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Jennifer Nu, Andrea Bersamin

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## Collaborating With Alaska Native Communities to Design a Cultural Food Intervention to Address Nutrition Transition

Jennifer Nu, MS, Andrea Bersamin, PhD

University of Alaska Fairbanks, Institute of Arctic Biology, Center for Alaska Native Health Research

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### Abstract

**Background:** To address changing dietary patterns and declining dietary quality in indigenous communities, there is growing interest in implementing interventions that promote nutrient-dense, culturally important foods.

**Objectives:** To describe formative research and an ongoing collaborative process to design a multilevel nutrition intervention—*Neqa Elicarvigmun* or the Fish-to-School (F2S) Program—that reconnects students to their local food system in a remote Yup'ik community in Western Alaska.

**Methods:** Qualitative data that explored the connection between salmon and well-being were collected and collaboratively reviewed with a community work group and analyzed using thematic analysis. Findings were used to co-design the nutrition intervention.

**Lessons Learned:** Formative research findings and ongoing collaboration between academic and community partners informed the final intervention design.

**Conclusions:** Because people's behaviors and interactions with culturally significant foods are embedded in cultural perceptions and local contexts, it is important for nutrition interventions to address local perceptions of these foods.

### Keywords

Curriculum, nutrition, community health research, health promotion, vulnerable populations

To address changing dietary patterns and declining dietary quality in indigenous communities, there is growing interest in implementing interventions that promote nutrient-dense, culturally significant foods that are harvested or produced locally.<sup>1,2</sup> Evidence-based nutrition interventions often arise from a Eurocentric biomedical framework based on Western science that emphasizes understanding how food and its components influence biophysical processes to prevent or cause disease.<sup>3</sup> By contrast, local understandings of food and health in indigenous communities arise from integrated, holistic, place-based worldviews that are connected to local value systems and address the spiritual, social, cultural, and economic contexts of a person's life.<sup>4,5</sup>

Spiritual connections and reciprocal relationships between the natural world and the world of human beings contribute to well-being and are vital to local food systems.<sup>3,5</sup>

Designing interventions that address dietary quality in indigenous communities is a process that requires combining indigenous ways of knowing with evidence-based strategies.<sup>6–9</sup> Because people's behaviors and interactions with culturally significant foods are embedded in cultural perceptions and local contexts, it is important for nutrition interventions to address local perceptions of these foods.<sup>10</sup> This requires a collaborative process between outside researchers and community members to create a space to listen and engage in dialogue with community members about local percep-

tions and meanings of food, health, and well-being beyond nutrition.<sup>7,11,12</sup> Feedback mechanisms throughout the process ensure that the emerging intervention design aligns with the community's perceptions of food.

Previously documented food system interventions implemented in communities by external agencies have worked with a community partner and/or organization to understand and adapt the intervention to local needs and community priorities.<sup>13</sup> For example, the Traditional Food for Health Intervention in Pohnpei, Federated States of Micronesia, was informed by a formative research component that used strategies such as key informant interviews and focus groups, including an examination of Pacific versus Western food-related values.<sup>14</sup> Likewise, the Healthy Foods North intervention in the Canadian Arctic used a community participatory process, including community workshops and qualitative and quantitative formative research.<sup>15</sup> Native American tribal organizations have produced guides such as *The Food Sovereignty Assessment Tool* compiled by The First Nation Development Institute to inform the planning process according to community needs and perspectives.<sup>16–18</sup>

Although cultural food interventions have been beneficial to the health and well-being of communities around the globe, these design strategies have not previously been implemented in the context of contemporary indigenous communities in rural Alaska. This paper builds on the processes pioneered by these studies and programs by sharing how this approach used formative research to explore and apply local meanings of a culturally significant food to design a nutrition intervention in an Alaska Native community.

The intervention, called *Neqa Elicarvigmun* or the Fish-to-School (F2S) program, responds to concerns expressed by Yup'ik community members in Southwest Alaska that youth were becoming increasingly removed from a traditional nutrient-dense, fish-based diet.<sup>19–22</sup> The program focuses on reconnecting middle and high school students with their local, traditional food system to by promoting fish at the individual and community level. It is hoped that the lessons learned from this process can inform future food system research and health interventions in indigenous communities and other cross-cultural contexts.

