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ADVANCES IN PHARMACY PRACTICE

Coronavirus 2019 work-from-home productivity of inpatient and infusion pharmacists at a comprehensive cancer center

Carolyn Kusoski, Stephen Polley *, Julie Kennerly-Shah

Abstract

Purpose: To evaluate inpatient and infusion pharmacist order verification productivity when working from home and to report their perceptions of a flexible workplace setting.

Methods: Order verification data were pulled from the electronic medical record from April 27, 2020, to June 30, 2020, matched to the pharmacist schedule on the basis of work setting and reported as average orders verified per day. Pharmacist perceptions were gathered via a survey to evaluate practice setting background, workplace setting preference, and perceived changes in workflow and their productivity.

Results: There was an overall increase in order verification productivity when working from home. Inpatient pharmacists, on average, verified 152 orders per day from home and 133 orders per day onsite. Infusion pharmacists, on average, verified 144 orders per day working from home and 117 orders per day working onsite. Fifty-nine percent of pharmacists reported preferring the mix of onsite and home workplace setting and noted little change in workflow. In addition, 57% of the pharmacists perceived themselves as being more productive, 32% as maintaining the same level of productivity, and 10% felt that they are less productive when working from home. The order verification data showed a greater increase in productivity for infusion shifts worked from home than inpatient shifts.

Conclusion: The coronavirus 2019 pandemic prompted pharmacy departments to re-evaluate their ability to provide a flexible workplace for pharmacists. Our study demonstrates that pharmacists, on average, verified more orders when working from home, and they also perceive themselves as being more productive. The results of this study support long-term applicability of a flexible work schedule for inpatient and infusion pharmacists.

Introduction

Traditionally, health care is a field that has lacked the ability and opportunity to modify workplace settings as it has been deemed that the majority of functions should be performed onsite. This differs from many other career fields that have been able to consistently provide remote work opportunities for employees where 20% of respondents in a Pew Research Center report identified working from home before the coronavirus 2019 (COVID-19) pandemic. Although this discrepancy in practices has historically been regarded as an issue of accessibility and ease, it has left many workers curious about whether or not a transition to remote work is plausible. Notably, an increased reliance on technology in health care through enactment of the Health Information Technology for Economic and Clinical Health (HITECH) Act in 2009 may have provided the foundation for a shift to a flexible work setting environment by a government-incentivized push for the universal use of electronic medical records (EMR).

Anecdotally, a driving factor that had previously made health care administrators hesitant in the move toward work from home schedules is how worker productivity would be impacted. With the onset of the COVID-19 pandemic in 2020, a push for social distancing and large group restrictions has also presented a challenge for health care administrators to provide safe working environments. Anecdotes and studies on productivity have begun to be published, as a large portion of America’s workforce has moved toward socially distanced remote work; however, little exists in the literature discussing remote work productivity of health professionals.
Bloom et al. published a productivity evaluation of telecommunications employees, showing an overall 13% performance increase of those who volunteered to work from home for 9 months. Those who volunteered to work from home also reported higher work satisfaction than those who continued to work onsite. While this study showed an increase in productivity, it is difficult to extrapolate their findings to other fields, as the workflow evaluated was entirely computer based before the study, making the transition to remote work fairly seamless. In addition, definitive and easily measurable end points were available to evaluate employee productivity.

Pharmacists may be uniquely positioned for a flexible schedule as the integration of technology through implementation of computerized provider order entry (CPOE) systems, and EMR has allowed for certain tasks to be computer-based. Responsibilities of pharmacists that can be completed with a computer include order verification, order entry, answering drug information questions, chart review, and completion of progress notes. Additional responsibilities that require pharmacists’ physical presence include product checking, emergency code response, and inventory-related work. It should be noted that many pharmacists within a health-system serve a clinical role to some capacity, which requires extensive communication and teamwork to provide patient care. Such collaboration has historically been best practiced in-person for ease of access and avoiding miscommunications, but this practice had to be altered during the COVID-19 pandemic. A pharmacist’s role, therefore, is often a hybrid of in-person and computer-based tasks, and those tasks that only require a computer are best suited to be completed remotely. Studies have shown that a consistent component of a pharmacist’s workday is spent on order verification and is done so with a computer, making it a key activity for remote productivity evaluation.

Negaard et al. performed a time study of pharmacists across varying practice settings including hospital, retail, ambulatory, and academia and found that across all settings, order verification accounted for 31% of pharmacists’ daily activities. This percentage increases as we focus in on hospital pharmacy, with 66% of pharmacists’ time spent verifying orders.

