M8 Portfolio Assignment: Checklists for Implementing Digital and Virtual Health for

Specialized Graduate Certificate in Health Informatics

Concentration: Digital Health

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Introduction

This is the checklist that will be used throughout the implementation to adoption process for this digital health application the "iCare HOME2" tonometer (iCare, 2023). This implementation will take place at the UCHealth Sue Anschutz-Rodgers Eye Center within the Department of Ophthalmology (CU Anschutz, 2023). Since the iCare HOME2 will be used as both a remote device for glaucoma intraocular pressure (IOP) monitoring and during "teleglaucoma" (telehealth) visits, we will utilize an implementation guideline that considers both approaches.

Checklists for Implementing Digital and Virtual Health

- **Resources -** Describe the healthcare organizational departments involved and list the roles of key team members, including leadership and champions. This will involve 3 key areas of the healthcare organization: Clinical, Operational, and Leadership (Liao et al, 2022).
    1. **Clinical**
        - Chief Division of Ophthalmology: internal champion and leadership for implementation effort.
        - Ophthalmology providers (MDs, PAs, NPs): primary consumers of the device, teachers/educators, primary patient care delivery.
        - Ophthalmology Residents and Fellows: primary and secondary consumers of device, teachers/educators, primary and secondary care delivery.
        - Nursing staff: Champion of device teaching/educating of patients and other staff members.
        - Medical Assistants/Ophthalmology technicians: similar role to nursing staff.
    2. **Operational/IT**
        - ___Ophthalmology Clinic Head administrator: champion and leadership for implementation effort.
        - ___Hospital IT department: champion and leadership for implementation effort. Primary leader of technical planning, education, and go-live effort.
        - ___Data Science/Bioinformatics: champion for data transmission and usage from the devices.
    3. **Administrative/Executive Leadership**
        - ___Chief Medical Information Officer: champion and leadership for clinical efficacy and implementation effort.

    - COO of hospital: champion for financial ROI monitoring during implementation.
    - Hospital Purchasing Committee: as part of the executive committee, they are going to closely monitor the ROI of the product and patient outcomes.
- **Governance -** List strategies for maintaining oversight and leadership support of technology.
    1. The clinical stakeholders' goals for oversight and leadership include patient safety, clinical effectiveness, patient and provider adoption, and providing clinical efficacy for the product (Liao et al, 2023).
    2. The operational stakeholder's strategies governance strategies are related to actionability and clinical protocols, performance of the devices, and governing the devices abilities to maintain compatibility of the normal operations, interoperability and infrastructure within the fabric of the healthcare system.
    3. The executive leadership group is primarily responsible for oversight of the 2 aforementioned groups but also the importance of ROI and equitability of the effort related to the goal of improved patient care delivery (Liao et al, 2023).
- **Workflow assessment -** List the strategies planned for assessing workflow and minimizing unnecessary workflow changes.
    1. First step is to identify the discrete workflow components which will include mapping the following: how the device will be utilized by the patient to take IOP measurements, data transmission and review by the provider, a telehealth workflow where the provider consults with the patient either via remote messaging in the iCare PATIENT2 app or video visit, and a provider review of IOP data transmitted by the iCare HOME2 device (Staras et al, 2021).
    2. The second step is an actual workflow assessment and analysis. This could include direct observation of the clinical staff, providers and patients; clinical staff reporting, interviews with staff and patients, audit logs from the device and associated applications, and any "job task diaries" or ad hoc notes taken by staff during the workflows (Staras et al, 2021).
    3. A third step would be "Triangulation" which is a verification process commonly used to clarify what was observed in the second step (Staras et al, 2021).
    4. A last step may be to involve all level stakeholders from clinical, operational and administrative staff using interview methods to gain a global perspective of how all stakeholders are affected by the workflow (Staras et al, 2021).
    5. To minimize unnecessary workflow changes, we will have to develop a pre-determined list of possible "workarounds" that can be utilized if certain parts of this new workflow do not go as planned. Workarounds are very commonly used in implementations of new EHRs or other digital health applications to avoid work stoppage or compromise in patient care (Zheng et al, 2020)
- **Technology -** List the activities performed by the IT Department to work with the vendor to install and test the implementation. We will also utilize the AHRQ guidelines for EHR implementation as a guide here (AHRQ, 2023),

