Introduction

It is well known that there is a large uninsured population in America[1]. Although the gap in Medicaid coverage has been decreasing with the recent healthcare changes, many individuals still rely on other options for their medical care[1]. One of the safety nets available to the United States population is a network of free clinics. Free clinics provide about 3 million visits per year, each seeing an average of about 3000 patients per year[2]. However, much of the care provided is on a volunteer basis and is largely based around primary care.

Many types of free clinics exist. Most clinics run in established locations such as churches or schools and allow walk in visits as well as scheduled appointments, just as traditional clinics[2,3]. Others reach out to communities through large screenings or mobile clinics[4]. However, only a small percentage are comprehensive, offering case management, social workers, laboratory services, gynecologic and reproductive health care, and medications. Furthermore, few offer specialty services.

One subset of free clinics gaining traction, especially in medical schools are student-run free clinics (SRFC). SRFCs uniquely offer medical students experiential learning and more autonomy than the traditional clinical setting without reducing the quality of care. Furthermore, most SRFCs offer comprehensive, interdisciplinary care[5,6]. Finally, the structure of some SRFCs allow students to spend more time with the patients than is typical for a physician.

Specialty care, specifically otolaryngology care, in the underserved population is more sparse than primary care[7]. Furthermore, patients from lower socioeconomic backgrounds or areas with health care provider shortages face a higher burden of ENT related disease[8]. Not only is the head and neck cancer burden higher in underserved communities, but there is also a greater need for overall otolaryngology care in rural regions[7,9].

There are many challenges to bringing ENT care to the underserved. Namely, otolaryngology has specialized equipment and may require technical procedures such as audiograms or flexible laryngoscopy. Additionally, many otolaryngology conditions require relatively expensive interventions such as CT scans or biopsies for neck masses. Many communities have tried to address these problems through outreach and screenings[10–12]. Other groups have attempted telehealth practices to reach underserved regions with provider shortages[13,14]. Only a few groups have run successful free clinics to provide otolaryngology specific consultations for the underserved[15,16]

The UCSD SRFCP provides healthcare to an underserved population of San Diego that otherwise does not qualify for access to care[3]. While the clinic mainly provides primary care, there are also a number of specialty clinics available, including otolaryngology. The otolaryngology clinic began in January 2010, with the addition of audiology in early 2011. The clinic began with 1 volunteer attending and 1 audiologist who saw 2-3 patients every 2 months. Currently, there are 2 volunteer attendings who see 2-4 patients every 6 weeks in addition to

the audiology clinic. The purpose of this study is to identify and describe the UCSD SRFCP ENT population and to describe this sustainable clinic model.

Methods

Scheduling, Staffing and Follow-up

The clinics of the UCSD Student-Run Free Clinic Project (SRFCP) take place at various sites throughout San Diego Monday through Friday. The SRFCP Otolaryngology Clinic is held about every 6 weeks on Wednesday evenings at the UCSD SRFCP Pacific Beach site. Clinics are staffed by medical students, community attendings, and audiologists on a volunteer basis. A minimum of 2 medical students, 2 audiology students/audiologists, and 1 otolaryngologist attend clinic each month. In addition, other volunteer staff available at the UCSD SRFCP includes social workers, volunteer attendings of other specialties, and pharmacists. In addition, there are 4 core family medicine attendings, supported by the clinic funds, who see all of the patients in the general clinic. The medical students keep a running list of all otolaryngology referrals from the general clinic and are responsible for calling, scheduling, and reminding patients of the date and time of the appointment.

Patients requiring follow-up appointments are noted by the medical students and scheduled. Further evaluation such as laboratory tests, imaging, other studies and consultations with other specialists can be arranged through the UCSD SRFCP infrastructure. Patients requiring further care either receive follow up care with the same attending physician in their community office or may seek charity care with the help of the volunteer medical students and social workers.

