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Foot Infections in the Veterans Health Administration

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BACKGROUND: Foot infections represent a major health concern in the Veterans Health Administration as they often may lead to limb loss. A majority of these infections are associated with diabetes in the form of diabetic foot ulcers. The diabetic foot infection is associated with a substantial mortality rate and often requires amputation to fully address the nidus of infection.
METHODS: A retrospective chart analysis of all surgeries to treat foot infections in an 18-month period was conducted. Multiple variables- patient location, preventative primary care diabetic foot screenings, routine follow-up by a foot-care specialist, and pre-operative hospital admission- were reviewed and recorded. The data was analyzed using a one-tailed z-test and chi-squared tests. The one-tailed z-test provided a facility-specific data analysis highlighting areas which may benefit from education or assistance in terms of resource allocation. The chi-squared tests reveal generalizable findings regarding the association among primary care diabetic foot screenings, routine follow-up by a foot-care specialist, and the need for pre-operative admission.
RESULTS: Results show an absence of routine follow-up by a foot-care specialist is associated with a statistically higher rate of patients requiring pre-operative admission. Conversely, those patients with routine follow-up required fewer admissions. Though not significant at conventional levels, a higher percentage of patients without the primary care diabetic foot exams also lacked specialty follow-up and necessitated pre-operative hospital admission when compared to patients with the screenings.
CONCLUSION: This study provides an example of methodology reviewing pedal infection-related surgical data to perform effective limb loss prevention in the VHA setting. The generalizable results elucidate the role of the primary care and foot-care specialists in preventative medicine thereby avoiding a hospital admission. The current study suggests that a close, collaborative, patient-centered approach between primary care and podiatry results in better outcomes for patients.

Key words infection, ulcer, diabetic foot, veteran, amputation

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Foot infections are a major health issue in the Veterans Health Administration as they often jeopardize limb preservation and shorten the patient's lifespan. A majority of these infections are associated with diabetes in the form of diabetic foot ulcers (DFU). The excessively high 5-year mortality rate associated with patients with diabetic ulcers reaches upwards of 55% [1]. With chronicity, the DFU transitions to bone infection. A festering osteomyelitis further propagates the pedal nidus of infection resulting in a statistically higher rate of fatal sys-

temic disease such as heart attack or stroke [2,3,4]. Consequently, 45% of all patients with a diabetic ulcer require surgery, often times a pedal amputation, to address the nidus of infection and reach resolution of symptoms [5]. Effective preventative care can maximize limb preservation and improve life expectancy.

As the single largest health care system in the United States, the Veterans Health Administration (VHA) is working to meet the complex needs of this dramatically increasing pathology [6]. Primary care providers, podiatric surgeons, general surgeons, vascular surgeons, infectious disease physicians, and wound care nurses are integrated in the treatment of the diabetic foot infection. In the enormity of the VHA system, providers can be oblivious to the amputation-related statistics that may improve patient outcomes. A facility-specific assessment allows providers to better understand the events leading up to the amputation and prevent long-term loss of follow-up. Such evidence can inform future strategies to effect better prevention and management of the DFU pathology. The aim of this study is two-fold: 1) to provide an example of a retrospective statistical analysis assessing facility-specific data regarding preventative care and patient outcomes for the benefit of other VHA facilities and 2) to understand the associations among preventative primary care diabetic (PC DM) foot exams, routine follow-up by a foot-care specialist, and pre-operative hospital admission in the VHA setting.

Methods

A retrospective analysis of all surgeries to address pedal ulceration infections between January 1, 2013 and June 30, 2014 were analyzed using one-tailed z-tests and chi-squared tests. The following data was collected for each infection-related pedal surgery: chronological surgery number, chronological patient number, location following the patient, whether a preventative PC DM foot exam was performed, whether the patient's condition required pre-operative hospital admission, if so the date of admission and the reason necessitating admission, dates of podiatric/surgical/wound care follow-ups the patient had prior to admission or surgery (in the case of no admission), whether the patient was routinely followed or not followed by a foot-care specialist prior to surgery, the date of surgery, and an update regarding the patient's condition. Patients who went on to have further limb amputation or endured further complication related to the pedal infection were classified as "poor prognosis." On the contrary, patients who healed the surgical sites were classified as "healed surgical site." A description of the data collected is detailed and summarized in Table 1 (see attached supplement). Table 1 was analyzed using both one-tailed z-tests (Table 2) to understand facility-specific trends and chi-squared tests (Table 3-5) to examine the association between PC DM foot screenings, routine follow-up by a foot-care specialist, and pre-operative hospital admissions.

