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Video Education For Nutritional Management Of Type 2 Diabetes In A Rural, Multiethnic Community In Molokai, Hawaii

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Video Education For Nutritional Management Of Type 2 Diabetes In A Rural, Multiethnic Community In Molokai, Hawaii

By
Megan Stephenson

Accepted in Partial Completion of the Requirements for the Degree Master of Arts

Kathleen L. Kitto, Dean of the Graduate School

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Master’s Thesis

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Megan Stephenson

May 13, 2016
Video Education For Nutritional Management Of Type 2 Diabetes In A Rural, Multiethnic Community In Molokai, Hawaii

A Thesis
Presented to
The Faculty of
Western Washington University

In Partial Fulfillment
Of the Requirements for the Degree
Master of Arts

By
Megan Stephenson
May 2016
Abstract

Type 2 diabetes (T2D) is seen acutely in the state of Hawaii: 9.7 percent of the adult population is diagnosed, but rates are disproportionate across ethnic groups. Food insecurity, agricultural restrictions, and low health literacy contribute to high rates of chronic disease like T2D. This thesis is a medical anthropological study, to test a modified diabetes education video about nutritional practices to the multiethnic community on Molokai. I argue that this modified educational video is more relevant to the local population by integrating cultural practices of the island, using local foods, local professionals, and local places. I further argue that information presented through the video will translate to improvements in health behaviors: increased knowledge in healthy dietary habits and portion sizes, captured in Knowledge, Attitude, and Behavior surveys and Food Frequency Questionnaires; and improvements in blood glucose levels, measured by HbA1c levels. My five case study participants were divided into control and intervention groups, where the intervention group showed an increased awareness of positive health behaviors, and all participants demonstrated the importance of subsistence activities to supplement their diet with local foods. I conclude that the video had a positive effect on diet and exercise knowledge, and many in the Molokai community are combating limited food availability and affordability in conventional stores through food subsistence methods.
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# Table of Contents

Abstract ........................................................................................................ iv
Acknowledgements ....................................................................................... v
Glossary of Hawaiian Terms .......................................................................... viii
List of Figures ................................................................................................. ix
List of Tables .................................................................................................. x
List of Charts ................................................................................................ xi
Chapter 1: Introduction ................................................................................ 1
Chapter 2: What is Type 2 Diabetes .............................................................. 6
Chapter 3: Multiethnic Identity in T2D Research ......................................... 9
  Ethnicity ........................................................................................................ 10
  Situational Ethnicity and ‘Local’ Culture ...................................................... 13
  Situational Ethnicity on Molokai ................................................................. 16
Chapter 4: History of Land & Power .............................................................. 19
  Political Economy ......................................................................................... 19
    Precontact .................................................................................................. 21
    Contact (1778 – 1848) ............................................................................. 23
    After the Great Mahele – 1848 To World War II ...................................... 27
    Democratic Revolution – 1954 to the 1980s ............................................. 30
  Current Industrial Agriculture in Hawaii ..................................................... 32
  Current Agriculture on Molokai ................................................................. 34
Chapter 5: Nutritional Intervention and Food Choice .................................... 38
  Food choice .................................................................................................. 40
  Video Education for T2D ........................................................................... 42
Chapter 6: Research Methodology ............................................................... 45
  Methodological theory ................................................................................ 45
    Case study .................................................................................................. 45
    Grounded theory ....................................................................................... 46
  Description of study population .................................................................. 47
  Design of study ............................................................................................ 47
  Data Collection ............................................................................................. 50
  Instrumentation ........................................................................................... 52
    Educational Video ...................................................................................... 52
    Knowledge, Attitude, and Behavior survey ............................................... 55
    Food Frequency Questionnaire ................................................................ 56
    Interviews .................................................................................................. 57
  Analysis ........................................................................................................ 58
    Surveys ....................................................................................................... 59
    Interviews .................................................................................................. 61
Chapter 7: Results and Discussion ............................................................... 62
  Subject characteristics ............................................................................... 62
  Case Studies ................................................................................................. 63
| Case Study No. 1: Malia | Page | 63 |
| Case Study No. 2: Lelani | Page | 66 |
| Case Study No. 3: Jay | Page | 69 |
| Case Study No. 4: Micah | Page | 70 |
| Case Study No. 5: Robert | Page | 74 |
| KAB Analysis | Page | 76 |
| Discussion | Page | 76 |
| Summary of Findings | Page | 80 |
| Limitations | Page | 81 |
| Chapter 8: Conclusion and Recommendations | Page | 82 |
| Considerations | Page | 83 |
| Contributions of This Study | Page | 83 |
| Bibliography | Page | 86 |
| Appendix A – KAB | Page | 110 |
| Appendix B – FFQ | Page | 125 |
| Appendix C – Letter of Introduction | Page | 130 |
| Appendix D – Participant Consent Form | Page | 132 |
| Appendix E – Flyer | Page | 136 |
| Appendix F – Exit Interview Questions | Page | 137 |
Glossary of Hawaiian Terms

Ahupua`a — Land division usually extending from the uplands to the sea, so called because the boundary was marked by a heap (ahu) of stones surmounted by an image of a pig (pua`a).

`Aina momona — Land that is fat, fertile, rich.

Ali`i — Chief, ruler, royalty

Ali`i nui — High chief

Haole — White person; formerly, any foreigner.

Kahuna — Priest, sorcerer, expert in any profession (whether male or female); in the 1845 Hawaii laws, doctors, surgeons, and dentists were called kahuna.

Konohiki — Headman of an ahupua`a land division under the chief.

Maka`aina — Commoner, populace, people in general.

Makahiki — Ancient festival beginning about the middle of October and lasting about four months, with sports and religious festivities and taboo on war; root word means annual or yearly.

Mālama `āina — Care for the land.

`Ohana — Family, kin group.

Pono — Goodness, uprightness, morality, righteous.

Ua mau ke ea o ka `aina i ka pono — The life of the land is perpetuated in righteousness. Hawai`i state motto.

Waiwai — Goods, property, assets.

Source: Ulukau 2003-2004
List of Figures

1) A map of Molokai, divided by census districts………………………………………………….. 9

2) An organizational flowchart of my data collection and timeline…………………………. 50

3) A group of women practice hula in a fitness class on Molokai…………………………….. 54

4) A family shops for produce at a CSA farm on Molokai…………………………………… 54

5) A screenshot of the video being edited………………………………………………………… 55
## List of Tables

1) Classic Design: Two-Group Pretest-Posttest Test......................................................... 43

2) Knowledge, Attitude, and Behavior survey question codes................................. 60

3) Participant Demographic Data.................................................................................. 63
List of Charts

1) T2D Diagnosis Rates of State of Hawaii and Island of Molokai, in Percentage……… 2

2) T2D Diagnosis Rates Among Ethnic Groups in Hawaii, in Percentage……………… 3
Chapter 1: Introduction

Type 2 diabetes (T2D) affects over 350 million of people globally (International Diabetes Federation 2014). The Centers for Disease Control and Prevention estimate 29 million Americans are living with T2D (Centers for Disease Control and Prevention 2014), and current trends indicate that one in three American adults will be diagnosed with T2D by 2050 (CDC 2010). The CDC reports that deaths due to the complications from diabetes rank 7th in the U.S., and cost billions of dollars in health care (CDC 2010, American Diabetes Association 2013).

Diabetes is a devastating disease that leaves the function of a body unresponsive to the hormone insulin that regulates glucose (sugar) levels. Diagnosis is sought when a person experiences numbness or pain in the limbs, frequent urination that is large in quantity, weight loss, increased appetite, and blurry vision, among other symptoms (American Diabetes Association 2015a). Untreated diabetes can lead to blindness, limb amputation, kidney failure, and vascular and cardiovascular disease (National Institute of Diabetes and Digestive and Kidney Diseases 2014). In recent years, researchers are taking into account the historical, cultural, environmental and individual life experiences in the development of T2D (Kaholokula et al 2008, Smith-Morris 2006), rather than just its epidemiological origins. I am approaching the intervention and management of type 2 diabetes by reviewing the origins of development from the socioeconomic perspective.

T2D is increasing in the United States — from 5.5 million people in 1980 to 22 million in 2014 (CDC 2015a). The rate T2D diagnoses is also on the rise throughout the state of Hawaii: 108,400 adults were diagnosed type 2 diabetics in 2014, 9.7 percent of
the population, a 1.3 percent increase from 2011. The increasing trend is also seen by ethnic group. Native Hawaiian, Filipino, and Japanese populations have the highest rates of diagnoses. As seen in Chart 1, the white population of diagnosed T2D has remained around 5 percent since 2011, while Native Hawaiian, Filipino, and Japanese populations have increased.

Chart 1: Type 2 Diabetes Rates Among Ethnic Groups in Hawaii

Molokai, however, has seen a significant decrease since 2011, dropping from 11.8 percent in 2011 to 8.5 percent in 2014, a lower average than the rest of the state (Chart 2).
Data of type 2 diabetes prevalence on Molokai divided by ethnicity is not yet available.

The prevalence of T2D throughout the state of Hawaii is about 10 percent and is exacerbated by dietary choices limited by poverty (Hawaii Department of Health 2004, Hsu et al 2012); agricultural restriction that leads to exporting most agricultural products, further limiting the dietary choices in local grocery stores (Kent 2008, Office of Planning, Department of Business, Economic Development & Tourism 2012, Meyer 2014); and high rates of obesity and high levels of inactivity (Thomas et al 2006, Winson 2004, Lasseter 2011, Steinbrecher et al 2011, Kaholokula et al 2013).

My pilot study took place on the island of Molokai in the state of Hawaii. Molokai has a small population, about 28 residents per square mile (U.S. Census Bureau 2012), and has a rural geography. It has limited development: one hotel, two gas stations, and not a single stoplight. The community is known for its resistance to development that would harm the environment or impair the continuation of Native Hawaiian values and
practices. It has the highest population of Native Hawaiian descent in the state (U.S. Census Bureau 2012).

The population faces limited employment opportunities, poverty, and geographic isolation; a change in lifestyle is extremely hard. I collaborated with the staff at the nongovernmental organization Molokai Community Health Center (MCHC) to collect data about what their clients needed to know to prevent or better manage their T2D. This thesis is a medical anthropological study, to test a modified diabetes education video about nutritional and exercise practices to the multicultural community on Molokai. The video emphasizes that lifestyle change improves health, and is a long-term solution to maintaining low glucose levels and other positive biomarkers, such as cholesterol, blood pressure, and weight. There was a need for a culturally appropriate educational video that would be more convincing, and the new behaviors easier for patients to model if local foods, local professionals, and local places were part of the story.

I recruited 5 participants from the health center’s patient list, as well as others in the community, to test the video’s effectiveness in changing behavior. I quantify the video’s effectiveness using clinical and behavioral measures. I used a Knowledge, Attitude, and Behavior survey and Food Frequency Questionnaire. I also collected the participants’ average blood glucose levels, from an HbA1c test, to see if improvements can be seen.

This thesis is divided into eight chapters. Chapter 2 describes the etiology of diabetes; Chapter 3, the multiethnic identity of Hawaii, and my participant population; Chapter 4, the political economy of food in Hawaii; Chapter 5, the examination of food choices given local contextual constraints, and attempts to change food choices through
intervention; Chapter 6, the research design and methodologies; Chapter 7, the main findings and limitations of this study; and Chapter 8, the conclusion.
Chapter 2: What is Type 2 Diabetes

In this chapter, I explain the etiology and epidemiology of T2D, and how the disease is diagnosed and the pathological trajectory assessed.

Diabetes is a chronic metabolic disease in which the body is unable to modulate levels of blood glucose through the action of the hormone insulin (Leonard 2014). The pancreatic beta cells are unable to produce insulin in type 1 diabetics, also known as insulin dependent diabetes and juvenile-onset diabetes. Type 2 diabetics or noninsulin-dependent (adult onset) are mostly less sensitive to or sometimes totally unresponsive to the insulin they produce (Munden 2007). Prevalence is highest for T2D and is continuing to increase worldwide partly thanks to higher obesity levels. Obesity contributes to reduced sensitivity to insulin by lowering the number of insulin receptor sites (Kahn, Hull, and Utzschneider 2006; Weyer et al 2001; Timmers, Hesselink, and Schrauwen 2013; Gierach et al 2014).

Insulin is a hormone produced in the pancreas and removes excess glucose from the bloodstream by storing it as glycogen, a complex carbohydrate (Leonard 2000). The mechanisms that lead to diabetes are not completely understood. Populations vary in their incidence and prevalence of T2D; prevalence is highest in Native Americans, intermediate in Asians and lowest in people of European descent (O’Dea 1991). Neel (1962) hypothesized that T2D favored a genetic response, the “thrifty genotype,” in hunting and gathering populations whereby there would be a quick release of insulin during the rare times that they encountered plentiful glucose-rich foods. Weiss et al. (1984) extended this hypothesis to American Native American populations that he and colleagues believed faced inadequate food supplies regularly and thus carried thrifty
genes. However, Szathmary (1986, 1990) argued that the thrifty genotype did not explain the high rates of diabetes in arctic and subarctic populations who ate high levels of fats and protein and rarely encountered glucose-rich foods. Genes are also not sufficient to explain how people all over the world that transition from traditional lifestyles to a Western diet tend to develop high rates of T2D, as in the case of Pacific Islander populations (Willett 2002, Ferreira and Lang 2006, Pollard 2008). Genetic predisposition coupled with less activity, readily available excess calories, especially excess fat and simple sugars, increased the incidence and prevalence of metabolic disorders such as NIDDM, obesity, hyperlipidemia, gallstones and gallbladder cancers.

Behavioral change after a positive T2D diagnosis can be a significant factor in improving quality of life and minimally postpone the worst outcomes of unregulated blood sugar: limb amputations, cardiovascular disease, and blindness (National Collaborating Centre for Chronic Conditions 2008). Injected insulin is commonly used to control blood glucose levels, but T2D can be managed with healthful eating and regular physical activity (Gilliland, Carter, Perez et al 1998; American Diabetes Association 2008, Centers for Disease Control 2014).

T2D can be diagnosed using the HbA1c test. This test measures glycohemoglobin, a protein found in the erythrocytes\(^1\), which live for about three months (National Diabetes Information Clearinghouse 2014a). This test is an evaluation of all the fractions of the hemoglobin molecule, the percentage of average plasma glucose level in 120 milligrams per deciliter of blood. A normal HbA1c is 5 percent; the American Diabetes Association diagnoses type 2 diabetes when the HbA1c test reaches 6.5 percent and higher (American Diabetes Association 2014, National Institute of Diabetes and Digestive and Kidney

\[^1\text{Red blood cells}\]
Diseases 2014). My research collaborator, the Molokai Community Health Center, recorded my participants’ HbA1c before and after the intervention. I use the HbA1c test because it is the primary assessment for glycemic control in health care (Zinman 2010).
Chapter 3: Multiethnic Identity in T2D Research

In this chapter, I argue how Hawaii became a multiethnic community through its settlement after Western contact. First, I describe my research location, the island of Molokai in the state of Hawaii. Second, I define ethnicity as an identification tool in anthropology, and health research. Third, I will explain how situational ethnicity is applied in Hawaii, how different ethnic groups created a fluid ethnicity seen through cultural expression, such as language and food. Lastly, I argue how shifting ethnicities influence the social and economic systems in Hawaii, and how multiethnic identity in the specific Hawaiian context is an important factor in health research in order to understand the disparities many minority ethnicities face in health and wellness.

Molokai is the fifth largest island in the Hawaiian archipelago, a rural landscape with the majority of its land designated as agriculture or conservation (Maui County Databook 2014:67). It is a part of Maui County, along with the islands of Maui, Lanai, and Kahoʻolawe. The main town, Kaunakakai, is along the southern shore and contains the main wharf for shipments, the island’s only two gas stations, and the majority of the island’s businesses, including its one hotel. There are no stoplights or corporate chain businesses on the island.

The western side of the island is the driest. The east end is more precipitous, and is where the island’s most sacred place, Halawa Valley, is located (Summers 1971). The Kalaupapa peninsula juts out from the north side, famous for the Hansen’s disease (leprosy) colony. The peninsula contains Kalaupapa National Historical Park and is its own county, Kalawao County. In the U.S. Census, Molokai is divided into two census tracts (Figure 1), West Molokai and East Molokai, as well as Kalawao County.
Combining the two tracts, Molokai’s population from the 2010 Census was 7,544, and 61.6 percent identify as full or part-Native Hawaiian (U.S. Census Bureau 2012). I did not include the Kalawao County population.

**Figure 1: A map of Molokai, divided by census districts (Hawaii Office of Planning 2010)**

Molokai has been designated a Medically Underserved Area and a Health Professional Shortage Area for Primary Care, Dental Care, and Mental Health, by the U.S. Public Health Service, and has one of the lowest overall rankings in the state in measurements of economic health, socio-economic stability and food security (Molokai Community Health Center 2011). Molokai has a 5.6 percent unemployment rate as of March 2016 (State of Hawaii Research and Statistics 2016), but which has hovered between 10-12 percent since 2008 (Molokai Community Health Center 2011). Nearly 18 percent of the island lived within the federal poverty level, according to data between 2006-2010 (Molokai General Hospital 2013:19). High cost of gas, electricity, and food all contribute to high cost of living.

**Ethnicity**

Understanding how ethnicity impacts health care is complicated by the fact that there is not one designated definition of ethnicity in the literature. For example, in multiethnic
cohort health research studies, the authors list “ethnic groups” as their subject population, such as African-American, Latino, white, and Japanese-descent (Park et al 2005:844), but do not define what makes African-American or white a distinct ethnic group (See also Kolonel et al 2000, Stram et al 2000, Morimoto et al 2011, Steinbrecher et al 2012, Sharma 2014). In a study by Moy et al. (2013), the authors base ethnicity on a person’s ancestry (Moy et al 2013:6).

I also refer to Hawaii’s *ethnic* background, rather than its *racial* background, because race is not a scientific term. The idea that humans are divided into distinct racial groups based on physical and behavioral characteristics is now refuted; race is now considered a socio-cultural imposition (Eriksen 2010:6).

