The Special Supplemental Program for Women, Infants, and Children (WIC): Applying Electronic Benefit Technology (EBT), Social Media, and Other Innovative IT Strategies to Strengthen the Program's Impact

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Preface

WIC participation helps reduce household food insecurity that can lead to toxic stress and improves healthful behaviors that are linked to reducing early childhood overweight. WIC also helps to ensure infants' and children's normal growth and improves access to health care and immunizations.

– American Academy of Pediatrics

[The WIC Program is] by far one of the most productive and effective programs the Senate Agriculture Committee has ever written into law.

– Senator Robert Dole

WIC has been a crucial part in raising all of my three children to be healthy and pick the right foods to help them grow and learn to their potential.

– Oregon WIC Participant

Food insecurity is a hardship for any person, but it is particularly harmful in early childhood. Insufficient food and nutrition have repeatedly been identified as interfering with physical growth and healthy brain development.[1] The American Academy of Pediatrics has reported that 16 million children live in households where food is scarce and compared to their counterparts in food-secure households, infants and toddlers from food-insecure families are 90 percent more likely to be in fair or poor health and 30 percent more likely to be hospitalized.[2]

The WIC Program is a nutrition intervention initiative for pregnant, breastfeeding, and postpartum women; infants; and children up to age five serving 7,256,304 participants (preliminary data) in 2017 with a budget of $6.4 billion. WIC provides three main benefits for participants in the program: 1) a monthly package of supplemental foods, 2) nutrition education and 3) counseling and referrals to health and social services. It is the third largest U.S. Federal nutrition program behind the Supplemental Nutrition Assistance Program (SNAP) and the School Lunch Program. Unlike other USDA nutrition assistance programs, WIC has statuatory mandates to provide nutrition education, breastfeeding support and referrals to health and social services as a part of its core mission.

This critical food assistance program now faces an additional challenge: an obesity epidemic that co-exists with food insecurity in America. One in seven Americans are food insecure, while 70.7% of adults and one-third of children are overweight or obese. These problems are particularly pronounced among people with low income. Currently, seven times as many low-income children are overweight as underweight in America. Obesity has adverse effects on the health of almost every organ system of the body and is linked to high rates of chronic disease including type 2 diabetes, coronary heart disease, hypertension, stroke, arthritis, and some cancers.[3] Overweight and obese children are also more likely to become obese adults.[4] As a result of the current obesity epidemic, this may be the first generation of children who are not as healthy or live as long as their parents. Congressional legislation in recent years has addressed the need to improve nutritional health among children enrolled in Federal food assistance programs including WIC.

To be eligible for WIC, applicants must be in one of the appropriate demographic categories, be certified to be at medical or nutritional risk, be a resident of a particular State or service area and must live in a household that is at or below 185% of the Federal poverty line. Federal law mandates that WIC participants be certified as being at medical or nutritional risk by a Certified Professional Authority (CPA) (e.g. doctors, nurses, nutrtionists, or trained health/nutrition aides). CPAs also tailor the food prescription to the specific needs of the participants; for example, they might prescribe less cheese for an overweight client or more cheese and peanut butter for an underweight client. Unlike SNAP (previously known as Food Stamps), which is a federal entitlement program, WIC is a categorical grant program. At the Federal level, WIC is administered by the Food and Nutrition Services (FNS) of the U.S. Department of Agriculture (USDA). Grants are provided to 90 WIC state agencies: 50 state health departments, 34 Indian Tribal Organizations, the District of Columbia, and five territories (Northern Mariana, American Samoa, Guam, Puerto Rico, and the Virgin Islands).

WIC operates through 1,900 local agencies at 10,000 clinic sites. Clinics are service delivery sites operated by subgrantees of the WIC state agencies, including county health departments, hospitals, mobile clinics (vans and modified recreational vehicles), community centers, public housing sites, migrant health centers and camps, and Indian Health Service facilities.

Traditionally, most WIC participants were given “food instruments” that they exchanged for their food benefits at approximately 47,000 grocery stores and pharmacies authorized by the state agencies. The instruments are either negotiable checks or vouchers that are redeemed by the WIC agency. WIC participants are typically given 2-4 checks or vouchers that list their food prescription. Usually, participants are issued three months’ worth of benefits at each clinic visit, but

each month's worth of benefits must be redeemed in their assigned month or the vouchers will expire.

There is no preset dollar value defined for these benefits. Participants are authorized for units of approved food, such as one gallon of low fat milk, and the vendor submits a request for payment in the amount of the shelf price. The supplemental foods are high in nutrients, such as iron, calcium, and vitamins A and D, that tend to be lacking in the diets of the target population.

WIC food packages, which had been generally unchanged since the program's creation in 1972, were modified in 2009 to align with the *USDA Dietary Guidelines for Americans*. This alignment reduced monthly allowances for some foods (including milk, juice, and eggs) and added other products (namely fruit, vegetables, and some multi-grain foods) to the food package.

In 2014, the USDA issued a final administrative rule, marking the completion of the WIC food package revisions begun in 2009. The new package included a first ever cash benefit called the Cash Value Voucher (CVV). The CVV provided a $10 cash benefit for the purchase of fruits and vegetables. Additionally, state and local WIC agencies were given more flexibility to meet the cultural dietary and nutritional needs of WIC participants.[5] Each state agency has the authority to determine specific food prescriptions and authorized products within the broad Federal guidelines.

Research has established that every $1 spent on a pregnant woman in the WIC program produces $4.20 in Medicaid savings during the first 60 days after birth by reducing the risk of pre-term birth and associated costs. WIC is also associated with a reduction in premature births, increased birth weight, reduced infant mortality, increased rate of early entry into prenatal care, and improved participant intake of key nutrients.[6]

Yet, despite the effectiveness of the program, only 66.5 percent of eligible women and children are enrolled in WIC.[7] A recent study conducted for the Minnesota WIC Program confirmed what is common knowledge among the WIC community: the top three ways of hearing about WIC included word of mouth, having grown up with WIC, or through community services, including hospitals, clinics, county programs or other government programs.[8]

While WIC has been lauded for its efficient food delivery system, participants often report problems with their shopping experiences including experiencing stigma when redeeming WIC paper vouchers in the grocery line.[9] In order to enhance the client shopping experience and improve its administrative efficiency and integrity, the 2010 *Healthy, Hunger-Free Kids Act* requires that by 2020, all WIC agencies must convert from the current paper-based voucher system for distribution of benefits to

electronic benefit transfer (EBT) technology. EBT is, a card-based system that allows recipients to authorize the transfer of their government benefits from a federal account to a retailer account in order to pay for the purchase of food products.

The Clinton Administration's Re-inventing Government Initiative envisioned EBT as having the potential to support a wide array of Federal and state benefit programs. Some of those programs adopted "stored value" cards (e.g. Unemployment Insurance in the Temporary Assistance for Needy Families Program[TANF] and Social Security Disability payments) and others used direct deposit (e.g. Social Security Retirement Benefits). Because SNAP and TANF were the first Federal programs to widely implement EBT, it is common convention to use the term "EBT" when referring to SNAP and TANF cards. In the late 1990's, as EBT began to be implemented in WIC, in an effort to differentiate WIC cards from these other programs, some states began to describe WIC EBT as "eWIC." Whether online or offline, eWIC and WIC EBT systems are the same. Only the name is different. In the interest of clarity, the term eWIC is used for this paper.

The technological advancements of the EBT system from paper vouchers holds the potential to revolutionize WIC nutrition education and research. If the EBT card could be transformed from a debit card that holds only the food benefit as currently conceived into an "interactive smart card", participants could view their purchase history on cell phones through mobile apps, on the Internet, or on a store kiosk. They could obtain individualized, personalized feedback and nutrition recommendations based on participants' food purchases (see Figure 14). The development of an interactive WIC app in the future would not only help consumers determine food product eligibility in the store by scanning product codes and smart labels, but would also provide personalized feedback on nutritional quality, keep a record of purchases, and offer recipes and other interactive features. Ultimately, the real-time data collected by the EBT card would become an important resource for researchers and policymakers to increase knowledge about dietary behaviors in this high-risk population, and to design interventions to improve nutrition and decrease obesity for WIC beneficiaries. These innovations might also help transform the nutrition landscape more broadly by reshaping food stocking patterns and individuals' purchasing behaviors.

Mobile technology holds great promise to promote health among low-income populations. According to the Pew Research Center, 84% of low-income adults in the United States have access to a mobile phone, and one in three mobile phone owners in America have used their phone to look up health information. Fifteen percent of people in the U.S. report that their only method of accessing the Internet is through their cell phones. With over 72% of Americans seeking health related information online within the past year, there are significant opportunities to explore improving health behaviors through online and mobile resources.[10] Furthermore, the percentage of smartphone users is expected to rise sharply as the costs for these devices continue to decrease. For example, this year a telecommunications company

in India released a $4 smartphone. With new generations of affordable smartphones, more low-income Americans will have access to online resources in a variety of settings. Whether through an app that tracks food purchases and nutritional content or with personalized text messages containing tips and words of encouragement about nutritional choices, information technology could potentially play an important role in innovating Federal food assistance programs including WIC with opportunities to help improve the health of program beneficiaries and their communities.

This report reviews the history and operations of WIC; discusses key strategies to apply public health technology to increase the program's impact; describes the current status of WIC EBT implementation; and considers the opportunities for research utilizing WIC participant and EBT data. The paper also explores the potential for innovative technology and social media to enhance the quality and effectiveness of WIC including data collection, nutrition education, and health as well as to improve access to this vital food assistance program that serves over 50% of young children and their mothers in the United States.

This document is intended as a backgrounder to facilitate the WIC Digital Health Summit to be convened by New America in collaboration with the MIT Media Lab and Harvard T.H. Chan School of Public Health in September, 2017 (see https://53percentconference.org). The conference will bring together a diverse group of experts in public health, nutrition, technology, finance, and digital currency to craft innovative solutions with the goal of enhancing the impact of WIC in the years ahead.

I. WIC History And Purpose

I.1 Background

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a nutrition intervention program for pregnant, breastfeeding, and postpartum women, infants, and children up to age five who are identified as being medically or nutritionally at risk. WIC provides three main program benefits for program participants: 1) nutrition screening and education, 2) access to health care, and 3) a monthly package of supplemental foods that are high in nutrients such as iron, calcium, and Vitamins A and D which tend to be deficient in the diets of the low-income target population.

WIC serves 7,256,304 million women, infants, and children .[11] Over three-quarters of WIC participants are children. Infants represent 23% of WIC beneficiaries, and children under the age of 5 represent 53.3% of program participants. The remaining 23.6% of WIC beneficiaries include women who are pregnant (9.6%), breastfeeding (7.4%), or postpartum (6.6%). WIC serves a diverse population: 58.7% of WIC participants are White/Caucasian; 20.3% Black/African-American; 11.1% American Indian or Alaskan Native; and 4.1% Asian or Pacific Islander. In Federal Fiscal Year (FY) 2015, WIC spent $5.97 billion in food assistance, $4.17 billion of which came from Federal appropriations and $1.8 billion from infant formula rebates. Total FY 2015 funding for WIC Nutrition Services and Administration expenses was $1.990 billion. Approximately 73 percent of people approved for WIC receive benefits from another Federal assistance program including SNAP, Medicaid, or Temporary Assistance for the Needy (TANF).[12]

The impetus for the establishment of WIC grew out of the 1960's War on Poverty and its emphasis on increased government funding of education and healthcare initiatives as a way to reduce poverty in the United States.[13] In the area of food and nutrition, the War on Poverty gave rise to the Food Stamp Program now known as the Supplemental Nutrition Assistance Program (SNAP) as renamed in *The Agricultural Act of 2008* (The Farm Bill)[14] and the Commodity Supplemental Food Program (CSFP).[15]

The *Food Stamp Act of 1964* (P.L. 88-525) sought to formalize the results of many pilot projects over a 25-year period into a uniform program providing food stamps to eligible recipients for the purchase of all items intended for human consumption, except alcoholic beverages and imported foods. The intent of the legislation was

to strengthen the agricultural economy and improve nutrition among low-income households. By 1969, the Food Stamp Program was providing over $228 million in food to some 2,878,800 recipients. Today, the renamed Federal Supplemental Nutrition Assistance Program (SNAP), provides approximately $66.6 billion in food assistance to over 44 million recipients.[16]

The establishment of the Food Stamp Act was followed by the *Child Nutrition Act of 1966*, that created school feeding programs and formally established the Special Milk Program, which had been operated as pilots since 1954. Many in the WIC community consider the milk program pilots to be the precursors to WIC.