## METHODS

Designing the F2S intervention was a two-phase process

that involved close collaboration with community members in a Yup'ik community of the Yukon Kuskokwim Delta. Farm-to-cafeteria interventions have been widely implemented throughout the United States to connect school-age students with their local food system.<sup>23</sup> This intervention is the first time such a program has been adapted for use in Alaska Native communities.<sup>24</sup> Salmon was chosen as the focus of the intervention because of its role as both a traditional food and a commercial local product that can be served in school lunches under food service regulatory guidelines. Adapting the intervention required understanding the context of how salmon contributed to the lives of community members beyond nutritional benefits.

In phase 1, formative research was conducted to explore local perceptions of well-being connected to salmon. In phase 2, findings from phase 1 were applied to the design of the F2S intervention in collaboration with the work group.

## Geographic Context

The intervention took place in a Yup'ik community located in a region of southwestern Alaska, roughly the size of the state of Oregon. About 31,000 people live in this region that is the traditional homeland of Yup'ik and Cup'ik people. Approximately 79% of residents in this region are all or part Alaska Native.<sup>25</sup>

The food system in rural Alaska Native communities is based on mixed subsistence–cash economies. Traditional foods, such as salmon, are directly harvested from the natural environment, processed locally, and distributed through nonmarket economic channels.<sup>26,27</sup> Fish and seafood continue to be important sources of essential nutrients.<sup>19–22</sup> Commercial fishing and working at the local fish processor provide a major source of cash income in the summer for many residents.<sup>27</sup> The school district has a universal free school lunch program in which virtually all students participate. Although the school lunch meets national nutrition standards, the menus are poorly aligned with traditional dietary patterns and may serve to widen the disconnect between students and their traditional food system.

All communities in the participating school district have one Kindergarten through 12 school per community. Intervention development took place in partnership with one community. The school district and the site administrator provided permission and supported the intervention activities at the school, but nonlocal school staff did not participate in

intervention development owing to high school staff turnover and the absence of school staff in the community during the summer months, when most of the development activities took place. Working with community members who live year-round in the community encouraged greater community ownership of the intervention.

### Participant Recruitment

The research team hired a local program coordinator to assist with intervention development and implementation activities. The coordinator was a college-educated Yup'ik resident who was born and raised in the community. The local coordinator was an active participant in subsistence activities, a singer in the local traditional dance group, and a substitute teacher at the school.

A community work group was formed to collaborate with academic research partners to design and implement the intervention. The local coordinator led recruitment efforts. A purposive sampling strategy to recruit work group members allowed a diverse representation of perspectives by age, sex, and occupation. Selection criteria required that potential members be residents of the community and interested in improving the health of youth. The 10-member work group included an Elder, tribal council members, city government, former and current teachers, parents, high school and university students, representatives from the fishing and business development sector, and other respected community leaders. Nearly all work group members had children at the school or worked at the school in one form or another. The research team elected to recruit a large and diverse work group to be inclusive and to account for attrition. Attrition is a common occurrence with community advisory councils and working groups owing to competing commitments (e.g., subsistence activities), scheduling challenges, and declining interest, and it was no different in this situation. Refreshments and honoraria were provided to compensate participants for their time at meetings.

### Phase 1: Exploring Perceptions of Salmon and Well-Being

*Data Collection.* Formative research used a focus group to explore perceptions of how salmon promotes health and well-being in the community. Focus groups provide a comfortable setting for community members whose long-standing relationship with the region, subject matter, and shared expe-

riences encourage rich discussion.<sup>28</sup>

Because of the democratic and community-oriented characteristic of Yup'ik culture, previous studies in the region indicated focus groups to be a more effective data collection method in Yup'ik communities than other qualitative methods, such as interviewing.<sup>5,29,30</sup>

The first work group meeting was held as an introductory workshop that included time for a focus group to explore the connection between salmon and well-being as a foundation for developing the intervention. The focus group was facilitated by the lead author, who had previous experience working in Yup'ik communities and facilitating meetings in rural Alaska. The local coordinator also co-facilitated the group. Special efforts were made to ensure that all participants had an opportunity to speak on a topic. Focus group participants also assisted with translations for the elder and encouraging the student to express her point of view.

