Type Agreement: Purchase Order K08506

Award Period: From 9/21/82 To 11/5/82 (Performance) (Reports)

Sponsor Amount: $3,651

Cost Sharing: NA

Title: An Analysis of the Pulmonary Services Department of Kennestone and Windy Hill Hospitals

ADMINISTRATIVE DATA

1) Sponsor Technical Contact: Mr. John Lindsey

Purchasing
Kemestone Hospital
677 Church St.
Marietta, GA 30060

Defense Priority Rating: NA

Security Classification: NA

REQUIREMENTS

See Attached Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with NA

COMMENTS:

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Research Property Management
Accounting
Procurement/EES Supply Services

Research Security Services
Reports Coordinator (OCA)
Legal Services (OCA)
Library

EES Public Relations (2)
Computer Input
Project File
Other GTRI

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Office
Date June 2, 1983

Project Title: An Analysis of the Pulmonary Services Department of Kennestone and Windy Hill Hospitals

Project No: E-22-617

Project Director: Dr. Tom Bowlin

Sponsor: Kennestone Hospital

Effective Termination Date: 11/15/82

Clearance of Accounting Charges: 11/15/82

Grant/Contract Closeout Actions Remaining:

- [x] Final Invoice and Closing Documents
- [ ] Final Fiscal Report
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other _______________________

Assigned to: Health Systems (School/Institution)

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Project File
Other Bowlin

FORM OCA 10:781
INVESTIGATION OF TIME STANDARDS AND RELATED ISSUES
FOR THE PULMONARY SERVICES DEPARTMENT

KENNESTONE HOSPITAL

MARCH 1983

A COMMUNITY OUTREACH PROGRAM PROJECT
of the
Health Systems Research Center
Georgia Institute of Technology
Atlanta, Georgia

prepared by
Tom H. Bowlin, Ph.D.
SUMMARY

The Pulmonary Services Department of Kennestone Hospital has a long history of including productivity monitoring as a significant element in its management structure. This project focused on determination of valid time standards for the Department. Besides a thorough literature review, the project included an observational phase in which time data for activities undertaken by the therapist and technician staff was collected.

Analysis of the data collected in the project verified that time standards being used by the Department were accurate in reflecting the actual time required for a broad range of treatments and other activities. No final determination could be made as to whether the time standards in use represented legitimate standards with respect to the quality of patient care inherent in these times. Discrepancies between the time standards in use and those included in the American Association for Respiratory Therapy's publication appeared to be due to procedural differences, with the higher published time standards reflecting more of an ideal staffing situation.
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INTRODUCTION

The need for time standards which are applicable in day to day operations is clear to those managers who determine that measurement and evaluation of productivity should be an integral part of managing their organizational unit. Through their support of research into the productivity aspects of hospital and departmental management, the senior administrative officers at Kennestone Hospital have indicated their desire to have "productivity management" take on its appropriate significance at the Hospital. This fact, coupled with the additional fact that many managerial personnel at Kennestone Hospital have extensive experience in monitoring and evaluating productivity data for their respective areas, creates the necessary climate for department-level studies of time standards and the managerial uses to which these standards can be applied.

In October 1982 a project was begun in the Pulmonary Services Department of Kennestone Hospital with the following objectives:

1. To document procedures, operational patterns and personnel utilization;
2. To evaluate time standards in use;
3. To develop time standards for those activities which, with the largest time requirements, accounted for 80 to 85% of the Department's total workload; and
4. To investigate the qualitative aspects of developed time standards.

Although the project was originally conceived as having parallel activities within the Pulmonary Services Department of Windy Hill Hospital, this aspect of the project was dropped after orientation to Kennestone's Department revealed the complexity that would arise in collecting and analyzing data
from facilities with differing procedures, patient care area layouts, etc. Thus, this report concerns only data from the Pulmonary Services Department of Kennestone Hospital.

Another aspect of this project that was influenced by the actual situation faced at Kennestone Hospital was consideration of the quality-related issues surrounding time standards for Pulmonary Services. Comparison of the procedures to be followed in giving treatments—particularly as shown in the American Association for Respiratory Therapy's "Respiratory Therapy Uniform Reporting Manual and described by the Department's Director—and actual service provision (by therapists and technicians) indicated that the techniques presently used are not consistent with recognized procedural standards. This fact implies that all "time standards" developed in the course of the project reflect actual, and not necessarily acceptable, techniques in use by the Department's staff.