CSFP was established in 1969 as a mechanism to leverage the crop insurance programs to improve the nutritional health of low income families.[17] The U.S. Department of Agriculture (USDA) purchases surplus crops and processed foods to distribute to the poor, including through CSFP which provides cereals, cheese, fruits, juices, milk, peanut butter/dry beans, potatoes/grains, proteins, and vegetables.[18] Initially CSFP served only low-income pregnant and post-partum mothers and children under the age of six. In 1982, seniors were added as eligible participants. With the growth of the WIC Program, seniors became the primary focus of CSFP and the 2014 Farm Bill removed mothers and children from this program to create a seniors-only CSFP. Also in 1969, USDA established the Food and Nutrition Service (FNS) to administer the growing number of food programs under its purview.

Their merits notwithstanding, these Federal food initiatives did not assuage the concern of medical and nutrition professionals that these programs were adequately meeting the needs of at-risk pregnant women. Several projects were launched to meet the special dietary needs of this important population, including a USDA commissary program in Atlanta, Georgia, and the Johns Hopkins University (JHU) food voucher program initiated by Dr. David Paige in 1968.[19] The JHU program served as the primary model for the WIC Program established a few years later in 1972.

I.2 The Women, Infants and Children's Program

I.2.1 In The Beginning

A 1972 amendment to the *Child Nutrition Act of 1966* (P.L. 92-433) established the Special Supplemental Food Program for Women, Infants and Children[1] (WIC) as a two-year pilot program, administered by the USDA, to provide supplemental foods to low-income, nutritionally at-risk women and children. But the Nixon Administration

1 In 1994, P.L. 103-448 changed WIC's name to the Special Supplemental "Nutrition" Program for Women, Infants, and Children.

resisted implementing the program and impounded the funds appropriated for the pilot. Lawsuits filed by potential provider agencies and recipients (1972, Dotson et al v. Butz; 1973, Dunham v. Butz) ultimately forced the Administration to implement the pilots in 1974.[2]

The first pilot was conducted in Pineville, Kentucky, and by the end of 1974, WIC was serving approximately 88,000 participants in 45 states. In 1975, P.L. 94-105[20], an amendment to the *Child Nutrition Act of 1966*, established WIC as a permanent program to supplement the Food Stamp Program with the specific purpose of providing supplemental nutritious food as an adjunct to good health for pregnant, breastfeeding women and during critical times of growth and development for infants and children up to their fifth birthday.

In 1978, Congress added several provisions to strengthen the Program: income eligibility standards linked to the school meals programs (household income at or below 185% of poverty); a requirement that one-sixth of administrative funds be expended on participant nutrition education; a definition of nutritional risk; restriction on fat, sugar, and salt content in the WIC food package; and, a requirement that state agencies establish plans for participant referrals to other health and social service providers (P.L. 95-627).

WIC has steadily grown in the number of beneficiaries over the years and is now considered a major component of the USDA's Food and Nutrition Service's mission. WIC enjoys strong support from the agriculture, food manufacture, retail grocery, and food and nutrition advocacy sectors. Its widespread support was evidenced when its funding grew three-fold during the Reagan Administration, a time when many of its companion health and nutrition programs were being cut and block granted (see Figure 1).

2 WIC continued to face challenges to its funding over the next decade. In 1976, WIC provider agencies sued the Nixon Administration to force the release of a cost-of-living increase that Congress had added to its appropriation. In 1983, the State of Georgia, et al, sued USDA Secretary Block to force the reallocation of unspent grant funds to other WIC agencies. And in 1985 it took a Sense of the Senate resolution to motivate OMB to release cost-of-living in that year.

Figure1

To illustrate WIC's impact, it is estimated that today approximately one out of two infants born in the United States is served by the WIC Program. WIC is administered by 90 "state agencies" consisting of the fifty geographic States, thirty-four Indian and Native American Tribal agencies (also known as Independent Tribal Organizations, or ITOs), five U.S. territorial governments (American Samoa, Guam, Northern Marianas, Puerto Rico, US Virgin Islands), and the District of Columbia. Collectively, in the first five months of Federal Fiscal Year 2017, these agencies served approximately 7.4 million women, infants, and children each month. Nation-wide WIC operates 1,900 local agencies in 10,000 clinic sites.[21]

However, today WIC is facing a challenging loss of caseload. Since 2009, WIC participation has declined, with FY2014 experiencing the largest decrease in caseload in the program's history (see Figure 2).[22]

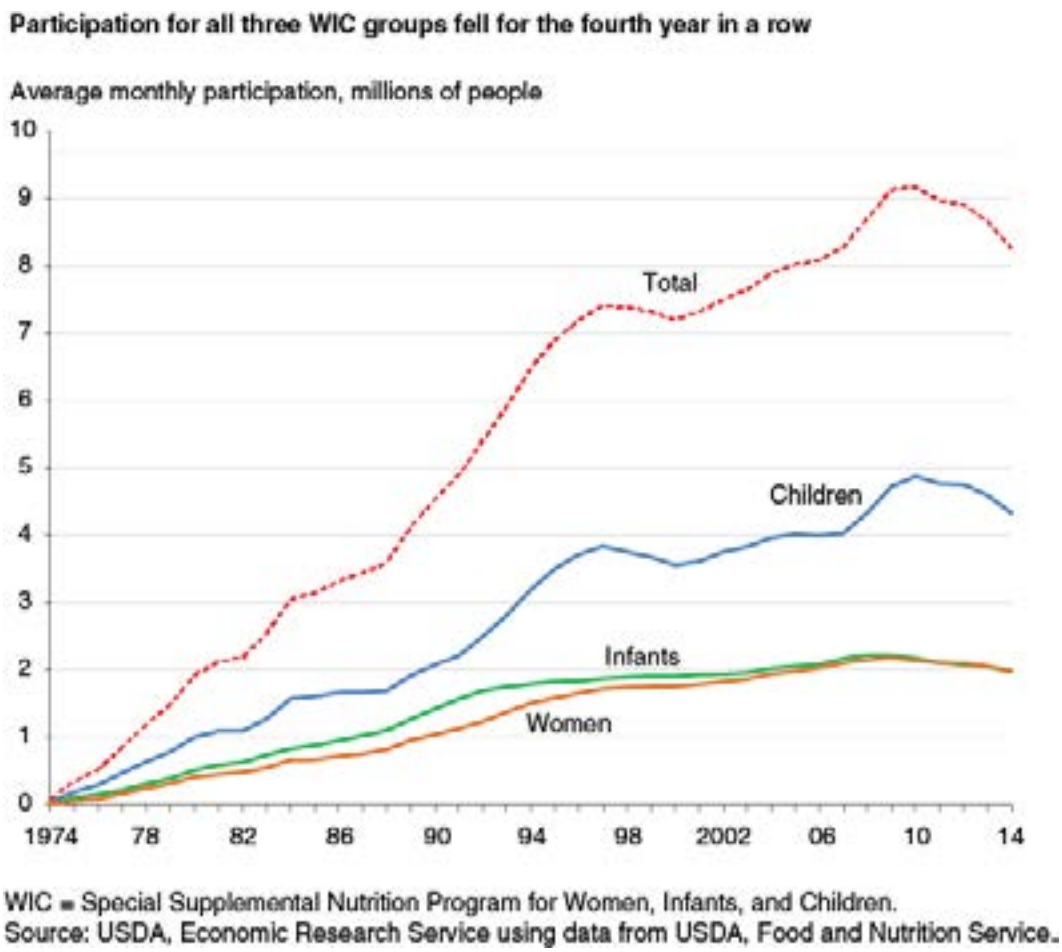


Figure 2

And recently there have been signs that it could get worse. Anecdotal evidence from states and media reports[23] that the Trump Administration is cracking down on immigration has led legal and undocumented immigrants to forgo health care, food assistance and even schooling. Undocumented immigrants are not eligible for SNAP, but other members of the household, typically children, who are U.S. born are eligible. Undocumented immigrants are eligible for WIC, but states have started to report that with policies of the new Administration, even legal immigrant families have been asking to be dropped from the program, and that their participation records be expunged out of fear of deportation.

If this trend continues, WIC may be facing an increasingly severe loss in participation with potential harmful effects on the health and wellbeing of low-income mothers and children.

I.2.2 The WIC Food Benefit

Until recently, the supplemental food packages provided by WIC had largely been unchanged since the program's inception in 1972. From the start, WIC provided milk, cheese, eggs, fruit juice, iron-fortified infant and adult cereals, and infant formula. Later, carrots and tuna fish were added to the package for breast-feeding women.

A USDA Interim rule, published in the Federal Register on December 6, 2007, revised the WIC food packages. The revisions aligned the WIC food packages with the *Dietary Guidelines for Americans* and infant feeding practice guidelines of the American Academy of Pediatrics. The interim rule revisions largely reflected recommendations made by the Institute of Medicine (IOM) of the National Academies in its report, "WIC Food Packages: Time for a Change," along with certain cost containment and administrative modifications found necessary by the USDA to ensure cost neutrality. All WIC State Agencies (SAs) were required to implement the revisions by October 1, 2009. The supplemental foods offered to WIC participants include milk, cereal, juice, fruits, vegetables, whole grains, soy products, eggs, cheese, peanut butter, beans, baby food and infant formula. Several of these items were added to the package in 2009 and the requirement for fruits and vegetables generated a parallel food delivery process (cash value voucher or CVV). The CVV for children and fully breastfeeding women provided $10 per month.[24] Initially, the CVV for pregnant, postpartum, and partially breastfeeding women was $8, but was raised to $10 the next year. In 2017, the National Academy of Medicine convened an expert ad hoc committee to undertake a two-phase comprehensive examination of the WIC food packages and will issue recommendations from this analysis.[25]

Unlike many other Federal assistance programs, the food benefit for a WIC participant is based on a food quantity (e.g. prescription) rather than a dollar amount. The maximum quantities of foods that may be issued to participants each month are established in Federal regulations. However, the food package for each participant is intended to be individually tailored to meet his or her nutritional needs. States may also establish categorical tailoring guidelines for entire categories of participants, such as issuing beans instead of peanut butter for pregnant women, as long as they are based on nutritional rather than economic grounds.

