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The United States has been sending men into space since 1961, and now in the year 2010 this could change. In current discussions of space exploration, a controversial issue has been whether or not to continue manned missions in space. According to eWeek, this conversation was initiated when the Obama administration investigated NASA and the goals it maintained for the future. A congressional subcommittee has proposed a bill that will increase NASA's overall budget by $421 million but will cut the manned spaceflight budget by $670 million. In addition to these changes, the new budget Obama has set forth for NASA will end the shuttle program by late 2010 (“Lawmakers Slash NASA’s Manned Space Flight Budget” para. 1). The recent debates have caused two separate groups, with opposing ideas on the issue, to form. On one side, many in science and politics argue that it is a waste of resources to send humans to space because there are so many places robots can go that a human being simply can’t. This camp contends that it is much more effective to send robots into outer space because manned spaceflights cost the extra money and risk involved. On the other hand, many in the aerospace business and in the general public argue that nothing can compare to actual human discovery. These people believe that we can learn more by putting a physical person in the environment rather than having a robot collect data to be interpreted later by humans on Earth. My own view is that the United States’ manned space program is critical to the continuation of discovery in space.

Possibly the most compelling argument against sending humans to space is that it is extremely risky to expose humans to the harsh environments of outer space. If the proper precautions and calculations are not made, the result can be devastating. One of the many hazards of space is an atmosphere far different from that on Earth. In The Hazards of Space Travel, Neil F. Comins illustrates the tragic loss of Apollo 1, the craft intended to carry the very first men to the moon. Of errors in the design of the spacecraft the capsule became filled with nearly pure oxygen. A spark set fire to material in the craft, which burned rapidly in the oxygen-rich environment. Astronauts Edward White, Virgil “Gus” Grissom, and Roger Chaffee were killed in the accident (5-6). This is just one of many instances in the history of manned space flight that ended with the loss of human life. Many people can more than likely recall the most recent losses of Columbia and Challenger. In both cases, the entire crew was lost and the media were buzzing for weeks on end about the tragedy. I will concede that sending a human to space is risky business, but every great discovery involves some amount of necessary risk.

Manned missions to space have provided us an infinite amount of knowledge, and in order to keep science headed toward further discovery, we must accept the necessary risks involved in such missions. People risk their lives in their jobs daily, the commercial crab fishing industry being just one example. Members of this industry quite literally put their lives in the line in one of the most dangerous working environments. These men battle high, freezing, and deadly seas just to provide seafood to people all over the world. It seems slightly hypocritical then that people see risking lives in the name of expensive seafood to be justified but risking lives in the name of science and discovery via manned space flight to not be. What makes an astronaut that much different from these individuals? Astronauts have dedicated their lives to science and are willing to put their lives on the line in the process. NASA itself has even come forward to commend astronauts for assuming the necessary risks of manned spaceflight. Its article on the brave men and women involved in the manned space flight program simply states, “Their food was limited, their sleeping conditions in hospitable and they travelled with the understanding that unknown dangers could put their lives at risk — yet they fulfilled their missions willingly” (“A Hot Shower and a Hug” para. 2). Although it is tragic to lose human life in the name of science, astronauts know the risks that they assume when they go into space, and they take them willingly in order to advance the world’s knowledge of science and outer space. Assuming the necessary risk involved in sending men into space has allowed us to make discoveries and will continue to do so.

Furthermore, with the continuation of the manned spaceflight program, the technologies used to keep astronauts safe will only continue to advance, and the issue of astronaut safety will become less and less pressing. The risk of sending humans to space is constantly taken into account as advancements in methods of protecting astronauts from the harsh conditions of space are consistently improved. For example, Albert Harrison explains in Spacefaring: The Human Dimension that in early space missions the inside of the spacecraft was filled with pure oxygen. However, scientists and engineers have concluded that it is better for the astronauts to breathe a combination of oxygen and nitrogen gas while aboard the spacecraft. This mixture is most similar to the breathable atmosphere on earth and allows metabolic processes to carry on normally (Harrison 67). This mixture of gases is also not nearly as conducive to combustion as a pure oxygen environment, cutting down significantly the risk of fire hazards. Harrison goes on to say that astronauts breathe pure oxygen only for three hours prior to exiting the craft to purge the blood of nitrogen. In the event that the airlock fails or the astronaut’s suit decompresses this will prevent the astronaut from getting the bends, a painful and possibly lethal condition in which gas bubbles out of the blood (Harrison 67). This specific advancement exemplifies how the safety of humans in space has been taken into account. Harrison also lists other advancements in technology that have improved the well-being and safety of astronauts, including filters and air purification systems, dust coating on space suits to help maintain temperature, water recycling and purification systems, and irradiated food to extend shelf life (Harrison 68-70). These advances in technology have helped to make spaceflight more safe and comfortable for humans. With each new mission, engineers have added a new dimension of safety to lessen the dangers involved in sending men to space.

The second major argument against manned space flight is that it is far costlier than unmanned space missions. There are many missions that can be done in space that do not require a human to be present. These missions, including research on the Big Bang, the
birth of stars, collisions of black holes, and measuring dark energy, would cost a few billion dollars. Nobel Prize winning physicist Steven Weinberg admits, “[It is] not cheap, but nothing like the hundred or so billion dollars for a manned return to the moon or the many hundreds of billions of dollars for a manned mission to Mars” (Weinberg para. 4-5). Although I concede that manned missions to space are in fact costlier than unmanned missions, Charles Krauthammer, writing in the Washington Post, raises concern about what could happen if NASA is no longer able to launch men into space. The Obama administration ended the Constellation program, which was expected to present a cheaper way to send humans into space. Rather than using this cheaper alternative to manned spaceflight, the administration intends for NASA to focus on getting unmanned crafts to Mars while allowing the private sector to launch humans into space (Krauthammer para. 5-6). Krauthammer warns that the idea of allowing the private sector to launch men into space should be alarming. He states, “This is nonsense. It would be swell for private companies to take over launching astronauts. But they cannot do it. It’s too expensive. It’s too experimental. And the safety standards for getting people up and down reliably are just unreachably high” (para. 7). The idea that the private sector could begin aimlessly launching men into space has the proponents of manned space flight concerned. Their opponents constantly insist that sending men to space puts them at extraordinary risk, but seem to be fine with risking human lives so long as the private sector is responsible. No one can deny that sending men to space involves necessary risks; however, the risks involved in allowing the private sector to launch men into space are not necessary and involve too much danger for the astronaut.

Even though manned missions to space are more expensive than unmanned missions, when the alternative is having the private sector haphazardly launching people into space I personally would think that it is worth paying the extra cost for NASA to do it. Someone in the private sector will continue to launch humans into space if the government won’t, and it is simply not worth saving money if human lives will be lost to such an unnecessary risk. Additionally, cutting funds for manned space flight to save money could end up costing us more in the long run. Krauthammer also brings up the issue that with the U.S. no longer sending men into space, it will have to turn to the Russians for shuttle rides into low earth orbits and to the space station. As work on the space station is not yet complete, the U.S. will have to depend on the Russians to get there. Since they will have a monopoly on space travel it is to be expected that they will charge outrageous amounts of money for rides into space (Krauthammer para. 2-3). Clearly if the U.S. is to continue its construction and research on the space station, it will cost a great deal more now that the U.S. will have to rely on the Russians until the private sector has time to catch up. Work on the space station is not simply going to halt when manned missions to space are put to an end. Therefore, continuing the manned spaceflight program means upmuch morecost effective for the U.S.

Some may argue that with advancements in technology robots will make fewer errors and fewer failures will occur, making manned missions to space obsolete. However, it is still more effective to send a person to space, especially for cases that involve measurement or analysis. Sending humans into space cuts out the middleman, so calculations and assumptions can be made with greater certainty. The childhood game of Telephone illustrates how easy it is to get things mixed up and confused when a so-called middleman becomes involved. In unmanned space flight this is essentially what the satellite or probe acts as. The scientist who analyzes the data brought back from the probe was of course not actually in the environment and has only the probe to rely on for clues. This deep reliance can cause a great deal of confusion, misunderstanding, and misinterpretation of the data, whereas in manned missions, the scientist is actually in the space environment running experiments or tests and the middleman is cut out. As is to be expected with unmanned missions when a middleman is involved, the data are sometimes confused and misinterpreted, leading to faulty conclusions. Take for example the spacecraft Viking, whose mission was to collect soil samples from Mars and analyze the samples for traces of organic compounds indicative of life. According to Ron Cowen, an author from Science News, the craft heated the sample to a temperature at which the compound perchlorate breaks down and destroys other organic compounds, and thus when the Viking returned to Earth, scientists interpreted the findings of the craft as indicating that life never did and could never exist on Mars. Further missions and research have indicated, however, that Martian soil could contain a few parts per million of organic compounds (Cowen 9). The importance of having a human present for experimentation in space is again made clearly evident by the article “Manned vs. Unmanned Space Exploration (Part 2),” which states simply, “Take the Mars exploration programs: out of 31 missions by the USSR, Russia, the US and Japan since 1960, all but 10 failed and only 5 met their original goals. Compare that to the high success rates of astronaut crewed missions—almost 90%” (para. 4). You can’t ask a robot if something went wrong that could have tainted the data, but a human is capable of accounting for mistakes and adjusting accordingly. Additionally, had a human been present for the Viking mission, it is possible that he could have fixed the craft and avoided the loss of millions of dollars due to the failure of a probe.

So much has been gained from manned missions to space that it would be foolish to discontinue this practice and stunt the progress it has made to this point. In Challenges of Human Space Exploration, Marsha Freeman explains that the space station has allowed for many new discoveries to be made in medicine, with advances in the treatment of diabetes being just one example. Some biological materials such as proteins are easier to study in the conditions of space because they act more uniformly than they do on Earth. Experiments in space have shown that cells manipulated in certain ways could be transplanted into the bodies of diabetics and act as an artificial pancreas that would increase levels of insulin in the body (Freeman 100). Such a mission could not easily be performed by a robot in space. There is simply too much data and close analysis involved that would make it necessary to have a person physically there observing. Albert Harrison, in Spacefaring: The Human Dimension, states, “Our desire to send humans into space has forced us to improve our understanding of biology and medicine” (Harrison 4-5). Everyone can agree that disease will more than likely always be an issue for people as a whole. So much is left to be discovered about the human body and how it functions that it would be foolish not to seize every opportunity available to improve our understanding of it. Manned missions to space provide an excellent platform for biological discovery. With various diseases continuing to plague the human population, it is vital to continue research in this field.

Americans have an unending need to explore and discover, and this should be encouraged through the continuation of manned space flight. Senior astronaut at the SETI Institute Seth Shostak contends that “Some part of each of us wants to ‘boldly go,’ to explore and experience the unknown. The claim that stepping across the threshold of the unknown is too costly or too dangerous wouldn’t have impressed Magellan or Lindbergh. It shouldn’t impress us” (Shostak para. 9-10). Sending people into space is an inspiration for us all to reach higher, explore, and make new discoveries. The manned space flight program forces us to realize what can be achieved when a person reaches out into the unknown.

The United States’ manned space flight program has led to many advancements that have furthered the field of science as a whole, and it is imperative that the program be continued. Sending a man into space is compelling and motivational, and shows that
the United States is still a force to be reckoned with. The United States has been a leader in manned space exploration almost since the beginning of the space race, and countries across the globe have been imitating our space program for years. With this superiority in manned space flight came prestige. Simply said, sending men into space boosts American morale. John M. Logsdon, a professor emeritus at George Washington University's Space Policy Institute, asserts, “It is inconceivable to me that the United States would willingly give up an activity that has for the past half-century symbolized its leading role in global affairs. Human space flight is part of the American patrimony” (Logsdon para. 7). The human space flight program defines everything which is great about America, and it would be foolish to terminate such a prominent and successful program.

WORKS CITED


It's 9 am on Saturday morning and already the dank Louisiana heat has my thick white too tight stockings uncomfortably clinging to and suffocating my little legs all the way up to my elasticized waist. My senses drift from the stifling heat and pinching clothes to the sounds and smells of the "Tanglewood" neighborhood in the heart of the Monroe ghetto. Cracking bacon and frying eggs, Scooby Doo cartoons and sharp laughter sing out from the tin-roofed homes, as my squeaky black patent leather Mary Janes clomp, click, and clunk down the splitting sidewalk to the next house.

"Anna, are you ready?" Mom's sweet, soothing voice brings me back to the duty at hand: it's my turn to present the latest Watchtower and Awake! magazines to the stranger behind the door. My sweaty little hands are barely big enough to proudly clutch my book bag filled with arsenal of Bible, copious amounts of other literature that I don't yet understand, and are barely big enough to proudly clutch my book bag filled with arsenal of Awake! magazines to the stranger behind the door. My sweaty little hands back to the duty at hand: It's my turn to present the latest Watchtower and Awake! magazines to the stranger behind the door. My sweaty little hands are barely big enough to proudly clutch my book bag filled with arsenal of Bible, copious amounts of other literature that I don't yet understand, and are barely big enough to proudly clutch my book bag filled with arsenal of Awake! magazines to the stranger behind the door. My sweaty little hands.

While I'm muttering to myself what I will say, I can hear my mom and dad arguing in the kitchen. They used to argue less before the family vacations I wasn't invited to, or my sister's wedding at which an "elder" protested my attendance, with subsequent retraction of the invitation. Recently, though, our communication has existed only if I initiate. The sinking feeling that our connection would soon be lost prompted me to write with the intention of scheduling a visit to Florida sometime in May. After all, I missed my family dearly and thought openly requesting time would either be well received, or, as feared, mark the end of a once close relationship. Either way, I'd have clarity.

I love you so much, Anna. I am willing to accept that your reaction to this email will disappoint you so much that you will not talk to me, but from now on I will do with you as I did with Kristinne when she was disfellowshipped. …We did not socialize or eat meals together… It is only fair Anna. …Maybe if I had reacted the way I did with Kristinne you would be back with us, happy serving Jehovah. …You know I want all my children to be with me in the promised earthly paradise. False religion is crumbling and will soon fall completely as you studied, and then Armageddon. My great fear is that my children will only want Jehovah's protection when it will be too late. …My heart aches for your change of heart.

Mom, being disappointed is the understatement of the millennium. I got your message yesterday and I wept like I've never wept. In a very long time, because I know that I will be grieving the loss of the connection with my family (including you) for a long time. Perhaps permanently. I don't want this, but you really have given me no choice other than choosing a religion in which I do not believe to keep my family close, or to lose contact entirely. I'm sure that my note to you now may break your heart, but welcome to my world. My heart has been broken into a thousand pieces over the last fifteen years. Being shunned and rejected by my own family simply because I do not believe the same doctrine is the worst imaginable pain that I would not wish on my worst enemy.

Since I was my mother's favorite, our relationship mostly carried on as before save the family vacations I wasn't invited to, or my sister's wedding at which an "elder" protested my attendance, with subsequent retraction of the invitation. Recently, though, our communication has existed only if I initiate. The sinking feeling that our connection would soon be lost prompted me to write with the intention of scheduling a visit to Florida sometime in May. After all, I missed my family dearly and thought openly requesting time would either be well received, or, as feared, mark the end of a once close relationship. Either way, I'd have clarity.