Background

The Pulmonary Services Department has a highly organized system of productivity monitoring, with data collected on a shift by shift basis. The form used for data collection is relatively comprehensive in terms of the variable workload handled by the Department (see Exhibit I). Individual therapists and technicians provide count-type data on their respective shift assignments. Shift supervisors summarize data on the form and calculate productivity for the shift, and also use data from the form as input into a bi-weekly report for their respective shifts. The Department's director receives the bi-weekly reports for review. In addition, the director uses computer-generated data on treatments and departmental charges to calculate productivity for the Department.
| STAFF | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

**TOTAL PROCEDURES**

**FACTOR (1/10 HOUR)**

| WEIGHTED UNIT | .5 | .25 | .6 | .3 | .5 | .25 | .25 | .09 | 1.52 | .0 | .04 | .25 | .1 | .06 | .3 | .1 | .15 | .25 |

**OXYGEN FLOORS ASSIGNED**

1. PATIENTS ON ROUTINE 02  
2. ROUTINE 02 INSTALLED  
3. ROUTINE 02 D/CED  
4. PATIENTS ON HUMIDITY  
5. HUMIDITY INSTALLED  
6. HUMIDITY D/CED  
7. VAPORIZERS CHECKED  
8. VAPORIZERS INSTALLED  
9. CODE OR EMERGENCY  

**SIGNATURE OF PERSON IN CHARGE OF SHIFT**
**EXHIBIT I (Continued)**

* **TREATMENTS NOT GIVEN MUST BE DOCUMENTED**

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<th>INITIALS</th>
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</table>

* **STANDARDS MET (X = NOT MET WITH COMMENT(S) BELOW)**

<table>
<thead>
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<th></th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
</table>

* **IN SERVICE EDUCATION**

* **TOPIC**

  | PRESENT: 1) | 2) | 3) | 4) | 5) | 6) |

* **PRODUCTIVITY**

* MAN-HOURS WORKED = _____ FTE = _____ BUDGET = _____ FTE = _____

* WEIGHTED UNITS = _____ FTE = _____ BUDGET = _____ FTE = _____

* OCCUPANCY @ SHIFT START =  ____________ PRODUCTIVITY = %

**COMMENTS:**
METHOD

Given the objectives for the project, a multi-faceted program of activities was required, generally including the following stages:

1. Interviews of the Department's director, shift supervisors and selected therapists and technicians, and review of the Department's procedures manual and productivity monitoring system;

2. Review of the American Association for Respiratory Therapy's "Respiratory Therapy Uniform Reporting Manual" (RTURM);

3. Review of open literature on the medical aspects of respiratory therapy and hospital respiratory therapy/pulmonary services department operations;

4. Continuous observation of therapists and technicians over selected periods of time and in selected areas of Kennestone Hospital, with detailed time recording of activities;

5. Analysis of data from observational periods and estimation of time standards from these data;

6. Comparison of time standards currently used by the Department with those estimated from observational data and the RTURM; and

7. Synthesis of all information available (from previous stages) related to the qualitative aspects of Departmental time standards.

The details as to how each of these stages were carried out are included in the seven sub-sections which follow.

Familiarization

To obtain a general knowledge of Department operations a series of interviews were conducted with key personnel in the Department. These interviews provided opportunities to discuss specific points from the Department's procedures manual and regarding the productivity monitoring system. In particular, the data fields on the Daily Shift Report were discussed and schedules for treatments (e.g., q.i.d.) identified. These activities provided a basic level of information about the Department's operation and aided in determining an appropriate plan for collecting observational data on therapists and technicians' work patterns, procedures, etc.
"time to set up a vaporizer", and "time in nursing station to locate chart", and others.

Analysis of Observational Data

To estimate time standards for the various types of work done by therapists and technicians the total time periods of observation were analyzed for two sets of results. First, for all types of work with sufficient numbers of observations the average times were calculated, i.e., the elapsed times for various work activities were sorted by activity type and the simple averages for each (work) activity calculated. These average times were calculated at a detailed level; for example, the average time to travel from a nursing station to a patient room was calculated. Averages were calculated for all treatments included on the Daily Shift report and for the majority of "checking" activities (e.g., "VAPORIZERS CHECKED").

The second set of results derived from time data was the separation of total time into several relevant groupings, as follows:

1. "Direct Patient Care" - Time spent in patient rooms with patients;
2. "Indirect Patient Care - Nursing Station" - Time spent in nursing stations related to chart review, charting and chart handling;
3. "Indirect Patient Care - Department Area" - Time spent in the (second floor) Department area preparing materials, gathering materials, entering information in cardex, and handling new orders; and
4. "Travel" - Time spent in transit between patient rooms, nursing stations, and Department area.

