Comorbidities of Skin Disease in the Homeless Population and Medical Students
Perspectives

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Abstract

The homeless population is at increased risk for skin disease. Exposure to the elements and lack of access to medical care contribute to the problem. To date there have been few studies analyzing the medical comorbidities that put homeless patients at increased risk for skin disease. The aim of this study is to discover what medical conditions are associated with skin disease to allow physicians to better screen their homeless patients for skin disease. The secondary aim of this study is to determine whether medical students are being adequately trained to recognize medical conditions associated with skin disease. Data from the Collaborative Initiative to Help End Chronic Homelessness (CICH) was used to look for diseases associated with skin conditions in the homeless population. Positive correlations with hearing problems, bronchitis, adjustment reaction disorder and eye problems were found. Medical students did not generally identify these as correlated with skin disease. Numerous social conditions were associated with skin disease, with medical students identifying some, but not others. When seen in a homeless patient, these conditions should signal the clinician to screen for skin disease.

Acknowledgements

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Introduction

Homelessness is associated with an increased risk for a variety of health conditions, including skin disease[1,2] Estimates of homelessness in the United States range from 2.1 million persons per year[3] to 3.5 million persons per year[4] representing approximately 1% of the total United States population. In other developed countries, the rate of homelessness is generally lower, though accurate reporting is difficult and variably defined. New Zealand, for example, measures two types of homeless populations: 'permanent' and 'temporary.' The permanent population is between 1300-5000 people and the temporary group is thought to be between 8000-20000 persons. Combined, this gives a range of .2% to .5%, significantly lower than the rate in the United States.

In the United Kingdom, homeless numbers are contested due to the variety of definitions ('households' and 'persons') as well as the fact that if a person is acutely homeless, the locality they are in is required to provide temporary housing. The cost of temporary housing may be a factor that leads to under-reporting of homelessness in the United Kingdom, which ranges from 14,760 households to between 54,300-83,000 persons. This gives a rate of between

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0.08% and 0.12%. Despite the National Health Service in the United Kingdom, it is unclear how the homeless receive their medical care[5].

Canada has approximately 200,000 homeless, which is equivalent to about 0.55% of its 36 million person population. In contrast to the U.K., the delivery of medical care to the homeless in Canada has been studied to some extent. In a 2010 study, 17% of the homeless in Toronto had unmet medical needs leading the authors to emphasize that health insurance is different from health care delivery[6]. A similar study in the United States found that 32% of the homeless population had unmet medical needs[7].

To date, comorbidities that increase the risk of skin disease in the homeless population have not been identified. Given the large number of homeless throughout the developed world, the correlation of comorbidities associated with skin disease merits further investigation. Once such comorbidities are elucidated, targeted skin exams and regular screenings for homeless patients might improve outcomes, reduce morbidity and mortality, and help control costs by reducing inpatient stays and emergency room visits.

However, provision of adequate skin care relies on the dermatological accumen of clinicians routinely involved in

the care of the homeless. While the skin is the largest and most accessible organ in the body, medical education related to skin function, pathology, pathophysiology and therapy is more variable than for other systems.

More generally, medical training differs significantly throughout the world. In the United States, the typical track is four years of undergraduate education, followed by four years of medical school, with an additional three to seven years of post-graduate (residency) training. The first year of post-graduate training in the United States is commonly referred to as 'internship' and is required to be completed to practice medicine. In other countries, there are other pathways. In Germany, for example, a student can be admitted to medical school directly after high school.   In New Zealand, there are 'graduate' and 'undergraduate' admissions. The former refers to those applicants with undergraduate degrees, the latter to those without. New Zealand's medical schools vary in the length of program, from four to six years. In the United Kingdom, similar to Germany, students are accepted to medical school after completing their A-levels, and the programs of study are typically six years. Canada has a greater variety of educational systems compared to the rest of the world, with

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some medical schools requiring no undergraduate degree, other schools requiring an undergraduate degree, and programs ranging from three to five years.

These differences extend through post-graduate training as well. Both the United Kingdom and New Zealand require two years of post-graduate training instead of the one year of internship in the United States. Germany essentially has categorical residencies for every specialty that are five to six years in duration.

These differences in training pathways, as well as other differences in health care systems, health insurance systems, and health care delivery systems lead to large differences in number of specialists in a given field and the scope of practice of primary care providers, mid-level providers, and the specialists themselves.

