How much time can clinicians save accessing patient information via a virtual desktop infrastructure (VDI)? The ability for healthcare organizations to enable their desktops to run on a virtual machine (VM) on their central server has a tremendous opportunity to impact patient care. HIMSS Analytics sought to highlight the quantitative ROI of VDI by conducting a series of interviews in March 2015 with clinical and IT staff at University Hospitals of Cleveland (UH) on behalf of VMware, provider of cloud and virtualization software and services. While UH, a major not-for-profit health system, has not conducted formal ROI analyses with regard to time savings, HIMSS Analytics uncovered numerous benefits in the areas of workflow improvement for both clinical and IT staff. These benefits in turn have enabled a more efficient IT department, mobile access to patient information by clinicians and more time for clinicians to spend with their patients — all of which support the Health and Human Services Department’s triple aim of improving the patient experience of care, improving the health of populations and reducing the per capita cost of healthcare.

Streamlined clinical workflow equals more time for patients

In an eight-hour shift, Amy Pound, director of medical student education in the emergency department (ED), typically looks at patient information before and after a patient encounter approximately 25 times. She estimates that leveraging VDI and “tap-and-go” technology from VMware and Imprivata to access patient records saves a maximum of 10 minutes per hour — up to an hour and 20 minutes per shift redirected to patient care. Faster access to patient information and being able to save the information on the screen after numerous interruptions in the ED has resulted in more time being spent on patients, according to Pound. “Prior to [the deployment of VMware Horizon], you would have to just sit there and wait to log on to the system and you cannot walk away,” she said. “Any time I had to wait at a terminal to access patient information means patients are waiting longer to be seen. It would keep me outside the patient room longer and inhibit overall patient flow and workflow in general.”
“The virtual platform makes it much easier to go between patients. I find I spend less time out of the room and more time with my patients.”

Amy Pound
Director of medical student education, ED
University Hospitals of Cleveland

“The virtual platform makes it much easier to go between patients. I find I spend less time out of the room and more time with my patients,” Pound added. With the ED dependent upon people coming in, Pound isn’t sure the platform helps her see more patients. That said, she emphasized, “I definitely get to spend more time with patients while they are there.”

UH nurses doing their rounds have also benefited from a streamlined workflow. After they access the UHCare electronic medical record (EMR) and their work list on their desktop, which enables them to review all medications they are ready to administer, they can log in to a workstation on wheels (WOW) and see the exact same screen that was on their desktop. Therefore, barcode scanning and verification and administration of medication at the bedside becomes a much more efficient process versus repeating the steps of logging in and opening up the work list on the WOW.

“That process alone can save us up to 30 seconds to a minute per patient,” observed Anthony Petros, clinical liaison to UH Ahuja and a trained nurse. Applying that metric to Pound’s workflow could result in a savings of upwards of 25 minutes in an eight-hour shift, which in a busy ED is precious time. Being able to access patient information such as lab work documentation with a badge touch versus a login on a workstation is a “huge advantage when providing patient care,” he added.

“The major advantages of the virtual desktop are that it frees the provider to focus on the patient and makes it easy for them to document at the point of care,” said James Millington, group product line marketing manager at VMware, provider of cloud and virtualization software and services.

“If orders enter the system quicker and medications get to the patient sooner, there’s a definite knock on effect to patient care.”

Enabling clinician mobility

Indeed, another impact of VDI on clinical workflow is its ability to support clinician mobility. Oftentimes, clinicians are interrupted from inputting data into an application on a workstation and then return to find another clinician.

“Good technology doesn’t just save clinicians time, but also prevents cognitive disruption and contributes to patient safety and better outcomes.”

Saving time, however, can directly impact patient satisfaction for clinicians. “As far as time saved, obviously the more time we spend with our patient the better the patient satisfaction, the better care they are going to get,” Petros said. “Whatever can accelerate our documentation or our login to the system — logging out of the system, signing out medications, anything like that — is of significant importance.” In the past, logging in could take up to 45 seconds.