The pharmacy department at The James Cancer Hospital at The Ohio State University Wexner Medical Center implemented a scheduling plan during the early portion of the pandemic to allow only the minimum necessary staff onsite, with the rest working from home and functioning in an on-call capacity to come onsite if staffing needs changed. The decision was made in order to best comply with national and state-recommended COVID-19 guidelines. Clinical generalist pharmacists primarily cover order verification shifts that span across inpatient and infusion practice settings and were chosen to be evaluated for order verification productivity as they rotated between working from home and onsite. Previously published articles have established order verification as one computer-based function of pharmacists. This, in combination with the ease of retrieving verification data from the EMR, makes it an appropriate evaluation tool of the differences in workplace setting productivity. Also recognized was the importance in considering pharmacist perception of this change as job satisfaction can affect productivity, motivation, and overall mental health as half of healthcare-system pharmacists may be at risk of burnout.

The purpose of this study is to use order verification data of inpatient and infusion clinical generalist pharmacists as a measure of productivity to justify a flexible work-from-home option for pharmacy staff. In addition, we seek to report pharmacist perceptions on working from home and its subsequent impact on workflow and workplace satisfaction.

**Background**

As a comprehensive cancer center, The James Cancer Hospital at The Ohio State University Wexner Medical Center has 356 inpatient beds and 6 outpatient infusion clinics, with the outpatient infusion clinics administering approximately 2000 infusion therapies weekly. The pharmacy model at The James Cancer Hospital is composed of clinical generalist pharmacists and clinical specialist pharmacists, both of which were given the opportunity to work from home. Clinical specialist pharmacists’ roles are highly integrated into the interdisciplinary health care team and are responsible for attending patient rounds, patient workup, and treatment plan modifications that align with their institutional privileging. Clinical generalist pharmacists are also integral to the interdisciplinary health care team, with many also participating in patient rounds, but they have a greater expectation of order verification responsibilities than clinical specialist pharmacists. Owing to the greater order verification workload, clinical generalist pharmacists were targeted for this study.

Before working from home, all pharmacists were required to test their home setup to ensure that they were able to access all systems that would be necessary to complete their work. Employees working from home were granted remote desktop access by hospital information technology services. This allowed for employees to use their home devices and connect to an onsite computer via a secure network through a virtual private network. Physical desktops onsite were designated as work-from-home use only to ensure that staff members working from home could maintain access. Further, a set of expectations for the flexible working schedule was shared. These expectations (Table 1) were set to aid in differentiating responsibilities of those onsite and those working from home. This allowed for onsite clinical generalist pharmacists to focus on tasks that required physical interventions while those working from home focused on tasks that are more easily completed remotely.

Clinical generalist pharmacists may work in the inpatient or infusion or rotate between both practice settings, and different expectations were set for inpatient and infusion shifts (Table 1). Inpatient and infusion shifts were evaluated separately because of inpatient workflow having minimal changes based on workplace setting, whereas infusion required workflow restructuring that was dependent on their workplace setting. For example, infusion shifts require a larger proportion of time spent on physical tasks such as product checking as compared with inpatient shifts. Further, the pharmacist verification queue responsibilities vary between practice settings. Inpatient verification queues are organized on the basis of the pharmacist’s assigned shift, having only 1 pharmacist per queue. This is in contrast to infusion verification queues that are organized on the basis of the infusion site, allowing for multiple pharmacists to cover the same queue.

There was additional guidance provided in the expectations document dispersed to all pharmacists, including how to maintain data security integrity, timekeeping, and general
guidelines to follow to be eligible for the work-from-home schedule. Such guidelines included the following: the worker must be accessible via email, phone, or computer messaging during scheduled hours; productivity must be maintained and may be monitored; and the worker must not be on a corrective action plan.

**Methods**

**Study design and participants**

There were 2 primary objectives: reporting pharmacists' perceptions of work-from-home productivity and a differential data analysis of pharmacist order verification. A total of 43 pharmacists were asked to participate in an anonymous Web-based survey, and order verification data were analyzed as a group aggregate. The survey underwent a validation process before distribution, in which 2 pharmacy managers who were not involved in survey design reviewed each survey question. The pharmacists are clinical generalists practicing at The James Cancer Hospital as inpatient clinical generalist pharmacists or infusion clinical generalist pharmacists, or they rotate between the 2 practice settings. Some shifts were dedicated to exclusively working onsite (such as night shift, owing to lower staffing numbers), whereas other staff members were exclusively working from home because of personal health and concerns. Exclusion criteria included those exclusively working onsite (i.e., night shift), exclusively working from home, having nonverification shifts (i.e., IV cleanroom shifts), and having training shifts.