However, until recently, U.S. census records and school forms have used the term ‘race’, and individuals were instructed to choose one category – white or African-American or Hispanic or Asian, and so on. The 2000 U.S. Census was the first time individuals were allowed to choose as many categories with which they identified, and was the first census to separate ‘Asian’ from ‘Native Hawaiian or other Pacific Islander’. The census now also allows space for people to write in their self-identified ethnicity if not on the form (Humes, Jones and Ramirez 2011; Palmer 2015). Researchers have long recognized that individuals are descended from and can identify with multiple ethnic backgrounds (Barth 1969, Nagata 1974, Patterson 1975, Bentley 1987, Lin and Kelsey 2000). Government census records are catching up to today’s health researchers.

There are 1.4 million people who live in Hawaii, and 26.2 percent (n=355,816) identify as Native Hawaiian or Pacific Islander and one or more other races\(^2\) (U.S. Census Bureau 2012). As of 2014, the largest ethnic majority in the State of Hawaii is Asian

\(^2\) I am using the U.S. Census term ‘race’ as seen on their forms and documents
(37.5%), followed by white (26.7%), two or more races (23%), and Native Hawaiian and Other Pacific Islander (10%) (U.S. Census Bureau 2014). According to the 2010 census, 33 percent (n=2,394) of Molokai residents identify as Native Hawaiian (U.S. Census Bureau 2012), and the island’s largest ethnic majority is Native Hawaiian and one or more other races (U.S. Census Bureau 2012).

Since the 1960s, anthropology as a discipline considers ethnicity to be any group that considers themselves culturally distinctive, though few anthropologists have clearly defined the term (Eriksen 2010:5). To some scholars, there is also a self-defining aspect to ethnicity. While ethnicities are classified in groups, anthropologist Jonathan Okamura (1981) argues that ethnicity is comprised of structural influences and individual cognition. Membership into an ethnic group can be overtly structured by society or by implied social status, as well as residential, educational and professional opportunities (Okamura 1981:453). An individual can then cognitively choose to adapt to those cultural constraints, taking on different identities and behaviors depending on expectations in social situations (Okamura 1981:454).

According to historian Paul Spickard, ethnicity is defined as a group classification, the meeting of shared origins, biological traits, cultural background, and social and economic interrelationships (Spickard 1995:1366). Today, ethnicity is still often used interchangeably with race, and came into the vernacular around World War II, to describe groups other than the Anglo-descent majority (Eriksen 2010:4). Much of public discourse still interprets the term ethnic as a minority or indigenous group, versus the dominant power (Eriksen 2010:5).
Situational Ethnicity and ‘Local’ Culture

How the different ethnicities in Hawaii interact is an ideal example of situational ethnicity, a theoretical frame to examine how ethnicity and social identities merge in settings where relative political, cultural, and socio-economic statues of groups are shared, causing a “fluidity” or “plasticity” of ethnicity (Okamura 1981: 453-54).

Situational ethnicity is a useful way to conceptualize ethnicity in mixed communities such as Hawaii, whose history has “resulted in a distinct ethnic geography” (Miyares 2008: 514). Europeans began interacting with the Kingdom on Hawaii after Capt. James Cook’s arrival in 1778, mostly through trade, until American and European missionaries arrived in 1820. An influx of immigrant labor followed through the 19th century — Chinese and Portuguese, Puerto Ricans and Spaniards, Japanese and Okinawans, Koreans and Filipinos — in addition to the Native Hawaiians and other Pacific Islanders living in Hawaii (Daws 1968, Allen 1982, Haas 1998, Miyares 2008).

Situational ethnicity explains that “particular contexts may determine which of a person’s communal identities or loyalties are appropriate at a point in time” (Miyares 2008:515). As such, multiethnic individuals can adapt and express to different behaviors of different groups in which they claim membership (Okamura 1981, Miyares 2008). In Hawaii, this merging began during the plantation era, roughly the 1830s to World War II (Rayson 1994:86-87), when class differences divided the ruling class — American and British businessmen and Hawaiian royalty, or ali‘i — from the labor class, who began sharing food, cultural concepts, and language with one another (Laudan 1996, Daws 1968). An ethnogenesis occurred: this new culture grew as the children and grandchildren of the first laborers began to intermarry, and was labeled ‘Local’ culture by the early 20th century (Miyares 2008).
Miyares applied situational ethnicity to Local culture in Hawaii as a different model of assimilation, which is “the social, economic, and political integration of a cultural group into mainstream society to which it may have emigrated or otherwise been drawn” (Huff, Kline, Peterson 2015:10). Rather than a minority culture integrating into the dominant, several minority cultures banded together to form a larger culture, a resistance to the powerful Euro-American culture (Miyares 2008). Local culture became its own ethnicity — an amalgamation of Native Hawaiian, Anglo, East and Southeast Asian, Portuguese, and Polynesian cultural expressions shared as one culture by people of many different cultural backgrounds, expressed in food, celebrations, language, art, and social activities (Yamamoto 1979, Miyares 2008, Drager 2012).

The term Local is used in Hawaii to denote longterm island residents, the opposite usually being haole. I use Local as a proper noun in this thesis to denote its status as a situational ethnic group in Hawaii, separate from the general term local (see Miyares 2008, Trask 2000). Haole translates to “without breath” in Hawaiian, and was the Hawaiian term used for Western missionaries and businessmen who came to the islands, to mean foreigner (Ohnuma 2002, Miyares 2008, Yamamoto 1979). Today, haole is a contested Local identity – although many haoles are longterm residents, it is often associated with being white, and evokes images of colonization and the military (Ohnuma 2002:274, Fuchs 1961:xv). Local culture comes primarily from the shared experience of oppression on the plantations (Ohnuma 2002:274). Local was first used in a newspaper article in 1931, to differentiate between the “island-bred” defendants and the “mainland-bred” plaintiffs in a rape trial (Daws 1968:317-27, Yamamoto 1979, Miyares 2008). Between the 1930s and the 1960s, Local was used to distinguish between islanders
and mainlanders in an increasingly militarized Hawaii. However, since the 1960s, more scholars and the public consider Local to be a multiethnic culture onto itself. In her 2011 dissertation, Kristen Odgen defines Local as

“a resident of Hawaii who shows by his or her actions a familiarity with the history and customs of the various ethnic groups of Hawaii, a concern for the welfare of Hawaii’s people and environment, an appreciation of the uniquely local things that make Hawaii special, and a commitment to be a part of Hawaii – in good times and bad” (Ogden 2011:197-198).

Many narratives from non-islander researchers working in Hawaii have provided a similar definition (Ohnuma 2002, McMullin 2009).

Two examples of Local culture – a language dialect, Hawaiian Pidgin, and the favorite local meal, the Plate Lunch – illustrate the cultural creations of this multiethnic community.

Hawaiian and English are both listed as official state languages today (Hawaii State Constitution 1978). However, with the arrival of more and more foreigners and the Hawaiian population declining, English became the language of the “upward economic mobility” (Drager 2012:4), and Hawaiian Pidgin formed in plantation villages, influenced by English, Hawaiian, Chinese, Portuguese, and Japanese languages (Drager 2012:4, Rezentes 1993, Roberts 1995, Marlow and Giles 2008). Pidgin “became the lingua franca of Hawaii’s polyglot plantation force during the last quarter of the 19th century (Roberts 1995:3). Despite its name, Hawaiian Pidgin is not a jargon language, but a Creole, stable language spoken by many in Hawaii (Smith 1933, Roberts 1995, Drager 2012). As an expression of situational ethnicity, Locals will mix the use of language depending on the situation: standard English is often used in business and in schools, while in social situations people will use Pidgin (Drager 2012:4). Children grow up speaking Pidgin, as a
way of enforcing their place in Local culture, but it is not very accepted in schools

The Plate Lunch is a ubiquitous meal found in any mom-and-pop diner in Hawaii. A typical plate lunch will usually have a meat or fish, like teriyaki chicken, fried mahimahi, or kalua pork; two scoops of rice; mayonnaise-based macaroni salad; and a vegetable, like canned corn or kim chee (Laudan 1996). Its origins come from plantation workers who shared food from their own kitchens or bought from the plantation lunch wagon (Laudan 1996:20). In the village setting, workers and their children would share lunches and hold celebratory potlucks³ (Lauden 1996). The Chinese introduced rice and roasted chicken and duck; the Japanese brought fish and teriyaki; the Portuguese contributed sweet bread and doughnuts; and the Hawaiians shared steamed pork and poi. Later, during World War II rationing, military staples like Vienna sausage and Spam were added (Miyares 2008, Laudan 1996). As lunch wagons became diners and restaurants, expanding from the plantations into urban centers, this mixing of different regional foods continued (Laudan 1996:20). For example, a Japanese proprietor that only served Japanese food began to have customers of different ethnicities, and needed to add different dishes to the menu (Shortridge and Shortridge 1999:40). This borrowing of food extends beyond the Plate Lunch, but into Pidgin as well. Sashimi is a common dish of raw fish from Japan, and is called poke (pronounced poh-kay) in Hawaii.

Situational Ethnicity on Molokai

Situational ethnicity can be a model to better understand how Local culture can be used in type 2 diabetes intervention on Molokai, where ethnic identity is actively shifting. While Hawaii has become multiethnic, many individuals employ situational ethnicity in

³ A meal or party to which each of the guests contributes a dish
their daily lives for relations with coworkers and bosses, banking and business, classmates, neighbors, church members, family and friends. The characteristics of Molokai are shared by nearly all of the community: small population and workforce, rural geography, depressed economy, retained subsistence activities for food, and shared access to health resources, exercise, and medical care. However, those with more Hawaiian blood suffer more hardships than other ethnic groups (Rayson 1994:222). This is important to point out in the case of health promotion on Molokai, because Molokai has a high proportion of Native Hawaiians and part-Native Hawaiians.

There is much research on a return to traditional diet and lifestyle of Native Hawaiians or even as grouped Pacific Islanders (Mau et al 2001, Fujita 2004, Sobralske 2006, Lasseter 2011, Ihara 2012, Kaholokula 2013). But there is not much research into health intervention methods for a community that holds many ethnicities, while sharing the same community values and resources, especially socio-economic status. Research into health promotion and education is constantly investigating how to better prepare healthcare practitioners and researchers (Huff, Klein, and Peterson 2015). Multiethnic communities are increasing, where no single group dominates over others in terms of numbers (Baezconde-Garbanati and Boley Cruz 2015:182). Additionally, individual health education is not as effective as change made on the social, environmental, and community level (Frankish, Lovato, Poureslami 2015:65). Historically, health promotion theories focused on individual determinants of health, but in the last 20 years health researchers have found multiethnic communities can be more effectively addressed if care includes appropriate cultural factors, and acknowledges beliefs about health from the population of interest (Frankish, Lovato, Poureslami 2015:65). A healthcare plan for a
multiethnic community must go beyond the physiological and enter the historical, political, economic, and environmental issues that affect the shared problems within the community.

Hawaii’s multiethnic population faces rates of non-communicable diseases, such as heart disease and type 2 diabetes, at higher rates than their white counterparts (Kim et al 2008, King et al 2012, Maskarinec 2012, Palmer 2015). A 2008 study found that multiethnic individuals had a higher prevalence of obesity and overweight than those with a single ethnicity (Albright et al 2013). In the past, researchers have attributed this predisposition to higher genetic susceptibility, but scholars of multicultural health promotion find this theory doesn’t hold up (Ferreira and Lang 2006). Rather, stress, especially lifelong or historical, and environmental factors are more meaningful elements: research suggests the instability in the lives of lower income people is a leading factor of adverse physiological or health outcomes (Scheder 2006:343). Lifestyle factors arguably play the largest role in the development and management of T2D, primarily dietary practices and sedentary behavior (Broadhurst 1997, Wiedman 2006, Scheder 2006, American Diabetes Association 2014, National Diabetes Information Clearinghouse 2014, Palmer 2015).
Chapter 4: History of Land & Power

Current residents of Molokai are hindered in their quest for a healthy diet, in part because of high cost healthy foods. This hindrance is due to several factors, including the colonial history of land access in Hawaii, and the subsequent industrialized food system in Hawaii today. In addition, the high cost of living coupled with a stagnant economy makes it less likely for Molokai residents to earn enough money to maintain a healthy diet. However, subsistence production is reviving, especially on Molokai, where farming, fishing, and trade economy can provide healthier options.

In this chapter, I begin by defining political economy in anthropological studies. Second, I review the history of land tenure in Hawaii in four eras: (1) precontact, (2) contact at 1778 to the land system dissolution in 1848, (3) changes in government from 1848 to the mid 20th century, and (4) the policy changes from the Democratic Revolution in 1954 until the 1980s. Lastly, I address today’s “diverse” agricultural policies in the state, and on Molokai in particular. In this chapter, I argue that colonial and capitalistic powers throughout the previous 200 years negatively impacted the cost of living in Hawaii, making healthy food options and agricultural resources difficult.

Political Economy

To introduce how the various economies of Hawaii affect the lives of Molokai’s residents today, I draw upon political economy, a theory that utilizes economics, law, politics, and development in social and economic systems (Groenwegen 2008). Nineteenth-century philosopher Karl Marx is a noted theorist on political economy, proposing that production isn’t just an act of reproducing material goods for exchange, but that production is also affected by social relationships, political forms, and cultural
constructs (Marx 1970; see Friedmann 1982, Roseberry 1988, Nugent 1993). In William Roseberry’s review of political economy in anthropology texts (1988), the author notes that most anthropologists use a Marxist approach, which places “anthropological subjects within the larger historical, political, and economic movements,” which then attempts “to understand the impact of structures of power upon them” (Roseberry 1988:169). For example, anthropologists may explain the development of agricultural plantations as capitalistic enterprises.

In study into non-capitalist societies, political economists argue that production is not a separate force in society, but interdependent on social domains such as kin group, gender, age, and social hierarchies (Nugent 1993:341; as seen in Malinowski 1922; Firth 1929; Thurnwald 1932; Gluckman 1955, 1965; Wolf 1968, 1982, 1990). Resources were distributed among interdependent but hierarchical social categories, gained and given through rights and obligations (Nugent 1993:341). In many of these non-capitalist societies, including precontact Hawaii, private property was contradictory to the community’s interests – as seen in Hawaii’s state motto: “Ua mau ke ea o ka ʻaina i ka pono,” meaning “the life of the land is perpetuated in righteousness” (Hawaii State Constitution 1959a). For centuries, the land management was called malama ʻaina, care for the land (Hommon 2013:55). Unlike in Western societies, where individual rights are championed and seen as inalienable, Polynesians saw the universe as an “organic whole, of which each thing or person was an integral part … because land was immortal and humans are mortal, the idea that humans could own land was beyond imagining. Land could not belong to men because men belonged to the land” (Kane 1997:30-31).
The political economy of food examines political structure, economic models and food-related practices within the context of production. In their review of anthropological study of food and eating, Mintz and Du Bois state that “food systems are used to illuminate broad societal processes such as political-economic value-creation” (Mintz and Du Bois 2002:100). Unlike in Marxist theory, where commodities are produced for surplus value, or profit, as the basis for power and dominance in society (Jacobsen 2004, Marsden 2013), the precontact Hawaiian economy was a closed economy, producing agricultural goods designed to support the local system (Hommon 2013, Allen 1991, Kirch 1992).

I approach type 2 diabetes from a nutritional standpoint, in that the key to understanding the causes and the solutions of this disease are rooted in what foods we eat. Therefore, it is important to understand agricultural policies reflected in Hawaii’s historical land tenure systems.

Precontact

With the introduction of Western ideas – through weapons, capitalistic value items like sandalwood and sugarcane, and Christian missionary attitudes towards domestic and work life – the sustainable way of life that maintained Hawaiians began to crumble.

Land is unquestionably linked to power in Hawaii (Cooper and Daws 1990:2). Who has controlled in the land in the last 200 years has controlled the economy, the social structure, and food systems. Precontact, Hawaii had an agriculture-based tributary economy. Native Hawaiian commoners – those that worked the land, provided the food and labor, and did not make the bigger governmental decisions – had no say in how Hawaii changed. The kingdom saw an irrepressible tide from Western influence, and
made calculated decisions that irrevocably changed the lives of 98 percent of the population.

The Native Hawaiian commoner class, called maka‘ainana, farmed the land, fished the sea, gathered the plants and wood, crafted the canoes, built the houses and the temples, and served in the armies. They were managed by konohikis, who in turn were managed by ali‘i nui; all were governed by their king. Throughout Hawaiian history, the eight major islands were divided into kingdoms, and many wars were fought to conquer each other. Beginning in 1795, Kamehameha the Great, a chief from Hawaii Island, conquered and unified Kauai, Oahu, Molokai, Maui, Lanai and Hawaii islands by 1810, and ruled until 1819 (Kirch 1992, Allen 1991, Malo 1951, Hommon 2013, Daws 1968). Since the settlement of the Hawaiian islands until the mid-19th century, kings divided their islands into ahupua‘a, managed by ali‘i and konohiki. Ahupua‘a are wedge-shaped strips of land, stretching from mountain to sea, that form a community as well as sustainable agriculture practices. Within each ahupua‘a, some land was set aside for food production for the king and ali‘i; the majority was divided by ‘ohana, the extended family unit, in which they farmed and gathered their own food. The Hawaiian economy was mainly a gift reciprocity system: the ‘ohana shared meats (usually chicken and dog), fish, poi, sweet potato, seaweed, and other foods with each other, and the ahupua‘a community worked together to provide food, build canoes and houses, and gather feathers and other value items for the king and ali‘i (Kirch 1992, Allen 1991, Malo 1951, Hommon 2013, Daws 1968). These items served as taxes, and would be collected a few times a year, during a religious festival such as Makahiki (New Year). All items were for

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4 Polynesians from Marquesas Islands and Society Islands (Tahiti) believed to have settled Hawaii around 800 to 1000 CE (Hommon 2013:3).
the king; some items would be gifted back to aliʻi, and through the aliʻi, food or craft materials could make their way back to the commoners (Kane 1997:44). The makaʻainana expected security and religious guidance from their king, in return for their work. There was also another class, in between the makaʻainana and the aliʻi, called kahuna, who were trained and apprenticed specialists. The kahuna were historians, teachers, priests, astronomers, medical practitioners, and other skilled workers (Fuchs 1961:5). What they gave back to the community was not for their ‘ohana but was a full-time employment for social purposes or exchange (reciprocal or redistributive) beyond family and residential boundaries (Malo 1951:121).

