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Increasing Access to Dermatology Care for Underserved Populations: A Literature Review of Existing Care Models

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Abstract

Access to dermatologic care is a significant challenge in underserved populations, where factors such as economic hardships, geographic isolation, and provider shortages create substantial barriers to timely treatment. As a result of these obstacles, skin conditions are largely exacerbated, often leading to more severe health outcomes and a greater impact on the overall well-being of affected individuals. In an effort to combat these challenges, several unique care models have been implemented. This review synthesizes existing literature on three established models: free clinics, teledermatology, and street dermatology. By analyzing the findings from published case studies, this review evaluates the effectiveness, accessibility, and impact of these models in reducing dermatologic disparities. Additionally, it explores their limitations and potential strategies for optimizing their implementation. Ultimately, this review aims to inform future efforts in expanding access to dermatologic care in underserved communities.

Keywords: *Dermatologic Disparities; Underserved Populations; Free Clinics; Teledermatology; Street Dermatology; Access to Care; Healthcare Equity*

1. Introduction

Dermatologic care is a crucial yet largely inaccessible component of healthcare in underserved populations. A combination of socioeconomic status, geographic location, and provider shortages creates barriers to receiving this specialty care, ultimately exacerbating health disparities [1]. For example, as a result of these inequities, many patients in underserved populations delay seeking care, leading to a higher incidence of late-stage skin conditions [2,3].

This is particularly concerning, as many dermatologic conditions worsen with time, leading to more severe physical symptoms and complications. Notably, skin cancers – including melanomas – often go unnoticed in underserved populations until the late stages, resulting in less successful treatment outcomes [3,4,5].

Additionally, delayed diagnosis and treatment of conditions like Hidradenitis Suppurtiva can manifest in ways unrelated to the skin, leading to metabolic, musculoskeletal, and psychological issues [6]. The impact of these dermatologic conditions, especially amidst a delayed diagnosis and treatment course, can severely impact the quality of life (QoL) of those in underserved populations. Particularly, a study with a population of nearly 20,000 individuals

concluded that the skin conditions of acne, alopecia, urticaria, atopic dermatitis, skin cancer, and psoriasis had a modest to extremely large impact on patient QoL [7]. Experiencing these dermatologic conditions for a prolonged period, as is often the case for underserved individuals, is likely to exacerbate their impact on QoL [8,9]. Furthermore, addressing barriers to dermatologic care is essential for reducing health disparities, improving QoL, and enhancing outcomes for underserved populations. Several innovative approaches have already been taken as efforts to address this need, such as integrating dermatology services into free clinics, utilizing teledermatology, and adopting a street dermatology model. The purpose of this review is to synthesize existing literature on these three care models by examining the populations they reach, outcomes they achieve, and the barriers to their implementation. It also speaks to the impact of these care models on advancing dermatologic care accessibility and health equity, while presenting potential strategies to optimize their use in underserved settings. By considering the potential for each model to reduce disparities in dermatologic care, we aim to better inform their broader implementation in underserved communities.

2. Free Clinics

Patients without health insurance often struggle to access adequate healthcare and meet their medical needs, leading to them delaying or forgoing physician visits due to the high costs associated with care [2]. To address these financial barriers, free clinics have been established as a non-profit safety net for those that are low-income, especially the 7.7% of the U.S. population that remains uninsured, providing essential healthcare services to individuals who cannot afford care by other means [10, 11]. Often staffed by volunteer clinicians and students, these clinics rely on donated resources, grants, and community support to operate. With over 1,000 free clinics throughout the nation, only a small fraction are estimated to offer dermatology services, accounting for as few as 19 clinics [11, 12].

2.1. Patient Population of Free Dermatology Clinics

To better understand the populations served by free dermatology clinics, we reviewed and summarized data from nine published case studies reporting on patient and clinic characteristics (Table I). These studies varied in location, sample size, and clinic structure, but collectively offer valuable insight into the underserved communities utilizing these services. Most of the included clinics were student-run free clinics (SRFCs), which aim to provide care to marginalized populations while also supporting medical education for students [12]. The majority operated in urban areas and primarily served uninsured or underinsured patients, with their work targeted mainly towards individuals facing financial, linguistic, or housing-related barriers to healthcare.

Table I. *Data About Included Free Clinic Case Studies*

Description	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]
Clinic description	Urban SRFC, affiliated with an academic medical center	SRFC, affiliated with Dell Medical School	Free-clinic in partnership with Stanford Healthcare, community physicians, and Stanford students	SRFC, affiliated with Yale School of Medicine	SRFC at a homeless shelter, affiliated with the University of California, San Francisco	SRFC, affiliated with the University of California, Davis	SRFC, affiliated with East Virginia Medical School	Free-clinic in partnership with the University of Michigan Health System	SRFC, affiliated with Saint Louis University School of Medicine
Location	Southeast US	Austin, Texas	California	New Haven, Connecticut	San Francisco, California	Sacramento, California	Norfolk, Virginia	Southeast Michigan	St. Louis, Missouri
Publication date	2022	2020	2016	2021	2017	2021	2021	2020	2024
Sample size	57	15	71	29	100	94	215	229	47

SRFC = student-run free clinic

Across the free clinic case reports analyzed, the average age of patients seen was typically between 40 and 50 years old, though some clinics also served pediatric and geriatric populations [14-19,21]. This wide age range reflects the broad reach of these services and the presence of dermatologic needs across all age groups . Racial and ethnic demographics reflected the

surrounding underserved communities, with many clinics serving high proportions of Hispanic/Latino, White, Asian, and Black/ African American patients [13-20,21]. Language barriers were also frequently reported, with non-English speakers making up to 79.3% of some clinic populations [16,18-20]. This emphasizes the importance of interpretive services to ensure equitable care. With the target population of free clinics being low-income and uninsured individuals, uninsured status rates were reported to range from 52.3% to 100% of patients [15,18,19]. Several clinics also noted serving patients experiencing homelessness, particularly those affiliated with shelters [14,17]. Collectively, these demographic trends highlight the vital role of free dermatology clinics in reaching vulnerable populations that often face barriers to this specialty care.

