

OFFERING COMMUNITY-BASED WOUND CARE AS PART OF A COMPREHENSIVE
SYRINGE EXCHANGE PROGRAM

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Dedication

I would like to dedicate this work to my husband Paul, who has been my champion through it all,
and to my family for giving me the foundation to continue my education.

Acknowledgements

I would like to acknowledge the incredible team of people that I have worked with at The CHOW Project, a true inspiration. In particular, Heather Lusk and Thaddeus Pham for envisioning a healthier, happier community and for always supporting my dream of providing wound care to a population in need.

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This community-based initiative would not have succeeded without each and every one of you.

Abstract

Injection drug users (IDUs) are at significant risk for health related complications including wounds, abscesses, and skin and soft tissue infections. Successful model programs were used to assist the Hawai'i State syringe exchange program (SEP), The Community Health Outreach Work to Prevent AIDS (CHOW) Project, in development of a community-based wound care program. Thus, the purpose of this evidence-based practice project was to develop and implement a community-based wound care program with The CHOW Project, to increase access to wound care and calculate average cost of wound care per patient in the community setting.

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model was used as the framework to provide comprehensive community-based wound care services to CHOW clients. The target population for this project was IDUs who seek CHOW services at the downtown, Chinatown, location in Honolulu Hawai'i.

Methods to assess program outcomes included data collection and analysis from patient records, cross-sectional surveys, and extant data for cost comparison. Two needs assessment surveys were conducted, one survey with CHOW clients, and the other with healthcare providers. The client needs assessment survey indicated that 13% of the respondents' self-reported seeking wound care over 20 times in the past 3 months. And all healthcare providers surveyed indicated that wound care was a significant need in the community, with skin and soft tissue infections, cellulitis, and venous ulcers as the most frequent types of wounds treated.

During the seven-month intervention period, 116 individual patients received wound care, for a total of approximately 220 visits, with an average of two visits per patient. The

average cost per patient including supplies, resources, and a full time Nurse Practitioner was \$92 in the community setting. These costs are less than ED services, and may serve as one indicator that a community-based wound care program is an effective alternative, especially among a high-risk population that experience several barriers to accessing care.

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CHAPTER 1. EXECUTIVE SUMMARY

Introduction

Injection drug use (IDU) has significant associated risks, which includes but is not limited to endocarditis, sepsis, wounds, non-healing ulcers, and death. Ronan and Herzig (2016) reported that in the United States, “Between 2003 and 2013, the number of people reporting heroin use in the past year approximately doubled from 314,000 to 681,000...” (p.832). Further, “Rates of hospitalizations related to opioid abuse/dependence and associated infection are on the rise in the United States (Ronan & Herzig, 2016, p.837). Given that illicit IDU has been an epidemic (Harris & Young, 2002), it is not surprising that a recent Hawai‘i statewide survey indicated wound care as a significant need, with emergency department (ED) utilization at almost four times the national average (CHOW, 2016). The purpose of this evidence-based practice project was to integrate and provide community-based wound care services in collaboration with the Hawai‘i State syringe exchange program (SEP), The Community Health Outreach Work (CHOW) to Prevent AIDS Project.

Conceptual Framework

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model was used as a framework for this evidence-based practice approach in providing community-based wound care in partnership with Hawai‘i State’s SEP. The CHOW Project is the contracted state agency tasked with syringe exchange and providing harm reduction services to the Hawai‘i IDU population. The JHNEBP model consists of 18 steps that guide the evidence-based practice approach from forming the team, to developing the evidence-based practice question, through dissemination.

Literature Review & Synthesis

In collaboration with a University of Hawai‘i at Manoa librarian, an electronic search was completed using PubMed, CINAHL, the National Guideline Clearinghouse, and the Cochrane Library. Some key words included: “wound care AND injection drug use,” “community based wound care AND injection drug use,” and “soft tissue infection AND syringe exchange program.” This project included 19 manuscripts, reports, and clinical practice guidelines. A critique and synthesis of the literature indicated that there were community-based wound care programs, both nationally and internationally that were successful, especially when designed in partnership with SEPs.

Innovations & Objectives

Based on the successful model programs of SEPs that offer soft tissue infection, abscess, ulcer, and wound care services; The CHOW Project modeled, developed, and implemented a community-based wound care program. The innovations included: (1) implementing a community-based wound care program, (2) using validated flowsheets to assess clients, (3) utilizing evidence-based clinical guidelines/algorithms for wound care, and (4) calculating the average cost per patient for wound care in the community-based setting.

Methods

An evidenced-based practice, quality improvement approach was used to develop, implement, and evaluate the effectiveness of a community-based wound care program in partnership with the Hawai‘i State SEP, The CHOW Project. Established in 1993, The CHOW Project’s mission is to promote the optimal health and well being of people affected by drug use. CHOW has five outreach workers, one housing case manager, one research/care coordinator, and

three administrative staff: the Executive Director, the Finance Manager, and the Program Manager. CHOW's social and community health outreach workers collaborated with volunteer nurses, physicians, and students to provide integrated community-based wound care as part of comprehensive harm reduction services to injection drug users (IDUs).

The target population for this project was IDUs with wounds who accessed CHOW services in downtown Honolulu. CHOW has a mobile van that provides services to participants Monday-Friday at River Street and Vineyard Boulevard, on the O'ahu Island location. The estimated sample size for this project was 60 clients.

Several methods were used for evaluation. A cross-sectional needs assessment survey of CHOW clients identified several variables which included: client knowledge about wounds, self-reported types of wounds, number of ED visits, need for community-based/follow-up care, and need for supplies (see Appendix A). A survey was also distributed to known wound care providers which assessed topics such as: frequency of wounds in the practice, types of wounds/how often wounds were related to injection drug use, whether a community-based wound care program would assist with homeless patient care, and whether the provider would be willing to work with a community-based program (see Appendix B). CHOW client records were used to capture descriptives of the population and outcomes of the wound care service, as well as to estimate the average cost per person in the community setting. Additionally, extant data was used to assess ED utilization and associated cost for opioid abuse/dependence and wound care.

Results

Description of Participants

A convenience sample was used, given that all adults who sought wound care services through The CHOW Project were assessed, treated, and or referred. Client notes from each visit were used to track outcomes such as the average number of times that clients were seen. The majority of clients seen were male (66%) with an average age of 43.4 years. The two most self-reported races included Caucasian (47%) and Native Hawai'ian (22%). Homelessness was reported by 66% and of these clients 83% had a mental health diagnosis.

Data Analysis Findings

The intervention period of June 2016- January 2017 was 244 days, with two clinic days per week, and three health fairs during this time period. There were 116 patients seen, with an average of at least two visits per patient over this period of time, with 220 client visits.

Abscesses, venous ulceration, and cellulitis were the most common types of wounds seen and treated. There were about 10 patients referred to The CHOW Project from The Queens Medical Center (QMC), 1 patient from Castle Medical Center, and over 30 patients referred from the Institute from Human Services (IHS). Of an operating budget of \$5,000, after the seven-month intervention period, \$3,491.73 was spent in clinical supplies and necessary resources to operate this community-based wound care program. Given the amount of money spent and the number of patient visits during the intervention period, it is estimated that the average cost to treat a wound care patient in the community- based setting is about \$33 per patient, or about \$15 per visit. However, the cost per patient is about \$92 when accounting for the estimated cost of hiring a Nurse Practitioner full time with benefits.

In Hawai'i State with the most recent obtainable figures from 2012, there were 32,711 visits to the ED for contusion, open wound and other trauma to skin and subcutaneous tissue,

with the average cost per patient of \$1,613, totaling to \$52,747,882. There were 10,865 visits to the ED for cellulitis and other bacterial skin infections, with the average cost per patient of \$1,378, totaling to \$14,949,224; and 2,732 visits to the ED for alcohol abuse and dependence, with average cost per patient of \$2,905, totaling to \$7,937,027.

Discussion

Interpretation of Results

The results indicated that there was a need for community-based wound care services, especially, geared toward a population that is at high risk for wounds due to homelessness, injection drug use, and who face barriers to routine/ preventative care. This community-based wound care program was successful in development and implementation, but will require ongoing efforts for sustainability especially related to ongoing sources of funding and resources. Community based partnerships and stakeholder engagement was essential for successful implementation, and are additional resources to ensuring that patient have access to quality care.

Recommendations & Implications

Next steps for The CHOW Project's community- based wound care program includes hiring a Nurse Practitioner and a Nurse full time Nurse Practitioner and a Nurse full time to ensure that the clinic is staffed appropriately at all times and is able to operate more days of the week with longer clinic duration. Ongoing education to patients and providers is necessary to ensure utilization of the most current evidence-based practice guidelines in the management of wound care, and to decrease stigma associated in caring for patients that face significant challenges like mental health diagnoses, drug use, and homelessness. Recognition of the special needs of this population also frame which outcomes of the project can be assessed and are

appropriate metrics. Ensuring that the community-based clinic is sustainable requires ongoing funding and partnerships among stakeholders, community organizations, and hospitals at the legislative and administrative levels not just at the clinical practice level.

Limitations

As with any quality improvement project, there were several inherent limitations. This project was implemented and evaluated over a little less than a one-year period of time. Some limitations with this design included fluidity in the practice setting and an inability to control variables or devise constant conditions. Other limitations included low levels of evidence in the body of literature primarily based on expert reports, which may decrease generalizability, a convenience sampling was used, and cross-sectional surveys with self-reporting was utilized. Lastly, difficulty obtaining extant data for cost analysis and ED utilization was a limitation, given that only already open source data was obtainable and the most recent data was already a few years old.

CHAPTER 2. PROBLEM

Introduction

Illicit injectable drug use has significant associated risk, which includes, but is not limited to, endocarditis, sepsis, wounds, non-healing ulcers, and death. The injection drug user population accounts for an under represented number of persons in the literature and thus specific prevalence and incidence rates of wounds related to injection drug use are unclear. Other national and international syringe exchange programs (SEP) have successfully offered community-based wound care services and demonstrated reduction in the cost associated with emergency department (ED) use. Prior to this project there was no community-based wound care program partnered with the State of Hawai'i SEP.

An evidence-based practice (EBP) approach was utilized to improve wound care for this population through increasing access to care, and attempted to reduce the problem of frequent ED use and the associated cost with injection drug-related wounds. The Johns Hopkins Nursing Evidence-Based Practice model was used to frame this clinical practice change and is the focus of the first part of this chapter. Next, the background and problem statement indicate the extent of the problem and the PICO statement describes the **problem/population, intervention, comparison, and expected outcome**. Lastly, the literature is synthesized and objectives for the practice change are depicted.

Conceptual Framework

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model was developed to fulfill the need for an EBP model for nursing that supports clinical decision-making based on available clinical evidence and provider's clinical expertise (Newhouse, Dearholt, Poe, Pugh &

White, 2005). “The use of an EBP process provides a systematic approach to rational decision-making that facilitates achievement of best practices and thus demonstrates accountability” (Newhouse et al., p.35).

The Johns Hopkins Hospital and the Johns Hopkins University School of Nursing developed the JHNEBP model to emphasize the multidisciplinary approach to advancing clinical processes through best evidence to advance, “nursing practice, education, and research” (Newhouse et al., p.36). Dearholt and Dang (2012) describe the JHNEBP model as an open system with interrelated components with internal and external factors that influence research, education, and practice (see Figure 1).

Internal factors include: organizational culture, values, and beliefs. The overall practice environment is comprised of the leadership within the organization, resource availability/ allocation, patient services, the mission and vision, and priorities. “Enacting EBP within an organization requires: A culture that believes EBP will lead to optimal patient outcomes...” (Dearholt & Dang, 2012, p.41). External factors include components such as: accreditation bodies, legislation, quality measures, regulations, and standards. While external factors can vary and are often plentiful, the organization should expect to make change that is translated from evidence (see Figure 1).

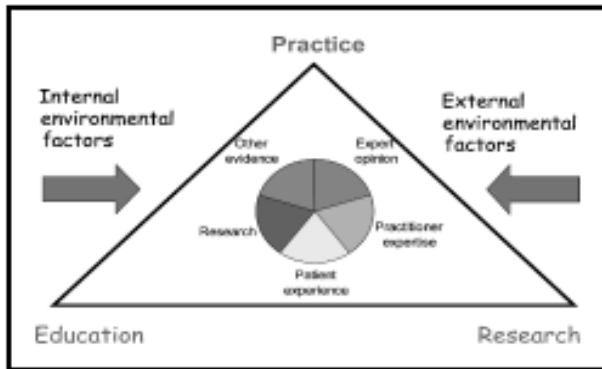


Figure 1. This EBP model and guidelines, “provide nurses with the structure and tools necessary to acquire EBP knowledge and skills, implement EBP changes in practice, and foster a stimulating, energizing, and rewarding practice environment” (Newhouse, et al., 2005, p.36).

In the Johns Hopkins model there are clear guidelines for implementation of an EBP project. This model includes 18 steps that begin with formulating and identifying the question through implementation and dissemination (see Figure 2).

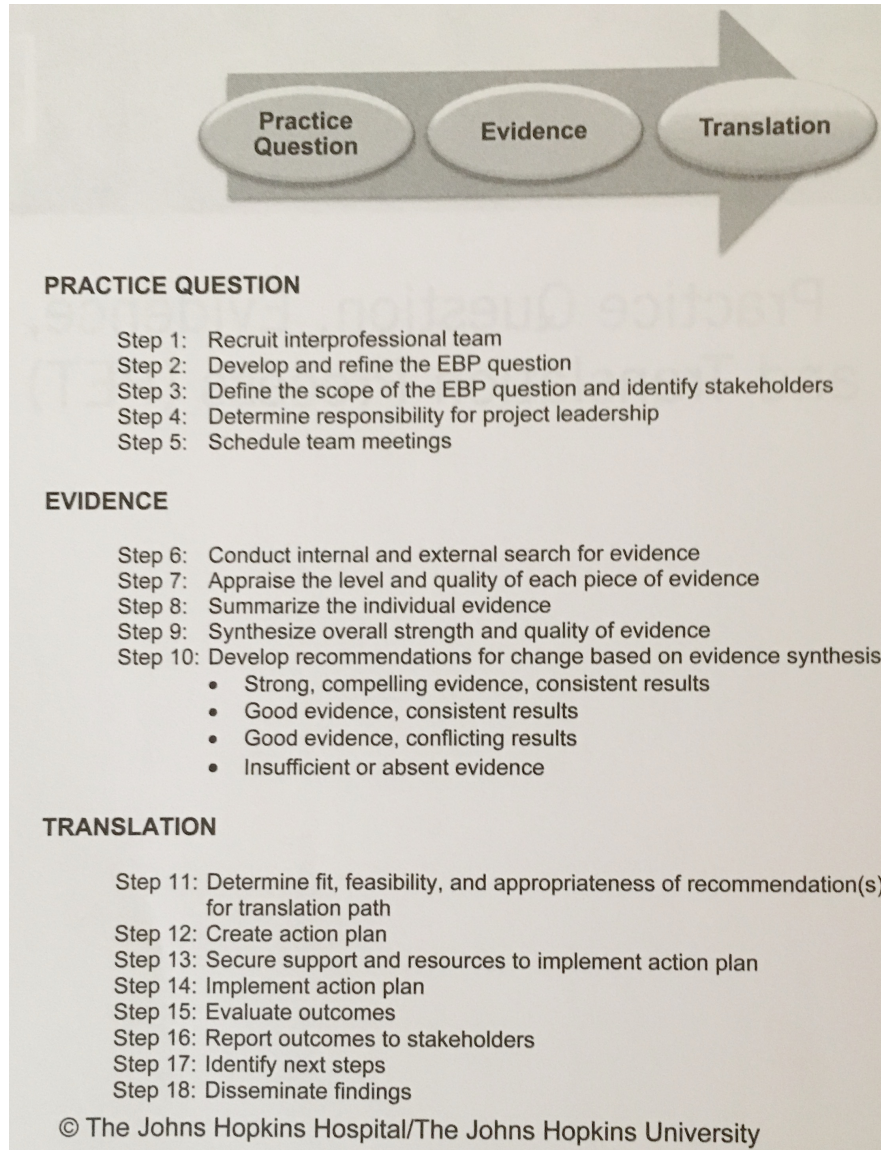


Figure 2. The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model (Dearholt & Dang, 2012, p.236).

Step 1: Recruit the Interprofessional Team

The CHOW Project is comprised of a multidisciplinary team of professionals and currently employs social workers, community outreach workers, public health professionals, and nurses. The Executive Director embraced the EBP model for implementing change and utilized this approach to offer more comprehensive services to clients.

The team providing care for The CHOW Project's community-based wound care program included (a) the change champion who is a Doctor of Nursing Practice and Adult/Geriatric Nurse Practitioner specialty student, (b) a Podiatrist with wound care certification, and (c) a Master's prepared nurse. Other CHOW Project team members included the Executive Director a Social Worker; the Program Manager who holds a Masters in Public Health; two Outreach workers; and the Board of Directors comprised of Physicians and community advocates. Additionally, other community members involved in direct patient care included the John A. Burns School of Medicine-Homeless Outreach and Medical Education (H.O.M.E.) Project, The Queen's Medical Center (Outpatient Wound Care & Hyperbaric Oxygen Center and the ED), The Institute for Human Services (IHS) clinic, and the Hawai'i Department of Health, Harm Reduction Branch.

Step 2: Develop and Refine the EBP Question

Injection drug use has significant associated risk, which includes, but is not limited to, endocarditis, sepsis, wounds, non-healing ulcers, and death. As Ronan and Herzig (2016) note that in the United States, "Between 2003 and 2013, the number of people reporting heroin use in the past year approximately doubled from 314,000 to 681,000..." (p.832). Further, illicit injection drug use has become an epidemic in the past decade (Harris & Young, 2002). One consequence on the healthcare system is an increase in "Rates of hospitalizations related to opioid abuse/dependence and associated infection..." (Ronan & Herzig, 2016, p.837).

The Centers for Disease Control (CDC) often focus reports on injection drug use (IDU) and rates of blood borne infectious diseases. With a emphasis on incidence and prevalence of

persons infected with HIV/AIDS and Hepatitis it is reasonable that SEPs were initially created to combat the increase in HIV/AIDS within the community.

National Statistics of HIV & HCV

In 2010, the CDC reported that only about 8% of persons who inject drugs (PWID) accounted for new HIV infections (CDC, 2015). In accordance with the National HIV/AIDS Strategy (NHAS), one component of high-impact prevention is to offer syringe exchange and other injection equipment (CDC, 2015). By doing so, the incidence and prevalence of HIV infections have declined. However, the prevalence of Hepatitis C (HCV) continue to remain high in PWID, estimates range from 50%-80% based on results of a recent meta-analysis, “The vast majority of incident and prevalent HCV infections in the world are related to unsafe medical and illicit drug injections. In most high-income countries, the primary route of HCV transmission is due to drug injection (Smith, Combellick, Jordan, & Hagan, 2015, p. 911).

Hawai‘i Statistics of HIV & HCV

According to the Hawai‘i Department of Health (DOH), in 2012, 6% of newly diagnosed HIV/AIDS cases were related to injection drug use, which is lower than previously reported years. Men who have sex with men and inject drugs (MSMIDU) are a high-risk population and accounted for five new AIDS cases in 2011 and one new AIDS case in 2012 (Des Jarlais, Lenze, & Lusk, 2012). Overall, 6.3% of AIDS cases in Hawai‘i are associated with injection drug use, which is less than the 8% reported nationally (Hawai‘i Department of Health, 2014).

Unfortunately, as of 2016, there were no funds set aside in the State of Hawai‘i for HCV surveillance. However, based on a recent statewide survey conducted by The CHOW Project,

there is a 65% HCV antibody positivity rate among injection drug users (Des Jarlais, Lenze, & Lusk, 2014).

Syringe Exchange Programs

SEPs have been credited with effective prevention of HIV/AIDS and in more recent years, SEPs have begun to provide additional services to clients. In 2013, the Hawai'i SEP saw a total of 6,441 participants, which was a decrease from the previous year of 7,669 client visits. However, despite the decline in client visits, the total number of syringes exchanged exceeded what is considered a large volume of syringe exchange.

The number of syringes exchanged is generally reported by categories of small to very large volumes. A small category accounts for less than 10,000 needles exchanged to very large category that includes a count of greater than 500,000 syringes per year. In Hawai'i, as of 2013, more than 800,000 syringes were exchanged, and in 2015 almost one million syringes were exchanged, indicating great need for the SEP. Some factors for the decline in client visits but an increase in syringe exchange may be attributed to the possibility of increased drug use among clients, increased SEP availability, and/or clients involved in secondary exchange, such as clients who collect and bring syringes for more than themselves (Des Jarlais, Lenze, & Lusk, 2012).

Injection Drugs Used

Currently, injection drugs commonly used include: uppers (predominately amphetamines), uppers mix (mixture of heroin & ice or methamphetamine), or speedballs (mixture of heroin, cocaine, & downers) (Des Jarlais, Lenze, & Lusk, 2012). Distribution of “cookers” (related injection drug use paraphernalia) has increased, with an increase in the

sharing of cotton. Sharing of filtration cotton/cookers is associated with increased risk for HCV (Des Jarlais, Lenze, & Lusk, 2012).

Associated Problems

Individuals suffering from drug addiction generally present with other complex problems such as mental illness, homelessness, viral infections, and soft tissue infections that have an impact on wound development and treatment (Schroeder, et al., 2001). Depression and anxiety/panic disorders are the leading mental illness diagnoses in PWID, with a possible associated increase in clients reporting injecting narcotics other than heroin (Des Jarlais, Lenze, & Lusk, 2012).