The locations from which the patient was referred included the main medical center: Wilmington, surrounding community based outpatient clinics (CBOC) A, B, C, and D, and a nursing home: Community Living Center (CLC). The CBOC facility location was withheld for this publication. Some patients were also referred from the neighboring Coatesville VA medical center. Patient follow-up data was not readily available from this facility, leading to the exclusion of patients originating from this location from the analysis. The variables (PC DM foot screening, specialty follow-up, admission, and surgery) measured in each facility were compared against each location's outpatient population share as the base value (Table 2). Additional analysis was also performed to test for dependencies between the variables: preventative PC DM foot exams, specialty follow-up prior to surgery, and pre-operative hospital admissions (Tables 3-5).

The PC DM foot exam is a clinical reminder to be completed by the primary care provider as required by "VA/DoD Clinical Practice Guidelines for the Management of Diabetes Mellitus in Primary Care" [7]. This reminder ensures that DFU prevention is performed in the primary care sector. This alert is only activated at the anniversary of the patient's last exam. The alert remains active until the test is performed by the provider at which point the test is de-activated for another calendar year. If the PC DM foot exam was either not performed or performed within a week of admission or surgery, the exam was considered non-preventative as it served no preventative use once the patient required surgical intervention.

	Population	Surgeries	Missing PC DM foot exam	Admitted	Followed by foot care specialist
Wilmington ↓	67.9% (24483)	**48% (24) p=.0013**	**47.6% (10) p=.0232**	**36.1% (13) p=.0000**	53.6% (15) p=.0525
CBOC A ↑	7.8% (2795)	**16% (8) P=.0153**	**28.6% (6) p=.0002**	**19.4% (7) p=.0047**	10.7% (3) p=.2836
CBOC B	6.9% (2498)	2% (1) p=.0858	0% (0) p=.1061	2.8% (1) p=.1600	0% (0) p=.0749
CBOC C ↑	9.0% (3241)	14% (7) p=.1083	19.1% (4) p=.0529	**19.4% (7) p=.0146**	**21.4% (6) p=.0109**
CBOC D	8.2% (2939)	10% (5) p=.3214	4.8% (1) p=.2851	8.3% (3) p=.4913	7.1% (2) p=.4160
CLC ↑	0.03% (101)	**10% (5) p=.0000**	0% (0) p=.4684	**13.8% (5) p=.0000**	**7.1% (2) p=.0000**
Total	100% (36057)	100% (50)	100% (21)	100% (36)	100% (28)

Table 2 One-tailed test comparing the variables measured in each location. Statistical significant findings are in bold. Down-arrow: Findings are statistically lower than expected. Up-arrow: Findings are statistically higher than expected.

	Not Admitted	Admitted	Total
Not followed by foot care specialist	9.1% (2)	90.9% (20)	100% (22)
Followed by foot care specialist	42.9% (12)	57.1% (16)	100% (28)
Total	28.0% (14)	72.0% (36)	100% (50)

Table 3 X2 = 9.9676, p = 0.008. A statistically significant relationship was found between patients who were not followed by a foot-care specialist and those who were admitted.

The specialty follow-up dates, (as listed in column 5 in Table 1), dictated if the patient was adequately followed by a foot-care specialist (as noted in the adjacent column, column 6). By recording the patients' last 3 podiatry, surgery, or wound care visits, the investigators were able to assess if the patient had regular follow-ups prior to surgery. At these visits, all components of the diabetic foot exam were assessed. ADA guidelines suggest that a high-risk patient with a history of amputation or ulceration be seen by a specialist every 1-2 months [8]. To give the patients and providers some leeway, the patient was considered "not followed" if he/she was not seen within 3 months preceding admission or surgery.

