number of FTE are greater than on standard deviation above the mean of the facility complexity group.

Or a particular comparable site,

- The Facility FTE Comparison Tool allows for comparisons between selected facilities.
- This can help identify heavily staffed cost centers

http://1.usa.gov/1Gx3fqG
Administrative FTE Model
Finding Areas of Variance

Or variance in type of Admin FTE,

- DSS (Title 38) FTE are higher cost
  - Is this a normal distribution of Title 38 employees to Title 5?

Or simply variance in year over year trends.

- Overall admin FTE trends
- Or trends within cost centers
Administrative FTE Model
Develop Action Plan

• Action plan for administrative FTE
  – Fix invalid data identified from data validation
    • Involve your HR and Finance offices to ensure accurate cost accounting
    • Ensure DSS labor mapping is correct to ensure correct capture of Title 38 administrative staff
  – Probe areas of variance from peer facilities and peer groups
    • What departments are heavily staffed compared to our peer groups?
    • What departments are heavily staffed compared to our selected peer sites?
    • Are Title 38 FTE being appropriately and effectively deployed in administrative roles?
    • Is there a reason for our overall trend in administrative FTE?
    • Is there a reason for the trend of administrative FTE within given departments?
  – Identify specific areas of concern and take action
    • Allocation of new resources
    • Re-allocation of existing resources
    • Systems redesign to encourage efficiency
    • Other resource decision-making
Administrative FTE Model
Develop Action Plan

Use the Admin FTE tool to make resource decisions

- Identify departments that are heavily staffed (or drastically understaffed)
  - Evaluate the overall efficiency of the department (are the staff being used effectively?)
  - Implement micro-systems analysis to increase efficiencies in heavily staffed departments
- Resource boards
  - Use the Admin FTE tool to identify possible over use of Title 38 FTE
  - Identify departments in greatest need of resources

Remember that the Admin FTE drill down tool goes to the name level:

- Use the name level to identify potential separations and retirements
- Identify areas where enhanced workforce planning is required
Summary

• Staffing Models
  • Facility Characteristics
  • Patient Characteristics
• Productivity Measurement
## VHA ADMINISTRATIVE STAFFING MODEL

### Analysis of Variance

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F Value</th>
<th>Pr &gt; F</th>
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<td>4.47847</td>
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<td>&lt;.0001</td>
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<td>0.01224</td>
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<tr>
<td>Corrected Total</td>
<td>139</td>
<td>32.96472</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Root MSE        | 0.11063 | R-Square | 0.9510 |
| Dependent Mean  | 6.22364  | Adj R-Sq | 0.9484 |
| Coeff Var       | 1.7775   |          |        |

### Parameter Estimates

| Variable                   | DF | Parameter Estimate | Standard Error | t Value | Pr > |t| |
|----------------------------|----|--------------------|----------------|---------|------|--|--|{}
| Intercept                  | 1  | -2.6132            | 0.37488        | -6.97   | <.0001|   |
| ARC PRP                    | 1  | 0.77069            | 0.031          | 24.86   | <.0001|   |
| CPM RISK                   | 1  | 0.76273            | 0.19873        | 3.84    | 0.0002|   |
| LTC ADC                    | 1  | 0.08201            | 0.016          | 5.12    | <.0001|   |
| RURAL CORE PATIENTS        | 1  | -0.03437           | 0.01422        | -2.42   | 0.017 |   |
| PTS FRM OTH FACILITIES     | 1  | 0.55662            | 0.14838        | 3.75    | 0.0003|   |
| MULTIPLE ED OR UCC         | 1  | 0.15892            | 0.03547        | 4.48    | <.0001|   |
| RESIDENTS                  | 1  | 0.02165            | 0.00995        | 2.18    | 0.0313|   |


