

Animals in Cities: Histories, Welfare, and People

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This research was conducted in response to a growing number of permissive urban animal agriculture ordinances across the nation. The first half of the research reviews the history of urban animal agriculture in the United States leading to today's trends in backyard poultry keeping ("Urban Agriculture" *Advances in Agricultural Animal Welfare*). The second half of the research ("A Method for Guarding Animal Welfare and Public Health: Tracking the Rise of Backyard Poultry Ordinances" *Journal of Community Health*) reviews the spatial and temporal attributes of urban poultry ordinances across 100 municipalities in Colorado. More poultry ordinances have been passed or modified in Colorado in the last five years than in the previous hundred. Comparing regulations to commercial operations and animal shelter surrenders, we find that permissive ordinances cluster near major urban areas even where they are in close proximity to large commercial operations. Most ordinances inadequately address both human and animal health and welfare concerns. Provisions governing animal slaughter and routine veterinary care are rare, presenting a concern for monitoring and intervening in public health crises. This research also surveys Colorado animal shelters which anticipate higher poultry intakes, particularly as unwanted birds are turned loose to become strays. Finally, this research includes public policy deliverables to model best practices based on a model from Fort Collins, Colorado, that became apparent in the course of conducting the second half of the research.

Urban agriculture

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13.1 Introduction: role of animals in early American cities

Animals have supported the founding and growth of early American cities in supplying labor, food, and, in some cases, are the basis of the local economy. Early city designers recognized the need to keep food sources close to consumers, and they planned supportive animal agriculture infrastructure into cities (Vitiello and Brinkley, 2014). The 1573 Laws of the Indies, a body of regulations issued by the Spanish crown to guide the design of new colonies, proscribed farmland in close proximity to villages, a common for pasturing livestock, and the siting of “slaughterhouses, fisheries, [and] tanneries” so “that the filth can easily be disposed of” on the village outskirts (Ordinances 122 and 129; King Phillip II of Spain and others, 1573). The resulting Spanish agricultural settlements shaped urbanization from the American Corn Belt to Chile, largely defining the geography of beef production into the late 19th century. Other examples of city designs for livestock include Boston’s Commons and Philadelphia’s four main green squares for pasturing.

To identify trends and make recommendations for modern urban animal agriculture, this chapter details the original rationale for animal welfare, animal control, and related land-use ordinances in urban areas. We focus on the United States, and the many changes which resulted in extracting urban farming from cities. Today, North America is experiencing a resurgence in backyard animal agriculture. Across the country, citizens are overturning historic bans. This chapter concludes with recommendations for revising regulations to better consider considering animal welfare and human health.

13.2 Importance for urban poor

Where animal agriculture was not planned, it sprang up out of necessity and economic ingenuity. Animal agriculture required less land than crops for food production, with the benefit that organic waste could be speedily processed as animal feed. The added waste management component of urban animal agriculture made the practice suitable to slums where public services rarely penetrate and food insecurity abounds. In an 1867 New York Times article, a reporter estimated that nearly one-half of New York’s tenement inhabitants relied solely on goats and chickens

for their diet ([New York Times, 1867](#)). These animals subsisted off of household vegetable waste and swill left in the gutters. Many modern cities, such as Cairo, continue to rely on animal agriculture to process city waste and feed low-income families in slum settings ([Fahmi and Sutton, 2010](#)).

13.3 Job of regulating: control, land-use, and welfare regulations

Animal agriculture is often associated with significant costs and risk to human lives ranging from minor concerns over the smell of manure to physical harm from stampedes and animal-to-human disease transmission. At the turn of the 20th century in New York City, manure overflowed the gutters, and copious effluent decreased the depth of the city harbors ([New York Board of Health, 1858](#)). Packs of rabid pigs roamed the streets endangering children ([The New York Evening Post, 1818](#)).

The work of cleaning up after animal agriculture was dirty and expensive for cities, prompting early regulations and bans for economic as well as public health reasons. The Chicago Department of Health, the second largest among city departments, devoted 71% of its budget to street cleaning work and removing dead animals in 1885 ([Garb, 2003](#)). As late as 1914, the New York Sanitary Bureau spent one-third of its time investigating applications for permits to keep chickens ([New York Times, 1914](#)).

13.4 Animal control: protecting people from animals

The regulation of animals in urban areas falls under two general categories: control and welfare. Animal control dates back to the medieval villages of Europe. The concept was brought to America with the first colonies in the form of the agricultural pound, a place for impounding lost or stray animals until they could be claimed. Many of the early animal agriculture ordinances date to the founding of cities, and predominately directed the uptake of stray animals to animal control agencies, which could keep the animals in the city pound or donate the carcasses to the city's Alms house to feed the poor ([Brinkley and Vitiello, 2014](#)). The earliest ordinances focused first on stray pigs and later expanded to include cattle, small ruminants and, last, poultry ([Brinkley and Vitiello, 2014](#)).

As cities modernized and saw fewer benefits from animal agriculture, animal control ordinances proliferated. Eventually, cities codified animal control regulations with land-use ordinances which prescribed the aesthetics, size, and setback of animal housing, as well as the sex, numbers, and species of animals kept in particular neighborhoods ([Butler, 2012](#); [Hodgson et al., 2011](#); [Salkin, 2011](#); [Voigt, 2011](#); [Brinkley and Vitiello, 2014](#)). For example, in 71 of the 100 largest American cities, chickens are regulated through animal control ordinances ([Bouvier, 2012](#)). In 14 of the 100, land-use ordinances are further codified in the city's prescriptive zoning code, a land-use regulatory concept that arose in the 1920s. As new subdivisions

and cities were founded throughout the United States, they used the boiler plate language found in older city documents as the basis for their regulations, often setting up the same system of managing urban agriculture (Horst et al., 2016).

The adoption of land-use ordinances was further spurred by major economic shifts as the delineation between agricultural and urban lands reified (Bartling, 2012; Fogelson, 2007; Orbach and Sjoberg, 2011). With the advent of the train, animal products could be sourced from further distances (Cronon, 2009). Cars replaced the use of horses, and urban animal agriculture fell out of favor as cities grew in size. The prohibition movement saw the closure of city distilleries, removing the need to keep urban herds of cows and pigs to process spent grains. Ordinances forced slaughterhouses and butcher shops to centralize and pushed the operations to the urban periphery. Cattle no longer needed to be herded through city streets on their way to slaughter. Sanitation services such as municipal trash removal and county landfilling were established through municipal budgets to replace informal waste processing by piggeries. Though the services that animals provided to urban areas had been mechanized by the early 1900s, animal agriculture exited the urban sphere begrudgingly, particularly in poorer neighborhoods where transportation, sanitation services, and the commercial food system did not penetrate as readily.

Simultaneously during the 19th century, pounds shifted from sheltering large farm animals of higher monetary value to sheltering dogs and cats. As a result, the financing structure changed from one where the pound could sell its animals for profit to one where public and private funds were needed to carry out duties. In response, the scope of animal control agencies over livestock was subsumed by a host of affiliated public and private agencies, such as nascent public health agencies, police departments, and nonprofits. Moreover, while publically funded, numerous private and nonprofit animal agencies bid and compete for animal control contracts, further blurring the delineation between public and private responsibilities for animal welfare. Today, animal control serves to respond to calls about animal nuisances in the form of dangerous or stray animals, including wildlife. Rarely is animal control equipped to respond to concerns over livestock.

Though most ordinances banning animals were originally formed on the basis of public health, they often had redevelopment undercurrents aimed at removing low-income groups of people to make way for urban renewal (Brinkley and Vitiello, 2014). New York's Central Park is one such example. Before it was Central Park, the land at the heart of Manhattan housed unglamorous piggery waste-feeding operations which processed the refuse for much of New York in the absence of publically funded sanitation services (McNeur, 2011; Brinkley and Vitiello, 2014). The early controversy to redevelop Central Park marks one of America's first cases of NIMBYism (Not in My Backyard). This trend spread across America as individual, usually wealthier, communities decided to ban the practice of urban animal husbandry on the grounds of raising their property values. This history is a stark contrast to increasing trends in "Yes! in My Backyard" campaigns by today's urban animal agriculture supporters, predominantly located in wealthier communities which are pushing to legally reintroduce urban livestock by overturning prohibitive ordinances.