**Order verification data**

Order verification totals were matched to the clinical generalist pharmacist schedule to compare those completed while working from home versus onsite. Group data were reported as arithmetic means to maintain individual privacy.

**Survey Questionnaire**

The survey had 16 questions and composed of multiple choice, ranking, and fill-in-the-blank formats. Topics covered in the survey included individual practice background, perceived workflow and communication changes, pharmacist perceptions of changes in productivity based on workplace setting, and what steps participants have taken to maintain productivity from home. The survey was anonymous, identified, and distributed via email to all eligible participants and remained open for 2 weeks (02/02/2021 to 02/16/2021).

**Data collection**

**Order verification data**

Order verification data were pulled from the EMR from April 27, 2020, to June 30, 2020, with removal of private health information (PHI).

**Survey Questionnaire**

Survey responses were kept anonymous and collected via Qualtrics from February 2, 2021, to February 16, 2021. No identifiable data or PHI was collected.

**Results**

**Order verification data**

For the evaluation time frame of April 27, 2020, to June 30, 2020, a total of 207,856 orders were verified by eligible clinical generalist pharmacists. These were completed during 632 work-from-home shifts and 901 onsite shifts. The captured order verification data were standardized for orders verified per day. Inpatient and infusion data cannot directly be compared because of the differences in workflow, so a comparison of inpatient and infusion daily orders verified by practice setting was reported as arithmetic means (Figure 1). These data include all eligible clinical generalist pharmacists, including those who rotate between both inpatient and infusion settings. Clinical generalist pharmacists covering inpatient shifts verified a calculated mean of 152 orders per day while working from home and 133 orders per day when working onsite (14.3% increase). Clinical generalist pharmacists covering infusions verified a calculated mean of 144 orders per day while working from home and 117 orders per day when working onsite (23.1% increase).

A comparison of order verification productivity based on practice setting was conducted for the subset of clinical generalist pharmacists who rotate between inpatient and infusion practice settings (Figure 2). There was a greater increase in order verification productivity when these
pharmacists were covering the infusion clinics than when they were covering an inpatient service. Rotating clinical generalist pharmacists verified 148 orders per day when working from home and 142 orders per day when working onsite and covering inpatient shifts (4.2% increase). This subset of clinical generalist pharmacists also verified 130 orders per day when working from home and 107 orders per day when working onsite and covering infusion shifts (21.5% increase).

Survey Questionnaire

The survey had a 72% response rate, with 31 clinical generalist pharmacists responding and giving consent for participation. Of the responses received, 14 worked in the infusion setting only, 9 worked in the inpatient setting only, and 8 pharmacists rotated between both settings, with the majority of respondents reporting no experience in working from home before this new work schedule (80%).

To justify order verification as an appropriate measure of productivity, the respondents were asked to rank the time spent on various tasks before working from home. They were ranked from most time spent to least time spent by the majority of pharmacists (17; 63%).

When asked about their perceptions of working from home, about seventeen (59%) respondents indicated that they enjoyed working from home but appreciate the mix, and the remainder stated that they enjoyed working from home (Table 2). The respondents were also asked whether they felt the workflow for those onsite was impacted by those working from home; fifteen (53%) indicated that they did not feel that onsite workflow has been impacted, 10 (36%) felt that they have more time to focus on other pharmacy tasks that can only be handled onsite, and 3 (11%) felt that they are working harder to account for lost productivity of those working from home. Then they indicated how they perceived their work-from-home productivity, specifically in considering order verification as the measure of productivity. The majority of respondents felt that they were either significantly more productive or slightly more productive while working from home (57%), but 9 (32%) did not feel that they were any more or less productive, and 3 (10%) felt that they were less productive.

Respondents who rotated between inpatient and infusion settings were asked additional questions to assess whether there was a preference in the setting they were covering while working from home (Table 3). Of the 8 rotating pharmacists, only one (12.5%) indicated a preference for covering infusion shifts from home, while 7 (87.5%) indicated no preference. Despite this, 3 (37.5%) of the pharmacists felt that they were more productive in covering infusion shifts while working from home and the other 5 (62.5%) did not feel a difference in productivity based on the setting they are covering.

Finally, an open-ended question was presented to participants to gather information on what steps they had taken to increase focus, productivity, and/or motivation while working from home. An overwhelming majority described having a dedicated workspace. Some unique responses specific to individuals included preparing for their shift with food, playing background music, and even rotating to different areas of their living space.

