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POLICY ANALYSIS OF CALIFORNIA SENATE BILL 1138: MANDATING PLANT-BASED MEAL OPTIONS IN HOSPITALS AND PRISONS

CAPSTONE PROJECT PAPER

A paper submitted in partial fulfillment of the requirements for the degree of
Master of Public Health in the University of Kentucky College of Public Health

By

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Hoover, Alabama

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Lexington, Kentucky

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ABSTRACT OF CAPSTONE PROJECT PAPER

POLICY ANALYSIS OF CALIFORNIA SENATE BILL 1138:
MANDATING PLANT-BASED MEAL OPTIONS IN HOSPITALS AND PRISONS

Obesity, chronic disease, and poor nutrition are prevalent in the United States while healthcare costs rise. Nutritional research advancements have suggested the healthfulness of plant-based diets. In 2018, the California state senate passed Senate Bill 1138, requiring plant-based meal options in hospitals and prisons. This paper sought to examine the context surrounding the bill, determine the appropriateness of the bill, and recommend next steps for nutritional policies in the United States. In a review of the literature, malnutrition in hospitals and prisons is highly prevalent, and state governments have already made efforts to improve their citizens' nutrition. In this analysis, Bardach's eightfold path for policy analysis was used as a framework to determine the appropriateness of SB 1138. Three alternatives to SB 1138 were chosen to compare to the bill. Criteria to determine appropriateness were time, place, and manner. Based on time, place, and manner, SB 1138 was chosen as the most appropriate out of the four choices. Recommendations were made following the analysis. The state of Kentucky should adopt a bill like SB 1138, and the public health community should adopt a plant-based diet as the optimal diet for public health.

KEYWORDS: Policy Analysis, California Senate Bill, Plant-Based, Hospitals, Prisons

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To my family, who raised me to tell the truth.
To Kara, who makes me better every day.
To everyone I’ve encountered along the way, every interaction has been meaningful.

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INTRODUCTION

Obesity and chronic disease prevalence in the United States is high[1,2]. Unlike a century ago when the leading causes of death were acute illness and injury[3], the nation's leading causes of death are now chronic diseases[4]. Evidence suggests that the leading cause of death in the US is an unhealthy diet[5]. For over one hundred years, government agencies in the United States have been publishing dietary guidelines[6]. These guidelines have been the framework for many public nutrition programs[7]. The current federal-level guidelines are published by the United States Department of Agriculture (USDA) every five years[6].

Every year, the US food supply includes more calories of food than every citizen needs[8], accounting for imports and exports[9]. It shows, as almost three-quarters of US adults are overweight or obese[1]. In response to this growth, the diet industry is booming[10]. Further, dietary fads come in all shapes and sizes, like Mediterranean-style, all meat, all plants, high-fat, low-fat, high-protein, and so forth. The general public likely does not know how to decipher peer-reviewed nutritional research, so they might defer to authorities to tell them what is and is not healthy. This is where governments can work with scientists to promote evidence-based dietary recommendations for their citizens.

As nutritional research has come a long way from the first vitamins being discovered in the early 1900's[11], there is now enough science in the literature for nutritional authorities to make solid, evidence-based decisions on what dietary pattern is optimal for human health. This dietary pattern is one composed almost all, if not completely, whole plant foods. This diet can reverse heart disease[12,13], type 2 diabetes[14], and prostate cancer[15]. It can improve the symptoms of autoimmune diseases like

rheumatoid arthritis[16]. Also, this is the dietary pattern of the longest-lived populations on earth[17]. For the remainder of this paper, plant-based diet will refer to a diet generally devoid of animal products and by-products, where most, if not all, calories are derived from unrefined plant sources.

Beyond the evidence suggesting the profound health benefits of a plant-based diet, some are choosing the diet for environmental or ethical concerns. Evidence suggests that animal food calories require far more resources to produce than plant calories[18]. Other concerns might include the large amount of manure and greenhouse gases produced by the animals grown into food[19]. Regarding ethics, knowledge of harsh conditions for the animals in factory farms could be pushing people away from eating animals[20].

Because of these trends, it is time for federal, state, and local government agencies to promote this dietary pattern, or at least recommend it as an option. The state of California has done this. In September 2018, the state of California passed Senate Bill 1138, requiring certain types of hospitals and all state prisons to offer a plant-based meal option devoid of animal products or by-products[21].

OBJECTIVES

- To examine the current nutritional landscape in hospitals, prisons, and state governments.
- To determine the appropriateness of California Senate Bill 1138 in the context of cultural and scientific trends.
- To recommend next steps for nutritional policies in the United States.

LITERATURE REVIEW

Current State of Hospital Nutrition

Hospital food and nutrition practices vary. Evidence suggests that there is a high prevalence of malnutrition in various types of hospitals across multiple countries[22]. In a large review, Kubrak and Jensen look at all the literature on malnutrition in hospitals from 1996 to 2005[22]. Out of nineteen studies on malnutrition in adults in acute care settings, six of them show a malnutrition prevalence of greater than fifty percent[22]. Out of five studies on malnutrition the elderly, four of them show a malnutrition prevalence of greater than fifty percent[22]. In this review, the authors explain myriad methods for evaluating malnutrition, and malnutrition is found across all methods used[22]. Finally, the adult acute care malnutrition studies in this review span eleven countries[22]. It is important to note that these are studies of prevalence of malnutrition rather than incidence. Kubrak and Jensen do not review studies where researchers assessed malnutrition upon admission and discharge. Nonetheless, the prevalence of malnutrition is high. The issue of malnutrition in hospitals is not unique to the United States, and it is a problem that can have serious consequences.

In a review of hospital malnutrition by Souza, Sturion, and Faintuch, they find that malnourished patients have worse health outcomes and are more costly overall[23], with malnourishment being defined as lacking one or more essential nutrients. One study looking at the relationship between nutrition and health outcomes examines a population of patients in the hospital for more than seven days[24]. The researchers find that those who decline nutritionally over their stay are statistically more likely to have complications noted in their chart during their stay[24]. Those who decline nutritionally over their stay are

also more expensive patients[24]. Further, those who decline the most have the longest lengths of stay[24], possibly contributing to the higher amount of charges. Worse nutrition during a stay at the hospital is associated with more money spent, more complications, and a longer length of stay[24]. A study done by Marques-Vidal et al. supports the link between poor nutrition and financial burden[25]. In this study, the researchers find that those patients who are undernourished cost more money[25]. Though not statistically significant, they also find that the costs incurred for undernourished patients are reimbursed at a slightly lower rate than those who are properly nourished[25]. The undernourished patients are also less likely to have their total costs covered[25]. Data for this study was gathered from a hospital in Switzerland, where citizens are required to be covered by insurance[26], so lack of insurance coverage is not a likely culprit for the lower reimbursement rates. Knowledge of higher costs and worse health outcomes in a certain patient population should draw the attention of anyone with a stake in the health care system.