I.2.3 Funding for WIC

WIC is a domestic discretionary categorical grant program and is not an entitlement program, like the Supplemental Nutrition Assistance Program (SNAP). In SNAP, the Federal government guarantees it will pay 100% of the food costs for all eligible

participants. USDA and states share the administrative costs equally. In WIC, the federal government pays 100% of food and administrative costs, but only up to the amount of funding Congress provides each year for the program. The annual WIC appropriation has two primary elements: funds for the foods and funds for nutrition services and administration. During WIC early expansion years, the formula for appropriated funds allocated to state agencies took into account a range of demographics, including population, infant mortality and poverty rates. As the Program has stabilized, the focus of allocations has been on maintaining stability in agencies that are near peak caseload and providing support for others to achieve this goal.

Other "special" administrative funds in WIC include Operational Adjustment (OA) grants, technology grants, EBT grants, infrastructure grants, and demonstration project grants. OA grants are drawn from Nutrition Services and Administration (NSA) appropriations and allocated to state agencies based on competitive applications. The additional grant funds come from special appropriations earmarked for specific purposes, such as for MIS or EBT projects. State agencies apply for these funds through Advance Planning Documents[26] or competitive grant applications.

WIC agencies supplement their food grants through a unique rebate system. In the 1980s, some WIC agencies raised concerns about the skyrocketing cost of infant formula, which was increasing at a rate two to three times the Consumer Price Index. This was problematic since 40% percent of WIC's food funds at that time were spent on infant formula.

In response, Betsy Clarke, then Director of the Oregon WIC Program (and later the Minnesota Program), John Harrison, Florida WIC Vendor Manager, and the late Mark Harland, the Tennessee WIC Vendor Manager, launched an initiative to leverage the commercial marketplace, offering exclusive rights to sell formula to WIC in exchange for a rebate on each product purchased. In 1987, Tennessee became the first WIC agency to conduct a rebate solicitation in a retail delivery system. At the time, Ross Laboratories controlled nearly 70% of the U.S. infant formula market, and Mead Johnson had most of the rest. They did not respond to Tennessee's request for bids. A smaller company, Wyeth, ultimately bid and won the Tennessee contract. Oregon was next, and Texas and other states began to follow.

In 1989, Congress passed P.L. 101-147, widely known in WIC as the Burdick Amendment, requiring all WIC agencies to adopt the rebate method. Nevertheless, Ross and Mead Johnson continued to resist. The Senate Judiciary's Subcommittee on Antitrust, Monopolies, and Business Rights, and the Federal Trade Commission (FTC) launched an investigation into alleged price-fixing and other anti-competitive behavior. Nineteen state attorneys general filed anti-trust suits against all three companies. The 1989 legislation forced the formula companies to provide rebates or

leave the WIC market, and eventually, all three businesses paid millions of dollars to settle the lawsuits.

Infant formula rebates have grown significantly over time. In FY 2016, WIC agencies received $1.8 billion in infant formula rebates, allowing the Program to serve hundreds of thousands of additional participants (see Figure 3).[27] At this time, WIC purchases about half of all infant formula sold in the United States.

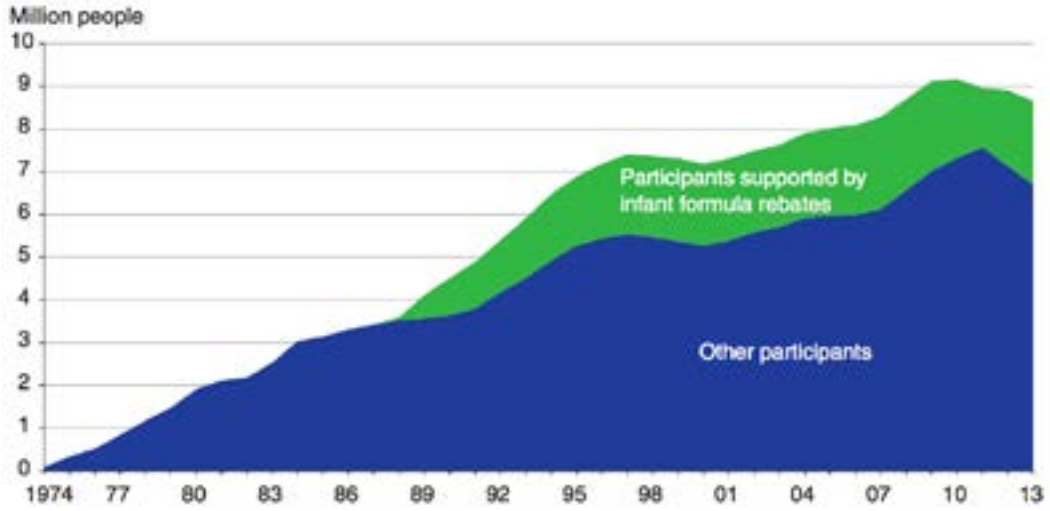


Figure 3

Average monthly number of WIC participants supported by rebates, FY 1974-2013

Source: USDA, Economic Research Service calculations based on USDA, Food and Nutrition Service (2014c) estimates of number of participants and USDA, Food and Nutrition Service (2014b) estimates of infant formula rebates.

I.3 WIC Food Delivery Systems

Current Federal regulations[28] allow states to operate one of three types of food delivery systems: retail, home delivery, or direct distribution. Historically, almost all states have used a retail purchase system. Listed below are the exceptions:

Vermont was the last geographic state still using a home delivery system, but it implemented statewide retail-based eWIC in May 2016. In past years, other states such as Ohio and Maryland served portions of their state through home delivery, while the rest of the state used the retail system. Home delivery of WIC foods grew out of the "milkman" deliveries that were once common in the U.S. In the late 1980s, FNS began to discourage the practice out of concern that it was difficult to effectively monitor compliance.

Mississippi is the only geographic state to exclusively use a warehouse distribution system. In Mississippi, participants pick up their prescribed commodities at several state-owned-and-operated warehouses. In addition to Mississippi, there are a small number of Independent Tribal Organizations (ITOs) that operate WIC warehouse distribution systems. These are very small programs, most serving just a few hundred participants per month in rural areas with a lack of qualified vendors. There is also a direct distribution center in Chicago, operated by a non-profit agency in the manner of a retail store. This operation was put in place in the 1990s in response to rampant fraud in inner city groceries. The 2020 eWIC Mandate is causing these agencies to convert to a retail system, because it requires that all WIC food delivery be retail-based.

As the WIC Program was being developed, most states adopted retail systems because they would offer the broadest participant choice of products and an anticipated educational benefit of "teaching" participants good shopping habits in retail environments where they purchase the rest of their family's groceries.

In a retail system, states authorize private businesses, referred to in federal WIC regulations as "vendors", to provide food benefits to program participants. In the paper-based system, WIC participants are given "food instruments" that they exchange for their food benefit at authorized vendors. The instruments are either negotiable paper checks or vouchers that are redeemed by the WIC agency. WIC participants are typically given two to four paper checks or vouchers that list their food prescription. The food is spread out so that perishables can be purchased throughout the month, while dry goods can be purchased in a single trip to a vendor. There is no dollar value defined for these benefits. Participants are authorized to obtain specified units of approved food (e.g. one gallon of low fat milk) and the vendor submits his/her request for payment in the amount of the shelf price for the item. In most states if a portion of the vendor's claim is rejected, the vendor is provided an opportunity to defend the legitimacy of the claim. Stores may not charge WIC participants more than its other customers.

Participants are also given one or two Cash Value Vouchers (may be checks) to purchase fruits and vegetables in the retail store and, in the summer, may receive between one and four instruments for purchasing fresh fruits and vegetables at authorized Farmers' Markets.

In an EBT system, the food prescription and the Cash Value Voucher are part of the EBT account and can be purchased in various increments and frequencies. Other than a handful of pilot projects, the Farmers Market Nutrition Program does not support EBT due to its limited administrative budget, so WIC participants (and elderly

participants of the Senior FMNP) will continue to receive paper instruments for those benefits.[3]

The 2013 WIC Vendor Study reported that WIC had 48,000 authorized vendors nationally. Vendor eligibility criteria is a combination of state and USDA policies, and includes requirements for inventory; pricing; days and hours of operation; and a history of compliance with WIC, SNAP and prevailing local law. Common WIC vendor vendor authorization criteria are listed below (See Figure 4).

COMMON WIC VENDOR AUTHORIZATION CRITERIA

- Current SNAP Authorization
- Past compliance history in SNAP and/or WIC
- Stocking a minimum number of food items in each of the food categories
- Prices in line with other retailers in similar markets and geographic areas
- Minimum inventory for the number of participants the retailer anticipates serving
- Acceptable hours and days of operation
- Visible and posted signs
- Attendance at vendor education (new outlets of chains excluded from requirement)
- No WIC conflict of interest
- Valid and current state/local licenses, seller's permit(s) and valid facility ownership or lease agreement
- Fixed location that is accessible to WIC participants

FIGURE 4

Because WIC is on a fixed-food budget, agencies are required to take "cost containment" steps in order to serve as many participants as possible within the

3 The WIC Farmers Market Nutrition Program is funded through a separate grant, not by the WIC Program.

constraints of their food grants. With this in mind, some states use a "competitive limitation" model that places quotas on the number of stores that can qualify as authorized vendors. The objective is to select lower cost stores and to limit the number of stores that require monitoring, in order to save administrative dollars.

The quotas for each area are based on a vendor/participant ratio (for example, 1 vendor per 250 participants in urban areas and 1 per 100 in rural areas). Vendor selection is based on ranking applicant vendors based on their shelf prices for WIC foods and selecting from the least expensive vendor upward until the quota is reached. Under this model, redemption prices are monitored by means of a not-to-exceed (NTE) value for food items or food packages, often established for their specific "peer group" (see below), either through quarterly surveys of average prices or through prices submitted in price surveys.

Retailers generally oppose these systems because they can stigmatize honest businesses that did not make the cut and can cause an entire chain to have to re-bid for their slots if they are acquired by a new owner, even if their prices do not change. WIC participant advocates also point out that distance is not the sole measure of access. For instance, a store that is only a mile away but is not on an urban transit line could be inaccessible to a pregnant woman or mothers with youngsters in tow. Alternatively, in rural areas, a WIC mother may be able to shop regularly at a general store a few miles from her home but could be required to travel many miles to reach a WIC-authorized vendor.

Citing these concerns and the absence of generalizable evidence[4] that these systems are effective at reducing food costs, approximately two-thirds of state agencies have chosen to use a "managed authorization" approach.

In a managed authorization model, vendors must meet specific eligibility criteria in order to participate in the program. In this model, no limits are established regarding the number of vendors who may participate in the program: all vendors who meet the eligibility criteria are authorized. The model is designed so that the use of very strict authorization criteria will indirectly limit the number of authorized vendors without risking a decrease in participant access.

Redemption price monitoring of vendors in both models is commonly realized through the use of peer groups: groups of vendors of similar size and business practice. In a 1982 report prepared for FNS, the authors define the causes of WIC food instrument price variation and the role of peer grouping as a means to control for the anticipated variation. Current regulations require state agencies to employ

4 A 2003 ERS case study examined cost containment in just six relatively large agencies.

a peer group system that is based on two criteria, one of which must be geography (there is a waiver process).

However, the May 2017 Report of the WIC Peer Group Study[29] suggests that the peer group methods in use may not be the most effective:

> *"Seven vendor characteristics (WIC annual sale, number of registers present in a store, number of unique Universal Product Codes redeemed, geographic location, store type for Supplemental Nutrition Assistance Program retailers, distance to the interstate, and business model store type) were tested as potential determinants of FBC [Food Basket Cost]. Several of these characteristics are currently used by some State Agencies to define their vendor peer groups, and USDA requires the use of a geographic variable. Only two characteristics were consistently and significantly related to FBC in all four SAs after controlling for other factors: number of registers and store type based on business model."*

The report recommends a "business model" characteristic that draws upon industry classifications and business size to categorize mass merchandisers, national and regional chain grocery stores, independents and pharmacies. This approach may be a best fit for EBT operations in particular, since businesses' approach to credit/debit/EBT processes are generally common to their groups.