Prescriptions for medications are available through the UCSD SRFCP pharmacy. Medications are obtained through Patient Assistance Programs (PAPs) or purchased by UCSD SRFCP and are provided to the patients free of cost.

There is no cost to the patients for the visit, services or procedures performed during the course of the clinic. UCSD SRFCP bears the costs of the supplies, equipment, and medications. The clinic is funded by various grants and donations[3].

All patient records are maintained either on paper chart (prior to 2014) or on an electronic medical record system (EPIC).

Data Collection

This was a retrospective medical record review. Patients over 18 years of age with ENT clinic visits from January 1st 2010 through June 30th 2015 were included in this study. We obtained study data from paper charts and EPIC. Data was stored in an online de-identified database that is HIPAA compliant (iShare).

Subject demographic data such as age, ethnicity, insurance status, education level, marital status, and past medical history based on patient report were obtained. Otolaryngology clinic encounter information such as chief complaint, diagnostic procedures, diagnosis, and management was recorded. Data were also collected for subjects referred to the clinic that were ultimately not seen. Descriptive statistics were calculated and presented.

This study was approved by the University of California Institutional Review Board project #151042.

Results

Over the 6.5 year time period, the otolaryngology free clinic had 85 visits, with 68 (80%) being new patient visits and 17 (20%) follow up. Over this same time period, the clinic received a total of 121 referrals with 53 (44%) patients who were never seen for various reasons (table 3). The median time between referral and clinic appointment was 43 days, though the range varied from 7 to 244 days.

Of the 68 unique patients, 20 (29%) were male and 48 (71%) were female (table 1). The mean age of the patients seen was 49 years old (range: 21 to 84). Most identified as Hispanic (49) and were primarily Spanish speaking (48). Most were unemployed (28) or homemakers (14) and few had more than a high school education (11).

The most common chief complaints were hearing loss, tinnitus, and rhinitis (table 2). The most common diagnosis was allergic rhinitis. The most common procedures performed were audiometry and tympanometry followed by fiberoptic laryngoscopy. Most patients received conservative or medical therapy.

The total value of services provided ($20,486) was estimated by Current Procedural Terminology (CPT) codes, though the patients were not charged (table 4). A typical office visit was estimated to be $188. Diagnostic procedures such as fiberoptic laryngoscopy, audiometry, and tympanometry were estimated to be $244, $79 and $31 respectively.

Discussion

This study demonstrates that this novel Otolaryngology free clinic model is unique and has successfully provided care to underserved patients despite some drawbacks. Additionally, this care model benefits all parties involved and is cost saving to the health care system. Moreover, this service is available to the underserved community at no cost and helps to expand the care options available to the uninsured patients who lack other resources or options.

From our findings, we believe that a student-run free clinic can successfully offer Otolaryngology consultations similar to any other ENT clinic. For one, our median wait time of 43 days is commendable given that the clinic is only held every 6 weeks. Furthermore, the diagnoses addressed by our volunteer physicians are similar to those from a general otolaryngology practice. From the most common conditions such as tinnitus, hearing loss, and rhinitis, to more difficult problems such as neck pain or dysphagia, we have seen a breadth of diagnoses.

Most of the conditions seen at the clinic are treated with conservative management and only receive referrals for more extensive work ups if there are concerning signs. Furthermore, one of the volunteer otolaryngologists is trained in acupuncture and utilizes this form of therapy for certain diagnoses such as TMJ dysfunction and allergic rhinitis. Anecdotally, the patients have found these therapies very helpful.

Most importantly for a surgical specialty, our clinic allows for procedures to be performed and for follow up to be coordinated. If something cannot be done in clinic, the system allows for outside referrals or further diagnostic procedure requests as well. For example, the most common finding that is worked up further is a suspicious mass, either with further imaging or outside referral.