13.5 Welfare: protecting animals from people

While land-use ordinances are largely credited with removing animal agriculture from cities, concerns over animal welfare often underpinned them. An example exists with the swill milk scandals, which focused public attention on milk quality as well as the living conditions for cows in New York's City distillery dairies (Hartley, 1842). The city's distilleries ran dairy operations that fed cows spent grains, referred to as "swill." The distilleries then sold the milk, meat, and bones locally for added income. At the same time, widespread infant mortality in the city drew attention to the quality of the milk. Milk from the countryside was often transported unrefrigerated over long distances and then altered with dirty water and other substances to generate a whiter appearance and greater volume. Distillery dairies were investigated by the New York Times, The New York City Board of Health, and the first study ever conducted by the Rockefeller Foundation. All found that swill milk was actually as good or better for children than country milk (Brinkley and Vitiello, 2014).

Nonetheless, the swill milk scandals continued to conflate the impurity of the city's milk with the animal welfare conditions of the city's distillery cattle. While the New York Board of Health could not find a connection between city distillery milk quality and disease, they did make early reference to the importance of animal welfare for safe, nutritious food production (New York Board of Health, 1858). The first finding in their report states that, "the restricted manner in which the cows are stalled and the stimulating character of the principal food added to the unvaried [sic] confinement in a warm and humid atmosphere cannot fail to produce a condition of the system adverse to the accretion of milk of a character suitable to be given to children" (New York Board of Health, 1858). As a result of this finding based mainly on animal welfare conditions, the Board of Health recommended an ordinance limiting any one person from stabling more than two cows south of 125th Street.

In the same way that enforcement of municipal ordinances placed disproportionate burden on the urban poor, the early animal welfare movement was also divided by class. Historian Harriet Ritvo asserts that the wealthy and well-connected fore-runners of the animal welfare movement often levied animal cruelty rhetoric against the lower classes, already widely thought of as cruel themselves and in need of civilizing by respectable orders of society (Ritvo, 1987, p. 133). Many in the upper class viewed cruelty to animals as a distressing signal of an individual's potential to be a threat to the order of society. This threat manifested in the uneducated and inadequately disciplined lower class, and it was the welfare movement's duty to bring those individuals back in line with civilized society by countering their cruelty (Ritvo, 1987, p. 135).

The class division in the animal welfare movement was evident in the rise of regulation around animal fighting operations. Previously outlawed by the British Parliament in 1835, the immigrant working class brought the popular spot of animal fighting to American tenement districts as they resettled (Dickey, 2017). Animal fighting at times crossed into accepted and legally required agricultural practices

such as bull baiting, wherein dogs would “worry” a bull causing the animal to produce lactic acid which would soften its muscles before slaughter. At the time it was widely felt that, unlike the working class, wealthy patrons of blood sports would face no punishment for violating animal welfare regulations (Dickey, 2017).

Animal cruelty in New York’s tenement neighborhoods attracted the compassionate eye of America’s first animal welfare pioneer, Henry Bergh. Inspired by the Earl of Harrowby’s Royal Society for the Prevention of Cruelty to Animals in England, and recently created regulations in England, France, and Germany, Bergh set about creating a similar regulatory setting in America. In 1865, Mr. Bergh drafted a Declaration of the Rights of Animals and formed the American Society for Prevention of Cruelty to Animals (ASPCA) (New York Times, 1888). A year later, he penned, lobbied for, and saw passed America’s first animal welfare legislation (Shelman and Lazoritz, 2003; New York Times, 1888).

In an unprecedented delegation of executive powers, the New York State legislature granted the nonprofit ASPCA the powers of prosecution and arrest. Bergh agreed to finance the enforcement of animal welfare regulations if the state would grant him the authority to enforce it. This model of animal welfare enforcement has become the predominant pattern across the United States, with nonprofits empowered to take offenders into custody and judicate.

Bergh’s first ASPCA was successful. New York’s summer stray dog slaughter, which paid children 50 cents a head for carcasses, was decreased from 5733 to 938 dogs in 1 year (New York Times, 1888). In 1873, Bergh toured the west, and animal welfare agencies sprang up in his wake such that by his death in 1888, 34 states had formed animal welfare regulations and empowered local ASPCAs to enforce them through privately funded efforts (New York Times, 1888).

Bergh’s work identified some of the earliest connections between animal and child abuse (Arluke et al., 1999; Saunder, 2000). In 1874, Bergh took on America’s first case of child neglect (Shelman and Lazoritz, 2003). As a result of his expertise in animal welfare, Bergh followed a similar path in establishing a nonprofit agency to protect children. He created the first Society for the Prevention of Cruelty to Children (SPCC) and developed the first US law shielding children from domestic abuse (Francione, 1993; Shelman and Lazoritz, 2003). A review of the limited empiric evidence on the linkages between animal and human abuse has not yet proven causation (Ascione, 1998; Saunder, 2000; Patterson-Kane and Piper, 2009). The literature suggests that the majority of violent offenders have not previously abused animals, but animal abuse is more common among men, and there is a higher probability of animal abuse being reported from those men who are violent offenders (Patterson-Kane and Piper, 2009). Nonetheless, as a consequence of these connections, several states have put forth legislation requiring the cross-reporting of animal, child, and domestic abuse (California Senate Bill 1277, Sen. Dean Florez (2010); Florida Statutes Section 828-12 Cruelty to Animals; 510 Illinois Compiled Statutes Section 70/3.0 3.3; Humane Care for Animals Act, New York State Assembly Bill 09912, Tedisco (2010); New York State Assembly Bill 10998, Tedisco (2010); Oregon Revised Statutes Section 167.332; Wash. Rev. Code Section 16.52.200 (Amended 2009)).

Women have continually played a large, and often overlooked, role in the animal welfare movement. Though many women initiated animal welfare organizations, they were often barred from voting or holding leadership positions, as they were broadly denied these positions in civil society at large. As a response, women created their own affiliated organizations that worked alongside the ASPCAs. Caroline Earle White (Fig. 13.1) founded Pennsylvania's first SPCA, but was barred from holding office within the society. In turn, White founded the Women's Humane Society in 1869, and opened America's first animal shelter in 1912 with a pioneering adoption program for cats (Buettinger, 1997; Gaarder, 2011). A patchwork of local, nonprofit humane societies, animal rescue leagues, and other animal welfare groups proliferated through private donations, running in parallel to the efforts of ASPCA chapters.



Figure 13.1 Drinking fountain erected for horses by Caroline Earle White (far right), founder of Philadelphia's first ASPCA in 1867. The fountain is in honor of Annie Lowry, an avid supporter of the Women's Humane Society. Source: The Women's Humane Society.

13.6 The current landscape of backyard regulations

As a result of the proliferative animal welfare movement, the lines between animal control and animal welfare began to blur with both animal welfare and animal control organizations sheltering animals and enforcing various aspects of permitting and land-use ordinances. For example, an urban poultry keeper may have built an inadequate henhouse either in size or placement on the lot according to land-use codes. Animal control officers could be called due to the nuisances that the hens produced in clucking loudly near neighbors, or animal welfare officers could be called out over concerns for the hens' welfare due to inadequate shelter. If the hens were confiscated, they would be held until the trial as evidence at the expense of the prosecuting agency. After the trial, animal agencies could turn the animals over to any number of privately run or nonprofit agencies to be put up for adoption, housed, or euthanized. As such, animal control and welfare agencies seek to work closely, often colocating offices or staff. Similarly, cities often contract out animal control regulation to domestic charitable corporations, such as the local SPCA (see for example Ord. 1972 c. 16 Section 1, "Animal Control Commission" of Boston), further obfuscating the distinctions between control and welfare agencies.

More recently, changes in funding for control and welfare agencies have influenced which control and welfare regulations can be enforced. In the 1900s, laws requiring leashing and licensing of dogs passed throughout the United States, with fees directed toward animal control agencies (see, e.g., Chapter 29 of the General Acts of 1917, Boston, MA). Many of these public safety laws were connected to public health regulations, requiring rabies vaccinations for cats and dogs as well as spay/neuter for population control (see, e.g., Ord. 1975 c. 16 Boston). The blanket of regulations encompassed animal welfare organizations, though they received little to no funding for programming, putting stress on the funding they could use to enforce welfare. As a result, some animal welfare agencies, such as the Philadelphia SPCA, one of the oldest and largest welfare agencies in the nation, focused its efforts almost entirely on humane law enforcement, while decreasing its role in bidding for animal control contracts, running a traditional shelter or offering low-cost spay and neuter clinics. These roles are fulfilled by other animal shelters in the city, such as Philadelphia Animal Welfare Society and the Animal Care and Control Team.