The study concludes: "Although addressing the shortcomings of current peer group systems tested during this study may not directly translate into lower food costs, by using empirical analysis to identify more effective peer group systems, SAs will help ensure that the WIC Program pays competitive and fair prices for supplemental foods."

WIC agencies analyze the prices charged in each peer group to establish a not-to-exceed (NTE) maximum price for WIC foods. The notion is to leverage the natural competition among peers to deny a price because it is out of the competitive range for that type of store. In the paper system, these NTEs were established for the list of foods on each WIC food instrument. In an agency with five peer groups and 200 "check types" (excluding special and medical infant formula), for example, the WIC data system would routinely calculate 1000 NTEs.

But with EBT, it is necessary to establish an NTE for each approved product, not just for each check type. This means that within a peer group system, 15,000 to 20,000 NTEs could be needed.

I.4 Authorizing Foods For WIC

The Federal Regulations of 7 CFR 246.10 of 1985 (last amended in March 2014) establish the parameters of what types and quantities of foods may be authorized for WIC.[30] These regulations provide considerable discretion to states regarding their implementation. Section 246.10 simply requires State agencies to "Identify foods which are acceptable for use under the Program in accordance with the requirements of this section.

There are no comprehensive studies of WIC agency food product authorization practices. Some of the material in this section is adapted from a study conducted for the California WIC Program.[31]

Three broad components of the food item selection process are discussed below. These are:

- Nutritional considerations
- Administrative considerations
- Cost considerations

The approval process utilized by WIC agencies must balance the sometimes-conflicting issues embedded in these components. The final elements of the food selection process are the frequency and timing of when decisions on product approval are made.

I.4.1 Regulatory Requirements

The Child Nutrition Act gives the Secretary of the U.S. Department of Agriculture (USDA) the authority to determine the types and quantities of foods authorized for WIC. Federal regulations (7CFR246.10) specify the general categories and quantities of food items. They also establish minimal nutritional criteria, such as the iron fortification and sugar limitations for cereals. The regulations have been supplemented over time with a series of policy decisions. For example, states must make available the maximum quantity of an item unless they can provide a justification for a lower limit based on a sound nutritional rationale. These regulations also specify that states must offer at least one item from each of 13 food categories (dairy products, cereal, and legumes, for example). In this manner, a state can reduce the amount of eggs offered, for example, but cannot eliminate eggs altogether.

Within these established parameters, states have considerable flexibility in deciding what specific products to authorize. In recent years, the decision-making process has become more complicated due to a proliferation of new and reformulated foods. Some of this proliferation is due to increased variety available in the new food packages. The use of objective decision-making criteria and a consistent process,

which are clearly defined in state administrative rules, has become more critical. States inevitably restrict the range of potentially authorized products. They must be able to show that decisions are not arbitrary and do not favor one manufacturer over another. As the amount of money at stake in these decisions increases, manufacturers and retailers are more likely to challenge the legality of decisions.

I.4.2 Nutritional Considerations

WIC's mission is to improve the nutritional status of participants through the provision of nutritious foods and nutrition education. Furtherance of this mission should be at the heart of decisions regarding the food package. However, nutrition professionals across states differ somewhat in what they recommend. Differences in populations from state to state also influence decisions.

In considering the nutritional effects of the program, states also must take into consideration age-appropriate foods. For example, most states make sure that they include cereals that toddlers may eat with their fingers, rather than just flake cereals. Many states also impose a minimum age limit for issuance of peanut butter to avoid choking hazards for young children. Some states decline to approve any products that they believe contradict their educational message.

Finally, nutritionists recognize that there are a wide variety of tastes in the WIC population. To ensure that participants actually consume the foods provided, it is necessary to have a sufficient variety to meet all or most of people's diverse tastes.

I.4.3 Administrative Considerations

States are responsible for ensuring compliance with their rules by participants and retailers alike. With hundreds of thousands of participants and high turnover in the population served, and with thousands of full- and part-time retail employees handling WIC food instruments, this is not a simple requirement. It is critical that WIC's policies are easily understood and easily conveyed to both participants and retailers. Many states have adopted food item selection policies aimed at increasing their ability to ensure compliance.

One such policy aims to assist in the monitoring of WIC eligible item acquisition. For example, some states have limited the number of cereal brands to make the approved product list easier to enforce. To avoid having to make fine distinctions in packaging, some states have instituted what may be termed a "confusion rule". The rule provides that an agency should not authorize a product that is easily confused with non-authorized products. For example, if there are two or more varieties of a product that have similar packaging, but one version is eligible while the others are not, a state following the confusion rule will not authorize the one that could

qualify for WIC. Examples include Welch's frozen grape juice, in which the eligible juice container is distinguished primarily by a yellow band around one end. Another example is General Mills Kix cereal (Regular Kix is eligible, but not Berry Kix). This type of rule requires some judgment on the part of state agencies. One state previously excluded Cheerios (arguably the most popular cereal among children) for this reason, but later determined that the difference in packaging was significant enough that participants would not confuse regular Cheerios with Honey Nut or Apple Cinnamon Cheerios.

Other administrative considerations include imposing restrictions on new or reformulated products. To avoid unnecessary changes in the approved food list, states frequently require a new product to be available for a minimum period of time (e.g., six months to one year) before they will consider adding it. New products are continually being introduced in the marketplace, and not all of them survive. Many States believe that it is not WIC's role to create a market for new products; they believe a product should prove its popularity before WIC authorizes it. Similarly, many states require that products be available in a significant portion of their authorized retailers before they will authorize them. These policies can sometimes result in a "Catch 22" situation for new products. WIC will not approve a new product until it is widely available, but the product needs WIC acceptance to gain shelf space in stores.

A related issue is how to deal with store branded products, particularly cereals. Use of store branded products has the potential to save the program funds, but it can become administratively cumbersome to track all of the eligible products. This is particularly true in large states with primarily regional, rather than statewide, chains. For instance, in the late 90s, Texas WIC reduced its reliance on store brand cereals because the number of brands became too large to manage.

States also impose restrictions on package sizes for a combination of cost and administrative convenience reasons. The WIC restrictions that preclude eligibility of small sizes of cereal packages, for example, are usually due to their high cost.

States also impose administrative restrictions that prohibit unusual or "specialty" items that are technically eligible under the regulations. Examples include brown eggs, items sold in bulk such as peanut butter, or any items not pre-packaged (e.g., deli cheese). These items are often more expensive or are difficult to administer (e.g. matching random weights with prescribed quantities).

I.4.4 Cost Considerations

Prudent spending of the WIC food grant has always been part of WIC management in retail-based food delivery systems. Active cost containment began with the advent of infant formula rebates in the late 1980s. In this context, it also includes

strategies to purchase items below the prevailing retail cost by using the volume buying power of the WIC Program and proactive policies to ensure that the program pays the best possible standard retail price for food items. As referenced earlier, it is necessary to maintain a proper balance between nutritional, administrative, and cost considerations. This is not an easy task, as they are sometimes in conflict, and decisions necessarily involve trade-offs.

There is no single strategy that works for all items in the WIC food package. States need a set of cost containment tools that they can apply to products as appropriate, depending on the nature of the product and the market factors at work. The following are some of the most common tools used by states:

1. **Competitively bid rebate contracts.** Infant formula rebates that are provided to the WIC agencies by infant formula companies are the first, and best, example. The factors that made this viable were the three-firm oligopoly in the formula market, the absence of significant nutritional differences between brands, and a very large market share for WIC. Rebate contracts have been used successfully with infant cereal and, formerly, with infant juice. Formula rebates have been extremely successful in saving WIC funds.

2. **Brand Restrictions.** This is the most commonly used approach to controlling costs for cereals. WIC agencies generally base decisions on a wholesale cost per ounce (using manufacturers' standard price lists) or on a retail cost per ounce (using survey data). Some WIC agencies combine brand restrictions with package size restrictions -- for example, allowing only boxes greater than a specified size to be purchased.

   A subset of this policy is the use of store brand products, particularly cereals. The savings can be significant from the use of store brands. However, states disagree on the taste/texture/brand acceptability of these product to participants who are purchasing them. A number of states (examples include Oklahoma and Texas initiatives in the 90's) have attempted to limit authorizations to these store brands and withdrew the policy following significant decreases in participant redemption of the cereal benefit. Moreover, they are an administrative difficulty for large states. Thus, some states have chosen to use store brands only for types of cereals for which a national brand is not available. With brand restriction policies, the state decides in advance which products are authorized and notifies participants at the time of enrollment and retailers by means of memoranda and an approved products brochure. Thus, there is minimal disagreement at the store regarding whether a product is authorized, one factor that distinguishes these policies from the next type.

3. **"Least Expensive Brand" Policies.** In states using these policies, participants are instructed to purchase the particular brand of an item that

has the lowest cost. The brand names of the products are not specified in advance, as the lowest cost brand may change from day to day and store to store. These policies require a higher level of understanding and a greater degree of shopping skills by participants. They work best for items where there is a limited choice of products and all are acceptable, such as with milk, beans, and eggs. Most stores carry one to three brands of milk. Most dairies are regional, and most larger stores carry their own brand of milk. While there is some taste difference between brands, it is usually not enough to discourage participants from buying the product. Products such as cheese have been found to be too complicated for these policies for several reasons. First, there are several brands and types of cheese that may be authorized in a state, and they may be displayed in several places in larger stores. Second, because of varying packaging practices, it is often difficult to tell which is the least expensive brand per ounce or per pound.

States have also had problems with a least expensive brand policy for peanut butter. In Texas, redemption rates for peanut butter were nearly halved when this policy was instituted. But because redemption data showed that participants were not buying the generic peanut butter and there was much confusion over brand eligibility, the policy was discontinued.

4. **"Typically Least Expensive Brand" policy.** This is a hybrid policy instituted statewide in Texas in 1998 following a successful pilot in one local agency. In this approach, a retailer tells the state at the beginning of the contract period which brands of milk and juice are the least expensive on average, and these become the brands that the retailer is authorized to sell. Since these are the brands the retailer should have been selling most of the time anyway, the cost savings are comparable to the previous, more rigid, least expensive brand policy. Participants like the policy because it eliminates the confrontations that used to occur at the cash register. Most participants shop at one or two stores most of the time and quickly learn the approved brands for that store. In some states like Texas, to further assist shoppers, retailers in this state provide large, brightly colored "shelf talkers" announcing the approved brands. The retailer can notify the state during the contract period if the cheapest brand changes for some reason. Texas then verifies the accuracy of the brand information as part of its routine monitoring visits.

Finally, a state must consider cost in the selection of authorized foods. However, to the extent possible, states should also avoid revising the approved food list in response to budgetary pressures during the year. There is a learning curve associated with any change in the authorized foods. The confusion that results from mid-year change increases the likelihood of participant/retailer conflicts and may also increase the level of non-compliance. The objective of a state agency should be to establish a set of policies that provide the lowest reasonable food package cost over the long term while minimizing participant/retailer conflicts. If the agency is

successful in meeting this objective, the need to make changes during the year will be diminished.