2.2. Trends in Dermatologic Diagnosis at Free Clinics

Table II summarizes the most frequently reported dermatologic diagnoses across the included studies. These data offer a valuable look into the types of skin conditions underserved populations most commonly present with at free clinics – data likely reflective of the broader dermatologic needs within these communities. Consequently, they help to inform on the dermatologic conditions free clinic providers should be well-equipped to manage within their practice.

Table II. *Most Common Dermatologic Diagnoses across Included Studies*

Diagnosis	No. of Studies (n = 9)	% Range	Average %	Sources
Dermatitis*	9	4.3 - 49.2	21.3	[13,14,15,16,17,18,19,20,21]
Atopic Dermatitis	7	3.1 - 20.4	9.9	[14,15,16,17,18,19,21]
Seborrheic Dermatitis	4	1.9 - 19.0	7.8	[17,19,20,21]
Acne	7	0.6 - 14.0	7.4	[13,15,16,17,19,20,21]
Tinea**	6	6.7 - 14.8	9.2	[14,15,17,19,20,21]
Tinea Pedis	5	0.6 - 13.6	6.2	[14,17,19,20,21]
Psoriasis	6	4.3 - 11	7.0	[15,17,18,19,20,21]
Seborrheic Keratosis	6	1.4 - 13.0	6.7	[14,15,16,19,20,21]
Nevus	6	0.6 - 26.1	9.2	[14,15,16,17,19,21]
Actinic Keratosis	4	2.8 - 7.4	4.9	[14,15,19,20]
Onychomycosis	5	0.9 - 9.0	3.7	[15,17,19,20,21]
Warts***	5	0.6 - 9.6	4.5	[16,17,19,20,21]
Skin Cancers (all types)	5	1.4 - 7.1	3.7	[15,16,19,20,21]
Basal Cell Carcinoma	3	2.0 - 4.0	3.0	[19,20,21]
Squamous Cell Carcinoma	3	1.4 - 4.3	2.7	[15,16,19]
Melanoma	2	0.3 - 0.4	0.4	[19,20]

** includes atopic, seborrheic, contact, stasis, nummular, allergic, pigmented purpuric, unspecified dermatitis*

*** includes tinea pedis, cruris, versicolor, corporis, manus, capitis*

**** includes verruca, genital, plantar warts*

The most commonly reported conditions across all included studies were inflammatory dermatoses, with dermatitis being the most prevalent – reported in all nine studies with an average prevalence of 21.3% (range: 4.3%–49.2%). Atopic and seborrheic dermatitis were the most frequently specified subtypes, averaging 9.9% and 7.8%, respectively. The severity of these chronic conditions are often exacerbated by environmental exposures, inadequate housing, and limited hygiene resources – factors that disproportionately affect these underserved populations [22,23]. Acne (7.4%) and fungal infections such as tinea (9.2%) were also frequently diagnosed. These conditions, though common, can significantly affect quality of life when left untreated, reinforcing the value of accessible dermatologic care [24,25]. Other common diagnoses included psoriasis (7.0%), seborrheic keratosis (6.7%), and nevi (9.2%), reflecting a mix of chronic and benign conditions. Skin cancers were reported in several studies, with an average prevalence of 3.7% (range: 1.4%–7.1%). Their prevalence is especially notable given the challenges of early detection in underserved communities. Specifically, melanoma – reported in two studies – remains a critical concern given its aggressive nature and poorer outcomes when diagnosed late [3,4,5]. In fact, in one study, 31% of patients waited over a year to seek care for a skin concern, while only 6.9% presented within the first month [16]; another found that 79% had been living with their condition for over a year before visiting the clinic [21]. These delays emphasize the essential role of free clinics in enabling timely diagnosis and management in reducing the burden of untreated dermatologic disease.

2.3. Trends in Treatment of Dermatologic Conditions at Free Clinics

Table III outlines the most commonly reported treatment strategies across the case studies, noting both medical and procedural care provided in free clinic settings. Topical and systemic medications such as steroids, antifungals, antihistamines, and antibiotics were frequently dispensed, with steroids being the most commonly reported. Procedural interventions such as biopsies, cryotherapy, and steroid injections were also provided, though their availability was limited by clinic resources and infrastructure. In fact, one study found that 19.3% of patients required referral for follow-up care due to these limitations [13]. Despite these challenges, free clinics demonstrate the ability to deliver a broad range of essential dermatologic treatments, reflecting their effectiveness and adaptability in meeting the needs of underserved populations.