Using these groupings, time standards were derived from the averages calculated for treatment types and "checking" activities. Due to their clear differences (i.e., in how time involved separates into the four groupings defined), the time standards for treatment types and "checking" activities required that differentiation be made within each grouping on this basis (e.g., the grouping "Travel" was separated into travel related to treatments and travel related to
"checking" activities).

Comparison of Time Standards

The time standards embodied in the Daily Shift Report form, those values found in the RTURM and the time standards calculated from observational time data were compared in several ways, including use of the basis of absolute magnitude as well as through use of standard deviation calculations based on observational time data.

Consideration of Qualitative Aspects to Time Standards

All information gained in preceding stages of the project, and particularly from the literature review and observations, was integrated to yield indications of the quality-related nature of available time standards.
RESULTS

Because the entire project centered on the collection of time data at Kennestone Hospital and estimation of time standards from these data, results from this phase of project activities are presented first, followed by comparisons of alternative time standards available (i.e., as currently used, as derived in the course of the project and those from the RTURM) and findings from the literature review. Finally, the quality-related aspects of time standards are presented.

Time Standards from Observational Time Data

Time data collected in the project was derived from twelve "episodes" of continuous observations involving eight different therapists/technicians and spanning over 750 minutes of observations. The twelve episodes included periods on day and evening shifts, and were distributed over several different days of the week (though no observations were made on weekend days). While a limited amount of observation occurred on the Intensive Care Unit, insufficient data was available to make any estimates of time standards for this unit. In addition, no observations were made in the Neonatal Intensive Care Unit and therefore no time standards were developed for this unit.

Average Times for Activities

The first step in estimating time standards for the various treatment types and for "checking" activities was to calculate average times for a large number of "elements" (i.e., components of larger, more relevant groupings of work activities). These elemental average times are presented in Appendix A along with data which gives indications of the dispersion associated with times for each element from observation to observation.

In time and motion study the time required of a well-trained worker to do a task at a normal level of effort is called "normal time." In order to
derive a "standard time", the normal time must be adjusted to reflect "allowances," that is, additional increments of time added to the normal time to account for aspects of work which intrude and cause the required time to complete work to be longer than the normal time. As identified in the RTURM, there are three allowances that are typically applied to the normal time in arriving at standard time: personal allowance, fatigue allowance and delay allowance.

Allowances to be Applied

Due to the nature of the work done by therapists and technicians--with periods of time where significant freedom exists to attend to personal needs--it is unnecessary to apply a personal allowance. Furthermore, fatigue allowance is not required when the data collected is representative of the various points in time (i.e., in terms of elapsed time into a shift) where work is being done. Thus, the only allowance necessary is the delay allowance--an allowance which accounts for unavoidable delay a worker experiences in carrying out their assignments.

To investigate the magnitude of delay allowance appropriate in the establishment of time standards the total observation time was separated into twelve "cells," each of which represented a unique type of time based on (a) groupings of direct patient care, etc., (b) whether treatments or "checking" was involved, and (c) whether the time was being productively used to achieve completion of a pending activity or was in the nature of a delay to such completion. As shown in Table I, delay is a significant aspect in both direct patient care and indirect patient care at the nursing station and, thus, must be accounted for in derivation of time standards for Department work.

Time Standards

Derivation of time standards for treatment activities and for "checking" activities followed different patterns. For treatment activities, data collection techniques dictated that the indirect and travel components to each treatment
TABLE I
SUMMARY OF TOTAL OBSERVATION TIME TO PERMIT DETERMINING DELAY ALLOWANCE