In New Zealand, there is a relative shortage of dermatologists that is expected to worsen over the next ten to fifteen years. Currently, there are 1.41 dermatologists per 100,000 people. This likely contributes to the fact that many primary care providers in New Zealand perform skin biopsies and skin cancer excisions. In Germany, which has a staggering 5 dermatologists per 100,000 people, referrals are often unneeded and patients simply make an appointment with a dermatologist. Dermatologists also have

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a greatly expanded scope of practice in Germany and can, with the appropriate certificates, practice andrology (men's health), allergy, mycology, and phlebology (the study of venous disease).

Canada and the United Kingdom, two examples of nationalized health care, are also similar to one another in that both have a shortage of dermatologists. Canada has approximately 1.7 dermatologists per 100,000 people. The United Kingdom has 1.26 dermatologists per 100,000 people. In Canada, a patient with a lesion suspicious for skin cancer is supposed to be 'fast tracked' to see a dermatologist. 90% of patients had their excision within 7.1 weeks, according to the Canadian Health Ministry.

While the dermatological knowledge of foreign graduates has not been extensively studied, it has been studied in the United States. American medical students are generally unprepared for the amount and types of dermatologic disease seen in primary care. Approximately 8% of visits to an outpatient family medicine provider are dermatological complaints[8]. United States Medical students total an average of only 10 pre-clinical and clinical hours of dermatology instruction[9]. Approximately 8% of US Allopathic medical schools have no dermatology instruction requirements at all. The same study found that more than

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53% of academic dermatologists responding to the survey expect students to learn to diagnose and treat 22 different dermatological conditions, and to diagnose (but not necessarily treat) an additional 16 skin conditions. 20% of practicing physicians report receiving no dermatological instruction in medical school[9]. Furthermore, Hansra et al found that less than 40% of primary care residents felt their medical school adequately prepared them to treat common skin conditions. Unsurprisingly, the same study also found that residents who had taken a dermatology clinical rotation (available at between 93%-97% of US allopathic medical schools[9]) felt more prepared than their counterparts who without a dermatology clinical rotation. The highly variable nature and intensity of dermatology training received by medical students means that most physicians in training must learn to recognize common skin diseases during post-graduate training if they are to diagnose and treat them in their own practice. Better still would be continuing medical education that educates both residents and practicing physicians on common skin disease and treatment. Given this high variability of dermatological training generally, it is likely that skin disease is even more likely to be overlooked in specific practice settings and patient populations such as the homeless.

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Most students recognize that the skin serves as the primary physical barrier between the organism and the environment and helps to protect from pathogens, prevent water loss, and provides both immunological and thermoregulatory functions. The skin also allows the most efficient method of maintaining vitamin D levels necessary for healthy calcium metabolism. Students may not recognize the role of skin disease in signaling the presence of internal disease or as a sign of poor nutritional status[8]. Furthermore, comorbidities which contribute to skin disease must be recognized so that these disorders may be adequately managed when patients present for seemingly unrelated skin complaints. Among the homeless population, skin disease has a prevalence of between 3% and 32%[2]. In addition, Moy and Sanchez (1992) found that 46% of patients admitted to an inpatient Dermatology ward at Bellevue Hospital were homeless. Given the high prevalence of skin disease in the homeless, adequate education of front line medical practitioners is critical. However, it is important to determine first, what disorders should alert practioners to look for concomitant skin disorders and vice versa.

Statement of purpose and hypothesis

To date, comorbidities that increase the risk of skin disease in the homeless population have not been identified.

The primary purposes of this study are to identify factors that are associated with the risk of skin disease in the chronically homeless and then to determine the extent to which medical students are aware of those comorbidities. We define chronic homelessness as "an unaccompanied homeless individual with a disabling condition who has either been continuously homeless for one year or more or has had at least four episodes of homelessness in the past three years"[12].

Using data from the Collaborative Initiative to Help End Chronic Homelessness (CICH), an 11-site study following homeless persons over a period of 24 months, we will identify factors that are associated with skin disease in this cohort. Bivariate analysis of factors including gender, age, race, veteran status, substance abuse, diabetes, hypertension, and HIV/AIDS status will be performed to identify those associated with skin disease. The identification of comorbidities will allow for targeted skin exams in those patients that are at higher risk for skin disease.

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A survey of medical students will then be conducted based on the data from the CICH study. The survey will target pre-clinical students, students in their third year of clinical training (completing required medical school clerkships) and students who have completed most of their third year training (fourth year students, fifth year students, and MD/PhD candidates).

Our hypothesis is that medical students will be able to identify some of the major comorbidities for skin disease in the homeless population. In addition, we expect to show that the likelihood that medical students will correctly identify comorbidities of skin disease in the homeless population is correlated with increased clinical training.