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It's 9 am on Saturday morning. The crisp damp Boulder sky brings a smile to my face as my four-legged girl Dharma and I walk softly down the sidewalk on the way home after a stroll through downtown. The sight before me is unmistakable: a family—the son with the father, and the daughter with the mother—out "in service." I consider crossing to the other side of the street to avoid having to be so close to something that was once so familiar, but I boldly stay on my path towards them. Their sweet smiles and pleasantries briefly transported me back to another time causing a pain in my heart both for the lost connection with my mom and also for the young girl who reminded me of all the bittersweet memories I'd left behind. I wondered if she was happy, or if her individuality was being crushed to bits. Today, like many other days, I mourn the "loss" of my family. Do I keep reaching out to them, "turning the other cheek" in the hopes that one day their eyes will be opened to the real "truth"? Or is the pain that I must endure with each rejection so great that they have to be dead to me? As we walk away from the family knocking on strangers' doors, I weigh these thoughts. I close my eyes to breathe in the cool air as Dharma looks up at me with her wagging tongue, almost human face, and unconditional love. I think of Troy, Bret, Gabby, Deirdre, Masyn, Emily, Lindsay, Jl, and Nami—my family of friends. I again feel excited for my "rebirth" into the world. Life is good.
Introduction

Today there is no secret that Iran and the Western world are engaged in a volatile geopolitical clash that threatens the stability of the Middle East and world at large. The political action of the Iranian state, which includes attempts to acquire nuclear weapons, denying the Holocaust, and threatening the West and Israel, continues to antagonize the Western world. This paper aims to better understand the important factors that create these hostile and potentially dangerous policies. Overall, forces on both the domestic and international levels converge on the Iranian government and create policies that attempt to divert attention away from the issues that matter most (e.g., human rights violation of institutionalized exclusion of certain opinions) and maintain some semblance of power for the current regime.

Theory of Cultural Relativism

Before examining the Iranian state and its political policies on a deeper level, I must establish an understanding regarding this paper’s frame of reference. “Cultural relativism is the thesis that a person’s culture strongly influences her modes of perception and thought”; in this regard it is important to note the frame of reference for examining cultural artifacts one has not directly experienced (Swoyer, 2010). This paper is written from a Western perspective, and although its claims attempt to minimize Ameicentrism, there is no way to eliminate all personal and cultural biases. This paper does, however, attempt to utilize as many artifacts that are directly produced by the Iranian people as possible. In addition, since the Iranian people increasingly use Western frameworks (as the product of a globalized world) to express their own dissatisfaction with their current government (e.g., human rights violations, which will be discussed later), arguments presented in this paper should not be devalued on the basis of cultural relativism alone.

Root Cause Analysis

The root cause of the volatile foreign policies of the current Iranian government can ultimately be reduced to domestic and international pressures that force the government to recover its legitimacy. On the domestic level unfair social and political limitations have created a government that is no longer a fair representation of what Iranian citizens want. While in the past governmental institutions did reflect citizens’ true desires (i.e., the birth of a theocratic government following the shah being ousted from power, globalization, demographic changes, and geopolitical movement have shifted the values of the people. The Iranian state, however, is unable to act as a reflection of the people’s desires due to its rigid governmental institutions. Since many of the most important Iranian leaders are unelected, true power over social and political change is often out of reach for average citizens and has created ideological inequality that excludes those who favor reform (Adib-Moghaddam, 2006). A growing majority of citizens who are disenchanted with the policies of the current regime (but are unable to make real change in the state) put pressure on the government through society. In addition to the domestic pressure, Iran has also become a target of hostile foreign policy on the international playing field. The United States, European Union, and United Nations have all condemned Iran’s hostile policies that threaten the West at large. Responding primarily through sanctions and threatening discourse towards Iran, these actors also contribute to the policy responses of the Iranian regime. Manifestations of both domestic and international pressures can be seen in concrete artifacts that will be presented later. It is the attempt to curtail these pressures (which the artifacts clearly illustrate) and recover its legitimacy that creates the government’s current hostile policies.

Domestic Pressures

John Rawls: Theory of Natural Rights

Ideological inequality, manifested in the institutionalized exclusion of opinions and political participation, is the most influential factor leading to social revolution in Iran today (Adib-Moghaddam, 2006; Lotfalian, 2009; Fairbanks, 1997). The birth of modern Iran represented state construction where “elites placed the liberation of the nation over individual liberties, the creation of unity over the defense of the individual human rights, and the strength of the state over the protection of civil society from state abuses” (Afshari, 1994). While the state has some elements of democracy, for example the election of a president with universal suffrage, ultimate authority is left in the hands of unelected and often oppressive individuals and rigid institutions (Hauss, 2006). The few democratic elements of the Iranian government have recently come under fire, as last summer’s reelection of President Ahmadinejad “was affected by significant fraud,” showing that supreme authority in the state is well outside of the people’s control (Mebane, 2009). While it is just for the state of Iran to have alternative governmental institutions (non-democratic), at the point where these institutions are no longer a fair representation of what the people want, they are unjust and represent a violation of basic human rights by curtailing free choice and the ability for citizens to change their government (Kazemipour & Rezaei, 2003). As Leif Wenar explains, in John Rawls’s view “political liberties are a subset of the basic liberties, concerned with the rights, such as the right to affect the outcome of national elections” and influence state governance (Wenar, 2008). This injustice is compounded by the fact that people are inherently blocked from changing the government of their own state, due to the unelected elements.

The majority political opinion of the Iranian population favors fundamental changes to governance and the introduction of democratic and free market social reforms (Clawson, 2004). Members of reform parties in the Iranian parliament have gone as far as proclaiming “their unwillingness to be present in a parliament that is not capable of defending the rights of the people and which is unable to prevent elections in which the people cannot choose their representatives” (Adib-Moghaddam, 2006, quoting Agence France Press). Although this majority is frustrated with the policies of the current government, its inability to create change forces the Iranian people’s beliefs to be manifested in other aspects of society. Examples of these manifestations, which are illustrated below, can be seen...
in a variety of artifacts ranging from individual interviews to political demonstrations.

Artifact 1: Iranian Newspaper Poll

On the most basic level, the majority of citizens are in favor of dramatic changes to the rigid governmental institutions of the modern Iranian state. In 2003, the Iranian newspaper Yas-e Now published a poll that asked citizens the following question: “What are the actual demands of the Iranian people?” The results provided rare insight into the lack of political capital held by the current regime. Twenty-six percent of the citizens surveyed said they were in favor of “fundamental changes in management and in the performance of the [political] system.” Even more staggering, 45 percent were in favor of “change in the political system,” even if the change required “foreign intervention” (Clawson, 2004). As Iranian citizens become further disenchanted with the clerical regime, they also observe a contrast in freedom between their Islamic state and the Western world. As Western influence continues to make its way into Iran (even with the government’s attempts to keep it out) through globalization, Iranians have become more and more aware of their Western counterparts. “There are fewer [sic] better explanations for why so many Iranians today are pro-American than [President] Bush’s July 12, 2002 statement: ‘The people of Iran want the same freedoms, human rights, and opportunities as people around the world’... yet their voices are not being listened to by the people who are the real rulers of Iran’” (Clawson, 2004). Since the rigid governmental institutions block citizens from changing their own government, citizens are forced to accept the policies of the conservative regime, even when a majority favors reform. For example, the current regime continues to block Western influence, even though a majority of the people desire Western goods (Majd, 2009).

Artifact 2: Plight of Women (Account of One Woman)

The Iranian government’s actions are especially focused on some groups within Iranian society. The government today continues to enact policies that even antifeminists in the West would find unacceptable; “women who commit adultery can legally be stoned to death” (Hauss, 2006, p. 385). Women are “regarded as second-class citizens under Iranian law”; they are forced to cover their heads with scarves and lack freedom of speech (Basu, 2009). Recently, Iranian women have become some of the most vocal agents of change, becoming “noticeably front and center of the massive demonstrations that have unfolded” (Basu, 2009). In an interview for CNN one Iranian woman put it this way: “This regime is against all humanity, more specifically against all women...I see lots of girls and women in these demonstrations, they are all angry, ready to explode, scream out and let the world hear their voice. I want the world to know that as a woman in this country, I have no freedom” (Basu, 2009, quoting Parsa). Although “women have become primary agents of change in Iran” as they push for modernization of their rights, they remain second-class citizens in the eyes of their own government (Basu, 2009, quoting Nayereh Tohidi; Fairbanks, 1997).

Artifact 3: Plight of the Well Educated (Student Interviews)

One of the most influential groups of Iranian citizens fueling the push for reform is well-educated young people. The victory of current president Ahmadinejad in 2005 and again in 2009 was “perceived by most members of the Iranian scientific community [and intellectual community at large]...as a setback to social reform” (Lofatian, 2009). These individuals are often so disenchanted with the current state of their nation they leave the state in search of a better (more fair) life in the Western world. “There are economic problems and no job security and no freedom,” says one student who hopes to go to Australia (quoted in Harrison, 2007). “Iran has also lost some of its brightest, best-educated, young professionals who have emigrated for political and/or economic reasons since the 1970’s” (Hauss, 2006). As another Iranian student, Shabanzade, puts it; “We work from morning till night and still we cannot live off the money we make but over there [in the West] we can have a better life with less hours of work” (quoted in Harrison, 2007). This is not only a product of misrepresentative governance but also a barrier to reform. Since so many of Iran’s best and brightest leave the state in search of freedoms and a better life in the Western world, the society loses the people who could potentially champion reform efforts (Hauss, 2006). If the state remains on its current course, these two groups represent a “massive force responsible for the winds of change currently blowing over Iran” (Harrison, 2003).

Artifact 4: Iranian Music

Beyond the plight of specific groups within Iranian society, Western influence has also prompted new outlets for growing frustrations. One example of these outlets is pop culture, which has recently seen the emergence of underground Iranian hip-hop music pushing messages of reform. One example of Iranian hip-hop is the song “The Cops Again” by Hichkas, currently the most famous Iranian rapper. The song’s lyrics (see Appendix, 1) illustrate the society’s dissatisfaction with the part of the government that people have the most daily contact with, the police. The lyrics demonstrate the lack of freedom afforded to Iranian citizens (especially youth) and call attention to the constant frustration of young people over how they are treated by their own government: “It seems that arresting us is their hobby, especially at night.” The song also calls attention to growing sentiment that Iran should integrate itself into the modern world through lyrics that express desires similar to those of Western peers: “I wanna sing rap all the time, too make lots of cash, buy lots of cool cars.” Overall, Iranian music has become an important and influential outlet for citizens who lack the right of voicing their opinion in their own government. Music offers citizens both a way to have their voice heard and a way to broadcast the message of change. In response to the message Iranian hip-hop aims to spread, the government has cracked down on the music’s dissemination into Iranian society, banning it in many areas.

Artifact 5: Social Networking and Political Demonstrations

Another influential outlet for growing frustration among Iranian citizens has been social-networking sites such as Facebook, Twitter, and YouTube, which provide a window into the lives of Iranians who push for change on a daily basis. Following the fraudulent re-election of Ahmadinejad in 2009, many Iranians used Twitter to express their dissatisfaction with the election results. “Web-based technology, such as the social messaging service Twitter and online video-sharing site YouTube, enabled Iranians to document and disseminate to the world images of and information on repression in the wake of the recent election” (Quirk, 2009). In addition to spreading their opinions through social networking sites, Iranians also capitalized on YouTube as a way to depict the oppressive regime. “In the hours immediately following the government’s announcement of the election results and through Tuesday evening, Iranians of all ages took to the streets with chants of ‘Down with the Dictator,’ and ‘Where is my Vote?’” (Quirk, 2009). These demonstrations were immediately uploaded to YouTube, and within minutes the entire world could see first hand the plight of Iranian citizens (see Appendix, 2).
International Pressures

In addition to the domestic pressures that currently face the Iranian government, international pressures also influence policymaking. On the international level both powerful nations, like the United States, and intergovernmental organizations, like the United Nations, push the Iranian government to act in certain ways. Today, these pressures usually come in the form of sanctions and threatening discourse, which seek to undermine the same policies these outsiders are threatened by (e.g., perpetuation of a nuclear program and Holocaust denial). In many ways, however, the international policy responses have become part of the problem, fueling the perpetuation of an “us vs. them” mentality (discussed further below) and subsequent hostile foreign policies.

Artifact 6: Economic Sanctions

In response to the perpetuation of Iranian policies such as the perpetuation of the nuclear program as well as hostile discourse (e.g., Holocaust denial), the United States has imposed a series of harsh economic sanctions against the current regime (see Appendix, 3a). This policy bars all banking transactions between the two states, any imports from Iran, any exports to Iran, and any financial dealings with Iran, as well as many aid programs for Iranian citizens (Overview of Sanctions, 2009). The United Nations Security Council has also imposed its own sanctions against Iran in response to Iran’s uranium enrichment programs, which violate the “Treaty on the Non-Proliferation of Nuclear Weapons” (see Appendix, 3b). Although these sanctions are loose in comparison to the ones levied by the United States, they still discourage trade and economic connections between Iran and the United Nations’ member states (United Nations Security Council, 2008).

Artifact 7: Threatening Discourse and Preconditions

Beyond concrete policy response to the current Iranian regime, it is also important to examine the discourse the United States and other international actors use to depict the state. In response to the perceived Iranian “security threat” US foreign policy has employed the threat of military force (Rogers & Holt, 2006). In addition to the threat of military action, US discourse has also imposed preconditions on any negotiations between the two states. For example in 2007, the Bush administration demanded that the Iranian government stop its nuclear program before the US would have any diplomatic negotiations with the government (Majd, 2009; Tarock, 2006). Policies like this not only antagonize the Iranian leadership, but also ostracize the Iranian people, uniting them behind the illegitimate government (Hudson, 1996).

Iranian Policymaking: The Theory of “Rally Around the Flag”

In response to decreasing support for the current regime domestically the Iranian government has capitalized on international pressures, which have been shaped by threats of economic sanctions and military force, and attempted to create an “us vs. them” mentality within the society (Bennis, 2009). Indifferent-to-hostile discourse and the overall attitude of the West have “always added urgency to the nationalistic rhetoric” (Afshari, 1994), playing into the hands of Iranian leaders, perpetuating their power as well as their policies. Beyond discourse, international action, specifically by the United States, has attempted to isolate Iran through economic sanctions (Tarock, 2006). These actions have also been counterproductive, “hurting ordinary Iranians, inflaming public opinion and uniting the country behind the government” (Landler, 2009). In this regard the Iranian government depicts international pressure as anti-Iranian, not simply antigovernment. Overall the government works to create a “rally-around-the-flag” mentality among its citizens through the use of diversionary politics. Originally formulated by John Mueller in War, Presidents, and Public Opinion, the “rally-around-the-flag” theory describes the mentality created among citizens when faced with a serious crisis (Mueller, 1985). The theory claims that when serious threats are posed to a state, citizens come together, criticism of the government is drastically reduced, and officials receive short-term support (regardless of their political affiliation). An example can be seen in the approval ratings of President Bush following the invasion of Afghanistan in 2001, which were the highest in his entire tenure in office.

In many ways the “rally-around-the-flag” concept applies directly to the current situation in Iran, explaining the tactics of the Iranian government in its attempt to maintain power even though it is faced with its own illegitimacy. In its attempt to curtail the domestic pressures illustrated above, the government utilizes “diversionary politics,” which include the perpetuation of its nuclear program, and threatening discourse aimed at the United States and its allies, to perpetuate an “us vs. them” mentality among its citizens. The United States tactics have been largely ineffective; “increased international pressure…has enabled the current regime to…discredit any moves toward reform as externally inspired” (Waites, 2008). The international community reinforces this mentality as it continues to utilize policies that are seen as anti-Iranian rather than antiregime. All of these forces culminate in the current regime’s use of diversionary politics on the macro level, in an attempt to assert Iranian power and deflect attention away from its inherent illegitimacy. International responses in the form of sanctions and military threats are utilized by the government to create an “us vs. them” mentality. This mentality capitalizes on the proud nature of Iranian citizens on the micro level, building support for the regime and reinforcing its ultimate goal to remain in power (Majd, 2009).

Conclusion

Although the volatile state of affairs between Iran and the Western world is highly publicized, it is easy to gloss over the plight of modern Iranian citizens and the policies that create hostility. With a better understanding of how and why the Iranian government continues to utilize threatening foreign policies towards the West, the United States and its allies will be better equipped to face the regime and prevent a large-scale global conflict.

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APPENDIX

1. Artifact 4: Iranian Music

The Cops Again (Hickkas)

Go back to your home, all of you
Again cops are coming, everyone hides their illegal things
Because if he got you, you are busted.