	Not Followed by foot care specialist	Followed by foot care specialist	Total
PC DM foot exam	36.0% (9)	64.0% (16)	100% (25)
No PC DM foot exam	57.1% (12)	42.9% (9)	100% (21)
Total	45.7% (21)	54.4% (25)	100% (46)

Table 4 X2 = 2.0563, p=0.152. No statistically significant association was found between patients who did not have a PC DM foot screening and those who were not followed by a foot-care specialist. However a higher percentage of patients who had a PC DM foot exam were also followed by a foot-care specialist. The converse also held true.

	Not Admitted	Admitted	Total
PC DM foot exam	38.5% (10)	61.5% (16)	100% (26)
No PC DM foot exam	21.7% (5)	78.3% (18)	100% (23)
Total	30.0% (15)	70.0% (34)	100% (50)

Table 5 X2 = 1.6067, p=0.205. No statistically significant association was found between patients who did not have a PC DM foot screening and those who were admitted. However a higher percentage of patients with no PC DM foot exam were admitted compared to patients with a PC DM foot exam. Similarly, most of the patients who were not admitted had a prior PC DM foot screening.

Results

Over the 18-month period, 53 surgeries were performed to treat foot infections on 44 patients. Of these surgeries, 92% were amputations (n=49). Fifty-six percent of the surgeries (n=30) required pre-operative admission. Of the admissions, 95.8% occurred secondary to a foot infection. Only 3.7% of the surgeries were performed on non-diabetic patients (n=2). Forty-four percent of the surgeries were performed on patients who were not followed regularly (<3 months). As a result of foot infection, 7.5% of the pedal surgeries (n=4) were associated with further limb amputation. Five of the surgeries were classified as "poor prognosis", i.e. the patient was expected to or did lose limb or life and was associated with an unresolved pedal infection. One of these patients, healed the surgical site but subsequently developed severe hypotension, multiple bodily pressure lesions, and died from septic shock.

The one-tailed z-test was used to identify patterns within the variables that were disproportionate to that facility's population share. For example, a CBOC serving 15% of the population would be expected to account for 15% of the performed surgeries. This location-specific analysis demonstrates significantly fewer infection-related pedal surgeries, missing PC DM foot exams, and pre-operative admissions out of the Wilmington facility than would be expected relative to its population share alone (table 1). In contrast, CBOC A has a significantly higher rate of surgeries, missing PC DM foot exams, and admissions than its population share would suggest. CBOC C also has more admissions than would be expected, but the number of surgeries and missing PC DM foot exams are not overly disproportionate to its popula-

tion. Additionally, a higher than expected number of patients were regularly followed in CBOC C prior to surgery. As expected with the typical nursing home population, the CLC has a higher rate of surgery, specialty follow-up, pre-operative admissions, and poor prognosis (60%). No significant findings were noted in CBOC B and D.

Although the above results are idiosyncratic to the Wilmington medical center and surrounding CBOCs, patterns identified in the aggregate data are generalizable to other VHA systems. Chi-squared tests were used to assess bivariate statistical dependencies in which the presence or absence of one factor influences the rate with which another factor occurs. Analysis confirmed a significant relationship ($p=0.008$) between patients who were not followed by a foot-care specialist to those who necessitate pre-operative admission (table 2). The observed relationship suggests that high-risk patients who are not routinely followed by a foot-care specialist are more likely to require admission than those who are routinely followed. In fact, the odds of a patient without routine specialty follow-up requiring pre-operative admission is roughly 7.5 times higher than for a followed patient. No statistically significant relationship was found between patients without PC DM foot screenings and those followed ($p=0.152$) and admitted ($p=0.205$) at conventional levels (table 3, 4). However based on percentages, certain trends among these variables seem apparent. Patients without the preventative PC DM foot screenings tended to also lack follow-up by a foot-care specialist (table 3). The converse also held true. Similarly, a higher percentage of the patients without the PC DM foot exam required pre-operative hospital admission when compared to patients with the screening (Table 4).