Methods

Collaborative Initiative to Help End Chronic Homelessness Database

A total of 734 CICH clients from 11 sites were included in the study. The sites included Chattanooga, TN; Chicago, IL; Columbus, OH; Denver, CO; Ft. Lauderdale, FL; Los Angeles, CA; Martinez, CA; New York, NY; Philadelphia, PA; Portland, OR; and San Francisco, CA. From March 2004 to April 2006, 1430 prospective clients were screened, 1242 found eligible and placed in house, with 734 (51%)agreeing to participate in the CICH study[13].

Those who chose to participate in the national study were more likely to have medical problems (43% vs. 26%), have mental health problems (73% vs. 48%), to be black (50% vs. 30%) to be older (45.2 vs. 43.2 years), and to be male (76% vs. 69%) compared to those who chose not to participate after the initial interview. Study participants were less likely to have substance abuse problems (72% vs. 84%). Study participants were less likely to be recruited from community locations and more likely to have been recruited from a housing agency or mental health agency (20% vs. 4%)[13].

Baseline assessments were conducted by research staff and, when possible, before the clients were placed in housing (N=531; 72%). Delays in conducting the baseline assessments were due to prolonged internal review board approval processes, and clinical urgency (housing was ready for the clients before they were able to provide informed consent). Delays also stemmed from rapid admission of large numbers of clients into the program.

Data was collected by full time research assistants initially trained on the protocol during a two-day session. Follow-on training was conducted by both conference call and individual telephone calls for the duration of the project. Initial interviews were conducted in person by the VA research staff after obtaining written informed consent. The research assistants then entered the client's responses into the survey forms. The research assistants also verified disabling conditions with other staff members as appropriate and completed the interviewers observations part of the survey. Follow-up interviews were usually administered in person, but were telephonic when necessary, such as for a client moving out of the area. Research assistants continued the follow-on evaluations even if the

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clients stopped participating in the services offered by CICH or discontinued the housing portion of the program[13].

Data was collected from the start of the project in March 2004 through May 2006. The follow-up rates were 97% at three months, 93% at 6 months, 88% at 9 months, and 81% at 12 months. Interview completion rates were 91% at 3 months, 88% at 6 months, 87% at 9 months, and 85% at 12 months. Significant differences in response rates across sites were not observed except for Martinez, CA, which consistently had above average response rates, and San Francisco, CA, which consistently had below average response rates. Response rates across all sites ranged from 16% at 3 months to 31% at 6 months. Since there was not systematic variability between sites, the data were not weighted for differential responses by site.

The baseline client interview included eligibility measures, demographic data (age, race, education etc), a housing history, the Lehman quality of life interview, employment history, Addiction Severity Index (ASI), Primary Care Assessment Tool (PCAT), and Short-Form 12 (SF-12, a brief mental and physical health evaluation). The interview also included mental health questions including the Brief Symptom Index, ACCESS mental health questions, questions

based on the Chinman Therapeutic Alliance, the Anderson Trust in Physician Scale, and questions relating to the use of services such as hospital stays, drug abuse treatment, and other social services. The Vaux social support record, Helzer and Kadushin social childhood questions, religious faith survey, Center for Mental Health Community Integration survey, and finally the ACCESS Veteran's supplementary interview (if appropriate) were also included. Follow on interviews included all of the above measures with the exception of eligibility criteria.

The variables for skin disease ('Do you have skin problems?' and 'Have you received treatment for skin problems in the last 3 months?') were analyzed using bivariate analysis with 339 other variables from the surveys contained in the dataset. This yielded both significance and correlation coefficients.

Medical Student Survey

The content of the questions on the medical student survey was based on the results of the CICH study. The first section of the survey collected demographic data (i.e. What year are you in medical school?). The second portion of the survey asked what medical, social, or other conditions were associated with skin disease in the

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homeless population. The verbatim Primary Care Assessment from the CICH survey was included in the medical student survey. Additionally, either expected and not found comorbidities of skin disease, or unexpected and found comorbidities of skin disease were also included. The medical students were able to choose either 'associated' or 'not associated' with skin disease for a total of 25 variables on the survey. The variables were chosen based on the variables from the CICH data that were positively or negatively associated with skin disease. Additional variables were added that experienced dermatologists thought would correlate with skin disease but did not, such as diabetes. The survey was sent to approximately 500 students at the Yale School of Medicine. Survey Monkey was used to generate the survey, collect the results and prepare the data for statistical analysis that was performed using Microsoft Excel.

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Results

Of the 734 clients in the CICH study, 462 (62.9%) reported a skin problem or having received treatment for a skin problem at least once during the two-year study duration. The results of the bivariate analysis from the CICH data set can be seen in table 1. Of the over 330 variables analyzed, 27 showed a significant association with skin problems ($p<0.05$). In contrast, some variables that were expected to show an association, such as diabetes, were not significantly correlated (correlation co-efficient .0197, $p<0.1197$).