Table III. *Most Common Management Strategies across Included Studies*

Treatments	**[13]**	**[17]**	**[19]**	**[20]**
Medical Management	***n = 57 patients***	***n = 125 units dispensed***	***n = 103 units dispensed***	***n = 229 patients***
% Steroids	21.1	24.8	55.3	–
% Antifungals	14.0	24.0	13.6	–
% Antihistamines	14.0	6.4	1.0	–
% Antibacterial/Antibiotic Agents	8.8	11.2	16.5	–
% Antiparasitics	–	7.2	1.0	–
% Personal care items	–	9.6	1.9	–
Procedural/Therapeutic Management	***n = 57 patients***	**–**	***n = 321 cases***	***n = 229 patients***
% Biopsy	5.3	–	8.4	–
% Cryotherapy	–	–	7.5	19.2
% Steroid injections	3.5	–	4.4	3.5
% Electrodessication and Curettage	–	–	–	0.9

Reported treatment outcomes across studies were generally positive, and suggest that dermatologic care provided in free clinics is both effective and impactful. One study reported full resolution in 37.5% of cases, with an additional 25% showing improvement; only 6.3% worsened or experienced recurrence [13]. Another study found a 95.6% resolution rate, with just 4.3% reporting unsatisfactory outcomes [16]. Together, these findings demonstrate the positive impact of dermatologic services in free clinics, highlighting their effectiveness in improving patient outcomes in underserved populations.

2.4. Patient Perspectives of Dermatology Services Provided at Free Clinics

Patient satisfaction with dermatologic care at free clinics appears overwhelmingly positive – an admirable finding given the barriers these patients have faced in accessing specialty care. In a 2016 study by Pyles et al., 82% of patients reported effective treatment, with an additional 13.3% noting partial improvement; only 4.4% reported no benefit [15]. Notably, 66.7% had never previously seen a provider for their condition, and among those who had, over half reported that prior treatment was ineffective [15]. These findings suggest that free clinic dermatology services meet the clinical needs of this patient population, while also being perceived highly by patients. This high level of satisfaction also influenced future healthcare behavior.

When asked about their likelihood of seeing a dermatologist again, 84.4% of patients indicated they were likely or highly likely to do so [15]. Similarly, a 2024 study by Hughes et al. found that 97% of patients felt they benefited from their visit, and 90% expressed satisfaction with their care [21]. Despite 56% of respondents never having visited a dermatologist before, nearly all reported positive experiences, with 95% saying they would recommend the clinic to a friend. Taken together, these findings reflect both the clinical benefit of dermatologic services in free clinics and also the sense of value and trust they generate in patients who may have previously lacked access to this type of care.

2.5. Limitations and Proposed Strategies for Free Clinic Dermatologic Care

While dermatology services at free clinics are generally effective and well-received, several limitations impact their ability to consistently provide care. One commonly noted barrier is transportation. In one study, nearly half of

patients (44.9%) traveled 10 to 19.9 miles to reach the clinic, and 16.8% traveled over 20 miles [18]. These distances may pose challenges for patients with limited transportation access, especially in areas with scarce public transit options. Additionally, it may contribute to the reported cancellation rates of 3.4 to 9.8% and no-show rates as high as 12.9% across studies [16,20]. To address this, some clinics may benefit from incorporating teledermatology options or transportation support initiatives (say, having an on-site driver) to reduce logistical barriers to follow-up. Another limitation is the scope of care that free clinics can provide. While many offer essential evaluations and minor procedures, complex cases often require referral to outside specialists (especially for surgical treatments). In fact, several studies reported frequent referrals, which can introduce additional obstacles – including cost, insurance status, and access to timely appointments [13,20]. For uninsured patients, this can result in delays or complete loss of follow-up. Expanding procedural capacity within clinics and forming partnerships with nearby hospitals or low-cost specialty providers may help mitigate these gaps and improve continuity of care.

2.6. Impact of Offering Dermatologic Care at Free Clinics

Free clinics offering dermatologic services serve as an essential source of care for underserved populations who face systemic barriers to specialty care. Across the studies reviewed, these clinics primarily served uninsured or underinsured patients, many of whom were also affected by other social and structural challenges such as language barriers, financial hardship, or housing instability. The variety of skin conditions treated – from inflammatory dermatoses to skin cancers – highlights the broad dermatologic need in these populations. Notably, several studies reported that many patients (sometimes even most) had been living with their condition for over a year before seeking care, reinforcing the role these clinics play in enabling earlier diagnosis and intervention, ultimately advancing health equity and reducing dermatologic health disparities faced by low-income populations. These services also appear to have a lot of positive receptivity among its patient population. Patients consistently reported high levels of satisfaction and a strong likelihood of returning for future dermatologic visits. Thus, the impact of these clinics lies in both the medical care delivered and in the increased trust and connections they help build between patients and the healthcare system. While limitations remain – including follow-up challenges, referral barriers, and procedural constraints – the overall outcomes and reported experiences strongly support the necessity of expanding dermatologic services within free clinic models. As the need for accessible dermatologic care remains crucial, these clinics offer an equitable and impactful solution to reducing dermatologic disparities in underserved populations.

3. TELEDERMATOLOGY

Teledermatology allows for remote evaluation and management of skin conditions using telecommunications technology. Services are typically provided through two formats: synchronous consultations, which occur in real time via video or phone, and asynchronous systems, which use a store-and-forward system that transmits clinical information and images for later evaluation [26]. The adoption of teledermatology has significantly increased in recent years, especially to improve access for underserved populations. During 2010-2015, approximately 46% of countries established teledermatology programs. According to a survey of 733 practitioners, the COVID-19 pandemic accelerated teledermatology usage to the point where 75% of dermatologists conducted their visits remotely [26]. This increased adoption demonstrates how teledermatology can connect patients to medical care during periods of restricted in-person visits.