The focus group discussion responded to the question, "How does salmon promote a good life in this community?" This question was designed to be broad enough to capture physical, psychological, social, economic, environmental, cultural, and spiritual dimensions of well-being, while also focusing on salmon. After free responses, the facilitator and the work group generated a list of themes to reflect ways that salmon promoted community and individual well-being.

*Data Management and Analysis.* During the focus group, the facilitator and the work group reiterated key concepts discussed to identify salient themes that linked salmon to "a good life." This was the initial codebook. The focus group audio recording was transcribed verbatim and coded by the lead facilitator to capture any additional themes. The local community coordinator and an outside academic partner also coded the transcript. Their codes were checked against the initial codebook. Techniques of consensual qualitative data analysis were used to organize selected quotes into thematic categories and to operationalize themes.<sup>31,32</sup> Although no intercoder agreement was assessed, the final themes from the analysis were presented to the work group for their verification.

### Phase 2: Applying Local Perceptions to Intervention Design

*Data Collection.* Nine additional work group meetings were convened to design the intervention components based on the ways salmon promoted well-being. On average, a core

Table 1. Community Perceptions of Salmon and Well-Being

Theme	Theme Description	Quotes
	Participants shared that salmon supported family unity and harmony, highly valued in Yup'ik culture. Salmon was the reason intergenerational members of the family lived in seasonal fish camps and worked together to harvest and process fish for winter.	<p>"Salmon and salmon fishing strengthens family life."</p> <p>"We lived in camps in the summertime and our family was always together."</p> <p>"A lot of the guys go out . . . as helper with their dads, uncles, cousins, other brothers, older friends. I don't know about the younger girls, but I helped my mom cut fish because I'm her only helper."</p>
Traditional life skills	For participants, traditional knowledge and life skills about salmon contributes to mental, social, and cultural well-being. Participants valued engaging young people in traditional and contemporary fishing-related activities to gain the firsthand knowledge and experience of setting nets and learning good places for fishing. Because foods at the local store were expensive and depended on distribution networks based outside the community, having the knowledge and ability to harvest fish and other subsistence foods helped supplement a family's food supply and contributes to physical well-being. These skills were essential to self-reliance and survival in a remote region where people travel long distances via boat and snow machine.	<p>"And the work to teach how to fish and how to maintain our gear . . . if you teach them at a young age, and no matter what they do they always have fishing to do . . ."</p> <p>"We can't just take any other wood like this and burn. It's got to be a certain wood. If you use ah, um, wet wood or kind of in-between dry and wet you have really dark-looking dried fish."</p> <p>"Some girls don't like to touch fish. I had to talk to them and tell them, that's our main food, don't matter if you don't like it, one of these days you might have to handle one."</p> <p>"If you break down somewhere and nobody knows where you're at, how are you going to survive? We run out of food. But if you have a net, you'll always have some food."</p>
Neqpik: Real Food	<p>Participants valued salmon as <i>neqpik</i>, which means "real food" in Yup'ik. The word <i>neqa</i> translates into a general term for "food" as well as "fish," which signifies the nutritional and cultural importance of fish in the traditional diet of the Yup'ik people. Participants observed that salmon and other traditional foods satiated one's appetite while some market foods left a person hungry soon after eating, suggesting a preference for traditional foods over certain market foods for physical and cultural well-being.</p> <p>Participants also mentioned the importance of knowledge about traditional rules for eating local foods, a Yup'ik concept called "<i>nernerlluk</i>." For example, one participant shared that a person who is severely ill or recovering from serious illness should abstain from eating foods considered to be heavy or rich, such as king salmon. Such foods are traditionally considered to interfere with or slow the healing process. This traditional knowledge represented specialized local understandings and behaviors related to salmon's connection to physical well-being.</p>	<p>"When we get tired of eating meat, we could easily switch to fish and cook it the way we want, no directions needed . . . fish broth is very nutritious. It helps our body. Mostly blackfish. When my late dad wasn't feeling good, unable to eat, mom would feed him fish broth little by little . . . one or two days later he was able to eat again."</p> <p>"Maybe our bodies aren't prepared for the high sugar, high sodium products at the store . . . our bodies aren't used to it, so you can have adverse effects you know, just eating store-bought foods."</p> <p>"You know, working up at the school sometimes I notice that um, sometimes the cooks serve us really lots, lots of times, and by the time we are done we're already hungry."</p>
Support local livelihoods	Salmon was described as a foundation for community members livelihoods and economic well-being. Salmon contributed to the cash economy as an income-generating activity. Harvesting and processing one's own salmon for winter and contributed to household food security and the subsistence economy.	<p>"A lot of the local economy depends on how the fishing goes," observed one participant. "[Commercial fishing] provides opportunities for employment."</p> <p>"You're saving money anyways, because you're putting food away for the winter, and then that's something you don't have to buy."</p> <p>"It provides a staple food for winter."</p>
Pride	Participants recognized salmon as a source of great pride for the community, which promotes psychological and emotional well-being.	<p>"We gotta have pride in the fish we eat. We gotta make sure our kids fall in love with those fish so they can carry on later after I'm way underneath the ground."</p> <p>"Our salmon is world famous and the quality of the fish is appreciated around the world," said one participant referring to the local salmon that is exported and marketed for its exceptionally high levels of omega-3 fatty acids.</p>