Medical conditions with significant positive correlations with skin disease included hearing problems (correlation co-efficient .2116, $p<0.0001$), bronchitis (.1830, $p<0.0001$), a diagnosis of adjustment reaction (.1708, $p<0.0003$), and eye problems (.1123, $p<0.01$).

Social conditions and societal factors that were associated with skin problems in this cohort included: Days slept in someone else's home at baseline (.1407, $p<0.005$), days slept in residential substance abuse treatment at baseline (.1115, $p<0.05$), days spent institutionalized (.0976, $p<0.05$), and substance abuse treatment in a halfway house (.1909, $p<0.05$).

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Of the approximately 500 medical students polled, 94 responded for a response rate of 18.8%. Responses varied somewhat among the class years: 19 first year medical students (MS1s), 11 second year medical students (MS2s), 19 third year medical students (MS3s), 15 fourth year medical students (MS4s), and 30 5th year students and PhD candidates (Mean=18.8%, Stdev +/-7.08%). When broken down by pre-clinical training years and post-3rd year clerkship training (see figures 1 and 2), MS1s represent 63.3% of the pre-clinical sample, with MS2s representing 36.7% while MS5s/PhD candidates represent 66.7% of the post clinical sample and fourth year medical students represent 33.3%.

Medical students associated significantly different things with skin problems than the data from the CICH study revealed. 1st and 2nd year medical students associated skin problems with HIV (86.7%)(mean=85.1% SD:1.38%), diabetes (80%)(mean=78.36%, SD:9.25%) sexually transmitted infections (73.3%)(mean=72.96% SD:6.11%) and cancer (53.3%)(mean=52.1% SD:4.22%). HIV was associated with skin problems in the CICH data, with a correlation coefficient of .09564 and p<0.05. Sexually transmitted infections (STI's) were also associated with skin problems in the CICH data, with a correlation coefficient of.1133 and p<0.02.

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Cancer and diabetes were not associated with skin problems in the CICH data.

A large percentage of 3rd, 4th, and 5th year medical students and MD/PhD's who had completed at least half their clerkships, similarly identified HIV, diabetes, cancer and STI's as associated with skin problems. 84.2% of MS3s identified HIV/AIDS as a comorbidity, 68.4% identified diabetes, 78.9% and 47.4% identified STI's and cancer, respectively. MS4s, MS5s, and PhD candidates who had undergone clerkship training also identified HIV (84.4%), diabetes (86.7%), STI's (66.7%), and cancer (55.6%). There was not an appreciable difference between medical students who had undergone clinical training and those who had not with respect to these 4 most associated conditions with skin problems (see figure 1).

Interestingly, although it was not associated with skin problems in the CICH data, arthritis/rheumatism was associated with skin disease by a majority of MS3s (63.2%), 4s, 5s, and PhD candidates (62.2%), but not by MS1's and 2s (33.3%)(mean=52.9% SD:16.98%). Other medical conditions associated by one group of medical students but not another include foot problems (68.4% of MS3s, 75.6% of MS4s, 5s, PhD's, but only 43.3 of MS1s and 2s)(mean=62.43% SD:16.95%)

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as well as stomach or digestive disorders (10% of MS3s, 13.3% of MS1s and 2s, but more than double that, 33.3%, of MS4s, 5s and PhD candidates)(mean=18.87% SD:12.61%). Foot problems were identified in the CICH data as significantly associated with skin disease (correlation coefficient of .2261, p<0.0001) while stomach problems and digestive disorders were not. Medical students did not associate adjustment disorder with skin disease (mean=21.46% SD:1.68). whereas the CICH data revealed a adjustment reaction diagnosis to have a correlation coefficient of .1708 (p<0.0003).

Social problems associated with skin disease by medical students of all years included: Days spent homeless (mean=91.56% SD:4.27%), a diagnosis of substance abuse disorder (mean=87.86% SD:6.33%), and lower quality of life (mean=81.76% SD:3.46%). Social problems that showed variance across years were days spent institutionalized (mean=61.6% SD:13.71%), substance abuse treatment as an outpatient (mean=23.8% SD:7.01%), a high number of visits to any provider (mean=25.73% SD:14.77%) and use of social services (mean=23.1% SD:9.22%).

A large percentage of MS3s (73.7%) thought that days spent institutionalized was associated with skin disease.

