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Clinical one health: A novel healthcare solution for underserved communities



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ABSTRACT

Limited access to healthcare is a symptom of poverty worldwide. In Knights Landing, California, USA, an economically underserved, agricultural community, advocates recognized that integration of human and animal healthcare could provide a less intimidating gateway to services and facilitate assessments of individuals' health, not just in moments in time, but within the context of the complex interactions with other humans, animals, and their encompassing environment. Humans and animals share diseases resulting from common exposure to environmental pollutants and disease hosts and lack of adequate nutrition. Thus, a One Health-based clinic was established using an interdisciplinary approach to individual and community health. Interprofessional proximity allows veterinarians and physicians to help each other develop the full community-health picture, allowing sentinel cases to come to the forefront. With a collaborative One Health approach and clinicians adaptable to the changing needs of the population, the provision of community-centered healthcare has become more tenable.

1. The challenge

Low-income populations have many barriers to good health and access to medical care, including lack of transportation; insufficient means to pay for diagnosis and treatments; and inadequate access to education that informs on health, nutrition, and disease prevention. These factors are independently extremely complex. In addition, underserved communities often have a lack of trust in healthcare systems, making them wary of requesting care, especially from government-run institutions [1]. Amplifying the complex healthcare problem, work attendance and productivity significantly decline when those suffering from conditions, such as low back pain, hypertension, and diabetes, are unable to seek out healthcare [2]. Alternatively, when healthcare becomes accessible, ill people can seek medical care, empowering one step along the path out of poverty [3].

One potential gateway to improve healthcare access for underserved communities is by combining offerings with veterinary services, especially since an estimated 23 million pets live with impoverished families [4]. By seeking services for animals, people can become more educated about disease prevention and nutrition without directly engaging in a

perceived threatening environment or judgmental health system. For example, women may be more comfortable seeking care for a pet injured as a result of violence in the home than they are willing to report a spouse for domestic violence. In fact, women in shelters were eleven times more likely to report violence by their partners against a pet than those who said they had not experienced intimate violence [5]. Thus, discussing a pet's injuries and causes may lead to discussions about domestic violence and prevention options [6].

Animals play a large role in the lives of humans as companions and food sources, and their health is inextricably linked with that of their owners. Pets can be sentinels of environmental problems, as dogs develop disease, such as lead poisoning [7], in a more rapid timeframe than humans in a contaminated household. In addition to shared environmental exposures, infectious diseases transmitted between animals and humans (zoonoses), such as rabies or methicillin-resistant *Staphylococcus* spp. infections, are potential health problems in communities where pets can also be sentinels [8]. There are also positive health benefits from the human-animal bond, including improvement in mental, psychological, and social health [9]. Therefore, it is reasonable to assume that increased collaboration in animal and human

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healthcare delivery could be of benefit.

2. A community in search of a solution

Knights Landing, California, is an economically underserved, agricultural community in the USA that experiences seasonal surges in the migrant worker population. The majority of these migrant populations are undocumented immigrants. Reduced healthcare access is not surprising, given that the Knights Landing community did not have a medical center for over twelve years and has never had a veterinary clinic, despite the presence of many domesticated animals, including dogs, cats, chickens, and livestock. Nationally, 24% of Latino communities live in communities without healthcare providers, compared with Asians (10%) and Whites (13%) [10].

Community advocates recognized the problem of access to healthcare and reached out to the University of California, Davis (UCD), located approximately 20 miles away. Beginning in 2013, a primarily student-run monthly human and animal wellness clinic, named the Knights Landing One Health Center (KLOHC), was formed. This One Health-based clinic was established through the collaboration of the Davis Schools of Medicine and Veterinary Medicine, Chicana/o Studies Department, and Science Education Outreach Program, in coordination with Yolo County Public Health Department, Yolo County Animal Services, and community activists (California Rural Legal Assistance Foundation and Empower Yolo). This new collaboration allowed health providers to deliver needed care to the entire community. These community-based efforts have resulted in the United States' first clinical One Health demonstration site for holistic community healthcare, delivering linguistically competent services to the people and animals of Knights Landing and promoting both access to services and a broader approach to healthcare for the community.

3. Model one health clinical solution

One Health is a concept widely discussed as feasible for the development of programs and policy, yet its utility in a clinical setting had remained untested. The development of this clinical approach within the Knights Landing community has allowed an opportunity to assess its functionality for positive impacts on health outcomes. The American Veterinary Medical Association One Health Initiative Task Force [11] has named coordination of clinical care of humans and companion animals as one of the main challenges for successful application of the One Health concept. Rabinowitz and Conti [12] speculated that establishing clinics where physicians and veterinarians could work together would have positive human and animal health outcomes and play a critical role in One Health efforts to identify and control emerging infectious diseases [8].