The Wilmington facility was associated with statistically fewer infection-related pedal surgeries, fewer missing PC DM foot exams, and fewer admissions than its population share would suggest. This site had fewer adverse events preceding the patient's surgery and overall fared better in the preventative arena than its CBOC counterparts. These comparatively better outcomes coincided with the most resource-intensive location. As a result, the Wilmington facility assisted in the evaluation in slow or non-healing ulcer patients from the CBOC facilities.

The overlap between CBOC C patients who required surgery and those were admitted was 100%. Moreover, 85% of these surgeries were associated with routine follow-up prior to surgery. These clinical outcomes are suggestive of a lack of efficacy in preventative care in this location. In CBOC A, 87.5% of surgeries required pre-operative admission, which is significantly higher than would be expected based on its population share. Our solution was to request the foot-care specialists in both CBOC A and C to send all non-healing ulcers with a duration greater than 3 months to Wilmington for evaluation and possible treatment. In terms of resource allocation, funds for part-time nail technician were requested for CBOC A and C to allow the providers to focus on the higher risk patient population. Additionally, 75% of surgeries out of CBOC A did not have preventative PC DM foot evaluations in the year prior to surgery. Our remedy was to present a facility-wide educational lecture discussing these results and the importance of preventative care in the treatment of DFU.

As expected, patients residing in the CLC were associated with a higher rate of pedal surgery with subsequent limb amputation. With its census of patients who are elderly, immobilized, poorly-vascularized, non-responsive, or systemically complicated, a proper treatment addressing the nidus of infection is often not accomplished. We advised the dedicated CLC wound care nurse who performs weekly wound assessments to consult podiatric or general surgery for new wounds in a timely manner. In addition, the Wilmington wound care nurses have assisted in CLC management and prevention of ulcers.

Discussion

The current study demonstrates the value of collaboration between primary care and specialty care for the treatment of diabetic foot infections in the VHA setting. It is the first in its class to present an example of methodology reviewing pedal amputation and infection-related surgical data for limb loss prevention in the integrated VHA system. This facility-specific research focusing on the circumstances surrounding surgery was conducted to assess the efficacy of preventative measures and effect change to better patient outcomes. As it stands today, data collection and analysis for the purpose of limb preservation is not a routine occurrence in the VHA. The present study

uses the data collected to highlight areas of concern and allow implementation of minor changes to effectively manage high-risk diabetic patients. This methodology can be applied in any facility and may directly impact departmental reorganization, resource allocation, and provider or patient education. The present research is also suggestive of a collaborative relationship between of primary care and foot-care specialists in the management and mitigation of diabetic pedal infections. Prior to this study, the associations of these variables and the need for pre-operative hospital admission were not evident. Our results encourage a partnership between primary care providers and foot-care specialists, including podiatrists, general surgeons, and wound care specialists for early detection of pedal infections, thereby minimizing the need for pre-operative hospital admissions in VHA facilities.

Results indicate CBOC A was associated with a higher rate of surgical interventions for foot infections as well as a lower rate of completed preventative PC DM foot exams. One explanation suggests that fewer providers examining the diabetic foot may lead to undetected foot ulcers, propagate the infection, and result in an amputation. Previous studies have indicated that an increased number of providers examining the diabetic foot resulted in fewer infection-related surgeries [9,10]. A study originating in Sweden demonstrates a lower amputation rate in a region in which patients were referred by a variety of providers in contrast to only referrals from general practitioners, suggesting that the more providers examine the diabetic foot, the earlier infection is treated [9]. Another analysis documents the reduced rate of amputation with early detection of DFU [11]. With the addition of nail technicians, we increase the number of providers examining the diabetic foot. Along with the current study, these investigations illustrate the importance of cross-collaboration between specialties for the early detection and subsequent referral to a specialized diabetic wound care team.