<table>
<thead>
<tr>
<th>Time Grouping</th>
<th>Productive Time for ...</th>
<th>Delay ...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatments</td>
<td>&quot;Checking&quot; (02 Rounds)</td>
</tr>
<tr>
<td>Direct Patient Care</td>
<td>427.68 mins.</td>
<td>29.42 mins.</td>
</tr>
<tr>
<td>Indirect Patient Care - Nursing Station</td>
<td>58.88 mins.</td>
<td>41.41 mins.</td>
</tr>
<tr>
<td>Indirect Patient Care - Department Area</td>
<td>121.43 mins.</td>
<td>6.71 mins.</td>
</tr>
<tr>
<td>Travel</td>
<td>75.35 mins.</td>
<td>1.40 mins.</td>
</tr>
</tbody>
</table>

type's time standard be related to the direct patient care component, with delay allowance applied, also, in relation to the proportion of the total normal time attributable to each of the four time groupings. That is, the portion of each treatment type's total normal time calculated to be due to direct patient care activities was the average time (in the patient room) for that treatment; however, the indirect patient care at the nursing station was calculated as $(58.88/427.68) = 0.14$ or fourteen percent of the direct patient care time. In a similar manner, the indirect patient care component attributed to the work in the Department area was calculated as $(121.43/427.68) = 0.28$ or 28 percent of the direct patient care time, and the travel component was calculated as $(75.35/427.68) = 0.18$ or eighteen percent of the direct patient care time. Combining these calculations with the delay allowances (shown in Table I) yielded the following relationship:

$\text{Time standard for treatment} = (\text{direct patient care time})(1.68)$.

Given this relationship, the time standards for all routine treatment types were calculated and found to be as follows:
* Nebulizer treatment - 14.73 mins., or 0.25 hrs.
* Chest physiotherapy treatment for adult - 16.90 mins., or 0.28 hrs.
* Chest physiotherapy treatment for child - 3.41 mins., or 0.06 hrs.
* Intermittent positive pressure breathing treatment - 16.31 mins., or 0.27 hrs.
* Incentive spirometry treatment - 4.02 mins., or 0.07 hrs.

Review of the elements which represent required activities for new orders led to the calculation that, given no additional travel was involved in the new order's handling (i.e., that the new order could be made a part of the usual process of moving from patient room to patient room giving treatments), the incremental time (beyond that of a routine treatment) would be 5.88 mins., or 0.10 hrs. Then, although an extra trip (from the Department to the patient and back, or in opposite direction) is not always required for new orders, the time standard calculated for such a trip was 5.16 mins., or 0.09 hrs. (i.e., the sum of travel elements #1, #11 and #12). Therefore, assuming a trip was required for a new order, coupled with the time associated with processing a new order, lead to the following estimates of new order time standards:

* Nebulizer treatment - 25.77 mins., or 0.43 hrs.
* Chest physiotherapy treatment for adult - 27.94 mins., or 0.47 hrs.
* Chest physiotherapy treatment for child - 14.45 mins., or 0.24 hrs.
* Intermittent positive pressure breathing treatment - 27.35 mins., or 0.46 hrs.
* Incentive spirometry treatment - 15.06 mins., or 0.25 hrs.

Time standards for "checking" activities, such as checking patients on oxygen, were calculated through summation of appropriate elements and application of delay allowance to those elements as appropriate for the particular time grouping. For example, the time standard for checking a patient on oxygen is comprised of direct patient care element #10 with a six percent delay allowance, the indirect patient care elements at nursing station #1 and #9 with thirteen percent delay allowance, the indirect patient care elements in
Department area #5 and #6 with one percent delay allowance, and travel elements #5 and #7. Numerically, this results in the following:

\[
\begin{align*}
(0.20)(1.06) &= 0.21 \text{ mins.} \\
(0.39+0.71)(1.13) &= 1.24 \\
(0.37+0.28)(1.01) &= 0.66 \\
(0.54+0.28) &= 0.32 \\
\end{align*}
\]

\[
2.43 \text{ mins.}, \text{ or } 0.04 \text{ hrs.}
\]

Given the (reported) need to fill vaporizers every other shift, the time standard derived for checking (and filling when needed) vaporizers was 2.38 mins., or 0.04 hrs. Handling a new order for vaporizer was calculated to have a time standard of 7.22 mins., or 0.12 hrs.

Comparison of Alternative Sets of Time Standards

Comparison of the time standards included on the Daily Shift Report form and those defined in the preceding section leads to the conclusion that the two sets of time standards are quite similar with respect to values for routine (or "completed) treatments but quite dissimilar with respect to values for new orders (or "starts") unless the most time consuming assumptions are made regarding the time standards derived in the previous section (e.g., that an extra trip is always required). Inspection of the two sets of time standards for "checking" activities yields a comparable conclusion. In particular, the value of 0.04 shown for oxygen checking will, as applied, lead to approximately one half as much time being associated with the activity as derived from observational data.