The red light of their siren is dancing on the walls but it is not the
dancing light of some nightclub with dancing girls
As soon as everyone caught sight of them,
they would disappear cause
We have some troublesome object in our pocket.
I will be as tame as a kitten in front of cops one of those goody kids
that their mama worship them.

I will behave in front of Mr. Cop as though
I am some educated engineer
I will prate something about college life or my grades.
I will behave as if I am such a goody boy officer would smile
and say: good luck kid. When they are gone, every one would come
out again guys would say: start rapping again.
I will sing and sing and drumming on a bucket
look, look, do not put handcuffs on me.

Hey, hey a voice is coming everyone would run away,
there is some disturbance up there.
It seems that arresting us is their hobby especially at night.
hey, hey a voice is coming everyone would run away,
there is some disturbance up there.
It seems that arresting us is their hobby especially at nights.

Hey officer, put them in the van oops fight again, fight.
do not move from your sit. oh, ok. Ok. I was just kidding. I do not have anything
to hide, I do not have to run away.
yeah? You are lying, if you do not bust me one night your night wont pass? You have nothing better to do?
You would say turn around so that I put handcuff on your hands but I would run away.
That is what I will I wanna get stoned I will fool with you, cause I am so mischievous, I will sing and sing till your head begin to spin,
and you begin quacking like a duck do not play with my lighter, idiot
I wanna fire my dope, oh boy, cops again, gonna forget the dope,
and you begin quacking like a duck do not play with my lighter, idiot
I wanna fire my dope, oh boy, cops again, gonna forget the dope, gonna run

Hey, hey a voice is coming everyone would run away,
there is some disturbance up there.
It seems that arresting us is their hobby especially at night.
hey, hey a voice is coming everyone would run away,
there is some disturbance up there.
It seems that arresting us is their hobby especially at nights.

Hey Reza do not look behind your back why?? a cop is looking
at you have something to hide? no have any drugs. yes, got a dope.
rolled it before. okay, just play cool throw it out of your pocket. are
the trees so tall? no, cool, so we can jump and get away. it is too late
for running away, just throw it down and put your foot on it

now what? I paid for it not you. I rather die than throw it away.
officer is talking on his radio, get up, got to run you wanna go to jail? No.
I wanna sing rap all the time, too make lots of cash, buy lots of
cool cars.

Hey, hey a voice is coming everyone would run away,
there is some disturbance up there.
It seems that arresting us is their hobby especially at nights.
hey, hey a voice is coming everyone would run away,


Correcting Misrepresentation: On Progressive Representations of Childhood in Female- and Queer-Authored Avant-Garde Cinema

By Rachel Stuckey

As with any visual medium, the dominant (white, male, heterosexual) group within avant-garde film creates and relies upon its own dictates for representinglessdominant groups, including people of other races and sexual orientations, women, and children. When one looks specifically at the depiction of children within this area of film, two main canonized images present themselves. The first, borrowed from other artistic canons, is that of the innocent and strictly gendered child. The second, attributable particularly to Stan Brakhage, is that of a filic object, or a mode of filming an object upon which light falls, as any plant or piece of furniture would be filmed. Because of this phenomenon's pervasiveness, more dimensional and accurate portrayals of youth in avant-garde film are seen as ranging between “alternate” and taboo. It can be argued that nonwhite, non-heterosexual males or female and queer-identified (defined as gay, lesbian, bisexual, transsexual, pansexual, asexual, intersex, or gender variant) filmmakers strive to present more accurate images of children than nonfemale or nonqueer filmmakers. Life experience as second-class citizens, especially within their artistic medium, paired with differing approaches to authorship, including collaborative conception and production as well as accessible distribution (via Internet, free shows, traveling exhibitions, etc.) of film and video work, allows for these filmmakers to operate outside typical means of representing youth.

The direct imposition of adult society’s rigid gender binary upon child characters—without regard to one’s own experience of youth—limits artistic expression rather like viewing a fluid form through a grid. The children in Brakhage’s films are primarily presented as canvases for light and color, but on the occasion that they are permitted some form of identity, the children are often engaged in gender-specific activities involving their mother. Similarly, Alfred Hitchcock’s home movies (arguably closer to avant-garde than his features) of his daughter from age two to age four perpetuate these gender roles by routinely depicting her in flouncy, pastel dresses and curled hair, smiling and playing amid flower beds with her nanny. Both of these situations represent classical images of children. These archetypal images of youth are significantly called into question by filmmakers such as the queer-identified Matthias Müller, Ryan Trecartin, and Barbara Hammer, and the female filmmakers Gunvor Nelson and Peggy Ahwesh.

Filmmakers like Nelson’s My Name Is Oona (1969) and Ahwesh’s Maya (1995) are impressionistic glimpses into the psyche of a grade-school boy using the visual vocabulary of someone that age. Although this film is relatively contemporary, it is important to look at for its reconstruction of a classical 1960s environment in which the visual language of the time period is torn down by shifting the voice to the child’s perspective. The iconic image of the nuclear housewife is viewed freshly through the eyes of a young boy who fetishizes and longs to claim that role. Thoughts of sexual frustration and repression of gender expression are relayed through television clips, domestic nightmares, and meandering, contemplative shots of objects from the child’s daily life. The complex relationship of a child to his mother is not often addressed in such a way that both identifies the token inclusion of Oedipal threads in many narratives and provides access to the impressionistic lexicon of the child. Filmmaker Barbara Hammer addresses similar concepts in her memoir, Hammer! Making Movies Out of Sex and Life. She describes an early film she made that utilized a lesbian lexicon, and notes that although she “didn’t know it then, [she had created] the first lesbian-lovemaking film to be made by a lesbian” (27). Her reapropriation of the lovemaking act mitigates the negative effects of its previous control by the dominant, heterosexual male point of view, and her reclamation of adult, lesbian identity moreover allowed her to approach her childhood in her film Dream Age (1979). This film is “shot from the eye level of a three year old as [she] remembered the cabinets…trying to find the Barbara that had come out of so many squares…making the film integrated my hetero and my homo selves” (103). Through the visual language of a child, she interprets the heterosexual-by-default phenomenon of her youth identity as an adult lesbian in an attempt to reconcile an imprinted identity with the expression of her internally felt identity.

As Alpsee changed the voice of child-centered films and as Hammer’s work challenged misconceptions of the child as inherently heterosexual, Gunvor Nelson’s My Name Is Oona (1969) altered the filmic syntax of youth. Though she worked as a structuralist, Nelson’s films operate through visual meaning and emotional content more than storylines. Within her relatively small body of film work,
one piece centers upon a child, her daughter. My Name Is Oona offers a poetic and resonant portrait of the titular girl, whose presence is unavoidable and claims the viewer’s attention with her constant movement and direct engagement with the apparatus. She interacts with the camera and its operator/her parent, where in Brakhage’s work the children interact with neither. Rather than being silenced, Oona exhaustively shares her voice, claiming even the title of the film for her own. As one watches the film, it becomes evident that Oona is not being directed or playing a role as much as she is directing the movement of the camera and challenging it to capture who she is. Nelson carefully portrays Oona as one who is thoughtful, chaotic, responsible, involved, and an enactor of ethereal horse riding as well as wrestling. Through superimpositions, repetition, and cross cutting, Nelson expertly blends these images, traits, motions, and emotions with a critical mass of sound to create a loving, knowing portrait of a person, as well as a tangible relationship between the filmmaker and the subject.

After the groundwork had been laid for altering the syntactical structure of a work, Peggy Ahwesh was able to create an entirely different filmic language in Martina’s Playhouse (1986). The film has received resistance in the art world for its overbearing “feminine-ness” and ability to raise ambiguous questions about gender, identity, and social roles without definitively answering them. There exists an incredible sense of openness in the work that doesn’t follow a solid storyline and allows for a very serious and wily six-year-old, Martina, to host the madness. Martina is generally given free rein to direct herself (in a more literal sense than with Oona) in a collage that dissects women’s roles and sexuality. In response to Ahwesh’s questioning of one of her stuffed animals, Martina states, “I thought he was a boy but she was really a girl,” directly exposing the fluidity of gender in the child’s mind. Martina’s mother also plays a role in the film, as directed by her daughter. The mom becomes the baby who is scolded and breastfed by Martina, who ultimately becomes distraught by the small size of the diaper she attempts to put on her mother. In an Eisensteinian attempt to pull out the sexuality-based subtexts of Martina’s actions, Ahwesh instructs her to read portions of Bataille and Lacan’s writings on sexuality. Though she stumbles and essentially rewrites the texts in her readings, the meaning is only enhanced. Her world is also intercut with that of Ahwesh’s twenty-something friend who casually tosses out that “everybody’s angry all the time, especially women,” perhaps suggesting that, as mentioned above, young people are more free from society’s marginalizing pressures. These aspects of role-reversal, queer identity, sexuality, and autonomy are generally ignored or unnoted in film produced by marginalized groups exhibit greater concern for accurately portraying the personal identities of their subjects and construct less rigid impressions of individual identity. This movement in film is particularly important because it creates new opportunities for self-expression that do not rely on cliché and archetypal images of gender and identity by reclaiming an empathetic representation of children as fluid subjects rather than rigidly defined objects.

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Imagine the blistering African heat. Imagine sweating uncontrollably without the expensive use of an air-cooling system. Now imagine a self-regulating ventilation system that would keep a building at temperatures comfortable for workers and residents in the most extreme temperatures. A building able to maintain constant internal temperature due to its structure and interaction with the local environment, rather than use of expensive external energy sources. How can this be done? you say. The better question is, how was this done? Mark Pearce developed the Eastgate Centre building in Harare, Zimbabwe, which is able to passively cool the structure and does not require a fuel-based air-conditioning system. The energy savings were staggering: 65% less energy used compared to conventional office buildings. Yet the most amazing aspect of this story is that the brilliant design was based on thermal control found in termite mounds throughout Africa. This is design inspired by nature's genius, otherwise known as biomimicry; and as Mr. Pearce has found, it makes financial sense.

Biomimicry is a very new and intriguing discipline that seeks sustainable solutions by emulating nature's time-tested patterns and strategies. In other words, organisms or ecosystems are mimicked in human design. Janine Benyus, the president of the Biomimicry Institute, explains, "Biomimicry is the process of learning from and then emulating life's genius. It's based not on what we can extract from the natural world, but what we can learn from it. Life has been on earth for 3.8 billion years, and in that time life has learned what works and what fits here. Mimicking their designs, strategies, and their recipes could change the way we grow food, power ourselves, conduct business, even the way we make our materials" (Benyus 2009). There are many organizations in the world that have already solved the problems many individuals spend their entire careers trying to solve. Janine Benyus describes a time frame of 3.8 billion years during which species have been evolving and perfecting their methods. This seemingly endless period of R&D has given rise to 10-30 million species with well-adapted solutions. These other organisms are solving the same problems we are facing today in the same context: the Earth. It seems that we have forgotten we are not the first ones to build, heat, and cool a structure; waterproof; make paper; optimize packing space; or even build houses for our young. Many other organisms have been doing these things that have allowed them to be here for billions of years. So the question then becomes: How does life make things? We tend to do the opposite, which has been termed Heat, Beat, Treat. We heat it up, beat it at high pressures, and then use chemicals. This method of carving things from the top down has created 96 percent waste left over and only 4 percent product (Benyus 2009). Life creates conditions conducive to life while maximizing output. Contrary to our belief, these goals are not mutually exclusive. If we can meet our needs and produce at full capacity while making this platform habitable for years to come, this presents the opportunity for enormous economic potential (Borrowing 2007).

While this field may sound unique, this science of “reverse-engineering” has been seen before in history. Joseph Paxton’s designs for the Crystal Palace that housed the Great Exhibition of 1851 were based, in part, on his observations of the structure of giant water lilies. George de Mestral, a Swiss engineer, came up with the concept of Velcro after observing the way burdock seeds clung to his clothes and the fur of his dog. Most famously, Leonardo da Vinci’s attempt to design the airplane was based on the way birds fly (O’Connell 2009). While these innovators looked to nature to expand human design at the time, many are doing the same today but on a more popularized platform. As we become more and more concerned about the environmental impact of our behavior, biomimicry is becoming fashionable. As Michael Pawlyn, the director of a sustainable architecture firm in Cornwall, explained, “Imitating natural systems is about trying to mimic the amazing effectiveness of ecosystems, where waste from one system or animal is used as nutrients for another. These then become closed loop systems. Often by applying ideas from ecosystems you can turn problems into solutions that are better both environmentally and commercially” (O’Connell 2009). There are some businesses and individuals that have captured this creativity and leveraged it to their advantage. If we take a look at some of the players in this market, we can begin to see how exactly nature’s blueprint is leading to economic success.

Dr. Frank Fish, a leading expert on how animals move, was looking at a sculpture of a humpback whale when he noticed that the artists had put bumps on the whale’s flippers. This made no sense to him, as everyone knew that the leading edge of a wing had to be smooth and streamlined. But after further investigation, he discovered these bumps were precisely the right shape, located in precisely the right places, to make this enormous animal extremely agile, as the bumps produce vortices that generate more lift and reduce drag. He then set up a firm called Whale Power that uses this concept, which he refers to as “tubercle technology,” to design wind turbines, pumps, and fans. He claims these bumpy blades are quieter and more reliable, and, most importantly, produce 20 percent more electricity a year (O’Connell 2009).

The Japanese firm JR West created a train with a rounded front end, hence called the bullet train. But the train was experiencing some difficulties when it entered and exited a tunnel. As the train entered the tunnel it built up a pressure wave, which caused a sonic boom as it exited. The executive team at JR West decided that they needed to find a solution for quieting the train. The kingfisher was the answer. This is an animal that goes from one density of medium (air) to another density of medium (water) without a splash, enabling it to see fish. The engineers thought, what if we do this? They redesigned the train based on the kingfisher’s narrow and sleek structure, which resulted in a quieter train, a 10 percent faster train, and one that used 15 percent less electricity (Benyus 2009).

Sharklet Technologies realized that we are not the first ones who have had to protect ourselves from bacteria. The Galapagos shark demonstrates this, as this is an animal which has no bacteria or any sort of fouling on its surface. This is not a fast moving shark, but rather a slower moving shark, so the question is, How does this...
The R&D team over at Nissan has taken this a step further. Integrated visual neurosystem for collision avoidance, which integrates on automotive applications based on this insect. It focuses on an beginning to create a single-chip bio-inspired visual perception system. The Locust Project, based at the University of Newcastle in England, is detecting to reaction takes about 45 milliseconds (Roach 2010). The spikes in energy allow the locust to take action, which from motion other locust or a predatory bird. It was found that the LGMD releases burst of energy whenever a locust is on a collision course with an- talent due to a large neuron called the locust giant movement detection. This innovative system creates rapid color change, is highly reflective technology called IMOD (Interferometric MODulation). This system of producing color allows for the dynamic control of light flow and wavelength interaction, which butterflies rely upon for camouflage, thermoregulation, and signaling (Vukusic 2010). Designers at Qualcomm picked up on this design and are now using these systems of structurally produced color, as this does not require the toxic heavy metals or manufacturing methods common with many pigments and dyes. They are calling it mirasol display technology, which is based on the reflective technology called IMOD (Interferometric MODulation). This innovative system creates rapid color change, is highly reflective, remains vibrant under low-light conditions, and requires less energy than other electronic display methods. It is so reflective the display itself can be seen even in direct sunlight. All these characteristics make it perfect for display light on cell phones (Qualcomm 2009).

