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Quality Improvement Proposal: Reducing Clinic Cycle Time to Improve Patient Satisfaction

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Abstract
This quality improvement proposal recommends interventions to reduce clinic cycle time during the annual health assessment in Occupational Health Services (OHS) by proposing the change to a self-scheduling appointment system. The quality improvement project using the Plan-Do-Study-Act (PDSA) model should satisfy the three recommendations of the Institute of Medicine (IOM); patient-centered, timely and efficient. Timeliness of care is the outcome measure. The clinic cycle time will be measured and compared to the external benchmark set by the Institute for Healthcare Improvement (IHI). The goal is to reduce the clinic cycle time to 1.5 times the actual value added time. Data will be collected from 100 employees over four weeks. Employees will enter the time in the data collection tool adapted from the IHI. After changing to the self-scheduling patient appointment system, the clinic cycle time will be measured again to evaluate the impact of the change. PDSA cycle will continue until the goal is reached. Executing this project should prove to be cost-effective and improve employee satisfaction.

**Keywords**: clinic cycle time, patient satisfaction, occupational health, self-scheduling, timeliness
Quality Improvement Proposal: Reducing Clinic Cycle Time to Improve Patient Satisfaction

Healthcare is currently changing with a major emphasis on patient experience to provide value-driven cost-effective care. The need has arisen to shorten the clinic cycle time of the annual health assessment process in the Occupational Health Service (OHS) clinic of New York City Health and Hospital Corporation (NYCHHC). Waiting in a clinic has an inverse relationship with patient satisfaction. Patient satisfaction is an indicator of quality health care, and quality gaps need to be addressed (Brigham and Women's, 2013).

Institute of Medicine (IOM) defines the quality of care as the degree to which health services for individuals and populations increase the possibility of desired health outcomes that are consistent with current professional practice (IOM, 2001). IOM has identified six aims for quality healthcare that are being safe, effective, patient-centered, timely, equitable and efficient (IOM, 2001). This proposed quality improvement (QI) project, to shorten the clinic cycle time by implementing a self-scheduling patient appointment system will satisfy three dimensions of being timely, patient-centered and efficient.

**Background and Significance**

Hospital employees, come to OHS during duty time for the mandated annual health assessment. When the employee is in OHS, the other staff and co-workers are affected because the worker has to be covered during the absence. The employee walks into OHS without scheduled appointments for the annual health assessment. The first step is the registration and completion of the necessary forms. The second step is the assessment by the clinical staff. The last step is the Respiratory Fit Testing (RFT). The employees have to wait in the clinic between
these steps because of the variable patient volume. The current clinic cycle time can vary from 30 to 90 minutes.

Waiting creates anxiety, anger, and frustration. While waiting, sometimes, clinicians receive urgent pages to go back to work. Nurses have often said, “I have to go and give medications, we are short staffed on the unit.” The patient volume is inconsistent because annual health assessments are unscheduled visits. All these factors cause OHS staff also to feel frustrated from the constant exposure to the irate behavior and complaints from the employees. The acceptable waiting time for a patient differs based on the individual tolerance, preference, and expectations (Joshi et al., 2014). The length of waiting time that may be acceptable to one patient may not be acceptable to another as the experience is highly subjective and variable.

**Literature Review**

A literature review was done by searching the database of Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed of the National Library of Medicine. For PubMed search, the Medical Subject Headings (MeSH) terms used were: ambulatory care, clinic cycle time, patient satisfaction, quality of care and wait time. Patient satisfaction is defined as “the degree to which the individual regards the health care service or product or the manner in which it is delivered by the provider is useful” (MeSH, 2015).

**Results**

The search yielded 28 articles, but only five were selected for inclusion in the review. The search of the databases did not reveal any specific research to waiting time in OHS. Other studies and survey reports were obtained through hand searching and from the gray literature. There were no randomized controlled studies or meta-analyses found in the literature and hence there is no Level 1 hierarchy of evidence-based studies. Inclusion criteria included: articles with
full-text published in the last ten years, English language, and human subjects. The excluded articles were related to time spent with a physician, patient choices of provider and appointment scheduling, teaching setting, telemedicine, disease-specific setting and studies done outside the United States.