Comparison of the currently used time standards and those derived in this project with the RTURM data leaves real questions as to the RTURM values. As explained in the RTURM, the "time standards" found in the Manual represent only time in the patient room, and do not include time for charting, travel, etc. Thus, that the value given for medication nebulizer (Procedure Number 01.044.000) of 0.33 hrs. exceeds the time standard as calculated (of 0.25 hrs.) and the
time standard currently used (also 0.25 hrs. for routine treatments) without any consideration of charting, travel, etc., suggests that the time standard which would be developed from the RTURM value would significantly exceed either of the other two sets' values. Similar comparisons arise in review of chest physiotherapy (Procedure Number 01.012.000) and intermittent positive pressure breathing (Procedure Number 01.040.000) values from the RTURM.

Comparison with Data from Literature

A variety of sources for time standard data were discovered in literature review, but data supplied did not lead to any particular conclusions regarding the time standards derived from observational data. For example, Wiles (p. 7) reports a standard time of 0.333 hrs. for chest physical therapy, Tonet (p. 166) states a standard of 0.500 hrs., and Phillips (p. 54) offers a time standard of 0.4 hrs. for "floor care," but none of these authors addresses the issue of differences in time standards for routine versus new treatments. In their paper in Respiratory Therapy, Shaffran-Larson and Eiserman (p. 124) offer a standard time of 0.5 hrs. but, as with the other authors, no distinction is drawn between times for routine and new treatments.

A second type of information found in one paper was a relationship for converting treatment time into standard time using a factoring approach similar to that used in this project for arriving at time standards for treatments. The Colorado Society for Respiratory Therapy's Committee for Statistical Standardization agreed on a factor of 76.22 percent to be used in accounting for all activities other than the direct patient care, with ten percent for "personnel fatigue" and 2.5 percent for "in-service education." If these two components are removed from the 76.22 percent figure, a result of 63.72 percent is derived--quite close to the 68 percent figure used in this project.
Quality-Related Aspects of Time Standards

There are no clear indication within recent publications as to any trend with respect to the types—and, consequently, times—of respiratory therapy expected for the future. Papers such as that of Braun et al in Journal of the American Medical Association emphasize the dynamic nature of the field of respiratory therapy but, due to their brevity, cannot analyze available data to draw particularly useful conclusions on the evolution of the field. Though there seems to be a general anticipation of reduced use of certain types of treatment, particularly IPPB (c.f., Pierce), Braun et al provide data to verify that certain facilities may not experience such downturns. Thus, it appears difficult or impossible to forecast any changes in the field of respiratory therapy that would have impacts on the time required for providing these services to patients. The most likely results of the questioning of various forms of therapy is that substitution (of one form of therapy for another) will occur without lessening the staff requirements for this component of the hospital organization. Thus, from a quality perspective, the future of respiratory therapy will, with increased levels of hospitalization, require increasing infusions of personnel to provide physician-requested therapy.

A second quality-related aspect to the time standards used by the Department is that of appropriate procedure, i.e., whether or not a time standard should be used if it does not reflect the time required when a procedure is done according to generally accepted standards of procedure. This issue is particularly relevant to this project in that it seems clear that procedures are being compromised and, thus, that the times observed for activities of technicians and therapists—most importantly, in direct care activities—understate the requirements inherent in following standard (longer) procedures for treatments. Indeed, the times mentioned
from various sources in open literature may be closer to the times required if following standard procedures than the times derived in this project.

For this reason, the time standards included in the RTURM cannot be dismissed as irrelevant.
CONCLUSIONS

1. The time standards derived in the course of the project generally agree with those presently in use in Pulmonary Services, though differences are notable between times for "new start" treatments.

2. The time standards included in the RTURM are not immediately applicable to Pulmonary Services.

3. The issue of defining and maintaining procedural standards for treatments given to patients is central to establishing appropriate time standards for Pulmonary Services.

4. Revision of the time standards presently in use could benefit from incorporating time standards derived in this project.
RECOMMENDATIONS

1. Time standards currently in use by Pulmonary Services should be modified in light of time standards derived in this project.

2. Research should be initiated with the objective of defining procedural standards to be maintained in providing patient treatments.