The ability to go from one workstation to another and call up the same information, said Wei Xiong, attending physician in neurology at University Hospital Case Medical Center, is like “having your entire desktop on the cloud that allows you to carry it with you without physically carrying it with you.”

Sean Kelly, MD, a practicing ED doctor at Beth Israel and chief medical officer at Imprivata, provider of SSO and secure communication solutions, agreed. “[With the virtualized desktop] I can roam my desktop and I don’t miss a beat,” he said. “The technology becomes seamless.”

Seamless technology experience impacts patient care and satisfaction

Xiong noted, “The benefit [of VDI] was taking away the frustration of having to deal with inconsistent computers, going from one to another and having to determine if it works or not. It definitely improves our workflow.” While he could not say improved workflow directly impacted patient care, he affirmed that it impacted patient care indirectly because he and his clinical colleagues were spending time with patients rather than with the IT help desk.

Others, however, view their technology experience as indeed positively impacting patient care. “Evaluating a stroke patient in the ER is highly time dependent,” said Kelly. In order to treat a patient with thrombolytics (“clot-buster drugs”), a clinician must rapidly access prior medical history for any contra-indications, order a CT scan to rule out bleeding and review it on PACS, consult neurology, perform an NIH stroke scale and potentially treat blood pressure or other co-morbidities, according to Kelly. “If the technology is seamless and serves that up to me as needed, then I can focus on the complex care decisions involved in delivering quality patient care, rather than the administrative or technical tasks necessary to deliver quality patient care,” he said.

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“Enabling clinician mobility”

Indeed, another impact of VDI on clinical workflow is its ability to support clinician mobility. Oftentimes, clinicians are interrupted from inputting data into an application on a workstation and then return to find another clinician using the desktop. With VDI, clinicians can pull up all their information on any other workstation and resume their work, without losing any information. “It really helps to streamline one’s workflow when you don’t have to battle over the one workstation on the floor that is free at that point in time,” said Petros.
Subsequent logins—after the first login within the 36-hour window—take 10 seconds to get back in versus the previous 45-second login.

**Physician adoption helps meet meaningful use**

While many healthcare organizations have struggled to get their physicians to embrace electronic medical record systems because of workflow disruptions, VDI is helping providers make electronic patient information more accessible yet in a secure manner, whether the physician is within or outside of the four walls of the organization. Physicians can open the UHCare EMR, for example, to review lab work or print out orders, interview the patient and come back to the same workstation or a different workstation, and continue the work that they were doing before seeing the patient. “If they are in the middle of one of their daily history and physical exams or progress notes and they have to step away for a second, they can lock their workstation, step away to get an updated status, and come back to any workstation and pull up that exact note and essentially continue from there,” Petros explained. “Again, they do not have to waste all that time logging into the system.”

When physicians and nurses request a new workstation, they are requesting a virtual platform, according to John Foley, CIO at University Hospital Case Medical Center. “The proof is in the pudding—people are actively saying they want it,” he noted. One of UH’s IT consultants related a story in which he received an image of a patient room at a UH facility with two different sets of computers. The physicians had crowded to the side of the room with the new virtual desktop platform and not the traditional computer workstations on the other side of the room.

With respect to CPOE, which is a core measure in Stages 1, 2 and 3 meaningful use objectives, Petros pointed out that while he could not make a direct correlation between CPOE and VDI, compliance of CPOE has increased, likely because of the availability of VDI, which has enabled physicians to “essentially sign-off on orders in more locations than where they could previously.” Many times physicians are paged while conducting CPOE but are able to move to another workstation, pull up the order, re-verify and add more medications, and send it on through. “This has happened several times,” Petros said.

Before the VDI deployment, Pound noted that orders that were partially completed but not submitted were lost once the clinician was called away from the workstation and the work had to be started all over again. Not only was Pound able to resume those same orders on the virtual platform, she was also able to quickly look up references for medical students or look up a specific clinical case because the system saved all her bookmarks and she could call them up regardless of which workstation she accessed.

Physicians have informed Petros that the ability to move from workstation to workstation has saved them time throughout the day. “Now I have physicians saying to me how great the new process is versus the old process, and how they love the VDI machines,” he said. “They could never go back to the old way.”