3.1. Target Population of the Teledermatology Model and its Impacts on Accessibility

Teledermatology programs exist to deliver medical care to patients who face barriers accessing specialty care facilities due to their location, financial situation, or other obstacles. The U.S. Veterans Health Administration has established robust teledermatology services for veterans lacking local access to dermatologists [26]. Community health centers and free clinics also use this model to reach uninsured and Medicaid patients, with one Philadelphia study reporting that 61% of patients would have otherwise gone without care [26]. Internationally, a program in rural Haiti showed that teledermatology collaborations between primary care providers and dermatologists achieved a 69% diagnostic concordance rate, resolving cases within an average of 1.7 days. [27]. These examples demonstrate teledermatology's ability to expand access to and

reduce delays in dermatologic care for underserved populations.

3.2. Trends in Diagnosis among Teledermatology Models

While teledermatology is used to assess various skin conditions, most cases fall into a few key categories (Table IV). Inflammatory diseases (such as eczema, dermatitis, and psoriasis) and suspicious lesions for cancer evaluation are the most common reasons for consultation. In fact, at one free clinic that uses teledermatology, eczematous rashes appeared in 31% of cases, while 26% involved neoplastic lesions [28]. Additionally, a large safety-net teledermatology service found that 65% of consults were for isolated skin lesions and 30% for rashes [29]. Other frequently managed conditions include acne, follicular disorders, pigmentary changes, and cutaneous infections [28,29]. These patterns indicate teledermatology's role in managing a wide range of skin conditions, ranging from chronic conditions to suspicious lesions.

Table IV. *Most Frequently Encountered Conditions in Teledermatology Consultations (illustrative data from selected studies)*

Condition Category	Approximate share of telederm cases	Sources
Dermatitis / inflammatory rash	30% of cases	[28,29]
Suspicious neoplasms (including moles)	20–25% of cases	[28,29]
Acne and follicular disorders	10–17% of cases	[28,36]
Infections (e.g., fungal skin infections)	10% of cases	[27,29]

3.3. Diagnostic and Therapeutic Effectiveness of Teledermatology

A central question in teledermatology research is how well remote diagnoses compare to in-person evaluations. A 2023 systematic review and meta-analysis by Bourkas et al. found an overall diagnostic concordance rate of approximately 68.9% between teledermatology and face-to-face dermatology, with a Cohen's kappa of ~0.67 (indicating substantial agreement) [30]. Concordance was notably higher when the teleconsultation was conducted by a dermatologist. Studies in which the same dermatologist provided both teledermatology and in-person evaluations showed ~71% agreement compared to ~44% when non-dermatologists made the initial teledermatology diagnosis. High-quality imaging and provider training further improved diagnostic accuracy – in fact, interobserver agreement reached 76% and diagnostic cordance with histopathology was around 55 to 56% [30]. These findings demonstrate that while teledermatology may not replace in-person evaluation for all cases – especially for conditions requiring biopsy confirmation – it remains an effective diagnostic modality when used appropriately (especially with board-certified dermatologists and high-quality imaging). In addition to diagnostic accuracy, teledermatology has proven effective for supporting both treatment and procedural planning. Most consultations result in specific treatment recommendations, including prescriptions, biopsies, or simply providing reassurance. A county-based teledermatology program found that 25 to 30% of cases were fully managed remotely (without a dermatology office) when sufficient clinical images were provided (Figure I) [29].

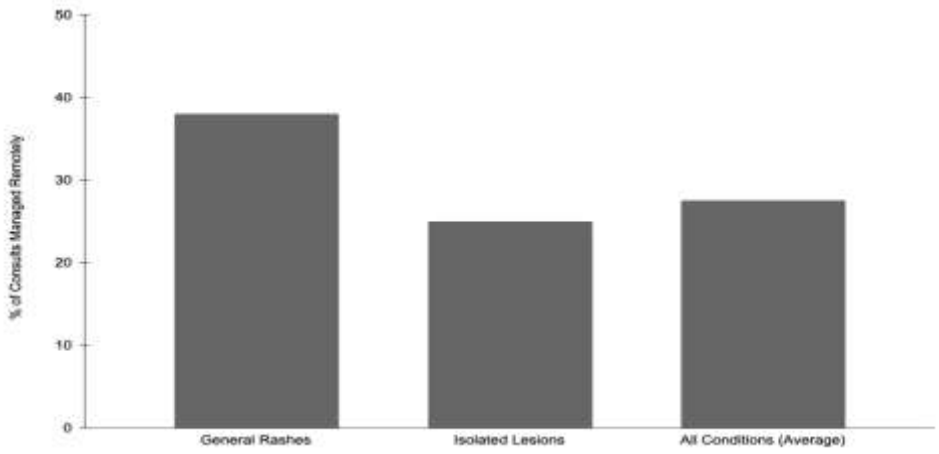

Figure I. *Percent of Cases Managed With Teledermatology, Without an In-Person Visit*

Notably, general rashes were more often treated remotely (38%) than isolated lesions (25%) because these lesions needed in-person, procedural follow-up. The remote management of these cases through teledermatology reduces the workload of specialty clinics, while allowing for more in-person slots available for patients who need both physical examinations and procedures [26]. Additionally, it shortens wait times for in-person visits by nearly 50% in safety-net settings [26] and enables faster intervention for critical cases, leading to earlier biopsies or surgical procedures compared to a solely face-to-face setting [31]. Outcomes are comparable to traditional care, and patients show high compliance with treatment plans due to the ease and convenience of remote care [32]. Teledermatology thus functions as an effective dermatology care extension.

