## ATTACHMENT 3 - Trinity Study: Phase 1 Summary of Findings

September 15-30, 2014

**Introduction**

Between September 15-30, 2014 the Trinity Field team traveled to New Mexico to conduct Phase I of the **Study to Collect Data on Diet and Lifestyle Patterns to Improve Estimation of Radiation Doses and Health Risks from Exposure to Radioactive Fallout from the Trinity Nuclear Test.** The aims of Phase 1 of the Trinity study were to:

1. Establish collaborations and partnerships with the advocacy community and academics in New Mexico.
2. Identify collaborators and subject matter experts.
3. Identify logistics and planning for the Phase 2 focus groups.
4. Determine the feasibility of recruiting Hispanic and Native American participants > age 69 years.
5. Collect information about diet and lifestyle practices.
6. Use key informant interview information and literature review for development of Focus Group Guide.

Aims 1-3 were successfully achieved through the pre-trip preparation and during the Phase 1 trip. This Report will summarize the methods and results for Aims 4-6.

**Aim 4**

To determine the feasibility of recruiting Hispanic and Native American participants > age 69, we set out to recruit and interview 9 key informants from a variety of geographic areas across New Mexico. Participants were recruited by using social networks of local collaborators, attending community events, and screening individuals who contacted the NCI after reading about the study in local newspapers.

The field team successfully recruited and interviewed 9 elders, between ages 69 and 101 years old from 6 diverse geographic locations (mountains, urban, rural). These participants included: 4 males and 5 females; 3 Native American, 6 Hispanic; 2 tribal Nations, and 5 New Mexican counties. The breakdown by each participant can be found in Table 1.

While we were limited by OMB regulations to recruit only 9 individuals, we identified more eligible participants and these contacts have been saved for potential participants in Phase II. Leaders of Tribal Nations also informed us of how many other members of their community would be eligible for Focus Group Interviews during Phase 2, which demonstrated the feasibility of conducting future Focus Groups.

**Aim 5**

To collect information about diet and lifestyle practices, we developed and administered the Key Informant Interview Guide with 9 participants. These interviews either took place in participants’ homes or private spaces provided by local community centers. For each interview there were up to two interviewers and up to two note takers. Each interview was also audio-recorded and later transcribed. Using a structured key informant guide, participants were asked to recall the summer of 1945 and then to report on their and their families’ consumption of water, meat, dairy, vegetables, and traditional foods. Participants also reported how food was prepared and from where it was sourced. All participants reported on the types of homes their community lived in, the types of festivities that took place in the summer of 1945, and the amount of time people of different ages spent outdoors. If participants indicated that they could not remember specific aspects of their diet or lifestyle in 1945, this was noted and the interview proceeded. Overall, the participants (with the exception of the woman aged 101 years) were able to recall what life was like in their part of New Mexico in 1945. Overwhelmingly, as participants thought about their lives as children, they would comment how different life was back then from now. Specifically, they remarked how most of the food came from their surroundings.

Table 2 summarizes number, geographic location and ethnicity of participants who reported important pathways of exposure during key informant interviews. The next section summarizes each section of the table and provides specific excerpts from the interview transcriptions to provide further ethnographic details.

**Water**

Access to water varied from participant to participant. Drinking water came from a variety of sources depending on the geographic location, including: acequias, ditches or streams (56%), cisterns (11%), wells (33%), piped water (33%), or a combination of these. All of the participants with piped water lived in urban areas. About one-third of participants remembered their families also collecting rain water in barrels, but specified that this water was normally used for cooking, especially beans.

**Meat**

Participants reported eating the meat from cows, sheep, pigs, elk, deer, chickens, small wild birds, rabbits, and squirrels. Meat from these animals was either eaten soon after butchering during special occasions, such as summer Feast Days or fiestas, or hung to dry and later cooked into stews. Participants (44%) confirmed eating the organ meat from lamb, chickens, rabbits, elk, deer, and pigs; however it was more likely consumed by people of lower socioeconomic position. When talking about the meat that would be served during the summer Feast Days, Participant 2 explains:

“No, we would not use the internal to feed the people [..], but we would save those internal organs. So anyways, you know, […] for the family use only. For example, like the sheep, that's what my grandma used to clean out you know, the inside the thing and the heart [or] liver. And I don't think the people that actually came to eat, they want you know, pure meat, you know, and not anything internal. Like who wants to be eating that you know, during the Feast Day as well, too? So, we saved those anyway, you know. And they were cleaned out anyhow then. [The] way I'd seen my grandma do this, she would go down to the creek or to the ditch and clean all the inside out and washed them out and then they would be sort of like tie them up and dry them out.”