Discussion

It has been previously illustrated in studies that a computer-based easily quantifiable function of pharmacists is order verification. The now-reported perceptions of a subset of hospital pharmacists, those practicing as inpatient and infusion clinical generalist pharmacists, support order verification as an appropriate measure of productivity. When analyzing order verification totals, inpatient clinical generalist pharmacists demonstrated a 14.3% increase in orders verified while working from home, and infusion clinical generalist pharmacists showed a 23.1% increase when working from home. Not only does this illustrate an increase in order verification productivity, but the clinical generalist pharmacists also perceived themselves as being more productive when working from home. Infusion clinical generalist pharmacists spend a greater proportion of time on physical tasks such as product checking than our inpatient clinical generalist pharmacists, who spend a significant amount of time on chart review and attending interdisciplinary rounds. Responsibilities of our inpatient clinical generalist pharmacists were more amenable to remote work compared with infusion clinical generalist pharmacists. Because of this, infusion clinical generalist pharmacists working from home demonstrated a greater increase in order verification totals as they had more time dedicated to this
specific task. Furthermore, pharmacy administration noticed a significantly reduced number of call-offs during the study period as the pharmacists were able to switch into work from home positions when needed. For example, during COVID-19 exposure quarantines, pharmacists would shift into work-from-home positions rather than calling off. Before this study, working from home was not an option, and the pharmacist would have needed to call off for the shift. Because of the flexibility given under the COVID-19 circumstances, pharmacists who still felt well enough to work could do so remotely while complying with exposure protocols.

It is important to consider a worker’s preference in workplace setting as this can impact their motivation and subsequent productivity. In addition, although no respondents indicated that they do not enjoy working from home, the majority of participants stated that they appreciate the mix of working from home and onsite. This is indicative of the potential importance to be allowed the flexibility in workplace setting and will be continued in a reduced manner at this institution for those who remain eligible for this practice. An added stressor to many health care employees is the lack of accommodations available to them in unforeseen circumstances such as an illness in the family, unexpected cancellation of childcare, or other need to stay home. The results of this study help to demonstrate that working from home is a viable option for pharmacists and can serve to improve job satisfaction. However, the goal is not to justify an exclusive remote work schedule as pharmacists are still needed for many onsite functions and hold an additional obligation to be available in onsite work if needed. It is important to note that it is crucial for the success of pharmacists to work from home to have an intimate understanding of onsite workflow. Having thorough experience within your specific institution gives an understanding of the intricacies of workflow, communications, and workplace relationships to allow for successful remote work.

Interestingly, there was a strong anecdotal preference across all health care professions to resume in-person patient rounds and has encouraged a shift toward bringing more staff back onsite as safety permits.

Some limitations of this study involve the lack of influencing variables to the order verification totals, including evaluating additional measures of productivity, complexity of orders verified, and variances in patient census. Order verification is known to be a time-consuming task of a pharmacist, but it may not fully capture a pharmacist’s productivity. Other duties that use pharmacist resources that were not analyzed in this study include time spent answering drug-information questions, chart review, contacting a provider, and pharmacist interventions. Furthermore, order verification was quantified by the number of verifications completed but did not assess the time requirement of each order verification or the complexity of that order. Increased complexity would require greater time dedication from the pharmacist in patient chart review, follow-up with providers, and potential order modifications but is not as easily quantifiable. It is possible that a lower daily average of order verification may have been due to greater complexity of orders for that day. Further studies would need to be done to include evaluation of the time requirements of an order. Although the order verification totals were standardized to a daily average, this did not account for changes in patient census. Inpatient census totals were greatly impacted by the COVID-19 pandemic, resulting in lower bed capacity than pre-COVID operations. In addition, there was not a decrease in the infusion census, but rates do vary from day-to-day and may result in fewer orders available for verification.

Finally, it is also difficult to easily extrapolate implications of order verification data between the different practice settings evaluated. There are distinct variances in practice between inpatient clinical generalist pharmacists and infusion clinical generalist pharmacists, and the expected order verification totals are different because of this. The expectations for inpatient clinical generalist pharmacists were the same regardless of whether they were working from home or onsite. However, infusion clinical generalist pharmacists saw a redistribution of their typical tasks such that those working from home were expected to dedicate more time to order verification than those working onsite, which was reinforced by the order verification data evaluated. Distinct differences in expectations for various pharmacist practice settings becomes