Patients originating from CBOC C were routinely followed prior to surgery but nonetheless required admission prior to surgical intervention. This finding questions the efficacy of preventative treatment received in this facility and is suggestive of the need for education, resources, or further referral to a more specialized team. Similarly, CBOC A was associated with a significantly higher than expected rate of surgeries and admissions. As a hospital admission rather than an outpatient consult usually confers a more serious infection, the presumption that superficial infections are permitted to devolve into deeper more consequential infections is suggested. One plausible hypothesis to explain the higher rate of amputations is that care may not be adequately appropriated for the higher risk patients. Often times, VA podiatric providers are inundated with the lower risk routine nail patients leaving limited resources available for the higher risk patients with ulcers. The American Diabetes Association task force recommends that high-risk patients (history of ulceration/amputation) be evaluated by a foot-care specialist every 1-2 months, whereas low risk diabetic patients may be evaluated annually by a primary care provider or specialist when necessary [8,12-14]. The addition of a nail technician in CBOC A and C could offload the low-risk patients allowing the providers to focus on the patients at a higher risk for amputation. Moreover, the request for the CBOC facilities to refer their long-standing DFU (> 3months) to the Wilmington facility benefits the CBOC patients. With the Wilmington facility having statistically lower rates of infection-related surgeries and admissions, the patients in the lesser performing facilities are likely to have more positive clinical outcomes with an earlier referral.

The purpose of the study was not necessarily to avoid pedal amputation but to maintain optimal compliance in the events preceding the surgery. Many providers have associated the word "amputation" with a negative connotation as in the case of "amputation prevention." However evidence-based medicine suggests that patients who avoid amputation and live with chronic osteomyelitis generate a chronic inflammatory response by triggering vascular atherosclerosis [3,15]. A population-based study in a cohort of 23 million studied the relationship between chronic osteomyelitis and coronary heart disease [15]. Once the researchers controlled for age, gender, hypertension, diabetes, hyperlipidemia, and stroke between the control and chronic osteomyelitis cohorts, they found a significantly elevated risk of heart disease- a 95% increase- as compared to the control population [15]. Similar findings were supported in a meta-analysis study evaluating the association of the DFU and cardiovascular mortality [3]. Results showed a substantially increased risk of all-cause mortality, fatal myocardial infarction, and fatal stroke in patients with DFU [3]. These stud-

ies are among the growing number of studies that support a timely resolution of the DFU thereby preventing limb loss and increasing life expectancy [3,15-20]. The 30-day mortality rate, cardiovascular outcomes, and pulmonary events associated with a pedal amputation is substantially lower (4x) than below-knee or above knee amputations [17-20]. The goal is not simply to avoid amputation but to recognize the time-sensitivity of reaching a permanent resolution, thereby broadening our perspective to prioritize limb and life preservation.

Results derived from the full dataset suggest that the more high risk patients are followed by foot-care specialists, the less likely the infection will progress to a degree that necessitates admission (table 2). On the patient-level, routine follow-up generally translates to earlier detection of infection or vascular impairment, fewer systemic complications, and lower potential for nosocomial infections. From the facility standpoint, a substantial financial and economic burden can be obviated for each avoidable hospitalization. Studies show that on average each hospital admission for a pedal amputation costs the facility is approximately $32,000 [21]. This confirms the role of foot-care specialists in the treatment of diabetic foot infection and limb loss prevention as documented in previous studies [22,23]. The present study also demonstrates a positive trend between PC DM foot screenings and follow-up by a foot-care specialist in the VHA setting (table 3). Thus the domino effect between the absence of PC DM foot screening and patients necessitating pre-operative admission is evident. The direct impact of fewer PC DM foot screenings and a higher rate of admission follows a negative trend, though not statistically significant at a conventional level (table 4). The current study, specific to the VHA system, is among the increasing evidence supporting the interdepartmental collaboration to improve patient outcomes and reduce complications [23-25].