A majority of participants (67%) reported eating dried meat, also known as jerky or *carne seca*. Many people made their own dried meat by hanging it on clotheslines, under the porch roofs or, as one Native American reported, from teepee poles. Participants reported either drying the meat that they butchered themselves or drying meat that they purchased or traded with surrounding communities.

The majority of jerky was made from beef, deer or elk; pigs and lamb were more likely butchered and stored in other ways. Rancher families, who were typically Hispano, were more likely to eat sheep than families that did not have ranches. About a third of participants also reported hunting and fishing.

**Dairy**

All 9 participants reported drinking cows’ milk, although there was variety in the type, amount and frequency of milk consumed. If families owned cows or goats, which was particularly common in rural areas, then they milked and consumed about a gallon of milk on a daily basis. Any milk that was left over was used in cooking; many people remembered their mothers using the milk to make a white gravy or Atole, a blue corn and milk drink.

If families did not own their own cows, they (about 33%) purchased milk either from neighbors or nearby stores. This was more common in urban areas, where milk consumption was also common but probably drank less frequently. Hispanics made cheese and often traded with neighbors, including Native Americans which accounts for about 67% of participants who reported eating cheese. Canned milk was also consumed but this was usually reserved by adults to drink with their coffee.

Although it is widely believed that there are high rates of lactose intolerance among Native American populations, we found no evidence that this was the case among the people interviewed in New Mexico. Participant 4 summarized this best when he told us, “I'm told there are people who are lactose intolerant but if they had, I didn't-- I frankly didn't know anybody who complained of anything like that at that time.”

**Vegetables**

Participants confirmed the consumptions of many of the same vegetables that were documented in the literature review and provided the names of many other wild leafy greens that were gathered from the wild, including wild asparagus, verdolagas (purslane), quelites (lambsquarters or wild spinach), and watercress. Cactus fruits, prickly pear, and mescal were consumed by at least 20% of the participants. There were numerous other plants, unique to the desert, that were reported to be used in teas and as natural remedies.

The vast majority of participants (89%) reported both growing and collecting vegetables and fruits. Many vegetables were grown in home gardens and eaten soon after picking, and only sometimes rinsed. Vegetables were either cooked into stews or hung to dry. Many people mentioned drying zucchini, calabacitas, and melons. Participant 1 specified that these were left to hang outside, “Where the sun could get them”.

**Traditional Foods**

The majority of participants reported similar staple foods when describing their diet. These included chili, beans, corn, squash, potatoes, wild spinach, dried meat and tortillas. There were certain regional dishes made from these dishes that participants mentioned eating, including posole (corn and pork stew), atole (corn, ash and milk porridge drink), menudo (organ meat dish), and chili. Participants (66%) also confirmed the consumption of clay, ash and soil in some of these dishes. Earth was also consumed directly by licking adobe from walls.

**Aim 6**

The results from the literature review and key informant interviews were combined and collectively analyzed in order to develop tools for Phase II of the study. These tools consist of a comprehensive a list of foods (Table 3), card sorting exercise and the Focus Group Guide (Appendix E.3. Table 3 includes the list of foods generated from those documented in the existing literature and those that were reported to be consumed during Phase I key informant interviews. This list will be further categorized and internal doses will be attributed to these foods. Because of the diversity in diets and lifestyles across the various communities of New Mexico, it will be necessary to determine which foods were commonly consumed by which communities. Therefore, we designed the card sorting exercise, which is a widely used mixed-method, to determine the consumption and frequency of foods consumed by each community included in the Focus Groups. The Focus Group guide has been developed to quantify the amounts of each foods consumed according to gender and age. Wall charts were designed to facilitate discussion among participants and to incorporate novel foods identified during Phase I of the Study. For example, atole and white gravy have been added to the Dairy wall chart (#1) since these were commonly consumed dairy products unique to New Mexico. Wall Chart 6 asks about the **source** of drinking water and specifically includes the numerous water sources that were identified by Phase I. We have also included a Wall chart (#7) to gather information regarding the amount of earth ingested.