Having access to their own personal desktop on any workstation has also increased healthcare IT adoption among physicians. In the past, users installed third-party software such as Google Chrome for browser purposes, but the link proved to be problematic on the older machines. Physicians were unable to view their radiology results, CAT scans or CTs on those machines, and were forced to move from computer to computer until they found one that allowed them to view their documents, according to Petros. With VDI, all the workstations have their own individual desktops so there’s no issue with third-party software installation. With the availability of shortcuts and access to all their information, Petros noted, “Physicians are a fan of having their own personal desktop on any workstation.”

“I would consider the [VDI] project a success if we get to the point that physicians are not thinking about the technology and we can make it that they focus on what they need to do,” added Foley.

**Security without impeding remote access**

One of the major challenges with providing remote access for clinicians is ensuring that the person accessing the information is authorized to do so and that the information is protected. Since 2009, when the HIPAA breach notification requirement took effect, nearly 31.4 million people have had their protected health information compromised in privacy and security breaches. The inability to protect patient information has significant financial and brand consequences. Indeed, according to the Ponemon Institute’s annual report, 2014 Cost of Data Breach: Global Analysis, the average cost of a data breach to a company was $3.5 million in U.S. dollars and 15 percent more than...
what it cost last year. The Office for Civil Rights, the Health and Human Services division responsible for enforcing HIPAA, has levied more than $25.1 million in fines against healthcare organizations responsible for violating the privacy and security rules.

UH has been able to balance securing patient information with enabling a mobile workflow for their clinicians. In fact, remote access for UH clinicians – especially home and mobile access – is part of the health system’s ongoing “anywhere, anytime access strategy,” according to Foley. UH clinicians can remotely access patient information via mobile phones or tablets. “By serving the remote-access capabilities through the virtual interface, we can provide full-featured remote-access capabilities for our systems,” he explained.

**Increasing IT department’s efficiency**

UH’s VDI delivers benefits for security patches, which are updated for main applications on a monthly cycle. The virtual machine allows UH’s IT department to stream the updates without disruption to the end-users in the same way mobile phone updates are imperceptible to end-users. “This is especially helpful for security patches and minor releases for applications,” pointed out Dennis Wilson, manager of Virtual Desktop Infrastructure. IT staff test the patches with its application owners and upload to the environment within a few days. Critical updates and patches are uploaded immediately, with IT staff alerting users to log off. “If the update or patch only applies to a certain percentage of users, then only they need to log off,” he said, of the minimal disruption.

With VDI, UH’s help desk is better able to support its users. “We are seeing fewer calls for unresponsive systems,” Foley said. “If they have problems that are software related, they can just log off, and while they are logged off, the system will automatically build them a new VM,” said Wilson. Approximately 60 percent of issues are resolved when users log back in and the VM is new, according to Wilson. “It takes minutes instead of a half-hour or multiple hours to resolve the issue,” added Foley.

“We are delivering better technology and constantly updated technology,” Wilson said. Central management of apps enables the IT department to take care of everyone at once versus relying on system management and patching tools across the network. Whereas an entire team previously was dedicated to updating desktops to the correct versions, now one or two IT team members spend “a very small percentage of what they do” on updates, according to Wilson.

In March, UH experienced its first VDI downtime, which resulted in users having difficulty logging into the virtual desktop environment. UH’s IT team was able to immediately distribute a folder and a change to all the workstations that allowed users to log into the UHCare EMR directly. “Within five minutes, thousands of users were able to access UHCare,” Petros reported.

**Supporting future initiatives**

By its very nature, VDI can scale to accommodate healthcare organizations’ future IT initiatives. “When I think ahead and look at the breadth and scope of deployments for certain future upgrades – Windows 10, for example – without VDI, we would need substantially more manpower and capital budget,” Foley pointed out. VDI enables a more streamlined process, so the IT department can operate strategically and focus on the things that add business value in an efficient manner. “It [VDI] really gives us some flexibility and gives us the confidence to execute on future capabilities,” Foley concluded.