Limitations to this study are inherent to any retrospective analysis in that all variables cannot be examined. Regarding the one-tailed z-test, extraneous variables such a provider methodology, patient non-compliance, reason for lacking specialty follow-up, or location-specific resources such as casts, grafts, or personnel assistance were not assessed. However, these extrinsic factors do not diminish current results highlighting areas that may benefit from assistance or modification. This study provides perspective in regards to the number of surgeries rather than the number of patients. Therefore, some patients had repeat infection-related surgeries; this variable was not assessed. In regards to the chi-squared tests, the variables studied (specialty follow-up, PC DM foot assessments, and pre-operative admission) are generalizable among the VHA facilities nationwide. However, small sample size biases against statistically significant results. For example, the findings regarding PC DM foot screenings and specialty follow-up or admissions are likely to be significant by conventional standards with a larger sample following the current trends. Future research specific to the treatment of pedal infections or DFU may help determine which strategies and wound therapies will improve amputation prevention in this high-risk population. We encourage all VHA facilities to retrospectively assess the variables affecting patient outcomes and study the associations between these variables to better patient outcomes.

In summary, by focusing on the situations surrounding the surgical treatment of pedal infections or amputation, each facility is able to perform self-assessments to improve patient care. We believe that only with a self-investigative approach can limb preservation be legitimately pursued. By assessing relevant variables we demonstrate the value of foot-care specialists and primary care providers in the treatment of diabetic foot infections in a VHA facility. This patient-centered approach facilitates earlier detection of infection, mitigates systemic complications, decreases the economic burden to the facility, and ultimately minimizes limb loss. With interdepartmental collaboration, we are able to prioritize limb preservation for veterans who have already sacrificed so much.

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Surgery #	Patient #	Location	PC DM Foot exam	Specialty Follow-up appointments	Follow/ Not followed	Admission Date CC:	Surgery Date	Surgery	Update: Healed/ poor prognosis (Poor prognosis underlined)
1	1	Wilmington	yes	11/26/12 12/7/12 12/21/12	F	No admit	1/23/13	R Partial hallux amputation	Healed surgical site
2	2	Wilmington	N/A	11/21/12 11/30/12 12/7/12	F	A: 1/22/13 Foot inf	1/24/13	R Transmetatarsal amputation	Healed surgical site- died from metastatic cancer
3	3	CBOC A	yes	5/27/10	N	A: 1/24/13 Foot inf	1/25/13	R Incision and drainage with debridement	Healed surgical site- discharged to CBOC
4	4	CBOC C	yes	10/23/12 12/18/12 1/15/13	F	A: 1/28/13 Foot inf	1/28/13	R 4th digit amputation	Healed surgical site- discharged to CBOC
5	5	Wilmington	yes	8/14/12	N	A: 1/28/13 Foot inf	1/29/13	R Partial 1st ray amputation	R BKA
6	6	Wilmington	no	10/22/12 11/22/12 12/31/12	F	A: 1/28/13 Foot inf	1/30/13	L Transmetatarsal amputation	Healed surgical site
7	7	CBOC C	no	6/20/12 11/13/12 12/4/12	N	A: 1/23/13 Foot inf	2/1/13	R Hallux amputation	Healed surgical site- discharged to CBOC
8	8	Coatesville	yes	N/A	N/A	A: 1/31/13 Foot inf	2/4/13	R Hallux amputation	Healed surgical site- discharged to back to Coatesville VA
9	9	Wilmington	no	10/24/12 1/2/13 1/30/13	N	No admit	2/4/13	L 3rd digit amputation	Healed surgical site
10	10	CLC	yes	6/21/12 10/2/12 12/21/12	N	A: 2/22/13 Foot inf	2/25/13	R partial 5th ray amputation	Healed surgical site
11	1	Wilmington	no	2/8/13 2/12/13 2/19/13	F	A: 2/21/13 Foot inf	3/6/13	R Hallux amputation	Healed surgical site
12	11	CBOC A	yes	2/14/13 2/28/13 3/20/13	F	No admit	4/8/13	L Transmetatarsal amputation	Healed surgical site- discharged to CBOC
13	12	CBOC A	no	2/14/13 3/14/13 3/23/13	F	A: 3/22/13 Anemia	4/11/13	L 2nd digit amputation	Healed surgical site- discharged to CBOC
14	13	CBOC C	no	4/15/13 4/21/13 4/22/13	F	A: 4/24/13 Foot inf	4/25/13	L Partial 5th ray amputation	Healed surgical site- recurrent ulcer on hallux- Followed by CBOC podiatry
15	2	Wilmington	N/A	11/21/12 11/30/12 12/7/13	F	A: 1/22/13 Foot inf	4/25/13	R Gastrocnemius recession to offload surgical site	Healed surgical site- died from metastatic cancer (unrelated).
16	14	Wilmington	yes	12/1/11 12/15/11 2/23/12	N	A: 5/2/13 Foot inf	5/13/13	R Partial 5th ray amputation	Healed surgical site. Subsequent hypotension, pressure ulcers, and septic shock. Died.
17	15	Wilmington	yes	2/15/13 3/4/13 5/8/13	F	No admit	5/24/13	L Hallux and 3rd digit amputation	Healed surgical site
18	16	CBOC D	yes	1/10/13 5/4/13 6/20/13	N	A: 6/24/13 Foot inf	6/28/13	L 2nd digit amputation	Healed surgical site, discharged to CBOC
19	17	CLC	yes	6/25/13 6/27/13 7/8/13	F	A: 4/25/11 CLC resident	7/11/13	L Partial 4th & 5th ray amputation	Bilateral AKA