In the automotive industry, collision threat detection still presents a great challenge for research and development. Individuals are looking for censoring and detecting mechanisms that can help reduce our 3.6 million car collisions per year in the U.S. Locusts can travel in swarms up to 80 million while occupying a single square kilometer and never collide with one another (Benyus 2009). Like many insects, they can see many more images per second than we do. With this ability, they can react to things that are approaching very rapidly and make their escape before collision. Locusts display this talent due to a large neuron called the locust giant movement detector (LGMD) located behind their eyes. This neuron releases a large burst of energy whenever a locust is on a collision course with another locust or a predatory bird. It was found that the LGMD releases more energy when something is coming directly at the locust. These spikes in energy allow the locust to take action, which from motion detection to reaction takes about 45 milliseconds (Roach 2010). The Locust Project, based at the University of Newcastle in England, is beginning to create a single-chip bio-inspired visual perception system for automotive applications based on this insect. It focuses on an integrated visual neurosystem for collision avoidance, which integrates sensing, perception, and action-control features (Rind 2005).

The R&D team over at Nissan has taken this a step further. The Japanese firm set itself the goal of halving the number of deaths or serious injuries involving its vehicles between 1995 and 2015. In-
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Preventing Drug-Resistant Bacteria through the Regulation of Antibiotic Use in Agriculture

By Ian Milligan

The discovery of penicillin and its uses in 1928 by Alexander Fleming ushered in the beginning of an era where prescription and antimicrobial drugs are staples of disease treatment. Diseases that once devastated human populations are now completely curable, requiring only a simple trip to the doctor’s office. Given their tremendous benefits, these antibiotics have spread to agriculture in an effort to promote healthy herds and, thus, a healthy food supply. The current use of these medications in agriculture, however, is non-therapeutic with the hopes of preventing disease rather than treating it. The use of antibiotics in feed and water supplies, and the resulting high concentration of antibiotics in animals, prompts bacteria to evolve and develop resistance to the medications. These bacteria are mutating faster than new, effective medicines are being produced, leading to a growing health concern over these new “superbugs.” More specifically, the concern deals with agriculturally induced resistance transferring into the human population, causing antibiotic-resistant sickness and rendering current treatment methods ineffective.

Currently, the Federal Food and Drug Administration (FDA) has instituted no regulations governing the use of antibiotics for livestock in farms. An aggressive attempt has come from Representative Louise Slaughter of New York, who introduced HR 1549, also known as the Preservation of Antibiotics Medical Treatment Act, or PAMTA, to the House of Representatives in 2009. This was an attempt to create a set of regulations for antimicrobial use. As a response, in June of 2010, the FDA released guidelines to reduce the development of resistance to medically important antimicrobial drugs used in food-producing animals (U.S. Food and Drug Administration). The stricter regulations of PAMTA would limit the use of antibiotics in livestock to “therapy for diseased individual animals and prophylaxis when disease is documented in a herd or flock” (The Library of Congress). This bill however, has come under scrutiny, most prominently from the National Pork Producers Council (NPPC) and the American Veterinary Medical Association (AVMA).

Both groups have argued that the non-therapeutic use of antibiotics in feed helps prevent disease, thereby keeping herds healthy. The NPPC claims that the bill, PAMTA, would be “detrimental to the health and well-being of pigs, increase pork producer’s production costs as well as the price consumers pay for pork and could jeopardize public health,” (National Pork Producers Council). The AVMA holds a similar stance regarding PAMTA, describing how the legislation would “increase animal disease and death without assurance of human health,” (American Veterinary Medical Association). While the AVMA and NPPC cite evidence supporting their claims, they misinterpret and misrepresent FDA’s findings and evidence, mostly ignoring the risks posed by bacterial resistance to antibiotics, which are significant enough to warrant the regulations suggested by PAMTA.

Antibiotics, Resistance, and Regulations

Developing the roles that antibiotics play in treating disease in both humans and animals will allow for the assessment of the growing risk of microbial resistance to these drugs. Antibiotic medications function by inhibiting the growth of bacteria, fungi, and other microbes. These drugs are able to accomplish this function several different ways, including “the inhibition of DNA replication, transcription, and bacterial cell wall synthesis, as well as translation,” (Center for Disease Control and Prevention). These functions keep bacteria from reproducing, eventually killing the microbe and ridding the body of the disease. These antibiotics have helped stem the ravishing effects of diseases such tuberculosis, meningitis, and streptococcus, among many others. Bacteria recently have started to adapt to the use of antibiotics by mutating into antibiotic-resistant strains. This mutation is due to a selective pressure placed on the microbes by the antibiotic, making resistant strains the dominant strain and ultimately causing the development of a resistance to the medications used to combat them. Recently, a strain of Staphylococcus aureus has developed antibiotic resistance. This specific resistance has lead to an increased number of untreatable cases, 94,360 of the Methicillin-resistant strain (MRSA) in 2005 (Center for Disease Control and Prevention).

To stem the overuse of these drugs in human patients, the Center for Disease Control and Prevention (CDC) has initiated an educational campaign, “Get Smart,” to instruct both patients and doctors about the proper times to prescribe antibiotics. This initiative addresses the problems of antibiotic overuse in human healthcare, but agriculture also represents a large portion of the prescription drug market with estimates reaching up to 70% of prescription drug use (Sayre).

Antibiotics are administered in agricultural settings as a method of disease treatment and prevention. Also, antibiotics have been used to encourage quicker growth rates in livestock through their inclusion in animal feed. These antibiotics are available to farmers on a prescription and over-the-counter basis, making them easy to obtain and administer through feed, water, or injection (Dyckman). Representative Louise Slaughter’s bill, HR 1549, addresses the overuse of antibiotics in agriculture. Specifically, the bill plans to “phase out the non-therapeutic use of medically important antibiotics and require a tough standard for the new applications for the approval of animal antibiotics” (The Library of Congress). This bill tries to stem the overuse of critically important medication used in human cases, with specific consideration for antibiotics containing “penicillin, tetracycline, and streptomycin” and their derivatives, to prevent microbes from forming resistance to medications critical for human disease care.

Response to the AVMA

While using antibiotics keeps animals healthy, the non-therapeutic use of these medications increases the risk of resistance and prompts questions about the conditions in which these animals are raised. The AVMA, strong proponents of the continued use of antibiotics, claim that “banning or severely restricting antimicrobial use limits veterinarians’ ability to prevent or control animal diseases,”...
(American Veterinary Medical Association). The AVMA fears that, if antibiotics cannot be used to prevent disease, as proposed by PAMTA, unhealthy animals can enter the food chain, thereby affecting human health. The report they cite chronicles Denmark’s ban on the non-therapeutic use of antibiotics as growth promoters. The AVMA, with the use of the report, claims that disease has become more prevalent in swine populations in Denmark, with increased mortality rates in weaners (young pigs) in 2008 (American Veterinary Medical Association). Also, they note how antibiotic use in swine herds increased in the years following the Denmark ban in 1998, 19% from 2001 to 2009.

While this data seem to suggest that the ban on growth promoting antibiotics affected the health of pig populations in Denmark, the AVMA overstates the evidence by ignoring the fact that the pig population has increased. The AVMA do have it right when they claim that antibiotic use in swine populations in Denmark has increased since the institution of the ban, however, so has the productivity of swine farmers. The increase in antibiotic use can be explained by a simple increase in herd populations. In fact, between 2007 and 2008, Danish Integrated Antimicrobial Resistance Monitoring and Research (Danmap), found there to be a 2.9% increase in the number of swine heads produced, either slaughtered or exported, and a 50% increase in total production since 1992 (Danish Integrated Antimicrobial Resistance Monitoring and Research Programme). The Center for Disease Control also analyzed the Danish regulations and found that the amount of antibiotics per kilogram of meat actually decreased in the years following the ban by 50% (Center for Disease Control and Prevention). The greater the number of pigs that are being raised and put into the food market, the greater the number of antibiotics needed to treat disease. The more important idea is that the amount of antibiotics per animal, or kilogram, has decreased from 100 milligrams to 49 milligrams per kilogram of meat (Center for Disease Control and Prevention). This ratio indicates that, while antibiotic use has increased following the regulations, the increased production is greater, leading to less antibiotics being introduced to individual animals.

The AVMA is most certainly justified in worrying about diseased animal populations decreasing agricultural productivity and potentially harming the safety of food produced in the United States, but other factors contribute to this risk. The most important of these is the environments in which these animals are raised. Decreasing antibiotic availability to veterinarians potentially risks the health of the animals, but why are non-therapeutic levels of antibiotics assumed to be necessary to protect livestock? Because the antibiotics attack the antimicrobials present in the body, the only motivation for non-therapeutic prevention would be the assumption that disease is ever-present in herds and individual animals. This raises questions about the environments in which animals are being raised. The rising demand for goods produced by animals has led to the inevitable increase in the number of factory farms. These factory farms house numerous animals in cramped conditions and are a breeding ground for disease. In fact, the 65 million hogs that are being raised in the United States are housed by a mere 65,000 farms nationwide (1000 pigs per farm). While this may not seem too bad, consider that in 1965, 53 million pigs were raised on over 1 million farms in the United States (Sayre). Concentrating animals in tight spaces, coupled with waste management problems, stress, and insufficient sunlight lead to disease in livestock spaces (Sayre). These are the conditions that are threatening to animal health, not the lack of non-therapeutic levels of antibiotics. If anything, the use of antibiotics as a preventative measure is covering up the fact that the environment in which the animals are kept is causing disease. If and when the housing of animals is corrected, non-therapeutic antibiotics will not be needed, and the sooner the crutch of non-therapeutic levels of antibiotics in feed is removed, the sooner healthier environments can be developed and the sooner antibiotic resistance can be addressed. PAMTA would force these changes, potentially leading to healthier living environments, healthier animal populations without antibiotics, and ultimately healthy food. The current method of production puts animal health at risk and potentially the health of the general public through antibiotic resistance, making the regulations suggested by PAMTA vital to ensuring both agricultural and medical safety.

The Link between Resistance and Antibiotic Use in Livestock

Despite the claims of the NPPC and the AVMA, decreasing the usage of antibiotics in agriculture can stem the increasing numbers of drug-resistant strains of bacteria both in the agricultural and medical fields. The NPPC and AVMA, in their opposition of PAMTA, set out to prove that there is no link between decreasing non-therapeutic antibiotic use and the prevalence of resistant bacteria. Once again, the Denmark study is given as evidence to show that “public health improvements have not materialized” (National Pork Producers Council). The NPPC cite a World Health Organization (WHO) report that chronicled the effects of the Danish ban on growth promoting antibiotics, saying that the ban did not decrease the population of antibiotic resistant Salmonella.

While the WHO report does indicate these findings, once again, they seem to be taken a bit out of context. The Center for Disease Control (CDC) recently submitted testimony that suggested a link between antibiotic use in agriculture and resistance in bacteria. In the testimony, the CDC cites various studies that monitored the appearance of antibiotic resistance in humans and compared it against that in animals. The strains of resistant bacteria were also studied in order to compare the human- and animal-resistant strains. The results indicated that an increased use of antibiotics, either by a new drug being approved or a period of sickness, increased the number of resistant strains in both the human and animal population. The human and animal strains of resistance were also indistinguishable. Not only that, but a study of Campylobacter, the bacteria responsible for food poisoning, showed that “following the approval of fluoroquinolones for use in poultry, resistance to this class of drugs among human Campylobacter isolates rose sharply, to more than 20%” (Center for Disease Control and Prevention). This indicates that there is a correlation between agricultural use of antibiotics and the development of resistance in both human and animal populations. After establishing this relationship between antibiotic use in agriculture and antibiotic resistance, the WHO report cited by the NPPC and AVMA can be analyzed.

The biggest issue in the opposition’s argument concerning the effectiveness of the ban on growth promoting antibiotics and an increase in human health is the way they describe the benefits to society. They suggest that a benefit to human health comes in the form of a decrease in drug-resistant strains of bacteria that directly affect humans. The purpose of PAMTA is not to decrease the already resistant bacteria in humans but to limit the agriculturally influenced evolution of more resistance. Decreasing the amount of antibiotics fed to livestock lessens the risk of cross-over to human drugs and disease. PAMTA, by limiting the use of growth promoting and disease preventing antibiotics, can achieve similar results. It is not necessarily that there is a decrease in human resistant strains of bacteria but, rather, a decrease in the precursors. Drug resistance is already present, but defending the current body of medications from more evolved bacteria is something PAMTA supports with its proposed regulations.
The Costs of the Proposed Bill

Despite the concerns about PAMTA’s increasing the costs of production, the Denmark experience illustrates that placing regulations on antibiotics has a relatively small effect on the costs of raising livestock. The NPPC uses a study by the Department of Economics from Iowa State University that analyzes the potential effects that placing a ban on non-therapeutic levels of antibiotics would have on the costs of production for pork farmers. The study analyzes the additional costs that would be placed on pork farmers for a ten-year period should a ban be instituted. The researchers assumed the costs would come in the form of additional weaning time, additional veterinarian expenses that would be accrued without the non-therapeutic levels of antibiotics, and changes in the facilities required to keep livestock healthy. After taking into account each of these variables, the study predicted that costs of production “would increase by $6.05 in the first year and by $5.24 per head at the end of the projection period” (Dermot J. Hayes). The study then described the impact on farmers due to the antibiotic ban Sweden placed on its farmers in 1986. As a result, farmers changed the way their pigs were weaned by keeping pigs in specific groups.

Despite this claim, which suggests an increase in costs, this analysis is simply a projection of what could result should PAMTA be put into place. Relying on a projection allows for a sense of uncertainty in its accuracy. Rather, data from the bans implemented in Denmark and Sweden effectively gauge the effect of an antibiotic ban. The WHO, which studied the impacts of the regulations on non-therapeutic levels of antibiotics since the Denmark ban, estimated “an increase in pig production costs of just over 1%,” with a 7.55 DKK ($1.37) increase per pig. Increases in meat prices were even smaller, with the average pig price per kilogram rose from 8.24 DKK ($1.45) in 1998, when the ban was first implemented, to 9.46 DKK ($1.67) in 2000 (World Health Organization). According to the Department of Economics at Iowa State, Sweden experienced similar increases in pork prices with “the net increase in consumer costs estimated to be about $0.12 per kilogram” (Dermot J. Hayes).

This body of data suggests that the bans that have already been put into place have not significantly increased the costs of raising livestock, nor have they significantly increased the price of meat for consumers. This suggests that the regulations promoted by PAMTA will not affect the costs of production for hog farmers in the United States. The problem with NPPC’s argument lies in the fact that it is a projection. Another model with different controlled variables could be constructed, and vastly different estimates may be reached. History, on the other hand, provides an example of what actually happened rather than what may happen in the future. While the American farming industry most certainly is different from those in Sweden and Denmark, farmers in the countries experiencing the ban were forced to modify the way they raised livestock. American farmers will have to do the same should PAMTA be passed, but the Denmark and Sweden experiences show that change can occur without a significant increase in cost. Therefore, PAMTA does not pose a serious threat to production costs of pork despite the claims that the NPPC makes and should be introduced in order to lessen the risk posed by antibiotic resistance.

While the NPPC worry about the additional costs accrued by farmers should PAMTA be passed, more disturbing are the costs associated with treating an antibiotic-resistant infection. In 1998, the National Academy of Sciences Institute of Medicine released a report analyzing the costs associated with treating cases of antibiotic resistance in humans. New York City, after an outbreak of MRSA in 1995, spent half a billion dollars treating the disease. The average yearly costs for the treatment of antibiotic resistance reach 3 to 4 billion dollars (National Academy of Sciences Institute of Medicine).

The NPPC argues that antibiotic regulations will induce costs onto their operations, but the continued generation of resistant bacteria also costing the people who get sick and the hospitals treating the infections. The more resistant strains that develop, the higher the costs of treating them will be. PAMTA, through its regulations, may add costs to farmers and their operations, but society incurs costs from the continued non-therapeutic administration of antibiotics to livestock. As the costs to farmers have proven to be insignificant, the cost to society have proven to be enormous, so regulating antibiotics in agriculture through PAMTA will slow the growth of antibiotic resistance and ultimately the costs associated with their treatment.