**Conclusions**

Phase 1 of the Study was successful in recruiting Hispanic and Native American elders to provide information about diet and lifestyle practices in New Mexico in the 1940s and 1950s. The elders seemed able to recollect events and practices from the past and report on them to the satisfaction of the team. From these initial field efforts, the study team has established the feasibility of conducting Phase 2 of the study and has designed community-informed tools to conduct this research.

Table 1. Descriptions of Phase 1 participants

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Participant # | Geographic area | Sex | Hispanic/NA\* | Age (y) |
| 1 | Rural | F | Hispanic | 80 |
| 2 | Mountains | M | NA | 75 |
| 3 | Rural | F | Hispanic | 101 |
| 4 | Urban | M | Hispanic | 80 |
| 5 | Urban | F | Hispanic | 84 |
| 6 | Urban | F | Hispanic | 77 |
| 7 | Mountains | M | NA | 70 |
| 8 | Rural | M | Hispanic | 80 |
| 9 | Mountains | F | NA | 76 |

\*Native American

Table 2. Number and percentage of participants reporting important dietary and lifestyle pathways of exposure

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Pathway | n | % | Geographic Location | Ethnic Composition | | |
| Water |  |  |  |  |  |  |
| Piped water | 3 | 33 | Urban | Hispanic |  |  |
| Acequia, ditch, stream | 5 | 56 | Rural | Hispanic and Native American | | |
| Well | 2 | 22 | Rural | Hispanic and Native American | | |
| Rain barrels | 3 | 33 | Rural | Hispanic and Native American | | |
| Cistern | 1 | 11 | Rural | Hispanic |  |  |
| Meat |  |  |  |  |  |  |
| Organ | 4 | 44 | Rural/Urban (low SES) | Hispanic and Native American | | |
| Hunted | 3 | 33 | Rural | Hispanic and Native American | | |
| Fish | 3 | 33 | Rural | Hispanic and Native American | | |
| Dried Meat | 6 | 67 | Urban/ Rural | Hispanic and Native American | | |
| Dairy |  |  |  |  |  |  |
| Cows' Milk | 9 | 100 | Urban/ Rural | Hispanic and Native American | | |
| Goats' Milk | 2 | 22 | Mountains |  |  |  |
| Cheese (cow or goat) | 6 | 67 | Rural/ Mountains | Hispanic and Native American | | |
| Canned | 4 | 44 | Urban/ Rural/ Mountainous |  |  |  |
| Butter | 3 | 33 | Rural | Hispanic |  |  |
| Vegetables |  |  |  |  |  |  |
| Garden | 8 | 89 | Urban/ Rural/ Mountains | Hispanic and Native American | | |
| Wild | 8 | 89 | Urban/ Rural/ Mountains | Hispanic and Native American | | |
| Earth |  |  |  |  |  |  |
| Consumed |  |  |  |  |  |  |
| Adobe/ dirt | 3 | 33 | Urban/ Rural | Hispanic |  |  |
| Clay | 3 | 33 | Rural/ Mountains | Native American | |  |
| Ash | 3 | 33 | Rural/ Mountains | Hispanic and Native American | | |
| Housing |  |  |  |  |  |  |
| Adobe | 4 | 44 | Urban/ Rural/ Mountains | Hispanic and Native American | | |
| Adobe and wood | 4 | 44 | Urban/ Rural/ Mountains | Hispanic and Native American | | |
| Wood only | 1 | 11 | Mountains | Native American | |  |