“Homeless people are four times more likely to misuse drugs than the general population” (Powell, 2011, p.52). Hawai‘i continues to face a housing shortage problem. In 2013, The CHOW Project found that there was a slight decrease in the number of clients living in a house or apartment that they rented or owned (Des Jarlais, Lenze, & Lusk, 2012). Unemployment also continued to be an issue due to homelessness and mental illness. Other significant consequences from IDU included: wounds, non-healing ulcers, abscesses, and other skin and soft tissue infections. “The precise number of soft tissue infections from injection drug use in the United States is not known, but anecdotal evidence suggests that it represents a significant public health problem” (Harris & Young, 2002, p.1217). Given that SEPs in community settings have helped to decrease the incidence of blood borne pathogens, offering community-based wound care may serve to decrease rates of infection, wound development, and other downstream related effects such as frequent ED utilization with associated cost.

Harris and Young (2002) described care of injection drug users (IDUs) with soft tissue infections in San Francisco, California. They noted that, “illicit injection drug use results in serious soft tissue infections that are the number one nonpsychiatric reason for admission to San Francisco General Hospital...” (p. 1217). Given that chronic leg ulceration is generally not an emergency, clinicians should be able to manage basic wound care in the community setting versus in the ED (Geraghty, 2015; Lowy, Kohler, & Nicholl, 1994). Coull, Atherton, and Taylor (2014) studied the

...prevalence of skin problems and leg ulcerations in young drug users in Glasgow and found that, of 200 participants aged between 21 and 44 with a history of current or previous injecting, 60% had experienced skin problems such as abscesses, lumps, and track marks, and 15% had leg ulcers. (as cited in Geraghty, 2015, p. 18)

Infections

Abscesses, ulcers, and wounds among the CHOW clientele are often related to lack of personal hygiene due to homelessness and IDU. In a recent Hawai‘i statewide survey of PWID, wound care was indicated as a significant need, with ED utilization at almost four times the national average (CHOW, 2016).

A needs assessment survey was also conducted at CHOW SEP sites by one social worker, familiar with the core SEP participants from November 2015-January 2016. Forty-six (84%) of 55 SEP participants completed the survey. With 39 (85%) respondents reporting seeking wound care 0-5 times and 6 (13%) seeking care over 20 times over three months. Most wounds were self-reported as abscesses. Forty-four (96%) of respondents reported needing help keeping wounds clean, and 44 (96%) reported they would consider seeking wound care services

through CHOW if offered. Open-ended comments revealed a reluctance to seek treatment at other facilities due to the perception of being “judged” and concerns of long wait times in the ED. Lastly, supplies and education were key components asked for by the clients surveyed (see Appendix A) (CHOW, 2015).

PICO Statement

Based on the aforementioned background and problem, the following PICO statement was developed to guide the EBP practice change. People who are injection drug users seeking syringe exchange services with wounds (P) who access a community- based wound care program (I) as compared to current practice (C) will have increased access to wound care (O). The purpose of this project was to develop and provide community-based wound care for SEP participants.

Step 3: Define the Scope of the EBP Question and Identify Stakeholders

Available resources limited the scope of this EBP project. The CHOW Project team members evaluated and determined that due to budgetary constraints and limited staff numbers that community-based wound care would only be offered in the downtown Chinatown (River Street & Vineyard Boulevard) area versus island wide.

Given the significant work to develop a community-based wound care clinic in conjunction with the SEP, community partners/stakeholders were an essential component for success. Continuity of care was also crucial, thus linking clients who sought wound care in the community with primary care providers was also an important aspect and may assist with reducing frequency of ED use. Stakeholders consisted of injection drug users, healthcare facilities, and community partners.

Injection Drug Users

CHOW sees up to 40-60 clients at the downtown Honolulu SEP site almost everyday. While not all clients presented with abscesses or wounds, it was noted by the social workers and community health outreach workers that a significant number of clients could benefit from skin hygiene, wound care education, wound care, and access to wound care supplies. Additionally, clients also requested wound care, wound care supplies, and education.

Healthcare Facilities

The Queen's Medical Center (QMC) is one of the closest hospitals to the downtown CHOW SEP site. From the client needs assessment administered by CHOW, 19 of 40 participants surveyed reported they sought wound care treatment at QMC, which was the most frequently selected healthcare facility. Other places where wound care was sought included: Straub Medical Center, Kuakini Hospital, Waikiki Health Center, Kalihi Palama Health Center, Castle Medical Center, Institute for Human Services (IHS), and private clinics/providers (CHOW, 2015). Therefore, it was also important to engage these healthcare facilities in conversations about wound care provision to these clients.

Community Partners

CHOW is actively engaged with the community and is currently partnered with several agencies: the Hawai'i Department of Health (DOH)- Harm Reduction Branch, the City and County of Honolulu, Walgreens, and American Medical Technology (AMT). The Hawai'i DOH, the City and County of Honolulu, and Walgreens assisted the CHOW Project through funds and donated supplies to ensure success of the community-based initiative. AMT wound care division provided patients with health insurance ongoing wound care dressings. Other

community partners included The John A. Burns School of Medicine- H.O.M.E Clinic, IHS, and the QMC Outpatient Wound Care & Hyperbaric Oxygen Center.

Step 4: Determine Responsibility for Project Leadership

The CHOW Project was afforded the opportunity for each team member to adopt roles and responsibilities for practice change. This team was primarily led by a Doctor of Nursing Practice (DNP) student with guidance provided by the CHOW Executive director, advisement from CHOW board members, and assistance with day-to-day management by CHOW staff. Patient care was directed by a multidisciplinary team of healthcare professionals as described in Step 1.

Each team member was assigned different duties, ranging from searching and reviewing the literature, developing client education cards, building provider education resources, budgeting for supplies, applying for funds/grant applications, caring for clients, administering surveys, and fostering community partnerships.

Step 5: Schedule Team Meetings

Bi-weekly meetings were scheduled to touch base with the team and to plan, implement, and evaluate the wound care program. Meeting agendas and updates to the CHOW Project's work grid (an organizational tool used to track responsibilities, assignments, and deadlines) were used to structure the meetings. Additionally, communication was directed via e-mails, phone calls, and face-to-face meetings with community partners.

Step 6: Conduct Internal and External Search for Evidence

In collaboration with a University of Hawai'i at Manoa librarian, an electronic search was completed using PubMed, CINAHL, the National Guideline Clearinghouse, and the Cochrane

Library. Keywords were searched separately and in conjunction utilizing quotations marks to specify phrases and Boolean operators: “AND,” “OR,” and “NOT” to combine terms. In addition, MeSH terms with subheadings were used to refine each concept. Other filters used were: publication/article type (e.g., Randomized Controlled Trial), peer-reviewed journals, journal subsets, truncation, phrases, nesting, and clinical queries. The search was then limited by publication years (2009-2016) and language (English). However, it was found that using the year 2009 as the starting point of the search was too limiting; therefore, articles dating back to the year 2000 were included.

Some keywords that produced the greatest search results included: needle exchange programs, harm reduction, syringe exchange programs, soft tissue infections, injection drug use, and community based wound care. Keywords that narrowed the search result included: “wound care AND injection drug use,” “community based wound care AND injection drug use,” “self-care/management of wounds AND injection drug use,” “soft tissue infection,” “abscess AND syringe exchange programs,” “abscess AND needle exchange programs,” and “soft tissue infection AND needle exchange programs”.

The search resulted in over 300 articles, which were then reduced by reviewing the titles and abstracts for relevance to this project. Only 25 articles related to the practice of caring for wounds related to injection drug use were fully reviewed; and 19 articles were deemed most relevant to impacting wound care for this population.

Internal Evidence

Internal evidence, as described by the JHNEBP model, includes an organization’s knowledge and evaluation of the patient population. Given this understanding, and CHOW staff

recognizing a need for wound care services, a client based needs assessment, cross-sectional face-to-face survey was conducted over a three-month period with CHOW participants on O’ahu (CHOW, 2015). This survey helped to quantify the problem and the wound care needs of the Honolulu population of IDUs. Forty-six (84%) of 55 SEP participants completed the survey. Thirty-nine (85%) of respondents reported seeking wound care 0-5 times; 6 (13%) sought care over 20 times. Most wounds were self-reported as abscesses. Forty-four (96%) of respondents reported needing help keeping wounds clean, and 44 (96%) reported they would consider seeking wound care services through CHOW if offered (see Appendix A). The results of the survey helped to frame relevant external literature sources to meet the specific needs of the population.

External Evidence

External evidence that influences evidence-based practice change as defined by the JHNEBP guide includes: accreditation body directives and reports, legislation, quality measures, regulations, and standards (Dearholt & Dang, 2012). The National Guideline Clearinghouse Clinical Practice *Guidelines for Management of Wounds in Patients with Lower-Extremity Venous Disease*, while not specific to injection drug use, was included as a guide for management of common injection drug-use related diseases (WOCN, 2011). Other clinical guidelines related to skin and soft tissue infections and lower extremity ulceration were also included based on review of the literature, which also pertain to IDU consequences.

Step 7: Appraise the Level and Quality of Each Piece of Evidence

Mosby’s Quality of Evidence was used to grade the evidence and assess internal validity (Mosby, 2004) (see Figure 3). The articles critiqued included one Level IV: non-experimental

case controlled, cohort study, and longitudinal study; nine Level VI: descriptive studies including: surveys, cross-sectional designs, and developmental designs; and nine Level VII: authority opinion or expert committee reports. For ease of assessing the level of evidence (LOE) of the literature included, the LOE as described by Mosby is provided within the first in-text citation.



Figure 3. Mosby’s Level of Evidence. This figure serves as a visual aid of the LOE by study design and methodology, with what are described as well defined studies being at the top of the pyramid (Melynck, 2004).

Step 8: Summarize the Individual Evidence

In summarizing the evidence for a community-based wound care program in partnership with a SEP, several aspects related to caring this population must be considered. Therefore, this section includes: the definition of IDU, the definition of harm reduction as related to decreasing the risks associated with IDU, and health consequences from IDU. Additionally described in this

section are: the prevalence and incidence of common types of wounds associated with IDU, types of wounds, a brief description of components of wound care, integrated wound care programs, and providing wound care for clients.

Definitions

Injection drug use. For the purposes of this project, the term injection drug use (IDU) encompasses the three primary routes of injection: intravenous (IV), subcutaneous (SQ), and intramuscular (IM) (Guild, 2008, LOE: VII; Pieper, Kirsner, Templin, & Birk, 2007, LOE: VII; Powell, 2011, LOE: VII). IDU related wound infections are a common result due to: unsanitary conditions, the type of drugs, frequency of injection, and prior skin and equipment preparation.

Harm reduction. The United Kingdom Harm Reduction Alliance states, “Harm Reduction is a term that defines policies, programmes, services and actions that work to reduce the health, social and economic harms to individuals, communities and society that are associated with the use of drugs” (Guild, 2008, p.5). The International Harm Reduction Alliance defines harm reduction as, “reduc[ing] the impact of substance use for the individual and society, and helps keep people alive and well” (Guild, 2008, p.5). In alignment with these definitions, syringe exchange, also known as needle exchange, programs have been established to provide sterile equipment (e.g., needles, cookers, cotton, water, etc.), provide education on proper injection, and to offer referral services to drug rehabilitation programs.

Health Consequences

IDUs are at, “...significant risk for numerous serious, high morbidity and mortality infections, [and] disproportionately use the emergency department (ED) for health care needs” (Kievlan, Gukasyan, Gesch, & Rodriguez, 2015, p. 674, LOE: VI). In an urban, level 1-trauma

center, a prospective sample of 603 adults admitted to the hospital for an infectious disease-related diagnosis (IDRD) between 2010-2011 was reviewed and diagnoses were compared between IDUs and non-IDUs. The clinical profile of IDUs presenting to the ED primarily included cellulitis, followed by pneumonia, abscesses, and bacteremia. IDUs also had higher rates of hyponatremia and thrombocytopenia (Kievlan, et al., 2015).

Binswanger et al., (2008, LOE: VI) noted that patients with injection-related soft tissue infections are also at risk for methicillin-resistant *Staphylococcus aureus* (MRSA) infection, HIV/AIDS, and Hepatitis B and C (HBV/HCV). Other less common microorganisms have been found to impair healing of disrupted skin. Necrotizing fasciitis predominated in Sacramento, California between 1984-1999; and authors Chen, Fullerton, and Flynn (2001) recommended that necrotizing fasciitis be ruled out for patients presenting with cellulitis, recent insect bites, wounds, or recent IDUs (LOE: IV). While this article concluded that 21% of non-IDUs died with necrotizing fasciitis as compared to 10% of deaths among IDUs, the authors hypothesized that the abscess presentation warranted earlier surgical incision and drainage, which alerted healthcare providers to the infection at an earlier stage. Additionally, IDUs were younger, and therefore less likely to have underlying comorbidities, such as diabetes.

Brown and Ebright (2002, LOE: VII) reviewed numerous articles hypothesizing that IDUs may have underlying HIV or a chronic viral infection that puts them at risk for bacterial infections, such as human T-cell lymphotropic virus (HTLV II). The hypothesis was that common skin and soft tissue infections (SSTIs) among the IDU population may be attributed to these underlying disease processes (Brown & Ebright, 2011).

Prevalence and Incidence

Prevalence and incidence of skin problems and ulceration in PWID in the United States are often estimated based on small subpopulations (by geographical location) due to a number of factors. Some reasons include: not all states in the United States allow SEPs, there is a lack of standardized terms to describe the different types of wound and ulcers, maintenance of health records is challenging because this population is often homeless, and there is difficulty with adequately accessing and assessing hospitalization/emergency department utilization (Guild, 2008; Powell, 2011).

Other countries such as the United Kingdom, estimate the prevalence of IDU and wounds but note that; "...there may be at least a sevenfold difference in the prevalence of injection-related drug use between cities and primary care trusts" (Powell, 2011, p.52). Some factors that present as challenges to health care workers in terms of assessing, treating, and providing comprehensive services to PWID include: knowledge barriers, lack of support, and financial barriers. Other challenges include mental health disorders associated with drug use and homelessness, which compound caring for this population (Guild, 2008; Powell, 2011). Given the complexities of caring for this population, the emergency department is often the first line of treatment for skin problems, infections, abscesses, and wounds (Powell, 2011).

Coull, et al. (2014, LOE: VI) studied 200 IDUs and found that 126 (60%) of participants reported skin problems classified as abscesses (75%), lumps (48%), track marks (47%), leg ulcers (25%), acid burns (24%), or chronic wounds other than leg ulcers (23%). The authors indicated that there was often lacking was a description between the types of wounds that were seen within the IDU population. A lack of standardization can lead to confusion about the

problems that IDUs present with and classifying all skin problems as SSTIs may lead to false diagnoses of infection with possible overuse of antibiotics.

The description of incidences of types of wounds as aforementioned (Coull et al., 2014), appears similar to other publications that assessed hospital and emergency department utilization for injection drug-related skin problems and infections (Binswanger, et. al, 2011; Kievlan, et al., 2015). Lastly, Fink, Lindsay, Slymen, Kral, and Blumenthal (2013, LOE: VI) aimed to identify the prevalence of SSTIs and those who self-treated their wounds. The results indicated that self-management of wounds may contribute to detrimental health consequences with increased impact to cost. Therefore, it was recommended that IDUs with wounds should access health care before self-care is explored (Fink et al., 2013).

Types of Wounds

One common type of wound described in the literature specific to the IDU population that can be treated in a community based setting is venous disease. Venous disease is a chronic disorder, often presenting with skin breakdown and ulceration and is known to affect the IDU population as a consequence of repeated injury. Chronic venous disease (CVD) risk is increased for PWID because of the impact that injection has on the veins, skins, muscles, and joints of the lower extremities (Pieper, et al., 2007). IDUs “serve as a model for the multifactorial nature of CVD including vein damage, diminished ankle range of motion, and decreased calf muscle strength” (Pieper, et al., 2007, p. 1305). Additionally, care for CVD is generally sought late in disease progression and, for IDUs, cellulitis, and abscesses are also sometimes present. Similarly, a cross-sectional study found that of 713 participants evaluated, persons who injected in the legs and or in the arms were 9.14 times more likely to develop venous ulcers than those

who injected in the arms and upper body only. CVD was associated with injection patterns of the groin, legs, and feet as compared to other injection sites (Pieper et al., 2009, LOE: VII).

Assessing & Caring for Patients

A Canadian Harm Reduction Coalition known as Insite and Onsite, developed assessment flowsheets (see Appendix C) and educational tools with input from wound care specialists to capture essentials for nursing assessments for the special IDU population (Insite & Onsite, 2014, personal communication July 9, 2015).

Additionally, resources from the Canadian Nurses Association, Discussion Paper titled, *Harm Reduction and Current Illegal Drugs Implications for Nursing Policy, Practice, Education, and Research* (2011) and the Best Practice Recommendations from the Canadian Harm Reduction Program (Strike et al., 2013, LOE: VII) were reviewed for patient care approaches.

The latest evidence-based treatment guidelines were also used in the treatment of the different types of wounds/ulcers, abscesses, skin and soft tissue infections. Some of the most pertinent findings are described below.

Skin and soft tissue infections. In 2014, the Infectious Diseases Society of America updated the clinical practice guidelines for the diagnosis and management of skin and soft tissue infections. Some of the key elements of these guidelines include assessing, diagnosing, and treating impetigo and eczthyma, purulent skin and soft tissue infections (cutaneous abscesses, furuncles, carbuncles, & inflamed epidermoid cysts), and cellulitis (Stevens et al., 2014, LOE: VII) (see Appendix D).

Lower extremity ulceration. The American Society of Plastic Surgeons (ASPS) developed evidence-based guidelines for assessing and treating chronic wounds of the lower extremity. The guidelines are a consensus of a task force convened by the Health Policy Committee of the ASPS, in an effort to assist with clinical management of lower extremity ulceration, “ a well-known condition with high prevalence, high cost, and poor clinical outcome...” (ASPS, 2014, LOE: VII). A systematic literature review was conducted, and articles were graded and critiqued based on ASPS Grades of Recommendation Scale. The guideline included: pertinent history, assessing for venous insufficiency, arterial occlusive disease, consideration of the diabetic patient, obtaining history and characteristic of the wound, assessing pain, functional status and quality of life, and treatment steps. Four core treatment principles include: 1) debridement of pathologic tissue, 2) pressure relief, 3) infection control, and 4) management of exudate (ASPS, 2014).

The Association for the Advancement of Wound Care also completed a systematic review to compile evidence-based practice guidelines for venous ulceration (AAWC, 2014, LOE: VII). The additional clinical recommendations not detailed in the ASPS guidelines, included utilizing the Clinical severity, Etiology, Anatomy, Pathophysiology (CEAP) Score and obtaining the Ankle Brachial Index (ABI) ratio to rule out arterial disease. Compression is an integral part of venous ulceration treatment and decreases wound-healing time significantly along with management of exudate and maintenance of the periwound area. However ensuring that arterial insufficiency or (mixed: arterial/venous ulceration) is ruled out before compressing the wound is essential.

Components of Wound Care

Access. Access to care is an important aspect to providing services. Geraghty (2015, LOE: VII) notes that it is difficult for ED staff to manage leg ulceration in the IDU population, as it can be costly and time consuming. Complaints of pain may be a primary reason along with easier access to EDs for frequent encounters versus community or primary care sites. However, as previously mentioned, SSTIs, abscesses, and other infections can be prevented, which would decrease frequency of ED use. For example, CVD is typically not an emergency and could be better managed in a community-based setting where the cost of multiple visits and services is still significantly less than an ED visit or hospitalization (Grau, Arevalo, Catchpool, & Heimer, 2002, LOE: VI; Harris, & Young, 2002, LOE: VI; Tookes, Diaz, Li, Khalid, & Doblecki-Lewis, 2015, LOE: VI).

Cost in Hawai‘i and Nationally. The estimated costs of ED and hospital utilization for persons with health complications related to IDU range from a few thousand dollars to hundreds of thousands of dollars per person, depending on the severity of infection. For example, endocarditis often results in increased length of stay and surgical costs, thereby increasing overall hospital cost (Tookes et al., 2015). Government payers (Medicare & Medicaid) accounted for the largest proportion of aggregate hospital costs, at 63% of all hospital costs related to subsequent consequences such as infections due to IDU (Healthcare Cost and Utilization Project, 2016, LOE: VI).

The Hawai‘i Health Information Corporation (HHIC) keeps records of Hawai‘i hospitalizations and ED utilization, diagnoses, and related cost. In 2014, HHIC released the *State of Hawai‘i 2012 Emergency Department Top 50 APR DRGs*, which is one way to categorize related diagnoses, treatments, and resource consumption. The Center for Medicare &

Medicaid states that, “All Patients Refined Diagnosis Related Groups (APR DRG) is a classification system that classifies patients according to their reason of admission, severity of illness and risk of mortality” (CMS, 2012, p.3). In the 2012 report, three APR DRGs were most relevant to the diagnoses and demographic characteristics of CHOW clients. These APR DRGs included: APR DRG 382 contusion, open wound, and other trauma to skin and subcutaneous tissue; APR DRG 383 cellulitis and other bacterial skin infections; and APR DRG 775 alcohol abuse and dependence (See Table 1).

Table 1

State of Hawai‘i 2011-2012 Emergency Department APR DRGs relevant diagnoses.

APR DRG	Visits 2011	Visits 2012	Charges 2011	Charges 2012	Average Charge per Visit 2011	Average Charge per Visit 2012
384- Contusion, Open Wound & Other Trauma to Skin & Subcutaneous Tissue	33,430	32,711	\$50,454,945	\$52,747,882	\$1,509	\$1,613
383- Cellulitis & Other Bacterial Skin Infections	11,118	10,865	\$14,949,224	\$14,972,222	\$1,345	\$1,378
775- Alcohol Abuse & Dependence	2,550	2,732	\$7,000,729	\$7,937,027	\$2,745	\$2,905

As seen in Table 1, charges and average charge per patient increased slightly from 2011 to 2012. The number of visits increased except for the DRG for cellulitis and other bacterial skin infections, which showed a slight decline in the number of visits from 2011 to 2012.