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They were largely correct, the CICH data showed a correlation coefficient of .0976 (p<0.05). MS4s, MS5s, and PhDs also had a relatively high percentage (64.4%) of students believe skin disease is associated with days spent institutionalized. Pre-clinical students had a much lower percentage at 46.7%. Use of social services (correlation coefficient of 0.1106 (p<0.05)) shows a similar pattern, with 3.3% of pre-clinical medical students associating it with skin disease while 31.6% of MS3s did and 24.4% of MS4s, MS5s, and PhD candidates did.

Two results that showed a difference between students in clinical training and both pre-clinical and post-third year students were outpatient substance abuse treatment (mean=23.8% SD:7.01%) and a high number of visits to any provider (mean=25.73% SD:14.77%). For both results, the students in clinical training (MS3s) had a lower percentage than pre-clinical and the MS4, MS5, and PhD candidate cohort. For substance abuse treatment the MS3s had a 15.8% association, while the preclinical students had a 26.7% association and the MS4, MS5 and PhD group had a 28.9%. The result is more striking with the high number of visits to any provider variable. MS3s had 10.5%

association, while MS1s and MS2s had 26.7% and the MS4, MS5,

and PhD candidate group had a 40.0% association.

Discussion

This study has interesting implications for the education of medical students and practicing physicians. The results of the CICH study were surprising in that the correlation of skin disease with various comorbidities was unexpected. That is to say, variables for which experienced dermatologists thought would correlate with skin disease did not correlate, and variables that were thought not to correlate with skin disease seem to.

Diabetes, which did not correlate with skin disease in the CICH study, has been shown to increase the incidence of skin disease among diabetic patients. Depending on the study, between 30%-70% of diabetics have skin disease at any given time. Diabetics have an increased rate of bacterial, fungal and yeast skin infections compared to the general population. Homeless diabetics, with less ability and opportunity to perform personal hygiene than their non-homeless counterparts, could reasonably be expected to have a higher rate of skin infection. Yet this comorbidity was not demonstrated in our data. Neuropathic ulcers also have a higher incidence among diabetics, and the association of this condition was confounded in our study by inclusion of the more general category of self-reported 'foot problems'.

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An additional surprising finding was that positive HIV/AIDS status was not associated with skin disease. HIV is associated with seborrheic dermatitis, molluscum contagiosum, and lower T-cell counts are associated with a large variety of opportunistic infections, many of which have skin manifestations[14]. Approximately 50% of HIV positive patients are outside the health care system (not receiving care because they are unaware of their status, or do not have access to care if they know their status.) Only 28% of HIV patients are receiving Anti Retroviral Therapy that successfully suppresses the virus[15,16]. The National Coalition for the Homeless estimates that 3.4% of the homeless population has HIV or AIDS. Compared with 0.34% of the non-homeless United States population, this is a ten-fold higher prevalence. This study, however, only had 741 participants, which means that only 25 of our subjects would be expected to have HIV/AIDS. The small number of subjects expected to have HIV/AIDS may have been insufficient to show correlation with skin disease in this study.

Given that some experienced dermatologists were surprised by the results of the CICH investigation, it is not surprising that both pre- and post- clinical training

medical students were often mistaken about the comorbidities of skin disease in the homeless. The fact that hearing problems are associated with skin disease is without an obvious causal link, so it is hardly surprising that most medical students did not associate it with skin disease.

In contrast, medical students did show increasing awareness of the association of other variables with skin disease as they progressed in their training. Medical student awareness of the associations between the number of days spent institutionalized, the number of visits to any provider, foot problems and use of social services skin disease generally increased as they progressed in their training. This awareness may likely be the result of clinical exposure to the health care system at large rather than a result of any specific educational program or didactic session. To provide better care for the homeless population, and to improve the identification of patients at risk for skin problems, a short session on risk factors for such problems would likely be sufficient. A checklist would also be appropriate in that it would suggest a skin exam if a patient had any of the associated factors this

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identified in this study. Such a checklist would obviously require further investigation and validation.

An interesting follow on study would be a survey of practicing physicians similar to the survey given to the medical students. This might reveal whether post-graduate medical training changes the perception of skin disease risk factors in the homeless. It would also determine if practicing physicians are aware of risk factors for skin disease in the homeless. This would apply especially to emergency room physicians, as many homeless people in the United States receive the majority of their medical care in the emergency room[17]. ED providers average 1.8 to 2.8 patients per provider per hour[18]. Even if ED physicians were educated on risk factors for skin disease, it is unlikely at the upper end of their patient load that they would have time to conduct a full body skin exam. Additional research that revealed highly correlated comorbid conditions could be used to construct simple tools for efficient diagnosis of otherwise unrecognized skin disease in the ED setting.