Conclusion

The risk posed by the current level of antibiotic use in agriculture threatens human health and should be regulated to slow the growth of antibiotic-resistant bacteria because animal health can still be maintained without the prescription of drugs. Recent research has illustrated the correlation between antibiotic use in agriculture and antibiotic resistance in humans, so regulating the current use of these antibiotics is critical to the prolonged and effective use of clinical medications. Also, history provides examples, Denmark and Sweden, of the successful implementation of similar regulations, proving that reducing the use of antibiotics can occur without a significant effect on costs to producers. PAMTA provides the regulations necessary to control the use of antibiotics in agriculture and should be approved despite the claims from the NPPC and the AVMA. Antibiotics are an essential part of the clinical treatment of infection and disease and should be protected so that they may continue to be used effectively in the future.

WORKS CITED


I am rushing quickly through the aisles of the store after my father. Rolls and rolls of cloth fill the space around me and my shoes squeak on the white linoleum floor. We grab squares of felt from the aisle in the back of the store, a bag of glue sticks in the same place. My dad always moves too quickly. I jog after him to the center of the store, the fabric and foam around us reach almost to the ceiling. The store feels like a maze, I can never see past one or two rows. We pluck one roll out of the sea of fabric around us. I think the other color will work better, this one is too bright. We put it back and I carry the new one, hugging it like a tree. I follow again, running to keep up as we go turn right and emerge into an overwhelming rainbow of thread on little spools. We match the thread to the fabric and then we stand in line behind the other crafty people. My sister has her fabric in her arms. She demanded to be a gorilla, so the fabric is black and fuzzy. She will be the smallest gorilla I have ever seen. We reach an desk in the center of the store, it is an island with four old women in the middle each equipped with a pair of scissors. They ask us how much we want. I stand with my arms wide and my dad measures what we will need. He holds the fabric up in front of me, from one outstretched fingertip to the other, then doubles the measured length and and pinches the fabric together as he hands it over to our designated cutter. She holds her scissors at the ready. Then she grabs the fabric, lays it out in one flick of her wrist, and slides the scissors all the way through the cut without ever closing them. She skillfully transforms our purchase into a small folded square with a yellow tag Scotch-taped on top. The woman is machine-like and automatic in her movements. My dad tries to make small talk. He probably says something embarrassing because for some reason he loves to embarrass my sister and I. Our friends tell us he has an accent, but we can never hear it. We check out and walk outside into the crisp October breeze.

I am walking through the halls of my elementary school. We are all lined up by class, in awkward costumes that are too big for our little bodies. The carpet is a pale blue on the stairs. The handrail is wooden. We aren’t allowed to slide down the handrail; once a boy slid down it and got a huge splinter in his leg. As we walk up and down the stairs, we pass each other in orderly lines and we are treated to a parade of costumes and all my friends have already seen it, so I don’t mind taking it out and pinching the fabric together as he hands it over to our designated cutter. She holds her scissors at the ready. Then she grabs the fabric, lays it out in one flick of her wrist, and slides the scissors all the way through the cut without ever closing them. She skillfully transforms our purchase into a small folded square with a yellow tag Scotch-taped on top. The woman is machine-like and automatic in her movements. My dad tries to make small talk. He probably says something embarrassing because for some reason he loves to embarrass my sister and I. Our friends tell us he has an accent, but we can never hear it. We check out and walk outside into the crisp October breeze. I am part of it off. My hands are still covered by the feathers on my wings, and I can feel the wetness of condensation turning to ice in the front of my felt mask. It is too hot so I take it off and put it somewhere near the door. It’s dark not notices. I’m an Owl, a brown one with big yellow eyes, but my mask is too bright. We put it back and I carry the new one, hugging it like a tree. I follow again, running to keep up as we go turn right and emerge into an overwhelming rainbow of thread on little spools. We match the thread to the fabric and then we stand in line behind the other crafty people. My sister has her fabric in her arms. She demanded to be a gorilla, so the fabric is black and fuzzy. She will be the smallest gorilla I have ever seen. We reach an desk in the center of the store, it is an island with four old women in the middle each equipped with a pair of scissors. They ask us how much we want. I stand with my arms wide and my dad measures what we will need. He holds the fabric up in front of me, from one outstretched fingertip to the other, then doubles the measured length and and pinches the fabric together as he hands it over to our designated cutter. She holds her scissors at the ready. Then she grabs the fabric, lays it out in one flick of her wrist, and slides the scissors all the way through the cut without ever closing them. She skillfully transforms our purchase into a small folded square with a yellow tag Scotch-taped on top. The woman is machine-like and automatic in her movements. My dad tries to make small talk. He probably says something embarrassing because for some reason he loves to embarrass my sister and I. Our friends tell us he has an accent, but we can never hear it. We check out and walk outside into the crisp October breeze.

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I am in sixth grade. We have a costume contest that I didn’t know about. It’s my first year at the school. I’ve elected to represent my first period Geography class at the assembly at the end of the day. I move quickly through the halls from geography to history, from history to science, from science to writing, from writing to art. The day is a blur, the assembly comes quickly. I join the other finalists back stage, where some administrator lines us up in single file. I can see a judges’ table with three teachers I recognize through the heavy red curtain. We can all hear the chatter of the rest of the school in their seats, past what those in the theater like to call the fourth wall. I kind of wish there was a wall there. I didn’t realize this contest was such a big deal. Nobody can see me through my mask, though, so I’m only a little nervous. I can’t see much either, and walking off the front of the stage may not be the quickest way to gain the respect of my classmates. My dad and I remade the mask last night because it looked like a black and white pillowcase and not a penguin. This one is rounder, with a bright pointy beak sticking out the front. It looks like a cartoon instead of a real penguin, but I like it anyway. I sacrificed my ability to see for the look of it, and I’m glad my parents let me do that. The line in front of me is getting shorter, being eaten up by the monster curtain in front of us. I can hear girls shrieking when they see their friends on stage. I wait for my turn, I hear them mispronounce my name and I walk in front of the curtain onto a narrow strip of stage. It’s louder than I expected; 600 people can make a lot of noise. I have a little plastic orange fish on a dowel that is supposed to look like a fishing pole. It doesn’t, but it was my idea and I made it on my own, so I’m proud of it. My nerves are overtaken by some instinct deep inside myself to perform, and I stop and quickly pretend to fish. When I lift up my catch I hide it and run feverishly to the other side of the stage. I must look ridiculous, but I like the attention. I catch a glimpse of my tennis shoes showing beneath the three-toed yellow feet we made. The crowd is chanting “Penguin! Penguin! Penguin!” I disappear behind the other side of the curtain. I win a new backpack and a new nickname for the side of the curtain. I win a new backpack and a new nickname for the

I am sitting in the backseat of the car. It’s a black Nissan Sentra that my uncle shipped to my mom from Virginia when he bought his new Lexus. We are winding through a giant quilt of farmland, it feels very far away from my normal existence, even though I’m only a few miles from my home. My sister sleeps through carrides; she takes up too much space and kicks me whenever she repositions herself. The drive feels long. Eventually, we turn into a dirt parking lot on the left side of the road, half full with old station wagons and a pickup truck. I’ve been here before with a friend and his mom to buy corn to cook for dinner. It was white with yellow spots, sweet, and fresh. But the season for corn has passed. My sister and I get out of the car and follow my mom past a small pen with chickens and goats. The air is cool. It’s cloudy and it looks like the sun will go down soon. There is a corn maze to our right, but we pass it and head out to the pumpkin patch. The hay underneath our feet crackles as we step carefully through the prickly vines on the ground. My sister and I hop over the pumpkins, searching for one with the perfect shape and a good handle on top. We hobble over orange orbs big enough to hold us, and we pass some that are still green but rotting and flat on the bottom. My mom follows us slowly now, as we let our passion guide us haphazardly through the field. She always wants us to go to the pumpkin patch, but I don’t think she has carved a pumpkin since she was a kid. My sister, my dad, and I always end up doing all the work while she sits with us in the kitchen.

I am standing in my living room barefoot on the soft brown carpet. There is fabric spread out on the floor. The table, crowded with poster-board and glue sticks, is pushed up against the wall. It’s already dark outside and I’m tired. My dad is cutting up pieces of felt while I glue the ones together that we already measured out. I try on the sleeves. My hands don’t come out the sides. He wants to cut them shorter but I don’t think it will look good. I plead with him not to change it; really, I don’t need to use my hands. He tells me about the time his grandmother made him a Batman costume for Carnival in Rio. It had shorts sleeve because it was hot and humid in Brazil in the summer. He was so embarrassed he didn’t want to wear it. I let him cut the sleeves, but I’m not happy about it. Later he will tell me about his first Halloween in the US, when he thought the idea was to have a costume as gruesome as possible. He carved broken bones out of wood that stuck out from his bloody clothes. I’ve never had a gruesome costume. We paint an outline on the mask, I fill it in with a little paintbrush and some acrylic. He adds the final touches. When I wake up to take it to school tomorrow it will look completely different. The perfectionism in him can’t help it. I guess the parent in him can’t help it either. I will go to sleep too tired to stay awake any longer, stressed out that I couldn’t finish making my costume, and I will wake up to it arranged very neatly on the couch. It will be folded with the mask sitting on top, the shoes on the floor. In my subconscious I must know it will be done but that doesn’t make me any less worried. I will rush downstairs because I always wake up first; I want it to look good. I wander up the creepy wooden stairs and past the brown bathroom door to the room my sister and I share. I walk past her bed packed with stuffed animals and tuck myself in. I fall asleep to the familiar sound of cars rushing by outside my window.

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There is a cardboard tombstone in the garden painted in grey and black acrylics. It reads “Trick or treat.” The one next to it reads “Don’t Forget to Vote!” My dad thought that just Halloween messages weren’t enough, I guess. He can’t vote since he’s not a citizen, but I won’t quite understand what it means to have a green card and be a “resident alien” for a while. This is his version of political involvement (along with long-winded, passionate conversations on long carrides to soccer games). In a week, the scandal of the Bush-Gore election will begin, and my own budding political activism will be shocked to life. Right now it doesn’t seem important. I won’t be able to vote for another two elections, so all I care about is getting in out of the cold and starting to eat my candy.

The light above our door is a bare orange bulb, surrounded by those fake spider-webs made of a million little strings that you have to pull apart and stretch. There are big black plastic spiders floating on it. Two Jack-0’-Lanterns line the narrow front door step, one crumbling and collapsing in on itself; —probably the work of a mischievous and hungry squirrel. The yellow light from the candles inside flickers out onto the sidewalk. I turn the brass doorknob and walk inside.

I am pouring out my candy on the floor. It slides out of the pillowcase as one mass of multicolored dots on the brown carpet. I quickly pick through it, taking inventory and arranging from best to worst. My mom yells from the kitchen telling me not to eat anything that is already open; I put those off to the side.

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Tuition Equity for Undocumented Immigrants in Colorado

By Kasey Schelling

Abstract

In order to develop human capital and workout immigration problems for future generations, the state of Colorado should expand access to higher education for undocumented children. If under certain provisions illegal immigrants could obtain in-state tuition, many more would have the opportunity to go to college. This would allow the state to realize a greater return on its investment in primary and secondary education, increase diversity in schools, and even put more undocumented children on a path to citizenship in the United States. The following study discusses current legislation relating to immigration and the effects it has on undocumented children. If the federal DREAM Act passes, it reinforces the importance of providing affordable tuition to undocumented immigrants.

Illegal Immigration in the United States

Illegal immigration is the source of much controversy today. The influx of undocumented immigrants in the United States has increased immensely, and the country has gone into panic mode. Although there are pathways of entering the country legally, in 2009, only 743,715 immigrants were naturalized (Lee, 2010, p. 2) while there were over ten million people living here illegally (Hoefer, 2010, p. 4). Why are there so many people who remain isolated behind the shadows of United States society? Is it because they find that they can easily get away with living and working here without having to bother doing it the legal way? Or perhaps it is because they want to work underneath so they can evade paying income taxes or collect welfare and Medicaid benefits? This is the direction in which many Americans tend to think, creating a negative stigma surrounding illegal immigration. This thought process is reasonable—American citizen tax dollars should not be allocated toward supporting illegal immigrants. And current policies should not encourage immigrants to live here illegally. Most would agree. However, the situation is much more complex than that.

It is becoming more and more difficult to live here without risking being deported. Laws such as SB-1070 in Arizona are gaining quite a bit of momentum in the United States. Some legislators are even proposing diminishing the right to citizenship through birth in the United States, completely contradicting the fundamental principles upon which this country was based (14th amendment anyone?) (“Birthright Citizenship,” 2010). Something is wrong here. It seems as though no matter what measures politics take, the influx of undocumented immigrants remains unchanged. Furthermore, undocumented immigrants are not just coming here for an extended vacation, thriving off of a luxurious American lifestyle with endless government handouts. The only public benefits that illegal immigrants are able to take advantage of are primary and secondary education and emergency medical care; the illegal immigrant tax contribution far exceeds these benefits (see “Undocumented Tax Contribution” below). So what could explain this influx?

According to the Department of Homeland Security, out of the 10,750,000 undocumented immigrants in the country, about 6,650,000 (62 percent) come from Mexico (see Table 1 below). This number has increased by 42 percent in the past twenty years. The time period of this increase is extremely consistent with the increased violence that rampant drug wars have created in Mexico today. Drug cartels continue to kidnap people in a fight for power. A couple of them have become so powerful that authorities (if not already involved) many times are forced to surrender to the drug cartels. In 2009, there were 5,597 known drug murders in Mexico (Pipitone 2010). It is important to understand that under these circumstances, people flee to the United States because they are in a life or death situation. Even if they have to risk the dangers of sneaking into the country or being deported, they will still do whatever they can to escape. Mexico is not the only place that experiences such violence. Illegally immigrating to the United States is often not just a hope for a better opportunity. It is a survival tactic.

Table 1

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<td>2</td>
<td>2</td>
<td>14</td>
<td>—</td>
</tr>
<tr>
<td>Ecuador</td>
<td>170,000</td>
<td>110,000</td>
<td>2</td>
<td>1</td>
<td>55</td>
<td>10,000</td>
</tr>
<tr>
<td>Brazil</td>
<td>150,000</td>
<td>100,000</td>
<td>1</td>
<td>1</td>
<td>49</td>
<td>10,000</td>
</tr>
<tr>
<td>China</td>
<td>120,000</td>
<td>190,000</td>
<td>1</td>
<td>2</td>
<td>-37</td>
<td>(10,000)</td>
</tr>
<tr>
<td>Other countries</td>
<td>1,650,000</td>
<td>2,000,000</td>
<td>15</td>
<td>24</td>
<td>-17</td>
<td>(40,000)</td>
</tr>
</tbody>
</table>

— Represents less than 5,000. Detail may not sum to totals because of rounding. Source: U.S. Department of Homeland Security.

1 SB-1070 is state legislation in Arizona that permits authorities to stop ask any “suspicious looking individual” for documentation. Failure to provide documentation would result in deportation (State of Arizona 2010).
Tuition Equity: A Path to Citizenship

The situation in Mexico shows that illegal immigration is an extremely dynamic issue, often caused by external, mutually exclusive events. We must not assume that more stringent policies will decrease the influx of illegal immigration. Considering the grave situations in their native countries that many people flee from, increased restrictions will not discourage immigrants from at least trying to come here, nor will they feel inclined to return to the severe conditions of their home country. Furthermore, mass deportation is an unrealistic and inhumane solution—it would be extremely costly to implement and the strategies for doing so are unconstitutional. Despite popular beliefs, illegal immigrants are not harmful to the United States economy. In fact, “Eighty-five percent of eminent economists surveyed have concluded that undocumented immigrants have had a positive (seventy-four percent) or neutral (eleven percent) impact on the U.S. economy” (Lipman, p. 3). Yet, if they were able to realize their full potential in United States society, they would be able to contribute even more.

Many have established a life here and would love to become naturalized, but citizenship is not a viable option for them. If there were more pathways to legalizing one’s status in the United States, most would probably take advantage of them. Considering the logistics and money required to become naturalized in the United States, most undocumented immigrant children do not even have the option to do so. Therefore they remain stuck, with limited options to contribute to society.