3.4. Patient Perspectives on Teledermatology

Patients consistently reported high satisfaction with teledermatology, largely due to its convenience and the ability to receive care without leaving the home [32,33]. In underserved communities, it is highly favored because it offers access to medical services that might otherwise be unavailable [26]. A review by Lopez-Liria et al. (2022), analyzing teledermatology programs across Europe and the U.S., found that teledermatology is well-received by both patients and providers while it also reduces healthcare expenses [32]. Notably, during the COVID-19 pandemic, many practices adopted telehealth visits and patients comfortably transitioned to teledermatology for non-urgent visits, and expressed willingness to continue using it because it provided specialist input without an office visit [32]. Santiago & Lu (2023) found patient satisfaction rates as high as 98%, with patients valuing the faster access to specialists and shorter wait times associated with teledermatology [33].

While overall satisfaction with teledermatology is high, there is some variation as some patients report lower satisfaction compared to in-person visits due to technical issues, privacy concerns, and the lack of physical examinations [33]. Older patients and individuals with limited technical proficiency sometimes struggle with video visit systems and uploading skin photographs through teledermatology platforms, while others feel uncomfortable sharing images of certain skin conditions [32,33]. Some patients also prefer in-person visits for services like full-body skin exams or same-day biopsies, which telederm cannot provide. Despite these concerns, it is important to note that many of these issues can be mitigated. Providing technical support and clear instructions helps older patients successfully use teledermatology and overall improve usability [33]. Additionally, patients can feel secure about their privacy when medical providers establish private communication channels and attain consent for photographing patients. Notably, hybrid models (such as those combining video visits with pre-visit calls from medical students) have resulted in minimal no-shows and enhanced patient comfort and experience [34]. When well implemented, teledermatology can achieve successful satisfaction levels comparable to traditional face-to-face care.

Table V. *Summary of Teledermatology Benefits*

Benefit Category	Key Findings
Access to Care	Improved access in rural, low-income, and non-English speaking populations
Diagnostic Efficiency	High diagnostic concordance (~69%) with in-person visits
Treatment Outcomes	Comparable outcomes for chronic conditions (e.g., acne, eczema)
Patient Satisfaction	High patient satisfaction (>90% in multiple studies)
Cost Effectiveness	Lower cost compared to traditional care models

3.5. Limitations and Potential Solutions of the Teledermatology Model

Implementing teledermatology in underserved communities (particularly in low-income or rural areas) requires addressing barriers such as limited access to smartphones, computers, and reliable internet [26]. This digital divide restricts its reach to those who may benefit most. For example, only 54% of elderly veterans in remote areas were willing to use video visits, while younger, higher-income individuals were more likely to participate [26]. To overcome these challenges, alternative delivery models have proven effective.

The store-and-forward provider-to-provider model allows primary care staff to collect images and clinical information for dermatologists to review, eliminating the need for patients to navigate technology themselves. This approach is especially useful in rural clinics and nursing

homes, where on-site staff performs the consult for patients. When video is not feasible, audio-only visits can maintain care continuity, as seen during the COVID-19 pandemic [26]. Programs should also offer real-time technical support (through hotlines or staff members) as a standard of care. Multilingual support further improves accessibility, with many clinics reserving Spanish-speaking slots and using interpreters to support non-English-speaking patients [34]. Ultimately, bridging this digital divide through thoughtful program design and support systems is essential to making teledermatology accessible in underserved settings.

Table VI. *Barriers and Solutions in Teledermatology Implementation*

Barrier/Challenge	Solution/Strategy
Lack of smartphones/internet in low-income/rural areas	Use of store-and-forward teledermatology through primary care clinics
Low digital literacy among patients	Technical support, coaching on photo-taking, user-friendly software
Language barriers for non-English speakers	Multilingual staff and interpreter availability in telederm clinics
Patient discomfort with photo submission or video platforms	Clear instructions and privacy assurances; hybrid video/phone options
Limited technology access among elderly populations	Offer audio-only consultations and assistive onboarding processes

Provider-side challenges include integrating teledermatology into clinical workflows and surmounting certain limitations of remote care. The quality of images stands as the most critical factor in teledermatology, as substandard photographs can prevent proper diagnosis, requiring additional photo requests or direct patient visits [29]. To address this, programs must train referring clinicians and patients in direct-access models, and implement standardized photo protocols, such as using appropriate lighting, focus, and including a ruler [26]. Notably, clinics employing nurses or medical assistants to take images achieve more consistent results. Successful programs also create referral systems for procedural follow-up, and coordinate patient care between teledermatology and face-to-face services with administrative support to maintain teledermatology as a complementary service instead of an isolated system. The telederm consult process also needs integration with electronic health records and scheduling systems, as having separate processes often reduces clinician adoption rates [35]. Acceptance of teledermatology has begun to grow over time, as providers recognize teledermatology's benefits (such as faster response times and decreased clinic burden) [33].

Policy has continuously influenced teledermatology's growth. Before 2020, reimbursement by insurers was limited to rural areas and often lower than in-person visits, while licensing restrictions hindered interstate telederm consults [35]. The COVID-19 pandemic brought temporary changes, including payment parity and interstate licensing waivers, which significantly expanded telederm access. Sustaining teledermatology services thus requires permanent reimbursement parity and flexible licensing. Additionally, insurance coverage for store-and-forward services need to be implemented broadly, which some states have already mandated [26]. As supportive policies expand, more institutions and providers will be empowered to offer teledermatology, especially for underserved populations where margins are slim and financial support is necessary to justify new services.

While teledermatology has implementation challenges, they can be overcome with strategies like investing in technology, training users, integrating workflows, and advocating for supportive policies. Programs in both resource-rich and limited settings show that telederm can be successfully implemented. Rural clinics in developing countries, for example, have used simple smartphone-based systems with excellent diagnostic results when staff are trained properly [36]. By addressing technical, educational, and systemic limitations, teledermatology can become an accessible, effective, and sustainable solution for underserved communities.

