

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	pipid 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	bread: 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	Indian millet		Wild	currants		

			used for sweetener, bee honey			mountain tobacco			
	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						