The Affordable Care Act has substantially expanded access to Medicaid in some states. It is possible that in those states, there may be a shift in the health care

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delivery model for the homeless. If those previously receiving care at the ED transition to Medicaid and gain a primary care provider, those providers would benefit from an increased awareness of the comorbidities of skin disease in the homeless. Since somewhere between 45%[19] and 69%[20] of physicians are willing to accept Medicaid patients, it is likely some of these patients will have mid-level providers as their primary care provider. Thus, the importance of educating both physicians and mid-level providers on the risk factors of skin disease in the homeless is apparent. This is even more important in the Medicaid population because a Merrit-Hawkins study in 2014 found that only 27% of dermatologists in major metropolitan areas were willing to accept Medicaid patients.

The CICH study was somewhat limited in its utility for this particular survey in that its questions on skin disease were limited to "Do you currently have a skin problem or been treated for one in the last in the last three months?" It was very useful, however, in that it allowed us to investigate the social factors associated with skin disease well as medical factors. The over 330 variables in the study allowed for an extremely broad evaluation of variables that are or are not associated with

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skin disease in the homeless population. Although this is useful as a preliminary investigation of comorbidities of skin disease in the homeless, further study is needed to determine more specifics.

The study of medical students was limited to Yale School of Medicine, and therefore has somewhat limited generalizability. At Yale, second year students receive approximately 20 hours of didactic instructions and have several small group problem-based learning sessions. There is no requirement for a dermatology clerkship or elective, although some students take a four-week elective during their fourth year. This student took one four week elective 3rd year, then did two four-week away rotations for a total of twelve weeks of dermatology exposure. Thus, even within one institution, there is a wide variety of exposure to dermatology. It is to be expected that there is an even broader range of dermatology exposure across different medical schools.

In conclusion, the comorbidities of skin disease in the homeless need further study and explanation. There are implications for the treatment of skin disease among the homeless population. Physicians, mid-level providers, and medical students would all do well to be better educated

about the comorbidities of skin disease in the homeless
population in order to provide cost-effective and timely
treatment for these patients.

Table 1.

Condition	Correlation Coefficient	P-value	N
Hearing Condition	0.2116	0.0001	461
Eye Problem	0.11231	0.0157	462
HIV	0.09564	0.0401	461
TB	0.12029	0.0097	462
Diabetes	0.07249	0.1197	462
Diabetes TX	0.09363	0.5504	43
Walking Problem	0.13317	0.0041	462
Dental Problem	0.14153	0.0023	460
Bronchitis	0.18301	0.0001	459
Back Pain	0.11103	0.017	462
Foot Problem	0.2261	0.0001	462
STI	0.1133	0.0149	461
Schizophrenia	0.10433	0.0249	462
Days slept in someone else's place at baseline	0.14073	0.0024	462
Days slept in residential treatment at baseline	0.11159	0.0164	462
Days spent institutionalized	0.09765	0.0359	462
Days spent homeless	-0.12591	0.0067	462
Substance abuse treatment in halfway house	0.19095	0.0437	112
PTSD	0.08204	0.0835	446
Adjustment Reaction	0.17084	0.0003	446
Substance abuse diagnosis	0.10117	0.0299	461
Social service inpatient visits baseline	0.0935	0.0448	461
Social Service visits at baseline	0.11061	0.0174	462
Substance abuse outpatient treatment at baseline	0.12041	0.0096	462
Total out patient visits at baseline	0.0939	0.0437	462
Help getting benefits at baseline	-0.07925	0.0892	461
Service of food bank	-0.11533	0.0133	460
Quality of life	-0.01409	0.7627	462
Receives benefit checks	0.09511	0.041	462
Has a choice with housing	-0.23077	0.0075	462
Own place to Live	-0.09232	0.0473	462
Has a case manager	0.1053	0.0236	462
Substance abuse problem treated at baseline	0.09921	0.0816	309