Feathers were highly valued by aliʻi, which were crafted into cloaks and war helmets. Poi was a huge part of the economy. Poi is made of pounded taro root and is relatively preservable, making it a staple food item for all classes.

“From this land came the taro, and from the taro, our Hawaiian people.” (Trask 2000:1)

Poi also has strong cultural significance: according to oral tradition, the first Hawaiian man came from a taro plant (Daws 1968, Laudan 1996). But precontact Hawaii functioned as one of the “originally affluent societies” as described by Marshall Sahlins (1972). When food and household needs were met, the makaʻainana stopped to rest, play games, and tell stories. The aliʻi did not force them to work for any surplus materials beyond what they needed (Kane 1997:42).

Contact (1778 – 1848)

British explorer Capt. James Cook is the first recorded foreigner to set foot on the islands, in 1778 (Fish 2011:360). Trading began immediately, at first mainly weapons, and the aliʻi were the only Hawaiians allowed to engage in trade. After Cook,
businessmen from England, France, and the U.S. began using Hawaii as a point of call on their way east. The ahupua’a system continued, but was disrupted as these foreigners introduced two things that reshaped the Hawaiian economy, and lifestyle – private land ownership, and wage labor. Westerners valued the aromatic sandalwood tree, which grew in the islands but is a very slow growing tree. The ali‘i began demanding maka’ainana labor to harvest it in unsustainable quantities, to be traded for more Western goods, such as cloth and weapons (Levy 1975:850). This led to a decline in normal food and tributary gathering, as most labor was allocated to sandalwood harvesting.

Disease brought by Westerners also began decimating the population. Estimates of the precontact Hawaii population are between 525,000 (Hommon 2013:11) and 1 million (Stannard 1989:32), which plummeted to 40,000 by the 1890s (Stannard 1989:45, Office of Hawaiian Affairs 2015). Many scholars believe that the standard concept of depopulation in Hawaii, due to susceptibility to newly introduced diseases, does not include the structural violence of colonial establishment, or the loss of spirit as a result (Scheder 2006:34).

In traditional Hawaiian society, disaster occurred because the king or high chiefs were no longer pono, or righteous; researchers believe the maka`ainana saw the disease epidemics and mass deaths as signs of the loss of pono. In addition, while the ali`i converted to Christianity, most maka`ainana did not immediately, but saw their gods and temples destroyed. With the growing influence of Euro-Americans,

“the maka‘ainana had no grand purposes to work toward as a whole community…life is a relationship between the spirit of the land and the people of the land, between material survival and cultural expression…this structured the core of Hawaiian kinship” (Scheder 2006:46).
Through trade with the Americans and British, Hawaii changed from a gift-debt economy to a paper-debt economy. In a gift or reciprocity economy, there is no need for cash, wages, or monetary wealth; there is no need to value your items to exchange (Hommon 2013:108, Earle 2014:227). The Hawaiian word for wealth is waiwai, coming from the word for fresh water, and there is no word for barter or trade in Hawaiian (Allen 1991:122). But the Hawaiian elite were adopting a system in which they didn’t fully understand the implications. While the sandalwood trade slackened, more and more whaling ships used Hawaii as the main Pacific port of call. Many maka‘ainana left their families behind to work on these ships, while others set up shops and saloons in Honolulu and Lahaina harbors for the foreign sailors (Fuchs 1961:11). The ali‘i began using foreign currency to trade goods, and the maka‘ainana that interacted with sailors and businessmen also had to become accustomed to wages. Through political and economic pressure, foreigners quickly gained authority in Hawaii (Kirch 1992:126). Less maka‘ainana were farming, gathering, and fishing, yet the leaders still demanded their tributes (Kirch 1992:87).

By the time of the arrival of missionaries in 1820, the ali‘i were leasing tracts of land to haole (white) businessmen to plant sugarcane. But the haoles wanted to control their own land, in the way of private ownership, and began pressuring the government to allow this. The royalty and ali‘i had realized the Hawaiian economy could not advance under the former feudal system (Chinen 1958:15). A constitution established a privy counsel and a two-bodied legislature in 1840 under Kamhehameha III, in which haoles were increasingly voted into power, through very restrictive voting requirements; voters had to be male, at least 21 years of age, property-owning, and could read and write in
English or Hawaiian (Fuchs 1961:155-56). Bowing to pressure from foreign businessmen who had strong economic control in the islands, Kamehameha III appointed a Land Commission in 1845 to determine “rights of land” (Chinen 1958:9). This led to the Great Mahele of 1848, a series of legal documents in which Kamehameha III divided the Hawaiian Kingdom’s land into two parts: crown lands and government lands, the second of which was to be managed for the maka’ainana by the legislature and agents made of the ali’i class. One million acres was set aside for the crown, 1.5 million was set aside for the government (in the hands of 250 chiefs), and less than 30,000 acres was awarded for the common people, which they then had to file a claim for individual tracts of land. At first, these laws still did not allow resident aliens (non-Hawaiians) to own any land. However, this quickly eroded as haoles gained more land and power, and in 1850, a new law was passed that allowed resident aliens to buy land (Chinen 1958:31).

Some scholars, notably Jocelyn Linnekin (1987), have questioned the intention of the kingdom at this juncture. Hawaiians, from the kings to the maka’ainana, believed the land was to be used by the people, but never owned in an individual sense. The land was not the king’s “own private property. It belonged to the chiefs and people in common, of whom Kamehameha I was the head, and had management of the land property” (Chinen 1958:8). After the Great Mahele, all residents were supposed to file land claims and pay a fee. While some ali’i did take advantage of their maka’ainana dependents by allowing them to remain tenants on the chief’s land without filing for their own (Linnekin 1987:28), she notes that the major issue was that the few maka’ainana that filed land claims did so for as ‘ohana, not as individuals (Linnekin 1987:29). Maka’ainana were also required to prove they were longstanding tenants of the land, and would continue to
physically work the land, a rule not imposed on ali‘i or resident aliens (Linnekin 1987, Chinen 1958). By better understanding the system, haole businessmen were able to claim or buy huge tracts of land awarded originally to ali‘i; by 1886, two-thirds of the government land had been sold to haoles (Fuchs 1961:16).

After the Great Mahele – 1848 To World War II

With the loss of land went the loss of gathering and harvesting food and other items for the ali‘i, but also the commoners’ own source of food. Many were forced to work in the rapidly growing urban areas, as unskilled laborers, or on the sugar plantations (Linnekin 1987:18). But the corporations needed more labor; the few Hawaiians left from disease did not adapt well to the contract-work life (Beechert 1998:182). The California gold rush in 1849 brought a boom to Hawaiian agriculture, when sweet potatoes, pumpkins, oranges, coffee, and of course sugar were exported, and rice was beginning to be cultivated in the 1850s (Hawaii Department of Agriculture 1999). By this time, the great influx of foreign laborers had begun. Sugar barons brought in laborers from China, Korea, Japan, as well as Portugal, the Philippines, and Vietnam (Rayson 1994, Laudan 1996). Hawaii was becoming multiethnic.

The Kamehameha dynasty ruled until the monarchy was disposed by an American rebellion (Rayson 1994, Daws 1968, Malo 1951, Haas 1998, Cooper and Daws 1990). The last Hawaiian monarch, Queen Liliuokalani, was forced to relinquish her thrown in 1893. When Liliuokalani refused to re-write the constitution in more favorable circumstances for foreign business, several American businessmen formed the Committee for Public Safety and plotted to overthrow the monarchy, had a ship full of Marines land in Honolulu, and asked the U.S. to annex the islands (Rayson 1994:6-7). The queen acquiesced to avoid violence, hoping the U.S. would restore her authority.
However, while President Grover Cleveland refused to annex Hawaii, he believed the U.S. could not help without an armed intervention, and dropped it from the U.S. agenda. The Committee for Public Safety formed the Republic of Hawaii, which was diplomatically recognized by the U.S., England, and other countries. Tax-free exports from Hawaii to the U.S. was restored in 1894, and Hawaii became an oligarchy (Rayson 1994:10-15).

“The elite continued an oligarchy which ruled in the broadest sense. It controlled not only the formal points of the political process but labor and wealth from the islands as well.”

(Fuchs 1961:152)

However, the next U.S. President, William McKinley, revived the Manifest Destiny principle and wanted to expand the U.S.’s influence internationally, particularly in the Pacific. In 1898, the U.S. annexed the islands, forming the Territory of Hawaii. The leaders of the Republic remained in power, and could send one delegate from Hawaii to Congress, although it was a non-voting member (Rayson 1994:15-16). American businessmen now had more control than ever over the islands and its capitalist potential. The “Big Five” emerged: five companies that began as sugarcane plantations and expanded into real estate and other commerce, and held control over Hawaii politically and economically until the 1950s – Castle & Cooke, Alexander & Baldwin, C. Brewer & Co., American Factors (later Amfac), and Theo H. Davies & Co (Rayson 1994, Fuchs 1961). By the 1930s, the Big Five handled almost 90 percent of the sugar business in Hawaii (Fuchs 1961:22). Pineapple also got into the game, with the foundation of Dole Pineapple in 1901, becoming the second most important industry in Hawaii within 40 years (Rayson 1994:103).

With annexation came the U.S. Constitution, with many of the rights and
privileges of being a member of the U.S. Voting rights were extended, more funding for public projects was available. Laborers immediately organized strikes and formed labor unions; there were 20 strikes in 1900 (Rayson 1994:78-79). Working conditions improved and wages were increased. Laborers lived in plantation villages, with public libraries, schools, churches, and recreational activities (Rayson 1994:81) – giving the multiethnic workers opportunities to mingle, share ideas and customs, and create a new society for themselves.

Leaders of the Republic became members of the Republican party. The largest voting populations were still haole and Hawaiians or part-Hawaiians. In order to maintain control over the territory, Republican leaders asked Prince Jonah Kuhio, successor to Queen Liliuokalani, to be the Hawaiian delegate to Congress in 1901 (Rayson 1994:47-50). Although Kuhio was bitter about the overthrow of the monarchy, he was a “realist,” knowing with the Republicans “lay the power” (Rayson 1994:50). As a delegate, he would be able to speak of the important issues of the Hawaiian people directly to Congress. Kuhio was a delegate until his death in 1922. His greatest legacy is creating the Hawaiian Homes Commission Act in 1921, establishing a settlement program for Hawaiians (Rayson 1994:54). In the beginning, the program set aside 200,000 acres for Native Hawaiians, those with at least 50 percent Hawaiian blood, to live and farm (Rayson 1994:241). It started off very rocky – the first settlement was a “dry and almost barren” wasteland on Molokai’s south side, and by the 1930s, much of the land set aside for Hawaiians to farm was leased by pineapple corporations, defeating the purpose of the “rehabilitation” (Rayson 1994:56-58).

Meanwhile, the federal government was buying up more land for military
purposes. Pearl Harbor was dredged in 1908 (Rayson 1994:31), and the U.S. military built up installations for the Army, Air Force, Marine Corps, and the Navy throughout Hawaii. Pearl Harbor is of course remembered as the site of a Japanese bomber attack on Dec. 7, 1941, which entered the U.S. into World War II. Pearl Harbor was the base of the U.S. military’s Pacific fleet (Rayson 1994:125). Today, the U.S. military controls over 250,000 acres in Hawaii (Hawaii Department of Business, Economic Development and Tourism 2014b). After World War II, tourism begins to grow as a leisure activity in America, and developers in Hawaii begin building condos, hotels, and resorts, “even on Molokai, the wildest of the neighbor islands” (Fuchs 1961:x). By the mid-20th century, the main industries in Hawaii were sugar, tourism, and the military.

Democratic Revolution – 1954 to the 1980s

From annexation until World War II, the government in Hawaii was controlled by Republicans, supported by elite haoles and the ethnic Hawaiian vote, in collaboration with the Big Five. The most productive land was mainly owned or controlled by the Big Five or their subsidiaries, and property taxes were kept low (Cooper and Daws 1990:37, Fuchs 1961). The Democratic party was supported by the other working class ethnic groups with an island-born Asian majority. Socially, politically, and economically, the most successful group to emerge in the 20th century was the American-born Japanese (Fuchs 1961, Cooper and Daws 1990). They ran stores and restaurants in cities, went to college and law school, and founded the labor unions. The second- and third-generation children of Asian immigrant plantation laborers were coming to adulthood in the 1940s and 50s; they were educated on democratic theories taught in public school, fought with distinction in World War II, and “began to question social conditions in Hawaii” (Cooper and Daws 1990:4) In a landslide, Democrats defeated their Republican opponents in the
polls, both in the Territorial Legislature and in local government, in an event now called the Democratic Revolution of 1954 (Cooper and Daws 1990, Fuchs 1961, Rayson 1994).

Democrats promised land reform, breaking up the landholdings of the Big Five, and fairer taxation. But it was gaining statehood that fulfilled many of those promises. When Hawaii became a state in 1959, many government lands under federal control were given to the state for management (Cooper and Daws 1990:8); the Democrats rewrote policies to allow more acreage available for individuals or smaller companies, for farming, ranching, and residential use. The new leaders, however, continued the same relationship that the Republicans had between government officials and developers: “There has never been a ruling class or government group that has not drawn in strength and sought it continuing advantage from the land” (Cooper and Daws 1990:14). Real estate lawyers, speculators, developers, and landlords were the same names as those in politics (Cooper and Daws 1990:12). But, through statehood and Democratic leaderships, Hawaii now had more money for large-scale social programs for un-landed, un-wealthy majority, such as public education and public works projects (Cooper and Daws 1990:37). Democratic leaders began prioritizing urban development – for condominiums, hotels, and tourist-related expansion – sacrificing agricultural land for smaller farmers and “undercutting Hawaii’s farming potential” (Cooper and Daws 1990:86).

While the other ethnic groups were successfully fighting for equality politically and economically, Hawaiians continued to struggle in a system that still favored land ownership and control as power. The Department of Hawaiian Homelands was created in 1959 to administer the trust of lands formerly led by the Hawaiian Homes Commission, which still faces issues of water access and affordable development (Rayson 1994:241).
Since the Great Mahele, Native Hawaiians have been the lowest rung on the economic latter, a position they still struggle with in the 21st century (Trask 2000:3).

**Current Industrial Agriculture in Hawaii**

In the 1960s, after the Democratic Revolution, the new leaders’ plan to create more revenue for the state was through tourism and real estate: tourism brought visitors and their dollars, and by breaking up big estates, the government could collect more property tax revenue for social programs, such as public education (Cooper and Daws 1990:37). This was done through rezoning agricultural land to urban use, like hotels and high-rise condominiums. However, “the scattering of urban subdivisions in prime agricultural lands, not only undercutting Hawaii’s farming potential but leading to inefficiencies in providing government services to new communities” (Cooper and Daws 1990:86).

Agriculture is one of Hawaii’s top industries, a $400 million a year export business. But rather than growing foods to feed the islands’ population, an estimated 90 percent of the food sold in grocery stores and in restaurants is imported to the islands (Office of Planning, Department of Business, Economic Development & Tourism 2012, Meyer 2014). An additional problem in this reliance on imports is food security in emergencies; the state does not keep emergency supplies of food, so there is only an estimated week’s supply of food in the islands at any given time (Kent 2008:2). Nearly 80 percent of the agricultural production is “ornamental” and for export – sugar, pineapple, coffee, macadamia nuts, and flowers – rather than basic food (Kent 2008:3, Hawaii Department of Agriculture 2015:4). A 2015 state agriculture report acknowledged that consumers are interested today in locally grown products, but “Hawaii’s agricultural sector is still largely export oriented” (Hawaii Department of Agriculture 2015:4).
Non-industrial agriculture, which I will call agrarian agriculture\(^5\) here, is supported by governmental policies, but small businesses cannot compete with the energy or technological costs of exporting produce from Hawaii (Han et al. 2012:34). Of Hawaii’s four million acres of land, nearly half (n=1.9 million) is designated as ‘agriculture,’ according to the Hawaii Department of Business, Economic Development and Tourism (2014). Seed crop farms in Hawaii make up 44 percent of the agricultural product, in just 10 of Hawaii’s 7,500 farms (Loudat and Kasturi 2013). What agricultural experts say Hawaii is missing is the infrastructure to produce and transport local products to local markets. A 2010 report from the Hawaii Office of Planning, Department of Business, Economic Development & Tourism found that replacing just 10 percent of imported food would keep over $300 million in the state (Office of Planning, Department of Business, Economic Development & Tourism 2012:i).

While land is linked to power, it is also linked to health (Scheder 2006:34). Says Native Hawaiian activist Ku’umeaaloha Gomes, “we cannot isolate health from socioeconomic status and government issues. The policy arena is where change will happen. We must address land issues, access to land” (Scheder 2006:35). The industrial food system in Hawaii is a continuation of the colonization of Hawaii’s resources, sequestered in the hands of a few landowners, which has profound health implications on the entire population. Food is a necessity to life, but is also a medium for cultural expression (Lien 2004). Activist Herbert Hoe, who lives on Molokai, has said the “limited availability of Hawaiian cultural food products becomes a political issue because the availability is directly tied to the land and to water resources” (Scheder 2006:36). For

\(^5\) “Small-scale, traditional, or diversified family-style farming,” opposed to industrial agriculture (Thompson 2010:30).
example, taro: Native Hawaiians’ most important crop is no longer produced in the quantities that once sustained its large population, but more importantly to Native Hawaiians, the plant has cultural significance.

Locally-sourced food is an important indicator of health. There are economic, environmental, and nutritional benefits to eating locally produced foods, which as we have seen is dependent on the availability of the local agricultural system. The farther foods travel, the more likely their nutrients deplete (Watters 2013). Mechanical harvesting methods, improper storage, and rough transport can also reduce the quality and nutritional value. Additionally, the energy cost of greenhouse gas emissions is a burden the whole planet will suffer (Watters 2013). Local foods are also an important factor in food security; a study by Moreland (2002), found an association between physical availability of food, and people’s adherence to health authorities’ recommendations for a healthy diet.