Because nutrition is an issue in hospitals around the world[22] and because poor nutrition in hospitals leads to worse outcomes and more money spent[23-25], people have been attempting to improve hospital food conditions. In a study by Navarro et al., researchers randomized two hundred and six new patients into a control group and experimental group[27]. The control group received standard meals[27]. The experimental group received meals where the presentation was altered to make the plate look nicer[27]. The experimental group ate significantly more than the control group[27]. In another study which aimed to increase food intake, researchers compared traditional food service, such as assigned meals at assigned times, to room service, such as patients ordering from a

menu on their own time and having the food cooked to order and brought to them[28]. In this study, room service resulted in significantly higher food intake and higher patient satisfaction[28]. Results from the food presentation study[27] and the room service study[28] showed two novel ways hospitals can get their patients to eat their food, possibly leading to less malnourishment, better health outcomes, and lower costs.

While there are evidence-supported methods of getting patients to eat a higher quantity of food[27,28], a possible first step to getting patients to eating a higher quality of food would be simply to offer it. There are a variety of voluntary hospital food initiatives designed to get hospitals to offer healthier fare. One such initiative is the Healthy Hospital Food Initiative[29]. Under this initiative, public and private hospitals in New York City voluntarily comply with food standards set by the New York City Department of Health and Mental Hygiene[29]. By the end of a 2010-2014 study period, forty hospitals were participating, with most of them meeting some, but not all, of the standards[29]. These results show that hospital food standards can be improved in a short period across dozens of organizations in a large city like New York City. Across the country, Partnership for a Healthier America created the Hospital Healthier Food Initiative[30]. This initiative allows hospitals to voluntarily comply with food standards set forth by Partnership for a Healthier America[30]. About ten percent of hospitals in the nation have agreed to comply with the standards[30]. So far, most of the work on improving the food standards in hospitals have come from voluntary standard adoption. This is an area where governments could weigh in to affect change quickly.

Current State of Prison Nutrition

Like in hospitals, there are no standardized prison food guidelines. Also, like hospitals, there are mixed reviews about the food quality in prisons. One large review of the literature of food in prison suggests it can be hard for some prisoners to eat a healthy diet[31]. The nutritional problem is worse when people have the option to buy processed snacks from a kind of snack bar[31]. Two studies of the diet of prisoners in Australia and South Carolina suggest that they have adequate intake of some nutrients but not others[32,33]. Because of the overall lack of specific nutritional guidelines in prisons, governments or regulatory agencies can step in to fill the void.

State Efforts Pushing Healthier Eating

With concerns about poor health and nutrition around the United States, many state governments have passed bills addressing levels of access to healthy and unhealthy foods. There are several recent state legislative actions attempting to increase the access of health-promoting foods to populations who need it. In 2019, Colorado passed a bill that directs a food systems advisory council to work with Colorado farmers to increase low-income people's access to healthy foods[34]. Hawaii passed a bill that matches up to $10 per day of fresh fruits and vegetables grown in Hawaii for recipients of the supplemental nutrition assistance program[35]. Similarly, funds from Maine's special supplemental nutrition program for women, infants, and children (WIC) are now valid for use at all farmers markets across the state[36]. In Maryland, the Farms and Families Fund provides grants to farmers markets[37]. The Farms and Families Fund now gives special considerations to farmers or organizations who serve people in food deserts[37]. In New

Jersey, the state Department of Agriculture is wants to partner with organizations to bring food to food deserts[38]. These bills acknowledge that health-promoting foods are necessary for optimal health, and they seek to allow more people to acquire health-promoting foods.

Along with increasing access to healthier foods, some states have also tried to limit access to unhealthy foods. Delaware, Hawaii, and New Jersey implemented legislation requiring restaurants to offer a healthy beverage as the default choice on children's menus[39-41]. Massachusetts passed broader legislation restricting sugar-sweetened beverage (SSB) marketing at schools, placing warning labels on SSB's, making healthy beverages the default at chain restaurants, and expanding access to water in public places[42]. Nationwide, the Food and Drug Administration (FDA) banned artificial partially hydrogenated oils (trans fat) from the food supply[43]. Trans fats were removed from the list of substances generally recognized as safe, so the FDA acted to remove them from the food supply[43]. These examples show that governments have substantial power and interest in regulating the food supply and informing the public of what is and is not healthy.

California Senate Bill 1138

In California, Senate Bill (SB) 1138 requires hospitals and prisons in the state of California to provide plant-based meal options without animal products or by-products[21]. The bill recognizes that different religious beliefs, food sensitivities, and physician orders could lead to varying dietary requirements[21]. The bill acknowledges that the American Medical Association (AMA) released a policy in 2017 calling on hospitals to offer plant-

based meal options[44]. The bill also acknowledges that vegetarian food options in prisons sometimes contains milk and egg products[21]. The bill requires that these institutions serving meals to those who cannot procure their own food, called "captive audiences" (SB 1138), do so on a cost-neutral basis[21], meaning that they are not required to spend more money to accommodate the change. It is important to note that failure to comply will not be treated as a criminal offense[44]. There are no penalties for lack of compliance.

METHODS

Eugene Bardach's Eightfold Path for policy analysis was used in this analysis[45]. The path involves eight steps to evaluate and compare solutions to a problem. The steps are the following: define the problem, assemble some evidence, construct the alternatives, select the criteria, project the outcomes, confront the tradeoffs, decide, and tell your story[45]. Bardach explains that not all steps will be followed exactly as he describes them[45]. In this analysis, the path will be loosely followed. Table 1 shows how each step was completed.

TABLE 1

Step	Method
Define the problem	Introduction & Literature Review
Assemble some evidence	Introduction & Literature Review
Construct the alternatives	Decide on alternative courses of action
Select the criteria	Create criteria with which to evaluate each alternative Weight the criteria
Project the outcomes	Determine how fully each alternative satisfies the criteria
Confront the tradeoffs	Using a decision matrix, multiply the outcome scores by the criteria weights
Decide	Select the alternative with the highest score
Tell your story	Narrative about the implications of the final selection

Literature Review

For the literature review, the following search terms were used in Google, Google Scholar, and PubMed: food, foodservice, hospital, prison, nutrition, malnutrition, state, bill, law, healthy, unhealthy, fruit, vegetable, plant, based, sugar-sweetened, beverage, market, desert, chronic, disease, overweight, and obesity.

RESULTS

The introduction and literature review sections of this capstone satisfy the first two steps of Bardach's path: define the problem and assemble some evidence.