Table 3: List of Foods by Food group consumed in New Mexico during the 1940-1950s.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Animals** | | | **Plants** | | | | | **Natural Elements** | | |
| **Dairy** | **Herbivore** | **Omnivore** | **Low Plant or Shrub** | **Nuts and grains** | **Root Vegetable** | **Leafy Greens** | **Fruit** | **Water** | **Clay or Soil** | |
| arroz con leche | antelope | bear | Alfalfa | acorns | beets | yerba buena | elderberries | well water | adobe | |
| boiled eggs | bighorn | birds | amaranth (seeds and greens) | agave and mescal leaves | carrots | asparagus | gooseberries | cistern | ash | |
| butter | bison | bobcat | aulospermum purpureum | alcoholic beverages made from plants | garlic | brew of herbs (leaves, twigs, etc.) | grapes | ditch | ash, in atole | |
| Cheese | bone, stew | bush or wood rat | bark of pinus ponderosa | avas | gum, from tree | cabbage | raspberries | water, rain for cooking | clay | |
| cheese; cow | buffalo | chipmunk-like | bell peppers | baked/boiled white corn tamales | Mariposa Lily root | calitas | squaw berries | water, spring | dirt | |
| cheese; goat | cattle | chorizo (pork, beef, chicken) | buffalo grasses |  | mescal tubers | celery | strawberries | piped water | juniper ashes | |
| cheese; longhorn | chicken | lard | Calabacitas |  | onions | chemo podium (greens) | agarita berries |  | juniper branches, used to clean ovens |
| cottage cheese | chicken; gizzard | morongo | cattail, rootstocks | blue corn meal mush | potatoes | chimaja | apples |  | native salt | |
| cream gravy | cow | pig | Chamomile | breads: wheat and corn | radishes | cilantro | apricots |  | volcanic | |
| eggs | deer | pig , loin | Chenopodium | cactus | resembling sweet potato | dried spinach | bananas |  |  | |
| ice cream | donkey | pig, blood | chile peppers | cactus fruits | rhubarb | hai chideh | bitter red berries |  |  | |
| manteca (butter) | dove | pig, feet | cogswellia orientalis |  | root chew | herbs (oregano) | boysenberry |  |  | |
| milk | dried fish | pig, head | colorado bee plant | cereal | rutabaga | horsemint | cherries |  |  | |
| milk; cow | dried jerky | pig, skin | Cota | chicos | sedeg tubers | lettuce | choke cherries | |  | |
| milk; goat | ducks | rodents (rats) | Cucumbers | choke cherry cakes | small wild potato, | locust blossoms | citrus fruits |  |  | |
| milk; in bread | elk | soap, pig fat |  | cholla cacti fruit | sweet potato | mint | datil |  |  | |
| natilla | fish |  | descurainia Sophia | coffee | turnips | osha | figs |  |  | |
| pastel de queso | goat |  | dried muskmelon | corn (Blue) | White potatoes | parsley | grapefruit |  |  | |
| queso fresco | guinae, hens |  | dried pumpkin | corn (common varieties) | Wild carrot roots | purslane | hackberries |  |  | |
| rennet | horse |  | dried watermelon | crackers | wild onion | spearmint | hawthorn fruits |  |  | |
| milk; canned | locusts |  |  | flour | wild potato | spinach | juniper berries |  |  | |
|  | mountain sheep |  | dried, squash | fried bread | yucca | squash blossoms | mulberries |  |  | |
|  | mule |  | Gourds | fruit of screw bean | dried yucca | string beans | opuntia fruit |  |  | |
|  | mutton/lamb |  | Grass seeds |  |  | wild celery | oranges |  |  | |
|  | neck, stew meat |  | green chili | green corn |  | Wild Greens (purslane, asparagus, and quelites) | peaches |  |  | |