The Agency for Healthcare Research and Quality (AHRQ), maintained by the U.S. Department of Health & Human Services and operates the Healthcare Cost and Utilization Project (HCUP), also provides national comprehensive data on services such as emergency department utilization and inpatient hospitalization. This national dataset was accessed to retrieve information related to Hawai'i State, to further assess cost related to specific diagnosis that were relevant to CHOW clients. Septicemia is a severe condition that can be a significant downstream consequence of IDU and wounds. In 2013, the most expensive condition billed to Medicare and the second most expensive condition billed to Medicaid was septicemia with the aggregate national hospital cost at \$3,354 million (HCUP, 2016).

In Hawai'i a total of 7,132 individuals were diagnosed under the broad category of septicemia in the HCUP data in 2013. Diagnoses by age and sex included 1,936 (27%) aged 45-64 years, 2,817 (40%) aged 65-84 years, and 1,452 (20%) aged 85 or older; with relatively equal sex ratio 3,747 (53%) male and 3,385 (48%) female. With the majority of patients diagnosed with septicemia insured by either Medicare (n = 3,950 or 55%) or Medicaid (n = 1,101 or 15%). In addition, 1,867 (26%) were privately insured and 128 (2%) were uninsured. Not surprisingly, the population diagnosed with septicemia was overwhelmingly Asian/Pacific Islander (n = 5,144 or 72%) followed by non-Hispanic White (n = 1,498 or 21%), reflecting the demographics in the state of Hawai'i (HCUP, 2016).

A study using national U.S. inpatient hospitalization data related to opioid abuse and dependence, both with and without associated infection, from 2002 to 2012, indicated that inpatient charges for both types of hospitalizations quadrupled over this time period (Ronan & Herzig, 2016). National estimates in 2012 of the total charges related to the number of hospitalizations with opioid dependence, and number of hospitalizations with opioid dependence and with a co-infection was \$14 billion and \$700 million, respectively (Ronan & Herzig, 2016). Notable is that number of hospitalizations related to opioid abuse/dependence with infection were significantly more costly and had almost double the length of stay inpatient and related procedures (Ronan & Herzig, 2016). The number of hospitalizations related to opioid abuse/dependence with infections was 3,421 in 2002 and increased to 6,535 in 2012, with the average length of stay decreasing from 16.8 to 14.6 days. The number of hospitalizations by infection type increased, with endocarditis as the most frequent (2,077 in 2002 & 3,035 in 2012), followed by septic arthritis (729 in 2002; 1,940 in 2012), epidural abscess (411 in 2002 & 1,085 in 2012), and osteomyelitis (458 in 2002 & 985 in 2012) (Ronan & Herzig, 2016).

Between 2002 and 2012 there was a relatively similar sample size, but a substantial increase in number of hospitalizations related to opioid abuse/dependence with and without associated infection (Ronan & Herzig, 2016). With 302,000 hospitalizations for opioid abuse/dependence in 2002 (N = 37 million hospitalizations) and 520,000 hospitalizations related to opioid abuse/dependence in 2012 (N=36.5 million hospitalizations). Hospitalizations related to opioid abuse/dependence saw an average length of stay remain relatively the same from 5.8 days in 2002 to 5.2 days in 2012; with the mean number of related procedures remaining the same (1.1 procedures). However total charges surged from \$4.5 billion in 2002 to \$14.9 billion

in 2012; this figure remained statistically significant even after accounting for inflation. It was also estimated that the total charge per hospitalization related to opioid abuse/dependence rose from \$29,000 in 2012 to \$107,000 in 2012 (Ronan & Herzig).

Additional state specific cost. Tookes et al. (2015) described the lack of harm reduction services available in Florida, citing that legislation has yet to allow passage of a SEP. The authors utilized a chart review of *International Classification of Diseases, Ninth Revision (ICD-9)* codes for illicit drug abuse and endocarditis, bacteremia or sepsis, osteomyelitis, and SSTIs. The authors conducted the review to estimate the mortality and cost of IDU related to bacterial infections over a 12-month period and to estimate the prevalence of HIV and HCV among the hospitalized cohort. It was determined that the total cost for treating IDU-related infections was \$11.4 million. In comparison, Robinowitz, Smith, Serio-Chapman, Chaulk, and Johnson (2014, LOE: VI) noted that by expanding the SEP in Baltimore, Maryland to include a wound care program known as Wounds on Wheels, wound care cost in the community was reduced to an average of \$146.45 per visit.

In a report of a wound and abscess clinic in Oakland, California, Grau, et al. (2002) noted that visits for wound care cost an estimated \$5 per patient for 20, two- hour clinic sessions and 173 treatments. These results demonstrated that community-based programs for soft tissue infections offered in conjunction with SEPs are economical. Given that this study was published in 2002, increased cost of wound care is assumed; but community-based wound care programs have demonstrated reduced cost as compared to the ED setting.

Integrated Wound Care Programs

Successful community- based wound care programs served as a model. High quality, cost-effective patient care can be provided through community-based wound care programs in partnership with SEPs (Grau, et al., 2002 Harris & Young, 2002; Robinowitz, et al., 2014; Tookes, et al., 2015). Mobile outreach programs also serve the community in terms of accessibility and service delivery approaches (e.g., decreased stigma) (Grau et al., 2002; Robinowitz, et al. 2014). The following programs served as models for the CHOW Project.

Maryland program. In 2012, the Baltimore, Maryland Wounds on Wheels program was established in partnership between the mobile Baltimore Needle Exchange Program and Johns Hopkins Wound Care Healing Center. “This program demonstrates that specialized wound care can be effectively provided through mobile outreach” (Robinowitz, et al., 2014, p. 2057). A variety of services were offered by the mobile wound care program and included: wound assessment, wound cleaning, incision and drainage of acute abscesses, sharp debridement of chronic ulcers, compression treatment, (including multilayered compression wraps), prescription and dispensing of antibiotics, and specialized wound dressing application and dispensing. Additionally, education about wound care was provided.

California programs. The Integrated Soft Tissue Infection Services (ISIS) Clinic in San Francisco was able to dramatically reduce visits to the ED, surgical service admissions/operating room procedures, and inpatient acute care bed days, totaling \$8,765,200 in savings in the first year of the clinic’s operations in 2002 (Harris & Young, 2002). ISIS was also able to convert inpatient care to an outpatient design (Harris & Young, 2002).

The Wound and Abscess Clinic at Casa Segura/Safehouse in Oakland, California is one of the oldest clinics in the United States; established in 1997, without formal hospital

agreements, but with funding from and partnership with the North American Syringe Exchange Network and the Alameda County Department of Health (Grau, et al., 2002). This clinic demonstrated that, "...soft tissue infection clinics held in conjunction with syringe exchanges can be economical and can make more appropriate use of emergency departments, in that clinic staff refer patients only as needed" (Grau, et al., 2002, p.1917). And that the increased contact with PWID and providers also assisted with referral to other health care services, such as drug rehabilitation, counseling, and testing (i.e. HIV/ Hepatitis).

Step 9: Synthesize Overall Strength and Quality of Evidence

Quality

Overall, the majority of the LOE was low (Melnyk, 2004) (see Figure 4). The majority of the literature was graded at level VI and VII, or descriptive in nature using primarily survey, cross-sectional, and developmental designs or authority/expert opinion. The validity of the studies were also assessed and the primary standard applied to the methodologies used in the body of literature reviewed was fair to good. The literature used in this review had study designs that were judged to have no fatal flaws that invalidated the results and met the criteria for the selected study designs.

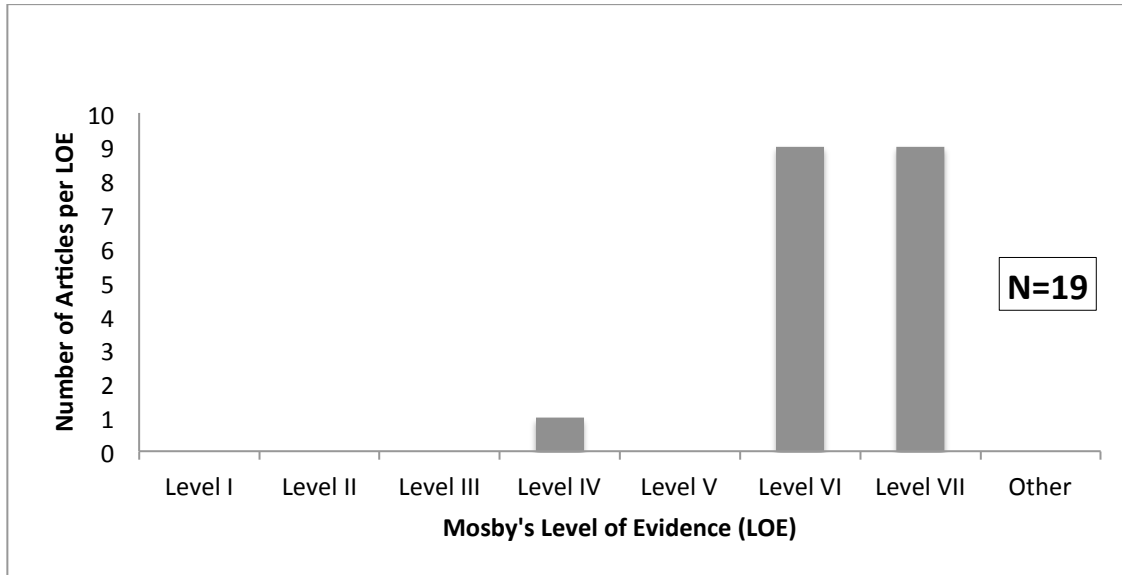


Figure 4. The number of articles critiqued and synthesized using Mosby’s Level of Evidence, (n=19 articles) (Melnik, 2004).

Quantity

The quantity of the evidence specific to wound care in the IDU population was relatively small; with only 19 manuscripts/articles or reports of wound care programs relevant for inclusion. However, there appeared to be a recent surge of interest in community-based wound care with a renewed focus on the cost of caring for IDUs in the ED and hospital setting, especially in the last three years. Overall, the literature indicates the need for new IDU wound care practice models.

Limitations

There were several limitations with the evidence-base for this practice change. There was significant lack of data at the Hawai‘i State level, which made it difficult to adequately assess the prevalence of wounds associated with IDU in Hawai‘i. Other limitations in this body of literature were inherent in the study designs themselves, such as self-reporting, cross-sectional

designs, one-time distribution of surveys, and expert reports based on unique geographic locations, which may decrease generalizability. As Mosby's levels I and II are considered more the "gold standard" for clinical and research impact, it is apparent that these types of studies should be conducted. However, it is notable that care for and research with this population often has limitations based on funding, ethical considerations, and the ability to provide follow-up care or conduct longitudinal studies with this population.

Step 10: Develop Recommendations for Change Based on Evidence Synthesis

Based on the aforementioned literature synthesis, it is clear that this population is at an increased risk for serious adverse health outcomes that can significantly impact the person's quality of life, community health, and are financially costly to the healthcare sector. The current system of over utilization of EDs and hospitals is not a sustainable model for treatment and care and the literature appears to be in agreement and recommends that other alternatives besides ED and hospital use be considered. While the literature review indicated overall low LOE, the literature is consistent and compelling that community-based wound care programs can be a sustainable alternative to hospital centric models. The model programs in Maryland and California demonstrate consistent results; suggestive that quality, cost effective wound care is evidence-based. Recommendations for change include: integrating a community-based wound care program with SEPs, utilizing evidence-based clinical guidelines for assessment and care of the patient with wounds and providing education to wound care providers and patients.

Innovation: The CHOW Community-Based Wound Care Program

Based on the evidence, successful programs, such as those in California and Maryland, served as the model for Hawai‘i. Wound care services were integrated with the CHOW SEP.

The CHOW Project:

1. Implemented a community-based wound care program
2. Used validated flowsheets to assess clients
3. Utilized evidence-based clinical guidelines/algorithms for wound care
4. Calculated the average cost per patient for wound care in the community-based setting

These innovations required provider and patient education, utilization of validated assessments tools, and wound treatment algorithms. Ensuring that stakeholders and community partners were involved was also an integral component to this innovation’s success and sustainability.

Summary

Given the number of syringes that the State of Hawai ‘i exchanged (959,237 syringes in 2015), it is crucial that evidence suggestive of practice change was used to inform this project to fight the public health epidemic of IDU and its associated risks. The goal of this project was to develop and integrate community-based wound care services in conjunction with The CHOW Project, utilizing the JHNEBP model as a framework. This chapter also detailed the JHNEBP steps one through ten which, included: describing the development of the interprofessional team, developing the EBP and PICO question, defining the scope of the EBP question and identifying stakeholders, defining responsibility of the project, scheduling team meetings, evaluating the internal and external sources of evidence, appraising and summarizing the literature, and finally making recommendations and discussing the innovations of this project based on the evidence.

CHAPTER 3. METHODS

Step 11: Determine Fit, Feasibility, and Appropriateness of Recommendations for Translation Path

Prior to this project there was no community-based wound care program partnered with the State of Hawai‘i syringe exchange program (SEP) to provide comprehensive harm reduction services to injection drug users (IDUs). An evidence-based practice (EBP) approach was utilized to provide patient care and increase access to wound care. The Johns Hopkins Nursing Evidence-Based practice model (JHNEBP), as introduced in the previous chapter, was used to frame this clinical practice change. The JHNEBP model steps 11-13 are discussed within this chapter. Additionally, this chapter focuses on: the objectives, design, sampling plan, data collection procedures, program evaluation plan, and limitations.

Objectives

The purpose of this EBP project was to develop a community-based wound care program in partnership with the State of Hawai‘i SEP-Community Health Outreach Work to Prevent AIDS Project (CHOW). Based on the literature searched, culled, and reviewed in the prior chapter, the following PICO statement was developed. People who are injection drug users seeking syringe exchange services with wounds (P) who access a community- based wound care program (I) as compared to current practice (C) will have increased access to wound care (O).

Design

The design of this practice change followed the JHNEBP model and guidelines. “EBP is a problem-solving approach to clinical decision-making within a healthcare organization. It integrates the best available scientific evidence with the best available experimental (patient &

practitioner) evidence” (Dearholt & Dang, 2012, p.4). EBP aims to inform decision-making at the clinical, administrative, and educational levels; confirming that, “healthcare providers use evidence to promote optimal outcomes or equivalent care at lower cost or in less time and to promote patient satisfaction and higher health-related quality of life” (Dearholt & Dang, 2012, p.4). The goals of EBP and this project were to enhance efficacy, efficiency, and effectiveness (Dearholt & Dang, 2012) in delivery and care to patients. The EBP approach was an appropriate design for developing and sustaining a community-based wound care program in partnership with The CHOW Project SEP, because the outcome was to provide patients with accessible, quality care and health education by capitalizing on the expertise of CHOW providers who have an established relationship with the IDU population.

Practice Change Description

Who, what, when, where, how. The CHOW SEP planned to provide community-based wound care as part of comprehensive harm reduction services. Based on the CHOW client needs assessment, the need for wound care was established. Next, CHOW’s staff utilized the evidence-based assessment and treatment algorithms available in the literature, as previously described, to develop protocols in caring for wound care patients, and to train the healthcare providers. Marketing materials and a business plan was also developed and shared during stakeholder and community partner meetings. Ensuring buy in from stakeholders and community partners was essential to ensuring that patients could be appropriately referred if necessary. Additionally, partnerships with local hospitals and organizations help to provide patients with continuity of care in the community, and facilitate program sustainability efforts.

Initial piloting of this program than took place at CHOW health fairs held, on average, every three months. The community-based wound care program then transitioned in June 2016 to the downtown Chinatown (River Street & Vineyard Boulevard) on O’ahu, at The CHOW van. CHOW’s social and community health outreach workers collaborated with volunteer nurses, physicians, and students to provide integrated community-based wound care to CHOW SEP participants.

Five Attributes of Innovations that Influence Rate of Adoption

Rogers (2003) describes attributes of innovations and how these attributes affect the rate of adoption amongst users and those who will be impacted by change. Adoption can be described as the rate at which the innovation is accepted and “...adopted by members of a social system. It is generally measured as the number of individuals who adopt a new idea in a specific period, such as a year. So the rate of adoption is a numerical indicator of the steepness of the adoption curve for an innovation” (p.221), whereas, diffusion is how far the innovation has spread, such as policy adoption or system-wide adoption. Attitudes about the innovation greatly impact the rate and amount of adoption and diffusion. There are five characteristics of innovation as described by Rogers (2003) which are defined and described below and were used to predict the impact to the rate of adoption of this project.

Relative advantage. Relative advantage, as defined by Rogers (2003) is the, “degree to which an innovation is perceived as being better than the idea it supersedes. The degree of relation advantage is often expressed as economic profitability, as conveying social prestige, or in other ways” (p.229). The type of innovation determines the category of relative advantage such as economic or social; and these aspects may influence the rate of adoption (Rogers, 2003).

Through marketing this new program. The CHOW Project became more visible in the community and was able to further educate community partners about the greater organization and mission of CHOW; which is a relative advantage to The CHOW Project. Other relative advantages of providing community-based wound care in partnership with a SEP included increasing access to wound care, prevention measures, and economic factors.

Access to wound care. By utilizing a community-based model, CHOW Project clients could more easily access wound care services available. This is due to the fact that clients were already familiar with the location of the mobile CHOW van that provides syringe exchange services. Additionally, the existing relationship to CHOW staff fostered a trusting environment for clients to seek services.

Prevention. Providing community-based wound care and education is in alignment with CHOW's SEP harm reduction practices and services with the goal of reducing the incidence and spread of HIV and Hepatitis. Persons who inject drugs (PWID) are at increased risk for wounds and infection, and therefore knowledge about risk and harm reduction is essential. By increasing CHOW SEP participant's knowledge about wounds and wound care, participants are better able to recognize early signs and symptoms of infection, which may facilitate timely treatment.

Economic factors. The initial cost of organizing and developing a community-based wound care clinic included many factors: provider time, wound care supplies, equipment (computers, cell phone, tables, chairs, etc.), and physical space. Additionally, the cost to provide wound care to each patient was also factored into the overall cost of the program. Current estimates to start up a community-based wound care program in conjunction with the Hawai'i State SEP (CHOW) was about \$5,000 not including provider salary. The initial cost was

significantly lower since overhead was shared with an established SEP. As an example, the Wound on Wheels program, which is a collaboration between Johns Hopkins Wound Healing Center and the Baltimore Needle Exchange Program, estimated that the average cost to provide wound care per visit through the mobile clinic was \$146.45, which is significantly less than clinic-based treatment (Robinowitz, et al., 2014).

The focus on economic factors helped to bolster early adoption and fostered community partnerships between hospitals most heavily impacted by over use of ED services for wound care, especially for non-urgent care.

Compatibility. Compatibility, as defined by Rogers (2003), “is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (p.240). SEP participants were expected to be early adopters because there was a need for wound care services and education, as demonstrated through the CHOW needs assessment. Trust was an essential component of working with the IDU population, and clients have reported a desire to obtain more healthcare services through CHOW since they have an established relationship with the organization. Additionally, by offering services at a known, established location, The CHOW syringe exchange van, this is a compatible location and is accessible to SEP participants.

Despite the fact that the CHOW Project has been in existence since 1989 and is the sole contracted agency for the State of Hawai‘i as the syringe exchange providers, rate of adoption/acceptance varies with legislative and community support. However, providing wound care as part of offering comprehensive harm reduction services was in alignment with existing values within the CHOW organization. Providing wound care at the van was compatible with

the existing workflow process of The CHOW Program despite an increase in workload increase given the newly added service of wound care. Overall through, the compatibility of providing community-based wound care in partnership with the existing SEP was in alignment with offering harm reduction services to PWID, and demonstrated appropriate fit and feasibility of this project.

Complexity. “Is the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers, 2003, p.257). Implementing a community-based wound care program as a service to the CHOW participants falls within the purview of comprehensive harm reduction services. Additionally, other states and nations have offered wound care as part of syringe exchange programs and successfully demonstrated reduction in cost to care for wound care patients in the community setting. Consequently, the providers felt that while there are some extra challenges with providing wound care services outside of a hospital or outpatient clinic setting, that the evidence and program models demonstrated feasibility.

Trialability. Rogers (2003), defines, “trialability [as] the degree to which an innovation may be experimented with on a limited basis” (p.258). Piloting this program took significant preparation in securing funds, equipment, supplies, and space resources. This program was initially piloted at the CHOW health fairs, which are held, on average, every three months at a local Church. CHOW health fair services consist of Hepatitis A and B vaccines, Hepatitis C testing and linkage to treatment if appropriate, HIV testing and linkage to services if appropriate, vision screening/ free glasses, mental health services, and linkage to housing services. Some of the incentives for CHOW participants to attend the health fair besides the services offered include, free food and door prizes. Clients carry a card with them at the health fairs, and at each

table that they visit to receive services or education, staff initial the client's attendance. With each signature, the client receives more raffle tickets, increasing their chances of winning a door prize. Thus, the CHOW participants were familiar with the health fair and adding wound care, as one of the healthcare stations was relatively easy to implement. Clients were engaged with seeking wound care services, education, and supplies; and volunteer nurses, nursing students, and a podiatrist provided wound care. American Medical Technologies (AMT) was also onsite to assist with insurance verification and wound care supply orders, so that patients with health insurance could receive on going wound care dressings/ supplies as needed.

The pilot phase of wound care at the CHOW health fairs was conducted from November 2015- May 2016 and then the community-based wound care program then transitioned in June 2016 to the downtown Chinatown (River Street & Vineyard Boulevard) on O'ahu, at The CHOW van. CHOW's social and community health outreach workers collaborated with volunteer nurses, physicians, and students to provide integrated community-based wound care to CHOW SEP participants. Currently, community-based wound care is provided at both the CHOW van, and when health fairs are taking place.