**Discussions.** Patient satisfaction and patient experience are significant dimensions of quality care. The annual national survey reports from hospitals across the country collected by Press Ganey have the largest database on patient satisfaction (Press Ganey Associates Inc, 2014). This report contends that among all the issues during a clinic visit, patients are least satisfied with waiting. Waiting also causes physical discomfort, anxiety, and anger. This survey report is a level VII hierarchy of evidence (Melnyk & Fineout-Overholt, 2005).

Eilers (2004) did a QI project in a school health clinic in Wisconsin to improve patient satisfaction and waiting time. Out of 500 students surveyed, 412 were returned and analyzed. The subjects were asked to grade the waiting time. Waiting time got the lowest rating. After increasing appointment slots and rearranging the waiting area, two follow-up surveys were done. Chi-square analysis of the data showed statistically significant improvement in patient satisfaction. The validity of the questionnaire is unclear. This is a level VI in the hierarchy of evidence because it is a descriptive study research (Melnyk et al., 2005). Harnett, Correll, Hurwitz, Bader, & Hepner (2010) conducted a study in a teaching hospital and compared two cycles of patient satisfaction surveys carried out in two consecutive years. 550 questionnaires were distributed in each cycle. A one-page questionnaire with a Likert scale ranging from poor to excellent was used. The subjects completed fourteen questions about courtesy, waiting and satisfaction. 872 questionnaires were returned. Waiting time was rated poorly by 79 % of the respondents. Staff received customer service training. The clinic systems
and provider roles were modified based on the reactions and expectations of patients. The wait time decreased from 92 to 41 minutes after the changes. Patient satisfaction improved significantly. This is a level VI in the hierarchy of evidence because it is a comparative descriptive study research (Melnyk et al., 2005).

11,352 patients from 44 ambulatory clinics over one year was surveyed for patient satisfaction. Results showed that every aspect of patient experience and perceived quality of care correlated negatively with the increase in the length of wait time (Bleustein et al., 2014). This survey study is a descriptive study research and hence level VI in the hierarchy of evidence (Melnyk et al., 2005).

**Evidence-Based Recommendations to Improve Timeliness**

Studies related to waiting and patient satisfaction are mostly surveys, observational studies or QI projects. From the few studies reviewed that are level VI on the hierarchy of evidence; it can be established that patient satisfaction increases with a decrease in waiting time (Melnyk et al., 2005). A study was done in “XYZ clinic” used the ten elements of the QI steps by Accreditation Association for Ambulatory Health Care (AAAHC). The wait time decreased from 50 minutes to 28 minutes (Kuznets, 2013).

Murray Hill Medical group, a 34-physician primary care group in NYC changed their appointment system to a self-scheduling system. This change gave patients the option to self-schedule appointments. Patient self-scheduling improved efficiency and has proven to be cost-efficient (Versel, 2004). Similarly “ZocDoc” is another self-scheduling system that was initiated a few years ago in some medical practices. A consumer survey conducted in 2013 by Accenture found that 77% of patients identified that booking, changing and canceling appointments was a priority (Jervis & Turpin, 2014). Several studies demonstrated that reducing wait time results in
higher patient satisfaction scores, and there is an inverse relationship between waiting time and patient satisfaction (McMullen & Netland, 2013; Michael, Schaffer, Egan, Little, & Pritchard, 2013; Camacho, Anderson, Safrin, Jones, & Hoffman, 2006). Thus instituting the self-scheduling system in OHS can decrease the wait time by improving access and patient satisfaction.

**Method**

The setting for the QI project is the OHS of NYCHHC, which serves about 5,000 employees. The subjects will be a random sample of 200 employees who come for annual health assessments. The data instrument will be used to collect data over a period of four weeks. The data will be analyzed and interpreted. With the support of senior management and stakeholders, the proposed change to a self-scheduling system will be implemented.