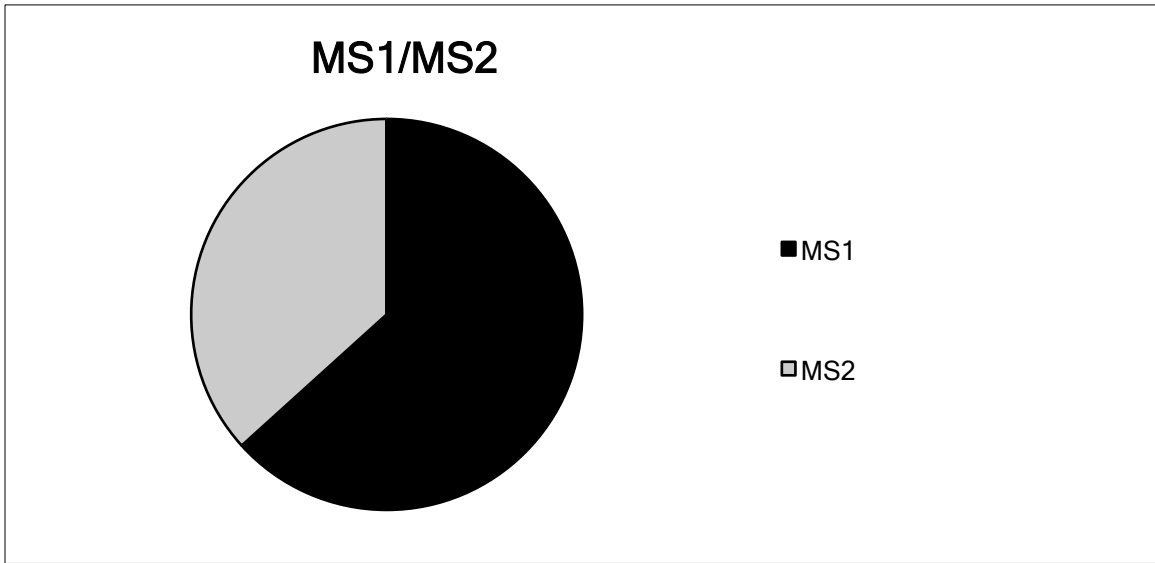Figure. 1 Breakdown of Pre-Clinical Responses
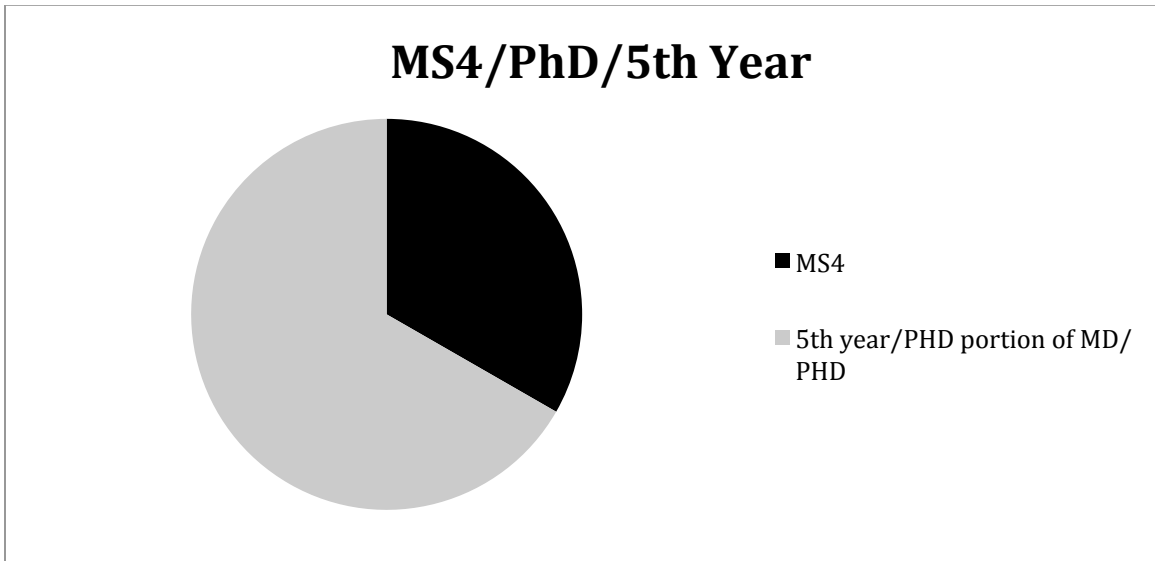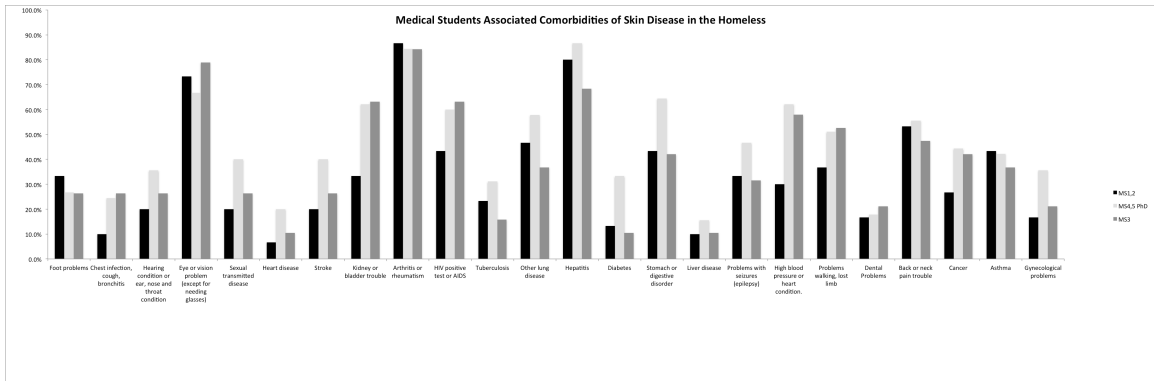