3. Time standards from the RTURM should be considered as appropriate based upon the research on procedural standards (Recommendation No. 2).
APPENDIX A

ELEMENTAL TIME DATA
<table>
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<th>Element Number</th>
<th>Element Description</th>
<th>Number of Observations</th>
<th>Average Time (mins.)</th>
<th>Standard Deviation (mins.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nebulizer treatment (time in room)</td>
<td>19</td>
<td>8.77</td>
<td>2.47</td>
</tr>
<tr>
<td>2</td>
<td>Incentive spirometry treatment (time in room)</td>
<td>2</td>
<td>2.39</td>
<td>0.08</td>
</tr>
<tr>
<td>3</td>
<td>Intermittent positive pressure breathing treatment (time in room)</td>
<td>10</td>
<td>9.71</td>
<td>2.28</td>
</tr>
<tr>
<td>4</td>
<td>Chest physiotherapy treatment for adult (time in room)</td>
<td>13</td>
<td>10.06</td>
<td>3.24</td>
</tr>
<tr>
<td>5</td>
<td>Chest physiotherapy treatment for child (time in room)</td>
<td>5</td>
<td>2.03</td>
<td>0.93</td>
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<tr>
<td>6</td>
<td>Suctioning (time in room)</td>
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<td>5.60</td>
<td>2.00</td>
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<td>7</td>
<td>Inhaler treatment</td>
<td>5</td>
<td>2.11</td>
<td>0.58</td>
</tr>
<tr>
<td>8</td>
<td>Ventilator check (time in room)</td>
<td>3</td>
<td>5.23</td>
<td>0.59</td>
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<tr>
<td>9</td>
<td>Set up vaporizer</td>
<td>2</td>
<td>2.29</td>
<td>0.08</td>
</tr>
<tr>
<td>10</td>
<td>Check O₂ (per pt - O₂ round)</td>
<td>15</td>
<td>0.20</td>
<td>0.07</td>
</tr>
<tr>
<td>11</td>
<td>Check apnea monitor</td>
<td>2</td>
<td>1.07</td>
<td>0.26</td>
</tr>
<tr>
<td>12</td>
<td>Check Ohio tent</td>
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<td>0.37</td>
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<td>13</td>
<td>Fill vaporizer</td>
<td>2</td>
<td>0.94</td>
<td>0.10</td>
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<tr>
<td>14</td>
<td>Check vaporizer (as &quot;Check O₂&quot;)</td>
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</table>
### INDIRECT PATIENT CARE - NURSING STATION

<table>
<thead>
<tr>
<th>Element Number</th>
<th>Element Description</th>
<th>Number of Observations</th>
<th>Average Time (mins.)</th>
<th>Standard Deviation (mins.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Locate patient chart</td>
<td>13</td>
<td>0.39</td>
<td>0.28</td>
</tr>
<tr>
<td>2</td>
<td>Chart treatment (per line item)</td>
<td>19</td>
<td>0.80</td>
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<td>3</td>
<td>Replace patient chart</td>
<td>14</td>
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<td>4</td>
<td>Review chart</td>
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<tr>
<td>5</td>
<td>Enter notes in chart</td>
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<td>6</td>
<td>Review chart for new order</td>
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<tr>
<td>7</td>
<td>Set up charting for new order</td>
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<tr>
<td>8</td>
<td>Check crash cart and O2</td>
<td>9</td>
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<tr>
<td>9</td>
<td>Chart and replace (O2 round)</td>
<td>19</td>
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<tr>
<td>Element Number</td>
<td>Element Description</td>
<td>Number of Observations</td>
<td>Average Time (mins.)</td>
<td>Standard Deviation (mins.)</td>
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<tr>
<td>1</td>
<td>Prepare syringe with drug</td>
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<tr>
<td>2</td>
<td>Prepare prefill</td>
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<tr>
<td>3</td>
<td>Gather materials and equipment</td>
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<td>Shift report</td>
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<td>Update cardex (per line item)</td>
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<td>Prepare list for O2 round</td>
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<td>Get out vaporizer</td>
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<td>Review/process new order</td>
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<td>Allocate treatments (start of shift)</td>
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<tr>
<td>Element Number</td>
<td>Element Description</td>
<td>Number of Observations</td>
<td>Average Time (mins.)</td>
<td>Standard Deviation (mins.)</td>
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<tr>
<td>1</td>
<td>Elevator to nursing station (on single floor)</td>
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<td>Elevator to patient room (on single floor)</td>
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<td>Patient room to patient room (on single floor, not O2 round)</td>
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<td>Patient room to patient room (on single floor, O2 round)</td>
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<td>Nursing station to patient room (separated by single floor)</td>
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<td>Nursing station to nursing station (separated by single floor)</td>
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<td>Department area to floor</td>
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<td>Floor to Department area</td>
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<td>2.69</td>
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REFERENCES