There is also considerable regional variation in animal regulations with regard to livestock. In some states, such as New York, farm animals, cattle, and poultry, are exempt from many animal welfare and control regulations, though operations may be subject to anticruelty laws that cover many of the same topics relating to access to water and starvation. Animal control may not be mandated to take up stray livestock, and rescue organizations may not cover farm animals in their mission statements. For example, the New York State Agriculture and Markets law (Section 353) requires food, water, and access to medical care, but does not require shelter for livestock. Many states also offer exemptions for practices that are

standard for agriculture, such as castration without pain relief or confinement housing. How such regulations pertain to backyard growers is often unclear. Additionally, many animal welfare laws are housed in sections of the regulation pertaining specifically to farming and not in the penal codes, which would make violations punishable as felonies instead of misdemeanors.

13.7 Yes! in my backyard: modernizing urban livestock ordinances

Renewed public interest in growing food at home parallels times of economic hard-ship. City bans were first levied against pig keeping in the 1700s, and most recently against poultry keeping in the 1920s (Brinkley and Vitiello, 2014). In a “last out, first in” paradigm, poultry are often the first animals to be reintroduced as bans on urban food production are lifted. During World War I, New York City loosened its bans on poultry as citizens struggled with food price spikes. At the same time, President Eisenhower kept a flock of sheep on the White House lawn as a symbol of American resourcefulness (Fig. 13.2). Meat rationing during World War II spurred a “Poultry for Freedom” movement as city dwellers turned to backyard poultry rearing and the federal government urged citizens to save food scraps for hens and pigs (see Fig. 13.3, a federal flyer promoting animal agriculture). These episodes reflect the broader cyclical trend of self-provisioning when the commercial food system fails to adequately provide for the public’s needs (Lawson, 2005). Today’s renewed interest in keeping agricultural animals in cities may be part of a broader economic trend after the financial crash of 2007. There are several indicators that the current “underground” backyard movement is also part of broader leanings in today’s alternative food movement. Backyard operations represent an



Figure 13.2 “White house sheep on lawn.” from Harris & Ewing, 1916 1919.
Source: Library of Congress Prints and Photographs Division Washington, DC 20540.

**Uncle Sam Expects You
To Keep Hens and Raise Chickens**



**Two Hens in the Back Yard for Each Person
in the House Will Keep a Family
In Fresh Eggs**

EVEN the smallest back yard has room for a flock large enough to supply the house with eggs. The cost of maintaining such a flock is small. Table and kitchen waste provide much of the feed for the hens. They require little attention—only a few minutes a day.

An interested child, old enough to take a little responsibility, can care for a few fowls as well as a grown person.

Every back yard in the United States should contribute its share to a bumper crop of poultry and eggs in 1918.

**In Time of Peace a Profitable Recreation
In Time of War a Patriotic Duty**

For information about methods of Back-Yard Poultry Keeping suited to your location and conditions, write

**Your State Agricultural College
or
The United States Department of Agriculture
Washington, D. C.**

This Space Provided by the Publisher

Figure 13.3 “Uncle Sam Expects you to Keep Hens and Raise Chickens”.
Source: Library of Congress Prints.

important component in keeping citizens connected to the land and their food, and a revival of cultural traditions and knowledge networks that transcend the rural urban divide (Brinkley, 2013; McClintock et al., 2013).

Today, chickens are the most common urban livestock (90%), followed by bees (37%), rabbits (9%), goats (9%) and large fowl such as turkeys or geese (4%),

based on a survey of 134 urban livestock owners in 48 US cities (McClintock et al., 2014). Backyard poultry ownership represents nearly 1% of all households with four times as many households planning to own chickens in the next 5 years, based on a National Animal Health Monitoring System (NAHMS) USDA survey of 41,950 households in four cities (USDA, 2013). By ethnicity, the percentage of households that own chickens is similar in the cities of Denver, Los Angeles, Miami, and New York (USDA, 2013). Ownership is spread evenly between rural, urban, and suburban households, based on a national survey of 1487 backyard poultry owners (Elkhoraihi et al., 2014). Most owners keep poultry for egg production (95%), pest control, and fertilizer production (63%) and as pets (57%), not for meat (Elkhoraihi et al., 2014). As practice and interest in ownership rises, many cities are changing regulations. While most major cities now allow and regulate food animals to some extent (Bouvier, 2012), over 20 US cities (including Cleveland, San Antonio, Kansas City, and Seattle) have recently passed new urban livestock ordinances (Butler, 2012).

Because the extent and distribution of urban animal agriculture has never been formally assessed, motivations behind such trends are hard to identify beyond the buzz of secondary literature and case reports. Indeed, much of the scholarship and reports on urban livestock ownership in the United States is from the past decade. Nonetheless, the modern backyard movement differs from its earlier iterations in one major way: it is viewed positively.

Adding to the renewed interest in urban livestock for economic sustainability reasons are new concepts of environmental sustainability, which arose as a movement in the second half of the 20th century. For example, major west-coast tech companies, such as Google, Amazon, and Yahoo!, employ goats to mow their lawns, often listing such initiatives in their company sustainability goals (Beaumont, 2009). While the savings in cost, emissions and noise of “eco-mowing” with ruminants is debatable, they are seen as superior in targeted control of invasive species and frequently garner affirmative media attention that everyday weed-whackers do not (Beatty, 2005; Livestock for Landscapes, 2012). Where urban ruminant mowing operations might have been negatively viewed in the 1880s, they are now appraised with a quizzical mix of light-hearted fascination and congratulations (see, e.g., Beardsley’s, 2013 report on “eco-mowing”).

Whether this newfound praise is because urban livestock management has significantly improved since the 1800s, or because commercial operations have degraded, seems a matter of perspective. The current urban poultry movement literature treats backyard poultry owners as radicals pushing back against the large, dirty, and evasive modern industrial food system, where hens are raised in “abusive and unsanitary” conditions (Bouvier, 2012). Yet, in a recent survey of 128 urban poultry owners on their reasons for backyard rearing, “animal welfare” was not mentioned (McClintock et al., 2013). Concerns over backyard animal welfare, however, may be captured in the majority of respondent attitudes over knowing where their food comes from and “how it is produced” (McClintock et al., 2013). Mimicking past food security rationales for backyard growing, the majority of survey respondents also indicated that they were concerned over the “risks of

commercially produced” meat and eggs (McClintock et al., 2013). Yet, such owners may also be uninformed about the risks of backyard rearing, which would enable them to make a comparison between commercial and backyard operations. There are few data on how backyard livestock housing, health or management have changed over time.

Mirroring the underpinnings of the American animal control and welfare movement, scholars argue that today’s interest in “alternative’ agriculture largely reflects white, middle-class prerogatives (McClintock et al., 2013; Alkon and McCullen, 2011; Slocum, 2007), as less powerful groups, often immigrants, have kept food animals and grown food despite urban ordinances forbidding the practice (Alkon and Agyeman, 2011; Bradley and Galt, 2014; Mazumdar and Mazumdar, 2012; Minkoff-Zern, 2012; Saldivar-Tanaka and Krasny, 2004; White, 2011a,b). According to the above-mentioned USDA (2013) survey, a favorable view of reintroducing urban poultry was shared regardless of gender, but differed by ethnic background with half of white and multiracial respondents in favor, while only one-third of Black/African American respondents were favorable.

By overlooking nonwhite and low-income groups, researchers and policy-makers nimbly sidestep the racially and ethnically charged history of how urban agricultural bans were historically levied at low-income, minority groups as a method of exclusion from the city (McNeur, 2011; Brinkley and Vitiello, 2014). Further, in downplaying the role of litigation over noise, property value degradation, smells, and waste, recent literature is biased toward allowing urban poultry. A study on urban livestock owners reported that 88% of survey respondents were white and had a “favorable attitude towards regulation” though regulation appeared to exert “little impact on management practices” of these same respondents (McClintock et al., 2013) presumably because they felt they were beyond the reach of law enforcement. More broadly, some animal welfare activists caution against relegalizing urban livestock ownership, asserting that new, nonskilled owners may be more apt than commercial operators to perpetuate animal neglect, inhumane conditions, and the development of backyard factory farms (Elwood, 2011; Kauffman, 2012).