Nonetheless, despite the genuineness of intentions, illegal immigrants are breaking the law by living here illegally, which in the eyes of many trumps all arguments in favor of their case. If the government grants amnesty to undocumented immigrants, it would extend extra benefits to them (such as higher education), it could diminish the process of becoming naturalized the “right way.” However, there exists a large demographic group of immigrant children who are brought to the United States with their families by no choice of their own. They grow up in this country and live a lifestyle very similar to that of other American children, except that they do not have the paperwork that entitles them to do so. Many do not even remember living in the country in which they were born. With that said, should children in such situations be punished for the actions of their families?

Current policy is actually quite contradictory for these children. Under the Supreme Court decision Plyer vs. Doe (1982), all children, regardless of immigration status, are eligible to receive a free primary and secondary education (“Undocumented Immigrants and State,” 2009). All states must abide by this legislation—they have no choice. However, in Colorado (among the majority of states), if these students have hopes of obtaining a college education, they will discover that they are no longer entitled to the benefits that American students receive. Undocumented immigrants do not have the access to in-state tuition that other citizens have; nor can they receive government loans or grants (“In-state Tuition Classification” 2007), making it nearly impossible for them to continue their education after high school. Upon this realization, some may even end up dropping out of high school before graduation, seeing that they have no means to develop their potential. It is counterproductive to invest in an education for all children but allow only a select population to advance. Instead of throwing away this potential, the state needs to fairly extend in-state tuition benefits to all hard-working and deserving students in order to develop a prosperous economy. This suggestion does not propose extending federal aid to unauthorized students; rather, it solicits the possibility of affordable tuition, which would generate revenue that colleges would not realize otherwise.

If undocumented immigrants were granted tuition equity, their chances of achieving residency status would also increase, allowing them to live here legally. Upon advancing their education, they could potentially become qualified to receive a special working visa, which would bring them closer to becoming citizens. They could even obtain lawful permanent status through the employment preference category. Upon further integrating themselves into American society, they would also become more likely to adjust their status through marriage. Statistics show that people are most likely to find a spouse in a college setting. Interethnic marriage is most prevalent in this setting as well (Kaushal 2008).

The DREAM Act

Unfortunately, under many circumstances none of these solutions would be a viable path to naturalization for undocumented students. These days, even marriage does not guarantee naturalization. However, there is a possibility that the Development, Relief, and Education for Alien Minors (DREAM) Act will eventually pass. The DREAM Act is a proposed piece of federal legislation that would put certain undocumented immigrant children on a path to lawful permanent status if they spend at least two years either studying at a higher education institution or serving in the military (“Immigrant Student Adjustment” 2010).

The legislation was initially introduced in Congress by Senators Richard Durbin (D-IL) and Richard Lugar (R-IN) on August 1, 2001 and has since been reintroduced several times in both the Senate and the House with no success. Immigration has become a completely partisan issue, and most Republicans cannot afford to support it. This bill has very little Republican support in both the Senate and the House of Representatives.

As of August 10, 2010, there were 39 Dream Act cosponsors in the Senate and 128 in the House of Representatives. Of all these supporters, only six represent the Republican Party: one Senator (Richard G. Lugar, IN [co-creator of the bill]) and five House members (Anh J. Cao, LA; Devin Nunes, CA; Lincoln Diaz-Balart, FL; Mario Diaz-Balart, FL; and Ileana Ros-Lehtinen, FL) (“Cosponsors of the DREAM Act” 2010). Not surprisingly, all of these House members either were born on foreign soil or come from families that immigrated to the United States. These well-recognized individuals have served several terms in Congress; they are examples of successful people whose lineage may not be purely “American,” but who have devoted their lives to stabilizing the future of this country. They were given the opportunity to succeed here, and recognize the importance of granting this opportunity to all willing and capable individuals. These politicians were fortunate enough to become citizens of the United States, and they recognize that many people do not have the same opportunities that they had. Considering their unique situations, and the creditable reputation that they have earned themselves, they do not have to take a partisan stance on this issue.

If more support and awareness of this bill is raised, perhaps more Republicans will follow in their footsteps. Politics are quick to form binaries, and many tend to assume that those who stand behind the DREAM Act are supporters of illegal immigration. However, the truth is that no politician really wants to encourage illegal immigration; rather, those who support the bill recognize that something needs to be done with the huge influx of illegal aliens in the country who are already here. Clearly, mass deportation would be nearly impossible and extremely expensive to conduct. So why not take measures to legalize the status of intelligent, willing individuals?
Undocumented Tax Contribution

Illegal immigration is a double-edged sword in the United States. Although there is a substantive opposition to their presence in the United States, the government exceedingly benefits from keeping undocumented citizens in the country. Although it may seem as though undocumented immigrants evade paying income taxes to the United States government, they actually contribute significantly. Francine J. Lipman details the nature of the undocumented immigrant tax contribution in Taxiing Undocumented Immigrants: Separate, Unequal and Without Representation. According to Lipman, undocumented immigrants are eligible to receive a certain type of taxpayer identification number called an ITIN. Citizen documentation does not need to be shown to obtain this number. However, if an undocumented immigrant chooses to work in the United States, this number does not authorize her to do so. In order to pay taxes and report payment to employees, employers must report a social security number and an authorized tax number called a TIN for each employee. Many undocumented immigrants will then use invalid social security numbers combined with their ITINs in order to file their taxes. The IRS is able to detect this mismatch, which makes all undocumented immigrants disqualified to file tax returns.

Moreover, under the Personal Responsibility and Work Opportunity Reconciliation Act of 1996, undocumented immigrants are ineligible to obtain welfare, Medicaid, or food stamps. The only government benefits they are eligible to receive are primary and secondary education and emergency medical care (Lipman 4).

According to the National Council of La Raza, undocumented immigrants in the United States will pay on average about $80,000 more in taxes per capita than they receive in benefits throughout their lifetime. These employees contribute about $7 billion to Social Security and $1.5 billion to Medicare every year, although they will never be able to receive any remuneration (Grillo-Chope and Rodriguez, 2005). The IRS has estimated that out of the 130 million people who file tax returns every year, about 6 million are undocumented immigrants (Lipman, p.8). These loopholes to the tax laws further provide the state with short-term additional aid for its current deficits.

The undocumented tax contribution is a temporary and immoral fix-it to current problems that does not consider its side effects or long-term implications. Lipman also reveals that even though the government receives several billions of dollars in extra tax revenue from undocumented immigrants, it also costs the Social Security Administration about $5 billion more in administrative coststoresolvethemismatchesbetweensocialsecuritynumbersandITINs. Clearly, this issue is much more complicated than it needs to be. The government cannot continue to patch up its structural deficiencies with others. With such a large influx of undocumented immigrants already working and paying taxes, it would be a lot more beneficial to both the state and the undocumented population if they could do so legally.

If instead the government achieves comprehensive immigration reform, the system will be able to function effectively. The DREAM Act provides the country with a practical solution that could potentially convert hundreds of thousands of undocumented individuals into proper contributory members of society. Innocent undocumented children should not have to submit to a stagnant, hopeless fate. They must be able to realize the potential that they were born with, which is developed in this country until they graduate from high school, and then, for most, terminated almost instantaneously.

Table 2 shows that the median household income for naturalized immigrants is about $57,030, which is nearly double that of undocumented immigrants (see section below titled “Tuition Equity in the State of Colorado”). Citizenship opens up several job opportunities for immigrants. Even though undocumented immigrants already contribute to income taxes, this shows that naturalized citizenship would allow them to contribute even more, as their median income nearly doubles (See “Tuition Equity in the State of Colorado” to view average incomes for undocumented immigrants).

Table 2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Median household income</td>
<td>$66,908</td>
<td>$59,372</td>
<td>$57,030</td>
</tr>
<tr>
<td>Median family income</td>
<td>$79,231</td>
<td>$65,177</td>
<td>$61,103</td>
</tr>
<tr>
<td>Education (aged 25 and over)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of total naturalized citizens</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Not a high school graduate</td>
<td>19.9</td>
<td>24.7</td>
<td>22.8</td>
</tr>
<tr>
<td>High school graduate</td>
<td>20.8</td>
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<td>22.1</td>
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<tr>
<td>Some college or associate degree</td>
<td>23.9</td>
<td>22.9</td>
<td>22.3</td>
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<tr>
<td>Bachelor’s degree</td>
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<td>19.2</td>
<td>20.0</td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>14.5</td>
<td>11.8</td>
<td>12.9</td>
</tr>
</tbody>
</table>

Note: Includes only persons who naturalized at age 18 or over.

Source: U.S. Census Bureau, 2008 American Community Survey.

The DREAM Act will not pass until it gains bipartisan support. In the recent midterm elections of November 2010, Republicans gained majority control in the House with 239 seats, while Democrats slightly gained it in the Senate with 53 seats (Allen, Blight, and Ridley, 2010). With the current backlash response to the downsfalls of the Obama administration in light of the struggling economy, Republicans have initiated an opposition action called the “Tea Party Movement” that radically counters the current solutions of left-wing politics. Interestingly, although there are many Tea Party members who severely oppose the Dream Act, the Tea Party platform takes no specific stance on immigration, which leaves space for it to become a nonpartisan issue. On Wednesday, December 8, 2010, legislators tried to pass the DREAM Act before the new Republican leadership could take over. The legislation passed in the House, but they strategically decided to delay it in Senate, in hopes of swaying more senators to support it. The current situation remains in limbo (“With DREAM Act Shelved,” 2010). Perhaps if more Tea Party supporters were conscious of the modern-day “taxation without representation” that undocumented immigrants face, they would feel more inclined to support the bill. If the DREAM Act does pass, it would reinforce the importance of expanding access to higher education, potentially converting thousands of hopeless individuals into proper contributory members of the country.
Tuition Equity in the State of Colorado

This study aims to unfold the opportunity cost of denying tuition equity to all undocumented immigrants by examining the policies surrounding immigration and the higher education system in Colorado, their effects on Colorado’s current socioeconomic situation, and how this situation would improve if tuition equity legislation were passed.

Colorado is characterized as one of the fastest-growing states in the U.S. within the past decade, with the highest population aged 18 to 44 in the nation and a rapidly growing Hispanic demographic group. Since a large portion of the population is baby boomers, the state expects a large worker turnover rate, which would require a larger state investment in higher education. However, the politics work against this goal (Jacobs, 2008). In fact, Brittany Anas, reporter for the Boulder Daily Camera, highlights that “Colorado has the largest ‘ethnic achievement’ gap in the nation, as there are far more whites than Hispanics earning college degrees.” Anas also reveals that even though Hispanics are the fastest growing demographic group in the state, only six percent have an associate’s degree and eight percent have a bachelor’s degree. The Urban Institute “Children of Immigrants Data Tool” furthermore shows that the Hispanic population accounts for an astounding 28.62% of children aged 0-17 in Colorado. Furthermore, 16.4% of children with parents from Mexico are undocumented, which constitutes a significant portion of the population. Colorado must expand access to higher education for undocumented immigrants in order to close the ethnic achievement gap.

A common view is that tuition for undocumented immigrants should not be subsidized while there are other American-born citizens who do not enjoy this luxury. Many may also question whether such a privilege goes against federal law. However, under section 5 of the federal Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA), states can provide illegal immigrants with in-state tuition benefits, but only if American citizens from other states are granted the same (Kaushal, 2008). As of now, in Colorado, all American citizens, green card holders, and certain visa holders have the opportunity to establish domicile after living in the state for only one year and complying with various tax and licensing requirements (“In-state Tuition Classification,” 2007). Although many nonresident students still struggle with obtaining domicile, they still have the option of attending college in their home state in addition to receiving government aid. Undocumented immigrants, on the other hand, do not have either of these options, regardless of how long they have lived in Colorado.

Colorado SB-126, a.k.a. ASSET (Advancing Students for a Stronger Economy Tomorrow), is a bill sponsored by Angela Giron (D-Pueblo) and Mike Johnston (D-Denver) that has recently been introduced in the legislature. It has already passed through both the education and finance committees in the Senate. This bill would allow undocumented students to pay resident tuition in Colorado if they had graduated from high school in Colorado, had attended school in the state for at least three years, and enrolled in college within a year of graduating. This would essentially entail no cost to the state—these students would not have access to public loans, grants, or the College Opportunity Fund as other Coloradoans have (Anas 2011). In addition, the students must sign an affidavit indicating that they will apply for permanent residency as soon as they are able to do so (Colorado General Assembly 2009). Not only do these provisions comply with IIRIRA, giving priority to American citizens, but they also give immigrants an incentive to legalize their status and equally contribute to the state. Currently, there are nine states that have already extended resident tuition to qualified undocumented students: California, Texas, Utah, New Mexico, Illinois, Kansas, Nebraska, Washington, and New York (DREAM Act Portal 2010). This legislation would allow more hard-working, qualified students to afford a college education, creating a level playing field. Furthermore, since the cost of out-of-state tuition is too high for undocumented families, it would generate revenue that colleges would not realize otherwise.

According to additional data from the Urban Institute (2008), there are an estimated 35,000 undocumented children aged 0-17 living in Colorado. Of these children, about 30,000 attend Colorado K-12 public schools. For the 2009-2010 fiscal year, the state of Colorado spent about $5,507.68 per student in public schools (Colorado Department of Education 2010). By multiplying these two figures, we can see that the estimated cost per year (disregarding inflation) of educating undocumented immigrants is about $165,230,400. Keep in mind that this is only the cost of educating every student per one year, and does not consider the cumulative costs over a larger period of time. Out of this population, 2,000 children are currently enrolled in preschool and kindergarten. This shows that there is a significant population of children who are funded through the Colorado public K-12 education system for thirteen years. Under these circumstances, by the time a student graduates from high school, the state has already spent (on average, not adjusting for inflation or changes in education budget) roughly $71,599.84. After investing this much money in a student, the state would most highly benefit from allowing the student to obtain a higher education. The Colorado economy depends on a highly educated community in order to prosper.

Current statistics show that it is nearly impossible for undocumented families to be able to afford out-of-state tuition in Colorado. The Urban Institute data further show that the median family income of these children is about $30,755, with about 13,000 families living below poverty level. Furthermore, 42.4% of these families support three to four children. When comparing this data to the cost of nonresident tuition, one can see that for most undocumented children, it would be impossible to afford nonresident tuition without assistance. The cost of nonresident tuition at public colleges in Colorado (2009-2010) ranges from $11,856 (Adams State College) to $26,700 (University of Colorado, Boulder). This rate is drastically subsidized for resident students, ranging from $2,712 to $10,446, accounting for a $9,144 and $16,234 subsidy at each school, respectively. For community colleges, the nonresident rate falls between $5,450 and $11,817 while the resident tuition ranges from $1,350 to $2,649, a much more feasible option for low-income families. According to research conducted by scholar Neeraj Kaushal, a $1,000 tuition subsidy increases the probability of being enrolled in college by 4 percent.

I now consider the possible costs of granting tuition equity. If this legislation adversely affects American citizens or the economy, it should not be considered. Linear regression analysis over various years shows that the enactment of tuition subsidy for Mexican undocumented students in Utah, Texas, California, and New York did not adversely affect the proportion of American citizens who enrolled in college. In fact, it indicates that the policy has a positive, statistically significant effect on the number of U.S.-born citizens with a college education, including citizens of Mexican descent. Furthermore, the direct monetary costs of subsidizing tuition for undocumented immigrants is almost negligible. Although there

2 The resident base tuition for the Colorado School of Mines (2009-2010) is actually $10,590, but this falls far out of the range of the remainder of the schools, and CSM actually has a nonresident base tuition of $24,750 (less than that of CU).

3 This research suggests that these results stem from the conditions of section 5 of IIRIRA, which extends tuition subsidy to a larger population of American citizens (Kaushal 2008).
true goals, they will in turn settle for something that may not align
suited. However, if they are denied the opportunity to realize their
wish to advance their education will more likely have the opportunity
to do so. The driving premise behind free market economics is to
to do that, they otherwise would not have.