Current Agriculture on Molokai

Molokai’s cultural history is of agricultural abundance. It has the most fishponds of all the islands; remnants of 60 have been found along the south coastline. Molokai was also called ‘aina momona, the fat land, by other islanders for its ability to cultivate (Hommon 2013:86, Han et al. 2012:1). Today, 41,854 acres are designated as agriculture and pasture land; 3,593 acres are actually used in crop production (Hawaii Department of Agriculture 2015:47). The largest landowner is Molokai Ranch, a subsidiary of a Singapore-based corporation, which owns approximately one-third of the island (n=56,743 acres) (Hawaii Department of Business, Economic Development and Tourism 2014a), many of which are former pineapple plantation lands, and its agricultural acreage now leased for coffee production, and biotech seed research such as Monsanto, which
operates on 1,850 acres on Molokai (Han et al 2012:35, Lichtenstein 2014).

Although much of Molokai is designated as agriculture land use, the majority of the farms are 1 to 5 acres (Han et al 2012:30), not a large enough operation to distribute through local stores. An average of 2 percent of locally grown or made products are sold in local grocery stores; businesses need to ensure they will get a consistent product which is difficult from smaller farms (Han el al 2012:28). In addition to industrial agriculture corporations, water is constant struggle on Molokai. The island has a single source aquifer and is a designated critical water management area, served by two water systems, the Molokai Irrigation System and the Maui County irrigation system. The Molokai Irrigation System was built in the 1950s for the island’s centralized agricultural fields, and the Hawaiian Homes Commission Act granted homesteaders first right of access, but this is not presently enforced. Molokai Ranch, among other non-homesteaders, leases use of this water for plantation and biotech industrial agriculture (Han et al. 2012:32). Many Molokai residents who farm, whether or not on a homestead lot, reported in a survey that the high cost of water made farming commercially difficult, and they felt “edged out by large corporate producers” (Han et al. 2012:34). The high operational costs of farming on Molokai – tools, fuel, supplies like fertilizer, compost, pest- and herbicides, electricity, fees and taxes to run business, and infrastructure – make it challenging to encourage local agriculture.

The nonprofit group Sust’ainble Molokai conducted an island-wide survey on food production and security in 2012, with a sample population of 3.9 percent of the adult population (n=208). The survey asked opinions about costs and availability of foods on island, and food security (Han el al. 2012:19). Here are a few results from that survey
which parallels my study:

- 94% care/think about where their food comes from
- 90% prefer to buy local food products
- 98% would eat more local food if available
- 51% participated in subsistence activity, or bought/bartered from other residents

Compared to a report from 1993, when 28 percent of Molokai families got their food from subsistence activities or traded/bartered, the Sust’ainable Molokai report recognized that subsistence activity plays an even bigger role today than it did 20 years ago, possibly due to the changes in Molokai’s employment outlook at the general global economy downturn (Han et al. 2012:20).

Subsistence activity, as defined by the U.S. Census, is activity “for the purposes of producing goods for his or her own family's use and needs. These activities include growing/gathering food, fishing, cutting crops for home use, raising livestock, making handicrafts for home use, and other productive activities not primarily for commercial purposes” (U.S. Census Bureau : Help). Anthropologically, researchers have used the term broadly, to describe survival activities, and more methodically, as a food obtaining activity and bio-cultural system (Kishigami 2008, Beals 1964: 134-36).

Molokai residents, like the rest of the state, face much higher costs at the grocery store than the rest of the U.S. According to the USDA Thrifty Food Plans, adjusted for Hawaii, the monthly cost for a family of four at the grocery store is $1,153.50, compared with $648.80 in the mainland U.S. (U.S. Department of Agriculture 2015). The Thrifty Food Plan was developed in order for a diet to meet minimum recommendations from the 1995 dietary guidelines on a modest budget or supplemented by food stamps (Jetter 2006:39). However, the Thrifty Food Plan basket prices out less nutritious foods, such as white bread rather than wheat. A healthier Thrifty Food Plan
basket would add an additional 18 percent to the average U.S. basket (Jetter 2006:43). Yet dietitians know that minor changes can have major results, such as switching from white to wheat bread (Jetter 2006:38). And in low-income neighborhoods, healthier options are sometimes not even available (Jetter 2006:42). Molokai has a weekly farmer’s market, but is not set up with the federal Supplemental Nutrition Assistance Program and therefore cannot accept food stamps (Han et al. 2012:47).

In conclusion, I argue that the colonial land tenure system from 1848 has undercut Hawaii’s internal food systems and disrupted basic food production, by taking away the land availability for agrarian agricultural and island sustainability. I find the current industrial agriculture system in Hawaii puts more value on exporting agricultural goods, rather than realizing the benefits of providing a local food market and ensuring small farms equitable access to resources and technology. Rural Hawaiian residents, like Molokai’s population, are disproportionately impacted by this industrial food system – agricultural lands are held by large corporations, producing goods for export, and small farms and grocery stores lack organizational structures and facilities to take advantage of the resources that are available to them. However, the “hidden” subsistence system strengthens families in today’s depressed economy (Han et al. 2012:41).
Chapter 5: Nutritional Intervention and Food Choice

I approach the treatment of T2D from a nutritional standpoint. However, food choice and diet are not always logical (Franchi 2012), and it is important to also understand why we eat the way we do. In this chapter, I first discuss the various reasons behind food choice, on both individual and societal levels, and how this plays into nutritional education. I am reviewing both external and internal forces behind food choice, how this can be included in educational tools. Secondly, I discuss how video education is an appropriate approach to behavioral intervention.

To maintain health – that is, to give our body the necessary amounts of energy to move, and nutrients to keep our body systems optimal – we require large quantities of macronutrients, and smaller quantities of micronutrients. Macronutrients are carbohydrates, fat, and protein; carbs and fat make up the major sources of energy, while proteins help us grow and repair tissues. Micronutrients are vitamins and minerals, which regulate body processes and help us grow and repair bones and tissues (Gibney et al 2009, European Food Information Council 1996).

It is the combination of these macro and micronutrients that determine whether a diet is ‘good’ or ‘bad’. I address this combination in the video intervention, because while carbohydrates are usually the largest form of energy we ingest, those with type 2 diabetes must be careful what kinds of carbohydrates they ingest so they do not unduly spike their blood glucose. For example, in the video, the experts urge patients to look for ‘complex’ carbohydrates rather than ‘simple’ carbohydrates. Complex carbohydrates are called such because it takes longer for the body to break down its glucose, and the body can use that glucose longer for energy; complex carbs are foods such as whole wheat, beans, lentils,
and starchy vegetables. The experts also discuss other types of carbohydrates for type 2 diabetics to watch for, including lactose in dairy and fructose in fruits. The American Diabetes Association recommends a maximum of 130 grams of carbohydrates a day for type 2 diabetics (American Diabetes Association 2008).

The term ‘healthy’ in terms of food is not easy to define, but a key component to my thesis is helping my study participants identify healthy foods. Before I define ‘healthy’ for this thesis, I first caveat by agreeing with many nutrition experts that there is a false discrepancy between healthy and unhealthy foods. According to the European Food Information Council, it is how much we eat certain foods, what our nutritional needs are, and what else we need in our diet that deem whether a food is healthy for us or not (European Food Information Council: FAQ).

Food “contain[s] energy and nutrients to help the body grow, maintain and repair itself … Because of the immense diversity in the composition of foods and the broad range of needs for balanced nutrition, no single food can supply all the essential nutrients. Therefore, one of the most fundamental principles of healthy eating is variety: the need to consume a broad range of foods on a regular basis” (European Food Information Council 1996).

The FDA defines a health food as a serving with less than 13 grams of fat, less than 4 grams of saturated fat, less than 60 milligrams of cholesterol, less than 960 milligrams of sodium, and greater than or equal to 10 percent of the daily recommended value for protein, calcium, iron, vitamins A and C, and fiber (Drewnowski 2005:723). The Washington State Department of Health defines healthy foods “usually fresh or minimally processed foods, naturally dense in nutrients, that when eaten in moderation and in combination with other foods, sustain growth, repair and maintain vital processes,
promote longevity, reduce disease, and strengthen and maintain the body and its functions” (Access to Healthy Foods Coalition 2008).

I use the term ‘healthy’ in this thesis to mean food products that meet the recommended nutrient level set by the FDA and Washington State Department of Health guidelines. These nutritional guidelines can also be applied to those without type 2 diabetes, or to the 37 percent of U.S. adults living with prediabetes, a condition of high blood glucose with high risk of developing type 2 diabetes (Center for Disease Control 2014).

Food choice

Food is more than its chemical characteristics and its nutritional composition. When choosing what foods to eat, we are influenced by our biology, culture, individual identity, and societal values (Franchi 2012:26). Food is emotional; it is what made up our childhood, it a representation of our identity. We are not always rational about our food choices. Understanding this in healthcare and health promotion means accepting food choices that nutritionally may be deemed ‘unhealthy’ or nutritionally insufficient, but are important culturally, psychologically, or emotionally. This includes accepting these food choices within disease intervention strategies.

Some of our food choice is individual, based on our emotional and cultural beliefs and histories. But of course we don’t make decisions based solely on what food is best for us nutritionally. Therefore, nutritional interventions must also include cultural understandings of the population (Mintz and Bois 2002, Cortes et al 2001). While behavior change is difficult, especially in adults (Franchi 2012:19), studies have shown that people are influenced by values close to them (Gilliland et al 1998). In Hawaii, and demonstrated on Molokai, community, family, and access to the land are important
values (Fujita et al 2004); therefore, educational tools should incorporate and reflect these values. An article by Fujita et al (2004) reviewed three weight loss programs in Hawaii, each emphasizing traditional Native Hawaiian diets. The article compared the programs in time intervals to estimate how effective the programs were in maintaining weight loss over time; the programs’ success cited incorporation of Native Hawaiian values, such as participation of the whole family and community building. The article also found that weight loss is dependent on environmental factors, and some participants faced barriers to accessing fresh, affordable produce and the need for a supportive environment that embraces healthy lifestyles (Fujita et al 2004:257).

Food systems are a part of the environment that affects choice, availability, and cost; food systems are the production, processing, distribution and consumption of foods, “from field to fork” (U.S. Department of Agriculture 2016). From an anthropological standpoint, food systems illuminate political-economic value-creation, and symbolic value-creation, such as nationality, ethnicity, class, and gender (Mintz and Bois 2002). I will be looking at the political-economic values behind food choice, as there is an unequal equation between food security and health adequacy in Hawaii (Franchi 2012:18). What foods we have access to, and what foods we want to eat are also related to social and economic stratification (Franchi 2012:20). When discussing nutrition as a potential solution to T2D management, it is necessary to include accessibility and affordability of foods in the discussion.

Accessibility and affordability of healthy foods are not always in an individual or a community’s control; this is called food security, which is an influential factor on an individual’s diet, as well as having an effect on entire populations. The Food and
Agriculture Organization of the United Nations defines food security as “when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (Kent 2008:1). Food security is not only about the needs of people in poverty, it is also concerned with malnourishment, which can effect overweight or obese persons, and can results in metabolic diseases such as heart disease, cancer, and type 2 diabetes (Kent 2008:4).

Video Education for T2D

Intervention methods must include the contextual environmental, social, economic, and cultural factors in the target population. I choose a video-based educational intervention, which is becoming a common tool in healthcare to provide prevention and management information and resources for patients (Abu Abed 2014; Tuong 2012; Albert, Buchsbalm, and Li 2007).

Visual aids, such as videos, have been found to be quite effective for modifying health behaviors. Videos can be less costly than written materials, as the videos are accessed either in clinical settings, or shared on hard copy (DVDs) or through the internet at the patient’s convenience, and the information can be viewed at the individual’s pace (Tuong 2012:218). Those with low health literacy⁶ are especially receptive to video-based education (Sobel et al 2009). Visual learning is also preferred among many patients: according to Lopez (2005:15), 75 percent of information absorbed comes visually, and if patients both see and hear the information, they are more likely to retain the information (Albert, Buchsbalm, and Li 2007; Brock 2007; Abu Abed 2014, Lopez 2008).

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⁶ “The degree to which individuals have capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions” (Nutbeam 2008:2073).
According to the American Dietetic Association, Americans get the majority of their nutrition, health, and dieting information from media sources, such as TV and magazines, over their friends and family. But mainstream media presents confusing, sometimes conflicting health messages, and Internet searches can fall short (American Dietetic Association 2005, Patterson et al. 2001, Wilson 2007). Health communication campaigns should come from expert sources and targeted toward specific populations and/or health issues (Snyder 2007:S38).

Education is an important precursor to understanding and following through with self-care behaviors (Fleming 1995; Albert, Buchsbalm, and Li 2007; Wilson 2007; Dyson 2010; Kaholokula et al. 2008). An educational intervention can provide resources to the target community, allowing the population to develop knowledge and skills, or an intervention could address social or environmental changes to support structures in the community, maximizing the efficiency of available resources. (Kline 2015:153).

There are numerous studies that have used lifestyle videos as a way to inform general health promotion, specific diseases, and prevention resources (Gagliano 1988, Fleming 1995, Brock 2007, Kaholokula et al. 2008, Glasgow et al. 2009, Sobel 2009, Dyson 2010, Frank 2015, Fitzner 2013, Berry 2012, Segal 2013, among them; for review of literature, see Tuong 2012 and Abu Abed 2014), and many of these employ culturally-specific messages. Fleming (1995) used a knowledge and behavior survey to evaluate educational videos targeted to a multiethnic community. European, Maori, and Pacific Islander subjects (n= 292) viewed ethnically-tailored diabetes education videos, and evaluated the videos using scale ratings and open-ended questions. The video was rated highly by all audiences and most subjects were able to repeat the main messages of the
video. Ahmad (2014) utilized the Health Belief Model to assess existing diabetes education programs in Malaysia, to develop a culturally-appropriate education model. Nagata (2013) evaluated a Tz’utujil-language diabetes education video for Guatemala Maya. Before watching the video, 25 percent of the respondent didn’t now what diabetes was. After the video, more respondents were able to describe diabetes as a disease related to blood sugar.

In these studies, the more the video is specified toward both the audience and the audience’s health issue, the more effective the video on biological and behavioral changes. There are numerous studies that focus specifically on T2D management through video intervention and education. Tuong (2012) and Abu Abed (2014) conducted reviews video intervention for patient education, and found the majority of the studies either used a single video as the sole educational tool, or compared an audience-tailored video to care-as-usual. Video duration ranged from 5 minutes to 4 hours, averaging 36 minutes. (Abu Abed 2014), and many of the diabetes-focused videos did not specify video design and published insufficient statistical analysis. All the diabetes studies reviewed measured improved glycemic control assessed by HbA1c levels, and subjects were tested pre- and post-intervention using a variety of knowledge and behavior surveys (Tuong 2012).

I will discuss my methodology for producing the video — which translates nutritional and physical activity information, presented by four local professionals and without unfamiliar medical jargon, into the video format — in the next chapter.
Chapter 6: Research Methodology
In this pilot study, I tested a health intervention video for type 2 diabetics on the island of Molokai, to demonstrate that culturally-modified educational videos, in addition to basic care, are an effective way to improve physiological health, increase nutritional knowledge, and sustain healthy lifestyles. I argue locally- and culturally-tailored videos are more effective at information retention than generalized diabetes educational videos or treatment-as-usual. The study design is a mixed-methods case study; I recorded quantitative data through two different surveys, and qualitative data from conversations with participants in exit interviews.

Five adults were recruited from the Molokai Community Health Center patient list and from cluster sampling in the community, to participate in a 4-month pilot study. The intervention group (n=2) watched an 11-minute video on nutritional and physical activity advice from local experts, and the control group (n=3) did not watch the video. Both groups were given pre- and post-intervention Knowledge, Attitude, and Behavior (KAB) (Appendix A) surveys and Food Frequency Questionnaires (FFQ) (Appendix B), and applicable health information was catalogued from their medical history.

Methodological theory

Case study
A case study is a research strategy to gain an “in-depth account of events, relationships, experiences, or processes” (Denscombe 2007:35), and the research aim is to record a “deep understanding” of the participants’ explanations and interpretations of whatever research question is being framed (Woodside 2010:6). In a small pilot project such as this, a randomized trial alone cannot tell why an intervention was or was not successful, but can assess the impact of the program in a holistic way, as framed by the
researcher (Bradley et al 1999, Denscombe 2007). Case studies are also useful methods for health research, because in small-scale research, “the boundary between a phenomenon and its context is not clear” (Yin 1999:1211). The phenomenon in this case being type 2 diabetes, and the context is the prevention or non-insulin management of the disease. By using multiple methods to record my data, I “triangulated” my qualitative and quantitative analysis methods to “converge…a true picture” of the answer to a research question (Gillham 2010:13). In this case, I searched for a cross-section of the population on Molokai with T2D in terms of age, ethnicity, and socio-economic status, seeking interrelated themes on their diet and exercise habits, opinions, and beliefs.

Grounded theory
Grounded theory is an approach that generates the ideas or even hypothesis as the research progresses, rather than testing an already designated theory (Denscombe 2007: 89). Like case study framework, grounded theory can form how categories relate to each other in one hypothesis (Denscombe 2007:98). In this pilot study, I draw together social concepts of ethnic identity, political and economic concepts of power and agricultural availability, and epidemiologic concepts of type 2 diabetes prevalence, into one idea: because many factors influence the impact of type 2 diabetes on Molokai, any intervention must be holistic in its approach to assist Molokai residents in prevention and management of this disease. Which led me to create an intervention tool that can be self-directed by the patient, as well as a teaching tool by health care professionals.

I frame this pilot study in grounded theory by tailoring the intervention tool from the Molokai community’s history, culture, socio-economic position, and rural lifestyle. As said by sociologists Corbin and Strauss (1990:5), “a grounded theory should explain as well as describe.”
Description of study population

I began my research process with my research contact, Dr. Christina Economos, Medical Director of the Molokai Community Health Center (MCHC). MCHC is a nonprofit health clinic that serves over 50 percent of the island (Molokai Community Health Center 2011). When I asked Dr. Economos what kind of research activities the clinic needed, she said they were interested in the major chronic diseases: diabetes, hypertension and obesity, “that all could benefit from practical dietary programs” (Economos 2014). Together, we brainstormed a research project that could have an applied use at the end.

My recruitment criteria was for type 2 diabetes patients, over the age of 18, of any ethnicity and gender, and who consented to participate in the study. I chose to keep the criteria broad to encompass the broad swath of community members on Molokai. As stated in earlier chapters, Molokai has a multiethnic population that fosters the Local cultural identity, and a community-wide lack of accessibility or affordability of nutritious foods. I later expanded outside the MCHC patient list using cluster sampling methods, described under Data Collection.