I.4.5 Approval process

When WIC was a much smaller program, states could make arbitrary decisions regarding which products to authorize. As the program has grown, the WIC market has assumed increasing importance to food manufacturers. It has become critical for WIC agencies to ensure that they have the legal authority to make decisions, and that they can demonstrate that their decisions about eligibility of food brands are based on objective factors. States are increasingly likely to face legal repercussions otherwise. Several years ago, for instance, New York was sued over its handling of an infant juice rebate contract, and several other states have had their infant formula contracts challenged. Florida was challenged by Kellogg's on its decision to drop one of its cereals in favor of store brands. Texas had to fight discrimination charges over its decision not to offer ultra-high temperature processing (UHT) milk, simply because a distributor was a minority owned company.

To defend positions about their decisions, states must develop objective criteria for authorizing or denying products, and they must codify these criteria in administrative rules. The rules must explicitly address all three of the considerations discussed here: nutritional, administrative, and cost. The criteria must be clearly written and measurable, so that they can be consistently interpreted and applied by anyone. For example, criteria that say "WIC will take package size into consideration when approving cereals" is open to interpretation. More specific criteria might say that "WIC will not authorize any cereal package size smaller than twelve ounces or greater than thirty-six ounces." Instead of saying "WIC will ensure a variety of grain types in the cereals," the rule should say "WIC will approve two brands of cereal of each of the following types of grains..."

I.4.6 Timing of the approval process

WIC agencies are advised to limit the times in which changes to the approved food product list are made and to consider changes at set intervals and times. Changes for all products should be made no more than once a year and, if possible, should be coordinated with retailer annual shelf refresh procedures. In contrast, food manufacturers who introduce a new product are anxious for it to be approved by WIC. However, there are very few, if any, new products that WIC participants cannot live without for up to a year. Once manufacturers are notified of the state's policy, they will take it into account in their marketing and promotion of products. If retailer

contracts are renewed annually, the approval process can be timed to precede the new contracts. Current, accurate information can be supplied with each contract, and retailers can be assured that there will be no changes in the food list during the contract period. This eases and improves their training efforts. Likewise, the educational materials that the state develops for participants can be revised concurrently with the approval process, reducing the chance of confusion, errors, or conflicting information between retailers and participants.

II. Choices of the early EBT states and the online/offline alternatives

II.1 What is EBT?

Since the 1980s, the U.S. Federal and state governments have pursued the implementation of Electronic Benefit Transfer (EBT) systems to replace paper instruments for the delivery of Federal food assistance benefits to recipients. EBT is an electronic system that allows a recipient to authorize the transfer of their government benefits from a federal account to a retailer account to pay for products received.[32] EBT differs from network-branded prepaid cards used for other benefit distributions in one way: EBT card accounts are not actually loaded with value.

EBT is an authorization to spend up to a certain amount (on approved items, at approved locations), but the government holds those funds until settlement occurs, at which point funds are moved directly from the state or federal government's account to the retailer's account. Other government benefit programs, such as Child Support, Social Security, and Unemployment Insurance, use prepaid debit cards, also known as Electronic Payment Cards (EPC), for cash benefits. EPCs are branded with a mark from one of the major payment card "open loop" networks, such as MasterCard or VISA, and are linked to a pre-funded account.

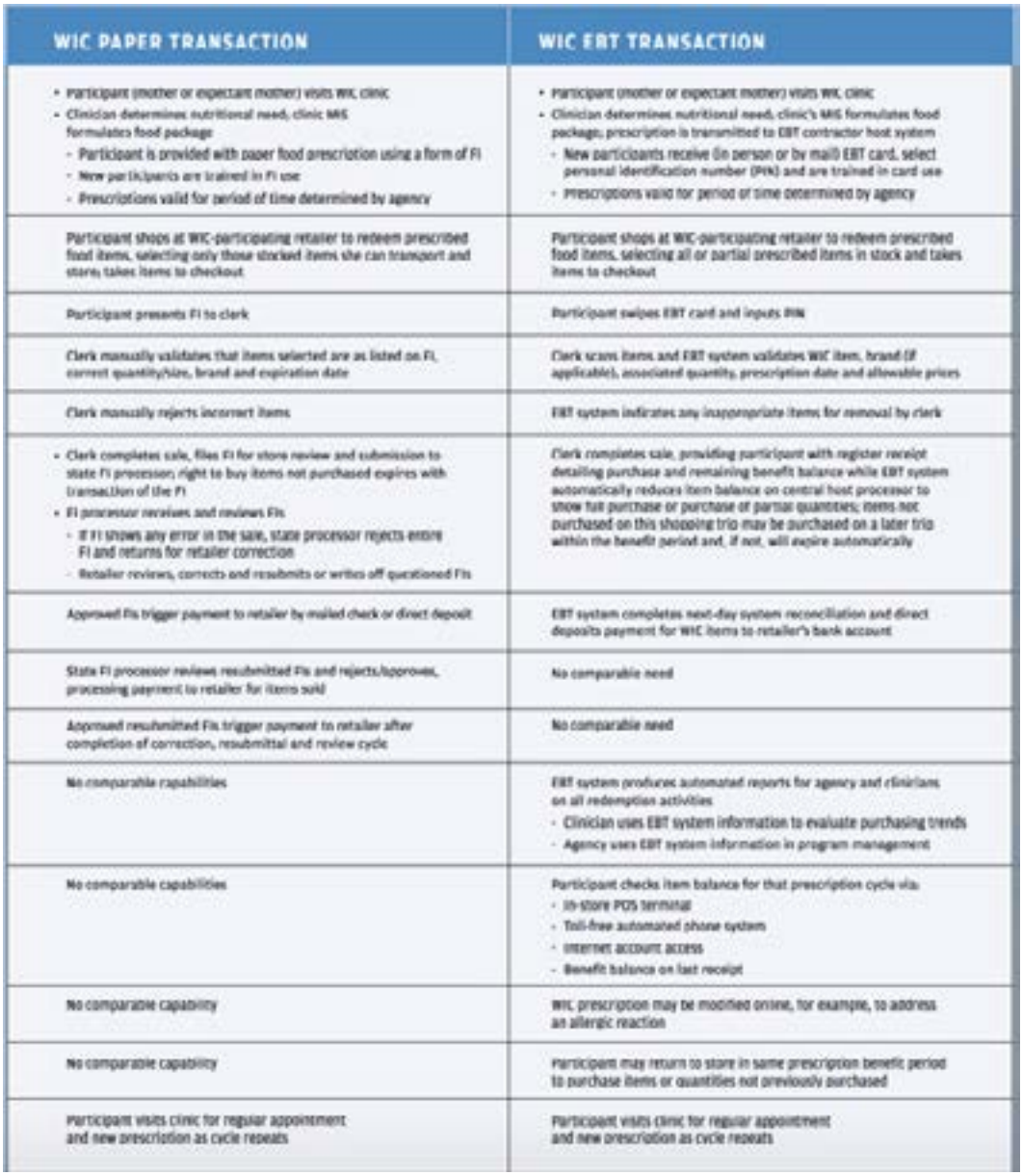
EBT is a closed, discrete ("closed loop") network where providers are pre-qualified and linked to a central authorizing processing facility. Although commonly associated with the Supplemental Nutrition Assistance Program (SNAP, formerly known as "Food Stamps"), EBT is a card-based system used to administer several benefit programs and is not a benefit program itself.

The United States Department of Agriculture's (USDA) SNAP is the largest program administered via EBT. SNAP distributed over $71 billion in food benefits in FY2016 to 44.2 million low-income individuals, and benefit delivery is administered entirely via EBT cards. Other state administered programs, such as the Temporary Assistance to Needy Families (TANF), sometimes employs EBT. In FY2015, the TANF Block Grant was $16.6 billion and forty-three states used EBT to distribute TANF cash and childcare benefits.

SNAP EBT cards typically adhere to an interoperability standard promulgated by the National Automated Clearinghouse Association (NACHA) and branded by QUEST (the operating standards for electronic benefits set by NACHA), although it is not required by Federal regulation.

Under a Congressional mandate, the WIC program is moving to employ EBT to administer the delivery of more than $6.5 billion in food benefits (including infant formula rebates) by October 1, 2020.[33] WIC is not covered by the QUEST standard. USDA has developed its own eWIC operating rules and technical standards.

It is common convention to use the term EBT when referring to SNAP/TANF cards and the term "eWIC" when referring to the use of EBT in WIC. In the interest of clarity the term eWIC is used for this paper. A comparison of paper vs. eWIC transactions is presented in Figure 5.[34]



WIC PAPER TRANSACTION	WIC EBT TRANSACTION
• Participant (mother or expectant mother) visits WIC clinic • Clinician determines nutritional need; clinic MIS formulates food package - Participant is provided with paper food prescription using a form of FI - New participants are trained in FI use - Prescriptions valid for period of time determined by agency	• Participant (mother or expectant mother) visits WIC clinic • Clinician determines nutritional need; clinic's MIS formulates food package; prescription is transmitted to EBT contractor host system - New participants receive (in person or by mail) EBT card, select personal identification number (PIN) and are trained in card use - Prescriptions valid for period of time determined by agency
Participant shops at WIC-participating retailer to redeem prescribed food items, selecting only those stocked items she can transport and store; takes items to checkout	Participant shops at WIC-participating retailer to redeem prescribed food items, selecting all or partial prescribed items in stock and takes items to checkout
Participant presents FI to clerk	Participant swipes EBT card and inputs PIN
Clerk manually validates that items selected are as listed on FI, correct quantity/size, brand and expiration date	Clerk scans items and EBT system validates WIC item, brand (if applicable), associated quantity, prescription date and allowable prices
Clerk manually rejects incorrect items	EBT system indicates any inappropriate items for removal by clerk
• Clerk completes sale, files FI for store review and submission to state FI processor; right to buy items not purchased expires with transaction of the FI • FI processor receives and reviews FIs - If FI shows any error in the sale, state processor rejects entire FI and returns for retailer correction - Retailer reviews, corrects and resubmits or writes off questioned FIs	Clerk completes sale, providing participant with register receipt detailing purchase and remaining benefit balance while EBT system automatically reduces item balance on central host processor to show full purchase or purchase of partial quantities; items not purchased on this shopping trip may be purchased on a later trip within the benefit period and, if not, will expire automatically
Approved FIs trigger payment to retailer by mailed check or direct deposit	EBT system completes next-day system reconciliation and direct deposits payment for WIC items to retailer's bank account
State FI processor reviews resubmitted FIs and rejects/approves, processing payment to retailer for items sold	No comparable need
Approved resubmitted FIs trigger payment to retailer after completion of correction, resubmittal and review cycle	No comparable need
No comparable capabilities	EBT system produces automated reports for agency and clinicians on all redemption activities - Clinician uses EBT system information to evaluate purchasing trends - Agency uses EBT system information in program management
No comparable capabilities	Participant checks item balance for that prescription cycle via: - In-store POS terminal - Toll-free automated phone system - Internet account access - Benefit balance on last receipt
No comparable capability	WIC prescription may be modified online, for example, to address an allergic reaction
No comparable capability	Participant may return to store in same prescription benefit period to purchase items or quantities not previously purchased
Participant visits clinic for regular appointment and new prescription as cycle repeats	Participant visits clinic for regular appointment and new prescription as cycle repeats

FIGURE 5

WIC Food Purchasing– Paper vs. EBT

Source: JP Morgan (2009). Moving Government from Policy to Results – WIC EBT: The Future is Now.

