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Point of Care Testing: Best Practice Toolkit for Improving Access to Point of Care Testing in Mobile Medicine

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Point of Care Testing: Best Practice Toolkit for Improving Access to Point of Care Testing in Mobile Medicine

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Abstract

Practice Problem: Healthcare for persons experiencing homelessness (PEH) is a complex issue. Chronic and communicable diseases are disproportionately represented within this population. Healthcare spending is 2.5 times more costly in comparison to those who have not experienced homelessness. Although mobile health clinics aim to reduce the concerns with access to care, they do not eliminate barriers if the appropriate tests are not immediately available.

PICO: In the homeless population treated in mobile medicine (P), what is the effect of point of care testing (I) on turnaround time (O) compared with outside laboratory testing (C)?

Evidence: Critical analysis of the literature revealed that point of care testing (POCT) is equivalent to or better at improving test results from baseline, improving medication adherence, and cost effectiveness. In PEH, this can significantly reduce the average days to treatment.

Intervention: Using the CDC's Program Evaluation Framework, three established mobile health clinics were evaluated to determine if the mobile environment was an appropriate setting to support POCT tools. Ultimately, it was determined that there was a need for an environment-specific toolkit to support additional POCT tools in mobile healthcare.

Outcome: A POCT in mobile medicine toolkit was created to support implementation of additional tools, which can provide rapid and convenient access to testing, results and treatment in a population known to have difficulty accessing traditional healthcare services.

Conclusion: This toolkit is designed to improve the multi-layered and complex issue of healthcare for the intended population. This is driven by the need to enhance the quality of care, patient outcomes, and operational efficiency of mobile healthcare.

Point of Care Testing: Best Practice Toolkit for Improving Access to Point of Care Testing in Mobile Medicine

Persons experiencing homelessness (PEH) have higher rates of illness and co-morbid conditions compared to the general population (National Health Care for the Homeless Council [NHCHC], 2019). Further, PEH experience barriers to accessing care. Together, these problems impact life expectancy: PEH die an average of 12 years sooner than the general population. Even with the rise in availability of mobile health clinics in the United States, more could be done to make receiving health care less burdensome for this vulnerable group. The implementation of more comprehensive point of care testing (POCT) tools could make disease management much easier for PEH. This best practice toolkit will discuss the significance of increasing POCT within the mobile environment; summarize the purpose of the program development project; describe the utility of the program; review the underlying analytical framework guiding the project; provide a synthesis of the literature; offer an evidence-based practice recommendation; and define program analysis, evaluation, and dissemination.

Significance of the Practice Problem

Disease management in PEH is a public health and safety concern (Health Care for the Homeless Clinicians' Network, HCHCN, 2010). According to the NHCHC (2019), PEH have higher rates of illness. Living in shelters or on the streets is stressful and brings exposure to communicable diseases, violence, malnutrition, and weather extremes. New illnesses can occur, and chronic health conditions worsen. Heart disease, metabolic syndrome and HIV/AIDS are prevalent health problems seen in PEH (Bamberger, 2022). Communicable diseases are disproportionately represented within this population with one in five reportedly having an

infectious or other communicable disease (HCHCN, 2010). High risk of spread occurs in crowded shelters or encampments creating health risks to the public.

Another consideration for this project is health care spending. A study by Koh et al. (2020) analyzed healthcare spending in PEH and those with no evidence of experiencing homelessness in Massachusetts. It was found that in PEH, healthcare spending was 2.5 times more in comparison to Medicaid recipients who did not experience homelessness. In 2015, total spending per year was $21,598 per PEH compared to $8,080 per person on Medicaid having never experienced homelessness. This is explained with more use in emergency department care and inpatient stays (Koh et al., 2020).

With further consideration of social determinants of health, one of the most common barriers to accessing care is transportation (HCHCN, 2010). Although mobile health clinics aid in reduction of access to care issues, they do not eliminate the need for transportation. Baseline labs should become standard practice in PEH related to the disproportionate risk of cardiovascular and liver disease (HCHCN, 2010). To obtain necessary lab work the provider needs to make clinical care decisions, PEH often must make an additional trip to a clinical laboratory. A mobile clinic primarily serving PEH in a metropolitan area of Northern California found that only 54% of ordered labs were completed in 2022 (Cha Vue, personal communication, January 31, 2023). This highlights a gap in care. The implementation of additional POCT options with more comprehensive POCT systems on mobile units will reduce turnaround time from point of provider orders to clinical decision making.

The implementation of additional POCT methods will affect direct patient care at the organization level. The three levels of external analysis are known as the micro-, meso-, and macrosystem matrix (Nelson et al., 2011). This matrix identifies actions leaders take at the three

levels of the health system to nurture change. The microsystem focuses on the organization. The mesosystem focuses on the transactional environment including clients, supplies, regulatory organizations, and others (Nelson et al., 2011). The macrosystem focuses on the contextual environment including sociocultural, technological, political, and economical factors. Use of this toolkit for implementation of a project will focus within the microsystem.

Purpose of the Program Development Project

Mobile health clinics deliver medical care directly to where PEH live and work. Traveling to these communities, "mobile clinics remove the logistical constraints such as transportation issues, difficulties making appointments, long wait times, complex administrative processes, and financial barriers such as health insurance requirements and copayments" (Hill et al., 2014, para. 15). Mobile health clinics target underserved populations with greater than 70% of patients in 2022 of an ethnic minority, and over 75% had government funded or no health insurance (Mobile Health Map at Harvard Medical School, n.d.).

Mobile health clinics services include urgent care, preventative health screenings and initiating chronic disease management (Hill et al., 2014). Their services have proven to produce a significant medical cost savings through reduction of emergency department (ED) visits and hospitalizations from improved disease management and increased use of preventative services (Department of Health and Human Services [DHHS], 2013). The Mobile Health Map at Harvard Medical School (n.d.) reported that as of January 2023, the 1,103 listed mobile clinics in the United States had produced over $225 million dollars in cost savings.

The goal of this project toolkit is to provide a framework to reduce the turnaround time from the time the provider decides to order labs to when follow up care is initiated. To accomplish this goal, SMART objectives were developed. SMART objectives are specific,

measurable, achievable, relevant, and time oriented (Minnesota Department of Health, 2022). The SMART objectives identified for this project are listed below.

- Using the Center for Disease Control and Prevention's (CDC) Framework for Evaluation, evaluate three established mobile health programs by the end of week 15 of the second practicum block to better understand the current state of the project organization and how the mobile setting would benefit from additional POCT tools.
- Complete a project toolkit that can be used for implementation of comprehensive POCT tools in a mobile health environment by week 10 of the third practicum block.
- Disseminate the results of the program evaluation and the developed toolkit through oral poster presentation during week 13 of the third practicum block.
- Implement the dissemination plan for the toolkit with respect to both internal and external to the project organization by week 15 of the third practicum block.

Program Problem Statement

The following is the PICO question developed to explore the effect of POCT availability on disease management in vulnerable populations: In the homeless population treated in mobile medicine (P), what is the effect of point of care testing (I) on turnaround time (O) compared with outside laboratory testing (C)?

Population/Problem

The target population is PEH in a metropolitan region of Northern California. According to Sacramento Steps Forward (n.d.), as of March 31, 2022, there were 6,052 known people experiencing homelessness. Of that, 12% were children, 8% were transition aged youth from 18-24 years, and 80% were adults. According to Hill et al. (2014), both men and women take advantage of mobile medicine services almost equally.

Intervention

The intervention being investigated is the use of a portable diagnostic analyzer for POCT. This machine can run up to 31 blood chemistry tests within 12 minutes to aid in quick clinical decision making (Abbott, n.d.).

Comparison

Sending patients to an outside clinical laboratory to get comprehensive lab work completed is the current practice. Turnaround time for the laboratory is defined as the time of sample collection to the time results are obtained. According to Quest Diagnostics (n.d.), turnaround time for 95% of routine tests is 24 hours. This timeframe does not include the amount of time elapsed since the labs were ordered to collection or the time after the provider receives the results until patient follow up. In a qualitative study by Navid et al. (2011), staff at a mobile clinic in urban Canada found that POCT quickened turnaround time from up to three weeks to minutes. The immediate results achieved by POCT mean less time is spent on phone calls reminding patients to get the labs drawn and to come back for follow up.