Construct the Alternatives

The policy being evaluated is California Senate Bill (SB) 1138[21]. This bill requires certain hospitals and all prisons in California to offer a plant-based meal option[21]. This policy will be compared to three alternatives. Because this bill is unique and was passed recently, the alternatives employed in this analysis will be hypothetical policies where SB 1138 is altered in some way.

Alternative 1:

The first alternative will be no bill. The status quo would remain. This will be the control for this analysis. There is a potential that no legislative action would be more appropriate than SB 1138 or other options.

Alternative 2:

The second alternative is a bill where the state of California requires hospitals and prisons in the state to offer only plant-based meal options and limit beverages to plain coffee, unsweetened teas, and water. This would completely remove animal products and by-products, remove beverages that supply significant calories, and remove beverages that are artificially sweetened. The organizations would have two years from the time of the bill passing to implement the changes. After two years, monetary penalties will be enforced.

Alternative 3:

The final alternative is a bill from the federal government where all hospitals and prisons in the United States are required to offer a plant-based meal option. This comes after recognition by the federal government that people are sicker than ever and eat a poor diet. Like SB 1138, the changes will be made on a cost-neutral basis, and there will be no penalty for lack of compliance.

Selecting and Weighting the Criteria

The overarching theme for the criteria on which to judge the bill and the alternatives is appropriateness. Appropriateness tells whether something should exist in a certain context. Appropriateness is being used in this analysis as a term to describe the suitability of legislative actions in different circumstances. Therefore, appropriateness of SB 1138 and the alternatives will be assessed by looking at the circumstances in which they might exist. To formulate specific criteria under the umbrella of appropriateness, one could look to a topic where appropriateness, or lack thereof, is regularly contested:

speech. The United States Constitution guarantees no abridgement of the freedom of speech. This right laid out in the first amendment is clearly not absolute, as speech is regularly censored if it is deemed inappropriate. Common restrictions of speech in the United States are time, place, and manner restrictions[46]. These restrictions involve appropriateness because they deal with the circumstances in which the speech takes place: time something is said or done, place something is said or done, and how something is said or done. SB 1138 and the alternatives will be evaluated based on the appropriateness of the time, place, and manner in which they exist. It is important to note that Constitutional time, place, and manner restrictions on freedom of speech must pass a multi-part test to be legal[46]. For this analysis, time, place, and manner are simply being used as criteria to determine appropriateness in given circumstances rather than to determine Constitutionality.

Time:

In policymaking, proper timing is crucial for a policy to be accepted and effective. Beaufort Longest, in ***Health Policymaking in the United States***, he describes a window of opportunity where problems, solutions, and political circumstances converge to make it the proper time to formulate a policy[47]. There is an appropriate time to create certain policies. For example, the thirteenth amendment to the Constitution ended slavery. While slavery had been recognized by some as an abomination well before the 13th amendment was passed, it likely would not have passed in the early days of the founding of the American republic. Slavery was commonplace, and ending slavery was likely not a major concern of those in the American colonies. Given that slavery was not seen as a problem

by those with the means to end it, there could be no clear solution developed to end it. The movement towards equal rights for homosexual Americans provides another example of the influence timing has on the development of legislation. Homosexuality was considered a mental illness by the American Psychiatric Association until 1973[48]. The window of opportunity for the Supreme Court to legalize gay marriage came in 2015[49], not 1915. Gay people's inability to marry was not widely seen as a problem in 1915, so again, there were no proposed solutions and no favorable political climate. Finally, per capita cigarette consumption in the United States in the 1960's was over 4,000[50]. Because smoking was ubiquitous, many of today's tobacco taxes and restrictions would not be considered realistic, as most lawmakers likely smoked themselves. If it is not the proper time to formulate a policy, the window of opportunity is not open, and people will not accept it. Because time is such an important aspect of policymaking, it will be weighted at 0.6 in this analysis.

Place:

Like time, the place in which a policy is created will contribute to its appropriateness. Longest suggests that three things are necessary in order for legislation to be developed and enacted: a problem, a potential solution, and a favorable political climate that recognizes the problem, and supports the proposed solution[47]. The passage of the Patient Protection and Affordable Care Act (ACA) provides an example of the interaction between the problem, potential solutions, and politics[51]. Lawmakers recognized that many United States (place) citizens were without health insurance (the problem), so the Democrat congress and Democrat president (favorable political climate)

created the ACA (the solution). The problem place was the United States, the solution covered the United States, and the political climate in the United States was appropriate to formulate this policy. As Republican lawmakers gained majorities in Congress, the political climate shifted, and there have been attempts to eliminate the ACA. Conversely, a situation where place factors might initially dissolve the formulation of a bill could have to do with the difference between local, state, and national governments. For example, a small town (place) of 2,000 people (political climate) might notice multiple hospitalizations from energy drink abuse (the problem) and enact a city-wide energy drink ban (the solution). These factors would make this the appropriate place to pass this law. On the national level, however, it would be much more difficult to identify widespread energy drink abuse (unclear problem), create a nationwide energy drink ban (drastic solution), and convince lawmakers to back a bill that might upset some of their constituents (ambivalent political climate). Place factors are important because certain problems should be addressed at a certain level. However, because bills created in the right time but the wrong place (e.g., a statewide pollution law aimed at addressing one town's pollution mishaps) might still be deemed appropriate, place will be weighted less than time. Place criteria will be weighted at 0.3.

Manner:

Like time and place, the way a policy is created and implemented might determine its appropriateness. For this analysis, manner will describe the method of delivery of a policy. To understand this criterion, it is useful to look at policies potentially delivered in an inappropriate manner. Local speed limits will not be enforced using

capital punishment. Next, first degree murderers will not be handed small monetary fines. Finally, the US military will not be funded by completely liquidating Social Security and Medicare. Method of delivery is more malleable than time and place and can be altered to suit a time and place. For example, funding sources for a legislative action or penalties for failure to comply with a law can be determined on an ad hoc basis when a bill is being formulated. Therefore, manner will be weighted less than time and place. Manner will be weighted at 0.1.

Table 2 shows the weights of each criteria included in the total appropriateness score.

TABLE 2

Criteria	Weight
Time	0.6
Place	0.3
Manner	0.1
Appropriateness score	1

Shown in table 3, each of the alternatives will be scored 1 to 4 based on how fully they satisfy each of the criteria. For each of the alternatives, the score for each of the criteria will be multiplied by the criteria weight and added together to determine the total appropriateness score.