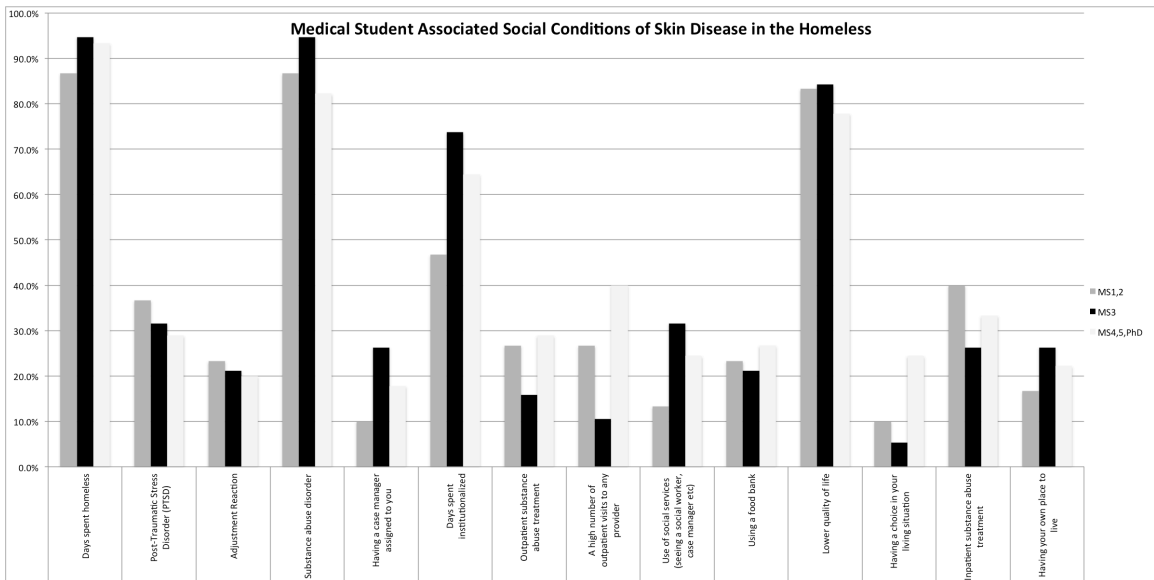Figure 2.   Breakdown of Post-Clinical Responses

Fig. 3 Medical Students Associated Comorbidities of Skin
Disease in the Homeless

*The first five columns, through "STI's", were significantly associated with skin disease
in the CICH data

Fig. 4 Medical Student Associated Social Conditions of Skin
Disease in the Homeless

*The first 8 columns, through "Days spent institutionalized" were found to be
significantly associated with skin disease in the CICH data

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Appendix A

Medical Student Questionnaire

What year in medical school are you?

MS1 MS2 MS3 MS4 5th year/PHD portion of MD/PHD

Which of the following are associated with skin disease in the homeless population? (Check all that apply)

High Blood Pressure or heart condition

Asthma

Other Lung Disease

Hearing condition or ear, nose and throat condition

Eye or vision problem (except for needing glasses)

Cancer

Heart Disease

Stroke

Kidney or Bladder trouble

Arthritis or rheumatism

HIV positive test or AIDS

Tuberculosis

Hepatitis

Diabetes

Stomach or digestive disorder

Liver Disease

Problems with seizures (epilepsy)

Problems walking, lost limb

Dental Problems

Chest infection, cough, bronchitis

Back or neck pain trouble

Foot problems

Sexually transmitted disease

Gynecological Problems

Pregnancy

Which of the following social or other conditions is/are associated with skin problems? (Check all that apply)

Days spent homeless

Post-Traumatic Stress Disorder (PTSD)

Adjustment Reaction

Substance Abuse Disorder

Use of social services (seeing a social worker, case manager, etc)

Using a food bank

Lower quality of life

Having a case manager assigned to you

Having a choice in your living situation

Days spent institutionalized

Outpatient substance abuse treatment

Inpatient substance abuse treatment

A high number of visits to any provider

Having your own place to live

Thanks for your participation!