Integration of healthcare can give providers the ability to assess an individual's health, not just in a moment in time, but within the context of the complex interactions with other humans, animals, and their encompassing environment. In fact, the limitations that complicate access to healthcare for this agricultural community are multilayered, and no unilateral approach had previously been able to successfully address the problem. In response, a comprehensive healthcare plan was developed that holistically addressed the needs of this community, sensitive to human and animal health linkages through a common environment.

3.1. Essential community stakeholder engagement

Beginning in advance of clinical implementation, the interprofessional KLOHC team worked to understand the unique community needs. Students and clinicians attended meetings with community leaders to determine immediate and long-term needs and developed services and educational offerings in response to requests. Since the opening in 2013, feedback from clinicians, students, community members, migrant worker legal representatives, and additional faculty

from the Schools of Medicine, Veterinary Medicine, and Department of Chicana/o Studies has been continually sought so the monthly clinics are adapted to best serve the population's needs.

3.2. Clinical approach

As a result of the participatory process, monthly clinics focus on preventive health and wellness of both human and veterinary patients. For human patients, primary care services, such as blood tests, physical examinations, treatment of acute non-emergent illnesses, management of chronic diseases, mental healthcare, reproductive healthcare (PAP smears and birth control), and nutritional counseling are provided. For animal patients, physical examinations; vaccinations for dogs and cats; external and internal parasite prevention; on-site cytology; blood tests including heartworm, feline retrovirus, and tick-borne disease testing; and basic grooming have been provided, along with low-cost spay and neuter through the UC Davis Veterinary Medical Teaching Hospital.

People of the community of Knights Landing reported not having gone to see a doctor for many years before visiting the KLOHC, and most said they had not ever brought their pets to a veterinarian, nor had their animals had any vaccines, including rabies. From 2013 to 2016, KLOHC delivered a total of 955 human clinical encounters, defined as each time a doctor examined a patient, as well as 1228 veterinary examinations.

Interprofessional proximity is very important to the successful application of the One Health approach in this clinical setting. Running clinics concurrently, with joint rounds on the clinic day, has facilitated beneficial communication. During rounds, team members give their perspectives of selected topics, such as zoonotic disease identified in the community, and clinical applications are discussed and optimized. Such an open forum also provides a training ground for healthcare students and professionals, exposing them to different professional perspectives, which has improved their respect for other professional sectors and their skills as doctors.

In this environment, veterinary and human clinicians help each other develop the full community-health picture, making diagnoses easier and allowing identification of sentinel cases. One incident involved a human patient who was referred to the veterinary team regarding a skin rash. Upon examination, the veterinary team diagnosed scabies, a zoonotic disease caused by the mite *Sarcoptes scabiei*, and communicated the appropriate treatment to the medical team. Over time, this collaboration has directed the improved understanding of the community's clinical picture, and the healthcare professionals have continued to develop and target a focused approach specific to the community being served. Education, both in the examination room and through seminars, includes nutrition, mental health, animal behavior, and basic first aid.

4. Future directions

When different disciplines come together to provide services and clinicians are adaptable to the changing needs of the population, the means to provide community healthcare becomes more tenable. The community acceptance and attendance of the Knights Landing One Health Clinic is testament to the need for alternative healthcare solutions, as evidenced by the clinic's existence and growth since its founding in 2013. Lessons learned in delivering the clinic and associated educational workshops include improved attendance when offering the clinic in a more central area and when providing educational classes and community meetings featuring senior healthcare professionals and guest experts. In the future, more formal evaluation of this clinic and others that may follow is highly recommended (see Supplemental Table 1 for suggested evaluation matrix). It is important to stress holistic community involvement to guide a healthcare approach specific to unique needs. Evaluations should be targeted in order to address the goals of specific clinics' objectives and may include

metrics, such as tracking of: [1] households presenting with an animal and human patient, [2] households reporting that they had not had access to or sought routine medical or veterinary care or education elsewhere in the past two years, other than through the One Health clinic, [3] number of zoonotic diseases identified and counseled, [4] sentinel health cases and/or concerns raised by households that have implications across One Health interfaces, and [5] cross-disciplinary health education and intervention recommendations made to households. In addition, if offered in an academic setting, such as the example provided, educational competencies mastered by the students participating, as well as knowledge and economic improvements achieved for the participating communities could be tracked and evaluated for ongoing improvements and to address scalability of the model. Efforts should also be inclusive of more disciplines trained in areas appropriate for specific community needs, such as hydrologist for assessing drinking water sources or psychiatry to address mental health. Future implementation of One Health clinics hold promise for improving community trust and access to healthcare as was seen in Knights Landing, improving livelihoods and giving communities the chance to rise out of poverty.

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Appendix A. Supplementary data

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