Design of study

I obtained IRB approval from the Western Washington University Human Subjects Review Committee on March 8, 2015. I completed the National Institutes of Health online training in “Protecting Human Research Participants” in April 2014, and Privacy, Security, and HIPAA training from MCHC in March 2015. The participants were randomly split into two groups, an intervention (n=2) and a control group (n=3), and I used the Two-Group Pretest-Posttest design (Bernard 2011:89) (Table 3).
I assigned each participant a number to secure their anonymity during data reporting and analysis. Of the five participants, four were MCHC patients, and the fifth was a patient with a private physician. I contacted the private physician and gained consent to work with the patient (who had already signed their own consent form) and to obtain information from their medical records. From the patient’s healthcare providers, I requested and received age, height, weight, average blood glucose level (HbA1c test), ethnicity, type of insurance, and marital status. I also requested income status, but was unable to obtain comparable answers. All patients receive basic care from their healthcare provider, including acute care, preventative care and annual physical exams, chronic disease visits, and women’s health (if applicable).

All participants completed two sets of surveys. The first surveys were given and completed in June or July 2015. The pre-intervention, or baseline Food Frequency Questionnaire (FFQ) recorded dietary habits from the previous six months. The baseline Knowledge, Attitude, and Behavior (KAB) survey recorded knowledge of nutrition and T2D, attitudes toward nutrition and T2D, and health behaviors.

<table>
<thead>
<tr>
<th>Group</th>
<th>Assignment</th>
<th>Pre-video</th>
<th>Intervention</th>
<th>Post-video</th>
<th>3 months after</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Random</td>
<td>FFQ₁, KAB₁, A₁c₁</td>
<td>X</td>
<td>FFQ₂, KAB₂</td>
<td>A₁c₂, Exit Interview</td>
</tr>
<tr>
<td>Control</td>
<td>Random</td>
<td>FFQ₁, KAB₁, A₁c₁</td>
<td>FFQ₂, KAB₂</td>
<td>A₁c₂, Exit Interview</td>
<td></td>
</tr>
</tbody>
</table>

From Bernard 2011
Then, the intervention group was given three options as to how to watch the video: (1) a DVD that I mailed to them, (2) a link to stream the video online, or (3) watch the DVD in a private room at MCHC, with a computer provided by the clinic. The intervention group was given a week timeline to watch the video, and all responded to my check-in calls. One chose to watch the video online, the other chose to watch the DVD at the health center; both watched the video in August 2015.

The post-intervention surveys were given to all the participants and completed in September 2015. After the study was completed, October 5, 2015, the control group was given access to the video, also offered their choice of an online link to the video or a DVD copy.

I gave all participants a $10 gift certificate to the local drug store, Molokai Drugs, and all five were entered in raffle to win a personal blender system, as a thanks for participating.
Data Collection

Figure 2: An organizational flowchart of my data collection and timeline

I took four trips to my field site, the island of Molokai in Hawaii, to collect the majority of my data. As seen in Figure 2, I developed the idea during meetings with MCHC and other consultants in Sept. 2014, spent the next five months researching the project, filmed the video in March 2015, recruited participants in April-June 2015, coordinated the surveys from June-August 2015, and completed the participants’ part by November 2015. I processed and analyzed my data through the winter into 2016.

I first identified 80 patients from MCHC with type 2 diabetes. Of those 80, I decided to narrow down to those with a high HbA1c, 8 percent or higher, because studies have shown that those with a high blood glucose are not skillfully managing their
diabetes (Pretorius et al 2015:12): this gave me 30 patient names. Using a direct mail campaign with a letter of introduction and consent form (Appendices C and D), I reached one participant, in April 2015. I then switched strategies, and used cluster sampling (Denscombe 2007:16) to recruit in the wider community by tabling outside of Molokai Drugs Inc., the only drugstore on the island. I also marketed my study with flyers (Appendix E) posted in and outside the drugstore, in MCHC waiting rooms, at Liberty Dialysis Molokai (a dialysis clinic), on Facebook, and in an article for the local newspaper, The Molokai Dispatch.

I met seven participants tabling outside the drugstore, Molokai Drugs, in June 2015. I had signs and flyers to inform passersby of my study’s subject matter, and when someone stopped for more information, I would inform them I was looking for people with type 2 diabetes. If they continued to show interest and fill out paperwork, I would then ask if they had been diagnosed with type 2 diabetes. The last participant, for a total of nine, responded to my newspaper article, and by happenstance, I met him in Bellingham in July 2015, where he was visiting his children. I randomly assigned the nine to either the control or the intervention group. Six returned the first surveys, and I began preparing for the intervention group to watch the video. I was unable to contact one participant at this time, and continued on with five participants: two intervention participants and three control participants.

In July 2015, I became aware that not all of my participants have type 2 diabetes. This knowledge caused me to adjust from a self-management approach of a diagnosed disease, to a prevention and intervention strategy for at-risk population. It is widely reported that non-white Hawaiian residents face higher rates of non-communicable
diseases than the white population (Gilliland et al 1998, Kim et al 2008, King et al 2012, Maskarinec et al 2012, Palmer 2015). I contend that my intervention tool is still a relevant and appropriate instrument for the prevention of type 2 diabetes as well as the management of the disease. My main focus was to increase nutritional knowledge as relates it to specific type 2 diabetes dietary considerations, which is still achievable with my intervention tool and participant population.

Instrumentation

Educational Video
To begin, I worked with three consultants on the video-making process, who provided advice on video production: WWU Anthropology lecturer and documentary filmmaker, Lisa Spicer; Molokai documentary filmmaker Matt Yamashita; and Nathaniel Buechler and Nathan Whitehouse, producers at Honey Toad Studio, based on Bainbridge Island, WA.

Using the information gained from the consultants, I produced a semi-structured script in the “practice presentation” video format, where real people, rather than actors, are filmed while engaged in a specific practice (Abu Abed 2014). The video’s format was based on the National Diabetes Education Program’s “Healthy Eating with Diabetes” video (National Diabetes Education Program 2014). Their video is 4 minutes 38 seconds, and features a dietitian speaking about ways to eat healthy, with an unidentified woman shown practicing positive health behaviors, such as buying apples, looking at food labels with the dietitian, and reviewing a plate with healthy foods. This video presents a good amount of basic information to strengthen the patients’ health literacy, as well as a psychological positive message that diabetes doesn’t require a special diet, just a modified one. In order to tailor the video to a multicultural population on Molokai, I
featured local foods, used Hawaiian background music, and featured local, more familiar people to present the information. I was also influenced by the video’s example of bullet points for carbohydrate and sugar examination, and encouraging diabetic patients that no special diet is needed nor any specific foods need to be avoided.

On Molokai, I worked with five consultants for the content of the video. I reached out to healthcare workers and community stakeholders known to me, including my research contact Dr. Christina Economos, and employed snowball sampling to find other potential video participants (Bernard 2011:144). For the video content, I worked with Dr. Economos; Ty McCombs, nurse practitioner at MCHC; Elias Vendiola, manager of Na Pu’uawai Fitness Center; Herbert Hoe, Native Hawaiian nutrition expert; and Harmonee Williams, director of Sust’ainable Molokai.

In semi-structured interviews, each consultant provided information and discussion on best practices for type 2 diabetes patients on the island. Using grounded theory (Glaser and Strauss 1967, Mullen and Reynolds 1979, Denscombe 2007), the consultants provided guidance for local exercise activity options, nutritional information, local food accessibility and affordability, and relevant cultural knowledge. This information was also used in the Knowledge, Attitude, and Behavior survey, the Food Frequency Questionnaire, and the script for the tailored video, produced by me.

For the video, four of my consultants (Economos, McCombs, Kapono Rawlins-Crivello, and Hoe) appeared on-camera to discuss their specific level of advice: positive health behaviors, nutritional information specific to type 2 diabetes diet, encouragement of physical activity, and available resources for Molokai residents. Additional footage, called “b-roll shots” for background or supplementary footage, was added around the
experts’ speaking, and included video of local exercise classes (Figure 3), and a local family shopping (Figure 4) and eating a healthy meal. My video is 11 minutes 16 seconds long (Figure 5).

**Figure 3:** A group of women practice hula in a fitness class on Molokai. Photo by the author.

![Figure 3](image1)

**Figure 4:** A family shops for produce at a local farm on Molokai. Photo by the author.

![Figure 4](image2)
As of June 2016, the video is not yet available on MCHC’s website but is planned in the future (www.molokaichc.org).

Knowledge, Attitude, and Behavior survey

To investigate perceptions, opinions, and knowledge of nutrition and type 2 diabetes with a sample of Molokai’s population, I used a Knowledge, Attitude, and Behavior (KAB) survey. The assessment of diabetes knowledge is important for health promotion and intervention, as it measures how well individuals and groups understand diabetes (Fleming 1995, Kaholokula et al 2008, Sobel 2009, Dyson 2010).

I based my KAB survey on the model utilized in Schrader and Lawless’s (2004) study, and modified questions from the National Diabetes Education Program (2009) Survey of the Public’s Knowledge, Attitudes, and Practices Related to Diabetes. I then modified further and added questions relevant to Molokai’s population and lifestyle, in consultation with Harmonee Williams, Herbert Hoe, and literature research (Bauer and Sokolik 2002, Mahan and Escott-Stump 2008, American Diabetes Association 2008,
Gibney et al 2009, Harvard School of Public Health 2015). I ended up with 88 final questions, divided into four sections: type 2 diabetes, lifestyle, nutrition, and other health. For indexing purposes, the questions are also divided into four types: behavior, opinion, personal facts/demographic, and actual factual questions about nutrition and proper health behavior.

My goal of this survey was to answer the following questions: 1) What do Molokai residents know about T2D, 2) What do Molokai residents know about healthy nutrition and activity levels, 3) How do Molokai residents acquire nutritional food, and 4) What information is important to them to make behavioral dietary and activity changes to improve their health?

Shen and Han’s (2014) meta-analysis of entertainment education on health communication found KAB surveys were significant in health outcomes. Fitzner (2013) found that telehealth is an appropriate health communication tool because of its accessibility, efficiency, and affordability for patients’ self-management. Many studies also found that health information coming from the patient’s healthcare center or provider was effective, provided the health center was consistent in the manner of communication (Berry 2012, Segal 2013). A meta-study by Chaudhary (2007) found that nutrition interventions aimed at low-income audiences should be interactive, culturally appropriate, and administered in health centers.

Food Frequency Questionnaire

For the food frequency questionnaire (FFQ), I used a modified version of FFQ samples from the Fred Hutchinson Cancer Research Center (Fred Hutch) and the National Cancer Institute (National Cancer Institute 2013). The FFQ is an ancillary survey tool in my study; I attempted to compare behavioral responses between the KAB
and FFQ surveys to see if their content matched or complemented. Using an FFQ enhances my study because, as Riley (1995) notes, this method is an important tool to assess the diet for individuals that are advised to follow a specific dietary regime, as recommended for those with type 2 diabetes.

I also modified by FFQ using a method by Sarmento (2013), who assessed commonly consumed foods by clustering foods into eight groups, documenting the frequency of intake, assessing the contribution of each food item to total energy and nutrient intakes, and portion sizes. My FFQ documents frequency of intake with examples of USDA-standard portion sizes (U.S. Department of Agriculture 2014). I used the Hawai‘i Foods website, developed by the Cancer Center and College of Tropical Agriculture and Human Resources at the University of Hawaii Manoa, to research popular foods frequently eaten in Hawaii. The website also provided nutritional information on its documented food (Hawai‘i Foods 2007). “Because the foods eaten in Hawai‘i reflect the cultural range of its people, this website contains nutrient information on foods typically found in Western, Asian, Pacific Islander, and other ‘Local diets’” (Hawaii Foods 2007:About Us).

**Interviews**
I spoke with all my participants several times over the 4-month study period, some in person during my fieldwork trips (March, June, and September 2015), and all over the phone. I checked in when I gave them the surveys, offering help if they had questions, and with the intervention group after they were given the video. When all participants turned in their final KAB and FFQ surveys, I conducted semi-structured exit interviews (Appendix F) with them over the phone, with two goals: to clarify answers from the surveys, and ask additional questions about the participant’s cultural views on
food, health, and family and personal history not covered in the KAB survey. I found that personal contact was a better way to communicate with my participants, as I was able to get answers they had left blank on the surveys through the interview format.

The exit interviews provided invaluable information on topics to in-depth to be sufficiently covered in a survey format. I discuss these findings in the Discussions chapter.

Analysis

I am analyzing my data in two ways: quantitatively comparing answers from the KAB and FFQ surveys; and qualitatively coding the answers to the exit interview, as well as drawing connections between interview answers and survey answers. From the KAB survey, there are 51 questions that I am looking at to note any changes between pre- and post-intervention surveys, for both the intervention and control groups. The FFQ survey contains a list of food, broken into familiar categories (bread group, meat group, diary group), in which the participants’ selected foods they eat, with what frequency, and in what portion sizes. There are 41 food items I am looking to note any changes in either frequency of eating or portion sizes, between pre- and post-intervention surveys, for both the intervention and control groups.

I did not anticipate much significant difference in the control group’s pre and post survey answers.

Midway through the study, I decided to add an exit interview with each participant, to better inform my case study profiles. I produced an interview guide (Bernard 2011:158) with 14 questions, in order to have comparable data, but conducted semi-structured interviews, allowing the participants to share their ideas and lead me in new directions.
Without a large study population, I processed my data using descriptive analysis – using Excel to index the survey answers and MaxQDA to code answers from the exit interview – but my own interpretations and summaries to realize patterns and significant results among the five participants.

Surveys
I have divided the KAB survey questions into Opinion, Personal Fact, Behavior, and Fact categorical codes (Table 2), and identified 51 questions that represent probable changes between the pre- and post-intervention surveys due to the educational video. These 51 questions either have a designated right or wrong option based on Fact, or a change in Opinion or Behavior, to see if the video increased the participants’ knowledge of healthy ways of eating, exercising, and other positive behaviors for preventing type 2 diabetes or maintaining a low blood glucose level through healthy living, not just insulin.
Table 2: Knowledge, Attitude, and Behavior survey question codes

<table>
<thead>
<tr>
<th>Categories</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opinion</td>
<td>Asks for participant’s personal beliefs and attitudes</td>
<td>Do you think you can reduce your diabetes symptoms or dependence on insulin?</td>
</tr>
<tr>
<td>Behavior</td>
<td>Asks about the participant’s health behaviors</td>
<td>Have you ever received diabetes education, such as taken a class or met with a diabetes educator?</td>
</tr>
<tr>
<td>Personal Fact</td>
<td>Asks truths about the participant’s health behavior, and demographic information</td>
<td>Have you ever heard of the term glycosylated hemoglobin or hemoglobin A1c?</td>
</tr>
<tr>
<td>Fact</td>
<td>Asks the participant if they know certain facts about type 2 diabetes or nutrition</td>
<td>How many servings of vegetables do you need a day?</td>
</tr>
</tbody>
</table>

To analyze the FFQ, I compared the intervention group’s answers between the first and second surveys, and compared the intervention and control groups’ answers from the second survey. I am looking at 41 foods, many of which highly contribute to glucose levels: sugars and carbohydrates, particularly complex versus simple carbohydrates. The video’s content discussed the difference between complex and simple carbohydrates, what foods are high in glucose, fructose, and lactose, and specific advice on what foods those with type 2 diabetes or who are at-risk should be aware of. I anticipated items I have designated as ‘nutritious’ will be checked more in the second survey by the intervention group.
Interviews
I called my participants in November 2015 and conducted semi-structured exit interviews. I had 14 total questions, but some questions were specific to a participant’s survey response, and so those questions were structured more personally. The questions were open ended, but some were follow-ups to specific KAB questions with unclear or interesting responses, and the rest were questions about the participants’ opinions and beliefs that required a more in-depth response. For example, I asked if ethnic, cultural or religious traditions factor into their health and wellness routine, and heard a variety of stories and responses.

I have experience in interviewing, both structured and unstructured, as a newspaper reporter, and used those skills in my exit interviews. I also know the benefits of probing during an interview, to guide the participant in giving more information and thinking about the question even more in depth. Most of the exit interviews went well, where the participants were free with their responses.

I then reviewed the interviews individually and as a whole to index the answers into a code system. I used Max QDA coding software to upload the interviews as text documents, and parse out phrases and words into codes.

After reviewing the codes in Max QDA, I categorized them according to the KAB survey categories (Opinion, Behavior, Personal Fact, Fact) to cross-examine the participants’ answers. I then analyzed all the codes to see the patterns and relationships emerge. This will be discussed in the next chapter.
Chapter 7: Results and Discussion

In this chapter, I present and discuss my findings. First, I present my participant data in the form of five case studies, which draws from survey responses and exit interviews. Next, I interpret my findings by discussing patterns that triangulate from the KAB, FFQ, exit interviews, and statistical data. Lastly, I will summarize my findings by establishing possible connections between type 2 diabetes, and the availability and affordability of healthy foods in Hawaii.

Subject characteristics

My results are case study results. This is due to the limitations of working with a small, localized community. At the outset of my research design, the goal of testing a sample large enough for statistical analysis appeared reasonable. However, several conditions limited the pool from which I intended to draw. It is likely that some potential participants failed to respond to my study due to 1) the stigma surrounding type 2 diabetes, 2) the ambivalence of participating in a study, and 3) ignorance of the health implications of being diagnosed with type 2 diabetes.

My participant group is made up of 3 men and 2 women, of various ethnicities, and different levels of health. As seen in Table 3, the participant demographic are older, with an average age of 61, and a standard deviation of 16.87 years. Two out of five have diagnosed T2D.
Here, I will address the most significant findings per person, followed by a summary of findings from comparable answers of all participants. I have given my participants’ pseudonyms, to make their stories more personable but protect their privacy.

Case Studies

Case Study No. 1: Malia

I met Malia while tabling outside the local drugstore, Molokai Drugs. She and her daughter, participant Lelani, stopped at my table to ask questions. Malia has a short bob of dark hair streaked with some grey, and an easy smile. I explained that I was a graduate student working with the Molokai Community Health Center, and was looking for people with type 2 diabetes to watch a video and fill out a few surveys; in return, they would be entered in my raffle to win a personal blender system. While Malia does not have type 2 diabetes, she and Lelani were concerned about their risk and signed up to participate. Malia is married, and her husband has T2D.