TABLE 3

Degree of Satisfaction	Score
Fully	4
Moderately	3
Minimally	2
Does not satisfy	1

Project the Outcomes

SB 1138:

Time:

SB 1138 was introduced in February 2018 and passed in September 2018[21]. The factors making this the proper time to pass this bill involve rising disease rates and healthcare costs, greater public awareness of diet's effects on the health of people and of the planet, and increased knowledge in the nutritional sciences.

According to the CDC in 2015-2016, about 71.6% of the United States adult population was overweight or obese[52]. The estimated costs associated with obesity are high and rise by billions of dollars each year[53]. Chronic diseases are many of the leading causes of death in the United States[4], with heart disease killing 635,260 people in 2016[54] and diabetes killing 83,564 people in 2017[55]. In 2018, healthcare expenditures accounted for nearly 18% of the United States GDP[56], while people were heavier and sicker than ever. Because diet is the leading cause of death in the US[5], policies pushing healthier diets are timelier than ever.

While chronic disease and obesity rates are high and continue to rise, more people are adopting plant-based diets. A Gallup poll from 2018 suggests that 3% of the United States population eats an entirely vegan diet[57], referring to a diet devoid of animal products and by-products. This does not describe the quality of the plant foods, just abstinence from animal foods. The Vegan Society suggests reasons people choose this diet are for animal welfare, environmental health, and physical health[58]. While it is difficult to assess forces contributing to changing ethical beliefs, empirical reports from global organizations that could have contributed to shifting dietary patterns for

environmental and health reasons. In 2006, the Food and Agriculture Organization of the United Nations released a report titled Livestock's Long Shadow[59]. The report outlines the heavy toll animal agriculture has on the environment[59]. In 2015, the International Agency for Research on Cancer of the World Health Organization released a report suggesting that processed meat causes cancer and that red meat possibly causes cancer[60]. Whether for ethics, the environment, health, or other reasons, the plant-based food market share has grown quickly in recent years[61].

Along with rising rates of veganism, nutritional research has built a preponderance of evidence suggesting plant-based diets might be the healthiest dietary pattern. In 1990, Ornish and colleagues published research showing reversal of coronary artery disease using a mostly plant-based diet along with moderate exercise, stress management, and social support[12]. In 1995[62] and again in 2014[13], Caldwell Esselstyn published research showing reversal of coronary artery disease using a low-fat, plant-based diet alone. In 1979, James Anderson at the University of Kentucky put patients who had type 2 diabetes for many years on a plant-based diet[14]. He was able to take participants off their insulin injections without weight loss and while consuming more carbohydrates[14]. Much later, in 2009, Barnard et al. published a randomized controlled trial showing that a low-fat vegan diet performs better for treating type 2 diabetes than a conventional diabetes diet[63]. Besides heart disease and type 2 diabetes, evidence suggests that predominantly plant-based diets are beneficial for asthma[64], rheumatoid arthritis[16], multiple sclerosis[65], cancers[15,66], and telomeres length[67]. Further, population-level data suggest that those eating more plant-based are healthier[68] and likely live longer[69].

Along with the clinical and population-level data, the Academy of Nutrition and Dietetics (AND), the leading authority for nutrition in the United States, released a position paper in 2016 stating that vegan and vegetarian diets are "appropriate for all stages of the life cycle" (Melina et al., 2016)[70]. The following year, the American Medical Association (AMA) called on health care facilities to improve the quality of the food served, including adding plant-based meal options to food menus[71].

Rising obesity and chronic disease rates, rising healthcare costs, increasing public awareness of the connection of food to health, to the environment, and to ethics, increasing scientific evidence of an optimal dietary pattern, and a calling by the AMA to improve nutritional quality in health care facilities makes 2018 an appropriate time to enact SB 1138. The time window of opportunity is open to formulate bills promoting plant-based meal options. SB 1138 fully satisfies the time criterion.

Place:

SB 1138 was introduced and passed through the California state government and affects hospitals and prisons[21]. In this time window of opportunity for plant-based diets to be promoted, California is the appropriate place to pass SB 1138 because of their political climate. The state level is the appropriate place to pass the bill because states have an interest in keeping their citizens healthy and because states have a large enough population to study and collect relevant data. Finally, hospitals and prisons are the appropriate places to affect change because these two populations are vulnerable, because there are no major, standardized food regulations for hospitals and prisons, and because malnutrition is widespread in hospitals and prisons.

The state of California has a favorable political climate to pass legislation promoting plant-based meal options. Based on a 2018 Gallup poll, liberal people are more likely than moderates and conservatives to choose a vegetarian or vegan diet[57]. Further, as of February 2020 in California, about 45% of registered voters were Democrats and 24% of registered voters were Republicans[72]. Because California has a high proportion of Democrats and because liberal people are more likely to choose a more plant-based diet, California is an ideal place to promote vegetarian and vegan food options. Other issues in the state of California are discussed in the appendix.

With California having a favorable political climate, the state level might be the appropriate place to create a bill like SB 1138. States offer Medicaid insurance to pay for low income families and misfortunate individuals. In 2018, California's Medicaid enrolled 27% of its population[73]. They spent nearly $84 billion, which is more than double the amount spent by every state other than New York[74]. Because of the large number of enrollees and because of the large financial burden on the state, California has an interest in keeping its citizens healthy. The higher the cost of healthcare, the more interest states will have in keeping their citizens healthy. Next, California is the largest state in the nation. They have 39,937,489 people[75] with diverse income levels, backgrounds, and living situations. With such a large, diverse population, this state can provide a valuable setting to collect data and evaluate the effectiveness of many policies. If empirical data from this policy across a whole state shows some measure of effectiveness, the data can guide policy formulation in other states or levels of government.

Hospitals and prisons are the appropriate place to implement a dietary change. As stated in SB 1138, the bill seeks to provide healthy food options to captive audiences[21], people in hospitals or prisons that would not be able to procure their own food. The sick and the criminal are at a disadvantage and are at the whim of the institutions that house them. In 2018, California had about 240,000 incarcerated people[76]. Encouraging this population to eat a healthier diet could set them up to live health-promoting lives when they are released. If incarcerated people are healthy when they leave prison, they might be less likely to utilize Medicaid. Next, as explored in the literature review, there are no standardized food and beverage regulations in hospitals and prisons. The result is that many people in these places are malnourished[22-25,31-33]. Any push toward healthier food options will be a step toward better health and better nourishment.

California is an appropriate location to pass the bill, the state-level is an appropriate location to pass the bill, and hospitals and prisons are appropriate settings for the bill to be implemented. The place window of opportunity is open in California to improve the nutritional practices of hospitals and prisons. SB 1138 fully satisfies the place criterion.

Manner:

SB 1138 states that plant-based options be provided on a cost-neutral basis[21]. This means that organizations are not required to spend more money producing the new meals. This is likely the best manner to affect change, as requiring hospitals and prisons to spend a certain extra amount of money on a plant-based meal option could cause retaliation. However, SB 1138 states that failure to comply with the rule will not constitute a crime[21].