Outcome

The initiation of increased POCT can reduce overall turnaround time, which is a key concern. Turnaround time initiation in the mobile environment starts at the time the provider makes the decision to order labs and stops when follow up care is initiated. Having POCT available in order to make on the spot clinical decisions avoids the additional trip to a laboratory (Florkowski et al., 2017) as well as the additional concern with follow up in this hard to reach population. A study by Keizer et al. (2020) examined the safety and effectiveness of same day sexually transmitted disease testing in vulnerable populations in Los Angeles, California and New Orleans, Louisiana. Time to treatment was found to have decreased from an average of 18.5

days to 3 days. Another study by Owen et al. (2021) examined the implementation of the Afinion Analyzer for HbA1c POCT within a mobile clinic in Northern California. This intervention resulted in 125 individuals receiving same day testing during the two-year study period.

Results from the HbA1c POCT led to patients receiving additional referrals including podiatry, ophthalmology, diabetes education, and nutrition (Owen et al., 2021). The impact of these additional referrals in relation to the POCT results is improved patient health outcomes. To measure the number of referrals, data would be collected from the electronic health record (EHR). Pre-implementation data would include the number of ordered labs from the mobile units as well as the number of labs that had not been conducted. Post-implementation data would include these same categories as well as the ordered treatments. The ordered POCT codes would be used to pull data regarding additional testing, medication management and referrals ordered.

Utility of Program

The ideal practice setting for this project is a federally qualified health center (FQHC), nonprofit agency, or other community organization who has an integrated mobile or street medicine component. As of 2019 typical participants of FQHCs in California included 64% Medi-Cal recipients, 7% private insurance recipients, 7% Medicare recipients, and 18% were uninsured (Capital Link, 2020). These types of organizations offer affordable health care to underserved populations who are challenged with barriers to accessing care including the inability to pay (Rebecca Owen, personal communication, March 3, 2023). Further defining the practice setting within a mobile or street medicine environment allows for increased access of care to those with additional social determinants of health barriers to include transportation and housing (Hill et al., 2014). The anticipated program evaluation, analysis, and product development based on an evidence-based analysis will improve disease management in

underserved populations. Additionally, this intervention will lead to medical cost savings through reduction of emergency department visits (DHHS, 2013).

There are many stakeholders to consider in this project. According to Silver et al. (2016), stakeholder analysis assists in the prioritization of stakeholders according to their level of necessary engagement. Stakeholders with high interest and low power are subjects. Those with high interest and high power are players. Those with low interest and low power are crowd. Those with low interest and high power are context setters (Silver et al., 2016). See the example of a stakeholder analysis provided within the toolkit in Appendix C. Interprofessional collaboration is required for the success in implementation of a project with use of the toolkit. Although each stakeholder has a different level of interest and power related to the project, each is essential for project success.

Analytical Framework

The CDC (n.d.) Program Evaluation Framework will be used to guide this paper and the development of this project. It is a formal means of evaluation to ensure that a project is visible and justified. This simple, low-cost framework encourages evaluations that are strategically scheduled to provide feedback at just the right times, which ensures practical application. The CDC's Program Evaluation Framework includes six interdependent elements of project evaluation (CDC, n.d.). These include engagement of stakeholders, description of the project, focus of the evaluation design, gathering credible evidence, justification of conclusions, and sharing lessons learned. Each of these elements encompasses the standards of this framework, which are utility, feasibility, proprietary, and accuracy. The standards address potential misconceptions about the purpose and methods of project evaluation (CDC, n.d.).

The Johns Hopkins Evidence-Based Practice (JHEBP) Model for nurses and healthcare professionals is synergistic to the CDC's Program Evaluation Framework and will be used to support the standards of the CDC's framework. This theoretical framework is interactive and places emphasis on the learner rather than the instructor (Dang et al., 2022). It forces learners to explore, ask questions and share. The JHEBP Model features three components influenced by organizational factors and evidence. These components include inquiry, practice, and learning (Dang et al., 2022). Inquiry begins the process by starting with what is already known and identifying the knowledge gaps. The results of the inquiry inform the practice and learning components. Practice is the translation of what is known into standards of care (Dang et al., 2022). Learning is building on what is already known and gaining new knowledge. The practice and learning components consist of the practice question, evidence, and translation (PET) process. The PET process guides the learner in developing an evidence-based practice (EBP) question; once the EBP question is developed, the learner appraises and synthesizes best evidence to make a recommendation and then determines the feasibility of that recommendation (Dang et al., 2022).

Evidence Search Strategy, Results, and Evaluation

As part of the CDC's Program Evaluation Framework, the project manager must collect credible evidence to convey a well-rounded picture of the project (CDC, n.d.). This includes sources that provide quantitative and qualitative data. The following section will describe the search strategy used to find credible sources, the results of the search strategy, and a JHEBP Model evaluation of each study included.

Search Strategy

A comprehensive literature search was completed regarding the PICO question described above. Databases used for the search included CINAHL Complete and PubMed. Keywords utilized are listed in Table 1. Filters included English language and date range from 2012-2023. Specific keyword exclusion criteria were "COVID," "mobile technology," and "mobile applications." This search identified a review article by Florkowski et al. (2017). The reference list from this article was searched for additional primary sources of information.

Inclusion of articles with research that took place outside of the United States were included; three articles from Australia and one from Canada were selected for review. Gialamas et al. (2009) completed a randomized controlled trial (RCT) in Australia regarding the adherence to medication with POCT versus clinical laboratory testing. Bubner et al. (2009) researched the effectiveness of POCT for therapeutic control of chronic conditions in Australia. Laurence et al. (2010) studied the cost-effectiveness of POCT in Australian general practice. Navid et al. (2011) completed a qualitative study regarding POCT in urban Canadian mobile health clinics. Each study's results were directly related to the clinical practice question at hand.

Results

The literature search generated a total of 200 non-duplicate articles from the databases CINAHL Complete and PubMed as well as a reference list from the systematic review by Florkowski et al. (2017). The student excluded articles from the database searches after completion of a title and abstract screen. The student excluded articles from the reference list search from the systematic review by Florkowski et al. (2017) based on topic relevance and date range. Of the twelve remaining articles, the student screened the full text. This resulted in seven

articles not including the systematic review by Florkowski et al (2017). See figure 1 for a summary of the search results.

Evaluation

Ultimately, the student evaluated eight articles for strength of evidence according to the JHNEBP model (Dang et al., 2022). A summary of the primary research evidence is found in appendix A. The student used the JHNEBP evidence level and quality guide to grade the articles. Of the eight articles, three were RCTs. According to the JHNEBP evidence level and quality guide, RCTs are considered level I evidence (Dang et al., 2022). All RCTs were of good quality, which is graded as B. The results and recommendations of each study were reasonably consistent with reference to scientific evidence. Of these RCTs, Bubner et al. (2009) noted a conservative non-inferiority margin of negative seven, which has the risk of results not actually being non-inferior. This is why it was graded as quality level B. Gialamas et al. (2009) had a small sample size, rating the quality level as B. Laurence et al. (2010) noted a limitation of one of their tools being specific to the trail and not immediately generalizable, rating the quality level as B.

Two experimental studies were included in the search results. The JHNEBP model reports experimental studies as level I evidence (Dang et al., 2022). According to this model, high quality grade A evidence requires consistent results, sufficient sample size, adequate control, and consistent recommendations. Keizer et al. (2020) was graded as such. Owen et al. (2021) was graded as quality level B given the small sample size and short duration.

Two qualitative studies were included in the search results. According to Johns Hopkins University, qualitative studies are level III evidence (Dang et al., 2022). Both Hsieh et al. (2010) and Navid et al. (2011) studies had small sample sizes; however, the quality of each study was good giving them ratings of B.