1. **Installation:** this will occur in a multi-step process. We will need to plan for installation in the ophthalmology clinic of the iCare CLINIC cloud database software as well as the iCare Export desktop application to all clinic computers.
    - We will also need to plan for the installation of the mobile application the iCare PATIENT2 that pairs with the iCare HOME2 tonometer.
    - There will be multiple trials of the installation process prior to a "Go-Live".
    - We will also need to discuss with the vendor how we can make sure the mobile application software is installed when we teach patients via telehealth how to install the application from the app store on their phone.
    - With installation we will need to plan for data transmission, integration and interoperability. We will need to develop a plan for how to synchronize the data to the EHR system that we use in the clinic. We will also need to evaluate the cybersecurity and multi-factor authentication using OAuth involved in this (Sayeed et al, 2021).

- **Testing process** (AHRQ, 2023):
    - Unit testing of all devices.
    - Integration testing.
    - Interface testing between all systems (iCare HOME2, iCare PATIENT2, iCare CLINIC, iCare Export).
    - System stress or load testing of all devices.
    - We will need to make sure that all testing involves all possible scenarios as well as cybersecurity testing. This may involve some simulated cyber-attacks such as "eavesdropping" and "man-in-the-middle" (Silva-Trujillo, et al. 2023).

- **Training -** List the plans to train the staff members (and/or patients) who will use the technology. We will make use of the recommended AHRQ EHR Implementation Checklist training guidelines as a guide for this (AHRQ, 2023):
    1. The iCare HOME2 vendor will present a general overview of the product and the associated digital health applications to all clinical staff and operational/IT staff.
    2. We will hold multiple sessions for “hands-on" and task-oriented training for all staff involved in maintaining the technology, treating and teaching patients.
    3. "Super users" will be identified as champions of the process from the clinical and operational/IT staff, and they will have additional training sessions so they can serve as front line trainers and damage control during the training process.
    4. There will also be some "dry runs" of using the technology in the clinic with medical staff serving as acting patients before we bring the technology to the patient.
    5. For the training sessions we will have educational material provided by the vendor, but we will also design a "cheat sheet" for all team members with diagrams and best practices for how to use the devices but also teach them to other team members and patients.

6. The next part of the training process is one of the most important. It has been shown that patients can be taught how to use the iCare HOME2 tonometer device purely via telehealth without any in person clinic sessions (Barbour-Hastie, 2022). We will hold additional training sessions for the clinical staff that will be teaching the device via telehealth as some patients may have the device delivered to their home, which could be as much as 500 miles away from our clinic and teaching it via a telehealth video link will be imperative to them using it. This may involve developing a special curriculum and a trial-and-error process with some volunteer patients.
7. The last part of the training will be to train patients. As mentioned, we hope to be able to train patients in how to use the device both in-person in the clinic but also 100% via telehealth. We will have ophthalmology clinical nursing, medical assistants and mid-level providers (Physician Assistants) be champions for training patients in the clinic. An ophthalmology provider will supervise them. We will then have the same team train some patients via telehealth and debrief the staff and patients on the processes to see how we can optimize them for everyone.

- **Change management -** List the efforts to gain buy-in, understand the technology transition, plan for help desk staffing, monitoring, and modifications.
    1. **Gaining buy in -** This involves 3 steps in "Preparing for Change" which includes (Kho et al, 2020):
        - 1. Assess opportunity and problem motivating the change - conduct a needs and compatibility assessment of the technology.
        - 2. Select and support a guiding change coalition which includes: establish plans, recruit leadership and management support, identify internal and external champions, engage all stakeholders involved.
        - 3. Formulate a clear vision for stakeholders - this should be clear, simple and articulate.
    2. **Understand the technology transition** - This will involve the process of "managing change" which includes **the next 3 steps** in the change management process as described by Kho et al. 2020:
        - 4. Communicating a vision for the technology - gaining all stakeholder trust and acceptance of the technology used.
        - 5. Mobilize energy for change - engage all stakeholders, clinical and administrative partners involved.
        - 6. Empower others to act - this involves assigning ownership of various stages of the technological transition to everyone involved.
        - 7. Develop and promote change related knowledge and ability
        - 8. Monitor and strengthen the change process
            - These last 2 steps will involve some flexibility to allow for education and training of the change that will be involved for everyone from the patients, clinical, operational, and administrative staff. New work processes, protocols and

procedures may need to be developed and everyone needs to buy in for change management to be effective.