Malia does not have a clear idea of what causes type 2 diabetes. From her surveys and the exit interview, she considers family history to be the biggest factor. She believes it “runs in the family,” and that she and her children are at risk because of family history; her mother, her husband, and members of his family are either diagnosed or have pre-
diabetes. She said she talks to her children about living a healthy lifestyle, and being careful about what they eat. That her husband has T2D concerns her for her children’s sake. “I’m only assuming, because its like, high blood pressure; if your parents have it, the chances of having diabetes...its hereditary,” she said in the exit interview.

She uses subsistence methods for some of her food sources. She selected hunting, fishing, and home gardening, while also shopping at grocery stores and accessing foods from neighbors, friends or family members. She said she’d like to have more seafood, because it is too expensive to buy through the stores and Molokai no longer has a fish co-op. “Sometimes I see vendors, and buy from them too, but its not as available as it used to be,” she said in the exit interview. Other than seafood, she did not find cost to be a deterrent to buying healthy food. She said living on Molokai has made for healthier living. Because there aren’t fast food places or many restaurants, she said she prepares food more, which she associated with eating healthier and less stress.

Malia identified with many positive health behaviors, according to the KAB survey: she eats slowly and pays attention to when she feels full, she doesn’t eat when she is not hungry (out of boredom), and exercises for at least 30 minutes three to four times a week; she cited walking as her exercise. She understands well the role of diet in blood glucose control, exercise in diabetes care, and how to use blood glucose monitoring. She believes diabetics can still have sugar and other high-glucose foods in their diet, and insulin is not the only way to treat diabetes. She previously has had diabetes education, through another healthcare center, a private physician, and a private nutritionist/dietitian. However, she could not accurately answer many of the survey questions about nutrition.
In her FFQ, Malia showed positive health behaviors by selecting beneficial foods and portion sizes. She eats poi on a regular basis, two to three times a month, which is a complex carbohydrate; she also selected that she eats wheat or multigrain bread on a regular basis. She regularly eats yams or sweet potatoes, and decreased how much she eats white potatoes in the second survey. She also decreased how many times she eats potato or macaroni salad, in the second survey. She checked poultry the most for her protein, but also eats beef, kalua pork, Spam, canned tuna, and tofu. She only selected her vegetables as eaten once a week: lettuce, kale, tomatoes, carrots, broccoli, cauliflower, green beans, and peas. On the unfavorable side, she was the participant that selected eating the most dessert food with the most frequency, and regularly drinks cola.

Case Study No. 1 Analysis

Malia strongly identifies with using traditional medicine. She said she uses essential oils for earaches, colds, and the flu on her family, and her husband uses la’au lapa’au, or plant medicine (Scheder 2005:36), for his back. She told me of other remedies from when she was younger, such as guava for diarrhea and prunes for constipation. She said she “listens to her ancestors.” When her kids were younger, she would also use a traditional kahuna, a specialized practitioner in Hawaiian culture. When asked to expand, she hesitated, and told me one can only use a kahuna if you know them, and they know you. There seemed to be a clear cultural element to the introduction; as I am not Hawaiian or raised in Hawaii, she was uncomfortable giving me information that may identify her kahuna. She also said she’s learned many things from interacting with

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7 Traditional medicine refers to “knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures” (WHO 2000).
other ethnic groups, but didn’t really recognize her ways of treating ailments as cultural or traditional “unless I thought about it.”

“In Hawaii, everyone shares their secrets [and] ways. Chinese, Japanese, Tongan – everyone has their own ways of addressing health problems…because we’re multicultural, you hear about these things.”

She said she goes to the doctor for serious issues, but “sometimes feels like [doctors] don’t know what they’re doing.” She said when her family gets sick, with the flu or colds, she treats them herself; she does not have a strong trust in Western doctors.

**Case Study No. 2: Lelani**

Lelani is Malia’s daughter; she lives on a homestead lot with livestock and a number of dogs, with her husband. She looks much like her mother, with medium-length dark hair. She is 29, born and raised on Molokai, and self-identifies as Hawaiian-Chinese.

I met her with her mother while tabling outside the local drugstore; she also does not have type 2 diabetes, but was concerned about her risk of developing the disease.

Lelani does not have a clear idea as to the causes of T2D. Lelani was in the intervention group, but her survey answers about the causes of T2D remained the same after she watched the video, including family history, being overweight, poor dietary habits, race/ethnicity, lack of physical activity, having high blood sugar, and being hypoglycemic.

Lelani uses subsistence methods for some of her food sources, including fishing, hunting, farming, and gathering to supplement, as well as grocery stores, and getting from neighbors, friends or family. She checked in her survey that financial burden does affect what she buys. “I like eating fish, but I cant get it all the time. Sometimes I go [fish] myself, but if busy, people [will] drop off food,” she said in the exit interview.
She doesn’t identify with using traditional medicine, except for her mother’s essential oils (participant Malia). She will use alternative remedies for colds (hot tea and lemon) and cuts (Hawaiian salt), and she said she won’t take Western medicine if she doesn’t want to. She also seemed to have reluctance toward Western medicine.

She has good food habits and behavior: she selected in the surveys that she normally eats slowly, stops when full, doesn’t eat when not hungry, and measures out her food portions. However, despite having taken a class on weight management at Na Pu’uwai (a Native Hawaiian healthcare center), she was not able to correctly answer the survey questions on nutrition. She said the video was a refresher. “Weight management, what we should eat, what we shouldn’t… the plate method, I remembered learning about those. Its good to get a refresher, sometimes I don’t make the right choices with what I eat,” she said in the exit interview. She tries to watch what she eats, including “lots of vegetables.”

In her FFQ, I wanted to see changes between the pre- and post-intervention surveys, and I believe Lelani identified some positive changes to her diet from what she learned from the video. She eats poi on a regular basis, two to three times a month. She selected eating wheat or multigrain bread on a regular basis. She also reduced how often she ate potato or macaroni salads in the second survey. She increased how often she eats brown rice, regularly eats yams or sweet potatoes, and decreased how often she eats white potatoes – all good signs to switching from simple to complex carbohydrates. She decreased how often she eats bananas, mango, and oranges, which are high in natural sugars and can spike blood sugar. For protein, she checked that she eats venison, poultry,
and dark fish the most. On the unfavorable side, she regularly eats potato chips at more than the recommended serving size, and continues to regularly drink cola.

She also told me that when she went in for her A1c test, she was told she was not at risk for diabetes, something she was concerned about because she is planning for a child, and “knows they don’t recommend [pregnancy] if the number is high,” meaning the HbA1c percentage number.

She said the video influenced her to exercise more. “I’m eating a lot healthier, exercising more. Me and my husband started running. I actually paddle [canoe]. With a friend, she doesn’t exercise, I started with her, a hula class, I figured I’d be there for her,” she said in her exit interview. She selected on the survey a number of activities for exercising, both before and after the intervention, and selected that she exercises 30 minutes to an hour, three to four days a week.

She was in the intervention group, and in the second survey selected she found the video helpful, entertaining, relatable, and it did influence her to change her dietary and activity habits. In the exit interview, she said the video was a sort of refresher from what she learned in a class six months prior.

*Case Study No. 2 Analysis*

Lelani was the only participant to note a change in the community in attitudes toward healthier eating. She said she has a healthier diet on Molokai than when she goes to other islands. “Off island,” there are restaurants and “unhealthy” things to eat.

“There are unhealthy foods here too, but more emphasis on eating healthier here, in the community. I noticed a lot more people in the community promoting more exercising and eating healthy. I remember when I was younger; it wasn’t as big as it is now.”
She said her parents taught her to eat well, but she’s noticing a change at the community level, “a group of people trying to change their health habits.”

Case Study No. 3: Jay

Jay is a 75-year-old, stocky Filipino man living on Molokai; he grew up in Manila, Philippines, and moved to Oahu in 1984, then to Molokai a few years later. He is married with children. I met him while tabling outside the local drugstore. He speaks English, but has a thick accent (Tagalog) and seemed a little hard of hearing, but he stopped by my table and was interested in the study. Jay does not have type 2 diabetes, so some information was lost in translation, but he continued to work with me during the study. There was a slight language barrier in our communications, and it was difficult to get him to expand his answers during the exit interview.

Jay partakes in subsistence activities to supplement his diet, including fishing, farming (home gardening), and gathering, in addition to the grocery store. He would like more access to foods at the farmers market, and through trading or bartering. He said financial burden sometimes affects his food sources, such as meats and protein.

Jay said he used traditional medicines growing up, because no doctor was available where he lived; he used leaves and herbs for remedies. Now, he hardly uses those remedies, but uses Western medicine because its available; “but still, if can avoid [it] won’t use [it].”

He said living on Molokai, with fresh air, no pollution, clean water, helps him live a healthier lifestyle. He gets to eat fresh vegetables and fish when he wants.

Jay did not select many positive health behaviors in the surveys. He said he doesn’t pay attention to when he’s eating and often is too full, eats when not hungry, and
doesn’t measure food portions. He did not have many correct answers to nutrition questions.

Jay believes many factors contribute to type 2 diabetes, including family history, being overweight, age, poor dietary habits, lack of physical activity, high blood pressure, high blood sugar, and high cholesterol.

Jay walks as his exercise, and selected he is active for 30 minutes five to seven days a week.

Case Study No. 3 Analysis

Jay did not complete either FFQ surveys. When we first met, I went over both surveys and explained how to fill them out: check how many times a month or week he eats a certain food, and then look at the portion sizes and select the best serving size for that food item. However, in neither survey were food items checked, but occasionally the portion sizes were checked. Over the phone, I went over the survey a second time before I gave him the post-intervention copy, but he did not correctly fill out the second FFQ. Language barriers are a potential limitation for further research, and I believe the researcher should be present when participants fill out these kinds of empirical survey tools, if there is a possibility of low literacy or comprehension of the survey.

Case Study No. 4: Micah

Micah is a 71-year-old, Hawaiian man who lives on Molokai; he grew up on Oahu and moved to Molokai in 1980 after his divorce. Micah was the most talkative participant, but at first was very concerned for being contacted. Although he had been diagnosed previously and been using insulin, he contacted me after receiving my introductory letter in April 2015, telling me he did not have diabetes. I apologized and
after talking with him more over the phone, realized he was frustrated with his doctors and the medical insurance system, but was aware he was being treated for diabetes. I also checked in with my research contact at MCHC, who was his doctor and assured me they discussed his condition.

We continued to have long conversations any time we spoke, on the phone or meeting in person; he seemed to need someone to listen to his grievances. He walks with a cane, but is quite independent; he lives at his own home, using public transportation to get around.

Micah partakes in subsistence activities to supplement his food, including fishing, hunting, farming, gathering, and raising livestock, in addition to grocery stores and neighbors, friends or family. He selected that he would like more access to trade and bartering, and variety at the farmers market. He said financial burden prevents him from some foods, including meats, vegetables, fruits, bread, and snacks. In the exit interview, he told me that ingredients for a soup recipe used to cost $10, now cost him $50. He fishes for his fish, “so I don’t have to pay the ridiculous price at the store.”

He said Molokai’s open space helps his health. He selected positive health behaviors on the survey: doesn’t overeat and pays attention to when he’s full, he doesn’t eat when not hungry, and measures out his food portions. He tries to eat moderately at lunch, and dinner time

“eat[s] a pretty good meal and [it] puts me to sleep. I’m not the type to sit down and stuff the food down my throat anymore. I think what I am chewing. My diet is a lot better than what it used to be.”

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8 As defined in Chapter 4, subsistence activity is producing food goods for a family’s use and needs.
He said he received some diabetes education from his insurance company, Kaiser, but wasn’t able to answer the nutrition questions correctly. In the exit interview, he mentioned eating fruits and vegetables to lessen his diabetic symptoms.

He did not complete the first FFQ survey, and did not fully complete the second, so I was not able to compare any changes. He eats poi on a regular basis, and wheat or multigrain bread. He eats Spam two to four times a week, and regularly drinks orange juice and diet cola. He checked that he has lettuce, kale, tomatoes, carrots, and peppers once a day, which correlates to his exit interview where he said he tries to eat more vegetables and keep his blood sugar low.

Even after the intervention, he still selected a number of reasons for developing type 2 diabetes, including family history, being overweight, age, poor dietary habits, race/ethnicity, lack of physical activity, high blood pressure, high blood sugar, high cholesterol, and being hypoglycemic. When asked about this question in the exit interview, he said diabetes problems were hereditary, and that when you get older, “the glad that gives up insulin starts to falter.”

He walks and swims as his exercise, “when not hurting,” one to four days a week for 30 minutes to over an hour. In the exit interview, he said he wants to exercise because it “helps out with diabetes,” but he has bad knees and back. He’d prefer to exercise than use painkillers and other medication.

Micah was in the intervention group, and said he learned that exercising “always helps out.” He found the format helpful, the video entertaining, relatable, and that it influenced his diet and lifestyle.

“I’d like see a program that is more for the people. A lot of local people cannot afford a computer…play [the video] on the computer while we
wait [in the doctor’s office], it’s a good idea.”

Considering his frustration with his doctors (on Molokai, and on Oahu) and his insurance system, Micah was insistent that the study I conducted continue; he wants to see more programs to help patients with their needs on Molokai, especially senior citizens.

**Case Study No. 4 Analysis**

Micah told me many times in probably every conversation his frustration with the medical system and the insurance system. He “feels doctors don’t communicate with each other.” He doesn’t like the side affects of the medicine he is put on because the side affects “hurt more than anything else,” and while dulling his pain, “causes other problems unrelated to the first problem.”

He identifies strongly with using traditional medicine, and told me many stories of what remedies he uses or stories of others’ successful remedies. He said he listens to his ancestors, and his kahuna, his Hawaiian doctor. He said the Hawaiian method for treating gout is to use the noni tree\(^9\); fermenting the pulp, putting it in rubber boots, and soaking your feet in the pulp all day – “no more gout for weeks,” except your “foot comes out black as the ace of spades.” The same pulp can be used to treat a sprain – “keep the juice as close to the injury as you can.” He said the kukui nut\(^10\) can be used to treat goiters, and mamaki\(^11\) leaves to make tea for high blood pressure.

“You guys [doctors] haven’t been around long enough [in Hawaii] to say it doesn’t work or not … they say, don’t eat butter, a few months later, don’t eat margarine. Popolo bean, used all my life!”

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\(^9\) English name Indian mulberry. Important medicinal plant (Bishop Museum 2016).

\(^10\) English name candlenut. Used for medicinal purposes, candles, canoes (Bishop Museum 2016).

\(^11\) No English name. Medicinal plant, also used to make bark cloth (Bishop Museum 2016).
He described using popolo\textsuperscript{12} beans as a treatment for high blood pressure to a Western doctor, who told him that popolo was poisonous and his treatment was “witch’s brew.” Micah responded that their Western medicine “didn’t lower [his] blood pressure the way the ‘witch’s brew’ did.” Micah shows a distrust for Western medical methods.

\textit{Case Study No. 5: Robert} 
Robert is a 71-year-old, white man living on Molokai; he previously lived in Washington State and moved to Molokai in 2004, after he and his wife visited a friend living on the island “to see what it was like and we liked it.” He has children, and one of his daughters lives on Molokai and has her own children. I recruited Robert through my article in the local newspaper, \textit{The Molokai Dispatch}, and actually met him and his wife in Bellingham, where they were visiting their children in July 2015. He has thick white hair and a round belly, giving him the appearance of clean-shaven Santa Claus on a tropical vacation. Robert was very interested in participating in a study, but had done extensive research on nutrition and type 2 diabetes already. When we met in Bellingham, he gave me some alternative research DVDs on type 2 diabetes to aid my studies, but I didn’t use them.

Although he is white and a Molokai outsider, Robert partakes in subsistence activities to supplement his food, including hunting, fishing, and livestock. He said he doesn’t feel financial burden, but would like more access at the farmers market. He doesn’t identify with using cultural or traditional medicine, but said he takes lots of vitamins and minerals, and is “still going strong. I look at a lot of people my age not doing as good as I am.”

\textsuperscript{12} English name glossy nightshade. An important medicinal plant (Bishop Museum 2016).
He has been diagnosed for 15 years, and has a daughter with diabetes. He selected my preferred answers for the causes for type 2 diabetes, poor dietary habits and lack of physical activity. He had previously taken a diabetes education class at Na Pu’uwai.

Robert also went through a hip replacement surgery during the study, which may have affected his insulin levels. He said in the exit interview he wants to keep working out, and said he started to use a stationary bike. In the KAB survey, he selected that he exercises one to two days a week for 30 minutes.

**Case Study No. 5 Analysis**

Although Robert said in our first and last interview that he is well informed on health behaviors and nutrition, his FFQ did not match with what behaviors he identified with in the exit interview. He selected that he eats white bread more frequently than wheat or multigrain, and that he still eats white rice despite telling me in the exit interview that he stopped eating white rice when he moved to Hawaii because “it drives up the blood sugar through the [ceiling].” He drinks cola regularly, but in the second survey reduced how often he drinks it and the portion size is less than the recommended amount. He eats yams or sweet potatoes the same amount as white potatoes. He checked bacon, hot dogs, sausage, lunch meat, poultry, and fried chicken as what meat he eats most often. He only selected certain vegetables, including kale, tomato, carrots, peppers, broccoli, cauliflower, and squash, as eaten once a month.

In the KAB, he did not select many positive health behaviors, including not paying attention when eating and feeling fuller when done, and not measuring out food portions. In the exit interview, he said he thinks he eats well; “on a scale from one to ten, I feel like a nine health-wise.” He believes he can reduce his dependence on insulin by
losing weight, increasing physical activity, eating a healthier diet, and eating fewer calories. On paper, he knows his health positive behaviors to reduce his dependence on insulin: His HbA1c and his FFQ answers, however, showed that his behaviors do not yet line up with what he knows.

KAB Analysis

Of the 88 KAB questions, there are 20 that have a ‘correct’ versus an ‘incorrect’ answer. The participants’ averaged 49 percent correct answers, and the intervention group averaged 52 percent. This means the video may need to be supplemented with other interventions, which target nutritional facts on targeted foods for diabetics, and positive health behaviors, such as portion control.