II.2 EBT History

In 1982, FNS funded a study of the technical and economic feasibility of an EBT system in the Food Stamp program (now called SNAP).[35] The favorable conclusions of this initial study prompted USDA to sponsor a 1984 demonstration of an online

Food Stamp EBT project in Reading, Pennsylvania. The evaluation of the project reported that most system participants preferred the EBT system over paper script vouchers and that EBT could reduce the program's vulnerability to benefit loss and diversion through the more secure electronic payment system. However, the evaluation found that the cost of EBT was nine times greater than that of the paper-based system.[36]

Over the next few years, Pennsylvania and the USDA worked to reduce EBT costs, largely through the state assuming operating responsibility, as well as through the integration of EBT functions with other program computer operations (e.g. integrated eligibility systems). A subsequent evaluation found that the redesigned EBT system was still preferred by clients and had been reduced to one-third the cost of the demonstration system; nonetheless, its cost remained about three times higher than that of the paper system.[37]

In 1988, Congress authorized pilot projects to determine if the use of electronic benefit cards or other electronic benefit delivery systems would enhance program operations to the benefit of both program administrators and recipients.[38] Following in Pennsylvania's footsteps, Ramsey County in Minnesota, San Diego County in California, and the states of Maryland, New Jersey, New Mexico and Texas soon launched food stamp EBT pilots. These pilots achieved measurable improvements in the quality and cost effectiveness of EBT and their success led Congress to formally approve the use of EBT to replace food stamps in 1990.[39] In that same year, the U.S. Department of Treasury proposed the implementation of EBT solutions across an array of direct Federal and state-level benefit programs, including Social Security, Railroad Retirement, Black Lung, Supplemental Security Income (SSI), Food Stamps, Aid to Families with Dependent Children (now TANF), Child Support and Unemployment Insurance.[40]

While several of these Federal programs eventually migrated away from EBT toward direct deposit programs, states continued to embrace the technology, and in 1996, Congress mandated the use of EBT in food stamps nationwide by 2002.[41]

Early implementation of EBT often employed an "online" magnetic stripe card-based system, comparable to ATM cards and networks. Two states, Ohio and Wyoming, seeking to partner Food Stamps and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), adopted smart card solutions. Smart cards are like credit and debit cards but have an embedded microchip with read/write capability. While a magstripe is a "write once/read many" technology, a smart card can be over written/updated multiple times (write many/read many).

II.3 eWIC HISTORY

WIC is a supplemental nutrition program that identifies and assists low-income pregnant women, their infants, and young children at risk of poor nutrition because of their economic status. It is funded by the USDA on the federal level but administered by state health departments. Recipients of WIC benefits are given a "food prescription," which they then take to a participating food retailer to fill. The prescriptions are item and quantity specific. Retailers receive paper checks or vouchers in payment, making the entire process very labor, paper, and data intensive. A WIC transaction requires much more data than just a financial transaction like food stamps. In the latter, the message set consists of some control and security data and a dollar amount. In WIC, the message must contain all of that plus the product code for each item purchase. Since the size of the WIC message set could slow or clog the electronic fund transfer (EFT) networks, the chip card, which stores the data offline, seemed to be a good candidate for a smart chip card based EBT program for WIC (see Figure 14).

The first use of EBT as a means to deliver WIC food benefits - the proof of principle study- was the WYO Card Project, implemented in Natrona County, Wyoming in 1991. The selected contractor proposed a smart EBT card and an "off-line" data transfer -- suggesting that the amount of data required to complete a WIC transaction was too great to be transmitted to and from an EBT host --through the electronic funds transfer (EFT) network within commercially-acceptable transaction time limits.

In 1994, FNS published its "WIC Program Electronic Benefits Transfer Vision", calling for WIC to "deliver WIC benefits and reconcile payments through a paperless EBT system." That same year, 32 state agencies participated in the August 1994 National WIC EBT Conference.

Following the WYO Card demonstration, Wyoming began implementation of the PayWest Project, which was the first joint WIC and Food Stamp EBT project. This project made use of offline smart card technology for the provision of both Food Stamps and WIC benefits. The two programs shared cards, POS terminals, a customer service call center, installation and maintenance subcontractor services, and an EBT contractor. As a cost-saving measure, Wyoming served as its own Prime Contractor (by hosting and maintaining the system in-house) and continued to do so for several years). Despite these cost-saving initiatives, the Food Stamp agency withdrew from the partnership in 2006 to adopt a less expensive online magnetic stripe card solution. However, Wyoming WIC continues its smart card system to this day.

Ohio WIC had an offline smart card pilot for approximately five years in the Dayton area from 1997 to 2002.[42] The system employed the same equipment and services as the statewide Food Stamp EBT system. In June 2005, the Ohio Food Stamp Program chose to convert to a statewide online EBT system. WIC was unable to afford the pilot without the support of their Food Stamp Program partner, and so converted back to the issuance of paper food instruments.

These early smart card EBT efforts were motivated in part by the potential for the development of multi-program electronic services delivery (ESD) solutions. ESD was proposed as an innovative strategy for improving the quality, efficiency, and integrity of a host of government services. It was designed to employ smart chip cards in ways not yet tried in US public and private sector applications. The Western Governors Association piloted one such solution, "Health Passport," for Head Start, Immunizations, and WIC, in North Dakota, Nevada and Wyoming. The 2004 six-state New England Partners Project developed, but never fielded, a prototype system for use by a dozen U.S. Department of Health and Human Services (HHS) programs across the region. In at least the short-term, these initiatives established extraordinary coalitions of government, client, and private enterprise system stakeholders to seek ways to overcome the funding and administrative rule silos that hindered cooperation across public health and human service programs serving the same populations. Other states (such as Montana, New Jersey, Texas and Utah) sought smart chip card solutions anchored in Medicaid and WIC.

In terms of actual implementation, however, Health Passport (HPP) stood alone. An evaluation of the project[43] concluded that it was promising but it was too short a demonstration period to determine its effectiveness. To evaluate cost savings evaluations:

> *"The HPP demonstration has succeeded in bringing a concept to life ... But the time period for this demonstration was very short. Although planned for 18 months, because of the lengthy start-up period and choices made about a phased implementation, most programs and applications (except in Bismarck) were operational for less than a year. This was barely enough time to smooth out the technical wrinkles, a prerequisite to active provider and client utilization of the system. In May 2001, although some applications of HPP were fully operational, HPP was just beginning to take hold in some programs. In others, HPP clearly had not taken hold, and in still others it was just too soon to tell."*

The report indicates that "savings are not apparent yet because of start-up costs and the short time that providers have had to reengineer their business processes." The findings suggested that there are several promising opportunities for cost savings using HPP.

The evaluation also concluded that it could not determine if HPP improved the quality of care (e.g., by providing timely and accurate clinical information), but it did determine that clients actually used the EBT, appointment information, and immunization information functions of the card. The authors noted that "clients used kiosks to access information, but much more can be done to enhance this feature."

It was also determined that "the majority of clients were satisfied with HPP and indicated that it helped with obtaining and keeping track of their health information."

Nevada was able to use the HPP pilot as a launch pad for a smart card eWIC system for the state and the Intertribal Council of Nevada WIC Programs. However, due to cost considerations, Nevada switched to an online eWIC system in 2009.

The states of Washington and Michigan WIC launched the first eWIC pilots in 2005. Washington WIC partnered with USDA to pilot the use of existing retailer equipment, with a magnetic stripe card and online technology, to deliver WIC benefits. This "proof-of-principle" pilot involved 300 families in the Tacoma, WA area. The "demonstration in principle" was ended by December 2005 and was the first successful use of online technology for eWIC.

While Michigan's original plan called for a smart card/offline technology, major retailers in the area convinced Michigan WIC to pursue an online solution for WIC. JP Morgan was contracted under the same procurement as Michigan EBT Food Stamps and Cash Programs to develop and implement this online WIC pilot. A successful pilot was implemented in Jackson County, Michigan in July 2005 with approximately 2600 families and 24 retail stores. As a result of an EBT Services re-procurement, ACS, Inc. became the prime contractor for services including customer service and retailer POS terminals shared by the WIC and Food Stamps Programs. After extensive evaluation, it was determined that sharing of the card would not be beneficial to either program. Implementation of the WIC-specific system statewide was completed in March 2009.

Kentucky WIC implemented its own online pilot in 2009. The system was developed and is currently hosted by CDP, Inc., the program's information system services provider. Two ITOs -Independent Tribal Organizations (Cherokee Nation and Isleta Pueblo) implemented offline pilots in the same year, and the Chickasaw Nation implemented an online system in 2010.

II.4 How eWIC works

The 2010 **Healthy, Hunger-Free Kids Act** *requires that by 2020, all WIC agencies must convert from the current paper-based voucher system to electronic benefit transfer (EBT) technology in order to enhance the client shopping experience and improve the program's administrative efficiency and integrity. EBT is a card-based system that allows recipients to authorize the transfer of their government benefits from a federal account to a retailer*

account in order to pay for the purchase of food.. As mentioned earlier, in the late 1990's, as EBT began to be implemented in WIC, in an effort to differentiate WIC cards from other Federal programs such as SNAP and TANF, some states began to describe WIC EBT as "eWIC." Whether online or offline, eWIC and WIC EBT systems are the same. Only the name is different. In the interest of clarity, the term eWIC is used for this paper.

USDA has addressed eWIC requirements in two ways specified in its Model Functional Requirements Document (FReD): Readiness and Functionality document. The functions that support "eWIC-readiness" are defined as a part of a WIC management information system (MIS) and not as a part of the eWIC system. These functions include identifying participants as members of family groups in the MIS rather than as individuals, issuing the food prescription in terms of categories and sub-categories instead of food type, and pooling family benefits. eWIC functionality requirements are identified as the basic requirements of the eWIC system, such as eWIC account establishment and maintenance, and grocery point-of-sale transactions.

II.4.1 Management Information System (MIS) Readiness

While WIC may have moved slowly toward adopting eWIC, the program has generally been quick to adopt each new generation of information management technology. In the 1970s and 1980s, many WIC agencies were supported by mainframe systems, with the guidance of USDA's "WIC National Model" specification. In these systems, clinic staff manually completed multipage carbonless copy forms called Turnaround Documents (TAD), which were shipped to a central site for key-capture. The key entry centers would then ship back printed TADs, which were used by clinic staff to submit corrections and updates. All clinic records were paper-based. Pre-printed food instruments were shipped in batches to the clinics on a monthly basis, to be sorted, distributed to participants, or voided in the event of error or a failure by participants to pick them up.

Many WIC agencies were early adopters of "distributed" systems -- typically PCs linked to a Local Area Network and server with nightly batch uploads to the mainframe central database. These systems replaced TADs with digital records. They included automated tools for case and clinic management, including appointment scheduling, eligibility calculations, and automated growth charts. A key feature was the ability to print food instruments on-demand when the participant was in the clinic.

The EBT Mandate came in the midst of WIC's migration to web-enabled systems. In a more modern way these systems returned the software and data storage

functions to a central processor, instead of the local area network servers in the clinic sites. This provided a single statewide database while still providing enhanced functionality at all program levels. But this system modernization initiative required significant staff and financial resources. Many states believed that modernizing the information system had a higher priority than implementing eWIC.

The early adopters of eWIC sought to avoid the cost and delay of modernizing the information systems by implementing a variety of process workarounds to avoid the expense of significant upgrades to their management information systems (MIS). Of the original ten eWIC agencies with clinics that could support eWIC, only the State of New Mexico and the Chickasaw Nation did so with an MIS that had been designed to support eWIC. Of course, this led to wide disparity in function and efficiency in WIC operations.

Prior to the 2020 Mandate to transition to EBT, USDA promoted eWIC and MIS interface standardization. Out of concern that implementation of a modernized MIS and eWIC concurrently would overwhelm state agencies, until recently, USDA required that state agencies modernize their MIS in advance of eWIC. This focused attention on the State Agency Model (SAM) initiatives (SPIRIT, Mountain Plains, and Crossroads) that sought systems capable of supporting both paper and electronic issuance and redemption.