3. **<u>Plan for help desk staffing, monitoring, and modifications.</u>** This aspect of the change management plan will involve "reinforcing change." These are the last few steps of the change management process by Kho et al 2020:
    - 9. Identify short term "wins" and utilize reinforcement of the new processes as it takes place. This will involve having the IT help desk fully staffed and trained for damage control, monitoring of the new processes and protocols as well as having the entire help desk staff trained on best practices for troubleshooting bugs and issues that may arise from the provider-patient interaction with the iCare HOME2 device, its associated digital health applications, data transmission, and telehealth interactions.
    - 10. Continue to engage all stakeholders, clinical/operational/administrative partners in the change process.
        - At this stage everyone involved should still be on board evaluating changes and maintaining flexibility.
        - Debriefing the change management process is paramount for it to work.
        - A "debrief checklist" as recommended by the AHRQ "TeamSTEPPS" process would be important for not only the help desk staff but all stakeholders, both technical and non-technical, clinical and non-clinical, to iterate over throughout the change process.
        - A debriefing should include but not be limited to (AHRQ, 2023):
            - Recounting of all events and documentation
            - Analysis of positive, negative, and other key events of what worked and would did not and what should be improved.
            - Lessons learned by individuals and team members and how change can be implemented in the future.
            - Reinforcement of what worked and how the team can learn from this.
            - Final assessment of what does need to be tweaked by the team and who is going to champion the changes going forward.
            - There is also an entire checklist the AHRQ publishes that we will have the help desk staff use throughout the implementation process to help with learning and improvements.

- **Metrics for success -** List the metrics collected to assess progress and success. For each metric, describe the frequency. The key performance indicators (KPIs) we will track are commonly used for evaluating telehealth (Vitelnet, 2023). This makes the most sense because the iCare HOME2 will be utilized in a telehealth or “teleglaucoma” setting.
    1. Clinical KPIs (Vitalnet, 2023)

- **Patient prioritization** – this metric will measure the percentage of patients treated in each stage of glaucoma from early to end stage. We will also track the percentage of patients that have their IOP targeted and treated by a provider to either reduce the IOP with medication or surgery, and those patients that are diagnosed for the first time with glaucoma based on their IOP measurement.
- **Measuring clinical efficiencies** – this metric will measure the efficiency of the process for a patient self-taking an IOP measure of their eye, transmitting it to the provider, and the providers time to analyze the data and respond via the mobile application.
- **Vision acuity metrics** – we want to track patient visual acuity measures to see if this device and remote IOP monitoring helps prevent further loss of the patient's sight or improves their vision (Brown et al. 2014).
- **Medication costs** – we want to monitor the average number of e-prescriptions dispensed to patients and see if this remote device and teleglaucoma can reduce the need for multiple prescriptions over time (Varma et al, 2011).

2. Operational/IT KPIs (Vitalnet, 2023)
    - **Accuracy of Data collected** – this metric will track how accurate the IOP data is for the patient's eyes over a period of time. The more data collected from the digital health device, the more we can evaluate this measure.
    - **Overhead Cost Analysis** – what is the overhead cost for using this device and its associated digital health applications the iCare PATIENT mobile app, the iCare CLINIC cloud database, and the iCare Export desktop app. We will track cost metrics for each patient and provider interaction over time to see how this compares to the overhead cost of a patient being seen in person in the clinic.
    - **Data interoperability** – we want to measure how much of the data collected from the iCare HOME2 tonometer and its associated applications is interoperable and integrated into the patient records either by FHIR APIs or by other data transmission methods. If the data is not being included in the patient record for most patients, this is a problem.
3. Administrative/Executive KPIs (Vitelnet, 2023)
    - **Effectiveness in reducing ED and other healthcare service utilization for glaucoma** – We will measure the effectiveness of this based on how many ED visits and emergent surgeries can be reduced. We know that Black and Hispanic patients are more likely to use the ED and need urgent surgical intervention due to poor follow up and monitoring of glaucoma and IOPs (Halawa et al. 2022). Over time we expect to see a reduction in these numbers from using this remote device and teleglaucoma visits.

- **Tracking of teleglaucoma visits and patient use of the device** – metrics we would track would be related to patient utilization of the device as well as the mobile applications. This would in turn include monitoring the provider-patient interaction with the data collected. Ultimately, we want to determine if patients and providers are using the device, the data, and the applications.
- **Return on Investment** – we want to monitor the ROI for 1 month, 6 months and a year vs. the improvement in quality of life for these patients. In glaucoma patients we expect to see their vision either not worsen or improve and thus improve their quality of life preventing blindness, thus reducing the need for healthcare service utilization (Brown et al, 2014).