Table 2
Clinical generalist pharmacist-reported perceptions of work from home productivity

| Answer options                                                                 | Count (%) |
|-------------------------------------------------------------------------------|-----------|
| Do you enjoy working from home?                                               |           |
| Yes                                                                           | 12 (41.4) |
| No                                                                            | 0 (0.0)   |
| Sometimes; I appreciate the mix                                               | 17 (58.6) |
| Do you feel the on-site workflow has been impacted by having staff work from home? |           |
| Yes, I have more time to focus on other pharmacy tasks that can only be handled while on-site | 10 (35.7) |
| Yes, I feel I am working harder to account for lost productivity of those working from home | 3 (10.7)  |
| No, I do not feel there is a difference in workflow while working on-site     | 15 (53.6) |

Overall, how do you feel your productivity, as measured by order verification, has been impacted with a work from home schedule?

| Answer options                                                                 | Count (%) |
|-------------------------------------------------------------------------------|-----------|
| I feel I am significantly more productive when working from home             | 7 (25.0)  |
| I feel I am slightly more productive when working from home                  | 9 (32.1)  |
| I do not feel any more or less productive when working from home             | 9 (32.1)  |
| I feel I am slightly less productive when working from home                  | 2 (7.2)   |
| I feel I am significantly less productive when working from home             | 1 (3.6)   |

Table 3
Self-reported preferences of practice setting coverage while working from home for inpatient and infusion rotating clinical generalist pharmacists

| Answer options                                                                 | Count (%) |
|-------------------------------------------------------------------------------|-----------|
| Do you have a preference of which setting you’re covering while working from home? |           |
| Yes, I prefer to working inpatient shifts from home                           | 0 (0.0)   |
| Yes, I prefer to work infusion shifts from home                               | 1 (12.5)  |
| No, I do not have a preference                                                | 7 (87.5)  |
| Do you feel there is a difference in ability to maintain productivity while working from home based on which setting you are covering? |           |
| Yes, I feel I am more productive covering inpatient shifts from home          | 0 (0.0)   |
| Yes, I feel I am more productive covering infusion shifts from home          | 3 (37.5)  |
| No, I do not feel there is a difference in productivity                       | 5 (62.5)  |
a key factor for the importance of outlining work-from-home responsibilities to ensure maintained productivity.

For purposes of administrative support, participants were asked an open-ended question of what steps they had taken to remain focused while working from home. This information was gathered to be used as support for future pharmacists who may use this flexible workplace opportunity. Responses consistently mentioned having a dedicated workspace. However, there were also niche actions taken by individuals such as preparing for their shift with food, background music, or rotating to different rooms. This is an important consideration in the success of working from home to tailor it to the individual's needs, and additional research is needed to evaluate the effect of flexible workplace settings in decreasing pharmacist burnout. Creating too strict an environment may be counterproductive, but offering general guidance and expectations can help maintain structure to their workday.

The purpose of this study is not to justify the exclusivity of pharmacists working from home or in an off-site location but rather to aid in diminishing stereotypes of an inability to work from home. This practice was precipitated by the COVID-19 pandemic, and evaluation of its long-term applicability was necessary. Ultimately, the support of staff to be given the option to work from home may be beneficial for their overall wellbeing.

**Conclusion**

The onset of the COVID-19 pandemic and need for social distancing practices precipitated the shift toward remote work, and increased technology use made it plausible for health care workers to do so. Pharmacists are uniquely positioned for this transition as select responsibilities are easily amendable to remote work, and order verification is the most time consuming of these tasks. When using order verification totals as a measure of productivity for inpatient and infusion pharmacists who rotated between working from home and onsite, an increase in productivity was shown when working from home. Furthermore, when asked about their perceptions on working from home, the majority of pharmacists reported that they appreciated the option to work from home and felt that they were more productive in that setting. Finally, successfully working from home as a clinical generalist pharmacist is possible only with extensive knowledge of their individual institution and workflow. We believe that these data support the long-term applicability of a flexible work schedule for inpatient and infusion pharmacists.

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Carolyn Kusoski, BSPS, Student Pharmacist, The Arthur G. James Cancer Hospital and Richard Solove Research Institute, The Ohio State University Wexner Medical Center, Columbus, OH

Stephen Polley, PharmD, MPA, MS, BCPS, Assistant Director, Cancer Pharmacy Services, The Arthur G. James Cancer Hospital and Richard Solove Research Institute, The Ohio State University Wexner Medical Center, Columbus, OH

Julie Kennerly-Shah, PharmD, MS, MHA, BCPS, Associate Director, Cancer Pharmacy Services, The Arthur G. James Cancer Hospital and Richard Solove Research Institute, The Ohio State University Wexner Medical Center, Columbus, OH