The final article reviewed was a systematic review by Florkowski et al. (2017). A summary of this is found in appendix B. The JHNEBP model grades systematic reviews as level I evidence (Dang et al., 2022). This review was rated as high quality given the comprehensive description of each included meta-analysis, RCT, and observational study. Generalizable results with consistent recommendations were made.

Critical Appraisal of the Evidence with Themes

Appendix A outlines the primary research evidence found relating to the clinical question. Major themes discovered in review of this evidence included how POCT affects general practice, how it affects vulnerable populations, and comparisons of POCT with clinical laboratory testing.

POCT in General Practice

Review of the literature has revealed strong evidence to support POCT when compared to laboratory testing in general practice. POCT has been shown to be equivalent or better with respect to improvement of test results from baseline (Bubner et al., 2009) and medication adherence (Gialamas et al., 2009). Over half of patients have been found to forget to take prescribed medications to some degree. This is within a population who has an overall low number of barriers to accessing health care. The use of POCT has been shown to improve medication adherence by 2.3% (Gialamas et al., 2009). Although results of these studies have not shown to be statistically significant, they could prove to be clinically significant in the setting of public health.

POCT in Vulnerable Populations

With unstable housing and everchanging contact numbers, follow up in vulnerable populations is difficult (Navid et al., 2011). The benefits of POCT are that they allow for same

day results with immediate follow up, and that no one is lost to follow up care. Keizur et al. (2020) found the median time to treatment of sexually transmitted diseases before implementation of same day treatment was 18.5 days among the gay, bisexual, transgender, and unhoused youth of two major U.S. cities. Navid et al. (2020) noted that in mobile clinic settings in urban Canada where the target populations included immigrants, homeless, and sex trade workers, POCT enhanced access to treatment and reduced the spread of infection. The ability to provide same day treatment improves quality control indicators (Owen et al., 2021) and reduces public health concerns (Keizer et al., 2020).

Comparing POCT and the Clinical Laboratory

Healthcare costs were not shown to be significantly different between POCT and tests sent to a clinical laboratory (Laurence et al, 2010). However, participants in the study by Navid et al. (2011) reported that healthcare costs were reduced with POCT because the requirement to transport specimens to the lab would be lessened. They also discussed that the cost of the labs for uninsured patients came out of the organization's budget. The use of POCT would reduce the organizational cost of using an outside laboratory. POCT has also been shown to significantly reduce patient costs related to travel time and copayments (Laurence et al., 2010).

The turnaround time from the when the provider makes the decision to order labs to interpretation of results is significantly lessened with POCT. Keizer et al. (2020) noted an 18.5-day turnaround time with use of an outside clinical laboratory, and Navid et al (2011) noted a one-to-three-week turnaround time. The immediacy of results leads to instant clinical decision making, which can eliminate the requirement for a phone or in person follow up visit (Bubner et al., 2009). However, there is clinician concern about the length of time POCTs take (Hsieh et al., 2010). With patients waiting for their same day results, clinicians will need to adjust their

workflow to allow for discussion of results and recommendations even if they have already started with another patient.

Evidence-based Recommendation Statement

There is a wealth of evidence about the implications of POCT in general practice. POCT is equivalent to or better in terms of improving test results from baseline, improving medication adherence, and cost effectiveness (Bubner et al., 2009, Gialamas et al, 2009, & Laurence et al., 2010). Within the environment of public health and working with vulnerable populations, POCT can significantly reduce the average days to treatment following testing (Keizur et al., 2020), and improve disease management with the ordering of necessary medications and referrals on the day of testing (Owen et al., 2021). The recommended practice change is to implement additional POCT options with more comprehensive POCT tools on mobile units serving vulnerable populations, which would enhance disease management in PEH. Using John Hopkins' Evidence Level and Quality Guide (n.d.), this recommendation is graded as A.

Program Analysis and Evaluation Plan

The CDC's Program Evaluation Framework will be used to assess three organizations who have mobile health clinics, which will validate the use of additional POCT in the mobile health environment. Below is a description of each step of the framework. These descriptions were used for each section/category to determine if the programs evaluated did not meet, met, or exceeded criteria. Table 2 illustrates the findings of each organization evaluated. After review of each program against the established framework, evaluation of each organization against the evidence found was completed and organized on table 3 by themes identified in the critical appraisal of evidence.

Engage Stakeholders

This is the first step in the evaluation cycle (CDC, n.d.). Stakeholders are those who are invested in the project, interested in the evaluation results, or have a position in what will be done with the results. First it is necessary to determine who the potential stakeholders are. The project manager must brainstorm who will be affected, who will be involved in implementation of the project, and who will use the results of the evaluation (CDC, n.d.). Involvement of those who may not share the same priorities of the project and those who are supporters or critics is necessary. This ensures that the needs and interests of each stakeholder are represented throughout the evaluation process. Each stakeholder may be involved in some or all steps of this process. At this point of the evaluation, it is imperative to establish clear communication (CDC, n.d.). A preliminary discussion with each stakeholder should be completed to determine the best method of communication throughout the project and to develop a plan for stakeholder involvement with specific roles and responsibilities (CDC, n.d.). See table 2 for review of the three mobile health organizations chosen for evaluation. As part of the toolkit developed in Appendix C, an example of a stakeholder analysis table is provided.

Describe the Program

The next step in the CDC's framework for program evaluation is describing the project through a logic model (CDC, n.d.). This is a road map that illustrates the relationship between resources, activities, outputs, and outcomes/impacts of the project. This step is an opportunity to gather information. Information to consider includes the mission and vision; goals and objectives; current program descriptions through fact sheets or website analysis; strategic plans; business, communication, and marketing plans; and existing performance measures (CDC, n.d.). All information is reviewed, and determination of the tasks of the project stakeholders and staff

is determined. See table 2 for review of the three mobile health organizations chosen for evaluation. As part of the toolkit in Appendix C, examples of a logic model, proposed project timeline and budget are provided.

Focus the Evaluation Design

The third step in this framework is determination of an effective evaluation design that anticipates intended uses of the project and creates an evaluation strategy (CDC, n.d.). The purpose is to assess effectiveness, efficiency, relevance, or sustainability of a program. The design will focus on the users of the project to include the stakeholders who will receive the findings or benefit from the evaluation. It will also determine the application of information generated by the evaluation (CDC, n.d.). The design will include data collection and analysis methods that will be used to answer evaluation questions and generate evidence. Finally, the agreements and protocols that will be established among stakeholders to ensure the quality, relevance, and use of the evaluation. See table 2 for review of the three mobile health organizations chosen for evaluation. As part of the toolkit provided in Appendix C, examples for data analysis, descriptive information of population and event data to be collected including timeframe for collection are available for reference.

Gather Credible Evidence

The fourth step allows the project manager to convey a complete picture of the project (CDC, n.d.). First, the project manager will compile information that is relevant and trustworthy. The evidence needs to be up-to-date, authoritative, unbiased, and appropriate for the project. Second, the project manager will choose meaningful indicators that address the evaluation questions (CDC, n.d.). Indicators are specific, observable, and measurable statements that help define what the project stakeholders hope to achieve through this project. Third, the project

manager will ensure the quality and quantity of data. Fourth, the project manager will consider the logistics of gathering evidence (CDC, n.d.). Logistics include the practical aspects of data collection, such as who will collect the data; when and where will they collect it; how will they store and analyze it; and how will they protect the confidentiality and privacy of the information and sources. See table 2 for review of the three mobile health organizations chosen for evaluation. As part of the toolkit provided in Appendix C, examples of proposed SMART objectives are provided specific to the goal of reduction in time to treat, which would enhance disease management in PEH. The toolkit also provides suggestions for data collection and storage.

Justify Conclusions

The fifth step is for the project manager to link the conclusions to the evidence gathered (CDC, n.d.). The project manager will need to show how the conclusions are supported by the data collected and analyzed. The approach should be systematic to analyze and synthesize findings. The results will also be interpreted with respect to the evaluation questions and stakeholders' standards (CDC, n.d.). Justifying conclusions is not a one-time task, but an ongoing process that requires critical thinking, reflection, and revision. The project manager will need to be open to feedback and willing to revise the conclusions if new evidence emerges or if stakeholders' standards change. See table 2 for review of the three mobile health organizations chosen for evaluation. The toolkit provided in Appendix C includes suggestions for statistical analysis as well as relevance of clinical significance.