Indeed, the rise in backyard poultry ownership reaffirms a disturbing disconnect between a desire to raise urban livestock and a lack of understanding about animal health, welfare, and risk management. The 2013 USDA survey of 41,950 house-holds in four cities showed that over half (55.6%) of survey respondents believed that chickens in urban areas will lead to more illnesses in humans (USDA, 2013). Yet, 40% of respondents were in favor of allowing their neighbors to own poultry, while only a third of respondents were strongly opposed to allowing poultry. Willingness to allow backyard poultry and lack of concern over health risk appeared to correlate. The city of Denver, Colorado had the highest percentage of respondents in favor of allowing backyard poultry (62.5%), the highest percentage who planned to own backyard poultry in the future (7.4%) and the lowest percent-age of respondents that believed urban poultry would lead to more human disease, as compared to Miami, New York, and Los Angeles.

Is animal health not a concern for backyard farmers because they have confidence in their superior management practices? Or because they are unaware of the

risk? Evidence would suggest the latter. Most respondents in a nation-wide study on backyard poultry knew little about animal disease, and most (61%) did not vaccinate against Marek's disease (Elkhoraihi et al., 2014). Vaccination against Marek's disease is important because this highly contagious disease causes tumors and mortality in birds, thereby impacting their welfare and the welfare of nearby avian populations should the virus spread. The disease is controllable by a vaccine administered in ovo or subcutaneously in day-old chicks, a standard procedure in commercial operations. Top challenges identified in the survey related to backyard poultry welfare pertained to predation (49%), providing adequate feed at low cost (28%), and complying with zoning regulations (23%). The other potential animal welfare challenges listed were manure management; handling aggressive chickens; lack of veterinarians trained in treating chickens; lack of good information about poultry health problems, husbandry, and behavior; and lack of slaughter facilities for processing small numbers of birds. While 13% of respondents also selected the "other" category, they most often mentioned the lack of reliable "chicken sitters" when going on vacation as their concern. Animal health did not feature prominently as a concern.

An example of the danger that urban livestock poses is found in the 2002 out-break of Exotic Newcastle Disease, originally confirmed in backyard poultry in Southern California (Nolen, 2003). The END outbreak spread to commercial poultry operations in California and backyard poultry in Arizona, Nevada, and Texas. The Governor of California declared the situation a State of Emergency, the Secretary of the United States Department of Agriculture (USDA) declared it an Extraordinary Emergency, and local emergencies were declared in San Diego, Riverside, Los Angeles, and San Bernardino Counties to assist with controlling the outbreak. A USDA and California Department of Food and Agriculture (CDFA) Task Force was formed that involved over 7000 individuals rotating in and out over the course of the outbreak. Over 3 million birds were destroyed, costing taxpayers \$161 million, severely disrupting the operations of many producers and increasing the cost of poultry products to consumers (CDFA, undated). Trade restrictions resulting from the disease had negative impacts on California and United States more broadly.

Acknowledging that modern-intensive animal farming techniques allow for rapid selection and amplification of pathogens, a 2012 review article on urban poultry regulations by an animal law specialist goes so far as to state that "encouraging a return to more small-scale agriculture. . . may prevent such a mutation from occurring" (Bouvier, 2012). In contrast, Hafez et al. (2010) investigated the prevalence of highly pathogenic avian influenza (HPAI, H5N1) in backyard and commercial flocks following Egypt's HPAI outbreak, which caused over 6000 suspected cases of human HPAI from 2006 to 2009. Hafez et al. (2010) found six times higher prevalence rates of HPAI (H5N1) in backyard poultry flocks than commercial flocks, and attributed this finding to the routine vaccination of commercial flocks with inactivated H5 strains; backyard flocks are not vaccinated. It is worth mentioning that the vast majority (107/112) of Egypt's clinically confirmed HPAI cases of human infection are linked to close contact or slaughtering of diseased backyard

birds as compared to only two cases linked to commercial poultry operations, according to the World Health Organization reports in January 2010 (Abdelwhab and Hafez, 2011). Both of the individuals infected from commercial operations recovered, while 36 of the patients died from the disease and limited human-to-human spread occurred (WHO, 2010). This example highlights the division of opinions among experts on the epidemiological role of urban livestock in posing a threat to food supply chains and human health.

13.8 Conclusion

With the revision of livestock ordinances, it remains important to safeguard human health and animal well-being for all the same reasons that animal agriculture was regulated originally, as well as some of the modern concerns over equitable ordinance enforcement. It is unclear that backyard poultry, on average, enjoy a higher standard of welfare than those raised in commercial operations. The backyard livestock movement positions itself as a response to concerns over food quality, a desire to lead a more natural lifestyle, and an effort to build community around food production (Brinkley, 2013; McClintock et al., 2013). It is not clear that animal welfare will be improved or protected in this process. Uncritical scholarship which influences municipal code adoption may be partially to blame. As researchers fail to consider the risk of disease, the role of urban livestock in food security for the urban poor, and the uneven enforcement of animal regulations on low income and ethnic communities, they risk making dangerous oversights in their recommendations.

For example, in overlooking the origins of urban livestock bans, many review articles also overlook the threats that urban animal agriculture poses to public health. Public health is related to animal and human welfare. Livestock can harbor numerous animal-to-human pathogens as well as diseases that would threaten global food supply chains by impacting commercial operations. Unlike commercial guide-lines for livestock management or urban regulations for pet vaccinations, most of the current urban livestock ordinances are not focused on mandatory vaccination protocols or establishing a relationship with an animal health expert. This omission is particularly puzzling given the regulations for urban pet ownership, where cats and dogs are required by law to be up-to-date on rabies vaccinations. In the case of urban livestock, the public health risk is not only to the human caregivers, but to commercial livestock as well.

The livestock industry, perhaps more so than municipal governments, has an incentive to respond to shifting animal welfare attitudes by changing policies and establishing guidelines, such as the National Chicken Council's Animal Welfare Guidelines (NCC, 2017). As positive as NCC's guideline changes are to commercial systems, they do not extend to the animal welfare, human health, or safety of urban livestock keepers and their communities. But commercial standards could serve as models for municipal ordinances. Translating commercial welfare

guidelines to municipal coding would benefit commercial growers in decreasing incidences of diseases like Exotic Newcastle disease by offering biosecurity advice. Such disease outbreaks have profound impacts on poultry operators, but also impact the welfare of backyard birds and potentially the health of their owners and neighbors.

Municipalities, as well, need to review their ordinances for livestock to ensure the regulations respond not only to nuisance and property value concerns, but to basic food safety and animal welfare standards demanded by constituents. As the practice of urban livestock ownership grows, urban policy-makers may wish to investigate adopting relevant aspects of commercial standards for animal welfare and health at the city or state level. Moreover, special attention to how municipal regulations are enforced is warranted given the long racially charged and classist history of levying regulations at the poor first, or only.

Partnerships between commercial growers, municipal animal control, nonprofit animal shelters, welfare groups, and local veterinary services could help promote animal welfare by sharing medical and husbandry knowledge. For example, back-yard livestock regulations often do not require vaccinations or veterinary health check-ups. Moreover, vaccines are often sold in bulk for thousands of animals, where backyard owners may only require a few doses. Additionally, contracted poultry veterinarians are prohibited from owning or visiting other poultry operations to prevent potential disease spread. Partnerships between poultry veterinarians and local small animal veterinarians can help facilitate vaccine sharing that could benefit the industry by extending vaccine coverage to backyard flocks. Similarly, small animal veterinarians can call on veterinary poultry specialists if they encounter an uncommon or potentially threatening disease in backyard flocks. To help build compliance, municipal regulations would need to ask for the basic animal welfare provision of a required relationship with a veterinarian, which could be augmented with annual health check-ups, mandatory vaccinations, and on-farm visits to ensure backyard facilities comply with welfare standards. Such municipal regulations are now commonplace for urban cats and dogs, and have played a role in reducing the incidence of rabies, and presumably controlling the spread of other zoonotic disease by virtue of building relationships between owners and medical professionals.

To ensure that new backyard standards are enforced, animal welfare agencies will need extra funding to extend their services. Perhaps this area offers another role for commercial partnership. The historic job of managing the negative externalities of urban animal agriculture was not minimal for city agencies. Due to the costly nature of animal agriculture, cities may wish to do a cost analysis before reintroducing animal agriculture. To this end, decisions to overturn regulations should consult not only animal control, but affiliated animal welfare agencies who will later be involved in overseeing welfare regulations. Shelters, in particular, are hesitant to reintroduce urban livestock for fear of increasing the burden on the shelter system, which is currently ill-equipped in many urban settings to manage farm animals.