Surgery #	Patient #	Location	PC DM Foot exam	Specialty Follow-up appointments	Follow/ Not followed	Admission Date CC:	Surgery Date	Surgery	Update: Healed/ poor prognosis (Poor prognosis underlined)
20	18	Coatesville	no	N/A	N/A	No Admit	7/25/13	L partial 2nd ray amputation	Healed surgical site, discharged to Coatesville
21	19	CBOC A	no	none	N	A: 7/23/13 Foot inf	7/29/13	R 2nd digit amputation	Healed surgical site- discharged to CBOC
22	20	Wilmington	yes	6/26/13 7/25/13 7/31/13	F	A: 8/1/13 Foot inf MI	8/5/13	R Hallux amputation	Healed surgical site
23	21	Wilmington	yes	7/17/13 7/24/13 7/31/13	F	No admit	8/8/13	L 5th digit amputation	Healed surgical site
24	22	CBOC D	yes	6/20/13 7/3/13 7/11/13	F	No admit	8/8/13	L hallux amputation	Healed surgical site, discharged to CBOC
25	4	CBOC C	yes	5/8/13 5/15/13 7/30/13	F	A: Post surgery 9/21/13 Pain, Fever	8/9/13	R 3rd digit amputation	Healed surgical site, discharged to CBOC
26	23	CBOC A	no	3/29/13 7/17/13 7/31/13	N	A: 8/7/13 Foot inf	8/12/13	L 2nd digit amputation	Healed surgical site, discharged to CBOC
27	15	Wilmington	yes	7/24/13 7/30/13 8/6/13	F	No admit	8/12/13	L 2nd digit amputation + ulcer debridement	Healed surgical site
28	24	CLC	yes	5/18/12 8/21/12 12/5/12	N	A: 8/14/13 Foot inf	8/14/13	R partial 1st ray amputation	R AKA
29	25	Wilmington	no	none	N	A: 8/9/13 Foot inf	8/15/13	L partial 1st ray amputation	Healed surgical site
30	3	CBOC A	no	6/24/13 7/1/13 8/8/13	F	A: 8/13/13 Foot inf	8/19/13	R partial 5th ray amputation	Healed surgical site- discharged to CBOC
31	26	Coatesville	no	N/A	N/A	No admit	9/18/13	L 2nd digit amputation	Healed surgical site discharged to Coatesville
32	27	CBOC A	no	4/5/11 6/12/12 7/10/13	N	A: 9/20/13 Foot inf	9/25/13	R 3rd digit amputation	Healed surgical site- discharged to CBOC
33	28	CLC	yes	none	N	A: 9/26/13 Foot inf	10/2/13	R partial 5th ray amputation	Healed surgical site
34	29	CBOC B	yes	1/31/13 6/3/13 9/30/13	N	A: 10/7/13 Foot inf	10/7/13	R 2nd and 3rd digit amputations	Healed surgical site- discharged to CBOC
35	30	CBOC D	yes	1/2012 7/25/13 10/3/13	N	A: 10/10/13 Foot inf	10/16/13	L Transmetatarsal amputation	Healed surgical site- discharged to CBOC
36	31	CBOC A	no	12/13/12 7/12/13 7/24/13	N	A: 11/1/13 Foot inf	11/14/13	L Transmetatarsal amputation	Healed surgical site- discharged to CBOC
37	32	Wilmington	no	8/21/08 1/19/10 1/20/11	N	A: 11/14/13 Foot inf	11/15/13	L 2nd digit amputation- gas gangrene	Poor prognosis- BKA vs AKA Care transferred to outside facility
38	33	Wilmington	yes	6/25/13 10/1/13 11/20/13	F	No admit	12/11/13	R 4th digit amputation	Healed surgical site
39	34	Wilmington	no	8/31/11 12/2/13 12/9/13	N	A: 12/13/13 Foot inf	12/18/13	L Hallux amputation	Healed surgical site