Because lack of compliance is not a crime, there is no way to enforce the bill. Based on the meal options appropriately being required on a cost-neutral basis but inappropriately being required without a method of enforcement, SB 1138 minimally satisfies the manner criterion.

SB 1138 could positively impact the health of Californians. Evidence suggests that each additional serving of fruits and vegetables decreases overall mortality risk by 5%[77]. If SB 1138 causes the average fruit and vegetable intake of the to increase by one serving among the hospitalized and incarcerated populations, that could result in a 5% lower mortality risk within these populations.

Alternative 1:

Time:

Obesity and chronic disease rates in the U.S. high[1,2], and they are costly[53,78]. Healthcare as a percentage of GDP is the highest it has ever been[56]. Multiple factors in the last few decades have led more people to choose diets of mainly unrefined plant foods, including advances in nutritional science. This led the AMA in 2017 to call on health care facilities to offer plant-based meal options[71]. Given these factors, some people might still prefer the status quo. Hospitals across the country are voluntarily attempting to improve their food conditions[29,30]. States are already making attempts to improve the nutrition of their citizens[34-42]. However, prison nutrition is not widely being addressed, and the window of opportunity to promote plant-based diets has never been wider. Though it is an appropriate time to push plant-based diets, keeping the status quo would

not require any additional effort, and healthier diets are already being pushed. Alternative 1 moderately satisfies the time criterion.

Place:

As the leading cause of death and disability in the US is diet[5], the window of opportunity for governments within the US to act is open. Because states help to fund Medicaid, they have an interest in protecting their most vulnerable citizens. Some of those vulnerable citizens are the hospital and prison populations. The place window of opportunity for states to take a next step to improving the health of their vulnerable citizens in hospitals and prisons is open. For this reason, alternative 1 should not satisfy the place criterion. However, because some would prefer governments not act in any given situation, and because some state efforts are already in place, alternative 1 minimally satisfies the place criterion.

Manner:

Under alternative 1, nothing would change. This is favorable to some people because some people would prefer the government not get involved. Obesity, chronic disease, and hospital and prison nutrition are such broad topics, the best next step to fix these problems is unclear. With multifaceted challenges that have complicated causes and effects, pushing for one thing over another will have unforeseen consequences. Because doing nothing might be better than doing something and causing more problems, alternative 1 moderately satisfies the manner criterion.

Alternative 2

Time:

At this point, it is known that nutrition is tied to health. Today, more people are choosing plant-based diets, and plant-based "meat" companies have entered the mainstream[79]. The AND agrees that animal product-free diets are healthy at all stages of life, can reverse some chronic diseases, and are easier on the environment[70]. Also, sugar-sweetened and artificially sweetened beverages have been linked to risk of obesity[80]. Fruit juices have mixed reviews because they are liquid calories and provide a high amount of simple sugars[81]. The American Academy of Pediatrics recommends that parents strictly limit the amount of fruit juice their children consume because of some of the negative health effects[82]. Cow milk's biological purpose is to nourish a baby cow and has been linked to type 1 diabetes[83-86], acne[87,88], and different cancers[88-90]. Today, there is a valid scientific justification for California to require hospitals and prisons to provide only plant-based meal options and low-calorie, unsweetened beverages. Alternative 2 would fully satisfy the time criterion if it was not such a large change from the status quo. Most people still consume animals and junk food, so the political climate in the window of opportunity is not fully open. Therefore, it is too soon to eliminate animals and junk food from all hospitals and prisons across the state, as there could be backlash. This large change is not fully appropriate for this time window of opportunity. Alternative 2 moderately satisfies the time criterion.

Place:

California is a prime location to affect change in the nutrition arena. Because a plurality of the state of California identifies as a Democrat and because liberal-leaning people are more likely to identify as vegan, radically changing hospital and prison food menus would not cause as much of a stir in California compared to other locations.

With vulnerable populations, hospitals and prisons could benefit the most from this change. Providing food and drinks known to cause harm to vulnerable populations should be seen as unethical. Hospitals and prisons would not hand out cigarettes and alcohol simply because people prefer them. Hospitals do not allow smoking because it clearly damages people's health, and this reasoning could be extended to products like processed meats and sugar-sweetened beverages.

Though hospitals and prisons might benefit from better nutritional standards, and though there is scientific justification for this change, alternative 2 is a significant change for an entire state. Because this change would cover such a large population of people, it could create more backlash than if it covered a smaller population at the local level. Alternative 2 minimally satisfies the place criterion.

Manner:

Like SB 1138, alternative 2 will require menu changes to be done on a cost-neutral basis. This will allow facilities to not take on extra financial burdens to make the changes. Unlike SB 1138, there will be penalties for facilities failing to comply. After a two-year grace period giving facilities time to make changes, hospitals will have a 20% reduction in Medicaid reimbursements, and prisons will be fined a monetary amount to

be determined. With the threat of penalties, organizations will be more likely to take the bill seriously. The two-year grace period will allow time for them to change. Alternative 2 fully satisfies the manner criterion.

California had about 3,400,000 hospital inpatients[91] and about 240,000 prisoners[76] in 2017 and 2018, respectively. The American Diabetes Association estimates that 13.4% of the adult population in California has diabetes[92]. If 13.4% of inpatients and prisoners already have diabetes, then 86.6%, or about 3,150,000 people, would not. Evidence suggests that people eating an entirely vegan diet have an odds ratio of 0.22 of getting diabetes compared to non-vegetarians[93]. If just 5% of the non-diabetic inpatient and prison populations adopt a plant-based diet as a result of Alternative 2, then up to 122,850 (0.05*3,150,000*(1-0.22)) new cases of diabetes could be avoided in California. Incidence rates of other diseases will likely decrease as well.

Alternative 3

Time:

In 2017, the American Medical Association suggested that health care facilities offer plant-based meal options[71]. This policy exists because of clinical and population-level data suggesting the health benefits of a plant-based diet. Because more people are choosing plant-based diets for various reasons, evidence suggests its healthfulness, and plant-based options are becoming more mainstream, health care facilities offering a plant-based option would not be a significant departure from the status quo. At this time, alternative 3 could be accepted by the public. People eat poor diets, chronic disease rates

are high in the US, and hospital and prison malnutrition are widespread. The time window of opportunity is beginning to open wider for the United States to require plant-based meal options at prisons and hospitals. However, because it would cover so many organizations across the country, alternative 3 moderately satisfies the time criterion.