table continues

Table 1. *continued*

Theme	Theme Description	Quotes
Hard work	Participants spoke positively about the physical and psychological benefits of hard work associated with salmon. The daily tasks required of fish camp life (e.g. fishing, cutting and smoking fish, repairing gear, tending the smokehouse, fetching water, sharpening <i>uluqs</i> or traditional knives) promote physical well-being by keeping people active and contribute to psychological well-being because these real-life tasks result in tangible outcomes.	<p>“In camps you’re pretty much busy the whole time . . . there’s always something to do at camp . . . you have to make sure you cut up wood to get the fish going and make your stuff ready to sharpen knives or clean your net.”</p> <p>“Learn how to fish then you’d be busy all the time, you wouldn’t have to worry about a recreation center. There’s lots of things to do instead of staring at your phone.”</p> <p>“Getting salmon is a . . . good distraction. Keeps your mind off of the world and you have set in your mind that you want to survive so you’re preparing for the future and you’re not thinking of today’s problems.”</p> <p>“It has to be worked for. It’s not an easy venture to go out there. You can’t just like take your net and put it in the water. You have to work on it, you have to buy the net, and you have to have a boat or somebody with a boat.”</p>
Connection to the environment	Salmon contributed to spiritual dimensions of well-being as a part of the Yup’ik people’s relationship to the local and global environments.	<p>“Salmon spend a large part of their life cycle way beyond Alaska and so what happens to them out there affects us directly.”</p> <p>“You have to be aware of what’s going on in the environment and the ocean and the river.”</p> <p>“There’s a spirituality beneath subsistence fishing, sense of respect for the land and our relationship to nature.”</p>
Social connection	Salmon promoted social well-being by strengthening social connections and reciprocal relationships between community members. Participants highlighted the Yup’ik value of sharing salmon and other subsistence foods during times of celebration and mourning, and sharing with elders, widows, and those unable to fish for themselves.	<p>“Fishing teaches you to be a provider, learning to be independent instead of dependent. Also teaches to be interdependent, like providing for other families for funerals.”</p> <p>“Fishing is like a common goal that ties everyone together. Because the whole town is thinking about it, catching fish and it’s like, a common goal for everyone.”</p> <p>“We share, too, during potlucks, or when um, maybe someone loses a loved one.”</p> <p>“It promotes traditional values of sharing, hospitality when guests come, you know you want to share the best you have and offer them some salmon.”</p>
Gratitude	<p>Sharing salmon and participating in salmon-related activities provide opportunities for gratitude. It facilitates relationships between people and the environment and strengthens relationships between people.</p> <p>Reciprocity can be defined as a cyclical relationship between two entities in relationship with each other, such as in nature or between people, which involves giving back or redistribution of tangible and intangible assets to maintain balance and kinship ties. The work group specifically emphasized the Yup’ik value of gratitude in relation to salmon because reciprocity and cultural foods are inextricably linked.</p>	<p>“Salmon promotes the value of being thankful, being thankful for what the land has to provide.”</p>

group of four to six members from the initial focus group were present at each meeting. To address attrition, detailed meeting summaries were sent to all original work group members, and the lead author contacted absent work group members for

feedback through phone calls, office visits, and home visits. The meeting summaries were compiled to track how findings from phase 1 were incorporated into the phase 2 intervention design. The lead author and local coordinator also attended

meetings with elders groups, local tribal and city councils, and joint meetings of local organizations to solicit suggestions and feedback of all emerging iterations of the intervention design.