Surgery #	Patient #	Location	PC DM Foot exam	Specialty Follow-up appointments	Follow/ Not followed	Admission Date CC:	Surgery Date	Surgery	Update: Healed/ poor prognosis (Poor prognosis underlined)
40	35	CBOC C	no	5/28/13 8/6/13 10/15/13	F	A: 12/12/13 Foot inf	12/19/13	L Incision, Drainage, partial 5th ray amputation	Healed surgical site, discharged to CBOC
41	25	Wilmington	no	10/23/13 12/2/13 12/5/13	F	No admit	12/19/13	L Transmetatarsal amputation	Healed surgical site
42	36	CBOC C	no	11/21/13 12/3/13 12/17/13	F	A: 12/24/13 Foot inf	12/26/13	R Incision, Drainage, Debridement of abscess	Healed surgical site- discharged to CBOC
43	30	CBOC D	yes	12/24/13 1/2/14 1/8/14	F	No admit	1/16/14	L debridement and excision of forefoot ulcer	Healed surgical site- discharged to CBOC
44	29	Wilmington	yes	1/8/14 1/15/14 1/29/14	F	A: 1/30/14 Foot inf	1/30/14	L Partial 5th ray amputation	Healed surgical site
45	37	Wilmington	no	12/24/12 2/25/13	F	No admit	2/20/14	L 4th digit amputation	Healed surgical site
46	38	CBOC C	yes	1/14/14 1/21/14 2/12/14	F	A: 2/11/14 Foot inf	2/27/14	R Fifth ray amputation	Healed surgical site- discharged to CBOC
47	39	Wilmington	yes	2/26/14 2/19/14 2/12/14	F	No admit	2/27/14	L Partial 5th ray amputation	Healed surgical site
48	40	Wilmington	non-diabetic-RA	10/5/12 10/19/12 4/1/14	N	No admit	4/10/14	R 2nd digit amputation	Healed surgical site
49	41	Wilmington	no	2/12/13 5/16/13 4/9/14	N	A: 4/16/14 Foot inf	4/17/14	R Hallux amputation	Healed surgical site
50	42	CLC	non-diabetic-immobile	2/26/14 4/16/14 4/23/14	F	A: 11/29/13 palliative care	4/30/14	R 2nd digit amputation	Healed surgical site
51	43	Wilmington	no	none	N	A: 5/29/14 Foot inf	6/4/14	R partial 5th ray amputation	Healed surgical site
52	20	Wilmington	yes	5/23/14 6/6/14 6/10/14	F	No Admit	6/12/14	R partial 1st ray amputation	Healed surgical site
53	44	CBOC D	no	4/18/14 6/6/14	N	A: 6/17/14 6/26/14 Foot inf	6/26/14	L Hallux and 2nd digit amputation	Healed surgical site- discharged to CBOC

Table 1 Data collected for each patient who underwent an infection-related pedal surgery. * denotes no preventative PCP DM foot exam performed.