Under a state legislative mandate, Florida was the first WIC agency to get approval for a concurrent MIS/eWIC development and implementation. However, the pressure of a one year legislative timeframe caused Florida WIC to defer some desired functionality in both systems for development after the systems went live.

Absent such circumstances, it is hard to imagine that many other states could complete the work of implementing both a new MIS and an EBT system in the same timeframe. But six others have now made the case that concurrent implementation is the best way to assure that they can meet the 2020 Mandate and have been approved to do so.

In order to support eWIC functionality, there are a number of WIC MIS features and functions that require modification, including:

1. *Creation of a household identifier*. Because WIC authorizes individuals, not households, legacy systems often did not include a family or household identifier. Under eWIC, the WIC food prescription for all WIC participants in a household are pooled in the eWIC account, so all participants must be part of a household unit.

2. *Issuance of an eWIC card*. An eWIC card is issued to the head of household (or to the person authorized to manage the WIC benefits), who then selects

a secret PIN used to provide security on the eWIC card. eWIC cards are pre-serialized but do not display participants' names or photos. When a card is issued, the MIS must capture the PAN (card number) and associate it with the household and the benefits issued.

3. *Standardizing food packages.* An eWIC system also requires a new approach to prescribing the WIC food benefit. To simplify benefit issuance, over time the paper systems began to rely on a list of standardized food packages. These standard packages defined the types and quantities of food to be issued according to a participant's category and nutritional risk(s). The standards also defined the allocation of food items across a number of food instruments, as illustrated below (See Figures 6 and 7)

EXAMPLE OF THE STRUCTURE OF A STANDARD PACKAGE*

Package ABCD

FI #	FOOD ITEM	QUANTITY
1	WIC-approved Juice, 46oz can or 11.5/12 frozen or concentrate	1
	WIC-approved hot or cold cereal, 36oz	-
	Fluid low fat milk, gal	2
	WIC-approved Cheese, 20oz	-
	Eggs, dozen (large or medium only)	1
	Peanut Butter, 18oz (store or least expensive brand)	1
2	Fluid low fat milk, gal	1
	Eggs, dozen (large or medium only)	1
3	Fluid low fat milk, gal	1
	WIC-approved Cheese, 20oz	1

*Not an actual food package

FIGURE 6

In eWIC, the prescription must be spelled out in greater detail and matched to approved product codes:

WIC Food	Category	Sub-category	Description	Benefit Unit Description Min/Max Abbreviation (X9.93:2-2014, table A.1)
updated 3/7/2016				
Cheese or Tofu	02	000	Cheese - all authorized	LB / POUND
		001	Cheese	LB / POUND
		002	Lowfat cheese	LB / POUND
		003	Low Sodium Cheese	LB / POUND
		004	Tofu	LB / POUND
		005	Cheese - Kosher	LB / POUND
		006-099	Reserved	
Eggs	03	000	Eggs - all authorized	DOZ / DOZEN
		001	Fresh shell eggs	DOZ / DOZEN
		002	Dried egg mix (powder)	OZ/OUNCE
		003	Liquid Whole Eggs	OZ/OUNCE
		004	Boiled eggs	DOZ / DOZEN
		005-099	Reserved	
Breakfast Cereal	05	000	Breakfast Cereal All Authorized hot and cold	OZ / OUNCE
		001	Whole Grain	OZ / OUNCE
		002	Non Whole Grain	OZ / OUNCE
		003-099	Reserved	

FIGURE 7

eWIC Category/Subcategory Sample

Source: Functional Requirements Document for Model WIC Information Systems, Version 2008 2.0, Appendix E, Electronic Benefit Transfer Systems, January 14, 2009, USDA/FNS

The WIC agency reviews its list of approved products and determines the Universal Product Code (UPC) or price look up (PLU) code for each item. USDA has established a National UPC Database that supports this process, but at first implementation, WIC staff may have to visit stores to capture the product codes for local and regional products. The UPC/PLU codes are then assigned to a category/subcategory.

Due to the variety and non-standard product codes in produce, Cash Value Voucher benefits have a one cent Unit and a Value in $1 increments (see Figure 8).

WIC Food	Category	Sub-category	Description	Benefit Unit Description Min/Max Abbreviation (7 CFR 246.2-2014, table A.1)
updated 3/7/2016				
Fruit & Vegetables Cash Value	19	000	Fruit and Vegetables - Cash Value Voucher	$$$ / $$$$
		001	Fresh	$$$ / $$$$
		002	Frozen	$$$ / $$$$
		003	Canned	$$$ / $$$$
		004	Dried	$$$ / $$$$
		005	Fresh Bananas*	$$$ / $$$$
		006-099	Reserved	

FIGURE 8

Sample Cash Value Voucher

** Banana substitute* for jarred infant fruits (12/001). State agencies to calculate dollar value for benefit issuance.*

When all category/subcategory and product codes are compiled, the end result is the Approved Product List, or APL.

The WIC MIS uses the APL category/subcategory and unit/value codes to define the food benefit provided to the participant. The eWIC system uses the APL to validate the in-store purchase.

eWIC requires a change in the assignment of the food prescription to participants. In the existing MIS, each participant has their own food prescription, and purchases are reconciled to that individual. In eWIC, the food prescriptions for all WIC participants are pooled and reconciled at the household level.

This, and other eWIC-specific requirements, have convinced most agencies that it is better to transfer a state agency model or other modern system into their state that is already eWIC-functional than it would be to attempt to upgrade their aging legacy systems.

II.4.2 The Functions of eWIC

In outward appearance, eWIC looks just like an ATM/debit card transaction. The cardholder swipes or inserts the card in the payment terminal at the checkout lane, enters their PIN, and approves the transaction.

In offline eWIC, the transaction is processed by an in-store system. A food prescription resides on a participant's chip card. The in-store system confirms that the card is valid and verifies the PIN. The WIC products presented for purchase are validated against the APL and the WIC benefit food balance stored on the card.

When the transaction is accepted, the card balance is updated and the store system captures the balance for printing or display. The vendor's claims for the day are uploaded to the eWIC host in a batch file (multiple transactions in one file) overnight. The vendor's claims are processed the next day and an ACH deposit to the vendor's bank account is initiated.

Transactions in an ***online eWIC system***, on the other hand, are processed at the eWIC host (the central computer that manages all transactions). An in-store system initiates the process by uploading the card number and PIN for validation and then accesses the account. The food prescription is maintained at the host and the card only has the account identification information. The in-store system validates the WIC products presented for purchase against the APL and benefit account balance. At the conclusion of the transaction, the eWIC host updates the benefit account and initiates an ACH deposit to the vendor's bank.

As discussed earlier, eWIC is more complicated than cash or SNAP EBT. The primary reason for this is the size of the benefit "message." Cash program and SNAP benefits are monetary values with message sets comparable to a debit or credit transaction. WIC's benefit is a ***quantity of specific foods***, which is communicated through a larger message. This large message set is one reason why the first five eWIC systems were offline.

A second reason eWIC is more complicated is that it involves cost management. Cash programs and SNAP do not monitor the cost of items purchased with their benefits. WIC must maintain cost containment systems, so eWIC must be able to support not-to-exceed price limits and rebate processing.

Participants have different experiences based on the type of eWIC card (online or offline) that they use in transactions. In ***online systems***, participants can call a helpdesk or go online to determine their current balance. They can change their PIN online, and if their card is lost or stolen, they can immediately request a replacement. The downside of the online systems is the risk of a network-wide or state-wide system outage. If the eWIC host or network is down, thousands of WIC participants could lose access to their benefits.

In ***offline systems***, the benefit account is ***maintained on the card***. To read their balance, participants must go to an authorized vendor or a WIC office. To change their PIN or to fix their cards if they stop working, participants must also go to a WIC office. When users report a lost or stolen card, a "hot card" alert is posted to vendors during the nightly updates and participants must wait three days to get a replacement so the agency can be certain that there weren't purchases that had occurred before the alert took effect. The upside of the offline approach system is that glitches are isolated to a store or area and there are no network or state-wide vulnerabilities to outages.

The presence of eWIC typically does not significantly change workflow in the clinic. Intake, eligibility screening, nutrition and health assessment all remain the same. Of course the issuance process does change with the introduction of eWIC, as this new system replaces the cumbersome printing and processing of paper food instruments with an efficient digital process.

For the State agency, eWIC provides significant details about specific foods purchased by participants, thus allowing the WIC Program to monitor and manage its food costs much more closely. With eWIC, maximum food prices (aka NTEs) can be calculated and implemented automatically on a more frequent basis. Further, eWIC makes it possible to closely monitor a household's use of WIC benefits and, through education and food package management, to increase the effectiveness of the program in serving specific households.

eWIC agencies report that product-level edits (e.g. price limits that are set for specific products) at the point-of-sale (POS) greatly reduce costly errors and gross over-charging. eWIC data also provide full accountability of what is purchased where and by whom, allowing a state to more accurately and effectively target fraud and abuse. It also provides stores with lane-specific WIC transaction information that helps them respond to potential store staff compliance issues. More details about EBT system functions can be found in Figure 9.

FIGURE 9

EBT System Functions

Source: Functional Requirements Document for Model WIC Information Systems, Version 2008 2.0, Appendix E, Electronic Benefit Transfer Systems, January 14, 2009, USDA/FNS

III. The 2020 mandate for national eWIC implementation and current rollout status

By 2010, eWIC was operational in six geographic state agencies and four tribal agencies. The states of Kentucky, Michigan, and Nevada, and the Chickasaw Nation and Inter-tribal Council of Nevada adopted online, magnetic stripe systems that solved the message size data volume challenge by using web-enabled technologies. The offline systems adopted by the states of New Mexico, Texas, Wyoming, the Cherokee Nation and Isleta Pueblo are based on smart chip cards. In recognition of these successful implementations, in December 2010, Congress mandated nationwide implementation of eWIC by 2020.[44]

In the years leading up to the mandate, the WIC Program community was somewhat divided on eWIC generally and on the issue of a mandate specifically. The early adopter agencies, retailers, and technical experts were strong advocates for nationwide eWIC, although even this group was split along the lines of preferred platform (online versus offline). As evidence, they pointed to the success of the early eWIC implementations, the nationwide success of SNAP EBT, and the cost of the cumbersome paper food instrument process. This part of the community was disappointed by the slow pace of eWIC adoption and believed it had negative program quality and financial impacts. One estimate suggested that in 2006, WIC was spending over $30M more in administrative costs per year than it would have if eWIC was in place program-wide.[45]

Other agencies pointed out that the majority of state agencies had obsolete certification and benefit issuance information systems; some were still using paper-batch solutions dating to the '80s. These systems are essential for nearly every aspect of WIC operation and administration, from participant services to financial reporting. They noted FNS' SAM initiative and suggested that system modernization should be prioritized over EBT.

While FNS itself had promoted eWIC since the early 1990s, and, in September 2002, had issued its first "WIC Electronic Benefit Transfer (EBT) System Development, Implementation, and Expansion – 5-Year Plan," the Agency made clear its concern that WIC might be unable to afford to build or operate EBT. FNS had fair cause for concern. A 2002 SNAP EBT mandate had required that the conversion from paper to EBT be cost-neutral. In the end, some states could not meet that requirement, and

Congress ultimately loosened it. Therefore, while the agency was developing and testing a National eWIC Cost Evaluation Model, it was also requiring a comprehensive feasibility and cost benefit analysis before a state agency could apply for approval to implement eWIC. The 2020 eWIC Mandate requires only that the operation of eWIC be affordable under an agency's NSA grant; planning and implementation costs are still funded through special grants. As a part of its 2020 initiative, USDA removed the requirement for the feasibility and cost benefit studies.