3.6. Impact of Teledermatology in Reducing Dermatologic Disparities

As it allows for a wider reach of dermatologic care, teledermatology plays a prominent role in advancing health equity and, in turn, reducing dermatologic disparities. Before the onset of this model, the uneven distribution of dermatology providers left many rural and low-income individuals without timely access to care. By utilizing this growingly digital world's

technology, teledermatology allows for this care to be provided to patients in geographically isolated or resource-limited settings, enabling earlier evaluation and intervention for conditions that might otherwise go untreated. It also eliminates the need for in-person visits, helping those without insurance, transportation, or the flexibility to miss work – barriers that disproportionately affect underserved populations. In doing so, teledermatology not only improves access to care but also serves as a powerful tool for closing long-standing gaps in dermatologic health outcomes.

4. Street Dermatology

4.1. Street Medicine Patient Populations and Accessibility to Care

Persons experiencing homelessness (PEH) are among the largest groups without access to adequate healthcare [37]. Chronic illness, whether physical or mental, can lead to job loss, lack of insurance, and worsening health, while homelessness itself increases exposure to infection, malnutrition, and stress [37]. The lack of access to healthcare in such populations is multifaceted. Barriers such as lack of transportation, stigma, and distrust in the healthcare system often deter individuals from utilizing free clinic services, resulting in higher emergency department use as basic healthcare needs go unmet [38]. In 2024, the US Department of Housing and Urban Development reported a record 771,480 individuals experiencing homelessness, with 32% identifying as African American and 31% as Hispanic [39].

Street medicine addresses this gap by delivering care directly to encampments and shelters, offering services such as primary care, behavioral health, and dermatology [38,40]. One of its key strengths is eliminating the distance between the patient and the medical system [40]. A 2019 study highlights that increased travel distance has been linked to poor dermatology follow-up, making accessibility essential [41]. Yet, many states with high PEH rates (such as California and Georgia) have some of the lowest dermatologist densities [39,42]. Additionally, an estimated 40% of the U.S. population lives in areas with limited access to dermatologic care [43]. Therefore, the street medicine model can be utilized as a non-traditional healthcare tool to provide dermatologic care to such marginalized populations.

4.2. Diagnosis, Treatment, and Outcomes of the Street Medicine Model

Street medicine offers a range of services, depending on the availability of equipment, supplies and volunteers who can run the program. These services are typically categorized into three levels. Basic medical care is provided at the first level, encompassing a general assessment, patient education, and dispensing treatments and resources [44]. The second level delivers more targeted primary care, allowing for the performance of labs, electrocardiograms, small procedures, and vaccinations. The third level involves full-scale primary care, placing emphasis on preventative care and chronic disease management [44]. Although this structure is centered around primary care, a specialized model has been proposed for dermatology. In this approach, a team of physicians and students first engage PEH on-site [45]. If a dermatologist is present, a diagnosis and treatment plan may be offered immediately. Otherwise, clinical images are captured for later review, and the treatment is initiated during a follow-up visit. This allows for both on-site care and continuity of dermatologic management in the field.

A street dermatology program was implemented based on the structure outlined above. This program ran for 6 months in Miami-Dade County and diagnosed 125 skin conditions over a six-month period, with the top three diagnosed etiologic categories being infectious (28%), inflammatory (24%), and ulcerations/erosions/wounds (12.8%) (Figure II). Amongst the inflammatory causes, acne (3.2%), dermatitis (16%), psoriasis (1.6%), and seborrheic dermatitis (1.6%) were identified [45]. Of note, some infectious causes included tinea pedis (8%), onychomycosis (8%), verruca vulgaris (3.2%), and scabies (2.4%). Seborrheic keratosis (4.8%), actinic keratosis (2.8%), solar lentigo (1.6%), and melanoma (0.8%) were determined as part of cutaneous neoplasm or UV damage conditions.

A similar program by Eachus et., al recorded 112 skin conditions over seven months using a REDCap-based electronic medical record (EMR) system [46]. Diagnoses were characterized as infectious (40.1%), inflammatory (4.5%), wounds (12.5%), miscellaneous (24.2%), nail disorders (7.1%), and unidentified conditions (11.6%) (Figure II). Wounds and ulcers resulted in the highest morbidity and required repeated

care. Treatment dispensed in this program included topical antifungals (11.5%) and topical antibiotics (13.4%) for infections, topical steroids (10.2%) for inflammatory conditions, wound care supplies (32.5%), emollients and barrier protection, lidocaine gel, powders, and hygiene kits (32.4%) for miscellaneous and unidentified conditions. The use of a customizable EMR system enabled better tracking of dermatologic trends and enhanced care delivery for this population.