*Research Ethics.* This study was approved by the Institutional Review Board at the University of Alaska Fairbanks. Additional approval was granted by the Human Subjects Committee at the Yukon Kuskokwim Health Corporation, which is the primary service provider for this region's communities.

## RESULTS

### Phase 1: The Connection Between Salmon and Well-being

Nine major themes emerged from the focus group discussion that represented diverse aspects of well-being supported by salmon. These themes are: family, traditional life skills, *neqpiik*, real food, support local livelihoods, pride, hard work, connection to the environment, social connection, and grati-

tude. Table 1 organizes information about the themes with community member quotes and a detailed summary of each.

### Phase 2: Applying the Findings to the F2S Intervention

**F2S Intervention Development: A Conceptual Model.** The F2S intervention was shaped by an iterative, collaborative process that applied local perceptions, values, and priorities from phase 1 into the final intervention design. The process is illustrated by a conceptual model (Figure 1) based on a cultural object or concept that is unique and meaningful to the community.<sup>7,30</sup> This model was developed by the research team and illustrated by the local F2S community coordinator to describe the intervention development process using the metaphor of a gillnet, which is used in the region for commercial and subsistence salmon fishing.<sup>33,34</sup>

The mesh on the model represents findings from phase 1 because community perspectives on salmon's connection to