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A Method for Guarding Animal Welfare and Public Health: Tracking the Rise of Backyard Poultry Ordinances

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Abstract

In response to a growing number of permissive urban animal agriculture ordinances across the nation, this research reviews the spatial and temporal attributes of urban poultry ordinances across 100 municipalities in Colorado. More poultry ordinances have been passed or modified in Colorado in the last 5 years than in the previous hundred. Comparing regulations to commercial operations and animal shelter surrenders, we find that permissive ordinances cluster near major urban areas even where they are in close proximity to large commercial operations. Most ordinances inadequately address both human and animal health and welfare concerns. Provisions governing animal slaughter and routine veterinary care are rare, presenting a concern for monitoring and intervening in public health crises. In addition, shelters anticipate higher poultry intakes, particularly as unwanted birds are turned loose to become strays.

Keywords Public health · One health · Animal welfare · Animal shelters · Regulations · Zoonotic disease · Urban planning

Introduction

Backyard poultry are gaining in popularity in the United States. While backyard poultry ownership represents nearly 1% of all households, four times as many households plan to own chickens in the next 5 years, based on a recent National Animal Health Monitoring System (NAHMS) survey of 41,950 households [38]. Ownership is spread evenly between rural, urban and suburban households according to a national survey of 1487 backyard poultry owners [14] and is similar across owner race and ethnicity [38]. This growing popularity is reflected by an increase in permissive ordinances, popular trade magazines and public health concerns. This research tracks the development of municipal ordinances, with attention to provisions for animal health and welfare and significant concerns for public health.

Historically, a renewed interest in self-provisioning often parallels times of economic hardship, such as the 2007

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financial crisis. For example, when meat was rationed during the First and Second World Wars, New York City repealed bans on urban poultry [7]. This phenomenon is also reflected in local trends of self-provisioning when the commercial food system fails to adequately provide for consumers' needs or preferences [19]. For example, many low-income communities have kept backyard food animals despite city ordinances banning them [7, 21].

In the wake of increasing interest, many cities are modifying regulations to legally accommodate backyard poultry, particularly egg-laying hens. Original bans were aimed ostensibly at improving public health. Livestock near dense, urban areas drive down property values, create nuisances such as noise and noxious odors, are implicated in the cock fighting business, and can be the source of disease. For a combination of these reasons, most urban livestock ownership had been banned in the United States by the 1920s [7]. The side effects of such bans were to remove the food supply for the urban poor and spur business consolidation in the agricultural sector [7]. Research is needed to assess how modern ordinances prevent these historic concerns from reasserting themselves while catering to modern notions of the benefits and risks of backyard poultry (for review see [29]).

Importantly, recent rationales for backyard ownership likely deviate from historical rationales. Backyard rearing

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appears less as a response to the economic climate and more a movement unto itself. Compounding issues of access to food, the modern food system has prompted concerns over food quality ranging from how the food is grown to the nutrients it contains [5]. In a survey of 128 urban poultry owners, the majority of respondents raised concerns about knowing where their food comes from and how it is produced while also being wary of the risks of industrially produced meat and eggs [21]. Echoing these concerns, an animal law specialist asserted in a recent publication on poultry ordinances that commercially raised birds often live in “abusive and unsanitary” conditions [6]. She contends that selection pressure and high bird density in commercial operations increases the incidence of highly pathogenic disease, but that the increasing prevalence of small-scale poultry operations could decrease disease incidence and hence improve animal health [6]. In support, backyard owners indicate that they perceive the birds in their care to experience better welfare than those in commercial settings (95%), and that the eggs and meat from their birds are safer to consume and more nutritious (86%) than commercial products [14].

Regardless of these perceptions, the commercial poultry industry operates within a network of regulations and standards designed to provide protection for human and animal health and welfare. The safety of eggs is federally regulated by the US Department of Agriculture Food Safety and Inspection Service and the Food and Drug Administration [15,39], as well as via state regulations. The focus is on ensuring that egg quality standards are met and pre-venting shell eggs and egg products (liquid or powdered eggs) from being contaminated with *Salmonella*. The federal regulations include requirements related to egg handling and storage prior to point of purchase by consumers, as well as testing for *Salmonella* on farms that have more than 3000 hens and implementation of biosecurity programs on those farms to control egg safety risks. For poultry meat safety, USDA inspects live birds and carcasses at federally inspected slaughter plants (i.e., plants that process meat for export or interstate commerce) to ensure that they are free of disease, and also evaluates conditions at those plants to ensure that they are sanitary and following “good commercial practices.” In addition, plants are legally required to use Hazard Analysis and Critical Control Points (HACCP) procedures to reduce problems with pathogens in meat [22]. As with eggs, there are also various state regulations for poultry meat safety and quality.

Though the health and welfare of poultry is related to food safety, these aspects of care are far less regulated in commercial operations. There is no federal regulation covering the treatment of poultry (or other livestock) on farms, nor are poultry covered under the federal Humane

Methods of Slaughter Act, which requires that food animals be rendered insensible prior to being slaughtered [23]. State laws are also rather limited and variable in their scope. However, many commercial poultry meat and egg producers follow the animal welfare standards produced by their trade organizations, the United Egg Producers [36], the National Turkey Federation [27], and the National Chicken Council [25]. Following these standards is voluntary, but the United Egg Producer’s program is also paired with an independently audited (third-party) certification program that allows egg producers to label their eggs “UEP Certified” if they pass their annual inspection; more than 85% of US eggs are produced under this certification program [37]. In addition, many poultry and egg producers participate in completely independent animal welfare certification and labelling programs to appeal to consumers who value animal welfare attributes when purchasing products. These programs include Certified Humane [12], American Humane Certified—Humane Heartland [3], and Global Animal Partnership [16]. Although the specific content of the standards varies from one program to another, they do have many common features. For example, both the trade group and independent standards typically have requirements related to important aspects of housing and management such as the quality and provision of feed and water; type and condition of flooring and bedding; housing design; ventilation needs and thermal environment; animal space requirements; environmental enrichment (e.g. provision of perches); vaccination and veterinary care; biosecurity and sanitation; bird handling; minimizing pain associated with special practices like beak-trimming; and euthanasia and/or slaughter.

Commercial production conditions vary significantly from the backyard situation, particularly with regard to flock size and thus complexity of housing and management needs. However, the overarching concerns linking bird health and welfare and human health and welfare in terms of zoonotic disease risk are relevant to both commercial and backyard flocks. A review of backyard poultry ordinances in 150 of the most populous US cities finds that 93% allow poultry, but that ordinances largely address nuisances and not public health concerns such as transmission of pathogens and manure management [35]. The study did not address whether ordinances had provisions regarding animal welfare. To safeguard community health, policymakers need an understanding of the risks posed by a lack of such health and welfare oversight.

Indeed, backyard birds may pose significant risks to the general public. The outbreak of highly pathogenic avian influenza (HPAI, H5N1) in Egypt offers a shocking example. The majority (107/112) of Egypt’s clinically confirmed HPAI cases of human infection from 2006 to 2009 are linked to close contact with diseased backyard birds resulting in 36 deaths and human-to-human spread [1, 41]. In addition, the 2002 California outbreak of Exotic Newcastle Disease (END) originated in backyard flocks [26]. The outbreak

spread into commercial operations and resulted in depopulation of over 3 million birds, costing taxpayers \$161 million [10]. Subsequent trade restrictions negatively impacted the U.S. economy. Therefore, an understanding of the spatiality in addition to regulation is of critical importance for public health agencies.

Further, ordinances offer an important tool for owner education as well as official oversight of practices through permitting. Owners may not know about preventative measures that could improve the welfare of their birds, wild birds, commercial operations and public at large. Troublingly, a USDA survey of backyard poultry owners shows that 25% of respondents do not wash their hands after handling the birds or eggs [39]. In another study, the majority of backyard owners knew little about poultry disease prevention or how to identify disease [14]. Unsurprisingly, contact with backyard poultry is associated with hundreds of multistate *Salmonella* outbreaks every year [11, 29, 35].