Discussion

With a small participant group, I am able to explore, in detail, 1) what they think are the causes of T2D, and how their family history plays into the development of the disease; 2) the strong association with subsistence methods to gather local foods, many of which are part of a healthy diet, especially for those with T2D; 3) the perpetuation of traditional medicines for many ailments, which local foods can be a part of; 4) and the lack of previous nutritional education and behavioral follow through.

Theme 1: Causes of Type 2 Diabetes

An important theme I set out to discover was the participants’ beliefs for the cause of type 2 diabetes. Regular physical activity and nutrition therapy are fundamental strategies for type 2 diabetes management (Berry et al. 2012:388); therefore I was looking for my participants to select ‘poor dietary habits’ and ‘lack of physical activity or sedentary lifestyle’ in the KAB survey. Physical inactivity and excess adipose tissue are strongly associated with the development of type 2 diabetes (National Institute of
Diabetes and Digestive and Kidney Diseases 2014), along with genetic susceptibility, which I leave for other research to address.

On the KAB survey, Malia, Lelani, Jay and Micah checked nearly all the options – family history, being overweight, poor dietary habits, high blood sugar, lack of physical activity or sedentary lifestyle, and race/ethnicity – as their beliefs for how one can develop type 2 diabetes. Robert “correctly” checked poor dietary habits, and added lack of physical activity post-intervention. The video does address possible causes of type 2 diabetes, including the need for regular physical activity and a monitored diet. In the video, my medical experts also explain that family history, age, and race/ethnicity are not strong factors in how or why type 2 diabetes develops. After the watching the video, neither intervention participant changed their opinion on the reasons for developing type 2 diabetes. I believe this should be more strongly emphasized in diabetes education in the future, because people should know what are the risk factors of type 2 diabetes, and what is not a risk factor.

**Theme 2: Emphasis on Subsistence**

The second largest theme I discovered is the prevalence of subsistence activities to supplement the participants’ diets. In the KAB surveys, all checked that they participate in subsistence methods, from farming to hunting, and many indicated they trade or barter with neighbors, friends, and family members to gain foods that have been gathered by others’ subsistence.

Lelani, Malia, and Micah emphasized that they wished they could still buy fish from local fishermen, and equating eating local fish to a healthy diet. If they did not or could not buy from someone else, all participants indicated they have fished for their own
seafood in the past. In the exit interview, all participants equated with eating vegetables and fish with healthy living.

“I eat a lot of fish, fresh fish, right out of the ocean. [I] love it. Don’t have to go to the store, pay a ridiculous price for a pound of fish, I can catch my own,” Micah said in his exit interview.

In order to combat the minefield of food security and affordability in Hawaii, Molokai families are taking food into their own hands – literally.

“Molokai’s hidden subsistence economy is a strength that assists families today in a chronically depressed economy.” (Han et al 2012:41)

By hunting, fishing, farming, gathering, and trading among each other, Molokai residents like my participants are able to access locally grown or prepared products and support a healthy lifestyle within their economic means. Locally grown food is important for both physical health and emotional or mental health. In Hawaii, food can also be a cultural resource; being able to grow or access traditional Hawaiian foods such as taro, or hunt deer or pig, is valuable “beyond nutrition to more fundamental goals of perpetuating cultural values and elevating pride in being Hawaiian,” according to Herbert Hoe (Scheder 2006:38). Even for those who are not Hawaiian, being able to access locally grown or produced food is an important step in food security (Moreland, Wing, and Roux 2002). Subsistence activities on Molokai include traditional and customary rights to fish and gather seafoods, and gather plant matter, protected by law for Native Hawaiians (Higuchi 2008:194), as well as hunting wild pig and axis deer, which were introduced in the last 100 years. Home gardening and small livestock, such as chickens, are also common practice. Fishing is common practice throughout the islands, whether for sport, commercial, or subsistence means, but the majority of articles or reports on subsistence
methods in the islands were mainly focused on Molokai (Matsuoka, McGregor, and Minerbi 1998; Ili 2000).

**Theme 3: Use of Traditional Medicine and Remedies**

The third largest theme I discovered was the use of traditional medicines, and a distrust of Western biomedicine. In the exit interview, I asked who used traditional remedies, meaning cultural, ancestral, or pre-Western kind of medicine or health care, not integrated into the dominant healthcare system (WHO 2000).

Malia in particular noted the importance of non-Western medicine, even culturally-driven medicine, in her life. I anticipated that Hawaiian and other ethnic cultures still maintain a strong presence on Molokai, and that out of cultural preservation and financial strain many would turn to traditional medicines and remedies. Malia seemed to relate type 2 diabetes as something to be addressed by Western medicine, but also saw the connections between diet and type 2 diabetes.

All the participants associated their lifestyle on Molokai as a benefit to healthy living; noting the slower pace, the lack of fast food, and the sense of community values.

I also surmised that Molokai residents’ diet and lifestyle would be effected by the multiethnic community and its differing cultures; I argue this was substantiated by Malia and Micah’s commentary. They refer to traditional Hawaiian remedies, listen to a *kahuna* and their ancestors about their well-being, and had many stories of being treated with these traditional methods by their parents. Moreover, she said Hawaii being multicultural is a benefit to all, and the different ethnicities share each other’s traditions. It was a very satisfying conversation.
Theme 4: Behavior and Previous Education

Three of the participants — Malia, Lelani, and Robert — had previously taken some form of health or type 2 diabetes education class. I noted a clear distinction between them and the other two participants in their knowledge level of good health behaviors, specifically in the pre-intervention surveys. What Malia, Lelani, and Robert had learned previously appears to have been retained, as all answered many health behavior questions correctly, meaning they know what are good diet and exercise behaviors. This does not mean, however, their knowledge corresponds to their actual behaviors. All the participants struggled with nutritional knowledge questions, and their FFQ answers reflect their behavior more realistically, where more unhealthy foods were chosen than their more nutritious counterparts (e.g. white potatoes over yams or sweet potatoes).

Summary of Findings

First, behavioral models in health education should be continued to be researched for adults with T2D or who are at-risk. My participants may understand the behavioral models in the KAB survey, but few follow through with definite actions. Future research could review the links between knowledge and behavior.

Second, availability to affordable, healthy foods is potentially already on Molokai, through the community subsistence system. Though this pilot study measures participant health through their individual behavior and risk factors, I also put these individuals factors in context through health risk exposure, such as the issue of land availability, which is not always an individual’s choice. For those already participating in subsistence activity — they can get taro, fish, sweet potato from themselves, their family
network, or neighbors — the video then reinforces those are good things to eat for a healthy lifestyle and management of type 2 diabetes.

Third, eating healthy is a concern for most everyone, but first people must have physical, social, and economic access to nutritious sources of food; having a secure food source allows people to make healthier food choices. Though type 2 diabetes rates have decreased on Molokai, the socioeconomic status of the island threatens its ability to maintain healthy lifestyle factors, like affordable healthy foods and exercise training. But the shared culture of multiethnic families may assist in finding relatable solutions to a shared problem.

Limitations

All participants were given a personal copy of the video through a DVD, in October 2015. However, at the time of the exit interviews (November 2015), no control had watched the video.

Because so few individuals participated, my results are descriptive, and further research required. The biggest takeaway from this project is to be physically present when conducting research on Molokai. It is a community that works better face-to-face, is more open and trusting if they can see and hear you and your intentions.
Chapter 8: Conclusion and Recommendations

For this study, I set out to create a modified educational video, focused on nutritional information for type 2 diabetes patients, on the island of Molokai in Hawaii, and to test its effectiveness on increasing knowledge in that community. I argue that creating an educational tool that reflected the community’s ethnic makeup, cultural practices, and most importantly, food security realities, is an effective approach to self-management practices of type 2 diabetes.

This thesis has shown that the political economy of food in Hawaii, specifically its history of agricultural practices and land ownership as political and social power, disproportionately affects non-white multiethnic groups. Looking at health disparities from a historical approach is an established medical anthropological frame; political, economic, and social structures are extremely influential on a populations’ health. Access to affordable healthy foods is a structural problem in Hawaii, and because nutrition plays such a large role in the development of type 2 diabetes, sources of food are directly linked to the prevalence of type 2 diabetes.

In addition, to effectively promote health in multiethnic communities, research now finds that cultural factors, such as language, behavior, foods, and traditional medicines and practices must be included in health practice. This improves communication between health care workers and patients, and gives reasons for those populations to participate in health promotion and disease prevention programs. Molokai is identified as a multiethnic community, with high populations of Native Hawaiian and mixed East Asian groups, with a strong Local culture. On Molokai, health promotion practices should incorporate Local culture, as well as the shared socio-economic factors, as a tailored approach to health education.
Considerations
Molokai is a complex and private community, wary of outsiders. It was difficult to recruit participants, even knowing many stakeholders, even having a personal connection to the island. Molokai is also a community that takes its time; trying to introduce a new idea, and being a medical study, from afar was difficult in my relatively short time frame. It is a multiethnic community, difficult to pin down except to ascribe to Local culture. But what I discovered is this community is aware that changes need to be made to their lifestyle, and the abilities of its members have a lot of offer.

While working on the video, I became aware of the challenges faced by staff at the Molokai Community Health Center. During the writing of this thesis, my research contact, Dr. Christina Economos, left her position. In many ways she was also a research partner: she gave me notes and ideas during the process of making the video, and is one of the experts featured in the video. The health center was not able to tell me why she left. But I know this was a difficult position, especially for an outsider. She was hired as the medical director, but also worked as a physician seeing patients, in addition to raising her young son. I have sympathy for her position. We had conversations about coming into this community, already knowing the challenges, but sometimes even with the best intentions, it is difficult to stay long-term. I thank Dr. Economos for her time and energy on this project.

Contributions of This Study
Statistics say type 2 diabetes diagnoses are up across the state, but down on Molokai. Why? No one has yet looked into the reasons, and my pilot study offers preliminary motives. When I designed my research, I believed T2D was a pervasive problem on Molokai, because of statistical research I found by the state health
department, and the position of the health center staff. However, my research has shown that T2D is a surmountable problem on Molokai.

I associated a decreasing type 2 diabetes prevalence with an increase in subsistence activities on Molokai. While many residents in the state at large may have difficulty obtaining affordable, nutritional foods because of entrenched land use policies that favor exported agriculture and urbanization, Molokai perpetuates its traditional roots in local food sustainability. Presently, there may not be a large farmers’ market, or a co-op to find locally grown foods, but families are growing their own produce, hunting and fishing for their own meats, and sharing their bounty with neighbors through selling, trading, or bartering.

While one aspect of health promotion is food security, through locally available and affordable foods, health care research must also find effective ways to educate the population. Behavioral modification is difficult with any person or populace, but is substantially more complicated in communities with a variable identity. Molokai experiences a depressed economy, adverse access to supplies, high unemployment, low health literacy, and diverse cultural and social backgrounds. Though type 2 diabetes rates have decreased on Molokai, the socioeconomic status of the island threatens its ability to maintain healthy lifestyle factors. But tailored educational interventions, like this video, can be a guide to managing type 2 diabetes, reflecting the community’s parameters of locally-grown foods, and feasible exercise ideas. The educational tools must reflect the local community, in order to support the population’s understanding of achievable behavioral changes.
This all comes together for applied health methods to work on reducing the prevalence of type 2 diabetes in the state and on Molokai. My hypothesis was that my modified video intervention, influenced by the multiethnic identity of the Molokai community and the economic realities of eating healthy on Molokai, will be a guide to managing type 2 diabetes with portion control, locally-grown foods, and feasible exercise ideas. Through the surveys and exit interviews, my participants’ status show a rise toward what information they need to make healthy choices – nutritional elements of certain foods, portions sizes, and regular physical activity – and how much more information they need. In summary, I believe my intervention tool was appreciated by my study participants, and is needed in communities like Molokai.
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Appendix A – Knowledge, Attitude, and Behavior Survey

Patient Participants

Knowledge, Attitude, Behavior survey 1

Participant number ___________________ Date _____________

Aloha! Thank you for participating in this pilot project. This is a survey to record what you know about type 2 diabetes, and your thoughts and opinions on health, nutrition, and diabetes. Your answers are an important part of this process. Your participation in this study is voluntary, and you can turn in this survey to the researcher at any time. All information you give the researcher will be kept confidential.

**TYPE 2 DIABETES**

1. Have you ever had a blood test to see if you have diabetes?
   - □ YES
   - □ NO
   - □ I don’t know
   - □ Don’t wish to respond

2. How long has it been since you have been diagnosed?
   - □ Less than 6 months ago
   - □ 1 year
   - □ 2-3 years
   - □ 4-9 years
   - □ 10-15 years
   - □ More than 15 years

3. If you are a woman and have been pregnant, have you ever been diagnosed with gestational diabetes?
   - □ YES
   - □ NO
   - □ I don't know
   - □ Don’t wish to respond

4. Does anyone in your immediate family have any form of diabetes: gestational, type 1, or type 2?
   - □ YES
   - □ NO
   - □ I don’t know
   - □ Don’t wish to respond

5. Has anyone in your immediate family been diagnosed with type 2 diabetes? (Check all that apply)
6. Have you ever been told that you have impaired fasting glucose or impaired glucose tolerance?
   - YES
   - NO
   - I don't know
   - Don't wish to respond

7. What do you think causes diabetes? (Check all that apply)
   - Family history
   - Overweight
   - Age
   - Poor dietary habits
   - Race/ethnicity
   - Lack of physical activity or sedentary lifestyle
   - High blood pressure
   - High blood sugar
   - High cholesterol
   - Hypoglycemic
   - Other ____________________________________________________________________________________

8. Do you think you can reduce your diabetes symptoms or dependence on insulin?
   - YES
   - NO
   - I don’t know
   - Don’t wish to respond

9. Have you ever heard of the term glycosylated hemoglobin or hemoglobin A1c (A one C)?
   - YES
   - NO
   - I don’t know
   - Don’t wish to respond

10. In the past 12 months, how many times has a doctor, nurse, or other health care professional checked you for A1c?
    - Once
    - Two to three times
11. What does your doctor or other health professional say your A1c level should be?
   - More than three times
   - None
   - Not sure
   - 5 or less
   - 6 or less
   - 7 or less
   - 8 or less
   - No goal specified

12. Do you check your own blood glucose?
   - YES
   - NO
   - I don’t know
   - Don’t wish to respond

13. How many times a day do you check your blood glucose?
   - Once
   - Twice
   - Three to four
   - Four to five
   - More than five

14. Do you use insulin to manage your blood glucose?
   - YES
   - NO
   - I don’t know
   - Don’t wish to respond

15. If yes to 14, how many times a day do you take an insulin injection?
   - Once
   - Twice
   - Three to four
   - Four to five
   - More than five

16. Have you ever received diabetes education, such as taken a class or met with a diabetes educator?
   - YES
   - NO
   - I don’t know
   - Don’t wish to respond

16a. If yes, where did you receive this education?
   - Molokai Community Health Center
Na Pu’uwai
□ Molokai General Hospital
□ Private physician
□ Private nutritionist/dietitian
□ Molokai Drugs Health Care Program
□ Off island (please name) ____________________________
□ Other (please name) ______________________________

17. Using a scale of 1-5 with 1=poor, 3=good, and 5=excellent, how would you rate your understanding of the following:

17a. The role of diet in blood glucose control?
1 2 3 4 5

17b. The role of exercise in diabetes care?
1 2 3 4 5

17c. How to use the results of blood glucose monitoring?
1 2 3 4 5

LIFESTYLE

18. One of the main reasons for exercising is to lose weight.
□ YES
□ NO
□ I don’t know
□ Don’t wish to respond

19. I seldom eat unless I am physically hungry.
□ YES
□ NO
□ I don’t know
□ Don’t wish to respond

20. The health and strength of my body is more important than how much I weigh.
□ YES
□ NO
□ I don’t know
□ Don’t wish to respond

21. I often turn to food when I’m sad, anxious, or lonely.
□ YES
□ NO
□ I don’t know
□ Don’t wish to respond
22. There are certain foods I like but avoid so I don’t gain weight.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

23. I’m often frustrated with my body size.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

24. I’m happy with my body.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

25. I normally eat slowly and pay attention to my food.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

26. I’m often on a diet or thinking of going on a diet.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

27. After eating, I realize I’m fuller than I would like to be.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

28. I put off buying clothes or participating in activities because I’m waiting to lose weight.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

29. I eat or make plans to eat even when not hungry.
   □ YES
30. I don’t care how much I weight as long as I’m physically fit, healthy, and can do the things I want.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

31. I exercise because how good it makes me feel physically.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

32. I feel pressure to control my weight or watch what I eat.
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

33. How can you reduce your risk of diabetic complications? (Check all that apply)
   □ Lose Weight
   □ Increase physical activity
   □ Eat a healthier diet
   □ Eat fewer calories
   □ Eat less fat
   □ Eat less sugar
   □ Have surgery
   □ Take medication
   □ I don’t know
   Other ____________________________________________

34. Has a doctor or health professional ever told you to control or lose weight?
   □ YES
   □ NO
   □ Don’t wish to respond

35. If yes to 34, what do you do to control your weight? (Check all that apply)
   □ Dieting
   □ Eating fewer calories
   □ Getting more exercise
   □ Eat less fat
   □ Eat less sugar
- Had surgery
- Taking medication
- Eat less carbohydrates
- I don’t know

Other ____________________________________________________________________________________

36. Has a doctor or health professional ever told you to be more physically active?
   - YES
   - NO
   - I don’t know
   - Don’t wish to respond

37. If you follow this advice, what have you done to be more physically active?
   (Check all that apply)
   - Going to the gym
   - Walking
   - Running
   - Paddling or stand up paddling
   - Dance/Zumba
   - Hula
   - Taking exercise classes
   - Participating in team sports
   Other ____________________________________________________________________________________

38. How many times per week are you physically active? Physically active is continuously moving for at least 30 minutes. (Check all that apply)
   - Less than one
   - One to two
   - Three to four
   - Five to seven
   - More than once a day

39. How long do you typically engage in a physical activity?
   - Less than 20 minutes
   - 30 minutes
   - 30 minutes to an hour
   - More than an hour

40. Where do you get most of your health information from? (Check all that apply)
   - Doctor/Physician
   - Other health care professional
   - Friend or family member
   - Insurance company or HMO
   - Television or radio
   - Newspaper or magazine
   - Internet