Place:

Though this is a favorable time to promote plant-based meals, the United States government might be the wrong entity to create this policy. The USDA releases dietary guidelines every five years[6]. However, they also promote the interests of American agriculture[94], which includes animal and junk foods. While the promotion of American industries is a worthy cause, if nutritional research is published suggesting one food product or another is unhealthy, the USDA would have the dual responsibility to tell people to eat less of it and promote it anyway. Because of this conflict of interest, the dietary guidelines published by the federal government will likely not exclude any food that is a major American agricultural product, but rather they will preach everything in moderation. If the federal government releases a policy requiring hospitals and prisons to offer an option with no animal products or processed foods, they could be perceived as working against the USDA's goal of promoting American agriculture. The place window of opportunity for the federal government will not be open for an indefinite amount of time. Alternative 3 does not satisfy the place criterion.

Manner:

Like SB 1138, requiring a plant-based meal option on a cost-neutral basis is preferable to requiring hospitals and prisons to take on more financial burden. Unfortunately, also like SB 1138, having no penalty for lack of compliance partially takes the legs out from under the policy. No penalty means the policy is more of a suggestion rather than a requirement. Alternative 3 minimally satisfies the manner criterion.

In 2018, about 25,000,000 people stayed overnight in a hospital[95] and about 2,300,000 people were in prison in the United States[96], totaling 27,000,000 assuming a slight overlap between the populations. The CDC estimates that 12% of adults in the US have diabetes[55]. If 12% of the hospital and prison populations already have diabetes, then there are 23,670,000 people without diabetes. Again, evidence suggests that people eating a vegan diet have an odds ratio of 0.22 compared to non-vegetarians[93]. If just 1% of the hospital and prison populations chose a plant-based diet because of Alternative 3, then up to 209,088 (0.01*23,670,000*(1-0.22)) new cases of diabetes could be avoided in the United States. Incidence rates of other chronic diseases could fall as well.

Confront the Tradeoffs

TABLE 4

	SB 1138	Alternative 1	Alternative 2	Alternative 3
Time	Fully	Moderately	Moderately	Moderately
Place	Fully	Minimally	Minimally	Does Not Satisfy
Manner	Minimally	Moderately	Fully	Minimally
Appropriateness Score	3.8	2.7	2.8	2.3

Using the decision matrix (table 4), the most appropriate alternative is SB 1138. The least appropriate is Alternative 3, in which the United States federal government requires a plant-based meal option be offered at all hospitals and prisons.

DISCUSSION

Decide

SB 1138 is the most appropriate selection based on the time, place, and manner in which it exists. The bill is lacking in its method of delivery. However, the current scientific and cultural landscapes make this the appropriate time for this bill to exist. Also, California, the state level, and hospitals and prisons are the appropriate settings for this bill. The confluence of time and place factors surrounding and leading to the development of this bill make 2018 the widest window of opportunity for SB 1138 to have been created. Figure 1 shows the factors contributing to the creation of SB 1138. The bill indirectly addresses nutrition, obesity, and chronic disease, directly addresses poor hospital and prison nutrition, sets a precedent for state governments weighing in on dietary patterns, and further promotes the agenda of those seeking disease prevention and reversal through dietary means. The bill is an appropriate step in tackling the major healthcare burdens of the twenty-first century.

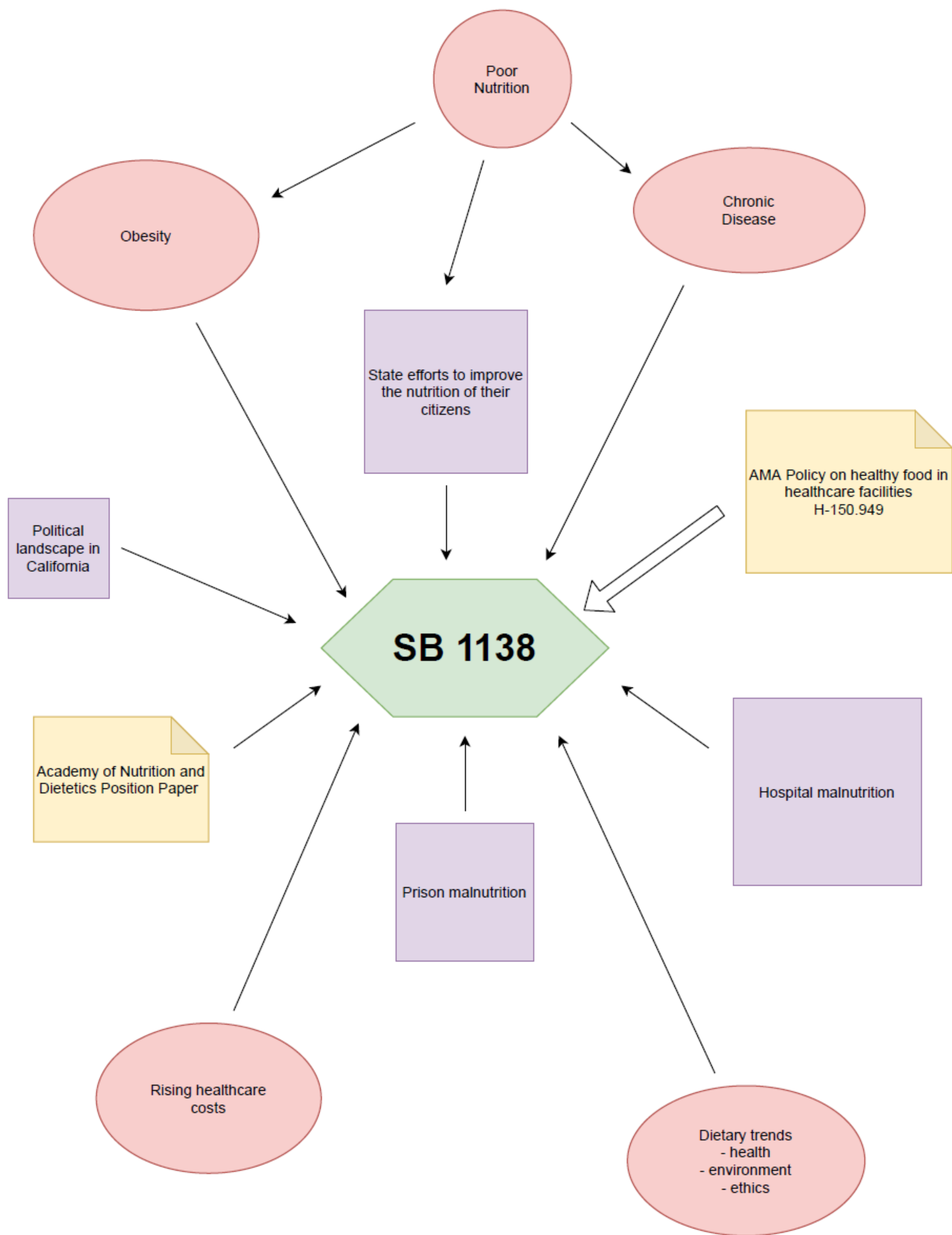

FIGURE 1: Factors contributing to the appropriateness of California SB 1138

Tell Your Story

In an opinion piece called "Facing the Facelessness of Public Health: What's the Public Got to Do With It?", physician David Katz writes about putting a face on statistics to cause an emotional connection and drive action[97]. When hundreds of thousands of people die in a tsunami across the world, people might barely bat an eye. However, stories of one person like Terry Schiavo grip the nation with emotion. Each person likely has a friend or relative who has suffered and died from a preventable chronic disease. Thinking about one person in detail causes much more emotion than seeing a statistic of 100,000 dead. To put a face on the potential power of plant-based diets, the following is a story Kate McGoey-Smith[98]:

> *Kate McGoey-Smith was working hard and enjoying her career when she started to feel various negative symptoms, like coughing, fatigue, and systemic swelling. When the swelling got worse, she went to an urgent care center and learned she had an A1c of 15.2, which is extremely high. This means she has diabetes. She was later diagnosed with severe heart failure and sleep apnea. Then, she was diagnosed with a rare form of pulmonary hypertension, a form of which she says "has no cure and comes with a terminal prognosis: two years to live without treatment and five years to live with treatment"* (McGoey-Smith, 2019). *Life was put on hold while she had to carry around an oxygen tank and started going blind from diabetic retinopathy. She became a lung-transplant candidate. She explains that her drug list cost up*

> *to $100,000 per year and made her have flu-like symptoms. This lasted for five years. She stumbled upon the documentary* ***Forks Over Knives***[99]*, and she eventually attended one of John McDougall's intensive programs. With newfound abilities to eat a whole-foods, plant-based diet, McGoey's-Smith's new life began. Her vision came back, she cut back on oxygen use, she was removed from the lung-transplant list, her heart failure went away, she stopped taking insulin, and she lost over one hundred pounds. She says, "My endocrinologist now considers me a non-diabetic!" (*McGoey-Smith, 2019*). Before, she had also been diagnosed with end-stage renal failure, and that went away as well. She now works to empower others to choose a whole-food, plant-based diet to reverse their chronic diseases.*

Evidence supports McGoey-Smith using a plant-based diet to cure her heart failure[100], diabetes[14,63], hypertension[101], and kidney disease[102]. McGoey-Smith's story and many other stories like hers can be found at nutritionstudies.org in the success stories area of the topics section[103]. Learning about the power of diet saved Kate McGoey-Smith's life. A plant-based meal option on hospital and prison menus and an acknowledgement by authorities about the power of diet could lead to many more lives being saved.

Limitations:

The procedural limitations in this analysis involve the criteria selections, criteria weights, alternative selections, and alternative scores. Time, place, and manner were selected as criteria to determine appropriateness and weighted based on their relevance to appropriateness. A separate analysis could use criteria like efficacy and justice. Further, some could argue that manner is the main criterion for determining the appropriateness of a bill. Recalculating the outcome with different criteria weights would change the outcome. Next, the alternatives were hypothetical constructions used to emphasize the appropriateness, or inappropriateness, of certain aspects of SB 1138. This was the case because there are few, if any, examples of bills closely related to this one. A separate policy analysis could compare SB 1138 to actual bills more distantly related to it and employ different methods. Finally, based on political leanings, subject knowledge, background, or dietary preferences, one could score the alternatives differently based on the chosen criteria. With the subjective nature of this policy analysis, the optimal path was to clearly explain the purpose of the criteria, the weighting of the criteria, the selection of the alternatives, and the scoring of the alternatives. Using a decision matrix also helped to mitigate the subjectivity.

The content limitations in this analysis involve the broad scope of the topics discussed. Nutrition, obesity, chronic disease, rising health care costs, hospital food, and prison food have endless information written about them. They were all included in the analysis because they are all interconnected. To address the topics, the discussions of each were tailored to be relevant to SB 1138. Some topics were not discussed. For example, the hospital and prison foodservice labor force, the continual rise and fall of fad

diets, and the effects of sleep, smoking, stress management, and exercise on obesity and chronic disease were not discussed. Each of these topics could be the main idea of other papers, but they were not directly relevant to this analysis. Other issues with chronic disease and death are discussed in the appendix.

RECOMMENDATIONS

Short-Term Recommendations:

Based on the information in this analysis, the window of opportunity is open for governments to promote plant-based dietary patterns, or at least suggest it as an option. The state of Kentucky could follow California's lead and pass a bill comparable to SB 1138. In 2016, Kentucky had about 2.4 million hospital discharge days[104]. In 2018, Kentucky had about 24,000 people in state prisons and 3,500 people in federal prisons[105]. Each year in Kentucky, millions of meals are given to hospitalized and incarcerated people. Further, in March 2020, Kentucky Medicaid had about 1.3 million members[106], which is comparable to the percentage of the California population on Medicaid[73]. With a large Medicaid population, Kentucky has a financial interest in keeping its citizens healthy.

A Kentucky policy like SB 1138 would help to validate the adequacy of plant-based dietary patterns in the minds of some Kentuckians. Every plant-based meal served would push the health of Kentucky in a better direction. A single plant-based meal might not mean a lot to the health of an individual, but one per person over the entire hospitalized and incarcerated population could make a huge impact on the health of the state. Now is the time for the state to weigh in on the health impacts of lifestyle.

Barriers to implement this bill involve the large agricultural sector of Kentucky's economy. Animal agriculture is a multi-billion-dollar business in the state[107]. Kentucky farms grow chickens, cows, pigs, sheep, and goats and produce milk and eggs[107]. Organizations like the Kentucky Farm Bureau and the AgriBusiness Association of Kentucky lobby the state government on behalf of the agricultural community in Kentucky[108,109]. Even if a proposed bill simply required a plant-based option in hospitals and prisons rather than a complete dietary overhaul, it would likely still receive staunch opposition from the agricultural community.

Long-Term Recommendations: Beyond Hospitals and Prisons

The Future of Public Health Nutrition:

For dietary recommendations, the public health community should look at the preponderance of the evidence suggesting the profound health effects of plant-based diets and make that the dietary pattern of choice for the optimal health of that nation. The optimal diet recommended by the public health community should address health at the individual and environmental levels. The community should choose a plant-based diet because of the positive effects of the diet, the negative effects of animal products, the contamination of animal products, and the differing environmental effects of food sources.