**Process/outcome measures**

The quality outcome is “timeliness of the annual health assessment” in OHS. The Agency for Healthcare Research and Quality (AHRQ) defines timeliness as the capability of a system to provide care quickly after a need is identified and it is an important component of patient-centered care (AHRQ, n.d.). Delay in service or untimeliness of care is a process issue that will negatively affect patient satisfaction (Prentice, Davies, & Pizer, 2014). Timeliness is the least well-studied and understood of the six dimensions of quality care (IOM, 2015). Therefore, IOM has identified the need to develop standards, guidelines, and national benchmarks through research with regards to timeliness of care and acceptable wait times (Bradenburg, Gabow, Steele, Toussaint, & Tyson, 2015).
Implementation of Project

This QI project will follow the Plan-Do-Study-Act (PDSA) model. This model, developed by Edwards Deming also called Shewhart cycle would be used to implement the QI proposal (Joshi et al., 2014).

Goal and Benchmarks

The goal is to decrease the in-clinic wait time and total clinic cycle time to 45 minutes from the current clinic cycle time of 60 to 90 minutes and improve patient satisfaction. The clinic cycle time will be compared to the external benchmark used by IHI. The recommended performance standard set by AAAHC Institute for Quality Improvement is to have the wait times that are same or lower than the shortest three wait time benchmarks of similar institutions (Kuznets, 2013). Accordingly, for the internal benchmark the wait time will be compared to the wait time in three other OHS of the NYCHHC.

PDSA Cycle. The “Plan” for this project is to decrease the clinic cycle time. The clinic cycle time is measured in minutes from check-in time at the registration desk to finishing the last step of the annual health assessment. The recommended total clinic cycle is 1.5 times the actual time spent with a clinician (IHI, 2015). The average time spent by an employee with a clinician in OHS is about 30 minutes. Thus, the total cycle time in OHS should be 45 minutes when compared with the external benchmark (IHI, 2015). The clinic cycle time includes the waiting time and the time when actual care is received. Value-added time is when care is received, and non-value-added-time is the waiting time in the clinic (IHI, 2015). The timeline for the project plan is included in Appendix D.
The “Do” for this project is to measure the clinic cycle time and implement a self-scheduling system. 15 patients is a reliable sample size to obtain average clinic cycle time measurement according to IHI (Ludwig, 2011). The sample is 100 employees who come for annual health assessment during the peak operating hours of OHS over a four week period. Data will be gathered from 20 employees per week using the data collection instrument (Appendix A). All other visits will be excluded from the sample. The “Study” phase is the data collection and analysis. The data will be analyzed and average clinic cycle time will be calculated. The data will be interpreted by the NP.

The “Act” of this project will be the implementation of a self-scheduling system using the existing software applications in the hospital. Template with 30 minutes slots will be made available for employees to self-schedule appointments. The employees will be able to download the forms from the intranet and come to OHS with the completed forms. This will save time and avoid waiting. The clinic cycle time should decrease to 45 minutes after implementing the proposed actions. PDSA cycle will be repeated if the goal is not attained (See Appendix D) for the timeline of the proposal. Run chart adapted from the “Run Chart” tool by IHI ((n.d.a) will be used to display the data (See Appendix B). The results will be communicated to the stakeholders and displayed on the bulletin board in OHS. The results will be discussed at the monthly departmental meeting.

Protection of Human Subjects. This project is a quality initiative, and hence there is no risk to the human subjects. The data collection tool is anonymous and does not have any identifying information on the subjects. The employees will have the option to refuse to participate. The project coordinator will store the data on a password-protected computer. Therefore, Institutional Review Board (IRB) approval is not necessary (HHS.Gov, 2009).
**Tools.** The data collection tool adapted from IHI (n.d. b) can be seen in Appendix A. It is a one-page worksheet on a clipboard and pen. Each subject will be presented the tool with serial numbers at the time of registration. The employee will be asked to carry the clipboard and enter the time as they go through each step. The completed tool will be collected by the clerical assistant when the employee completes the process. This tool will measure the office visit cycle time as well as the in-between wait time in OHS. The business analyst will enter the data, and the NP will analyze and interpret the results.

**Cost-Benefit Analysis**

This is a relatively simple and cost-effective study. The estimated cost benefits savings will have an enormous impact on the quality of care. These savings will be realized due to more efficient use of time and resources.