In addition to food safety and zoonotic disease risks, animal control and welfare agencies are concerned about the piecemeal legal protection offered for backyard poultry [33]. Some animal welfare activists argue that permissive urban legislation could give rise to abuse, inhumane conditions, and the development of backyard “factory farms” with little legal opportunity for intervention [33]. Compounding this, animal shelter managers have noticed an increase in the number of birds relinquished to shelters when the owners struggle with husbandry, ill birds, and hens that are no longer laying eggs or that become masculinized later in life [2]. Local urban poultry ordinances commonly regulate housing aesthetics, size, and setbacks, as well as the sex, numbers, and species of animals that can be kept in particular neighborhoods [4, 7, 9, 34, 35, 40]. However, these ordinances are frequently unclear in regards to provisions for the health and welfare of the animals, in contrast to the guidelines followed by commercial producers.

Our study compares poultry ordinances with commercial guidelines for health and welfare, and is the first study to assess ordinance revision over time as well as geographically to understand the spatial and temporal nature of the backyard poultry trend in relation to urban areas and commercial operations. We focus on Colorado, the only state to compile publicly available animal shelter surrender data thereby enabling us to assess trends in poultry surrender and the burden on the animal welfare and rescue system. The city of Denver, Colorado had the highest percentage of respondents in favor of allowing backyard poultry (62.5%), the highest percentage who planned to own backyard poultry in the future (7.4%) and the lowest percentage of respondents that believed urban poultry would lead to more human disease, as compared to Miami, New York and Los Angeles [38].

Methods

This research was completed using two primary sources: municipal ordinances from Municode and animal shelter intake statistics from the Colorado Department of Agriculture. Municode.com is the largest digital publisher of municipal codes, containing codes from 2700 cities and counties in all 50 states [24]. The Colorado Information Marketplace houses shelter and rescue statistics for 2014 and 2015. The 2012 Pet Animal Care Facilities Act (PACFA) requires animal shelters and rescues in Colorado to report basic intake and outcome statistics for the animals in their care. The Colorado Department of Agriculture oversees PACFA, which is also a licensing and inspection program dedicated to “protecting the health and wellbeing of animals in pet care facilities in Colorado” [13].

To gather municipal ordinances in Colorado, we queried the Municode library for Colorado municipalities¹ using the search terms ‘chicken’, ‘poultry’, ‘hen’, ‘fowl’, ‘bird’, and ‘livestock’. Ordinances were parsed based on allowance or prohibition of poultry, land use restrictions, the number of birds and the sex permitted, as well as if there were any restrictions or requirements for slaughter. We also made note of the presence (or absence) of codified requirements for poultry housing, ventilation, veterinary care, vaccinations, feed, and water. In addition, for each ordinance relating to poultry keeping we noted the date that the ordinance was passed or modified. The data of municipality incorporation and earliest code uploaded to Municode was captured to ensure that the dates of poultry-specific codes would not be artifacts of upload timing. In all but one case, from 1985, incorporation and earliest Municode entries pre-dated poultry ordinances. In that case, incorporation, first code entry and poultry ordinances were all dated 1985. Once compiled, this dataset of 100 municipalities gave us the ability to compare poultry keeping requirements in the state across space and through time.

¹ Cities: Alamosa, Arvada, Aurora, Avon, Basalt, Bayfield, Bennett, Boulder, Bow Mar, Brighton, Broomfield, Buena Vista, Burlington, Carbondale, Castle Pines, Castle Rock, Centennial, Cherry Hills Village, Commerce City, Cortez, Craig, Crested Butte, Cripple Creek, Dacono, Del Norte, Denver, Dillon, Durango, Eaton, Edge-water, Englewood, Estes Park, Estes Valley, Evans, Federal Heights, Firestone, Florence, Fort Collins, Fort Lupton, Fort Morgan, Fowler, Foxfield, Fraser, Georgetown, Gilcrest, Glenwood Springs, Golden, Greeley, Greenwood Village, Gypsum, Hudson, Idaho Springs, Johnston, La Junta, La Plata County, Lafayette, Lamar, Larimer County, Leadville, Lochbuie, Lone Tree, Longmont, Louisville, Lyons, Manitou Springs, Mead, Milliken, Minturn, Monument, Mountain View, Nederland, New Castle, Oak Creek, Pagosa Springs, Palisade, Parker, Platteville, Pueblo, Rifle, Rocky Ford, Salida, San Luis, Severance, Sheridan, Silt, Silverthorne, Snowmass Village, Steamboat Springs, Sterling, Superior, Thornton, Timnath, Weld County, Westminster, Wheat Ridge, Windsor, Woodland Park, Wray.

Next, we created a database that included all organizations reporting an annual intake of ten or more animals in the “birds” or “other” data categories to PACFA in 2014 or 2015. At the time of our research PACFA did not have a reporting category for livestock animals, thus some organizations listed intake under the “birds” or “other” category. To verify data and triangulate findings, directors from each of the ten shelters and rescues that took in more than ten chickens during 2014 or 2015 were interviewed. We contacted the executive directors and/or operations directors for each organization via email to arrange a telephone interview. Semi-structured interview questions covered: how many chickens the organization had taken in, intake characteristics including those of owners surrendering the animals, if the organization’s intake numbers were trending up, down, or remaining consistent, and what the directors thought were the reasons behind the trends. Lastly, we provided time for each director to share thoughts not captured in the survey.

Limitations

The literature has not yet established the degree to which legalization and proliferation (or decline) of ordinances correlates with practices or public opinion. We use such legalization as a proxy for public opinion while acknowledging that regulations may not influence practice [21]. Several limitations apply to animal shelter data. Many shelters nationwide rely on semi-formal networks of foster homes. For this reason, the reported number of animals entering the shelter system may be much lower than the actual number. Compounding this limitation, many organizations reported being confused by how to categorize chickens under PACFA regulations. Some organizations only began keeping reliable data on chickens within the last year due to this confusion. Additionally, though PACFA licensing and reporting is required by law, because of the annual cost involved (\$225 for foster-based rescues, \$350 for organizations with < 3000 animals or sanctuaries, \$400 for organizations with > 3000 animals and an additional \$225 for organizations with an animal transporter; Colorado Department of Agriculture [13]) some rescues and shelters have forgone licensing and reporting in order to “fly under the radar” and thus their results were not captured by our study. Last, Denver is the most populous city in the state, and the Denver Animal Shelter had the highest reported poultry intake numbers. We were unable to get in touch with a representative from this shelter to confirm the data and have removed this organization from our analysis of trends.

Findings

Backyard poultry keeping has been shown to increase in times of economic hardship or food scarcity [7]. Yet, since the most recent economic downturn in 2007, more poultry ordinances have been passed in Colorado than at any other time in the last one hundred years (Fig. 1). The earliest municipal codes that refer to poultry were passed in 1905, and permitted poultry-keeping. Nearly 90% of all ordinances in the state pertaining to poultry were passed after the year 2000, distinguishing the recent surge in permissive poultry ordinances from previous low-level resurgences of backyard growing.

Nearly 80% of municipalities have some type of urban poultry regulation and over half allow urban poultry production with a permit or license. This finding is similar to previous studies in other states [4, 6, 9, 34, 35, 40]. Of the 100 municipalities reviewed, 61% allowed the practice, 22% had no ordinance related to poultry, 14% had ordinances explicitly banning poultry keeping, 1% allowed chickens but are phasing out the practice, and 2% had ordinances where it was unclear if poultry keeping was permitted (Fig. 2). Of the 61% that allowed the practice, 21% only allowed poultry with a permit and 4% included zoning designations for areas where the animals could be kept. Most of the permitting and licensing requirements require urban producers to pay a small administrative fee and file an application with the town administration or city manager’s office. Some require enclosure or setup inspections by neighborhood services departments or community safety officers, mainly to ensure the setup will not be bothersome to neighbors. A small group of the municipalities require urban producers to acquire a permit from the local humane society such that the applicant will receive training deemed appropriate by the welfare agency on poultry keeping. Provisions for enforcement or inspection were not stated in any codes. There is no spatial correlation with permissive or non-permissive regulations in relation to poultry production (Fig. 2). Colorado has 3.4 million commercial birds according to the U.S. Agricultural Census, where 3.3 million are in Weld County, just north of Denver (black, Fig. 2). In Weld county, only one municipality bans urban poultry, all others are permissive (Fig. 2.)