Plant-based diets have positive effects on the course of many diseases. Previously mentioned in this paper, plant-based diets have shown benefits for heart disease[12,13,62], type 2 diabetes[14,63], prostate cancer[15], rheumatoid arthritis[16], asthma[64], multiple sclerosis[65], heart failure[100], hypertension[101], and kidney disease[102]. Further, plants have

fiber, and the US population does not eat enough of it[110]. Plants also have significantly more antioxidants than animal foods[111], generally have less fat, and do not have cholesterol. Whole plant foods improve people's health.

Many components of animal foods have negative health effects. First, animal protein has several negative effects. Animal protein increases the activity of the protein mTOR because of high leucine quantities[112] and boosts IGF-1 concentration in the blood[113]. IGF-1 and mTOR both promote cancer[114,115]. Animal protein has a high net-acid load[116], contributing to metabolic acidosis, which supports cancer growth, impairs kidney function, and increases blood concentrations of stress hormones[117]. Evidence suggests that a high intake of branched-chain amino acids, proteins found at high concentrations in animal protein, causes insulin resistance through multiple mechanisms[118,119]. Animal protein promotes the growth of gut bacteria that produce trimethyl amine, which is converted to trimethyl amine N-oxide (TMAO) in the liver[120]. TMAO promotes atherosclerosis[120]. Saturated fat, found mainly in animal products and processed food, boosts inflammation, causes insulin resistance, promotes non-alcoholic fatty liver disease, and promotes atherosclerosis[121]. Finally, when animal protein and fat are cooked at high temperatures, they produce high levels of heterocyclic amines (HCA) and polycyclic aromatic hydrocarbons (PAH), which are both known carcinogens[122,123]. People should consider the negative health effects of animal products when making dietary recommendations.

Beyond the macronutrients and essential micronutrients found in animal products, many animal products contain substances that are unnecessary for and likely detrimental to human health. First, all foods of animal origin contain hormones[124], whether organic or

conventional. Animals produce their own hormones, so hormones will always present in their flesh, milk, or eggs. Next, environmental pollutants concentrate up the food chain and are stored in animal flesh. Both organic and conventionally grown meat products are contaminated with persistent organic pollutants[125]. Seafood widely contains heavy metals like arsenic, cadmium, lead, and mercury[126]. Animals are the major source of foodborne illness[127]. If people undercook their meat products while seeking to avoid HCA's and PAH's, they would run the risk acquiring a foodborne pathogen. In milk production in 2007, bovine leukemia virus was found in the milk tanks of 100% of the operations with 500 or more cows[128]. Milk also contains white blood cells, or pus cells[129]. Other concerning substances found in milk include Mycobacterium paratuberculosis[130] and bovine insulin[131], both implicated in the development of type 1 diabetes[131,132]. Further, bacterial endotoxins found largely in animal foods are pro-inflammatory and persist through cooking[133]. Animal foods contain many non-essential substances that can cause various pathologies.

Regarding the environmental effects of dietary patterns, growing plants for food generally uses fewer resources, produces less waste, and does not promote antibiotic resistance. Evidence suggests the plant food production uses far less land and water than animal food production per calorie and per protein calorie[18]. This could be partly caused by the need to provide animals with food and water for the duration of their lives. Next, animal food productions emit far more total greenhouse gases than plant food productions per calorie and per protein calorie[18]. Also, animal waste pollutes the water and air[18], a problem not faced by plants because plants do not defecate. In conventionally grown animals, antibiotics are used to prevent disease, treat disease, and cause animals to grow

faster[134]. The CDC suggests that antibiotic use in farm animals contributes to antibiotic resistance[135]. Some people might be concerned about pesticides, GMO corn, and GMO soy in the US. Almost all the GMO soy and most of the GMO corn is fed to farm animals for food[136], where pesticides will bioaccumulate in their tissues before being consumed by humans. The environmental impact of plant food production is much less severe than that of animal food production.

After considering the positive health effects of plant foods, the negative health effects of animal foods, the adulteration of animal foods, and the environmental effects of different food products, the public health community should recommend plant-based diets. If animal food products were necessary for human health, the discussion would be different. However, because they are not necessary for human health and are likely detrimental to physical and environmental health, the choice is clear. A diet of only unrefined plant foods addresses physical health and environmental health. By promoting a single dietary pattern, the public health community can provide US citizens with a dietary north star. Though only a few people might achieve perfect compliance, all people will have an anchor pulling them toward better health for themselves and for the Earth. Other dietary considerations are discussed in the appendix.

CONCLUSION

Obesity, chronic disease, and rising health care costs are problems that are burdening society. Knowing that poor diet is the leading cause of death in the US provides governments with a good place to start formulating solutions. SB 1138 was formulated at the right time and place because of dietary trends, nutritional research advancements, prevalent hospital and prison malnourishment, and California's demographic makeup. The state of Kentucky should adopt a bill like SB 1138 to take steps toward improving the nutrition of its citizens. Based on the evidence of the healthfulness of plant-based diets on individual health and on environmental health, the public health community should promote a plant-based diet as the optimal diet.

APPENDIX

Why should the California state government use its time addressing diet?

California is a large state with wide-ranging issues. In a poll from January 2020, California residents said that homelessness was the largest problem in California, followed by housing costs and affordability, jobs, the environment, and immigration[137]. Based on this survey, the California government might better spend its time dealing with these issues. However, regarding SB 1138, the bill is around 500 words and would not take much time and effort to enact. Also, the changes for hospitals and prisons are not large changes. A registered dietitian in these organizations could easily create a nutritionally adequate plant-based meal option. Formulating and enacting this bill is not a large burden for the state government or for the organizations it affects, and the bill would leave plenty of time for the state government to address other major issues.

What about other contributors to chronic disease and death?

Chronic disease and death are variable and complex. Some children have cancer while others might smoke, drink, eat hamburgers every day, and live 100 disease-free years. Diet has been shown to be protective from chronic disease, but so has exercise[138], quitting smoking[139], lower stress[140], and better sleep[141]. Diet is emphasized in this analysis because it is the subject of SB 1138 and because evidence suggests it is the leading cause of death in the US[5], now surpassing tobacco use.

What about highly processed foods, including highly processed plant foods, and their relationship to chronic disease and obesity?

Evidence suggests that highly processed foods are related to obesity and chronic disease[142,143]. Switching from the highest quality animal food products to highly refined, sugary, oily food products made from plant sources could be a negative tradeoff. In the long-term recommendations section of this analysis, a diet of whole plants, not a diet simply devoid of animal products, is suggested as the optimal diet. The negative health impact of highly processed food products were not discussed because that should be widely known in the nutrition and public health communities. Instead, the recommendations focused on the negative physical and environmental effects of animal products because those ideas might be less widely known.

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