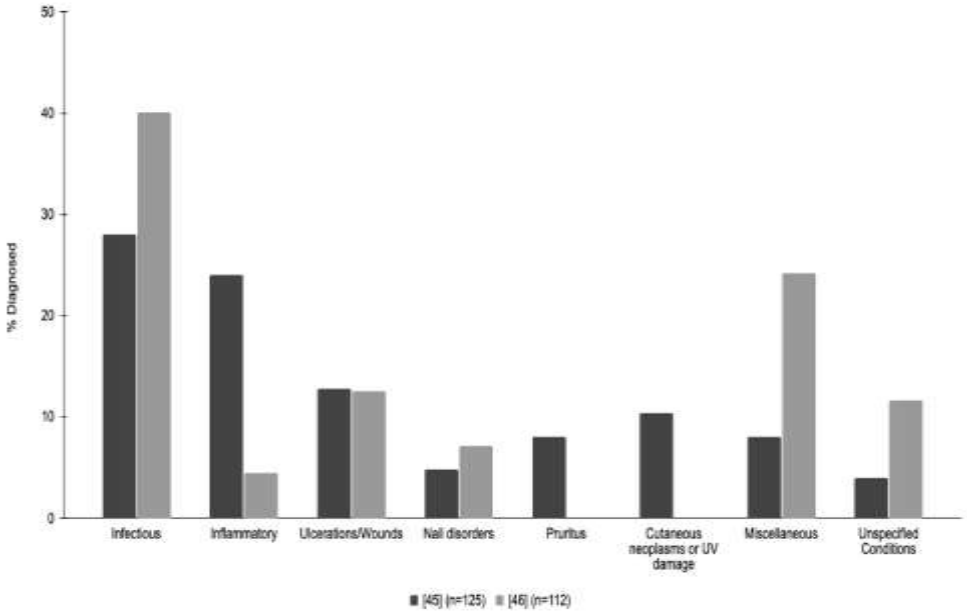

Figure II. *Trends in Dermatologic Conditions Encountered in Street Medicine Programs*

The conditions diagnosed in the studies above align with trends identified in a recent scoping review of 93 articles on dermatologic presentations among PEH [47]. Similar to what is seen by street dermatology programs, infectious conditions and infestations such as foot infections (38%), tinea pedis (3.1 to 38%), and body lice (0.15% to 30%) placed the highest burden on unsheltered populations. Although few malignant cases were observed in the street dermatology programs, PEH populations have a 25% higher prevalence of malignant growths [48]. These findings reinforce the need for accessible, inclusive dermatologic care for PEH.

4.3. Patient Perspectives on Street Medicine Services

The healthcare system often falls short in providing accessible care to PEH, with a critical issue being the lack of trust in the system [40]. Understanding their perspectives can help create a more inclusive approach. Frankenberger et al. identified three key principles for street medicine: individualism, humanism, and non-judgmental care [49]. These principles ensure care is tailored to each patient's goals, promotes autonomy, and fosters trust. This “whole person” approach emphasizes listening attentively, progressing at the patient's pace, and avoiding judgment for nonadherence, helping build respectful relationships between PEH and staff.

A study interviewing PEH who received on-site care revealed how street medicine can positively shape patient perspectives [50]. Many patients described feeling dehumanized and disconnected from society due to their social status, while others avoided clinics out of fear over lacking insurance or the ability to pay. Conversely, when asked about the care received on location, they expressed several advantages to such services, and on-location care was seen as more accessible and responsive. Patients reported shorter wait times, direct management of their concerns, and continued care through specialist referrals when needed. The informal structure of these encounters also fostered trust and a sense of safety, highlighting the emotional and practical relief this model can offer to marginalized populations.

A case report of a 65-year-old unsheltered patient with pyoderma gangrenosum managed by the Miami Street Medicine team demonstrated how longitudinal wound care – using only saline, foam dressing, and elastic bandages – resulted in reduced pain, discharge, and lesion size over seven months despite resource scarcity, as immunosuppressants were avoided due to safety

and cost concerns [51]. This case highlights both the adaptability required in street medicine and the urgent need for dermatology-focused programs, as untreated cutaneous disease in PEH populations often causes physical suffering, stigma, and avoidance of hospital-based care.

4.4. Benefits and Limitations of the Street Medicine Model

There are several benefits to the street dermatology model. First, since care is being brought to patients, transportation to free clinics is not needed [40]. Moreover, this model delivers care to individuals regardless of insurance coverage [40]. The support provided with street medicine models is patient-centred and individualized, reducing the stigma faced in typical clinical settings. Recent studies have also seen a reduction in emergency room visits as a result of street medicine programs [38]. Finally, this model is a great learning opportunity for students and researchers. Students will be able to learn from the medical team on-site and learn to provide immediate care.

Despite the advantages offered by the street medicine model, the model is still novel and limited. Continuity of care and patient follow-up is one such limitation. The intricacy of conditions seen in unsheltered populations may require the need for longitudinal and specialized care, which may not be provided by all street medicine programs. There is also great concern with prescribing medications that need long-term monitoring or require completion of a full course such as antibiotics [52]. Another issue that arises is the storage and monitoring of medications, ensuring that they are stored at the correct temperatures and have thorough instructions for each patient. The creation of standardized guidelines that outline the responsibility of each individual within the team and procedures for referral and safety netting may greatly benefit this program. Moreover, a protocol outlining the appropriate procedures for dispensing and storing medications will allow for a more organized approach to care [52]. The psychological impact on staff is another concern, as treating unfamiliar conditions can lead to stress and burnout. Standardized programs could support staff with regular check-ins and mental health resources. The introduction of more standardized street medicine programs could allow for providing staff with check-ins, access to mental health resources, and a better understanding of the types of improvements that should be made. Lastly, there is limited qualitative and quantitative data on street medicine programs, specifically those in the field of dermatology. However, this growing field, supported by studies and case reports discussed in this section, underscores the importance of further research into this model of care.

4.5. Significance of the Street Medicine Model on Dermatologic Care in Marginalized Populations

Street medicine has revolutionized the type of care available to people experiencing homelessness. This model directly addresses the barriers faced by marginalized groups, eliminating the need for health insurance and access to transportation, while providing care in a stigma-free and safe environment. Although this model has been commonly used in the treatment of primary care conditions, it is novel in the field of dermatology. However, as outlined in this section, case reports and studies are now addressing the importance of this model in dermatology. It is clear that dermatologic conditions are not only highly prevalent in populations of unsheltered individuals, but often go untreated despite being manageable conditions. This is attributed to patients' distrust of the system, the cost of treatments, and living conditions that may further deteriorate their health. The street medicine model of care targets such issues, bringing non-judgmental care to patients while placing great emphasis on the maintenance of patient autonomy and humanity.