**Estimated Cost**

The costs are based on personnel expenses. There is no capital investment cost as the recommended appointment scheduling software already exists in the hospital. The time for planning the meetings to engage stakeholders is included in the built-in time. The initial costs of the project involve data collection and implementation, and the total estimated cost is $842.00 (See Appendix C).

**Estimated Cost-Savings.** Using the gross costing method of cost analysis, the cost of waiting during the clinic cycle visit can be estimated. Since, the titles of employees who come to OHS vary from physicians, administrators, registered nurses and service aides. Hence, an average worker salary has been utilized to calculate cost savings. The average salary of an employee is $44.00 per hour according to the Unites States (U.S.) Government (U.S. Bureau of Labor Statistics, 2015) is $44.00 per hour. The estimated cost for in-clinic waiting is “non-value
added time” will indirectly affect revenue. Reducing the wait time by 30 minutes will result in a cost saving of $22.00 per employee. On average, 400 employee annual health assessments are done every month. So, the average cost saving will be $8,800.00 per month. Therefore, the projected total annual cost saving will $105,600.00 which is a cost saving (Appendix C).

**Benefits and Value.** The total cost saving and the estimated value of benefits is a compelling reason to improve the timeliness and efficiency by decreasing clinic cycle time. The saving from value-added time will be translated to the availability of more staff time in the assigned areas of the employees in the hospital. Eliminating wasted time will increase the productivity of workers. The effect of improved quality care will be reflected in better scores in the Hospital Consumers Assessment of Healthcare Providers and Systems (HCAHPS) surveys are linked to the Medicare and Medicaid reimbursement to the hospital (Centers for Medicare & Medicaid Services, n.d.). Employees will also be more satisfied with having a better experience in OHS. The data regarding employee satisfaction will be reflected in Press Ganey employee satisfaction report of the hospital which is used for employee engagement and to drive change in the organization (Press Ganey Associates, 2015).

**Project Engagement**

Patient and family engagement is important in patient-centered care. Patients are employees, and family members do not come to OHS. The care should be consumer driven to improve patient satisfaction. Stakeholders will be engaged in the planning and implementation phase of the project to generate ideas, enlist cooperation and ensure the realization of the QI initiative. Interdisciplinary team members, OHS staff, and leaders from different departments will be involved. The team members will include Director of Human Resources, Director of Nursing, Director of OHS, representatives from the labor-management committee, and one staff
member each representing physicians, registered nurses, advanced practice nurses, non-clinical support services, one clerical associate, and one service aide. After the data is analyzed, it will be reported to the team members. Meetings will be held with the leadership of the hospital to institute the self-scheduling system. Training sessions will be conducted for employees on the new self-scheduling system.

**Conclusion**

Prolonged waiting to receive care is not to be expected as a norm as it negatively affects patient satisfaction and the efficiency of care. Decreasing the wait time will improve customer satisfaction and quality of care resulting in a positive patient experience. A follow-up QI project to evaluate the effect of self-scheduling on clinic cycle time is recommended. The QI project will positively impact the operations of OHS and will also be using technology to provide patient-centered care
References


http://www.ihi.org/resources/pages/measures/officevisitcycletime.aspx


Appendix A

Data Collection Tool: Quality Improvement Project

This tool is used to collect information about the time spent in OHS during the annual health assessment. The data will be used to decrease the wait time.

Clinic visits Cycle

Tool Serial # 001 to 100. (To be entered)

Date: __________ Day of week _________________ Time __________

Instructions: Enter the time at the start of each step. Example. 9:20 am or 10:24 am

<table>
<thead>
<tr>
<th>Steps</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of registration (e.g., 10.00 am)</td>
<td></td>
</tr>
<tr>
<td>Time forms received by employee (e.g., 10.10 am)</td>
<td></td>
</tr>
<tr>
<td>Time forms returned to clerk (e.g., 10.10 am)</td>
<td></td>
</tr>
<tr>
<td>Time called by clinician (e.g., 10.10 am)</td>
<td></td>
</tr>
<tr>
<td>Time assessment completed by clinician (e.g., 10.20 am)</td>
<td></td>
</tr>
<tr>
<td>Time called for fit test Respiratory Fit Test (e.g., 10.30 am)</td>
<td></td>
</tr>
<tr>
<td>Time completed fit test (e.g., 10.50 am)</td>
<td></td>
</tr>
<tr>
<td>Time left OHS (e.g., 10.50 am)</td>
<td></td>
</tr>
</tbody>
</table>