There exists a common misconception that immigrants are
not contributing to higher education funding; therefore they do not
deserve to have the same rights as other American citizens. As we
have already revealed, many undocumented immigrants pay much more
taxes than the benefits they receive. Furthermore, in Colorado
about 97 percent of higher education funding at public institutions
comes from tuition revenues. Therefore, the state provides only
about three percent of funding for public universities in Colorado.
Of that funding, more than half comes from the General Fund, which
is a pool of several different types of tax revenue that gets divvied up
for different purposes. In 2009, about 30 percent of the general fund
came from consumption taxes (Colorado Legislative Council Staff
2009), which are contributed to by any person who lives in the state,
regardless of immigration status. To conclude, even if an immigrant
does not pay income taxes, she still contributes a significant amount
to the state-generated fund, which is almost negligible.

Another thought to consider is whether this legislation
would encourage undocumented immigrants to move to the state
of Colorado. This likely will not happen, because there are several
states (closer to the border) that have already passed this legislation,
with much looser requirements. New Mexico, Utah, and Nebraska
all directly border Colorado and have already passed tuition equity
legislation. If illegal immigrants from Mexico wish to come to the
United States to attend college, they will most likely reside in the
states that border Mexico before they come to Colorado. Texas, New
Mexico, and California have all passed tuition equity legislation.
Moreover, New Mexico, lying right between the Mexican border and
Colorado, grants in-state tuition to undocumented immigrants after
they have lived there for only one year. Colorado’s provisions would
contain a three-year requirement.

Moreover, with the failure to extend tuition equity to
diverse demographic groups, Colorado is becoming economically
incompetent with respect to other states. The state is also beginning
to cover its investment in undocumented students, because
many can move to New Mexico in their junior or senior year of high
school to obtain resident tuition.

In addition, through comparative economic policy and the
study of the outcome of a heightened level of education in society,
the study also unfolds both the social and economic benefits that
the state could potentially realize if it granted tuition equity to
immigrants. This study shows that in implementing tuition equity,
the state of Colorado will not only be able to provide support for
immigrants, but also become more economically prepared to meet
future economic needs. In turn, this policy will serve as a model for
other states in the U.S., potentially creating a paradigm shift in the
ongoing self-destructive war of the politics of ethnocentrism.

Although menial jobs provided by undocumented
immigrants are a contribution to society, the state would not lose
the demand for these jobs. There will still be immigrants who do not
choose to or are still unable to receive a higher education and will
continue to work low-wage jobs that most American citizens do not
want. What will happen, however, is that those immigrants who do
wish to advance their education will more likely have the opportunity
to do so. The driving premise behind free market economics is to
allow all humans to specialize in a field for which they are most
suited. However, if they are denied the opportunity to realize their
true goals, they will in turn settle for something that may not align
with their natural strengths and potential. If the state could more
closely assist individuals in finding their niche in society, it could
come closer to realizing its full potential for economic growth.

The United States needs to initiate a strategic change in
immigration policy. Current policies are harmful to both the state
and undocumented immigrants themselves. There is an enormous influx
of illegal immigrant children in the United States who are educated
through the United States primary and secondary education system
but are then left with almost no options to become citizens and
develop their potential.

The DREAM Act in combination with tuition equity solves
a portion of the complex immigration issue. If it passes, there will
still be people who continue to come here illegally, and many who
are already here will be ineligible to benefit from the legislation.
However, it is a step in the right direction, for it grants guiltless,
undocumented children a chance to transform their otherwise
stagnant future into something tangible—a career path that will
most highly benefit themselves and the state. The future of the United
States depends on the youth of today. As Gilbert K. Chesterton says,
“Education is simply the soul of a society as it passes from one
generation to another.” The more students who are educated and
given the opportunity to realize their ambitions, the more they can
achieve solidarity and cohesion to create a prosperous future for the
United States of America.

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Colorado Department of Higher Education. (2010). “History of under-
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Lists undergraduate resident tuition costs from 2008 to 2010 of sev-
eral public universities and community colleges in Colorado.

Colorado Department of Higher Education. (2010). “History of un-
dergraduate non-resident base tuition costs.” Retrieved 10/24/2010 from

Current policy regarding in-state tuition classification. It reads that
undocumented immigrants are denied this benefit under any circum-
cstances. Green card and certain visa holders can petition for in-state
tuition under the same provisions as citizens. Those visa holders
unable to qualify fall under categories F-1, F-2, H-3, M-1, M-2, H-4,
J-1, J-2 (visas granted specifically for educational purposes).


Proposed Senate Bill 170 in Colorado (2009). Did not pass. Extends domicile, regardless of immigration status, to all persons who attended a Colorado high school for at least three years and enroll in a Colorado higher education institution within five years after graduating or those who enroll in a Colorado higher education institution within five years after earning a GED in Colorado.


This article talks about the issues of the higher education fiscal structure in Colorado, focusing on the College Opportunity Fund. It reveals that the Hispanic population is increasingly being underrepresented in higher education institutions in Colorado. With hikes in tuition, some middle and lower class citizens are still unable to afford college, which now accounts for a large influx of out-of-state students.

This problem seems only to be getting worse, and unless the TABOR laws are adjusted, Colorado residents will increasingly become underrepresented at higher education institutions.

This is a proposal that argues for in-state tuition for undocumented immigrants who have graduated from Colorado high schools. It outlines several social and economic advantages that Colorado could realize if it granted this opportunity to this demographic group.

This study makes a lot of good points, but it fails to target Colorado specifically compared to other states. It also does not provide any information regarding the differences between in-state and out-of-state tuition in Colorado. It provides a lot of great statistics and useful information, but it seems to jump to the conclusion while leaving out some key points.


New Mexico Section 1 Chapter 21 Article 1 NMSA. Retrieved 10/22/2010 from http://www.nmlegis.gov/Sessions/05%20Regular/final/SB0582.pdf

Senate Bill S82 (2005). Extends in-state tuition benefits to students who attended a secondary institution in New Mexico for at least one year, graduated from a New Mexico high school, or received a general education development certificate in New Mexico.

These loose requirements could attract many undocumented immigrants to migrate from Colorado to New Mexico to receive a higher education, ultimately draining potential from Colorado.


This article aims to isolate the factors that led to granting in-state tuition benefits to undocumented immigrants in Texas and those that led to denying them in Arizona. Using the advocacy coalition and policy entrepreneur theories, the authors compare the sociopolitical climate in each state at the time the laws were enacted. Although both states are historically conservative and have a very similar influx of immigrants, they prove to take nearly opposite positions regarding this issue.

This study provides a lot of useful insight in exploring the factors contributing to granting in-state tuition to undocumented immigrants. However, it ignores other key components, such as the economic health of each state during legislation. This is an important factor that should not be left out in this type of study.


This document reviews the issues and legislation regarding undocumented students in the United States, outlining the legislation in the 111th Congress. It explores the pros and cons of providing illegal aliens legal permanent resident status through the DREAM Act.


This is a tool developed from United States census data that allows users to choose several different parameters regarding children in the United States to generate statistics.

There’s a lot of ways to tell people they’re going to die. I’ve told people they’re going to die because their heart has failed. I’ve told people they’re going to die because their kidneys have failed. But I have to say that the most…mad reaction I get is when I tell patients or patients’ families that their loved ones are going to die because we do not have antibiotics. (Hung 2009)

With the above anecdote, Dr. Deborah Hung opened her 2009 presentation for the National Academy of Sciences in which she discussed new methods for battling antibiotic resistance. Unfortunately, the situation she describes is becoming common in today’s hospitals. The problem is not that we have an antibiotic shortage, but that microbes develop mechanisms to resist antibiotics faster than we can create new ones. It is generally accepted that we have brought this problem upon ourselves, as the overuse of antibiotics promotes these so-called “superbugs.” These superbugs kill more and more people every day; currently, the most well-known superbug, Methicillin-Resistant Staphylococcus aureus (MRSA), kills more Americans per year than AIDS (Klevens et al. 2007).

The United States government has recognized antimicrobial-resistant diseases as a pressing issue and has taken action to regulate the administration of antibiotics. While it is understood that misuse and overprescription of antibiotics in hospitals is a major cause of antibiotic resistance, not many people recognize that antibiotic use on farms can also exacerbate the problem. In response to recent events and research, Representative Louise Slaughter introduced the Preservation of Antibiotics for Medical Treatment Act of 2009 (PAMTA). This act calls for regulation and a decrease of nontherapeutic antibiotic use in livestock or, in other words, the use of antibiotics when animals are not ill. Slaughter believes that this bill is necessary to stop the spread of antibiotic-resistant microbes in the United States (Slaughter 2009).

Many opponents of this act state that there is simply not enough scientific proof to show that restrictions on antibiotic use in farming will help end the problem of antibiotic resistance. Further they argue that restrictions will cause farmers to unnecessarily lose animals and money to disease (Eckholm 2010; Peeples 2009). Of particular interest are the claims of two veterinary experts, Dr. Scott Hurd and Dr. Liz Wagstrom, who gave separate interviews in February 2010 on behalf of the National Pork Board. The National Pork Board is an organization that collects research and provides information regarding pork production and consumption to American pork producers (About Us 2009). These interviews were intended to inform the public about antibiotic use in pork production and its relation to the problem of antimicrobial resistance. Dr. Scott Hurd is a professor at Iowa State University with a focus in microbiology and drug resistance in animals. He is also a former Deputy Undersecretary of Food Safety for the U.S. Department of Agriculture (USDA) (H. Scott Hurd, DVM, PhD). Dr. Liz Wagstrom is the Assistant Vice President, Science & Technology for the National Pork Board. Hurd firmly asserted that he does not believe antibiotics in pork production are causing any harm to humans and that antibiotics are necessary to avoid unhealthy animals. Wagstrom explained there are misconceptions about antibiotic use in pork production and declared that research in Denmark shows that a ban on antibiotic use would do little to help human health (Hurd 2010; Wagstrom 2010).

While they do not directly address PAMTA, Hurd and Wagstrom mislead the audience into thinking that restrictions on antibiotic use in agriculture will do little to help curtail the spread and generation of antibiotic-resistant microbes in humans. Hurd’s claim that not enough research exists to show a relation between antibiotic use on farms and antibiotic-resistant diseases in humans is unfounded. Both Hurd and Wagstrom use unrepresentative data from a Danish study that is actually too limited and involves too many factors. Finally, both lead the audience astray by providing a vast amount of information regarding the safety of American pork, which is basically irrelevant to the issue of antibiotic resistance.

Antibiotic Use in Livestock

Farmers have been using antibiotics for years to keep meat healthy and reasonably priced. Because livestock tend to live in closed quarters where disease is rampant and can spread easily, farmers must administer antibiotics to prevent disease and ensure healthy meat. Additionally, antibiotic use can increase growth in animals and lessen the need for feed, which keeps meat prices low. Antibiotics also maximize productivity, because farmers are able to maintain more animals with the money they save on feed, and they need less space to raise livestock since antibiotics keep disease from spreading (AVMA 2010).

Of course, any administration of drugs is carefully regulated. Two government groups, the Federal Drug Administration (FDA) and the United States Department of Agriculture (USDA), lead this regulation in the United States. They carry out actions such as approving the antibiotics that are used, carefully monitoring the use of antibiotics in livestock to ensure they are used properly, and inspecting meat for antibiotics after processing. Oversight is also provided locally, as producers who raise livestock work closely with veterinarians to ensure that they are administering antibiotics correctly. Producers take care to abide by FDA and USDA regulations and to listen to the advice of their local veterinarians (Hurd 2010; Wagstrom 2010).

How Pathogens Acquire Antibiotic Resistance in Humans

So how does antibiotic use in animals relate to antibiotic resistance in humans? First, one must understand how pathogens are able to resist antibiotics. Antibiotics used in medicine are actually derived from microbes themselves. Living conditions are harsh in the microbial world, and microbes produce antibiotics to help themselves survive. These antibiotics are generally toxins that...
enable microbe to defend themselves against predator microbes and compete for resources. As a result, to stay alive, microorganisms develop mechanisms to resist the effects of the antibiotics they produce themselves and the antibiotics others use. They can easily adapt these resistance mechanisms to target man-made antibiotics. Examples of these mechanisms include excretion systems that remove the antibiotic from the cell or thick membranes that prevent antibiotics from entering cells. Those that are not resistant to certain antibiotics can also acquire resistance mechanisms through genetic transfer, which is the uptake of random DNA from the environment or other microbes. The DNA may contain the genes necessary to render the antibiotics ineffective, and thus another resistant strain is born (Madigan et al. 2008).

![Diagram of antibiotic deployment](Image)

**Figure 1 (from Hung 2009):** The top portion of this chart depicts when various antibiotics were discovered and used, and the bottom portion shows when strains were found to be resistant to particular antibiotics.

Of course, microbes cannot be resistant to every antibiotic, so the new antibiotics we use do kill most nonadapted pathogens. However, there are a few random strains that are able to resist the antibiotic, survive, and proliferate. As a result, these rare resistant pathogens are now dominant in the population and can spread and infect people, and now we cannot kill this strain of pathogen with the same antibiotic as before. To add to the creation of drug resistance, genetic transfer of drug-resistant genes can occur between strains or even between species of microbes (Frieden 2010).

We attribute this problem of drug resistance to overuse and misuse of antibiotics. Antibiotic-resistant microbes were not a major problem earlier because we could simply find a new antibiotic and kill the resistant strain with it. However, as Figure 1 shows, this would only set off a new cycle of resistance selection and we would soon return to the same problem; new microbes would simply become resistant to the new drug, or worse, already resistant strains would also acquire resistance to the new drug. To make matters worse, doctors have often overprescribed antibiotics because this method is the easiest way to treat an infection with unknown cause. This situation is illustrated in the case of throat infections, where the first thing many doctors do is prescribe various antibiotics even though the illness could very well be a viral infection, in which case antibiotics will be ineffective. As a result, the microbes exposed to these antibiotics are given a chance to develop a resistance to these antibiotics (Frieden 2010). This excess use of antibiotics has brought us where we are today: left with little innovation in the field of antimicrobial discovery and faced with an alarmingly vast number of multidrug-resistant superbugs.

Current Efforts to Stop Antibiotic-Resistant Diseases in Humans

Antibiotic resistance is a pressing problem because we are depleting our only methods of fighting off severe illnesses: antibiotics. Thomas Frieden, the director of the Center for Disease Control and Prevention (CDC), explained in a speech addressing the problem of antibiotic resistance that the infections caused by antibiotic-resistant microbes can make people seriously ill or even kill them. Battling these infections often requires using antibiotics that are not only less effective but more toxic to humans (Frieden 2010). Another negative consequence of antibiotic resistance is the financial burden it creates for hospitals. Frieden stated that “In a 2008 study of attributable medical costs for antibiotic-resistant infections, it was estimated that infections in 188 patients from a single healthcare institution cost between $13.35 and $18.75 million dollars” (as cited in Frieden 2010). Given these dire consequences, the government and other healthcare groups have taken action to quell drug-resistant pathogens.

The initial solution that we have for defeating superbugs is the obvious one: find new antibiotics. However, there has recently been a dry spell in new antibiotic discovery. This year, only one antibiotic has been developed, and given how fast microbes can develop resistance, it will not be useful for long (Gaynes 2010). There is currently much research under way to discover new ways to target pathogens and kill them. Methods such as using exotic antibiotics that most pathogens have never encountered, targeting essential proteins, and others are currently being investigated (Walsh & Fischbach 2009). However, as promising as this research sounds, we still face the problem of creating new microbes resistant to the new antibiotics we make. In other words, simply creating new antibiotics to defeat antibiotic-resistant pathogens will never provide a real solution.