|  | ox |  | Guaco |  |  | Wild mountain tea | pears |  |  | |
|  | prairie dogs |  | Horsebeans | hops |  | Wild spinach | plums |  |  | |
|  | quail |  | Indian perfume | hotcoats (corn meal) |  | wild tobacco | sumac berries |  |  | |
|  | rabbit |  | inner bark and sap of box elder and inner bark of pine and aspen- sweeteners | Indian banana, skin peeled |  | peppermint | wild plum |  |  | |
|  | sardines |  | inner bark of pine used for sweetener, bee honey | Indian millet |  | Wild mountain tobacco | currants |  |  | |
|  | sheep |  | Itchee | Lechuguilla |  | verdolagas |  |  |  | |
|  | sheep, intestines (liver) |  | Juniper | Maguey |  | tobacco |  |  |  | |
|  | squirrel |  | juniper bark, smoked | mescal |  | watercress |  |  |  | |
|  | tuna |  | Melon | mesquite |  |  |  |  |  | |
|  | turkey |  | Milkweed | mesquite beans |  |  |  |  |  | |
|  |  |  | Mushroom | mesquite pods |  |  |  |  |  | |
|  |  |  | Muskmelons | mezcal |  |  |  |  |  | |
|  |  |  | narrow leaf grass | molasses |  |  |  |  |  | |
|  |  |  | Peas | nopales |  |  |  |  |  | |
|  |  |  | Pennyroyal | oatmeal |  |  |  |  |  | |
|  |  |  |  | oats |  |  |  |  |  | |
|  |  |  | prunus melanocarpa | orobanchaceae |  |  |  |  |  | |
|  |  |  | Pumpkin | peanut butter |  |  |  |  |  | |
|  |  |  | rhus Canadensis | peyote |  |  |  |  |  | |
|  |  |  | rocky mountain bee plant | pinole bread |  |  |  |  |  | |
|  |  |  | rosemary seeds | pinon nuts |  |  |  |  |  | |
|  |  |  | Sagebrush | pinus edulis |  |  |  |  |  | |
|  |  |  | Saltweed | popcorn |  |  |  |  |  | |
|  |  |  | screw bean |  |  |  |  |  |  | |
|  |  |  | seeds; pigweed, tumbleweed, and grasses like dropseed | rice |  |  |  |  |  | |
|  |  |  | shepherd purse | saguaro fruit |  |  |  |  |  | |
|  |  |  | silver nightshade berries | smoking cornhusk or "green corn" |  |  |  |  |  | |
|  |  |  | skunk brush | sotol- prepared in the same manner as agave |  |  |  |  |  | |
|  |  |  | Snakeweed | sunflower seeds |  |  |  |  |  | |
|  |  |  | Snakeweed | timothy |  |  |  |  |  | |
|  |  |  | Solanum Jamesii |  |  |  |  |  |  | |
|  |  |  | sporobolus cryptandrus | walnuts |  |  |  |  |  | |
|  |  |  | spruce leaves | wheat |  |  |  |  |  | |
|  |  |  | stalks of bear grass and amore (roasted and peeled) | wheat |  |  |  |  |  | |
|  |  |  | Tomatoes |  |  |  |  |  |  | |
|  |  |  | Tomatoes |  |  |  |  |  |  | |
|  |  |  | tule, rootstocks |  |  |  |  |  |  | |
|  |  |  | Vetch |  |  |  |  |  |  | |
|  |  |  | Watermelon |  |  |  |  |  |  | |
|  |  |  | white evening primrose fruits |  |  |  |  |  |  | |
|  |  |  | Wide leaf Yucca dried fruit |  |  |  |  |  |  | |
|  |  |  |  |  |  |  |  |  |  | |
|  |  |  | wild pea pods |  |  |  |  |  |  | |
|  |  |  | Wine |  |  |  |  |  |  | |
|  |  |  | wolf berries/ tomatillo |  |  |  |  |  |  | |
|  |  |  | wood sorrel |  |  |  |  |  |  | |
|  |  |  | yucca fruit |  |  |  |  |  |  | |
|  |  |  | yucca glauca |  |  |  |  |  |  | |
|  |  |  | tuna (cactus fruit) |  |  |  |  |  |  | |
|  |  |  | bean, pinto |  |  |  |  |  |  | |
|  |  |  | Beans |  |  |  |  |  |  | |
|  |  |  | prickly pear |  |  |  |  |  |  | |
|  |  |  | Cantaloupe |  |  |  |  |  |  | |
|  |  |  | green beans |  |  |  |  |  |  | |
|  |  |  | green onion |  |  |  |  |  |  | |