Ensure Use and Share Lessons Learned

The final step in the CDC's framework for evaluation is to ensure that the findings are used and disseminated (CDC, n.d.). The project manager will make a deliberate effort to design

the evaluation for usefulness. This means that the evaluation should be planned with the end-users in mind. Preparation of stakeholders is necessary, so the evaluation plan and expectations are communicated clearly and effectively (CDC, n.d.). Explanation of why the evaluation is important, what it will involve, how it will be of benefit, and what their roles and responsibilities will be. Training, guidance, or support should be provided as needed. The project manager is also responsible for providing continuous feedback, which also includes listening to feedback, questions, or concerns with responses that are respectful and constructive (CDC, n.d.). The project manager will follow up with intended users after the evaluation is completed and share conclusions and recommendations. These include explanations of how the findings relate to their needs and interests, how they can use them in their work or decision-making, and how they can provide feedback or suggestions for improvement. This should be done through tailored communication strategies by choosing the most appropriate formats for disseminating the findings to different stakeholders. See table 2 for review of the three mobile health organizations chosen for evaluation. The toolkit provided in Appendix C includes suggestions for dissemination of results with local, regional, and national organizations to promote knowledge sharing (Harris et al., 2020).

Program Evaluation Discussion and Recommendations

Program evaluation of existing mobile health programs occurred using the CDC's Program Evaluation Framework. The three mobile health programs were chosen based on the project organization's pre-established networking amongst the programs.

The program manager interviewed representatives of each mobile health program as well as observed one of the programs in action. Given the limitations of time and resources, the project manager was only able to observe one of the programs in action, which is a limitation.

Ideally, the opportunity to observe each program in action would have occurred. The project manager also reviewed the available online documentation for each mobile health program. All information obtained was used to evaluate the three mobile health programs. The project manager used the steps of the Program Evaluation Framework, subdivided into relevant standards to identify if each program did not meet standard, met standard, or exceeded standard. These were coded as 1=does not meet standard, 2-meets standard, and 3-exceeds standard. See table two for this quantitative data.

The mobile health programs were then evaluated against the evidence found in the themes identified in the critical appraisal of evidence. See table three. The themes included POCT in general practice, POCT in vulnerable populations, and comparing POCT with the clinical laboratory. This essential analysis was used to understand if POCT is appropriate in the environment of mobile healthcare. It further established the need for this environment specific toolkit to support additional POCT tools in mobile healthcare. The project manager's evaluation of the three mobile health programs against the identified themes is presented in table three. The project manager coded the results as 1 = does not meet standard, 2 = meets standard, and 3 = exceeds standard.

Overall, all three mobile health programs met or exceeded the standards in all three themes. This suggests that POCT is an appropriate approach in the environment of mobile healthcare and that there is a need for an environment-specific toolkit to support additional POCT tools in mobile healthcare. See appendix C for this toolkit. POCT can provide rapid and convenient access to testing, which is especially important for vulnerable populations who may have difficulty accessing traditional healthcare services (Navid et al., 2011). Additionally, POCT

can help improve the efficiency of mobile healthcare services by reducing the need to transport patients or specimens to and from central laboratories (Laurence et al., 2010).

It is important to note that this is a quantitative evaluation, and it does not consider all the factors that may influence the appropriateness of POCT in mobile healthcare. For example, the project manager did not evaluate the quality of the POCT devices used by the mobile health programs, or the training and experience of the staff who performed the POCT tests. However, the overall findings of the evaluation are positive and suggest that POCT is a promising approach for improving healthcare access and quality in mobile healthcare settings.

Dissemination

Project results dissemination promotes knowledge sharing and provides a sample roadmap for others to use (Harris et al., 2020). Each avenue for dissemination requires special consideration to audience, presentation, purpose, language, and engagement to effectively represent the project. An audiovisual presentation to the project organization was completed. All project stakeholders were invited to join. This presentation focused on the outcomes and potential financial impact of use of the toolkit. Peer review of the presentation by the project preceptor was previously completed.

A poster presentation was given at the USAHS via a virtual symposium. All USAHS faculty and students were invited. Additionally, a poster presentation abstract was submitted to the Mobile Healthcare Association's (MHA) annual conference (MHA, n.d.). Upon selection, this presentation will provide a description of the toolkit, how the toolkit could be used to expand access to healthcare, sustainability of the intended project post-implementation, and relevance to other healthcare providers. Finally, written publication was submitted to USAHS through the Scholarship and Open Access Repository.

Conclusion

The intention of this manuscript, complete with a best practice toolkit, is to reduce the barriers of PEH in access to health care. The need for an environment-specific toolkit to support additional POCT tools in mobile healthcare is supported by the findings of the literature review and critical appraisal of the evidence through themes. Such a toolkit provides guidance on the selection, implementation, and evaluation of POCT tools in mobile healthcare settings. The project manager used the CDC's Program Evaluation Framework to evaluate three mobile health programs (CDC, n.d). This framework is a systematic and comprehensive approach to program evaluation, and was used to assess the effectiveness, efficiency, and impact of established mobile health programs. This further validated the use of additional POCT in the mobile health environment. This best practice toolkit discussed the significance of increasing POCT within the mobile environment; summarized the purpose of the program development project; described the utility of the program; reviewed the underlying analytical framework guiding the project; provided a synthesis of the literature; offered an evidence-based practice recommendation; and defined program analysis, evaluation, and dissemination.

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Table 1

Keywords Used for Literature Search

Population	Intervention	Comparison	Outcome
Homeless	Point of care testing	Outside laboratory	Disease management
Unhoused	POCT	Laboratory	Treatment
Mobile medicine	Finger stick technology	Clinical laboratory	Chronic disease
Street medicine			Clinical decision making

Table 2

Program Evaluation Framework: Steps and Standards

Steps in Evaluation Practice	Relevant Standards	Group	Item	Existing Program 1	Existing Program 2	Existing Program 3	Key
1. Engaging Stakeholders	1.1 Stakeholder Identification	1.1.a Utility	1.1.b A	3	3	3	1= Does not meet standard
	1.2 Evaluator credibility	1.2.a Utility	1.2.b B	3	3	3	2= Meets standard
	1.3 Formal agreements	1.3.a Propriety	1.3.b B	3	3	3	3= Exceeds standard
	1.4 Rights of human subjects	1.4.a Propriety	1.4.b C	3	3	3	
	1.5 Human interactions	1.5.a Propriety	1.5.b D	2	3	3	
	1.6 Conflict of Interest	1.6.a Propriety	1.6.b G	2	3	3	
	1.7 Metaevaluation	1.7.a Accuracy	1.7.b L	1	2	2	
2. Describing the program	2.1 Complete and fair assessment	2.1.a Propriety	2.1.b C	2	2	3	
	2.2 Program documentation	2.2.a Accuracy	2.2.b A	2	2	3	
	2.3 Context analysis	2.3.a Accuracy	2.3.b B	2	2	3	
	2.4 Metaevaluation	2.4.a Accuarcy	2.4.b L	1	2	3	
3. Focusing the evaluation design	3.1 Evaluation impact	3.1.a Utility	3.1.b G	2	3	3	
	3.2 Practical procedures	3.2.a Feasilbilty	3.2.b A	2	3	2	
	3.3 Political viability	3.3.a Feasilbility	3.3.b B	2	2	2	
	3.4 Cost effectiveness	3.4.a Feasibility	3.4.b C	3	2	2	
	3.5 Service orientation	3.5.a Propriety	3.5.b A	2	2	2	
	3.6 Complete and fair assessment	3.6.a Propriety	3.6.b E	1	2	3	
	3.7 Fiscal responsibility	3.7.a Propriety	3.7.b H	3	2	2	
	3.8 Described purposes and procedures	3.8.a Accuracy	3.8.b C	2	2	2	
	3.9 Metaevalation	3.9.a Accuracy	3.9.b C	2	2	2	
4. Gathering credible evidence	4.1 Information scope and selection	4.1.a Utility	4.1.b C	2	2	3	
	4.2 Defensible information sources	4.2.a Accuracy	4.2.b D	2	2	2	
	4.3 Valid information	4.3.a Accuracy	4.3.b E	3	2	3	
	4.4 Reliable Information	4.4.a Accuracy	4.4.b F	2	2	3	
	4.5 Systematic information	4.5.a Accuracy	4.5.b G	2	2	2	
	4.6 Metaevaluation	4.6.a Accuracy	4.6.b L	2	2	2	
5. Justifying conclusions	5.1 Values indentification	5.1.a Utility	5.1.b D	2	3	3	
	5.2 Analysis of quantitative information	5.2.a Accuracy	5.2.b H	2	3	3	
	5.3 Analysis of qualitative information	5.3.a Accuracy	5.3.b I	1	3	3	
	5.4 Justified conclusions	5.4.a Accuracy	5.4.b J	2	3	3	
	5.5 Metaevaluation	5.5.a Accuracy	5.5.b L	2	3	3	
6. Ensuring use and sharing lessons learned	6.1 Evaluator credibility	6.1.a Utility	6.1.b B	2	3	3	
	6.2 Report clarity	6.2.a Utility	6.2.b E	3	3	2	
	6.3 Report timeliness and dissemination	6.3.a Utility	6.3.b F	3	3	2	
	6.4 Evaluation impact	6.4.a Utility	6.4.b G	2	3	2	
	6.5 Disclosure of findings	6.5.a Propriety	6.5.b F	2	2	2	
	6.6 Impartial reporting	6.6.a Accuracy	6.6.b K	2	2	2	
	6.7 Metaevaluation	6.7.a Accuracy	6.7.b L	2	2	2	