Observability. The community-based wound care clinic was visible to the CHOW SEP participants and those who are involved in providing the care. "Observability is the degree to which the results of an innovation is visible to others" (Rogers, 2003, p. 258). Through marketing strategies such as: development of client education cards which included the wound care program location, clinic days/ hours, and phone number; CHOW social and community health outreach workers who worked daily with clients increased visibility of the wound care program through word of mouth, as did the IHS outreach workers; face-to – face meetings were

scheduled with local hospitals and organizations where one page workflow diagrams with pertinent contact information were developed and utilized; and lastly patient referral forms were shared between partnering organizations. Follow- up phone calls and emails were also essential to sustaining relationships and expanding the community's knowledge about the new community-based wound care program offered by the CHOW Project.

Step 12: Create Action Plan

In creating the action plan, several methods were used to implement and deliver community-based wound care in conjunction with The CHOW Project SEP. The action plan first included defining key terms that were seen in practice, utilizing EBP guidelines for treatment, establishing the facilitators of communication, describing the setting, sample, and sample size, and determining the inclusion and exclusion criteria. Next the strategies for recruitment, developing the marketing and business plan, engaging community partners and stakeholder, and providing education were established. Additionally, methods for data collection, evaluation process, and outcome variable measurements were established and finally the timeframe for each aspect of the program from development through implementation and evaluation was constructed.

Definitions

How terms are defined impacts the usage, meaning, and contextual framework for how users understand the results of practice change. Terms can be categorized as either conceptual or operational. Conceptual terms include the more abstract or theoretical, where as operational terms help to define procedures, explicate measurement of outcomes, and place more

quantitative parameters on goals and objectives. The following operational definitions were used in the implementation of this project.

Wound. The term, wound, for this project was broad and encompassed any disruption in the epithelial layer, including skin and soft tissue infections, abscesses, and venous ulcers. Additionally, other wounds not directly related to injection drug use, such as diabetic foot ulcers were also assessed and treated.

Skin and soft tissue infections. The broad term, skin and soft tissue infection (SSTI), can encompass multiple types of wounds and ulcerations. Thus, more specifically, each type of wound can be further defined. The following definitions are taken from the IDSA (2014) practice guidelines for the management of skin and soft tissue infections:

Bullous impetigo. "...Caused by strains of *S. aureus* that produce a toxin that cleaves the dermal-epidermal junction to form fragile, thin roofed vesicopustules. These lesions may rupture, creating crusted, erythematous erosions, often surrounded by a collar of the roof's remnants" (Stevens et al., 2014, p.e21).

Nonbullous impetigo. "...Can occur from infections with β -hemolytic streptococci or *S. aureus*, or both in combination. Impetigo begins as erythematous papules that rapidly evolve into vesicles and pustules that rupture, with the dried discharge forming honey-colored crusts on an erythematous base" (Stevens et al., 2014, p.e21).

Ecthyma. "Is a deeper infection than impetigo, and *S. aureus* and/or streptococci may be the cause. Lesions begin as vesicles that rupture, resulting in circular, erythematous ulcers with adherent crusts, often with surrounding erythematous edema. Unlike impetigo, ecthyma heals with scarring (Stevens, et al, 2014, p. e21).

Cutaneous abscesses.

...Are collections of pus within the dermis and deeper skin tissues. They are usually painful, tender, and fluctuant red nodules, often surmounted by a pustule and encircled by a rim of erythematous swelling. Cutaneous abscesses can be polymicrobial, containing regional skin flora or organisms from the adjacent mucous membranes, but *S. aureus* alone causes a large percentage of skin abscesses with a substantial number due to MRSA strains. (Stevens et al., 2014, p.e22)

Epidermoid cysts. Or epidermal inclusions, “often erroneously labeled sebaceous cysts, ordinarily contain skin flora in a cheesy keratinous material. When inflammation and purulence occur, they are a reaction to rupture of the cyst wall and extrusion of its contents into the dermis, rather than an actual infectious process” (Stevens et al., 2014, p.e22).

Furuncles.

...Or (boils) are infections of the hair follicle, usually caused by *S. aureus*, in which suppuration extends through the dermis into the subcutaneous tissue, where a small abscess forms. They differ from folliculitis, in which the inflammation is more superficial and pus is limited to the epidermis. Clinically, furuncles are inflammatory nodules with overlying pustules through which hair emerges. Furuncles often rupture and drain spontaneously... (Stevens et al., 2014, p.e22)

Carbuncles. Carbuncles are “infection involving several adjacent follicles produces a carbuncle, a coalescent inflammatory mass with pus draining from multiple follicular orifices. Carbuncles develop most commonly on the back of the neck, especially in individuals with diabetes. These are typically larger and deeper than furuncles” (Stevens et al., 2014, p.e22).

Cellulitis. “And erysipelas refer to diffuse, superficial, spreading skin infection. The term “cellulitis” is not appropriate for cutaneous inflammation associated with collections of pus, such as in septic bursitis, furuncles, or skin abscess” (Stevens et al., 2014, p.e24).

Erysipelas.

Has 3 different meanings: (1) or some, erysipelas is an infection limited to the upper dermis, including the superficial lymphatics, whereas cellulitis involves the deeper dermis and subcutaneous fat, and on examination erysipelas putatively has more clearly delineated borders of inflammation than cellulitis; (2) for many, erysipelas has been used to refer to cellulitis involving the face only; and (3) for others, especially in European countries, cellulitis and erysipelas are synonyms.

Both infections have clinical manifestations of a rapid spreading area of erythema, edema, tenderness, and warmth, “sometimes accompanied by lymphangitis and inflammation of the regional lymph nodes. The skin surface may resemble an orange peel (peau d’orange) due to superficial cutaneous edema surrounding hair follicles and causing skin dimpling because the follicles remain tethered to the underlying dermis. Vesicles, bullae, and cutaneous hemorrhage in the form of petechiae or ecchymosis may develop. Systematic manifestations are usually mild, but fever, tachycardia, confusion, hypotension, and leukocytosis are sometimes present and may occur hours before the skin abnormalities appear. These infections arise when microbes breach the cutaneous surface, especially in patients with fragile skin or diminished local host defenses from such conditions as obesity, previous cutaneous trauma (including surgery), prior episodes of cellulitis, and edema from venous insufficiency or lymphedema. The origin of the disrupted skin surface may not be obvious, such as trauma, ulceration, and preexisting cutaneous inflammation, but often breaks in the skin are small and clinically unapparent. These infections are most common on the lower legs. (Stevens et al., 2014, p.e24)

Pyomyositis. This condition needs to be clinically diagnosed and then based on clinical guidelines often confirmed with MRI. Thus, patients with suspected pyomyositis will be appropriately referred.

Pyomyositis the presence of pus within individual muscle groups, caused mainly by *S. aureus*. Due to geographical distribution, this condition is often called tropical pyomyositis, but cases can occur in temperate climates, especially in patients with human immunodeficiency virus (HIV) infection or diabetes mellitus Presenting findings are localized pain in single muscle group, muscle tenderness, and fever. The disease typically occurs in an extremity, but any muscle group can be involved... (Stevens et al., 2014, p.e31)

Necrotizing Fasciitis. While this infectious disease will not be treated in the community-based setting, it is important for clinicians to be able to differentiate between cellulitis and necrotizing fasciitis.

Necrotising SSTIs differ from milder, superficial infections by clinical presentation, coexisting systemic manifestations, and treatment strategies. These deep infections involve the fascial and/or muscle compartments and are potentially devastating due to major tissue destruction and death. They usually develop from an initial break in the skin related to trauma or surgery. They can be monomicrobial, usually from streptococci or less commonly community-acquired MRSA, *Aeromonas hydrophila*, or *Vibrio vulnificus*, or polymicrobial, involving a mixed aerobe–anaerobe bacterial flora. Necrotizing fasciitis is an aggressive subcutaneous infection that tracks along the superficial fascia, which comprises all the tissue between the skin and underlying muscles. The term “fasciitis” sometimes leads to the mistaken impression that the muscular fascia or aponeurosis is involved, but in fact it is the superficial fascia that is most commonly involved. Extension from a skin lesion is seen in most cases. The initial lesion can be trivial, such as a minor abrasion, insect bite, injection site (as in drug addicts), or boil, and a small minority of patients have no visible skin lesion. The initial presentation is that of cellulitis, which can advance rapidly or slowly. As it progresses, there is systemic toxicity, often including high temperatures, disorientation, and lethargy. Examination of the local site typically reveals cutaneous inflammation, edema, and discoloration or gangrene and anesthesia. A distinguishing clinical feature is the wooden-hard induration of the subcutaneous tissues. In cellulitis, the subcutaneous tissues are palpable and yielding; in fasciitis the underlying tissues are firm, and the fascial planes and muscle groups cannot be discerned by palpation. A broad erythematous tract is sometimes evident along the route of the infection, as it advances proximally in an extremity. If there is an open wound, probing the edges with a blunt instrument permits ready dissection of the superficial fascial planes well beyond the wound margins. (Stevens et al., 2014, p. e24-e25)

Cutaneous vasculitis. Cutaneous vasculitis is due to small vessel injury in the skin, usually venules, due to characteristics of flow, which increases vulnerability, permeability, and endothelial adhesion. Circulating noxious agents are mostly likely the cause and damage the vessel, frequently associated with infection or breakdown of tissues from neoplasia or other autoimmune processes. “The clinical characteristics of small vessel disease in the skin range from leakage of blood contents giving rise to palpable swellings or urticarial-like lesions to purpura which is the extravasation of red cells” (Ryan, 2000, p.127). Vasculitis only involving the skin in the initial development rarely progresses to other organ involvement. However,

systemic vasculitis is a serious condition due to necrosis and is life threatening and requires emergent care to (Ryan, 2000).

Venous ulcers. Most simply defined as, “A skin defect in a limb with a venous abnormality” (Bevis & Earnshaw, 2011, p.7). Venous ulceration is related to vein incompetence, or venous insufficiency. Retrograde blood flow and poor circulation are related to venous congestion and, “In venous insufficiency, the valves are damaged, and blood backs up and pools in the vein. Fluid may leak out of the vein and into the surrounding tissue. This can lead to a breakdown of the tissue and an ulcer” (WebMD, 2016, n.p.).

Diabetic foot ulcer. Is defined by the Johns Hopkins diabetes guide as, “A non-healing or poorly healing full-thickness wound, through the dermis, below the ankle in an individual with diabetes...” (Sanders, 2015, n.p.). Additionally diabetic foot ulcers (DFUs) “Are categorized as being purely neuropathic, purely ischemic, or neuroischemic (mixed). Most common sites are: plantar surface of foot (metatarsal heads, and midfoot), toes (dorsal interphalangeal joints or distal tip) [and] pathogenesis: DFUs frequently caused by repetitive injury to an insensate or dysvascular foot” (Sanders, 2015, n.p.).

Osteomyelitis. Osteomyelitis is an infection of the bone, often as a result of open wounds with bone exposure (Mayo Clinic, 2015).

Injection drug use. Since the population of focus for this evidence-based practice project was injection drug users, defining the term injection drug use is important to operationalize. The term injection drug use (IDU) describes the three primary routes of injection: intravenous (IV), subcutaneous (SQ), and intramuscular (IM) (Guild, 2008; Pieper, Kirsner, Templin, & Birk, 2007; Powell, 2011).

Intravenous drug user. Any adult (18 years or older) who presented to the community-based program, self-identifying as using drugs and willing to receive CHOW services.

Harm reduction. Harm reduction is a term used when describing the goals of SEP. Often the term, harm reduction, is used to collectively describe services provided at a SEP that aimed to reduce the impact of injection drug use on the person and the community. “The origins of harm reduction lie in the more than a century old public health movement aimed at protecting the entire community from harm” (Erikson et al., 2002, n.p). There have been several definitions throughout history of harm reduction techniques, and this term continues to evolve.

One definition is, “... any policy or program designed to reduce drug-related harm without requiring the cessation of drug use. Interventions may be targeted at the individual, the family, community, or society” (Erikson et al., 2002, n.p). Another similar definition comes from The International Harm Reduction Alliance, defining harm reduction as “reduc[ing] the impact of substance use for the individual and society, and helps keep people alive and well” (Guild, 2008, p.5).

ED visit. Any visit to the emergency department within the State of Hawai‘i. This will exclude 24-hour observation holds.

ED cost. The amount paid (versus billed) for charges incurred while seeking health care services at emergency rooms within the State of Hawai‘i. This will exclude patients who are transferred to 24-hour observation holds.

EBP Guidelines

The CHOW Project’s community-based wound care program adopted national practices and evidence-based guidelines for wound care. Wounds were assessed and treated in

accordance with practice guidelines (AAWC, 2010; ASPS, 2014; Bevis & Earnshaw, 2011; Sanders, 2015; Stevens et al., 2014; WOCN, 2014) that were obtained through searching and critiquing the literature as described in Chapter 2. Flowsheets provided by the Canadian Harm Reduction Coalition known as Insite and Onsite, were used as educational tools for the CHOW wound care providers (Insite & Onsite, 2014, personal communication July 9, 2015) (see Appendix C). Then depending on the type of wound that the patient presented with, the corresponding treatment guideline/ algorithm was followed. The previous definition section outlines the wound types and the guidelines used for management. Of note is that both sharps debridement and manual debridement techniques were used to remove nonviable tissue and promote wound healing. Concurrently, antibiotics were also used appropriately prescribed by the onsite attending or podiatrist. A variety of wound care dressings were used based on the wound characteristics, including specialty wound care products used where applicable to promote granulation tissue; thus requiring less frequent wound care dressing changes. Consideration of the wound care dressing used is important in the IDU/ homeless population.

Basic wound characteristics that are assessed include: size with a depth measurement (in centimeters), whether tunneling/undermining is present, amount of granulation tissue, whether slough, eschar, or necrotic tissue is present, the amount of drainage, if odor is present, and noting other signs and symptoms of infection (i.e. erythema, edema, calor, tenderness). For wounds that have significant drainage, care should be taken to protect the periwound area. Fluctuance should be assessed for patients presenting with abscesses when considering incision and drainage. And further assessment for systemic signs and symptoms of infections were also assessed and included fever, chills, nausea, vomiting, change in bowel habits (i.e. diarrhea). Lastly, other

significant notable factors include the onset of the wound, the duration of the wound, location of the wound, pain assessment (quantifying number and descriptor), prior/ if any treatments tried, aggravating factors, recent hospitalizations related to the wound, recent antibiotic use (as well as allergies and type of reaction), and chronic co-morbid conditions that may affect or impair wound healing if not managed. CHOW SOAP notes, the format for documenting client encounters included these variables for consideration (see Appendix E).

Facilitators of Communication

In order to ensure the success of practice change implementation, identification of the different types of communicators were important. Change agents also known as change champions, are individuals with a high degree of expertise who have contact with influential decision makers with high socioeconomic status, formal education, and social influence. Change agents are key for effective communication, can use opinion leaders to implement and diffuse change, direct client orientation, and evaluate innovation. The identified change agent for implementing this community-based wound care service was an Adult Geriatric Primary Care Nurse Practitioner- Doctorate of Nursing practice (A/GPCNP-DNP) Student. This individual understood the evidence-based practice model and the utilized health care provider networks to ensure practice change and comprehensive patient services.

Opinion leaders are described as highly respected individuals who are early adopters of change, who influence behavior change and often do not need incentives to implement practice change. Opinions leaders are able to see the innovation application at a broader systems level and help diffuse the innovation across the entire organization. Other characteristics of opinion

leaders include: influential exposure to mass media, links to networks-both interpersonal and social, and early adopter characteristics (Rogers, 2003).

In this clinical practice change, there were several opinion leaders integral to diffusion and adoption. The Viral Hepatitis Coordinator at the Hawai'i Department of Health, Harm Reduction Branch, had a strong presence within the community and was able to network via mass media such as Facebook and Instagram, as well as through more face-to-face interpersonal channels.

A master's-prepared nurse was another opinion leader integral to the community-based project success. As a respected nurse within the community and nursing faculty member at the University of Hawai'i at Manoa, she had experience in wound care and teaching nursing students. She successfully integrated nursing student volunteers to assist with The CHOW Project health fair events which allowed students to gain education about wound care and IDU, as well as assisting with CHOW client care.

A podiatrist, with a wound specialty certification, was also an integral opinion leader within this community-based wound care program. He volunteered to assist with sharps debridement and antibiotic prescriptions for CHOW clients. His involvement helped to ensure that clients received high quality wound care services within the community setting. The podiatrist also practiced at the Hawai'i Veterans Affairs (VA), which assisted CHOW clients who were veterans the ability to access care using their veteran benefits.

Another equally important opinion leader was the Executive Director of CHOW, a social worker. She is an expert in IDU care and comprehensive care services that improve the health of

IDUs. Additionally, she helped to bridge the connection between the IDUs and social workers/ outreach workers within the community and at tertiary care centers.

Lastly, The Queens Medical Center and the CHOW Project developed a partnership to address continuity of care for wound care patients. Given that almost half of CHOW participants reported using Queen's medical services), the goal of the partnership was to improve patient care, access to wound care, and patient follow-up (CHOW, 2015). Specifically, patients who were beyond the scope of the CHOW community-based program were appropriately referred to The Queens Medical Center ED or to their outpatient wound care clinic. Conversely, The Queens Outpatient Wound Care Center referred patients who needed basic wound care that could be followed in the community setting.

Setting

In 1989, the Hawai'i State Department of Health began a pilot project to provide syringe exchange in response to the growing acquired immunodeficiency syndrome (AIDS) epidemic. Initially, the project utilized the train-the-trainer approach, meaning that former drug users and other persons knowledgeable about drug use began to serve as peer educators for persons who currently were injecting drugs. In 1990, the former Hawai'i Governor John Waihee, signed into law Act 280 which enabled the Hawai'i Department of Health (DOH) to establish a two-year pilot program. Since the initial pilot, this project has grown to include: client education, access, and referrals to drug treatment centers/programs, hygiene supply kits, harm reduction services, HIV testing, viral hepatitis testing, and vaccinations. Additional services include helping clients' access to social work services, for example, housing placement.

By 1993, the legislature authorized HRS §325-113 (c)/Act 152, which allowed the operation of the Syringe Exchange Program (SEP) to continue, as long as necessary, to fulfill the intended purposes: (a) preventing transmission of HIV, hepatitis B and C (HBV/HCV), and other blood-borne pathogens; and (b) to provide people who inject drugs (PWID) with referrals to appropriate health and social services. The CHOW Project is the contracted coordinating agency for the statewide SEP. In 2012, CHOW exchanged 723,600 syringes and successfully helped to reduce the transmission of HIV/AIDS and Hepatitis (Des Jarlais, Lenze & Lusk, 2012). And by 2015, CHOW exchanged 959,237 syringes (CHOW, 2015).

Established in 1993, CHOW became a statewide program to promote the optimal health and well being of people affected by drug use. The CHOW Project is dedicated to serving individuals, families and communities adversely affected by drug use, especially people who inject drugs, through a participant-centered harm reduction approach. CHOW staff is comprised of five outreach workers, one housing case manager, one research/care coordinator, and three administrative staff members that include: the Executive Director, the Finance Manager, and the Program Manager. The CHOW Project offers services statewide, but Monday through Friday one CHOW van is located on River Street and Vineyard Boulevard, in downtown Chinatown on O'ahu Island. This van is staffed with at least one outreach worker providing services from the van, and other outreach workers walk downtown to meet clients, or set appointments to meet clients on the island.

CHOW works to reduce drug-related harms such as, but not limited to, HIV, hepatitis B/C, and overdose. CHOW's services include outreach to provide health education, access to safer sex and drug use supplies, HIV and hepatitis testing, hepatitis care coordination, housing

navigation and linkage to drug treatment, healthcare, and other services. While CHOW was started as a SEP, it has expanded its mission and services to become a more comprehensive program addressing the needs of those battling addiction, including community-based wound care.

Sample

Injection drug users. The target population for this project was injection drug users (IDUs) with wounds. The accessible sample was IDUs who were participating with the CHOW SEP. CHOW's participants represent some of the most marginalized populations in Hawai'i. Over 2/3 of CHOW participants have received a mental health diagnosis, over 60% identify as homeless or marginally housed, and over 98% self-identify as being addicted to alcohol and other drugs (CHOW, 2016). On O'ahu, the main location for CHOW, services are in downtown Chinatown but CHOW outreach workers spend one day a week on the Windward, Leeward and North Shore areas to ensure all communities are reached. The focus of the wound care program however, was at the downtown Chinatown location (River Street & Vineyard Boulevard) where the syringe exchange van is located. Quarterly, The CHOW Project also hosts health fair events at the Harris United Methodist Church (Vineyard Blvd.) where wound care was also performed.

Wound care providers. The community-based wound care providers are a multidisciplinary team comprised of nurses, a nurse practitioner student, a podiatrist, nursing students, and medical students. However, the core team that provided wound care services to CHOW clients on an ongoing basis included two nurses and one physician.

The DNP student is the nurse who primarily coordinated all wound care services for the CHOW Project participants with assistance from the nurses and the podiatrist. The community-

based wound care program also received assistance from nursing students who are enrolled in University of Hawai'i nursing programs across the multiple campuses on the island of O'ahu and from medical students enrolled at the John A. Burns School of Medicine, H.O.M.E Project clinic. The medical students came with an attending physician every second, fourth, and, when there is a fifth Tuesday of the month to assist with wound care and to offer other more comprehensive primary care services such as: vaccinations, chronic condition medications (i.e., hypertension, diabetes) and testing services (HIV/Hepatitis).