116
☐ Facebook, Twitter, or other social media
☐ I don’t know
Other ________________________________

41. How closely do you follow news stories about diabetes?
☐ Very closely
☐ Somewhat closely
☐ Not too closely
☐ Not at all

42. Where do you get most of your health news from? (Check all that apply)
☐ Newspaper
☐ TV News
☐ TV Commercial
☐ Radio
☐ Magazines
☐ Internet
☐ Social media (Facebook, Twitter)
☐ Friends or family
Other ________________________________

43. Would you rate these statements as true or false?
43a. I should avoid sugar because of diabetes.
☐ True
☐ False
☐ I don’t know
☐ Don’t wish to respond

43b. There are foods I cannot eat because of diabetes.
☐ True
☐ False
☐ I don’t know
☐ Don’t wish to respond

43c. Insulin is the only way to treat diabetes.
☐ True
☐ False
☐ I don’t know
☐ Don’t wish to respond

43d. The foods I eat don’t really affect my diabetes.
☐ True
☐ False
☐ I don’t know
☐ Don’t wish to respond
43e. I pay attention to the foods I eat to affect my blood glucose level.
   □ True
   □ False
   □ I don’t know
   □ Don’t wish to respond

43f. I should adjust my insulin dose based on the foods I eat.
   □ True
   □ False
   □ I don’t know
   □ Don’t wish to respond

43g. Diabetes is a dangerous disease.
   □ True
   □ False
   □ I don’t know
   □ Don’t wish to respond

43h. Have you ever been on a diet or participated in a weight loss program (ex. Atkins, Weight Watchers)?
   □ True
   □ False
   □ Don’t wish to respond

List/Explain ____________________________________________________________

44. Do you participate in food subsistence activities (hunting, fishing)?
   □ YES
   □ NO
   □ I don’t know
   □ Don’t wish to respond

44a. If yes, please check all that apply.
   □ Fishing
   □ Hunting
   □ Farming
   □ Gathering (natural foods)
   □ Livestock
   □ Other ____________________________________________________________

45. Would you like to eat more or less of certain foods? 1=less, 3=OK with amount I eat, 5=more
45a. Seafood
   1  2  3  4  5
45b. Meat
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☐ Other ____________________________________________________________________________

46. Do you feel you have access to the foods you want to eat?
☐ YES
☐ NO
☐ Sometimes
☐ I don’t know

46a. If yes, how do you access those foods?
☐ Grocery store
☐ Neighbor, friend, and/or family member
☐ Grow yourself
☐ Hunt/fish yourself
☐ Off-island (Costco, etc)
☐ Other ____________________________________________________________________________

46b. If no, how would you want to access those foods?
☐ Farmers’ market
☐ Trade/barter with neighbors, friends, and/or family
More variety at the grocery store
Other ______________________________________________________________

46c. If sometimes, what do you feel is preventing you from accessing those foods?
Explain ____________________________________________________________

47. Does financial burden affect the foods you buy and eat?
   □ YES
   □ NO
   □ Don’t wish to respond

47a. If yes to 47, what foods do you typically NOT buy when saving money?
   □ Meats and protein
   □ Vegetables
   □ Fruits
   □ Breads and grains
   □ Snacks (chips, cookies)
   □ Alcohol

NUTRITION
48. Do you use the USDA ChooseMyPlate to guide your daily meal choices?
   □ YES
   □ NO
   □ I don't know
   □ Don’t wish to respond

49. Do you measure out your food portions?
   □ YES
   □ NO
   □ I don't know
   □ Don’t wish to respond

50. Which food group is our body's best source for energy?
   □ Protein (meats)
   □ Fats, oils, and sweets
   □ Carbohydrates (breads and cereals)
   □ Dairy
   □ I don't know

51. Which of these is not considered a nutrient?
   □ Vitamins
   □ Minerals
   □ Fiber
   □ Fats
52. The bread and cereal group is a good source of what?
☐ Carbohydrate
☐ Vitamin C
☐ Calcium
☐ Vitamin D
☐ I don’t know

53. Citrus fruits are a good source of what?
☐ Calcium
☐ Vitamin C
☐ Vitamin B
☐ Calories
☐ I don’t know

54. Foods from the meat group are an important source of what?
☐ Iron
☐ Fiber
☐ Beta carotene
☐ Calcium
☐ I don’t know

55. How many servings of vegetables do you need a day?
☐ 6-11
☐ 2-3
☐ 3-5
☐ 1-2
☐ I don’t know

OTHER HEALTH

56. Has a doctor or other health professional ever told you that you have high blood pressure or hypertension?
☐ YES
☐ NO
☐ I don’t know
☐ Don’t wish to respond

57. Has a doctor or other health professional ever told you that you have high cholesterol?
☐ YES
☐ NO
☐ I don’t know
☐ Don’t wish to respond
58. Do you know the difference between LDL and HDL cholesterol levels?
☐ YES
☐ NO
☐ I don't know
☐ Don't wish to respond

59. Have you ever received instruction from a doctor or health care professional on the following:
59a. What is the role of diet in blood glucose control.
☐ YES
☐ NO
☐ I don't know
☐ Don't wish to respond

59b. What is the role of exercise in diabetes care.
☐ YES
☐ NO
☐ I don't know
☐ Don't wish to respond

59c. How to use the results of blood glucose monitoring.
☐ YES
☐ NO
☐ I don't know
☐ Don't wish to respond

59d. What are the treatment options for high blood glucose.
☐ YES
☐ NO
☐ I don't know
☐ Don't wish to respond

59f. What preventions can be taken for long-term complications of diabetes.
☐ YES
☐ NO
☐ I don't know
☐ Don't wish to respond

60. Have you been diagnosed with other health problems (high blood pressure, high cholesterol, depression)?
☐ YES
☐ NO
☐ I don't know
☐ Don’t wish to respond
List ____________________________________________________________

60a. If so, do you believe your other health issues are related to diabetes?
☐ YES
☐ NO
☐ I don’t know
☐ Don’t wish to respond
Explain __________________________________________________________

DEMOGRAPHICS

61. Do you have regular access to a computer and/or internet?
☐ Computer
☐ Internet
☐ Both
☐ Neither

62. What is your age? ____________

63. Are you male or female? ____________

64. What is your ethnicity (list all you identify with)? ____________________
____________________________________________________________________
____________________________________________________________________

[In the intervention group, the second survey included the following questions:]

MOLOKAI HEALTH VIDEO

61. The video’s format included interviews with experts and examples of healthy lifestyles. Was the format of the video helpful in learning new information?
☐ YES
☐ NO
☐ I don’t know
☐ Don’t wish to respond

62. How much of the information presented in the video did you feel you already knew? 1 = not much, 3 = some of the information, 5 = mostly everything
1 2 3 4 5

63. Was the video entertaining and kept you interested? 1 = not much, 3 = some of the time, 5 = very entertaining
1 2 3 4 5
64. How many times did you watch the video?
   □ Once
   □ Twice
   □ More than two times
   □ Did not watch

65. Did you watch the video with others?
   □ Yes
   □ No
   □ If yes, name relationship to the person (mother, friend) ________________________

65a. If yes, did you discuss the content afterward?
   □ Yes
   □ No

65b. If yes, do you feel this discussion helped in learning the video’s information?
   □ Yes
   □ No

66. Do you feel the video was relatable to you and your life?
   □ Yes
   □ No

67. Do you feel the video influenced you to change your dietary or activity habits?
   □ Yes
   □ No

68. Are you interested in the researcher following up with a short interview about the video?
   □ Yes
   □ No

Thank you for your time! If you have any further questions, contact Megan Stephenson at [phone number] or Dr. Christina Economos at [phone number].
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<th>5+ per week</th>
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<td>Low or nonfat desserts</td>
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<td>Ice cream, mochi</td>
<td>1 scoop</td>
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<td>Pudding, custard</td>
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<td>Donuts, pies</td>
<td>1 medium slice</td>
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<td>Cookies, cakes</td>
<td>1/2 medium</td>
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<td>Chocolate, candy bars</td>
<td>2 pieces</td>
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<td>Other candy (jelly beans)</td>
<td>4 pieces</td>
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<td>Orange, other fruit juice</td>
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<td>Hawaiian Sun juices</td>
<td>1 cup</td>
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<td>Hot tea</td>
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<td>Green tea, hot</td>
<td>1 cup</td>
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<td>Coffee drinks (w/syrup)</td>
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<td>Liquor</td>
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<td>Light beer</td>
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<td>Asian teas</td>
<td>1 cup</td>
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<td>Iced teas</td>
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Food Frequency Questionnaire

Cola 12 oz

Diet cola 12 oz

Please list any foods you have eaten regularly in the last five months not listed here.

Do you use tobacco products? (circle)
- Yes
- No

If yes, please list

Do you take any medications (vitamins)? (circle)
- Yes
- No

If yes, please list

Do you take any supplements (vitamins)? (circle)
- Yes
- No

If yes, please list

Do you use tobacco products? (circle)
- Yes
- No

Please list any foods you have eaten regularly in the last five months not listed here.
Aloha [name],

I’m Megan Stephenson, a graduate student from Washington State, and I am writing you to ask for your participation in my research study. I am contacting you because you have been diagnosed with type 2 diabetes, and are a patient at the Molokai Community Health Center.

I am working with MCHC staff on an educational pilot video project. Our goal is to create a Molokai-focused educational video that explores nutrition, health goals, and Molokai foods and lifestyle. We hope to learn more about how Molokai residents get nutritional information about their food, what they know about how food and medication affects the body, and how long residents remember this information after learning it.

The reason I want to know more about type 2 diabetes care on Molokai is because I want to share practical health information for residents. Type 2 diabetes is something you can manage when you have healthy dietary and lifestyle information to make the best choices for you and your `ohana.

I care for this community because I have lived on Molokai as a reporter for the Molokai Dispatch for two years. Having learned so much from the community, I also know some of the challenges to finding healthy and affordable food options. I want Molokai residents to be an active participant in this study, by providing specific thoughts and opinions unique to this community.

Participation will require only a few hours of time over the course of six months:

- On your own time, complete a series of surveys over a six month period. The surveys ask for your thoughts about diabetes, the food you eat and related health information.
- We will send you the surveys by mail or email and send you reminders to complete them.
• Some participants are invited to watch and discuss a video in June at a meeting at the Center, where we provide food. Other participants will watch the video online in September.
• This study also requires permission for us to view some of your medical information such as age, weight, ethnicity, and A1c level. We will not use your name, but instead assign you an anonymous patient number. Your name will never be attached to this study and its results.

This study is free and your input on the video may provide information that helps the community center work with future patients. As a thank you for taking part in the study, you will be entered to win a raffled prize.

If we do not hear back from you by May 8, the health center will contact you to confirm if you do or do not wish to participate in this study.

Please do not hesitate to call me if you have any questions. I am happy to review this with you and answer any questions. You may reach me, Ms. Megan Stephenson, at [phone number], or MCHC Medical Director, Dr. Chris Economos, at [phone number].

Taking part in this study is voluntary. You may choose not to participate. If you decide not to participate in this study, your decision will have no effect on any care you or your family members receive at the Molokai Community Health Center.

Mahalo nui for your time.

Sincerely,

Megan Stephenson
Master’s Candidate
Western Washington University
Appendix D – Participant Consent Form

CONSENT FORM
Patient Participant

Community-based Participatory Research on Type 2 Diabetes
and Nutrition on Molokai, Hawaii

Megan Stephenson from the Department of Anthropology at Western Washington University is conducting a research study.

In partnership with the Molokai Community Health Center, Megan Stephenson, an MA candidate, will address type 2 diabetes (T2D) self-management, by testing the effectiveness of a community- and culturally-based nutritional video, as a way to educate recently diagnosed individuals with T2D about intuitive eating and nutritional practices. This project will give the Molokai Community Health Center information on what kinds of nutritional knowledge their patients have, and give diabetic patients on Molokai the opportunity to influence self-management practices.

Why am I being asked to participate?

You are asked to participate in this study because you are a patient at the Molokai Community Health Center and have been diagnosed with type 2 diabetes in the last six months. At least 60 people will be participating in this study. In the reports from this study you will never be identified by name. All participants will be given a patient number and the researcher will use this number, rather than your name, in the study. For example, when you complete a survey or an interview, the researcher will write down your patient number rather than your name.

Will my name or health information be shared?

Your name and health information will only be shared with Megan Stephenson, the researcher leading this study.

What benefits are there to participating in this study?

If you agree to participate in this study, you will be providing potentially useful information on nutritional and diabetic knowledge on Molokai, and will help the Molokai Community Health Center identify ways they can better provide patient education. The video you will watch in this study will be accessible though the health center’s website after the study is complete for you to share with friends and family. If you agree to participate in the entire study, you will be entered to win one of four $50 gas gift cards.
What will I do in this study?

There are three parts to this study.

First, in April I will mail you a form that asks about diabetes related practices and the foods you eat. When you complete the form you can mail it to the health center using a stamped envelope I provide you.

Second, in May, we will meet at the health center to watch a diabetes education video that was filmed on Molokai. Before we watch the video I will ask you questions about your ideas about diabetes prevention. After the video I will ask you questions to see if your ideas changed.

I may interview you after the first behavior survey, at a location of your choice (the health center, your home, local park), and ask you to share your experiences and stories about health, exercise practices, and community history.

Third, in August, I will mail you another behavior survey for you to complete and mail to the health center, using a stamped envelope I will provide.

Finally, by participating you will also give the health center permission to access your health records and give me basic information without your name on it. This information may include your age, height, weight, and diabetes status.

Who do I contact if I want to participate but have more questions about the study?
You may email or call the researcher, Megan Stephenson, at any time during the study if you have questions. Additionally, you may contact Dr. Christina Economos of the Molokai Community Health Center if you have questions related to the study. Our contact information is listed at the end of this form.

I am not interested in participating in this study. What do I do next?
Sign the bottom portion and mail the Researcher Copy using the stamped envelope.

I’m interested in participating in this study. What do I do next?
Read more about your participation in the study below, and mark what you are agreeing to on both the Researcher and Participant copies; you will keep the Participant Copy. Mail the Researcher Copy using the stamped envelope.

I UNDERSTAND THAT:
1) This study will involve watching a diabetes-focused educational video and providing my thoughts, opinions, and ideas in a survey, as well as basic health information. My participation will involve approximately 1 hour total.

2) There are no anticipated risks or discomfort associated with participation. I will benefit from learning more about nutritional information to manage my diabetes.
3) My participation is voluntary, and I may choose not to answer certain questions or withdraw from participation at any time without penalty.

4) All information is confidential. My signed consent form will be kept in a locked cabinet separate from the questionnaires and audio-tape. Only the primary researcher will listen to and code the audiotape. This tape will be destroyed at the end of the study. My name will not be associated with any of my responses at any time.

5) My signature on this form does not waive my legal rights of protection.

6) This experiment is conducted by Megan Stephenson. Any questions that you have about the experiment or your participation may be directed to her at [cell phone number] and [email], or Dr. Economos, medical director at the Molokai Community Health Center, at [phone number]. If you have any questions about your participation or your rights as a research participant, you can contact the WWU Human Protections Administrator (HPA), [phone number].

If during or after participation in this study you suffer from any adverse effects as a result of participation, please notify the researcher directing the study or the WWU Human Protections Administrator.

I AGREE TO:

(check) Agree Do Not Agree

- Watching a 10-minute video about nutritional information relating to diabetes
  - [ ]
  - [ ]

- Release relevant medical information to the researcher, via anonymous patient number
  - [ ]
  - [ ]

- Complete two behavior surveys about diabetes related topics, and one food frequency questionnaire.
  - [ ]
  - [ ]

- Participants may be audio taped, videotaped or photographed.

  Audio
  - [ ]
  - [ ]

  Video
  - [ ]
  - [ ]

  Photograph
  - [ ]
  - [ ]
I have read the above description and agree to participate in this study:

Participant’s Signature ___________________________ Date __________

Participant’s PRINTED NAME __________________________________________

I do not agree to participate in this study:

Participant’s Signature ___________________________ Date __________

Participant’s PRINTED NAME __________________________________________

NOTE: Please sign both copies of the form and retain the copy marked “Participant.”
Researcher Copy
Participant Copy
Do you have Type 2 Diabetes?

Join a graduate student study, learn about nutritious local food and physical activity, and be eligible to win a raffled prize!

The study takes place from June to September 2015. Your participation will be to fill out surveys and watch a short locally-tailored nutritional education video. Your feedback on this project will help advance future health projects here on Molokai — local information for local people.

Contact: Megan Stephenson
mkstephenson@gmail.com
Dr. Chris Economos
at MCHC, (808) 553-5038
— to see if you qualify.
Appendix F – Exit Interview Questions

EXIT INTERVIEWS

NOVEMBER 2015

Question 1 - Can you tell me about your family history with diabetes?

Question 2 - How often ill? What kinds? Use any alternative or traditional means of healthcare? Like, when I have a sore throat, I use hot water and honey before I use any medication, even cough syrup over the counter. Do you do things like that? Why or why not?

Question 3 - How define eating habits growing up? Energy, exercise level?

Question 4 - I’m going to read a definition of health, and I want you to tell me if you agree or disagree – [WHO definition] “Health is a state of complete physical, mental and social well being, and not merely the absence of or disease infirmity” Add anything to this – environmental? Community?

Question 5 - Does your ethnicity – traditions, culture – or your religion factor into your health and wellness?

Question 6 - Do you feel that living on Molokai has affected your health? In what way?

Question 7 - How do you feel how your diet and foods have affected your health?

Question 8 - Would you be interested in nutritional or diabetes education? Give resources, how keep healthy?

Question 9 - Have you watched the video? Thoughts?

Question 10 – Reference KAB question #46, Do you feel you have access to the foods you want to eat? You put sometimes – explain?

Question 11 - Reference KAB question #43, ‘There are foods I cannot eat because of diabetes’, you sent from true to false, why?

Question 12 - Reference KAB question #7, you selected being race as a cause of diabetes – can you tell me why you selected that?

Question 13 - Reference KAB question #62. How much of the information presented in the video did you feel you already knew? What know? What not know?
**Question 14** - Reference KAB question #67. Do you feel the video influenced you to change your dietary or activity habits? Explain.