The major metropolitan region of Denver, however, appears to be an explanatory factor. In the map of permissive (green) and non-permissive (red) municipalities (Fig. 2), Denver is located in the north central region of the state at the center of the dense cluster of municipalities with poultry ordinances. The city center of Denver does not allow poultry, but surrounding suburbs do. Overall, permissive municipalities cluster near the major urban center of Denver, Colorado. The geography of permissive land-uses is likely different in

Fig. 1 Timeline of poultry ordinance creation and amendments in 100 Colorado cities

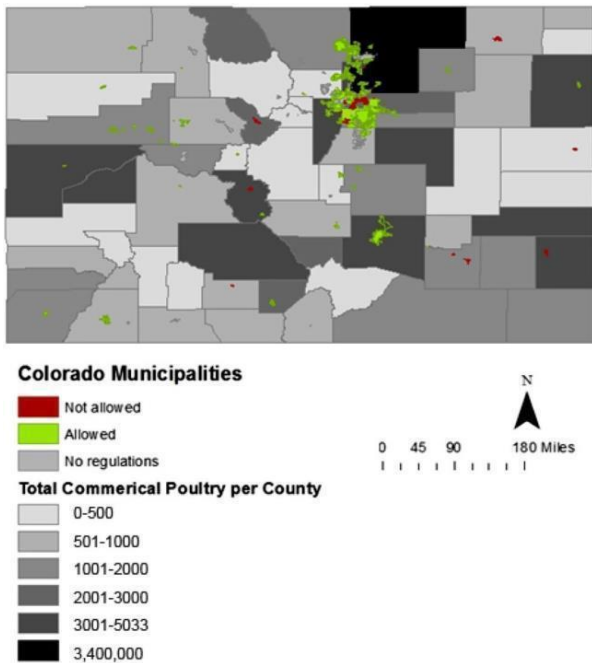
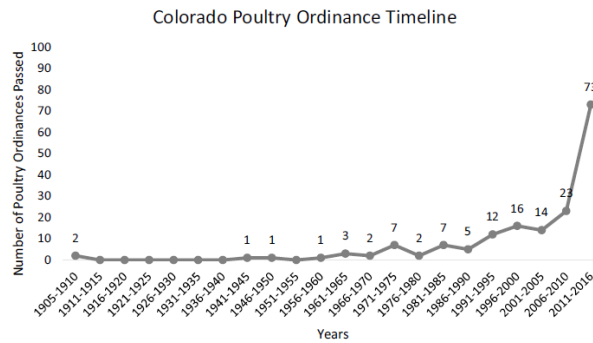


Fig. 2 Municipalities which allow poultry (green) and those which do not (red) in relation to county-level data on commercial poultry numbers provided by 2012 USDA agricultural census. Natural breaks are provided for total poultry numbers with the exception of Weld County (black), which produces 3.3 million of the total 3.4 million birds, all in layer operations. (Color figure online)

other states, and would be interesting to review, especially in light of the Exotic New Castle outbreaks originating from backyard growers in total number of birds allowed. Ordinances commonly

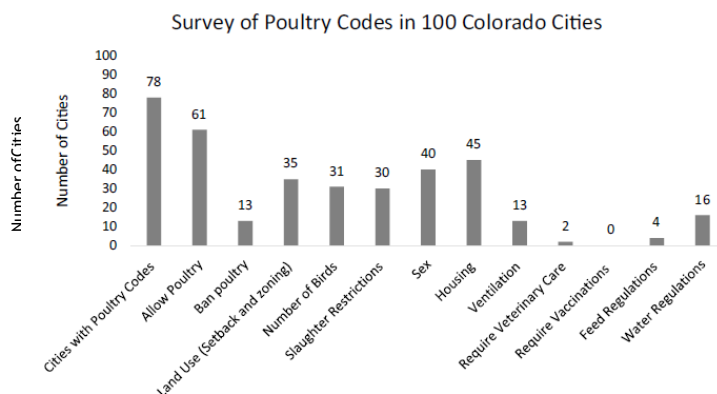
required housing to be predator resistant, easily cleaned, and maintained regularly to prevent the development of pests, rodents, or odors that would cause nuisances (Fig. 3). Most municipalities in Colorado restrict urban poultry production to between 4 and 6 birds per lot. Fewer than a third of the municipalities which allow poultry have regulations regarding ventilation, and those that do call for “proper ventilation” but do not provide specify guidelines. The municipalities with codes regulating space require an average of five square feet per bird, well above commercial grower standards [25]. Two-thirds of the ordinances allowing poultry explicitly prohibit roosters. Variations included: an ordinance allowing one male for every 12 hens, another ordinance that allowed roosters only on properties larger than 2 acres, and several ordinances excusing residents in certain zoning districts from the rooster ban.

Half of the municipalities that allow urban poultry have codes relating to slaughter. The most common codes prohibit owners from slaughtering their own poultry in public view, and allow euthanasia only by a licensed veterinarian or animal shelter. A few cities restricted slaughter for commercial purposes, and if permitted, the owner was only able to supply the meat for their or their family’s consumption. Only one municipality required “humane and sanitary” slaughter of urban poultry, but provided no guidelines for how those requirements should be met.

Regulations pertaining directly to animal health and welfare were rare. Only 2% of municipalities included poultry under animal cruelty and abuse regulations. Less than 1% of municipalities that allow poultry (four municipalities) require that the birds be provided with food, while only a quarter require that they be given water. None of the municipalities provided guidelines for the quality or composition of the feed and only one municipality required water to be “fresh.” None of the municipalities have guidelines for the

Fig. 3 Survey of 100 Colorado city municipal codes relating to urban poultry ownership and welfare

Survey of Poultry Codes in 100 Colorado Cities



quality or composition of the feed and only one city requires water to be fresh. While many owners understand that water and food are a basic necessity for keeping all animals, including poultry, alive, the exclusion of farm animals (or fowl) from anti-cruelty regulations in many states [18] complicates the ability for animal welfare enforcement agents to act if an animal has been left without food and water. In sum, these animals have little legal protection and lack the basic promise of veterinary care if sick, injured, or dying.

Half of the ten shelters and rescue organizations interviewed reported their chicken intake numbers have stayed consistent, although three organizations expect their numbers to rise in the near future citing changes in local ordinances and laws around poultry ownership as the reason. Across the 2 years of available data, there were 205 chicken intakes. Two organizations reported an increase in chicken intake with one organization reporting the increase as related to a change in local laws around poultry keeping. Another organization reported a previous increase immediately following the change in local ordinance that allowed for poultry keeping, though surrender levels have since stabilized. Six of the organizations surveyed reported taking in more stray chickens than owner surrenders due to owners turning the animals loose. In detailing the rationale for owner surrenders, organizations cited noise complaints, owners getting bored with the animals or not realizing the level of necessary care, and welfare seizures as the top reasons for non-stray related intakes. The most common intake was roosters. The prevalence of homeless roosters was attributed to owners unwittingly purchasing them as unsexed chicks, and the roosters being noisy, aggressive, and not permitted under local ordinances. Several organizations felt roosters were a

problem population to manage as they are not easily adopt-able and would contribute to higher euthanasia rates, potentially impacting funding for the rescue. The organizations reporting steady numbers of poultry intakes cited the ability for owners to easily find new homes for their chickens. There is currently a high demand for chickens in the state and willing homes have yet to reach a saturation point wherein shelters and rescues are necessary. It was reported that livestock trade shows where the public can buy, sell, and trade livestock including chickens are gaining in popularity and many people are able to trade their chickens for other animals at these events.

Reports on the welfare condition of poultry at intake were evenly divided. Half of organizations reported that chickens arrive to the shelter or are rescued from bad situations in poor physical health because of a lack of knowledge, concern, or will on the part of owners to care for them properly. The other 50% of organizations reported that the chickens they are taking in, even those brought in as strays, are in good health, friendly, and were obviously well cared for. Most organizations did not track owner demographics.