References

AHRQ, 2023. "Digital Healthcare Research Checklist - EHR Implementation Checklist." Accessed on November 4, 2023. https://digital.ahrq.gov/sites/default/files/docs/workflowtoolkit/ehr_implementation_checklist.pdf

AHRQ, 2023. "Reviewing the Team's Performance: Debrief." Accessed on November 5, 2023. https://www.ahrq.gov/teamstepps-program/curriculum/team/tools/debrief.html

Catriona C. Barbour-Hastie and Andrew J. Tatham, 2022. "Teaching home tonometry using a remote video link." *Eye* 2023, no.37 (February 2022): 501-505, https://doi.org/10.1038/s41433-022-01966-y

CU Anschutz, 2023. “Ophthalmology”. Accessed on November 5, 2023. https://medschool.cuanschutz.edu/ophthalmology

Frank Liao, Sabrina Adelaine, Majid Afshar, and Brian W. Patterson, 2022. "Governance of Clinical AI applications to facilitate safe and equitable deployment in a large health system: Key elements and early successes." *Frontiers Digital Health* 24, no. 4 (August): 1-8, https://doi.org/10.3389/fdgth.2022.931439

Gary C. Brown, MD, MBA; Melissa M. Brown, MD, MN, MBA; Joshua D. Stein, MD, MSc, MS; Richard P. Wilson, MD; and George L. Spaeth, MD, 2014. "Measuring the Impact of Glaucoma and the Value of Treatment: A primer on value-based medicine.“ *Glaucoma Today*. March/April 2014.

iCare, 2023. "iCare HOME2." Accessed on November 4, 2023. https://www.icare-world.com/us/product/icare-home2/

Joanna Kho, Nicole Gillespie, and Melinda Martin-Khan, 2020. "A systematic scoping review of change management practices used for telemedicine service implementations." *BMC Health Services Research* 20, no. 815 (September): 1-16, https://doi.org/10.1186/s12913-020-05657-w

Kai Zhen, PhD, Raj M. Ratwani, PhD, and Julia Adler-Milstein, 2021."Studying workflow and workarounds in EHR-supported work to improve health system performance." *Ann Intern Med* 172(11 Suppl): S116-S122, https://doi.org/10.7326/M19-0871

Omar A Halawa, Ajay Kolli, Gahee Oh, William G Mitchell, Robert J Glynn, Dae Hyun Kim, David S Friedman, and Nazlee Zebardast, 2021. "Racial and socioeconomic differences in eye care utilization among Medicare beneficiaries with glaucoma.“ *Ophthalmology* 129, no.4 (April 2022): 397-405, https://doi.org/10.1016/j.ophtha.2021.09.022

Raheel Sayeed, James Jones, Daniel Gottlieb, Joshua C Mandel, Kenneth D Mandl, 2021. "A proposal for shoring up Federal Trade Commission protections for electronic health record–connected consumer apps under 21st Century Cures." *Journal of the American*

Medical Informatics Association 28, no. 3 (March 2021): 640-645, https://doi.org/10.1093/jamia/ocaa227

Rohit Varma, Paul P. Lee, Ivan Goldberg, and Sameer Kotak, 2011. "An Assessment of the Health and Economic Burdens of Glaucoma." *Am J Ophthalmol* 152, no. 4 (October): 515-522, https://doi.org/10.1016/j.ajo.2011.06.004

Silva-Trujillo et al, 2023. "Cybersecurity Analysis of Wearable Devices: Smartwatches Passive Attack." *Sensors* 23, no. 12 (June): 5438, https://doi.org/10.3390/s23125438

Staras et al, 2021. "Using a Clinical Workflow Analysis to Enhance eHealth Implementation Planning: Tutorial and Case Study." *JMIR Mhealth Uhealth* 9, no. 3 (March): e18534, https://doi.org/10.2196/18534

Vitalnet, 2023. "15 KEY PERFORMANCE INDICATORS To Power Success In Telehealth." Accessed on November 4, 2023. https://www.vitelnet.com/wp-content/uploads/2021/07/15-Key-Performance-Indicators-to-Power-Success-in-Telehealth-2.pdf