Sample size. Sixty participants was the target sample size for the wound care project at the downtown Chinatown, Honolulu site. This target number was derived from the average number of clients known to readily seek services with The CHOW Project.

Inclusion criteria. Adults aged 18 years and older with wounds who were participants of the CHOW syringe exchange program. Patients were asked to sign a consent form to be evaluated and receive treatment for their wound(s). This consent form outlined risk related to standard of care and was not a research consent form; as there was no randomization, no control group, and all clients received care or appropriate referral.

Exclusion criteria. Patients under the age of 18 and patients who did not have wounds that could be managed in the community as clinically indicated based on assessment. Some of these wound types included: significant burn wounds, gangrene, necrotizing fasciitis, or animal bites. Wound with bone exposure or probing to bone were referred to an appropriate tertiary care center for evaluation and treatment. Clients presenting with significant symptomatology (i.e. sepsis) or at great risk for osteomyelitis were also referred.

Recruitment. CHOW clients were recruited through various methods. The primary method for recruitment was through word of mouth provided by outreach workers and social workers that are heavily involved in “on-the-streets” daily outreach. Client education cards were developed and included The CHOW Project’s community-based wound care program clinic days/hours, and phone number (see Appendix F). Additionally, community organizations that serve the homeless were a significant point of contact for IDUs and helped connect clients with CHOW services. Another agency for recruitment included the Viral Hepatitis Outreach Program of the Hawai‘i DOH where clients seeking hepatitis-related services also obtained information about CHOW services. Other sources of recruitment came from referrals from community partners such as The Queens Medical Center (QMC) and the IHS.

Marketing & Business Plan

CHOWs multidisciplinary team was integral to marketing the newly developed community-based wound care service. There were several different levels of marketing that were used in order to make clients and community-partners aware of new CHOW services. CHOW’s outreach and social workers helped clients become aware through word of mouth and client point of contact at the CHOW SEP van. Additionally, the outreach workers from IHS helped to engage homeless that may benefit from CHOW services. IHS outreach workers go out, “on-the-streets” Monday through Friday to talk with homeless and pass out flyers describing available services in the community. These aforementioned communication strategies are known as interpersonal communication strategies (Rogers, 2003). While this type of communication is slower in terms of rate of diffusion, this method had the advantage of face-to-face interaction and the ability to interact and engage with the user.

Community partners & stakeholders. Another marketing approach used was the interpersonal style of communication through e-mails to community partners and face-to-face meetings. E-mails and meetings primarily between the CHOW wound care providers and other healthcare professionals that were involved in client wound care were scheduled. For example, e-mails and meetings with local hospitals helped to form partnerships and established referral locations for clients who needed additional wound care beyond the scope of CHOWs community-based services. Face--to-face meetings were scheduled to review the work flow process between organizations, review the referral process, evaluate patient care, update resources/ provide wound care education, and assess partnership satisfaction. Additionally, engaging emergency department/hospital staff at the social work, provider, nursing, and administration levels helped bridge the gap that was often experienced by CHOW SEP participants after discharge back into the community or back onto the streets. In-service education sessions were crucial accompanied by written materials about the CHOW Program. These sessions helped to reinforce the goals of the program, and what services were available to patients.

Input from community health centers and homeless shelters were also essential, given that many SEP clients do not have an established primary care provider and are frequently homeless. Finally, engaging other organizations such as the Hawai'i DOH, and bringing awareness to legislative bodies also help to ensure sustainability through shared visions and funding allocation necessary to meet the needs of this underserved population.

Evaluation of Process & Outcomes Variables

Process variables are the components of the program that are necessary for implementation and sustainability. Poe and White (2010) describe the JHNEBP implementation and translation, utilizing the Avedis Donabedian’s (1996) framework for evaluation in three dimensions. The three dimensions include: 1. “Structure - what is the physical location where care is provided, the philosophy of care... or type of facilities and/ or equipment?” 2. “Process of care - what is being done? Was appropriate treatment provided? Was it done correctly?” and 3. “Outcomes of care - What are the results of the actions?” (p.157). The process variables assisted with measurement of the care provided, and outcome variables were selected to quantify and describe results. The program-specific process and outcome variables were defined to aid with data collection (See Table 2).

Table 2

Process and Outcome Measurements

Type	Instruments	References	Number of Items	Psychometrics
Process Measures	Needs Assessment Survey (clients)	CHOW developed	12 questions quantitative & qualitative	Unknown validity/ reliability
	Needs Assessment Survey (Providers)	CHOW developed	9 questions quantitative & qualitative	Unknown validity/ reliability
Outcome Measures	Extant Data	www.hcup-us.ahrq.gov https://hhicorg	Multiple variables	Known validity/ reliability

Data Collection & Measurements

Specific instruments were used to collect data and to measure and quantify the outcomes as a result of a program (See Table 3).

Table 3

Data Collection Details

Who (is Responsible)	What (Instrument)	When (Data Collection Point)	How (Data Analysis)
CHOW social worker & DNP student	Client Needs Assessment (Pre- Implementation) ^a	November 2015- January 2016	CHOW developed survey- Descriptive Statistics
CHOW social worker & DNP student	Provider Needs Assessment (Pre- Implementation) ^a	November 2015- January 2016	CHOW developed survey- Descriptive Statistics
CHOW providers & DNP Student	Descriptive (i.e. number of visits, number of referrals etc.)	Monthly	Chart Review/ Encounter Data Base – Descriptive Statistics
DNP Student/ extant data	Cost per patient per visit in community setting and ED	After implementation	Cost analysis for community setting; extant data for ED utilization- Trend Analysis

Note. a. Needs assessment surveys are given to both CHOW clients and to community providers at various locations.

Key evaluation questions were developed to assess the effectiveness of offering community-based wound care to CHOW SEP clients. Evaluation questions can be categorized by type, which includes implementation, cost effectiveness, efficiency, and attribution; these types of questions are all elements central to program evaluation and sustainability. The Centers for Disease Control and Prevention (CDC) published a guide to evaluation for public health programs, which outlines the types of evaluation.

Implementation evaluations (process evaluations) document whether a program has been implemented as intended... [and] examine[s] whether the activities are taking place, who is conducting the activities, who is reached through the activities, and whether sufficient inputs have been allocated or mobilized” (CDC, 2011, Types of Evaluation section, para.2).

Whereas, outcome evaluations or effectiveness can be described through assessing efficiency: whether the program's activities are produced using the minimal resources necessary (e.g. staff time, budget), cost-effectiveness: "Does the value or benefit of your program's outcome exceed the cost of product[ion]" (CDC, 2011, Effectiveness/Outcome section, para.3). And attribution applies to whether the outcomes can be attributed to the program, and not random occurrences or other concurrent events.

The questions that CHOW developed included: How will the CHOW Project impact the number of clients seeking wound care services either as primary or secondary purpose of visit? What is the average per person cost of integrating wound care into CHOW services given the overall program budget? What is the average estimated cost per patient treated through the program (including provider time and supplies) compared to the cost for the same or similar client at a nearby emergency department or hospital?

In order to determine whether the purpose of this EBP program was effective, several objectives and program evaluation measures were developed to help quantify the outcomes. The following paragraphs outline key sources of the data collection process.

Needs assessments. The CHOW multidisciplinary team, including physicians, nurses, and social workers knowledgeable about wounds in the SEP population, developed a needs assessment survey for clients. The client needs assessment survey was administered at CHOW SEP sites to participants on O'ahu by a single social worker familiar with SEP participants over a period of three months. The social worker helped clients to complete the survey. The client needs assessment captured: self-reported frequency of wounds, type of wounds, and the number of times he/she visited the emergency department or other clinic. The survey also asked about

where the client receives wound care services, whether the client would seek wound care through a CHOW community-based program, whether the client thinks he/she needs help with wound care, needs wound supplies, and what are some of the barriers to accessing wound care (see Appendix A).

Additionally, a modified short form needs assessment was developed and administered to O'ahu wound care providers through an online survey link emailed to providers. The needs assessment was used to assess: the frequency of wounds seen, types of wounds, cause of wounds, barriers to providing wound care, whether he/she would support a community-based wound care program and any additional recommendations (see Appendix B).

Client encounter data. An excel database was developed to help track client encounters. The variables collected included: the patient's CHOW ID, and whether or not the client was currently using injectable drugs; the wound characteristics which included: onset, location, and duration of wound(s), whether pain was present; whether signs and symptoms of infection were present, whether or not antibiotics were prescribed, the size of the wound, if undermining/tunneling was present, and if the client had a pertinent co-morbidity (i.e. diabetes). Additionally, other key variables included whether or not the client had sought treatment at another facility/ the previous treatments tried (example, previously tried dressings) or if this was an initial encounter, the diagnosis, the treatment plan, if the client was being referred/ and if so where, and the date that the wound closed. This information and any additional pertinent information, such as referral forms, are also contained within the client's medical records.

Cost analysis. A cost analysis was performed to estimate the average per person per visit cost for providing wound care in the community. Cost data for CHOW was tracked through

client records and amount of funds spent for supplies and resources used. Extant data was used to estimate the cost of an ED visit for wound care related to IDU.. Additionally, extant data was obtained to assess emergency department utilization and related cost for opioid abuse/dependence and associated infections/wounds. This data was important to understanding the average cost per person for seeking ED services for wound care through billing and procedure codes. As compared to the average cost per patient seen at The CHOW community-based wound care program.

Timeframe

There were a series of events that were necessary to ensure that there was timely delivery and progress of this evidence-based practice change. Table 4 displays what activities were planned per month. This proposal was successful defended in August 2016 when the project transitioned into the implementation and evaluation phase.

Table 4

Timetable of Events for Program Completion.

Timeline of Events	2015	2016				2017				
	Nov- Dec	Jan- Mar	Apr- June	July- Sept	Oct- Dec	Jan	Feb	Mar	Apr	May
Needs Assessment (Clients & Providers)										
Engage Community Partners/Stakeholders										
Successful Proposal Defense										
CHOW Board Approval										
Develop Marketing Products										
Prepare Wound Care Flowsheets; Charting Forms; Review Clinical Guidelines/ Algorithms of care										
Training and Education to Providers										
Pilot CHOW Community-Based Wound Care										
Develop Database										
Implement Practice Change- CHOW Community-Based Wound Care										
Collect Data										
Enter Data										
Analyze Data										
Interpret Data										
Written & Oral Defense										
Graduation										
Prepare & Submit Dissemination Products										

Note. Timeline of events indicating project development, progression, evaluation, and dissemination. Some program aspects occurred within the evidence-based practice project, indicated by light grey shading, and other events occurred at the University of Hawai‘i level for completion of the project, indicated by the dark grey shading.

Step 13: Support and Resources to Implement Action Plan

Required Resources

In order to implement and evaluate this EBP project, there were several required resources. The resources or inputs required for successful implementation and sustainability of the program are identified below by type, which includes, budgetary needs, human resources, and physical space requirements. A logic model was developed to help depict the required inputs or resources needed to implement and sustain the program (see Appendix G).

Budget. CHOW utilized existing grant funds to support an operating budget of \$5,000 to purchase supplies, equipment, and resources necessary to offer community- based wound care. These funds were used to purchase wound care supplies and equipment including tables, chairs, waste disposal, cell phones, and computers. Grant funds were not used to cover CHOW staff salaries. Instead, salaries are paid by state funds as part of the contract between CHOW and the Hawai‘i Department of Health for syringe exchange services. However, community-based wound care providers were not paid for their time during this project.

Human. CHOW’s multidisciplinary team of members provided time to ensure success of this EBP program. Those directly involved were the wound care providers, executive director, and community-outreach workers. However, other personnel, such as the CHOW board members, also donated time to development of the program.

Physical. Securing community-based wound care program space was an essential component to offering services. In order to keep overhead low, community-based wound care was offered at the mobile van, at CHOW health events, and directly in the community through outreach.

Plan for Sustainability

Sustainability is a key aspect to program development and outcomes. The following factors were considered crucial to program sustainability: funding, space and supplies, client retention, community partner/stakeholder engagement, and education.

Funding & providers. During the pilot phase of the program, grant funds helped with start-up costs, which included equipment (e.g. chairs, tables, a cell phone, computer, etc.) and wound care supplies. Some supplies were obtained through the client's health insurance plan, which allowed for more ongoing continuity of care. Planned long-term funding approaches include utilizing a multispecialty team, including physicians and nurse practitioners who can independently bill for services rendered. This would ensure that the community-based clinic incurs revenue for providing wound care to CHOW SEP clients. Other sources of funding would include establishing contracts with third party payors or utilizing the fee-for-service model or bundled payment model through Medicaid, as this is the primary insurance payor of CHOW SEP clients.

Space and supplies. Space and supplies were essential components of this program. A physical building space designated for community-based wound care clinic would help ensure continuity of services and ability to provide for client's needs on a more routine basis. While services were provided at the SEP van, which had the advantage of reaching clients directly where it is most convenient to the patient, there were other challenges with this option, such as no running water and dealing with bio hazardous waste on the streets. To help mitigate the issue of not having a sink, CHOW and Walmart Pharmacy agreed on a set price for large quantity orders of normal saline for wound cleansing. Additionally, stocking supplies for the clinic as

well as providing some basic wound care supplies to patient's to assist with self-management of wound care are important to the sustainability of this program.

Specialty wound care products were more expensive and difficult to obtain through donation/grant base. Therefore, establishing a partnership with wound care supply vendors was important for treatment options for clients. The CHOW Project was also able to receive mail orders of supplies to the CHOW office and store these supplies for clients. This was important because many CHOW clients are homeless and do not have a secure, clean place to store dressing change supplies. Additionally, by utilizing supply companies, those participants with insurance were able to secure supplies more easily than non- insured, which also reduced cost of the CHOW Project.

Client retention. Maintaining established client relationships through CHOW's social workers, case workers, community outreach workers helped ensure that CHOW clients were knowledgeable about services available. Word of mouth was an important tool utilized to keep clients engaged and aware of services. Flyers were also printed which helped detail out what services were available, the time, and location of services (see Appendix F).

These flyers were distributed in the community by the social and outreach workers. The basic wound care supply kits provided to patients also contained a flyer with the CHOW wound care program phone number, location, and time of services offered. A designated cell phone line was established to direct clients to the community-based wound care program. Clients were able to easily access the wound care program and call about wound re-assessment, dressing changes, and information.

Community partner & stakeholder engagement. Future engagement with community partners and stakeholders will require continuous face-to-face meetings and follow-up e-mails to further refine the partnership. Legislative support will also be necessary for sustainability initiatives, through demonstration of need and data backed outcomes. Additionally, partnerships must evolve with personnel transitions thus, providing more in-service and educational sessions help to increase CHOW Project visibility.

Education. Providing education across various levels will be important for sustaining the community-based wound care clinic. Education to patients will help to ensure that: patients are aware of services available, may help with early detection of infection, and provide ways to navigate the healthcare system. Ongoing education and training to wound care providers assist with maintenance of current EBP standards of care. Education through in-service sessions with community partners increases visibility of the program, and fosters collaboration between organizations to assist with comprehensive patient care. Lastly, providing education through demonstration of need and outcomes at the legislative level may increase accessibility to funds and support while decreasing stigma surrounding this population.

Human Subjects Consideration

Consenting Procedures

The CHOW Project's mission is to promote the optimal health and well being of people affected by drug use throughout Hawai'i by providing harm reduction services in a nonjudgmental setting. This project was designed in consideration with the protection of the rights of human subjects. As a quality improvement initiative, subjects were not randomized into

different treatments, standard evidence-based practices were implemented, and there was no additional risk beyond standard practice, aligning with the ethical tenant of non-maleficence.

The ethical tenant of autonomy was upheld, as clients made independent decisions whether to seek treatment through the community-based wound care program or not. While person-identifiable information was collected for evaluation and treatment purposes, this quality improvement initiative was evaluated using aggregate data, without person-identifiable information.

Additionally, patients, providers, and the community benefited from the program, which upholds the ethical tenant of beneficence. The CHOW Project team worked diligently to assure that all clients had access to equal and fair treatment, which is in alignment with the ethical tenant of justice.

The author has taken the University of Hawai'i required Collaborative Institutional Training Initiative (CITI) course in Human Subjects Protection. Additionally, this project was reviewed by a committee consisting of faculty and clinical experts to ensure that there was adequate human subject protection.

Limitations

As with any quality improvement project, there are several inherent limitations. This project was implemented and evaluated over a little less than a one-year time period. Limitations with this design included fluidity in the practice setting and an inability to control variables or devise constant conditions. Convenience sampling was utilized and broad inclusion criteria were applied. There was also a small sample size during the pilot and implementation phases of this program.

Additionally, several measures relied on self-reports and surveys that have no known reliability and validity. These surveys were also of cross-sectional design. However, a multidisciplinary team of physicians, nurses, and social workers knowledgeable about this population carefully developed surveys that were used to collect data and assess program outcomes. Implementation procedures were carefully constructed to minimize bias. One social worker familiar with CHOW participants was trained to collect participant survey responses on the pre-intervention needs assessment. Additionally, A limitation to data analysis in this type of project design is the inability to determine directionality or causality. Trend analysis and descriptives were used to determine project outcomes.

Summary

Chapter 3 included the JHNEBP steps 11-13 which covered the following content: a review of the objectives of the project, design of the project, description of the practice change, the five attributes of innovation that influence rate of adoption which helped determine appropriateness of the fit and feasibility of the project, and developing the action plan. The action plan included several program specific aspects including: wound type assessment and treatment guidelines, defining the setting, sample, recruitment techniques, the marketing and business plan, determining the process and evaluation measures, data collection requirements, and timeframe for the project. Additionally, this chapter reviewed the required resources to implement the action plan including sustainability measures, human subjects considerations, and addressed limitation of the design of the project.

CHAPTER 4. RESULTS

Objectives

One objective of this evidence-based practice initiative was to increase access to wound care in the community-based setting, in partnership with the Hawai'i statewide syringe exchange program (SEP), Community Health Outreach Work to Prevent AIDS Project (CHOW). The other objective was to demonstrate that community-based wound care is a safe and effective alternative to hospital-centric clinics; especially for high-risk populations including injection drug users (IDUs) and the homeless. These high-risk populations face significant barriers to accessing care and resources, which result in inappropriate utilization of emergency department (ED) services, at a considerable expense.

Step 14: Implement Action Plan

The resources and support in preparation to implement the action plan were actualized. The action plan was first implemented through implementing the literature based evidence-based practice (EBP) guidelines for assessing and treating wounds. Next, the setting and sample were considered and a pilot of the wound care program was conducted at the CHOW health fairs. While stakeholders and community partners were engaged through the marketing and business plan. Simultaneously, CHOW staff and providers were trained and provided educational materials to assist with recruitment of patients and increase visibility of the community-based wound care program in the community. Then CHOW transitioned to providing wound care to patients in the community twice weekly (Tuesday & Friday), located at the CHOW van stationed along River Street and Vineyard Boulevard, in downtown Chinatown on O'ahu. Additionally, clients were referred to appropriate tertiary care centers through community partnerships to

ensure that clients received access to wound care that was beyond the scope of the community setting and for continuity of care purposes. Patients were also referred from tertiary care centers for appropriate community-based follow up care. Data was collected in relation to the defined process and outcome measures using the developed instruments, and finally analyzed to assess the outcomes of the project.

Step 15: Evaluate Outcomes

Description of Sample

One hundred sixteen patients sought wound care services at The CHOW Project community-based wound care program. The majority of patients seen were male (66%) with an average age of 43.4 years. The two most self-reported races included Caucasian (47%) and Native Hawai‘ian (see Figure 5). Sixty-six percent reported homelessness and 83% had a mental health diagnosis. The primary drugs injected included opioids (66%) and (33%) methamphetamine (ice). Client’s self-reported reasons for seeking ED services primarily for detoxification and wound care.

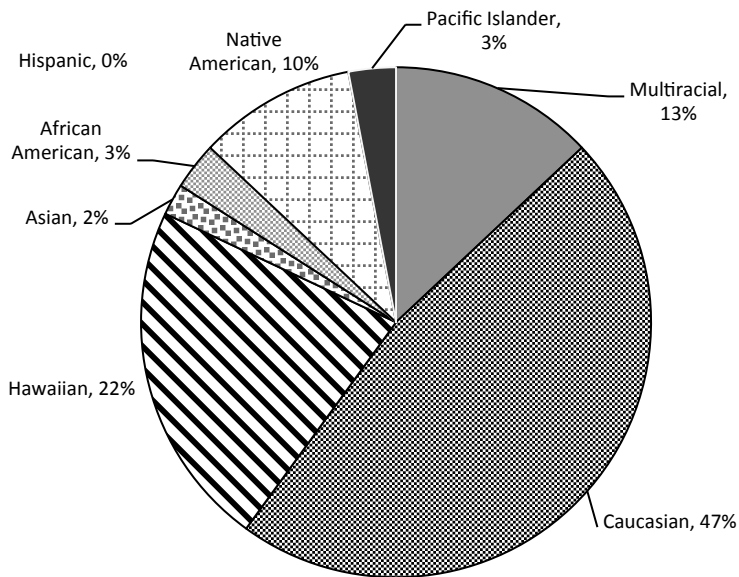


Figure 5. CHOW Project participant’s race and ethnicities as self-reported on The CHOW Project’s annual Statewide Syringe Exchange Survey (CHOW, 2016).

Trend Analysis of Process and Outcome Variables

Client needs assessment. A multidisciplinary team at The CHOW Project included physicians, nurses, and social workers who were knowledgeable about wounds in the SEP population developed a needs assessment survey. The purpose was to assess the prevalence of wounds among SEP clients on O’ahu, as well as their healthcare seeking behavior, and wound care concerns to better understand if offering additional services would benefit this underserved population. Forty-six (84%) of 55 SEP participants completed the survey. The survey asked the client to recall how many times in the past three months they received care for wounds. Thirty-nine (85%) of respondents reported seeking wound care 0-5 times; 6 (13%) sought care over 20 times. Most wounds reported were abscesses. Forty-four (96%) of respondents reported needing

help keeping wounds clean, and 44 (96%) reported they would consider seeking wound care services through CHOW if offered.