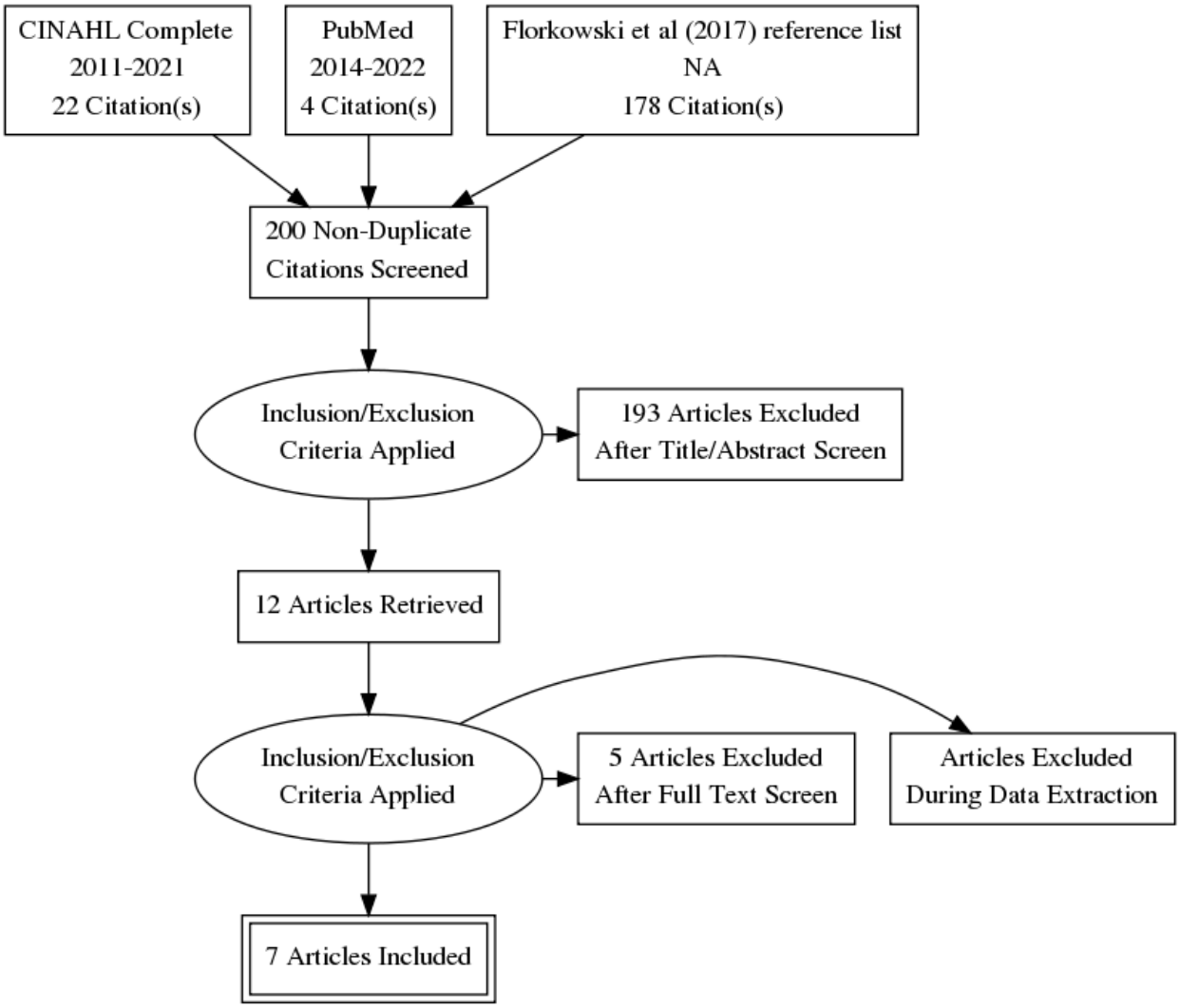
Table 3

Program Evaluation Framework: Evaluation by Themes

Theme From Literature Synthesis	Relevant Evidence	Currency	Gap	Existing Program 1	Existing Program 2	Existing Program 3	
1. POCT in General Practice	1.1 Improvement in test results from baseline (Bubner et al., 2009)	POCT same or better in showing improvement in test results (Bubner et al., 2009)	Not statistically significant	2	2	2	Key
	1.2 Improvement in medication adherence (Gialamas et al., 2009)	Improvement by 2.3% (Gialamas et al., 2009)	Not statistically significant	2	2	3	1= Does not meet standard
2. POCT in Vulnerable Populations	2.1 POCT offers same day results with immediate follow up (Navid et al., 2011)	Qualitative data showing clinical significance	Quantitative data	3	3	3	2= Meets standard
	2.2 POCT reduced spread of communicable disease spread (Navid et al., 2011)	Qualitative data showing clinical significance	Quantitative data	2	2	2	3= Exceeds standard
3. Comparing POCT and the Clinical Laboratory	3.1 Healthcare costs	No transportation requirement for POCT= reduced cost (Navid et al., 2011) POCT has reduced patient cost related to less travel time and copayments (Laurence et al., 2010)	Samples and duration of studies were small for sufficient statistical analysis	2	2	2	
	3.2 Turnaround time to treatment	POCT with same day results versus 1-3 week turnaround time for use of clinical lab (Navid et al., 2011)	Samples and duration of studies were small for sufficient statistical analysis	3	3	3	

Figure 1

PRISMA Flowchart



Note. Prisma flow chart diagram from "Preferred Reporting Items for Systematic Reviews and Meta-analyses: The PRISMA Statement," by D. Moher, A. Liberati, J. Tetzlaff, & D.G. Altman, 2009, Annals of Internal Medicine, 151(4), p.267 (http://dx.doi.org/10.7326/0003-4819-151-4-200908180-00135). Copyright 2009 by The American College of Physicians.