Our clinic model differs from most other attempts at addressing the specialty care gap. Most models simply provide outreach or screenings. One successful model is the Hope clinic described by Shuman et

al[15]. While this model is similar to ours in many ways, the main difference is that they host the otolaryngology clinic at the University of Michigan Health System's clinic site so they would have access to specialized equipment. Currently, the UCSD SRFCP Otolaryngology clinic is located at a church and utilizes equipment donated and brought by staff members for each visit. This allows the clinic model to be more widely applicable, though access to specialized equipment remains limited.

There are many other benefits to the SRFCP Otolaryngology clinic model. For one, the clinic provides specialized care that is difficult to obtain for such patients with little access to the health care system. Some of these patients would otherwise wait until their conditions worsen and then either pay out-of-pocket for treatment or present to an emergency room. Thus, our model is overall cost saving to the health care system and to the patient, as problems are addressed earlier. Finally, there is an educational and social benefit for all of the parties involved. For one, the underserved patients receive personalized and dedicated care by highly trained specialists. The participating medical students benefit from additional clinical encounters and education, especially when clinical education is minimal in the first half of medical school.

Limitations of the clinic

Unfortunately, due to the nature of a volunteer based clinic servicing the uninsured, there were some limitations uncovered by this study. For one, there is a wide range of wait times between time of referral and consultation and many unseen referrals (44%). While in general specialty practices fewer referrals may be left unseen[17], in this free clinic setting with more hurdles for patients, a higher rate is not unexpected.

This can be partially attributed to the difficulties faced by the underserved population, such as access to transportation, time off of work, and family burdens. For example, while the UCSD SRFCP has multiple locations in San Diego, the Otolaryngology clinic is only at the Pacific Beach site. This location is farther away from the neighborhoods where most of our patients reside, making it difficult to access for those without a car.

Additionally, the relatively high rate of unseen referrals can be attributed to the infrequency of clinic. Unfortunately, the clinic frequency is largely dictated by the availability of the volunteer physicians and students. To address this issue, in periods of high referral burden, the staff has volunteered to hold clinic more frequently. However, why some of the referrals were not addressed still remains unclear.

If a patient's condition is too urgent to wait for the next clinic, their issues were dealt with by the family physician on staff. For example, one patient who had a rapidly growing neck mass who could not be seen by ENT within the next few days was first seen by the family physician who identified a potential urgent threat and referred the patient to the Emergency Department for immediate evaluation.

Another limitation of this study is that it is a single institution, single site retrospective review. The population seen by the clinic and conditions treated are highly dependent on the underserved population in the area. A similar clinic in a different location and state may see a different range of conditions. In addition, as the clinic relies on volunteerism, scheduling is subject to change based on the volunteer's schedules and commitment.

Future Directions

Moving forward, the clinic would benefit from an improvement in referral management. Currently, the referral scheduling is managed by medical students with minimal exposure to Otolaryngology. The next step for improvement would be additional training in triaging referrals. While the students have a dedicated faculty member to help when triage questions arise, they do not tend to seek assistance. Thus the additional triaging training would especially improve wait times for the more urgent referrals. In addition, it would be fruitful to compare our findings with other student-run free clinics that offer otolaryngology consultations as well. However, currently, very little literature is available about ENT free clinics. One potential route for collaboration is through the Society of Student Run Free Clinics. If other similar clinics publish their methods and findings, it may lead to an overall improvement in our ultimate goal of better care for the underserved community.

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Table 1: UCSD SRFCP Otolaryngology Clinic Patient Demographics from January 1, 2010 through June 30, 2015 (n=68)