Open-ended comments revealed a reluctance to seek treatment at other facilities due to the perception of being “judged” and concerns of long wait times in the ED. Clients also requested supplies and education.

Provider needs assessment. A provider needs assessment was also distributed among known local agencies to gather information in regards to the frequency of wounds seen, the types of wounds seen, barriers to caring for clients with wounds. There was also the opportunity to provide feedback or suggestions in regards to developing and/or willingness to work with a community-based wound care program. Four clinicians from various local organizations including a local hospital, a Federally Qualified Health Center (FQHC), and a homeless shelter clinic provided responses. Clinicians included nurses, advanced practice nurses, and physicians.

The most frequently selected answer to the question, “How frequently do you see/treat wounds and or ulcers?” was 6-10 times per week, with one response indicating 11-15 times per week. All respondents indicated that the frequency in which they saw wounds related to injection drug use was about 0-5 times per week. The most frequently selected types of wounds were related to skin/soft tissue infections and cellulitis followed by venous, arterial, and traumatic wounds.

Half of the respondents indicated that patient access to clean and stable housing was the biggest challenge when caring for a patient with wounds related to injection drug use (IDU) and/or homelessness, followed by access to supplies. Lastly, 75% of respondents felt that a community-based wound care program would help service the community and decrease the use

of urgent care facilities. All respondents indicated a willingness to collaborate with a community-based wound care program (CHOW, 2016) (see Appendix B).

The CHOW Project community-based wound care program. The number of patients that sought wound care between June 2016 and January 2017 was 116. On average patients were seen for at least two visits over this period of time for a total of 220 client visits. Abscesses (26%), skin/soft tissue infections (SSTI) and cellulitis (25%), and venous ulceration (19%) were the most common types of wounds seen and treated. There were about 10 patients referred to The CHOW Project from The Queens Medical Center (QMC), one patient from Castle Medical Center, and over 30 patients referred from the Institute from Human Services (IHS). Similarly, about 20 patients (6%) of CHOW wound care patients were referred to QMC outpatient wound care center and an estimated 7% of CHOW wound care patients were referred to local EDs.

Average cost per patient. A total of \$3,491.73 was spent in clinical supplies and necessary resources to operate the program for seven months. Of note is that some wound care supplies were obtained via the patient's healthcare insurance, which was not accounted for in the cost of the program. The intervention period of 244 days included two clinic days per week and three health fairs. Given the amount of money spent and the number of patient visits during this period, it was estimated that the average cost to treat a wound was about \$33 per patient, or about \$15 per visit. In calculating the average cost per patient for wound care at the CHOW community-based wound care program including the cost of a full-time Advanced Practice Registered Nurse, specifically a Nurse Practitioner, it was estimated that the cost would increase to \$92 per patient. This calculation was derived from the average national annual salary of a Nurse Practitioner (\$100,00/ year; or \$48.07/hour) with one to five years experience (Medscape,

2016) including the average cost for benefits of \$11.03 per hour (Bureau of Labor Statistics, 2016) plus cost of supplies at (\$33), totaling to an estimate of \$92 per patient. The Wounds on Wheels Program in Baltimore Maryland calculated that the average cost per patient for community-based wound care was \$146.45 (Robinowitz et al., 2014). Comparatively, ED wound care costs in the State of Hawaii were estimated range from \$1300 to \$1600 per visit in 2011-2012 (HHIC, 2014) (see Figure 6).

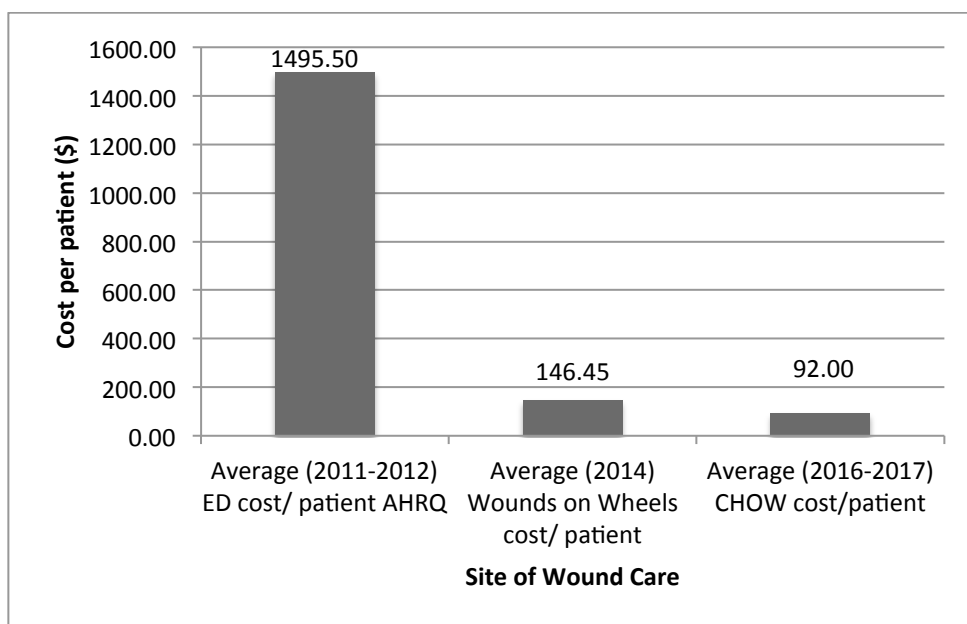


Figure 6. Comparison of the average cost per patient for wound care at various sites, including Hawaii State emergency departments, a community-based clinic in Maryland, and the CHOW community-based wound care program.

Evolution of Project

Expected versus actual. The four main objectives of this project were: (1) implement a community-based wound care program, and increase patient access to wound care services in the community setting, (2) use validated flowsheets to assess clients, (3) utilize evidence-based clinical guidelines/algorithms for wound care, and (4) calculate the average cost per patient for

wound care in the community-based setting. Implementation of a community-based wound care program in partnership with The CHOW Project was established. It was expected that the number of clients that accessed wound care services through CHOW would increase due to the newly added service. While the use of flowsheets assisted with wound care provider education, completion of the detailed flowsheets for each patient was challenging. At the onset of the project, using a free electronic health record (EHR) was expected. However, in practice in the community it was more feasible to document client encounters from assessment through treatment plan on paper. Additionally, it was anticipated that capturing average time to wound closure would be a measured outcome; however tracking this was more challenging than expected. Many clients were lost to follow-up because their wounds improved and only sought care after a new wound developed or their wound re-opened, or became re-infected.

In terms of cost analysis, a comparative approach of CHOW specific data and Hawai'i statewide ED utilization data was expected, however, obtaining an average charge in the ED for years 2014-2016 was challenging because of the cost requirement to obtain data. A request for claims data was made, but was not available at the time of this evidence-based practice report. Thus, the most recently publically available data was used to compare cost of wound care per patient in the ED setting as compared to the community setting.

Additionally, another goal at the onset of this project was to decrease inappropriate ED use and overutilization. However, there was consideration given to the fact that if clients were acutely ill and presented to any community health system, they would be referred to ED for more acute based care. Over time, the expected outcome is that the number of persons seeking ED services will decline because of ongoing access to wound care in the community, which may

decrease infections or acute presentations. With ongoing services provided, patients with chronic wounds can be managed in the community-based setting as compared to inappropriate utilization of ED services.

Due to the CHOW statewide survey and the client needs assessment data indicating frequent ED use, it was thought that CHOW clients readily use ED services. However, observationally it was noted that CHOW clients, might utilize ED services but do not seek the ED excessively. For many reasons, these patients wait until the wound or secondary complications from untreated wound is severe and thus require admission from the ED for prolonged stays in the hospital. Within the IDU population, a feeling of judgment is often expressed, and is a barrier to accessing services through a primary care provider or at the hospital setting. The QMC recently began tracking what the Center for Medicare & Medicaid (CMS) defines as super utilizers, given that a large number of patient who are homeless, those with mental health diagnosis, and or alcohol/drug dependency seek services at QMC. CMS defines super utilizer as, “beneficiaries with complex unaddressed health issues, and a history of frequent encounters with health care provider” (CMS, 2013). The QMC chose to define super utilizers by the following parameters: three ED visits in a week, or three admissions in a month, or ten ED visits in a month, with Honolulu City and County including five transports by Emergency Medical Services (EMS) in a month. The findings indicated that there were about 13,000 ED visits in 2015 and about 1,200 runs by EMS in 2016; with \$20-25 Million in unpaid costs, which does not include provider salaries for Hawai‘i in 2015 (D. Cheng, personal communication, November 28, 2016). After providing patient case load information to QMC, it was determined that CHOW clients generally do not meet the parameters as defined by QMC as a super utilizer,

but instead have prolonged length of stays inpatient (30- 60 days) with more significant infections, such as sepsis, a secondary diagnosis related to injection drug use (D. Cheng, personal communication, January 31, 2017). However, of note is that QMC super utilizers have some of the biggest socioeconomic and health disparities including 70% of super utilizers are homeless, and behavioral health and substance abuse make up the majority of the acute care diagnoses, with one in ten having used illicit drugs in the past month (D. Cheng, personal communication, November 28, 2016).

Stakeholders and community partnerships were essential in the actual facilitation of implementation, and for sustainability initiatives of this community-based wound care program. Partnerships with QMC at multiple levels have been instrumental in ensuring that patients have comprehensive care. A workflow process was developed and referral forms were shared between the organizations to assist with the patient referral process (see Appendix H). Patients were able to seek services at The QMC Outpatient Wound Care Center through the referral form process completed by CHOW wound care providers. The CHOW providers would make the referral if it was necessary and appropriate for patients to seek ongoing additional care beyond the community-based setting. Of note is that QMC Outpatient Wound Care Center does require patients to have health care insurance; fortunately, greater than half of the CHOW clients have health care insurance, with Medicaid as the primary payor. In addition, QMC was able to refer patients with wounds that were suitable for community-based management to the CHOW Project. This arrangement of care helped to ensure continuity of wound care and support for patients. Other significant facilitators included the HIS. The IHS wound care nurse and outreach workers were engaged with CHOW wound care providers to ensure that treatment plans

for mutual patients were communicated, and that patients were being appropriately followed in the community. Finally, the Homeless Outreach and Medical Education (H.O.M.E) Project also facilitated more primary care like services for patients, and were also able to supply patients with antibiotics, which was necessary in a population that faces increased risk for skin and soft tissue infections (SSTIs).

Primarily, the greatest barrier was access to unencumbered funds to ensure sustainability of the community-based wound care program in conjunction with the statewide SEP. There was also a constant need for supplies and equipment to provide ongoing essential patient care, and meeting the evidence-based standards of care. Additionally, access to the electronic medical records for patients that are admitted into the hospital setting presented as a challenge. The ability to follow the patient into the inpatient setting would allow the community-based wound care provider to prepare for discharge and better collaborate with the inpatient team. Increasing communication between the hospital providers and community-based wound care providers also may help to decrease overutilization of ED services, and decrease readmissions.

Step 16: Report Outcomes to Stakeholders

Data sharing and reporting outcomes to stakeholders and community partners allows continued sustainment of partnerships. Additionally, the project can evolve to include new variables that may demonstrate the successful outcomes and need of this project. Outcomes were reported to stakeholders through face-to-face meetings, presentations, and written reports.

Step 17: Identify Next Steps

Next steps for The CHOW Project's community-based wound care program includes hiring a Nurse Practitioner and a Nurse full time to ensure that the clinic is staffed appropriately

at all times and is able to operate more days of the week with longer clinic duration. Ongoing education to patients and providers is necessary to ensure utilization of the most current evidence-based practice guidelines in the management of wound care, and to decrease stigma associated in caring for patients that face significant challenges like mental health diagnoses, drug use, and homelessness. Recognition of the special needs of this population also frame which outcomes of the project can be assessed and are appropriate metrics. Ensuring that the community-based clinic is sustainable requires ongoing funding and partnerships among stakeholders, community organizations, and hospitals at the legislative and administrative levels not just at the clinical practice level.

While this community-based initiative has been successful thus far, sustainability is a long-term goal. Thus, further collaboration between more local Hawai 'i hospital systems such as Straub Medical Center Medical Center Medical Center, Castle Medical Center, and Kuakini Medical Center will be necessary to ensure engagement at all tertiary care centers. Continued outreach to other community-based organizations (such as IHS and FQHCs) and national agencies such as American Medical Technologies (AMT) and Walgreens also will help to ensure sustainability, especially from the supply and financial compartments. Cost analysis will continue to be a primary focus, and obtaining more recent cost figures from a statewide perspective will help to demonstrate need for community-based programs. Lastly, engaging clients to seek care in a more preventative approach, through access to primary care services will help ensure that clients do not develop more significant complications such as septicemia, which is a costly diagnosis in the healthcare system, and is associated with poor health outcomes.

Summary

In conclusion Chapter 4 included the Johns Hopkins Nursing Evidence Based Practice (JHNEBP) steps 14-17. These steps and this chapter provided content related to an overview of the project objectives, implementing the action plan, evaluating the outcomes including description of the sample, trend analysis of the process and outcome measures, a description of the evolution of the project, reporting outcomes to stakeholders, and identification of the next steps.

In summary, The CHOW Project community-based wound care program demonstrated the need for the project; saw 116 patients over a seven-month intervention period, with an average of 2 visits per patient for a total of 220 patient visits. The most common types of wounds assessed and treated included SSTIs, cellulitis, and venous ulcers. Over all about 6% of patients from The CHOW community-based wound care program were referred to QMC outpatient wound care center, and 7% of patients were referred to the ED. The average cost per patient for wound care, including supplies, resources, and hiring a Nurse Practitioner full-time with benefits estimated at \$92 in the community setting, which is less than the cost per patient for wound care in the ED setting.

CHAPTER 5. DISCUSSION

Step 18: Disseminate Findings

Interpretation of Findings

The project results indicate there is a need for community-based wound care services, especially tailored for a population that is at high risk for wounds due to homelessness, injection drug use, and barriers to routine and preventative care. This community-based wound care program was successful in development and implementation; but will require ongoing efforts for thorough evaluation and sustainability, especially in regards to funding sources and resources. Community-based partnerships and stakeholder engagement was essential for successful implementation, and are additional resources to ensuring that patient have access to quality care. The following paragraphs interpret the findings of the process and outcome measures.

Needs assessments. The client needs assessment helped to quantify what type of services The CHOW Project participants needed most, and some of the barriers associated with accessing traditional healthcare options. Wound care was a frequently reported reason, besides detoxification, for seeking emergency department (ED) services. Other important aspects garnered from the needs assessment included need for ongoing wound care supplies, education about wound care, and what barriers clients self-reported in terms of accessing wound care services.

In regards to the provider needs assessment survey, even though a small sample size, this survey helped to obtain information about the number of times providers saw wounds, the type of wounds seen in the community, and an opportunity for suggestions, feedback, and willingness to work with a community-based initiative. Given that stakeholders and community partners are

essential for The CHOW Project's community-based wound care initiative, it was positive that the clinicians surveyed were willing to work with a community-based program to provide additional services to clients who otherwise would not seek care, or inappropriately access and/or over utilize emergency department services.

Wound care provision. It was estimated that the number of clients The CHOW Project would see during the intervention period was 60 patients. This was based on the number of clients that were known to seek syringe exchange services on a routine basis, in the location that wound care was provided. However, The CHOW Project saw 116 unique individuals during the intervention period, accounting for over 220 visits. Thus, these numbers help to demonstrate the need for wound care in the community. Willingness by The Queens Medical Center (QMC), Institute for Human Services (IHS), Castle Medical Center, and other organizations to refer to The CHOW Project's community-based wound care program also demonstrated the desire to assist clients in receiving access to wound care, continuity of care after discharge, and investment to sustain initiatives that are more cost effective, and can potentially decrease inappropriate, overutilization of ED services.

Access. Community-based initiatives that aim to provide ongoing services for patients who have barriers to accessing primary care/preventative services are important to consider. A community-based wound care program in conjunction with the Hawai'i State SEP was one option for high-risk population groups, such as injection drug users and homeless, and those with mental health diagnoses who face significant barriers to accessing and maintaining continuity of care. In Hawai'i, primary care provider (PCP) shortages also place a burden on both the patients and the providers.

Patients who have several socioeconomic burdens, such as lower education status, low income or reliance on Social Security/ disability/ unemployment sources of income, difficulty with transportation etc. also are less likely to engage in primary care services. Future considerations to utilize patient navigators, in partnership with case workers may help to coordinate patient visits and help patients make and keep their appointments. Socio-economic barriers must also be addressed in order to see a significant improvement in overutilization of ED, and to reduce the economic burden. Thus, community-based programs can serve as a way to engage patients who otherwise would only access ED services when a need arises, regardless of the situation being a true emergency.

Cost. Cost was based on the resources and supplies necessary to launch this community-based wound care program. There was limited overhead costs because, all wound care providers were volunteers and did not use diagnosis or billing codes for reimbursement. Additionally, some supplies were ordered through the patient's insurance plan and therefore was not calculated in the average cost per patient. Thus, the overall program cost was very reasonable. However with sustainability initiatives, billing for services and generating revenue is a more realistic consideration.

In an attempt to obtain average ED cost for a similar patient within Hawai'i State there were several challenges, which included the cost to access the most recent data from The Hawai'i Health Information Corporation (HHIC). There were delays with requesting and obtaining claims data from The Department of Health and Human Services because of barriers to data share agreements between facilities. Thus, open source AHRQ and HHIC data, from 2011-2013 were used to assess the average cost in the ED for a patient in Hawai'i and nationally

reported average cost for patients with similar diagnosis. At onset of the project, a return on investment calculation was an expected outcome, however with the difficulty in obtaining recent data from statewide ED utilization through claims data, this calculation was not performed.

However, it was feasible to calculate the average cost per patient for wound care at the CHOW community-based wound care program including the cost of a full-time Advanced Practice Registered Nurse, specifically a Nurse Practitioner. This calculation was derived from the average national annual salary of a Nurse Practitioner (\$100,000/ year; or \$48.07/hour) with one to five years experience (Medscape, 2016) including the average cost for benefits of \$11.03 per hour (Bureau of Labor Statistics, 2016) plus cost of supplies per patient (\$33), totaling to an estimate of \$92 per patient. Similar to multiple studies (Grau, et al., 2002; Harris & Young, 2002; Robinowitz, et al., 2014; Tookes, et al., 2015), community-based initiatives demonstrate that cost to care for patients who have non-emergent conditions can receive quality care at significantly less cost.

In a retrospective chart abstraction of *International Classification of Diseases, Ninth Revision* (ICD-9) related to illicit drug abuse and endocarditis, bacteremia or sepsis, osteomyelitis, and skin and soft tissue infections (SSTIs) over a 12 month period (July 2013 to June 2014), Tookes et al., (2015) found that the most commonly reported infections were among IDUs (64%), and 92 % (N=349) were either uninsured or had publically funded insurance. The total cost for treatment at Jackson Memorial Hospital in Miami, Florida was \$11.4 Million, with the median charge for hospitalization for IDU related infection at \$39,896 and the majority of charges were billed to state-funded Medicaid programs (\$18, 375,845) (Tookes, et al., 2015). Additionally, \$15 billion was spent for hospitalizations related to opioid abuse/dependence, and

\$700 million was spent for opioid abuse/dependence with associated infection (Ronan & Herzig, 2016). Medicaid was the primary payer for both of these types of conditions. When compared to discharges related to opioid abuse/dependence alone, those with associated infection had almost four times more cost, were more likely to die during hospitalization, and more likely to require placement to a second facility after discharge.

It is well known that disproportionate usage of health care spending in the US is based on caring for a small percentage of the population. In fact, only about

...1% of the population accounting for 22 percent of total health care expenditures annually. The distribution of spending is even more uneven within Medicaid, with just 5 percent of Medicaid beneficiaries accounting for 54 percent of total Medicaid expenditures and 1% of Medicaid beneficiaries accounting for 25 percent of total Medicaid expenditures. (DHHS CMS, 2013, p.2)

Hawai'i State is unique in regards to the high number of insured persons. CHOW Project participants despite homelessness are often insured, with Medicaid as the primary insurer. This facilitates easier access to ongoing wound care supplies through vendors that require and bill the patients insurance. Additionally, services rendered can be billed which will generate a stream of revenue into the community-based wound care program increasing sustainability efforts.

Recommendations & Implications

Wound Care

Recommendations from this evidence-based practice project include hiring a Nurse Practitioner and nurse full time to ensure that the clinic is staffed appropriately at all times and is able to operate more days of the week for longer clinical duration. Billing for services rendered

will be an essential next step to secure ongoing funding for the community-based wound care program. Additionally, hiring a data analyst to assist with data collection and entry will help facilitate need for the program as well as demonstrate project outcomes. Some outcomes which will require more data collection efforts include: tracking patient's time to wound closure, using a camera to take pictures of patient's wounds to document wound care progression, tracking the number of patient's that are referred to ED services and admitted, obtaining more information about estimated cost for ED services, and average cost and length of stay for patient's admitted. Utilization of an EHR, and access into the major local hospital systems EHR will help ensure improved coordination of care for patient. While clinicians at partnered hospitals were eager to assist with data sharing via EHR access, in actuality administration and the information technology (IT) department were more hesitant. Recommendations include working closely with the local hospital's IT department at the start of the project to facilitate appropriate access into the EHR system and to establish data use sharing agreements with administration.