We are now aware that we cannot fully rely on new antibiotics to solve this problem of antibiotic resistance, and many policy proposals have been made to address the problem of antibiotic overuse. The major groups in charge of health and disease prevention are involved in this massive effort to stop the spread of drug-resistant diseases and prevent the creation of new ones. These associations include the CDC, the FDA, and the USDA. All of these groups have issued statements that acknowledge the pressing problem of antibiotic resistance is due to overuse of antibiotics everywhere, including agriculture. As a result, they have all put forth efforts to restrict the administration of antimicrobials and do further research about antibiotic resistance. For example, the CDC has created the “Get Smart” program to educate professionals and the general public about proper antibiotic use. The CDC is also working in collaboration with the USDA and the FDA to support the National Antimicrobial Resistance Monitoring System (NARMS). This system follows and researches the spread of antibiotic resistance in hospitals (Frieden 2010). In regard to antibiotic use on the farm, the CDC has included a “Get Smart on the Farm” program to address individuals in agriculture and inform them about how to appropriately distribute antibiotics and limit their use. The USDA has issued a report suggesting increased surveillance of disease on farms and resistant strains and calls for a limit on antimicrobial availability. Finally, the FDA supports the guidelines prescribed in PAMTA to reduce antimicrobial use and believes they will help the situation (Smart: Know When Antibiotics Work 2010; FDA Issues 2010; Akkina & Johnson 2007).

Most stewardship programs are focused on healthcare settings, as that is where the obvious connection to antibiotic resistance is, but in light of recent research, PAMTA specifically targets the issue of antibiotic use on farms. The act aims to reduce the spread of drug-resistant microbes from animals to humans and to preserve the effectiveness of the antibiotics we have (Slaughter 2009). Specifically, the bill is an amendment to the Federal Food, Drug and Cosmetic Act as dictated by the FDA. This amendment will provide the Secretary of Health and Human Services with the
power to deny “nontherapeutic” application of any new “critical” antibiotics unless it can be proven that they will not result in harm to humans. The bill defines “critical antibiotic” as a drug that is used on livestock that also acts as an antibiotic medical treatment in humans. Nontherapeutic applications include “any use of the drug as a feed or water additive for an animal in the absence of any clinical sign of disease in the animal for growth promotion, feed efficiency, weight gain, routine disease prevention, or other routine purpose.” (H.R. 1549). Thus, the bill does not aim to ban all antibiotic use in agriculture, just the use of human-related drugs in applications not associated with the treatment of illness.

The Link between Agricultural Antibiotics and Antibiotic Resistance in Humans

Dr. Scott Hurd was interviewed by the National Pork Board to give his expert opinion on the matter of antibiotic resistance in animals and humans. When asked to address the fear that antibiotic resistance in humans is due to antibiotic use in livestock production, Hurd stated that “there is lot of concern, but it is largely unfounded based on the science” (Hurd 2010). He believes that American pork is perfectly safe and there is no evidence to prove resistant microbes can pass from animals to humans. However, contrary to Hurd’s beliefs, there have been a vast number of credible studies that have shown a link between antibiotic use in farms and antibiotic resistance in humans.

Of particular interest is a 2000 study led by Dr. Henrik Wegener that provided strong data to disprove Hurd’s argument that decreased antibiotic use on farms will not aid in decreasing antibiotic resistance in humans. Dr. Wegener is a prominent Danish scientist with a master’s degree in food science and a Ph.D. in microbiology from the Royal Veterinary and Agricultural University in Copenhagen (Henrik Caspar Wegener, 2010). His study was cited in an article in Science written by Dan Ferber in 2000. It was carried out in 1999 and it monitored the spread of drug-resistant Salmonella from food to humans in the Washington, D.C., area, “Eighty-four percent of the isolates were Salmonella” (Hurd 2010). This process of gene transfer poses threat to people with compromised immune systems, whom commensals can infect. If these bacteria develop antibiotic resistance, people with these infections cannot be treated and will suffer greatly (Ferber 2000). Furthermore, if antibiotic resistance can pass to microbes in our digestive tract, then it could easily pass to harmful pathogens in the environment. The microbial world is a complex place, and seemingly harmless farm microbes with antibiotic resistance could easily come in contact with life-threatening pathogens, and resistance genes could spread and create a new, deadly strain of pathogen.

Overall, studies have shown that antibiotic use in livestock will select for drug resistance in microbes. These resistant strains can pass to humans through handling or consumption. The resistant genes accumulated in these strains can also spread to other microbes, including our own commensal bacteria and maybe even dangerous pathogens. In light of the data provided by Wegener, White, and other researchers, Hurd was incorrect to claim there is no evidence to show antibiotic resistance in animals can spread to humans.

What Can Be Learned from “the Danish Experiment”

As of 1998, Denmark completely banned “growth promoter antibiotics” in the production of livestock. As the name implies, these are antibiotics meant to supplement feed and increase the size of animals meant to be used as a food source. As a result, Denmark was used by many researchers as a model to study the effects of such a limitation on antibiotic use in agriculture, commonly referred to as the “Danish Experiment.” The most notable of these studies was performed by the World Health Organization (WHO) in 2002 and included a comprehensive report on the effects of this antibiotic ban in Denmark on animal health, human health, economics, and the environment (WHO 2002). An international group of experts with a range of backgrounds carried out the research for this report to keep the analysis relatively unbiased. Data from these reports have been widely cited in arguments from both sides of the antibiotic debate. Even Dr. Hurd and Dr. Wagstrom used information from Denmark to support their claims. However, after one reads the WHO report, it turns out that the evidence that Hurd and Wagstrom use to support their claims was either taken out of context or not very representative data in the first place, which renders their arguments unconvincing.

Both Hurd and Wagstrom claim that the data from Denmark show that a decrease in antibiotic usage does not impact human health and in some cases has led to more cases of disease. It is true that preliminary data from the WHO's research showed that restrictions on antibiotic usage may have been linked to increased cases of illness in Denmark. However, its portion on human health, the WHO stated that...
“Data from healthy humans however are relatively sparse on which to assess the effect of the termination of antimicrobial growth promoters on the carriage of antibiotic resistant bacteria,” and that “Further larger studies are needed to determine how much of an effect the discontinued use of antimicrobial growth promoters in Denmark will have on the carriage of antimicrobial resistance in the intestinal tract of humans in the community” (2002). In other words, the WHO was able to gather only a small amount of data on how the restriction of antibiotic use affected the spread of antibiotic resistance in humans, and more studies with more subjects would be needed to make any conclusions. Thus, the data that Hurd and Wagstrom have used to support their claims are not representative and, as a result, cannot properly prove their point that antibiotic restrictions will not affect human health. Additionally, the WHO reported that decreased antibiotic use in Denmark led to some positive impacts on human health as well. These consequences included a definite decrease in antibiotic-resistant strains of E. coli isolated from cows and a decrease in human cases of streptogramin-resistant E. faecium (WHO 2002). Again, these data were noted as not representative, but if Hurd and Wagstrom were willing to state the negative effects of the antibiotic ban on humans as fact, should they not note the positive effects as well?

Hurd also claims that one harmful impact of the restriction of antibiotic use will be an increase in illness and mortality among pigs. He stated that his personal experience in Denmark showed that more pigs have fallen ill and died from illness due to this decrease in antibiotics. However, the WHO report explains that the pig deaths that Hurd is referring to would have happened regardless of the ban on antibiotics. The reported increase in deaths was mostly due to infant pigs falling ill. The health of these pigs primarily depended on two drugs, olaquindox and carbacho. The report states that the EU took these two drugs off the market in 1999 because they might have been poisonous to humans (WHO 2002). Thus, while Hurd correctly reported an increase in swine mortality in Denmark, it was not due to the ban of nontherapeutic antibiotics in general but to the limitation of two specific drugs that would have been banned anyway.

Wagstrom sheds light on another negative outcome of Denmark’s antibiotic ban: the increased use of human-related antibiotics to treat sick pigs. According to Wagstrom, as more pigs became ill in Denmark, there was a great increase in permitted therapeutic antibiotics important to human health. This created a problem because if more human-related antibiotics are used, then antibiotic resistance will more likely spread from animals to humans. Wagstrom states that if growth promoter antibiotics, which are not widely used in humans, were used in animals in the first place they would not become ill and antibiotic resistance would be better avoided. However, the WHO reports that only the use of some human-related antibiotics increased in pigs and the use of others remained the same. Furthermore, the report stated that “total therapeutic use in 2000 and 2001 was similar to 1994, the peak year of therapeutic use before any antimicrobial growth promoters were terminated” (WHO 2002). Contrary to Wagstrom’s claim, some human-related antibiotics were still being preserved, and the use of these antibiotics did increase but not to a level that was higher than before the ban. Finally, her argument is also irrelevant in regard to the United States, as the proposed restrictions on antibiotic use in PAMTA would include only human-related, or critical, antibiotics. Thus, all noncritical antibiotics could still be administered for disease prevention and there would actually be a decrease in human-related antibiotic use in livestock. Hurd and Wagstrom cite proof from the Danish experiment to show that a limitation on antibiotics in agriculture will not help humans and antibiotics are necessary for the well-being of livestock. However, this evidence is taken out of context and does not properly reflect the message the WHO report was trying to get across. In fact, the WHO stated, “We conclude that under conditions similar to those found in Denmark, the use of antimicrobials for the sole purpose of growth promotion can be discontinued” (WHO 2002), contradicting Hurd and Wagstrom’s claim that these growth promoters are necessary for animal health.

A False Sense of Confidence

Hurd and Wagstrom both assert that everything that is done during pork production, including the current use of antibiotics, ensures the safety of the meat, but the fact that meat is safe for consumption has nothing to do with the problem of antibiotic resistance. In fact, it appears that they are trying to show that since current regulations for antibiotic use result in safe meat, these regulations do not need to be changed, but that is simply not the case in regard to antibiotic resistance in humans. Hurd describes the meticulous inspection of meat products for antibiotic residues so no antibiotics make it into food. Wagstrom describes how there is oversight from both the USDA and FDA during the entire process of pork production. She explains that every producer strictly adheres to these rules and anyone who disobeys the rules is severely fined (Hurd 2010; Wagstrom 2010). While assuring the public that pork is safe to eat creates a sense of confidence in the consumption of meat, it does not address the main purpose of the interviews: educating the public about antibiotic resistance in animals and in humans. Yes, there may be no antibiotics in the meat, but there are still antibiotic-resistant bacteria that can infect humans, as White’s research shows (White, 2001). Also, the regulations that Wagstrom cited to maintain the safety of pork are evidently not enough to curb the threat of antibiotic resistance. This is obvious in both the FDA’s and the USDA’s support of PAMTA and other restrictions on antibiotic use (Sharfestine 2009; Akkina & Johnson 2007). In the end, the food produced by livestock may be safe to eat by some standards, but that does not mean that it is free of antibiotic-resistant bacteria, which could easily cause disease or spread resistant genes to other strains.

Wagstrom makes an illogical argument when she discusses the link between human cases of MRSA and porcine MRSA in order to assuage the fears of antibiotic-resistant bacteria passing from animals to humans. She first explains that according to studies in Denmark, where nontherapeutic antibiotics in livestock have been banned, there has actually been a tenfold increase of MRSA in humans. However, she then goes on to explain that research has found an MRSA strain unique to pigs, which is not a contributor to human cases of MRSA, so humans shouldn’t worry about getting MRSA from pigs (Wagstrom 2010). Using Wagstrom’s logic, one could say that the human cases of MRSA have nothing to do with pig MRSA and thus with the use of antibiotics in pigs. So the tenfold increase that she says happened in Denmark despite the antibiotic ban means nothing, as antibiotic use in animals would not affect human MRSA. This hole in Wagstrom’s logic renders her argument questionable. Did she actually do enough research to say that restrictions in animal antibiotic use will not help end antibiotic resistance in humans? Both the use of irrelevant information and illogical arguments make Hurd and Wagstrom’s arguments against the regulation of antibiotics in livestock misguiding and weak.

Ending “Factory-Farming” and Finding Alternatives to Antibiotics

Hurd and Wagstrom make a point that current antibiotic use needs to be upheld because restrictions will lead to more sick animals and thus unhealthy meat on America’s tables. Increased sickness in animals will not only harm humans but make animals suffer when they do not need to. They assert that antibiotics use in agriculture is not excessive and for the most part is meant for preventative care. However, would this preventative care be necessary if producers were not using so-called “factory farming” techniques? The bigger
problem that should be addressed is the inhumane way that livestock are raised to make a profit.

A “factory farm,” formally referred to as a Confined-Animal Feeding Operation (CAFO), is a livestock production site that feeds animals systematically in an enclosed space to prepare them for food production. Wastes produced by these animals are simply washed away and stored on site in ponds outside or underground, making conditions very unsanitary. There is also poor ventilation in holding areas, which makes it hard for animals to breathe and easy for microbes to proliferate and spread (Issues: Factory Farming). It is commonly known that a large amount of the meat sold commercially comes from CAFOs (Nierenberg 2005: 5).

With such overpopulated and unclean conditions, it is no wonder that animals are so susceptible to illness and require antibiotics. Thus, Hurd and Wagstrom were right in saying that antibiotics are necessary to keep pigs healthy in America, but that is only because producers have forced them into such unhealthy living conditions in the first place. Hurd and Wagstrom may be able to claim that American meat is healthy, but how about when the animals are alive? Are antibiotics any substitute for fresh air, room to roam, and clean living quarters?

Ending factory-farming methods and reducing the use of antibiotics requires a sacrifice of profits on the part of livestock farmers and spending on the part of meat consumers. Antibiotics are able to reduce feed costs and the cost of housing animals, as they can supplement food and enable farmers to use less space to keep animals. This results in lower meat prices for consumers. As reluctant as many farmers are to reduce the use of antibiotics, there are plenty of alternatives to using antibiotics to keep animals healthy. James MacDonald and Sun Ling Wang discuss the results of some of these alternatives in “Broiler Producers Search for Alternatives to Antibiotics.” It was found by the USDA in 2006 that many “broiler” chicken, or non-egg-laying chicken, farms have been able to avoid nontherapeutic antibiotics by carrying out Hazard Analysis and Critical Control Point (HACCP) plans. These plans are routines carried out to detect and avoid any potential food safety hazards in a facility. In addition to these plans, producers that did not use nontherapeutic antibiotics used other methods to avoid animal illness, such as frequent sanitation, improved ventilation, and routine disease testing. Since about 44 percent of broiler producers were reported not to use nontherapeutic antibiotics, it is obvious that these alternative methods were successful for this large percentage of farms and enabled them to continue production (MacDonald & Wang 2006). These simple sanitation and pathogen testing practices could easily be applied to other livestock raised in factory-farming conditions. These findings prove contrary to Hurd and Wagstrom’s belief that preventative antibiotics are required to keep animals healthy, and expose another method of disease prevention that they failed to address.

Breaking Free from the Vicious Cycle of Antibiotic Resistance

As Christopher T. Walsh and Michael A. Fischbach put it in their article in Scientific American referring to the problem of antibiotic resistance, “humans may never definitively win this race against time, but for the past century new therapies have kept us a step ahead of the pathogens. Every effort must be made to retain our lead” (2009). These words expose the dire situation we have placed ourselves in by overusing and misusing antibiotics; we can no longer depend on new drugs to save us from resistant pathogens. Every effort must be made to preserve the antibiotics we have now and prevent the spread and creation of drug-resistant strains. Contrary to what Hurd and Wagstrom may argue, this includes decreasing the use of antibiotics in farming, despite how unrelated to the issue it may seem. It is evident in this report that antibiotic resistance can indeed spread from the farm to humans no matter how much we inspect meat and carefully handle it. We must take care to educate ourselves and support actions such as PAMTA and the “Get Smart” program that aim to reduce antibiotic use to ensure our ability to fight drug-resistant pathogens. Hopefully, the combination of four limitations on antibiotic use and the discovery of new antibiotics will make it so Dr. Hung will never again have to tell a patient that he will have to die because there are no antibiotics to fight his disease.

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