Appendix A

Summary of Primary Research Evidence

Citation	Design, Level, & Quality Grade	Sample	Intervention	Comparison	Outcome Definition	Results Key Findings Usefulness
Bubner et al, 2009	RCT Level I Quality B	4968 patients with established type 1 or 2 diabetes, hyperlipidemia -3010 intervention -1959 control -1967 had type 1 or 2 diabetes -3819 had hyperlipidemia -944 taking anticoagulants Some had more than 1 condition Age: 18+ Data contributed from: -53 general practices in urban, rural and remote areas -23 pathology laboratories Setting: Outpatient Location: Australia	POC blood and urine samples CoaguCheck S analyzer to measure INR DCA 2000 analyzer to measure HbA1c, urine albumin and ACR Cholestech LDX analyzer to measure lipid levels Results of test given immediately	Blood and urine samples tested at pathology laboratory Results received by telephone or follow up visit	POC HbA1c, urine albumin, ACR, total cholesterol and triglyceride levels were same or better compared with laboratory INR and HDL not POCT same or better in showing improvement in test results Percentage of tests within target range: -HbA1c Tx= 57.3% Control= 44.9% P<0.001 -Total cholesterol level Tx=74.2% Control=57.4% P<0.001 -Triglyceride level Tx=54.9% Control=51.1% P<0.001 -HDL	POCT same or better than pathology laboratory testing for HbA1c, urine albumin, ACR, total cholesterol and triglyceride levels INR produced mixed results POCT demonstrated same or better clinical efficacy in comparison to laboratory testing for HbA1c, urine albumin, ACR, total cholesterol level, and HDL level Limitations = Conservative non inferiority margin of -7% Useful to support efficacy of POCT in general practice.

					Tx=29% Control= 36.7% P=0.58 -INR not included as reduction may or may not be improvement	
Gialamas et al., 2009	RCT Level I Quality B	58 general practice offices in urban, rural, and remote -Intervention: 30 practices -Control: 23 practices -5 practices dropped out Age: 18+ 4968 patients with type 1 or 2 diabetes, hyperlipidemia or anticoagulant therapy. Some with more than 1. -3010 intervention -1958 control -4732 sent 1st questionnaire -4543 sent 2nd questionnaire Setting: outpatient Location: Australia	POC blood and urine samples CoaguCheck S analyzer to measure INR DCA 2000 analyzer to measure HbA1c, urine albumin and ACR Cholestech LDX analyzer to measure lipid levels. Results of test given immediately MARS-5 self-administered questionnaire asking participants to indicate frequency of medication non-adherence behaviors	Blood and urine samples tested at pathology laboratory Median distance between practice and laboratory = 12 kilometers Results received by telephone or follow up visit. MARS-5 self-administered questionnaire asking participants to indicate frequency of medication non-adherence behaviors	Intervention group more adherent to taking prescribed medications >50% of patients in both groups report forgetting to take medications at some point during study. Tx: 39.3% adherence Control: 37% adherence	POCT is same or better with regard to medication adherence Report of medication adherence is slightly higher in those who underwent POCT Limitations: -Self-reporting of adherence has potential to possible overestimation of adherence -Amount of pts in each group differed Useful to support use of POCT

Hsieh, et al., 2010	Qualitative Level III Grade B	8 focus groups, which included 76 STI professionals	Trained structured group discussion facilitators. Discussion topics: -currently available POCT -perceived barriers to using POCT -priority STI for POCT treatment -characteristics of ideal POCT All discussions recorded and transcribed	NA	Barriers for current POCT: -complexity -long time frame for result -multiple steps -difficulty in reading result -workflow interruption -invasiveness Priority STI for POCT: -Chlamydia Ideal turnaround time for POCT: -less than 20 minutes	POCT is meant to reduce turnaround time and enhance efficiency. Key characteristic for POCT should include: -ease of use -rapid turnaround -high accuracy Limitations: small sample size Useful in ensuring characteristics of ideal POCT tools are met.
Keizur et al., 2020	Experimental study Level I Grade A	235 participants Age: 12-24 years With high sexual risk behaviors from homeless shelters, lesbian/gay/bisexual/transgender organizations, and community health centers Birth sex: -190 male -45 female Race/Ethnicity -151 African American -13 Asian/ Pacific Islander/American Indian/Alaskan Native -48 Latino	POCT with same day STI treatment and partner treatment packs	POCT testing with referral to local clinic or PCP for treatment	Proportion of same day treatment increased from 3.6% in the control group to 21.1% in intervention group 37.9% of participants took advantage of partner treatment packs	Offering POCT with same day treatment and partner therapy reduces public health concern Limitations: -modest sample size -convenience sampling leading to potential selection bias -same day treatment only offered for 3 months in New Orleans related to antibiotic shortage

		-19 while -4 other race Setting: outpatient Location: Los Angeles, CA New Orleans, LA No mention of dropouts				Useful in that it supports use of POCT in high risk and vulnerable populations.
Laurence et al., 2010	RCT Level I Grade B	4968 patients with established type 1 or 2 diabetes, hyperlipidemia -3010 intervention -1959 control -1967 had type 1 or 2 diabetes -3819 had hyperlipidemia -944 taking anticoagulants Some had more than 1 condition. Age: 18+ Data contributed from: -53 general practices in urban, rural, and remote areas -23 pathology laboratories Setting: outpatient Location: Australia	POC blood and urine samples No co-payment for testing Results of test given immediately	Blood and urine samples tested at pathology laboratory. No copayment for testing Results received by telephone or follow up visit.	POCT cost less for ACR POCT cost more for INR, HbA1c and lipids although noted not to be statistically significant	Cost effectiveness of POCT is favorable. POCT and laboratory testing costs are similar. Limitations: -short duration- 18 months -Medicare cost estimate data Useful in that is supports the use of POCT in practice as it is no more costly than going to a clinical laboratory
Navid et al., 2011	Qualitative Level III Grade B	9 representatives from 6 different organizations serving vulnerable populations in Canada. 5/6 organizations operate a mobile health clinic	Interviews, which were transcribed and analyzed to identify themes.	NA	Benefits of POCT: reduced cost, immediate results, improved efficiency of clinic workflow, quicker treatment	Those using POCT in mobile clinics found benefit with reduced cost of testing, immediacy of results, and improved turnaround time.

			Question topics included: -organization approach to infectious disease testing -counseling procedures -lab turnaround time -how POC testing may be relevant		Disadvantage: Additional time during appointment	Limitations: small sample size, no discussion of validity or reliability of tools Useful as it provides the opinions of the healthcare providers who administer the POCT.
Owen et al., 2021	Experimental study Level I Grade B	125 non pregnant adults with current diagnosis of type 2 diabetes who received care from mobile clinic Age: 18-75 Setting: Outpatient Location: Sacramento County, CA	Placement of Afinion 2 Analyzer, a HbA1c POCT machine, on mobile unit	Traditional laboratory ranging from 1.5-5 miles away from local homeless encampments	Referrals based on POCT -48% Podiatry -54% Ophthalmology -6% diabetes education -11% nutrition education	Availability of POCT on mobile unit led to increase in HEDIS quality control indicators adherence Those tested received follow up attention with necessary referrals POCT for HbA1c increased access to care for homeless patients and improved clinical practice outcomes Limitations: -small sample size -short time -follow up barriers for homeless Useful as it provides data supporting increased use of POCT in vulnerable populations

Legend: RCT= randomized control trial, POC= point of care, POCT= point of care testing, INR= international normalized ration, ACR=albumin-creatinine ratio, HDL= high-density lipoprotein, STI=sexually transmitted infection

Appendix B

Summary of Systematic Reviews

Citation	Quality and Grade	Question	Search Strategy	Inclusion/ Exclusion Criteria	Key Findings	Usefulness/ Recommendation/ Implications
Florkowski et al., 2017	Level 1 Grade A	Does POCT have any advantage in clinical decision making in different scenarios?	Pubmed English language only Human subjects Search terms: -troponins in emergency department and intensive care units -POCT	Inclusion: -Systematic reviews -meta-analyses -RCTs -observational studies Exclusion: -duplicate publications	Overall reduction in turnaround time in all settings In primary care settings, POCT results in more intense disease management leading to better outcomes POCT is generally more expensive compared with clinical laboratories	Highlighted multiple studies in the use of POCT in various healthcare settings. Supports improved turnaround time in all settings. Useful in finding primary sources to support project proposal.