One key implication of sharing the findings of this project with community partners and stakeholders has been that a large local hospital is more interested in data sharing. This hospital became interested in collecting more data that demonstrates how this projects collaboration exhibits a core aspect of the Magnet Model, which utilizes research, evidence based practice, and innovation to generate new knowledge, innovations and improvements (American Nurses Credentialing Center, 2011). Thus, through resource sharing and collaborating on data collection both organizations can achieve greater impacts on patient outcomes.

Education

Ongoing education to patients and providers is also necessary to utilize the most current evidence-based practice guidelines in the management of wound care; and to decrease stigma associated in caring for patients that face significant challenges like mental health diagnoses, drug use, and homelessness.

Sustainability

Ensuring that the community-based clinic is sustainable is a long-term goal and will require ongoing funding and partnerships among stakeholders, community organizations, and hospitals at the legislative and administrative levels not just at the clinical practice level. Cost findings demonstrate that those who are the highest-costing patients are ones that often do not receive primary care, preventative services, or coordinated care. CMS continues to support efforts that reduce super-utilization of ED services and decrease the number of hospitalizations. While there is not a clear definition of super utilize, one key theme is that the term definitely refers to, "... patients who accumulate large number of emergency department visits and hospital admissions which might have been prevented by relatively inexpensive early interventions and primary care" (DHHS CMS, 2013, p.2). AHRQ assessed super utilizers within the Medicaid population and found that septicemia and mental health and substance use disorders were among the 10 most common principal diagnoses for hospitalization (HCUP, 2012). Therefore, it will be important to continue to support alternative initiatives that provide quality care at more reasonable cost such as this community-based wound care program.

DNP Essentials

Additional implications and recommendations are based on The American Association of College of Nursing (AACN), which developed *The Essentials of Doctoral Education for*

Advanced Nursing Practice, first published in 1986 with ongoing updates to reflect and meet the current complexities of health care. The Doctorate of Nursing Practice (DNP) degree has a focus on, “practice that is innovative and evidence-based, reflecting the application of credible research findings” (AANC, 2006, p. 3). *The Essentials of Doctoral Education for Advanced Nursing Practice* serves a guideline of expected competencies for nurses practicing at this level. The following paragraphs describe integration of the essential competencies in relation to the current evidence-based practice program as applicable.

Essential I: Scientific Underpinnings for Practice. This essential illuminates the need for a strong scientific background and knowledge base that will help ensure that the foundation of nursing practice develops to meet the needs of the ever-growing complexity of healthcare demands. The evidence-based practice program aforementioned integrates scientific principles, researched based knowledge, clinical practice guidelines, healthcare systems, healthcare delivery and evaluated new practice approaches to management of a high risk population in need of alternative forms of healthcare and access to health related services.

Essential II: Organizational & Systems Leadership for Quality Improvement and Economics. Systems organization and leadership are essential to improving patient care and health related outcomes. “Doctoral level knowledge and skills in these areas are consistent with nursing and health care goals to eliminate health disparities and to promote patient safety and excellent in practice” (AACN, 2006, p.10). Through evaluation of system level care, including the financial components, and the impact on patient health related outcomes and safety; this evidence-based practice project attempted to assess the cost-effectiveness of providing wound care in the community-based setting. While providing safe, quality, evidence-based practice care

methods. Communication, collaboration, and leadership across healthcare systems was also essential to ensuring that patients received coordinated compressive care.

Essential III: Evidence-Based Practice & Translation Science. Evidence-based practice and translation science, involves clinical scholarship and analytical methodology applying meaning and connecting knowledge across disciplines. This essential capitalizes on, “Nurses hav[ing] long recognized that scholarly nursing practice is characterized by the discovery of new phenomena and the application of new discoveries in increasing complex practice situations” (AACN, 2006, p. 11). Improving both individual health outcomes of those who are disadvantaged as well as community-based public health were central to The CHOW community-based wound care program. This project utilized evidence-based practice guidelines to improve and promote safe, timely, efficient, equitable, and patient-centered care (AACN, 2006).

Essential IV: Information Systems & Technology. Technology and information systems are growing areas in healthcare systems management; especially in relation to evaluation of programs of care and assessing effectiveness of care. The use of technology is required to develop, collect, and analyze data to demonstrate efficacy. Data collection tools were developed and aligned with current standards of care; a database was then developed to collect, assess, and analyze data from this evidence-based practice initiative. However, utilization of an EHR in the community-based setting providing more challenging, and in the future technology such as form fillable documents on tablets will be trialed. Additionally, collaboration with a local hospital to pilot telemedicine may assist with prompt assessment and treatment plans in the community-based setting.

Essential V: Health Care Policy & Ethics. Policy development and change is essential to overall systems transformation. AACN states that, “Health care policy--whether it is created through governmental actions, institutional decision making, or organizational standards--creates a framework that can facilitate or impede the delivery of health care services or the ability of the provider to engage in practice to address health care needs” (2006, p. 13). The CHOW Project is heavily involved at all levels of policy to ensure that those who are most in need are able to access harm reduction services, and healthcare while improving outcomes within a cost conscience model. Legislative efforts that support through funds, alternative care programs outside of a hospital centric model would increase this community-based wound care programs sustainability. Advocating for those that face significant increased risk related to healthcare outcomes and social justice is also in alignment with ethical principles and is evident in the core components of The CHOW Project’s mission.

Essential VI: Inter-professional Collaboration. Multi-disciplinary collaboration and communication is essential to caring for more complex patients and in a complex healthcare system. Thus, DNP students are prepared to work in a team approach, with leadership skills to ensure that patient-centered care is timely, efficient, and equitable; which is also in alignment with recommendations by the Institute of Medicine (IOM). The CHOW Project employs and utilizes a variety of specialties including: physicians, nurses, public health professionals, outreach and social workers to engage clients at all levels as well as to work with and across a variety of settings in the community. The success of this evidence-based practice initiative required collaboration between many different specialties to ensure that clients had comprehensive access to services and ongoing care.

Essential VII: Prevention and Population Health. The AACN defines, “*Clinical prevention*... as health promotion and risk reduction/illness prevention for individuals and families. [And] *Population health* is defined to include aggregate, community, environmental/occupational, and cultural/socioeconomic dimensions of health” (2006, p.15). The nature of this community-based wound care clearly demonstrates the intent to promote health and reduce risk of illness, by adopting harm reduction practices and meeting clients in a trusted community based setting which reduced the barriers and burdens of access among this population.

Essential VIII: Advanced Nursing Practice & Education. With increased sophistication of health care needs and the overall delivery system, it is imperative to ensure that nursing curriculum continues to advance. As nurses have a variety of roles and positions, scenarios appropriate to the specialty should be developed and demonstrated. One consideration is future wound care certification for the Nurse Practitioner and nurse working in the community-based wound care clinic. DNP nurses must demonstrate, “...advanced levels of clinical judgment, systems thinking, and accountability in designing, delivering, and evaluating evidence-based care to improve patient outcomes” (AACN, 2006, p.17). The DNP student with specialty in Adult/Geriatric Nurse Practitioner used advanced clinical judgment, evidence-based standards of care, and therapeutic relationships to build a community-based wound care program to support improved patient access to care.

Plans for Dissemination

Results will be reported in a variety of methods, which include oral, briefs, and formal written reports/publications. These types of formats will help to disseminate the program

findings to a variety of audiences including the community at large as well as community partners and stakeholders. The CHOW Project is reporting findings of this project to demonstrate the need and to assist with application for funding. Through publications, this evidence-based practice initiative can be adopted across other settings, such as with other states that utilize harm reduction approaches like SEPs in the IDU population that are at significant risk for wounds and infections. Additionally, publications help to demonstrate the comprehensive nature of The CHOW Project's work, as Hawai'i State's SEP which aims to provide harm reduction services, and reduce stigma of caring for this population, and barriers to accessing healthcare. The CHOW project also seeks to reduce the burden of health related outcomes associated with injection drug use, homelessness, and other socioeconomic disadvantages for the patient as well as the greater community, while considering the cost effectiveness of quality, patient-centered, evidence-based practice care.

Summary

Chapter 5 interpreted findings of The CHOW Project's community-based wound care, evidence based initiative. This chapter also described *The Essentials of Doctoral Education for Advanced Nursing Practice*, and how this project integrated the essentials as required by the Doctoral program. In summary, The CHOW Project's community-based wound care program increased access to wound care for patients, demonstrated reduced cost to care for wounds in the community setting, and made the recommendation that a Nurse Practitioner would help sustain funding and the clinic. Other recommendations were to hire a data analyst to track more project outcomes, increase data sharing and EHR access at the local hospitals, and obtain more statewide and national data to demonstrate cost effectiveness of the community-based program. Finally,

plans for dissemination were discussed in hopes that stakeholders continue to participate in this initiative of providing wound care for a high-risk population in the community setting.

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Appendix A
Client Needs Assessment Survey



Community Health Outreach Work

677 Ala Moana Blvd., Suite 226
Honolulu, HI 96813
Phone (808) 853-3292 • Fax (808) 853-3274

CHOW Wound Care: Community Needs Assessment Questions

PREFACE: A wound is a sore that does not heal.

- 1a) How many times since 4th of July (past 3 months) have you received care for wounds?
- 0-5 times
 - 6-10 times
 - 11-15 times
 - 16-20 times
 - Over 20 times
- 1b) What kind of wounds?
- 2a) Where do you normally go for wound care?
- Queens Hospital
 - Waikiki Health
 - Kalihi Palama
 - IHS
 - Kuakini Hospital
 - Care-A-Van
 - Tripler/VA
 - Other:
 - Nowhere
- 2b) Why have you chosen to receive wound care there?
- 2c) What do you like about where you usually go? What do you dislike about it?
- 3) If CHOW started offering wound care at the van, would you consider seeing us for these services? Why or why not?
- 4) Would you prefer to come in on a drop-in or appointment basis?
- 5) Is there a day or time that works best for you?
- 6a) Do you need help keeping your wounds clean ongoing? Yes or No
- 6b) How can we help you keep your wounds clean?

- a. Education/showing you how?
- b. Giving you the supplies for it?
- c. Helping you clean them?
- d. Other:

7) What supplies would you like us to carry?

Appendix B

Provider Needs Assessment Survey



Community Health Outreach Work

677 Ala Moana Blvd., Suite 226
Honolulu, HI 96813
Phone (808) 853-3292 • Fax (808) 853-3274

Facility Name/ Location

Department

Contact Name

Contact Phone and/ or E-mail

Question 1) How frequently do you see/treat wounds and or ulcers?

- 0-5 times/week
- 6-10 times/week
- 11-15 times/week
- Over 20 times/week

Question 2) How frequently do you see/ treat wounds that are secondary to injection drug use?

- 0-5 times/ week
- 6-10 times/ week
- 11-15 times/ week
- Over 20 times/week



Question 3) What other types of wounds do you see?




- Venous stasis/ insufficiency
- Cellulitis/ infections
- Diabetic foot ulcers
- Pressure ulcers
- Arterial ulcers
- Traumatic wounds
- Non-healing surgical wounds
- Other:

Question 4) On average, how often is it that a homeless patient will come back for follow-up appointments related to wound/ ulcer care?

- Never
- Not Often
- Sometimes
- Often
- Very Often

Appendix C

Assessment Flowsheets

Client Name: _____

DOB: _____

PN: _____

UT AUTHORITY/PROF/REG: _____

Year: _____

WOUND ASSESSMENT & TREATMENT FLOWSHEET

Wound Date of Onset _____

Page 1 of 2

(Please fill out ONE form per wound) **Goal of Care:** To Heal To Maintain To Monitor / Manage


Wound Type/Etiology (if known)

Pressure Venous Arterial Diabetic Surgical 2^o Intention Skin Tear Other

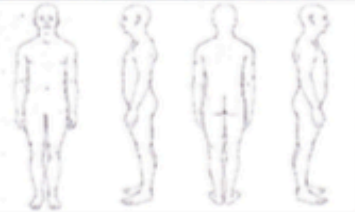
If Pressure Ulcer, chart one stage only and date. Stage 1 _____ (dd/mm) Stage 2 _____ (dd/mm) Stage 3 _____ (dd/mm) Stage 4 _____ (dd/mm)


If change, chart new stage and date. Stage X (unstageable) _____ (dd/mm) Stage SDTI (Suspected Deep Tissue Injury) _____ (dd/mm)

MARK LOCATION OF WOUND/ULCER WITH AN ARROW OR AN "X"



Left Right






Right Left

Left Right

Legend: X or Blank Space = Not Applicable (as per agency) ✓ = Assessed/Completed PN = See Progress Notes

Wound Location:		Month/Year	Day										
			Time										
Weekly/PN  Location corresponds to face of clock with patient's head at 12 o'clock position	Wound Measurements in cm	Length											
	Width												
	Depth												
	Sinus Tract #1 Depth												
	Location (o'clock)												
	Sinus Tract #2 Depth												
	Location (o'clock)												
	Undermining #1 Depth												
	Location (o'clock)												
	Undermining #2 Depth												
Location (o'clock)													
Wound Bed:	% Pink/Red												
	% Granulation (red pebbly)												
	% Slough												
	% Eschar												
	% Foreign body (sutures, mesh, hardware)												
	% Underlying structures (fascia, tendon, bone)												
	% Not visible												
% Other:													
Exudate Amount [✓] one	None												
	Scant/small												
	Moderate												
	Large/copious												
INITIALS													



Client Name: _____

DOB: _____

PHN: _____

01 2020/01/01/2020 Year: _____

WOUND ASSESSMENT & TREATMENT FLOWSHEET

Page 2 of 2

Wound Location:		Month/Year	Day																		
			Time																		
Exudate Type [✓] all that apply	Serous																				
	Sanguineous																				
	Purulent																				
	Other:																				
Odour	Odour present after cleansing Yes or No																				
Wound Edge [✓] all that apply	Attached (flush w/ wound bed or "sloping edge")																				
	Non-Attached (edge appears as a "cliff")																				
	Rolled (curled under)																				
	Epithelialization																				
Peri-wound Skin [✓] all that apply	Intact																				
	Erythema (reddened) in cm																				
	Indurated (firmness around wound) in cm																				
	Macerated (white, waterlogged)																				
	Excoriated/Denuded (superficial loss of tissue)																				
	Callused																				
	Fragile																				
Other:																					
Wound Pain (10 = worst)	Scored from 10 point analogue Pain Scale See Pain Assessment for details																				
Packing Count	Any depth 1cm or greater, count packing pieces	Out																			
		In																			
Treatment	Treatment done as per Treatment Plan																				
INITIALS																					
VISIT COUNT (Home Care Nursing Only)																					

WOUND TREATMENT PLAN

Leave plan in place for ONE week whenever possible. Document rationale for change on the Progress Notes	Date Initiated	Initials	Date D/C	Initials



Client Name _____

DOB _____

PHN _____

Or addressograph / label

BASIC LOWER LIMB ASSESSMENT FLOW SHEET

Parameter	Right Lower Limb	Left Lower Limb	Parameter	Right Lower Limb	Left Lower Limb
Missing Limbs or Digits	<input type="checkbox"/> Leg above knee <input type="checkbox"/> Leg below knee <input type="checkbox"/> Foot partial <input type="checkbox"/> Foot all <input type="checkbox"/> Great toe <input type="checkbox"/> Second toe <input type="checkbox"/> Third toe <input type="checkbox"/> Fourth toe <input type="checkbox"/> Fifth toe <input type="checkbox"/> No amputations	<input type="checkbox"/> Leg above knee <input type="checkbox"/> Leg below knee <input type="checkbox"/> Foot partial <input type="checkbox"/> Foot all <input type="checkbox"/> Great toe <input type="checkbox"/> Second toe <input type="checkbox"/> Third toe <input type="checkbox"/> Fourth toe <input type="checkbox"/> Fifth toe <input type="checkbox"/> No amputations	Range of Motion	Knee (Active): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Knee (Passive): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Ankle (Active): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Ankle (Passive): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Great Toe (Active): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Great Toe (Passive): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased	Knee (Active): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Knee (Passive): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Ankle (Active): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Ankle (Passive): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Great Toe (Active): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased Great Toe (Passive): <input type="checkbox"/> Normal <input type="checkbox"/> Decreased
Skin Colour	Lower Leg: <input type="checkbox"/> Pale <input type="checkbox"/> Flesh tone <input type="checkbox"/> Red <input type="checkbox"/> Bluish/Purple <input type="checkbox"/> Black Foot: <input type="checkbox"/> Pale <input type="checkbox"/> Flesh tone <input type="checkbox"/> Red <input type="checkbox"/> Bluish/Purple <input type="checkbox"/> Black Toes: <input type="checkbox"/> Pale <input type="checkbox"/> Flesh tone <input type="checkbox"/> Red <input type="checkbox"/> Bluish/Purple <input type="checkbox"/> Black	Lower Leg: <input type="checkbox"/> Pale <input type="checkbox"/> Flesh tone <input type="checkbox"/> Red <input type="checkbox"/> Bluish/Purple <input type="checkbox"/> Black Foot: <input type="checkbox"/> Pale <input type="checkbox"/> Flesh tone <input type="checkbox"/> Red <input type="checkbox"/> Bluish/Purple <input type="checkbox"/> Black Toes: <input type="checkbox"/> Pale <input type="checkbox"/> Flesh tone <input type="checkbox"/> Red <input type="checkbox"/> Bluish/Purple <input type="checkbox"/> Black	Edema Location	<input type="checkbox"/> Foot <input type="checkbox"/> Up to ankle <input type="checkbox"/> Up to midcalf <input type="checkbox"/> Up to knee <input type="checkbox"/> Up to groin <input type="checkbox"/> No visible edema	<input type="checkbox"/> Foot <input type="checkbox"/> Up to ankle <input type="checkbox"/> Up to midcalf <input type="checkbox"/> Up to knee <input type="checkbox"/> Up to groin <input type="checkbox"/> No visible edema
			Severity	<input type="checkbox"/> +1 Trace 2 mm pitting <input type="checkbox"/> +2 Moderate 4 mm pitting <input type="checkbox"/> +3 Deep 6 mm pitting <input type="checkbox"/> +4 Very deep 8 mm pitting <input type="checkbox"/> Non-pitting <input type="checkbox"/> None noted	<input type="checkbox"/> +1 Trace 2 mm pitting <input type="checkbox"/> +2 Moderate 4 mm pitting <input type="checkbox"/> +3 Deep 6 mm pitting <input type="checkbox"/> +4 Very deep 8 mm pitting <input type="checkbox"/> Non-pitting <input type="checkbox"/> None noted
			Sleep Position		
Skin Warmth	Lower Leg: <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold Foot: <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold Toes: <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold	Lower Leg: <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold Foot: <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold Toes: <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold	Circumference Measurements	10 cm up from heel: ____ cm 30 cm up from heel: ____ cm	10 cm up from heel: ____ cm 30 cm up from heel: ____ cm
			Skin Assessment	<input type="checkbox"/> Dry/flaky <input type="checkbox"/> Itchy <input type="checkbox"/> Rash present <input type="checkbox"/> Fragile <input type="checkbox"/> Weepy <input type="checkbox"/> Shiny <input type="checkbox"/> Hairless <input type="checkbox"/> Mottled <input type="checkbox"/> Moist/waxy <input type="checkbox"/> Inflammation <input type="checkbox"/> Healed wound/scar <input type="checkbox"/> Blister(s) present <input type="checkbox"/> Wound(s) present <input type="checkbox"/> None of the above	<input type="checkbox"/> Dry/flaky <input type="checkbox"/> Itchy <input type="checkbox"/> Rash present <input type="checkbox"/> Fragile <input type="checkbox"/> Weepy <input type="checkbox"/> Shiny <input type="checkbox"/> Hairless <input type="checkbox"/> Mottled <input type="checkbox"/> Moist/waxy <input type="checkbox"/> Inflammation <input type="checkbox"/> Healed wound/scar <input type="checkbox"/> Blister(s) present <input type="checkbox"/> Wound(s) present <input type="checkbox"/> None of the above
Circulation Pulses by Palpation	Dorsalis Pedis: <input type="checkbox"/> Present <input type="checkbox"/> Diminished <input type="checkbox"/> Not palpable Posterior Tibial: <input type="checkbox"/> Present <input type="checkbox"/> Diminished <input type="checkbox"/> Not palpable	Dorsalis Pedis: <input type="checkbox"/> Present <input type="checkbox"/> Diminished <input type="checkbox"/> Not palpable Posterior Tibial: <input type="checkbox"/> Present <input type="checkbox"/> Diminished <input type="checkbox"/> Not palpable	Sensation Assessment	<input type="checkbox"/> Numbness <input type="checkbox"/> Burning <input type="checkbox"/> Tingling <input type="checkbox"/> Crawling <input type="checkbox"/> Intermittent <input type="checkbox"/> Continuous <input type="checkbox"/> None of the above	<input type="checkbox"/> Numbness <input type="checkbox"/> Burning <input type="checkbox"/> Tingling <input type="checkbox"/> Crawling <input type="checkbox"/> Intermittent <input type="checkbox"/> Continuous <input type="checkbox"/> None of the above
Capillary Refill	3 seconds or less <input type="checkbox"/> Yes <input type="checkbox"/> No	3 seconds or less <input type="checkbox"/> Yes <input type="checkbox"/> No	Pain Assessment	<input type="checkbox"/> Ache <input type="checkbox"/> Knife-like <input type="checkbox"/> Intermittent <input type="checkbox"/> Continuous <input type="checkbox"/> Non-verbal response <input type="checkbox"/> No pain	<input type="checkbox"/> Ache <input type="checkbox"/> Knife-like <input type="checkbox"/> Intermittent <input type="checkbox"/> Continuous <input type="checkbox"/> Non-verbal response <input type="checkbox"/> No pain
Comments		<input type="checkbox"/> See Progress Notes			

Date (dd/mm/yyyy)	Time	Signature	Printed Name
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ADVANCED LOWER LIMB ASSESSMENT FLOW SHEET