Demographic Factor	n (%)
Sex	
Male/Female	20/48
Age (years)	
Mean (range)	49 (21-84)
Ethnicity	
Hispanic	49 (72.1)
Caucasian	7 (10.3)
Asian	1 (1.5)
African American	1 (1.5)
Native American	1 (1.5)
Not reported/other	9 (13.2)
Language most comfortable with	
Spanish	48 (70.6)
English	10 (14.7)
Chinese	1 (1.5)
Blank	9 (13.2)
Employment	
Employed	12 (17.6)
Unemployed/looking for a job	28 (41.2)
Homemaker	14 (20.6)
Retired	1 (1.5)
Blank	13 (19.1)
Highest education	
Junior high or lower	18 (26.5)
High school	25 (36.8)
Associate's degree or equivalent	2 (2.9)
Bachelors degree	9 (13.2)
Blank	14 (20.6)
Marital status	
Single	18 (26.5)
Separated	11 (16.2)
Married	21 (30.9)
Divorced	4 (5.9)
Widowed	3 (4.4)
Blank	11 (16.2)
Alcohol consumption	
Yes	24 (35.3)

No	44 (64.7)
Smoking Status	
Smoker	26 (38.2)
Does not smoke	42 (61.8)
Most common co-morbidities	
Diabetes	19 (27.9)
Hypertension	19 (27.9)
Hyperlipidemia	18 (26.5)
GERD	16 (23.5)
Allergic Rhinitis	12 (17.6)
Depression	11 (16.2)
Asthma	6 (8.8)
Hypothyroidism	6 (8.8)

Table 1 caption: Demographic factors based on intake questionnaire of all unique patients seen by the Otolaryngology clinic (n=68) in a 6.5 year time period.

Table 2: UCSD SRFCP Otolaryngology Clinic Encounter Characteristics: Chief Complaints, Diagnoses, Diagnostic Procedures and Therapies from January 1, 2010 through June 30, 2015

Chief Complaint (n=71)	
Tinnitus	15
Hearing Loss	14
Congestion/allergies	9
Vertigo	8
Otalgia	8
Suspicious mass	5
Dysphagia	6
Jaw/neck pain	6
Diagnosis (n=42)	
Allergic Rhinitis	10
Presbycusis	7
TMJ dysfunction	6
Ear infection	5
SNHL	5
GERD	4
Eustachian tube dysfunction	3
Sinusitis	2
Procedures (n=33)	
Audiogram/tympanogram	21
Laryngoscopy	9
Imaging	3
Therapies (n=64)	
Conservative	30
Medical	13
Hearing aid	6
Other referral	6
Acupuncture	5
Surgery referral	4

Table 2 caption: The table above lists various chief complaints, diagnoses, diagnostic procedures, and therapies noted in the medical records. The total number of chief complaint and diagnosis do not equal because some patients had multiple conditions and only most common conditions are listed.

Table 3: UCSD SRFCP Otolaryngology Clinic and Referral Characteristics from January 1, 2010 through June 30, 2015

Visits	n (%)
Total Patients seen	85
Unique Patients	68 (80)
Return Patients	17 (20)
New patients/year (n=68)	
2010	13 (19)
2011	11 (16)
2012	15 (22)
2013	7 (10)
2014	16 (24)
2015	6 (9)
Total number of referrals	121
Referrals not seen	53 (44)
Reason that referrals were not seen (n=53)	
No Show	13 (25)
Phone doesn't work	7 (13)
Saw someone else	6 (11)
Resolved	9 (17)
Unknown	18 (34)
Year Referred (n=121)	
2010	16 (13)
2011	33 (27)
2012	23 (19)
2013	17 (14)
2014	22 (18)
2015	10 (8)
Time between referral date and first appointment (days)	
Median (range)	43 (7-244)

Table 3 caption: The table lists various clinic and referral characteristics including number of patients seen and referrals received per year. Incomplete documentation prevented tabulating why some referrals were not seen.

Table 4: Estimated Cost of Services Provided

	Number of services provided	Cost per service	Total cost
Consult of office visit (typical)	85	$188	$15,980.00
Diagnostic fiberoptic laryngoscopy	9	$244	$2,196.00
Comprehensive audiogram	21	$79	$1,659.00
Tympanometry	21	$31	$651.00
Total			**$20,486.00**

Table 4 caption: Costs for above items were determined based on Current Procedural Terminology (CPT) codes and consultation with a community otolaryngology clinic. New and return visits were estimated to be the cost.