5. DISCUSSION

Each model discussed in this review – free clinics, teledermatology, and street dermatology – have proven to be powerful contributors to overcoming the dermatologic disparities faced by marginalized and underserved populations. These models each have their own strengths and limitations, and understanding these can inform future implementation and policy strategies.

Free clinics provide essential dermatologic services to uninsured and low-income individuals who might otherwise forgo care. Their strengths lie in accessibility, cost-free services, patient trust, and high patient satisfaction, with studies reporting clinical efficacy across a wide range of conditions [53].These clinics often serve as the first point of contact for untreated dermatologic issues, but face limitations such as restricted procedural capacity, reliance on volunteers, and challenges

with follow-up due to transportation and referral barriers [54]. These limitations can be addressed by partnering with local health systems to expand procedural capabilities, securing stable funding to reduce reliance on volunteers, and implementing teledermatology clinics to improve follow-up access for patients facing transportation or referral barriers [54].

Teledermatology excels in scalability and rapid access. It effectively addresses geographic and workforce shortages by enabling remote evaluation and triage [55]. Diagnostic accuracy is relatively high, especially when performed by board-certified dermatologists using quality imaging. It allows for early diagnosis for patients who are not able to access a physician in-person immediately. It also enables early diagnosis for patients unable to see a physician in person, allowing for prompt medical responses in critical cases. This leads to earlier biopsy or surgical procedures avoiding delays with traditional in-person consultations. [56]. The model has limitations, including limited access to smartphones, internet, and digital literacy, particularly for older adults, rural populations, and non-English speakers [26]. Additionally, some patients feel uncomfortable using remote platforms, especially for sensitive conditions.

Street dermatology redefines accessibility by bringing care directly to persons experiencing homelessness. This model eliminates major access barriers including transportation, insurance, and stigma [45]. It demonstrates particular strength in building trust with marginalized patients, offering patient-centered care, and managing both acute and chronic skin conditions in resource-limited settings. However, sustainability remains a concern. Challenges include limited longitudinal follow-up, difficulty monitoring complex treatments, and provider burnout. Lack of standardized protocols and formal funding also restricts program growth [52].

Despite their successes, all three models face many gaps. Free clinics often lack surgical capacity and depend on unstable funding and staffing [54]. Teledermatology is constrained by digital inequities, and street dermatology faces logistical hurdles in continuity of care and medication safety [26]. No single model can fully address the dermatologic needs of underserved populations, so a coordinated, multimodal approach is essential. Improving integration between these models could enhance impact. For example, incorporating teledermatology into free clinics may extend reach and reduce specialist referral bottlenecks [57]. Street medicine teams could utilize asynchronous teledermatology for on-site diagnostic support. Additionally, establishing community partnerships – with academic centers, public health departments, and hospitals – can expand procedural capacity and streamline referrals [54]. Lastly, training and mental health support for volunteers and clinicians is critical for sustainability.

In addition to developing a multimodal approach, policymakers must address structural constraints limiting scalability, such as funding for free clinics to offer dermatology services and supporting mobile outreach units through public health grants [54]. Investments in digital infrastructure and multilingual support will also bridge the digital divide for teledermatology, improving access and encouraging long-term investment in underserved care [58]. These models reduce dermatologic disparities by enabling early diagnosis, patient education, and timely treatment, which improve quality of life and long-term health outcomes. Importantly, they foster trust in the healthcare system – a crucial step for sustained engagement and preventative care in marginalized communities [59].

Expanding access to dermatologic care through nontraditional models can inform broader healthcare reforms, promoting community-based, integrative, and patient-centered approaches. As healthcare systems continue to evolve, embedding flexibility and accessibility into dermatologic care delivery will be vital in reducing disparities and ensuring health equity.

6. Conclusion

Access to dermatologic care remains a critical unmet need among underserved populations in the United States. Innovative care models such as free clinics, teledermatology, and street dermatology have developed to address the structural, financial, and logistical barriers preventing timely diagnosis and treatment. Each of these models offers a unique contribution to reducing disparities while sharing common strengths: adaptability, patient-centered design, and measurable clinical impact. Free clinics, although limited in number, offer a valuable entry-point for patients with untreated skin conditions, thriving off of volunteer-driven care and fostering patient trust in the healthcare system. Street dermatology similarly expands the reach of the healthcare system by delivering care directly to individuals experiencing

homelessness, removing barriers like transportation, stigma, and insurance. Teledermatology adds another layer by bringing remote care to rural and isolated communities through virtual diagnosis and triage.

Although no single model can fully resolve the access gap, a multimodal approach blending in-person, virtual, and mobile services is essential for achieving equitable dermatologic care. Expanding these care models will require sustainable funding, standardized protocols, strong community partnerships, and policy changes to overcome systemic barriers and to ensure long-term sustainability. Ultimately, free clinics, teledermatology, and street dermatology offer sustainable, patient-centered solutions that can reshape dermatologic care delivery to vulnerable populations. Integrating these models into the broader healthcare system will be essential in fulfilling the field's commitment to equity and access for all patients.

Abbreviations Used

QoL = quality of life

SRFC = student-run free clinic

PEH = persons experiencing homelessness

Conflict of Interest Statement

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