Comments by employee:

For Administrative Use of OHS Only

Time spent with clinician _______________ Time spent for RFT _______________

Value added time (Actual time care obtained): ________ minutes

Non-value added time (In-clinic wait time): ________ minutes

Total clinic cycle time: ________________ minutes

## Appendix B  Run Chart

### Sample Data

<table>
<thead>
<tr>
<th>Date / Observation</th>
<th>Value</th>
<th>Median</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/1/2015</td>
<td>90</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>60</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>90</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/4/2015</td>
<td>45</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>30</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>55</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>45</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>90</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>75</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>68</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>30</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>50</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>45</td>
<td>55</td>
<td>45</td>
</tr>
</tbody>
</table>
Appendix B: Run Chart (Continued)

Office Visit Cycle Time October 2015 -Pre-performance

Vertical Axis Y: Clinic cycle time

Horizontal axis X: Date of Observation

“Run chart” adapted from The Institute for Healthcare Improvement, Boston, Massachusetts.

Developed by Richard Scoville, Ph.D. (richard@rscoville.net)
## Appendix C

### Expenses for Implementing Program

<table>
<thead>
<tr>
<th>Expense &amp; Training</th>
<th>Resource</th>
<th>Calculation/Formula Per hour in Dollars (U.S. Bureau of Labor Statistics, 2015)</th>
<th>Number of Hours</th>
<th>Total Cost for one PDSA cycle in dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education &amp; Training</td>
<td>Clerical Assistant</td>
<td>$44.00</td>
<td>1</td>
<td>$44.00</td>
</tr>
<tr>
<td>Project Coordinator</td>
<td>Nurse Practitioner</td>
<td>$44.00</td>
<td>2</td>
<td>$88.00</td>
</tr>
<tr>
<td>Data collection</td>
<td>Clerical Assistant</td>
<td>$44.00</td>
<td>10</td>
<td>$440.00</td>
</tr>
<tr>
<td>Business Analyst</td>
<td>Business Analyst</td>
<td>$44.00</td>
<td>5</td>
<td>$220.00</td>
</tr>
<tr>
<td>Supplies</td>
<td></td>
<td></td>
<td></td>
<td>$50.00</td>
</tr>
<tr>
<td>Total Expense</td>
<td></td>
<td></td>
<td></td>
<td>$842.00</td>
</tr>
</tbody>
</table>

### Cost-benefit savings

Savings from eliminating non-value-added time by Decreasing Clinic Cycle time

<table>
<thead>
<tr>
<th>Savings</th>
<th>Calculation/Formula Average wage Per hour in Dollars (U.S. Bureau of Labor Statistics, 2015)</th>
<th>Total Saving in dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average savings for one month</td>
<td>$22.00 x 400 employees per month</td>
<td>$8,800.00</td>
</tr>
<tr>
<td>Saving for one year</td>
<td>$8800.00 x 12 months</td>
<td>$105,600.00</td>
</tr>
</tbody>
</table>

Annual Net Savings: $104,758.00
Appendix D

Timeline for the QI Proposal

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>The projected date of starting the QI project is</td>
<td>February 2016</td>
</tr>
<tr>
<td>Planning meetings with stakeholders</td>
<td>January 2016</td>
</tr>
<tr>
<td>Training</td>
<td>January 2016</td>
</tr>
<tr>
<td>Development of tool</td>
<td>January 2016</td>
</tr>
<tr>
<td>Data collection – 100 Samples</td>
<td>February 2016, 2 Samples per day for four weeks</td>
</tr>
<tr>
<td>Data analysis</td>
<td>March 1-15, 2016</td>
</tr>
<tr>
<td>Data interpretation and dissemination of information</td>
<td>March 16-31</td>
</tr>
<tr>
<td>Planning meetings to implement changes</td>
<td>April 2016</td>
</tr>
<tr>
<td>Implementing proposed changes – Self-scheduling appointment system</td>
<td>May 2016</td>
</tr>
</tbody>
</table>