Legend: POCT=point of care testing, RCT=randomized control trial

Appendix C

Point of Care Testing in Mobile Medicine Toolkit

Purpose Statement

This toolkit was developed to provide healthcare organizations with a mobile healthcare initiative with the information and resources to implement additional point of care testing (POCT) tools with long-term goals to include reduced rates of illness among persons experiencing homelessness (PEH), improved public health and safety, and improved medical cost savings. The purposes of this toolkit are to provide organizations:

- An overview of the need for additional POCT tools within a mobile healthcare environment.
- Guidance to staff, administrators, and other healthcare professionals on how to implement these additional POCT tools for their own mobile program with suggestion for implementation using the Phases of Change Theory by Lippitt et al. (1959).

Audience

The target audience for this toolkit is healthcare organizations that are looking to implement additional POCT tools in their mobile healthcare initiatives. This could include organizations such as mobile health clinics, ambulances, free clinics, community health centers, school-based health clinics, home health agencies and disaster relief organizations. This toolkit provides information and resources that can be used by a variety of healthcare professionals including administrators, nurses, providers, paramedics, and other health care professionals.

Implementation Strategy

This toolkit uses the Phases of Change Theory by Lippitt as a guide for project implementation (Lippett et al., 1958). This change model includes seven phases of change. Within each phase,

inclusion of the description of processes, interprofessional collaboration required and the role of the project manager is discussed.

1) Phase One: The Development of a Need for Change
    a) During this phase, the change process is initiated by the organization or stimulated by a project manager (Lippitt et al., 1958). Interprofessional communication begins with stakeholders to determine the need for additional POCT tools within the mobile healthcare environment. The identification of all stakeholders is completed during this phase. See an example of a stakeholder analysis under the Form Examples section of this toolkit.
2) Phase Two: The Establishment of a Change Relationship
    a) Lippett et al. (1958) defined this phase as the establishment and clarification of the nature of the change relationship. A subprocess of this phase is assessing the motivation of the project organization to accept and use help. Motivation for this toolkit was derived from an attraction to potential improvement in PEH access to care and improved turnaround time from input of lab orders to clinical decision making. An additional subprocess is the assessment of the project manager's resources and motivation (Lippett et al., 1958). According to Lippett et al. (1958) there is an assumption that the project manager's professional training experience has given them the knowledge to cope with various problems that arise. The project manager will need to assess what the available resources are. Clarification of the expectations about type and amount of work, and clarification of special goals required are other subprocesses of this phase (Lippett et al., 1958). After completion of these subprocesses, the change relationship is established.
3) Phase Three: Diagnosis of the Problem

a) The subprocesses of this phase include information collection, diagnosis formulation, and acceptance of diagnostic insights (Lippett et al., 1958). Information required to formulate a diagnosis specific to a project includes baseline data of the project population with regard to demographics and percentage of completed labs; available POCT systems; requirements for system maintenance and storage; cost of supplies required for use; training requirements of staff for system use; and budget. Interpretation and communication of this information with the project organization determines the complexity of the problem. At this point the project manager is essential in assisting the project organization in balance between helpless dependency on the project manager and rejection of the diagnosis (Lippett et al., 1958). This is a road map in the form of a logic model, which can illustrate the relationship between resources, activities, outputs, and outcomes/impacts of the project. An example is provided in the Form Examples section of this toolkit.

4) Phase Four: Establishing Goals and Intentions of Action

a) This phase of Lippitt's theory is focused on the support of the intentions to change and development of the competence for action (Lippitt et al., 1958). Interprofessional collaboration between the project organization's leadership to include the medical director, mobile manager, billing department, human resources department, compliance department and project manager is essential for the development of project goals and objectives as well as determining the necessary training of the support staff in use of the POCT systems. The goal with implementation of this toolkit is to reduce the turnaround time from the time the provider decides to order labs to when follow up care is initiated. To accomplish this goal, SMART objectives are required. SMART objectives are

specific, measurable, achievable, relevant, and time oriented (Minnesota Department of Health, 2022). Examples of SMART objectives are listed within the Form Examples of this toolkit.

5) Phase Five: The Transformation of Intentions into Change Efforts
    a) In this phase, the project manager, as a member of the team, will assist in initiating the first step in change (Lippitt et al., 1958). In collaboration with the POCT system product representative, schedule training for staff. Communicate with the organization's procurement manager to order the appropriate equipment and supplies. Establish the budget and formulate a timeline. The timeline requires regular review. Examples of a budget and a timeline are listed under Form Examples of this toolkit.
6) Phase Six: The Stabilization of Change
    a) This phase is focused on the project manager giving support and guidance to the organization (Lippitt et al., 1958). After implementation of the POCT systems, data collection and analysis occur. The project manager will collaborate with the project organization's business intelligence team to assist in data collection from the electronic health record. CPT codes can be used to pull quantifiable data on how many POCT labs were resulted with the associated treatment orders. This data should be analyzed to determine the effectiveness of this system change. A policy and procedure should be developed for stabilization. Evaluation strategies are discussed later in this toolkit.
7) Phase Seven: Achieving a Terminal Relationship
    a) In this phase, Lippett et al. (1958) recommended collaboration with key stakeholders to determine achievement of the change effort. This is accomplished through results

dissemination. Following project stabilization, the project manager should remain available for advice and reinforcement.

Evaluation Strategy and Tools

Project evaluation is a process that defines value and measures the impact of a change (Harris et al., 2020). Evaluation of the PICOT question and SMART objectives with analysis of outcome data will determine the success of this project. An example of a table that describes the unit of analysis is provided in Evaluation Tools section of this toolkit.

The data collected will determine how effective the implementation of the new POCT tool had on the turnaround time from lab test order to clinical decision-making. An example table that contains descriptive information of population and event data that may be collected including timeframe for collection is included in the Evaluation Tools section of this toolkit. The data should be entered into the electronic health record upon every patient encounter where it is stored (Converted Media Ltd., n.d.). This is a secure, validated, electronic based tool. It allows for data collection, tracking of manipulated data, interoperability with outside sources and deidentification. The business intelligence director of the project organization can collect deidentified data based on specifications outlined. Analysis of this data can be conducted by the project manager.

Independent sample *t*-tests should be used for statistical analysis of the outcomes of the intervention (Kim & Mallory, 2017). These *t*-tests are used to compare the means of pre-intervention data against postintervention data. A statistically significant change occurs when there is a substantial difference between the two means and the *p*-value is less than 0.05 (Kim & Mallory, 2017).

Place emphasis on the clinical significance of the outcomes of this project. This reflects the impact the intervention had on clinical practice (Kim & Mallory, 2017). Any improvement in the number of lab orders completed will show clinical significance. Additionally, the number of medication and referral orders in relation to those completed labs will relate to improved health outcomes for the patient population.

Suggestions for Knowledge Sharing

Effective results dissemination is necessary for knowledge sharing and can serve as a valuable resource for others (Harris et al., 2020). It is important to consider various avenues and approaches to ensure information is well-received. Share internal to your organization through use of internal communication channels to promote the project among employees. This includes email newsletters, company-wide meetings, or internal social media. Knowledge sharing outside of the organization can be promoted through the organization's website, social media channels, and newsletters. Further dissemination to potentially interested regional or national organizations can serve as a sample roadmap for others to use.

Form Examples

Example Stakeholder Analysis

Subjects	**Players**
• Setting medical providers • Setting supervisor • Setting medical assistant staff • Abbott POC solution specialist • Division of Infectious Diseases Program Director • Medical legal consultant	• Preceptors • Chief executive officer • Chief medical officer • Chief financial officer • Mobile manager • Director of compliance and risk management • Procurement manager
Crowd	**Context Setters**
• Patients • Community partners • Local community • Human Resources	• Operations managers • Board of directors

KEY: Subject: high interest and low power. Player: high interest and high power.