Discussion and Conclusion

If the timeline of Colorado's ordinance passage is any indication for the nation, urban poultry keeping is growing in acceptance if not prevalence. Other states may wish to carry out a similar analysis in order to understand the spatiality of policy in relation to dense, urban populations and commercial operations. Such information could aid public health agencies in disaster preparedness in the event of disease outbreaks. This this end, our study indicates that there are fewer guidelines for the health and welfare of backyard poultry than their commercial counterparts. Regulation is important in disease prevention. Fragmented oversight of animal welfare and health creates policy blind spots critical to shared

human and animal health. An important policy recommendation would be to consolidate permitting and oversight with welfare agencies which are already mandated with policing animal welfare and are staffed with veterinarians. Municipalities which currently require welfare training and a permit from the humane society offer an entry point to best practices. Permitting and training allow owner education on animal health and welfare beyond nuisance prevention. Similarly, provisions for enforcement or inspection beyond coop setup were not stated in any codes. Inspections would allow some coherency in oversight. Animal welfare agencies could carry out annual poultry housing inspections instead of the neighborhood services departments or community safety officers to ensure continued monitoring under a single agency. Extensions of such programs has the potential to reduce incidences of abuse or neglect. In addition, the token administrative fees and applications for permits could be made to the animal welfare agency instead of the city manager's office. Indeed, animal welfare and shelter agencies are mandated to safeguard animal welfare but, as non-profits, often lack funding to adequately carry out such tasks. Permitting in combination with fees could help support the work of welfare agencies with regard to urban poultry.

Partnerships between companion animal and poultry veterinarians can facilitate the extension of education and care. Understandably, there is risk and limited expertise for many companion animal veterinarians to work with backyard flocks [32], but information is growing [17, 20, 28, 30, 31]. To prevent disease spread, specialized poultry veterinarians are prohibited from owning or visiting backyard operations, but may provide critical advice to their companion animal counterparts. Additionally, poultry vaccines are produced in bulk for commercial operations; backyard owners only require a few doses. Here again, partnerships between companion and poultry veterinarians offers synergies for vaccine and expertise sharing [29].

In addition, increasing participation in programs widely utilized by the commercial industry but underutilized by backyard owners could help to improve bird health. An example is the National Poultry Improvement Plan [8], a voluntary cooperative program between the USDA and individual states that, among other services, provides participants with diagnostic services for certain poultry diseases. Unlike industry regulations or rabies vaccinations for household pets, most poultry ordinances do not mandate vaccinations or veterinary care. With streamlined permitting overseen by animal welfare agencies and mandated vaccinations and veterinary care, many backyard diseases can be prevented or caught early, improving community health writ large.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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Title: Protecting Human Health and Animal Welfare Through Backyard Chicken Permitting and Education

Executive Summary:

Interest in urban poultry is growing rapidly across the United States, but backyard chicken keeping carries the risk of disease transmission to humans as well as disease transmission into the commercial food supply. Weak regulatory structures do little to protect animal health and limit the ability of animal welfare agencies to intervene in the event birds are being neglected or abused. A recent study reports that 50% of chickens arriving in Colorado animal shelters and rescues show signs of abuse and neglect¹. Requiring poultry permits, and tying said permitting to animal handling education courses, will reduce both the spread of disease to humans, and abuse and neglect cases for backyard birds.

Scope of the Problem:

A Growing Trend:

One percent of all households in the United States own backyard chickens. Four times as many plan to own chickens in the next five years⁴. In response to this increasing interest, cities are rapidly overturning historic bans on urban agricultural animals, passed in part due to concerns over human health risks. A recent study of poultry regulations in 100 municipal ordinances in Colorado found that the state has passed more poultry ordinances in the last five years than in the previous 100, a pattern which is indicative of how quickly the trend is growing around the county¹.

Human Health:

Urban poultry have been linked to widespread transmission of disease from infected birds to human handlers. The Centers for Disease Control reported over 1200 cases of Salmonella linked to backyard chickens in the first ten months of 2017. These cases occurred in 48 states resulting in 249 hospitalizations and 1 death. In response, the CDC has begun a campaign to educate poultry keepers on proper handling to prevent disease transmission². Similarly, between 2006 and 2009 an outbreak of H5N1 in Egypt linked to backyard poultry killed 36 people⁵.

Commercial Operations:

A 2002 outbreak of Exotic Newcastle Disease in California originated in backyard flocks and spread into commercial operations. The outbreak resulted in the depopulation of over 3 million birds at a cost of \$161 million dollars to taxpayers. Subsequent trade restrictions negatively impacted the US economy⁶.

Animal Welfare:

The Colorado study also found that permissive poultry ordinances are doing little to protect animal welfare. Less than 20% of municipalities in the study have codified basic care such as

requiring owners provide food and water for backyard chickens. Only 2% of cities in the state required veterinary care “as needed.” Chickens were not included in statewide anti-cruelty regulations and were only protected in 2% of local cruelty codes. Excluding the birds from cruelty statutes, and not requiring basic care, limits the ability of animal welfare enforcement agencies to intervene in the event backyard birds are being abused or neglected. A survey of animal shelter and rescue staff, also performed in the Colorado study, found 50% of poultry entering shelters show signs of abuse and neglect¹.

Policy Recommendations:

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Attaching urban poultry ownership to a permitting process involving coop inspection and completion of a poultry handling course would reduce bird to human disease transmission as owners will learn best practices for animal care including hand washing, egg handling, and basic animal hygiene. Similarly, a chicken husbandry course would reduce cases of poultry neglect and abandonment, alleviating strain on the local animal welfare system in cities that decide to allow backyard chickens. Local animal shelters or humane societies are ideal partners for the administration of poultry education and permitting given their direct connection to the policy outcome and knowledge of best practices in animal handling. Passing on the funds from a small administrative fee for permits to the animal welfare agency will alleviate the economic impact of program administration for shelters and give the organizations the capacity to administer the program. Fort Collins, Colorado has already implemented such a poultry permit and education program.

Increasing participation in programs widely utilized by the commercial operations but underutilized by backyard owners could help control the spread of bird to bird diseases. The National Poultry Improvement Plan is a voluntary cooperative program between the USDA and individual states that provides participants with diagnostic services for certain poultry diseases. Increasing the availability of programs such as this to backyard owners will build avenues and knowledge towards early disease identification. Finally, partnerships between companion and poultry veterinarians would provide a simple way for backyard owners to get their birds vaccinated, in line with the same disease controlling vaccines required for dogs and cats, and reducing the chances of disease reaching the commercial chicken supply.

Recommended Sources:

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Fort Collins, Colorado requires would be backyard poultry owners to first obtain a license issued by the Larimer Humane Society. To acquire a license, owners must go through a training course on humane chicken keeping. Attaching poultry ownership to permits and education could reduce zoonotic disease transmission, poultry neglect, and poultry abandonment, alleviating strain on the local animal welfare system in cities that decide to allow backyard chickens. Fort Collins could be a model for better poultry ordinances around the country.

The following is a post for the Growing Food Connections Local Government Policy Database based on poultry ordinances in Fort Collins. The Growing Food Connections Local Government Policy Database is a searchable collection of local public policies that explicitly support community food systems. This database provides policymakers, government staff, and others interested in food policy with concrete examples of local public policies that have been adopted to address a range of food systems issues: rural and urban food production, farmland protection, transfer of development rights, food aggregation and distribution infrastructure, local food purchasing and procurement, healthy food access, food policy councils, food policy coordination, food system metrics, tax reductions and exemptions for food infrastructure, and much more.

Jurisdiction

Name: Fort Collins
State/Province: CO
Country: United States
Type of Government: Municipality
Population: 164,207
Policy Links: Municode.com

Policy type: Ordinance

Year: 2013
Local Food

GFC Topic: Production

Keywords: Backyard animals, agriculture, poultry, backyard chickens, chickens, food production, local, local food production, urban, urban agriculture, zoning, urban agricultural animals

Adopting Government Department(s): Fort Collins City Council

Lead Implementing Entity(s): Larimer Humane Society

Support Entity(s): Colorado State University's Extension Office

Policy Title: Sec. 4-117. - Sale of chickens and ducklings; quantity of chickens and ducks. restricted; keeping

Policy Outcome(s):

The City of Fort Collins allows the keeping of between 6-12 hens within city limits. Any person wishing to keep poultry must first have been issued a license by the Larimer Humane Society. To be issued a license, prospective poultry owners must receive training pertaining to the keeping of poultry as the humane society deems appropriate. The humane society shall also conduct a site inspection to verify compliance with care standards and poultry keeping requirements as outlined in the city municipal code. Licenses cost \$30 and include a copy of the Raising Chickens Handbook.

Additional Resources and Information: Larimerhumane.org

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[Brinkley, C., Kingsley, J.S. & Mench, J. J Community Health \(2018\). https://doi.org/10.1007/s10900-017-0462-0](https://doi.org/10.1007/s10900-017-0462-0)

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