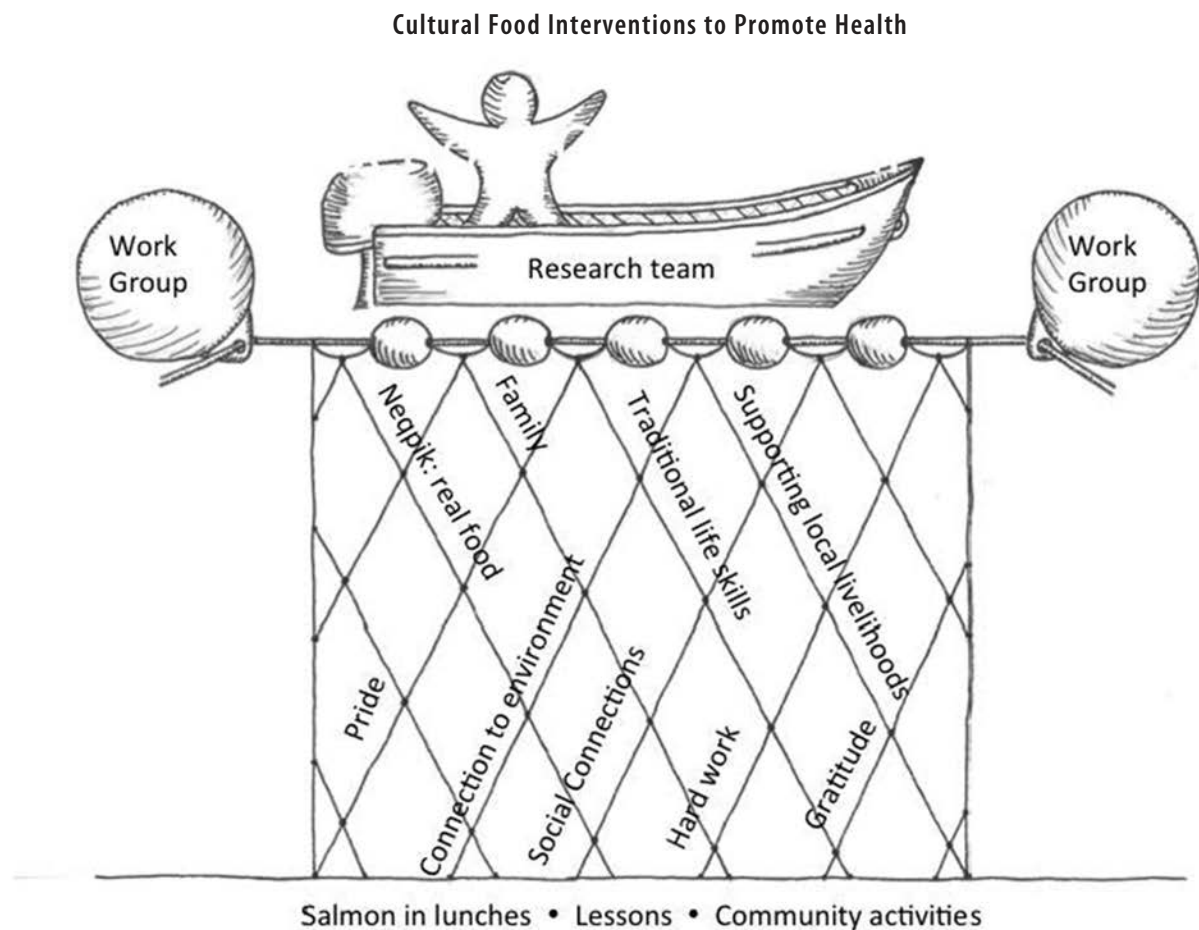


Figure 1. Fish-to-school conceptual model.

well-being set the parameters of the intervention design to “catch” the desired outcome of changing dietary behavior to favor local salmon and other traditional foods.

The lead line at the base of the net weighs the mesh open under water. This symbolizes the three core intervention components: 1) serving local salmon in school lunches, 2) delivering lessons illustrating the benefits of traditional foods, and 3) hosting community activities that celebrate salmon.

Finally, the water-level components of the conceptual model represent the actors driving the intervention design. The buoys and floats represent the work group members who upheld the themes in the net during the development process. During intervention development and implementation, the research team drove the boat and guided the intervention research process. Upon conclusion of the larger study, the research team will transfer the intervention design and study findings to community leaders so they can adjust the parameters of the net to drive the intervention in their own direction.

### Integrating Phase 1 Themes Into Intervention Components

Table 2 shows how the themes that connected salmon to well-being were integrated into the intervention components.

*Salmon in the School Lunches.* Salmon was purchased from a community-based organization and fish processor that provided significant employment opportunities for regional residents. All students at the school received salmon in their lunches roughly once a week for the duration of the intervention. The school lunch component supported salmon’s role in reinforcing social connections and supporting local livelihoods by connecting students with fish produced by members of their own community. The theme of salmon as *neqpiq* and work group recommendations prompted efforts to adapt familiar local salmon recipes for school cafeteria regulations rather than use recipes developed for urban palates.

*Community Activities.* Community activities included a local fish-themed scavenger hunt, a food-themed film festival, culinary classes, and a community food celebration. Phase 1 findings set the stage for activities to be intergenerational and family friendly, teach life skills, and integrate concepts of reciprocity and social connection into the activity design. Work group meetings were held to design, plan, and coordinate logistics and volunteers for the community events. All community activities were free and open to students of all

grade levels, their families, and community members.

*Food System Lessons.* The work group applied phase 1 themes to review and modify preliminary lesson drafts into culturally relevant, place-based curriculum that promoted salmon-related dimensions of well-being. In addition to increasing food-related knowledge, the lessons aimed to also prepare students to make food choices that benefit their personal health, correspond with community values, and respect the environment. Work group members contributed community-specific scenarios in the lessons to reflect the local mixed subsistence–cash economy and highlighted the social connections that supported the harvest, processing, and distribution of local subsistence salmon. The lessons were delivered to middle and high school students in grades 7 through 12 as part of the intervention.

## DISCUSSION

Phase 1 elucidated the cultural significance and values of a local food that might have otherwise been overlooked in an intervention that promoted only the food’s nutritional merits. By going beyond the biomedical framework of well-being, this community-centered process set a foundation for effective and meaningful health promotion by identifying salmon’s connection to multiple aspects of health and well-being to inform the final intervention design.<sup>35</sup>

Local involvement in health promotion activities increases the chances for an intervention’s sustainability because participation in the design process fosters community ownership of the intervention results.<sup>36,37</sup> A commitment to incorporating local perspectives and collaboration with the work group gained widespread community support for the intervention. Broad lessons learned from the process of developing the F2S intervention may be useful designing similar cultural food interventions in other settings.