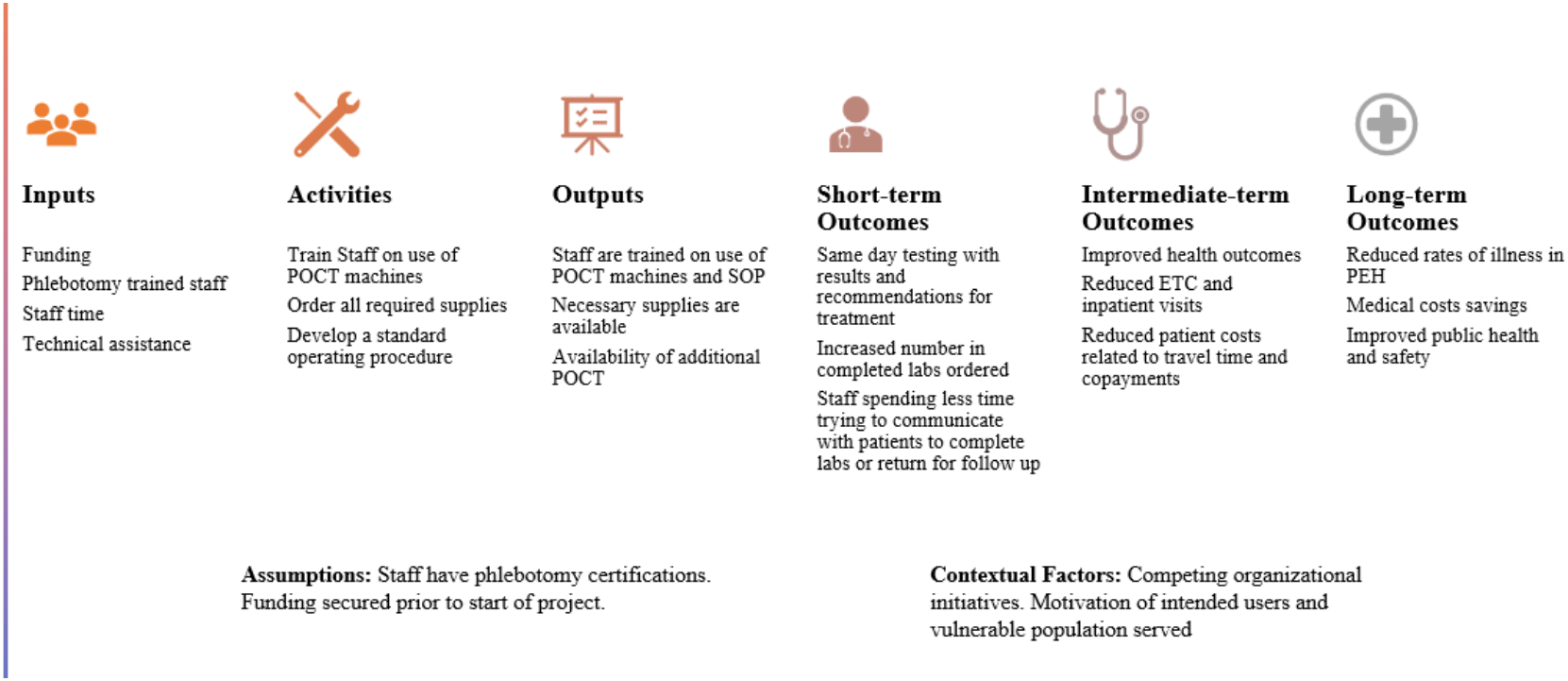
Crowd: low interest and low power. Context setter: low interest and high power

Example SWOT Analysis

Strengths	**Weaknesses**
• Clinical chemistry systems already procured. • Improved patient care • Reduced need for transportation of specimen to outside clinical laboratory • Reduced overtime needs related to specimen drop off outside of clinical hours • Quick turnaround time from ordering of POCT to results and recommendations given by provider • Improved patient health outcomes	• Need for equipment storage space • Resistance to change • Acceptance of new technology • Training, implementation, and maintenance costs • Increased patient appointment times • Future obsolescence
Opportunities	**Threats**
• Support of Abbott representatives for staff training • Better reimbursement by improved health maintenance and patient outcomes • Improvement in communication within work environment • Improved provider/patient relationships	• State regulations for proper certification of staff for moderate complexity laboratory tests • State regulations for medical assistant phlebotomy training

Legend: POCT=point of care testing

Example Logic Model



Example Project Budget

Expenses		Revenue	
Indirect- Included in regular operating costs	est. $	Billing	$unknown
Salary and benefits x 1 hour for training, variable staff.	$22/hr x ~n staff	Supplies/patient	$unknown
Supplies x 1 patient/ day, variable patient count	$20 ~n patients/ day	Grants	$undetermined (Have 2 potential grant sources)
Overhead	$282,000		
Supplies – office	$<100		
Estimate Total Expenses	$282,142	Estimate Total Revenue	0
Net Balance			$NA

Note: All budget entries are estimates. Expenses are based on means. Revenue estimates do not include potential cost avoidance due to realized outcomes. All costs associated to salary and benefits, patient care supplies, and overhead are fixed indirect expenses not associated with this project. Project costs are nominal for printing and laminating, under $100.

Example Implementation Schedule

Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 17	Week 19	Week 21	Week 23	Week 25	Week 27	Week 29	Week 31	Week 33	Week 35	Week 37	Week 39	Week 41	Week 43	Week 45	Week 47
Prepare project proposal	X	X	X	X	X	X	X	X																
Develop evaluation plan							X																	
Develop dissemination plan							X																	
Collaborate with stakeholders		X	X		X	X		X			X			X			X		X		X			X
Review project goals, timeline, roles, responsibilities, and expectations	X	X					X		X	X					X		X		X			X		
Submit project proposal for approval									X	X														
Meet with mobile management to discuss POCT tool implementation									X															
Order appropriate supplies required for POCT tool									X															
Designate POCT tool champions and complete training									X	X														
Initial data collection and in-service									X	X														
Project implementation											X	X	X	X										
Post intervention data collection															X	X								
Data analysis																X	X							
Develop policy and procedure																		X	X					
Disseminate results																				X	X			
Project presentation																						X	X	
Project completion																							X	X

Example SMART objectives

- By the fourth week of project implementation, PEH served in the project organization's mobile health clinics will have availability of additional POCT to include basic metabolic panel (BMP), comprehensive metabolic panel (CMP), lipids and liver panel resulting in same day testing.
- By the twelfth week of project implementation, the identified population will have an increase of 10 percentage points the number of completed labs ordered.
- By the twelfth week of project implementation, the identified population will receive same day results of the POCTs measured by number of aligned CPT codes ordered: BMP 80048QW, CMP 80053QW, lipid profile 80061QW, and liver function 80076QW.
- By the twelfth week of project implementation, the identified population will receive same day provider recommendations for treatment to include medication and referral recommendations measured by provider orders as a result of completed same day POCT.

Evaluation Tools/CBO document

Example of Description of Unit of Analysis

Name of the event	Turnaround time of labs ordered
Events exposed to intervention	Completed number of labs ordered during intervention implementation period of 2 months
Events used for comparison	Completed number of labs ordered in the two months prior to intervention implementation
Source of data	Electronic health record
Number expected	Approximately 100 labs ordered in each group
Criteria for inclusion	All ordered labs
Criteria for exclusion	Canceled labs

Example of Descriptive Information for Population and Events

	Variable name	**Variable description**	**Data source**	**Possible range of values**	**Level of measurement**	**Timeframe for collection**
Population						
	Age	Age at start of intervention	Electronic health record	>0	Ordinal	Collected when all data are collected
	Gender	Gender		-Male -Female -Transgender -Non-binary -Prefer not to respond	Nominal	
	Race	Race		-American Indian/ Alaskan Native -Asian -Black/ African American -Hawaiian/ Pacific Islander -White -More than one race -Unreported	Nominal	
	Ethnicity	Ethnicity		-Hispanic -Non-Hispanic	Nominal	

				-Unreported		
Event						
	All pre-implementation labs ordered	Number of labs ordered	Electronic Health Record	0-100	Ordinal	Collected retrospectively 2 months prior to intervention
	Pre- implementation completed labs ordered	Number of completed labs ordered				
	Pre- implementation time	Average days to lab completion		1-60		
	During implementation labs ordered	Number of labs ordered		0-100		Collected when all data are collected
	During implementation completed labs ordered	Number of completed labs ordered				
	During implementation time	Average days to lab completion		1-60		