Client Name _____

DOB _____

PHN _____

Or addressograph / label _____

Parameter	Right Lower Limb	Left Lower Limb	Parameter	Right Lower Limb	Left Lower Limb	
Doppler: Dorsal Pedis	<input type="checkbox"/> Present <input type="checkbox"/> Diminished <input type="checkbox"/> Not audible <input type="checkbox"/> Triphasic <input type="checkbox"/> Biphasic <input type="checkbox"/> Monophasic	<input type="checkbox"/> Present <input type="checkbox"/> Diminished <input type="checkbox"/> Not audible <input type="checkbox"/> Triphasic <input type="checkbox"/> Biphasic <input type="checkbox"/> Monophasic	Foot Assessment	<input type="checkbox"/> Bunion(s) <input type="checkbox"/> Callus(s) <input type="checkbox"/> Corn(s) <input type="checkbox"/> Planter's wart(s) <input type="checkbox"/> Dropped metatarsal head(s) <input type="checkbox"/> Hammertoe(s) <input type="checkbox"/> Crossed toes <input type="checkbox"/> Fissures <input type="checkbox"/> Cracks between toes <input type="checkbox"/> Abnormal skin dryness <input type="checkbox"/> Acute Charcot presentation <input type="checkbox"/> Chronic Charcot presentation <input type="checkbox"/> None of the above	<input type="checkbox"/> Bunion(s) <input type="checkbox"/> Callus(s) <input type="checkbox"/> Corn(s) <input type="checkbox"/> Planter's wart(s) <input type="checkbox"/> Dropped metatarsal head(s) <input type="checkbox"/> Hammertoe(s) <input type="checkbox"/> Crossed toes <input type="checkbox"/> Fissures <input type="checkbox"/> Cracks between toes <input type="checkbox"/> Abnormal skin dryness <input type="checkbox"/> Acute Charcot presentation <input type="checkbox"/> Chronic Charcot presentation <input type="checkbox"/> None of the above	
Doppler: Posterior Tibial	<input type="checkbox"/> Present <input type="checkbox"/> Diminished <input type="checkbox"/> Not audible <input type="checkbox"/> Triphasic <input type="checkbox"/> Biphasic <input type="checkbox"/> Monophasic	<input type="checkbox"/> Present <input type="checkbox"/> Diminished <input type="checkbox"/> Not audible <input type="checkbox"/> Triphasic <input type="checkbox"/> Biphasic <input type="checkbox"/> Monophasic		Toe Nail Assessment	<input type="checkbox"/> Incorrect length—short <input type="checkbox"/> Incorrect length—long <input type="checkbox"/> Ingrown <input type="checkbox"/> Involved <input type="checkbox"/> Thickened <input type="checkbox"/> Ram's Horn formation <input type="checkbox"/> Discoloured <input type="checkbox"/> Thin <input type="checkbox"/> Ridged <input type="checkbox"/> Brittle <input type="checkbox"/> Fungal infection <input type="checkbox"/> None of the above	<input type="checkbox"/> Incorrect length—short <input type="checkbox"/> Incorrect length—long <input type="checkbox"/> Ingrown <input type="checkbox"/> Involved <input type="checkbox"/> Thickened <input type="checkbox"/> Ram's Horn formation <input type="checkbox"/> Discoloured <input type="checkbox"/> Thin <input type="checkbox"/> Ridged <input type="checkbox"/> Brittle <input type="checkbox"/> Fungal infection <input type="checkbox"/> None of the above
Ankle Brachial Index	Dorsal Pedis Pressure _____ Posterior Tibial Pressure _____ Brachial Pressure _____ Peroneal Pressure _____ ABI Score _____ <input type="checkbox"/> Unable to compress arteries	Dorsal Pedis Pressure _____ Posterior Tibial Pressure _____ Brachial Pressure _____ Peroneal Pressure _____ ABI Score _____ <input type="checkbox"/> Unable to compress arteries			Skin Assessment – Advanced (see Basic Assessment: Skin for additional information)	<input type="checkbox"/> Blanching on elevation <input type="checkbox"/> Dependent rubor <input type="checkbox"/> Hemosiderin staining <input type="checkbox"/> Woody fibrosis <input type="checkbox"/> Venous dermatitis <input type="checkbox"/> Atrophie blanche <input type="checkbox"/> Contact dermatitis/pruritis <input type="checkbox"/> Ankle flare <input type="checkbox"/> Varicosities <input type="checkbox"/> Hyperkeratosis <input type="checkbox"/> Papillomatosis <input type="checkbox"/> None of the above
Toe Brachial Pressure Index	Toe Pressure: _____ Brachial Pressure: _____ TBI Score: _____	Toe Pressure: _____ Brachial Pressure: _____ TBI Score: _____	Pain Assessment – Advanced (see Basic Assessment: Pain for additional information)	<input type="checkbox"/> With deep palpation <input type="checkbox"/> Relieved with elevation <input type="checkbox"/> Relieved with rest <input type="checkbox"/> Relieved with dependent position <input type="checkbox"/> Intermittent claudication <input type="checkbox"/> Pain at night <input type="checkbox"/> No pain		<input type="checkbox"/> With deep palpation <input type="checkbox"/> Relieved with elevation <input type="checkbox"/> Relieved with rest <input type="checkbox"/> Relieved with dependent position <input type="checkbox"/> Intermittent claudication <input type="checkbox"/> Pain at night <input type="checkbox"/> No pain
Monofilament Testing	<input type="checkbox"/> 1st Digit <input type="checkbox"/> 3rd Digit <input type="checkbox"/> 5th Digit <input type="checkbox"/> 1st MTH <input type="checkbox"/> 3rd MTH <input type="checkbox"/> 5th MTH <input type="checkbox"/> Medial <input type="checkbox"/> Lateral <input type="checkbox"/> Heel <input type="checkbox"/> Dorsum _____ / _____ Score	<input type="checkbox"/> 1st Digit <input type="checkbox"/> 3rd Digit <input type="checkbox"/> 5th Digit <input type="checkbox"/> 1st MTH <input type="checkbox"/> 3rd MTH <input type="checkbox"/> 5th MTH <input type="checkbox"/> Medial <input type="checkbox"/> Lateral <input type="checkbox"/> Heel <input type="checkbox"/> Dorsum _____ / _____ Score		Comments	<input type="checkbox"/> See Progress Notes	
Positive Stemmer's Sign	Present: <input type="checkbox"/> Yes <input type="checkbox"/> No	Present: <input type="checkbox"/> Yes <input type="checkbox"/> No				
Limb Shape	<input type="checkbox"/> Champagne-bottle shaped leg <input type="checkbox"/> Wasted calf muscle <input type="checkbox"/> None of the above	<input type="checkbox"/> Champagne-bottle shaped leg <input type="checkbox"/> Wasted calf muscle <input type="checkbox"/> None of the above				

Date (dd/mm/yyyy)	Time	Signature	Printed Name
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(Insite & Onsite, 2014)

Appendix D

Management of Skin and Soft Tissue Infection (SSTIs) Algorithm

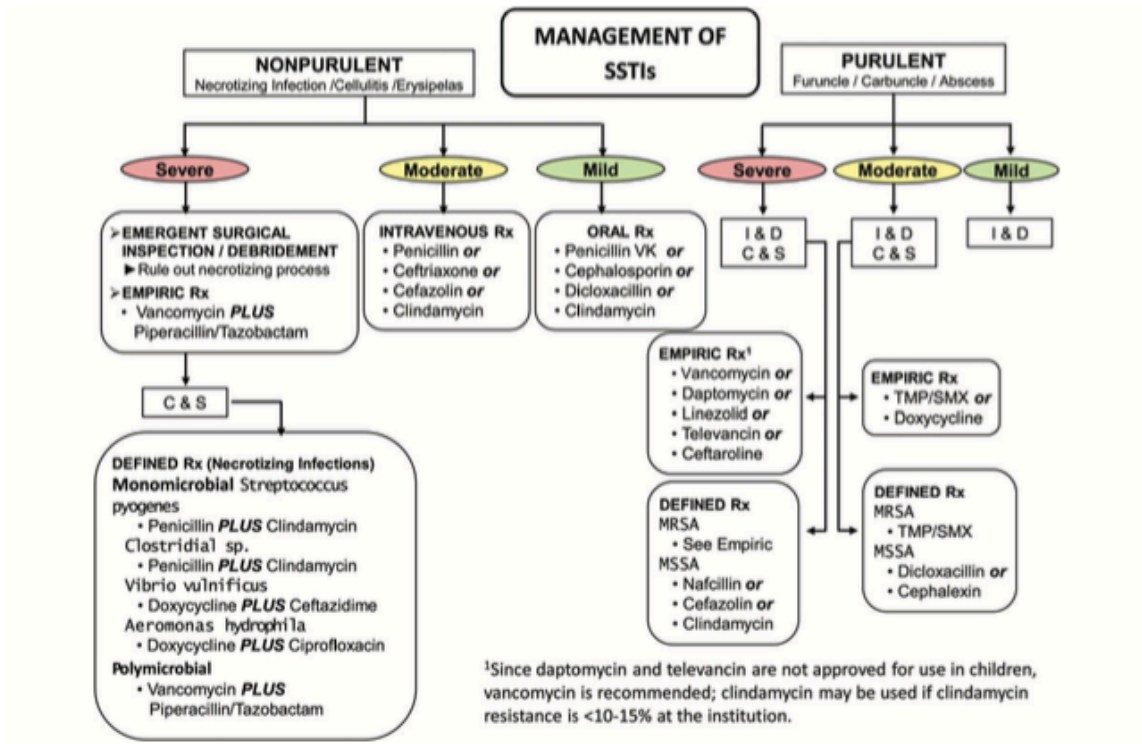


Figure 1. Purulent skin and soft tissue infections (SSTIs). Mild infection: for purulent SSTI, incision and drainage is indicated. Moderate infection: patients with purulent infection with systemic signs of infection. Severe infection: patients who have failed incision and drainage plus oral antibiotics or those with systemic signs of infection such as temperature >38°C, tachycardia (heart rate >90 beats per minute), tachypnea (respiratory rate >24 breaths per minute) or abnormal white blood cell count (<12 000 or <400 cells/μL), or immunocompromised patients. Nonpurulent SSTIs. Mild infection: typical cellulitis/erysipelas with no focus of purulence. Moderate infection: typical cellulitis/erysipelas with systemic signs of infection. Severe infection: patients who have failed oral antibiotic treatment or those with systemic signs of infection (as defined above under purulent infection), or those who are immunocompromised, or those with clinical signs of deeper infection such as bullae, skin sloughing, hypotension, or evidence of organ dysfunction. Two newer agents, tedizolid and dalbavancin, are also effective agents in SSTIs, including those caused by methicillin-resistant *Staphylococcus aureus*, and may be approved for this indication by June 2014. Abbreviations: C & S, culture and sensitivity; I & D, incision and drainage; MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin-susceptible *Staphylococcus aureus*; Rx, treatment; TMP/SMX, trimethoprim-sulfamethoxazole.

(Stevens et al., 2014)

Appendix E

The CHOW Project SOAP note template for client encounter documentation



CHOW Project- Community-Based Wound Care

Patient Name: _____

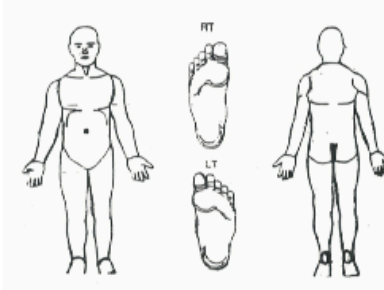
CHOW Participant ID: _____

DOB: [MM/DD/YYYY] _____

Allergies: _____

ONSET:

LOCATION:



DURATION:

CHARACTERISTICS:

(i.e. of pain)

AGGRAVATING/ALLEVIATING FACTORS:

(i.e. treatments tried)

FOCUSED PHYSICAL EXAM:

[*Measurement] (Additional elements to consider: odor, S/S of infection, tunneling, undermining, type of wound & stage)

ASSESSMENT/PLAN:

1. Clinical picture indicates:

Appendix F

Client education card

How to treat and care for your wounds

Wash your hands before you touch any wounds.

For a wound with no open skin, that is red, swollen and tender:
Keep clean, apply warm compress, and keep covered with bandage.

For a wound with open skin, that is draining fluid, and you do not have fever, chills or fatigue:
Keep clean and dry. Apply antibiotic ointment and change dressings daily or when dressing becomes wet.

For a wound that causes severe pain or has a foul smell and you have fever, chills and fatigue:
Seek medical attention. Wound requires immediate treatment and use of antibiotics.

DO NOT drain your own wounds because it increases your risk of infection.

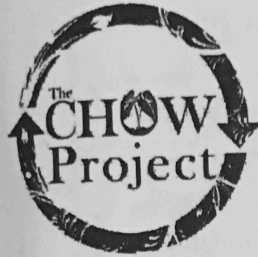
DO NOT use antibiotics without a prescription. This can lead to antibiotic resistance.

**Call us to get help to treat your wounds.
(808) 683-5484**



Wound care is available at the CHOW van on Tuesdays, 9am - Noon.

www.chowproject.org



BASIC WOUND CARE

Managing and treating your wounds is important to your overall health. The CHOW Project wants to help you prevent wounds, understand the types of wounds that can occur, and how to properly take care of them.

Wound Prevention: If your skin is dirty, bacteria can enter the skin through the tip of the needle. To help prevent this you should:

- Wash your hands
- Clean the injection site with water and soap OR alcohol wipes
- Inject with a clean unused needle
- Try not to use the same injection site multiple times

Common skin infections related to intravenous drug use include cellulitis, ulcers, and abscesses. Your wounds should be identified by a healthcare professional to make sure you get proper treatment.



Cellulitis



Abscess



CHOW CONTACT:

Hilo/Kona: 895-1719 / 756-0999

Kauai: 651-7213

Oahu: 285-4265 / 286-2852

Maui: 264-1982

This is distributed with the understanding that The CHOW Project is not engaged in rendering medical, legal, or other professional services.

Appendix G

CHOW Community-Based Wound Care Program Logic Model

A logic model has been developed as a visual aid in indicating the activities and resources that are required in order to produce outputs and outcomes that can be evaluated to assess impact and effectiveness of the evidence-based practice change.

Program: Community-based wound care in partnership with Hawaii State syringe exchange program (SEP) CHOW Project.

Goal: Provide basic wound care to injection drug users (IDUs) in the community, reduce emergency department (ED) overutilization, and reduce associated cost of frequent ED use.

Inputs (What we invest)	Outputs (What we do and who we do it to.)		Outcomes – Impact (The incremental events/changes that occur as a result of the outputs)		
	Activities	Participation	Short	Medium	Long
Time/Provider's time Personnel Board Members Money (Approx. \$5,000) Physical Space: meeting rooms/ clinic Equipment: tables, chairs, cell phones, computers. Supplies: wound care items like- gauze, saline, antibiotic ointment, tape/ Band-Aids etc.	Team Meetings CHOW board member meetings Educational guidelines/algorithm development Trainings Engage community hospitals/CHCs/ Homeless shelters Marketing, Outreach Purchasing equipment/supplies Service delivery-Clinic days/times Evaluation	Volunteers- nursing students, social worker students Providers- Physicians, Nurse Practitioners, Nurses Community Workers- Social workers/ outreach workers CHOW SEP Clients Community members- Queens/QEC, VA, JABSOM Kuakini, CHCs-CAV/KP, & IHS Legislation- Health Committee	Within 1 month utilize evidence-based wound care algorithms that the CHOW wound care providers will use from 90%-100% of the time to assess and treat CHOW participants with wounds. Increased access to wound care for CHOW participants Increase awareness within 3 months about CHOW's community-based wound care program from 50%-90% of participant's knowing about CHOW services offered. Within 2 months increase education among CHOW participants with wounds, to recognize signs and symptoms of infection and when to seek care 60%-70% of the time. Increase community support and interaction for donors/ funding within 6 months. Increase client and community partner satisfaction with the community-based wound care program.	Within 9 months increase the number of CHOW participants seen from 25% to 50%. Decrease the percentage of CHOW participants with wounds who seek the emergency department for wound care by 10%-15% within 9 months. Decrease the cost associated with frequent ED use by 50% due to CHOW clients seeking wound care in the community within 2 years. Increase funds to sustain the CHOW community-based wound care program from \$5,000 to \$10,000 within 6 months.	Fewer CHOW participants will have wound care needs related to injection drug use. Decrease spending on wound management; by demonstrating ROI for community based wound care programs. Increase sustained funding from State/Federal sources.

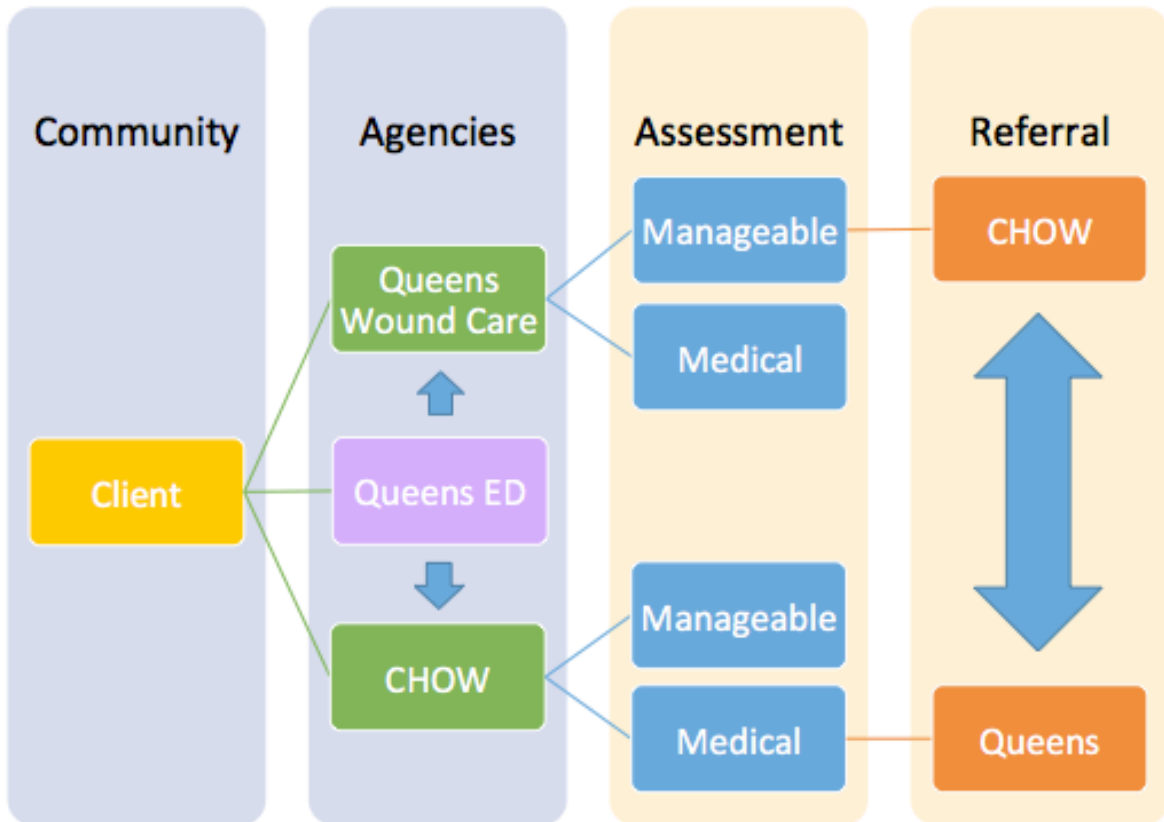
Assumptions: Assuming wound care for IDU is necessary in the community. The CHOW Board supports the concept of a wound clinic. Assumin clients will seek community-based wound care from CHOW. Assumes community stakeholders are willing to partner with CHOW to increase wound care managed in the community. Assumes state will continue to contract with CHOW for SEP.

External Factors: Local and national events that impact IDU trends. Shifts in political leadership at the state/federal level.

Appendix H

Workflow Diagram and Process

Wound Care and Referral Workflow
Collaborative Project between the CHOW Project and Queens Hospital
Updated 7/18/16



1. Client Eligibility

- a. Persons who access wound care services in Downtown/Chinatown
 - i. CHOW clients (w Participant Card)
 - ii. Persons who inject drugs
 - iii. Others referred from Queens

2. Assess and Refer

- a. To Queens Wound Care Clinic
 - i. Assess client, provide basic care, and refer as clinically indicated for conditions that require more extensive evaluation and treatment.
 - ii. Call front desk and/or other points of contact.
 - iii. Complete and submit referral form *for insured clients only*. Queens ED will utilize electronic form. **[See attachment.]**
 - iv. Attach updated medical records (either hard copy or EPIC).
- b. To CHOW
 - i. Assess client, provide care, and refer when conditions may be managed in community-based setting.
 - ii. Call Christina Wang/CHOW to provide patient referral.
 - iii. Complete and submit referral form. **[See attachment.]**
 - iv. Attach updated medical records (either hard copy or EPIC).
 - v. CHOW outreach workers will look for patient to connect to wound care services.

Points of contact	
Queens Wound Care Center (808) 691-5496	
Dr. Ajay Bhatt, Dr. Michael Shinn, Patricia Slachta, APRN	
The CHOW Project	
Christina Wang	(808) 683-5484 (main) (703) 894-8842 (cell)
Outreach	(808) 853-3292
Heather Lusk	(808) 853-3271
Queens Emergency Department	
Social Work	(808) 691-5849
Nurse Case Manager	(808) 691-5502
Other	
Thaddeus Pham (DOH)	(808) 551-1917 (cell)
Mimi Harris (Queens)	(808) 691-4422
Mailing address (for dressing supplies)	
The CHOW Project 677 Ala Moana Boulevard, Suite 226 Honolulu, HI 96813	