### Strong Academic–Community Partnership

The commitment of financial and intellectual resources was valuable for developing a collaborative academic–community partnership to support the intervention design process.<sup>38</sup> At the invitation of the work group, the lead author lived in the community for a month during the summer salmon season during phase 2 and returned regularly throughout intervention implementation. Spending time in the community facilitated the coordination between academic and community

Table 2. Integrating Phase 1 Themes Into the F2S Intervention

Intervention Component	Activity	Theme	Anticipated Outcome
Salmon in the lunches	Source local salmon	Support local livelihoods	School purchases fish from local processor thereby creating new market for the processor and enhancing its sustainability.
		Gratitude/social connection	Students appreciate contribution of community members to their lunch.
	Adapt local salmon recipes for cafeteria menu	Neqpik	Recipes reflect traditional food preference.
		Pride	School values community salmon recipes.
Lessons	Demonstrate environmental, nutritional, and economic impacts using a comparison of local and non-local food supply chains	Pride	Students recognize benefits of local fish and subsistence foods.
		Social connections	Students understand how salmon brings community members together.
		Connections to environment	Students understand how food choice affects the environment.
		Support local livelihoods	Students recognize benefits of participating in subsistence activities and eating subsistence foods.
		Neqpik	Students learn about <i>nernerluk</i> , specialized Yup'ik food knowledge.
	Include local images and community-specific scenarios in curriculum materials and content	Pride	Students create advertisements that highlight the environmental, cultural, and health benefits of local salmon.
		Social connections	Students recognize the ways that salmon is exchanged through local sharing networks.
		Connection to the environment	Board game highlights the importance of conservation and a clean environment for managing sustainable salmon populations.
		Gratitude	Students appreciate community members' and their own contribution to the local salmon industry and subsistence lifestyle.
		Hard work	Lessons highlight the value of students' participation in salmon and subsistence-related activities.
Community activities and	Design activities to be intergenerational and family-friendly	Family	Community members and families participate in activities.
	Offer cooking lessons	Traditional skill development	Students develop skills in cooking contemporary and traditional salmon recipes.
		Hard work	Students understand the process and work required to prepare a meal.
		Pride	Students feel pride for their accomplishments and new skills.
	Integrate reciprocity into activities	Social connection	Student and community-generated materials for media campaign recognizes student learning and creativity.
		Gratitude	Activities provide opportunities for participants to give salmon to elders.

partners and increased awareness and community support for the intervention by demonstrating a genuine interest and commitment to making the intervention more locally relevant.

### Flexible Timelines

Flexible timelines were necessary to balance the intervention planning and implementation needs with existing community commitments. Allowing time for formative research allowed the findings to refine the intervention design before implementation. Unexpected circumstances such as emergency school closures and deaths in the community required flexibility to reschedule planned events and meetings.

### Good Communication Strategies

Effective communication over geographical distances and in cross-cultural contexts was a challenge. Although preferable, in-person meetings were not always possible owing to the high expense of travel to the remote community. Unreliable Internet and telephone service in the community posed communication barriers between the academic research team and community partners. Developing good communication strategies was an ongoing process that required a variety of methods, including text messages, emails, telephone, and social media.

### Respectful Engagement With Diverse Stakeholders

It is important to understand and respond to social and cultural norms to respectfully engage with diverse stakeholders. Elders and youth contributed significantly less to the discussions than the adults. Holding separate work group meetings for Elders, youth, and adults is recommended in this cultural context to provide a more comfortable setting for participants to share openly with others of their age group.

## CONCLUSIONS

A commitment by researchers to understand local values and meanings of culturally important foods can strengthen nutrition interventions in indigenous communities. Valuing community perspectives as part of designing the F2S intervention set the stage for a mutually beneficial academic–community partnership and generated strong community support.

Overall, community collaboration resulted in significant changes made to culturally adapt an existing intervention model to a Yup'ik community in Southwest Alaska. It is hoped that the process used to design the F2S provides a guide for designing interventions that are relevant to local people's lived realities by inviting community members to participate in promoting the long-term well-being of their community.

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\* In memorium.

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