Early adoption of eWIC was also slowed by competing priorities and limited funding. Since FY2009, USDA has distributed $159 million for EBT and MIS planning and implementation. In FY2010, Congress appropriated $30 million in WIC technology funds and $37 million in FY2011. But in FY2012, Congress did not provide any technology funds for the program. However, in FY2013 Congress appropriated $44 million and in FY2014, $40 million in technology funds. This fluctuation and uncertainty about funding began to concern the WIC community because the pace of funding did not appear to be on track to enable agencies to meet the 2020 WIC EBT implementation mandate.

On March 5, 2014, an eWIC Stakeholder Mini-Summit Meeting was held in conjunction with the National WIC Association's (NWA) 24th Annual Leadership Conference and Research Summit. The event was hosted by the NWA and the Electronic Funds Transfer Association's eGovernment Payments Council (eGPC). In attendance were representatives of six states, the USDA/FNS/Supplemental Food Program Division, retail and grocery associations, client advocates, and eWIC processors and consultants.

The idea for the meeting grew out of conversations at the NWA Technology and Program Integrity Conference (Dallas, September 2013) and the EFTA/ eGPC EBT: Next Generation Conference (San Diego, November 2013), during which representatives of the government, retail industry, and EBT services communities shared concerns about the risk that WIC might not meet the 2020 EBT implementation mandate. Concern centered on the adequacy of funding for the transition and the perception that it was taking too long for agencies to implement EBT.

The group also expressed concerns that even with the mandate in place, there were some stakeholders who did not understand or did not accept the business case for eWIC. Consequently, the group began by agreeing on a consensus business case for the eWIC Mandate. There was agreement that the two most significant advantages of adopting eWIC were to reduce client stigma and enhance the program's integrity. Retailer representatives offered that eWIC was less complex to implement than paper vouchers and simplified the WIC transaction. As a result, clients using eWIC feel less conspicuous in shopping lines. In addition, under eWIC, client-clerk disputes over eligible items are less likely. The eWIC simplifications were also reported to reduce the level of necessary clerk training about WIC procedures.

State representatives noted that eWIC's flexible shopping benefited the working poor and homeless. As noted previously, in paper systems, a client must purchase all items at once every month; in EBT systems, they may shop as needed throughout the month. Advocate representatives added that EBT also improves a WIC mother's ability to protect food benefits for her and her children from abusive partners. WIC representatives whose states operate EBT relayed that this technology had measurably enhanced the state's ability to promote and enforce compliance in the food delivery system. Retailers agreed that EBT improved operations for both the stores and the program, but noted that implementation is not as easy as "just throwing a switch."

The discussion about the business case ultimately gave rise to a broad exploration of the cost of EBT and who stands to gain the most from its use. FNS representatives reported a broad estimate of $250 million to $300 million to complete the rollout of WIC EBT by 2020. Noting that there are a wide range of variables, it was reported that a sizable portion of the total cost of WIC EBT rollout would be for the modernization or replacement of client certification and management information systems (MIS) to enable EBT adoption. Sometimes, states over or underestimate their needs or require more time than expected to complete each phase, making it difficult to establish firm cost estimates on an annual basis. Additionally, the time required by the states to get through planning, procurement and implementation means that there needs to be multi-year funding. If FNS does not provide the funds first, many states cannot release a Request for Proposals (RFP), and when they do hire an MIS or eWIC services contractor for implementation of eWIC, the process can take upwards of 18 months to complete. However, some USDA representatives present suggested that "if Congress gave us all the funds needed at once the states wouldn't be ready to use it."

The discussion that followed in the meeting revealed skepticism regarding the total cost and the level of MIS work needed for WIC EBT implementation. FNS responded that they based their estimates on funding requests and their "best guess" as to what remaining work needs to be accomplished.

Regarding costs, EBT contractor representatives at the conference reported that WIC EBT implementation and operating costs have dropped over the past few years as adoption and industry competition have increased. Other attendees expressed concern that EBT implementation and operations fees could actually increase due to the reduced competition resulting from the departure of JP Morgan EFS from the EBT market. At the end of the discussion, consultants at the conference agreed to work with FNS to see if they could clarify the cost estimates for WIC EBT roll-out.

The question of who gains the most from WIC EBT financially generated a broad range of opinions at the meeting. Some felt the state and federal government would benefit the most due to the elimination of cumbersome systems and the adoption of effective tools for cost containment and compliance efforts. Others noted that

EBT reduces store staff training costs, is more efficient for in-lane shopping, and eliminates costly WIC check rejections at the point of sale.

Discussion at the conference also focused on whether or not EBT was less expensive for states to operate than paper systems. It was reported that Michigan and Texas that had employed state-redeemed paper systems, achieved considerable savings by implementing EBT. Some states that employ bank or state treasurer based check systems reported lower check handling fees, which are a major portion of the cost of paper-based food delivery. It was suggested that economy-of-scale could be a factor. On the other hand, the consulting firm representatives at the meeting reported that in most states studied to date, EBT solutions seem to cost more to operate than do many paper systems.

Some discussion focused on food cost savings resulting from WIC clients choosing not to redeem their entire food benefit. While such "partial redemptions" are evident in data from paper systems, it appears there is a much higher level of partial redemption under EBT, where the client is not required to purchase all of the food on a given check at once.

Store costs and savings, other than the cost of paper checks rejected for errors or that exceed the maximum allowable price, are difficult to quantify due to the wide range of retail businesses. While it was agreed that getting rid of the paper transactions generally benefitted the retailer cost-wise, in many stores it did so for such a small percentage of sales that they did not see a real impact on overall profitability.

A report, ***Industry Estimate of WIC EBT Implementation Costs***, was released in July 2014. The WIC and congressional stakeholder groups reconvened on July 28, 2014 to review the estimate included in this study. The analysis examined the current status and previous funding of EBT/MIS projects on an agency-by-agency basis. In some cases, the status was known by FNS based on formal planning documents and funding requests. In other cases, the consultants had more recent information. The analysis did not include the cost to retailers of modifying their systems to accept WIC EBT transactions.

An estimate of need was established for each of the remaining 66 WIC state agencies based on available information from each state, previous experience in other projects, and expert judgment. Once each agency was assigned an estimate, they were grouped by either caseload size or participation in a consortium. This was

done in recognition of the fact that larger agencies often have higher implementation costs and that consortiums often share costs.

Next, the estimates for each state were summed within categories. This was done to shield confidential information and to make clear that it is a national estimate and therefore is not reliable on the state level. Finally, to provide for a likely margin of error, the total estimate was increased by 10%.

Of the $219 million estimated need, approximately 40% is for the planning, procurement and implementation of eWIC systems. The remaining 60% is for the modification of legacy information systems or the planning, procurement and implementation of new information systems; necessary to implement EBT.

The conclusion of the independent industry cost estimate is that the remaining cost of completing eWIC implementation is slightly less than the FNS estimate of $250 million to $300 million.

The stakeholder group decided to request a meeting with the USDA Undersecretary to discuss their concerns regarding the uncertain appropriations, the impact of the periodicity of cash flow given federal process, state procurement, and industry capacity; and, support for a multi-year/zero-year funding solution. While sympathetic, the Undersecretary and his staff at USDA did not offer any solutions at the time and were skeptical of the chance for zero-year money, in which there is no expiration of the appropriation until the task is completed.

Several members of the stakeholders group decided to present the eWIC business case and Industry Cost Estimate to staff in the U.S. House of Representatives and U.S. Senate. There was a positive outcome: the Senate Appropriations Committee appropriated $220 million in FY 2016 in zero-year money to support the completion of the eWIC rollout.

Currently, the pace of eWIC implementation is quickening. As of June 1, 2017, twenty-four WIC agencies have fully implemented eWIC: eighteen online and six offline. By the end of calendar year 2017, it is projected that twelve more agencies will roll out their eWIC systems, all online. Forty percent of WIC participants now receive their benefits via eWIC. Based on FNS' eWIC Status Reports, some 22 agencies will likely implement eWIC by the end of 2019. However, based on current schedules, there are 27 Independent Tribal Organizations (ITOs) and eight geographic state agencies that are planning to implement in FY2020 and are therefore at some risk of not meeting the October 1, 2020 deadline (see Figure 10).

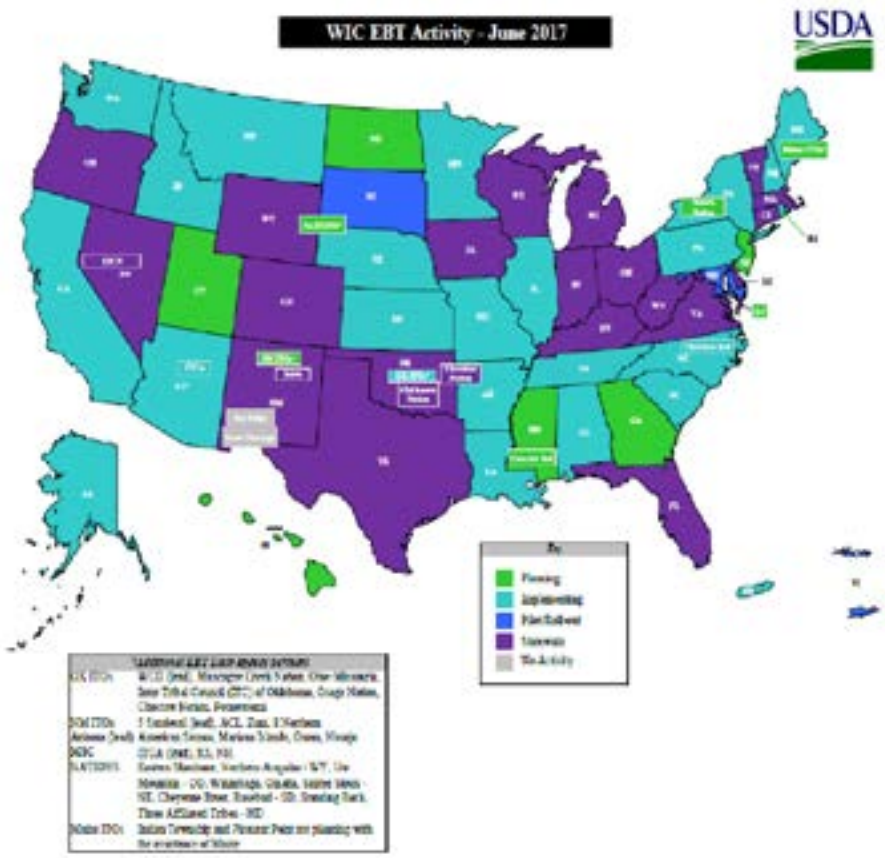


FIGURE 10

WIC EBT Implementation Status Map

Source: https://www.fns.usda.gov/sites/default/files/wic/June2017WICEBTActivityMap.pdf. Viewed June 7, 201

IV. WIC Technology and infrastructure: challenges of mining and utilizing eWIC data

Discussions about the potential use of eWIC data have been taking place since the earliest days of small pilot programs of the technology and continue at the present time. The earliest use of eWIC data was to evaluate the technology itself, during its use in the offline and online pilots.

In 1999, GAO noted that the adoption of eWIC would "improve efforts to prevent and detect vendor and participant fraud and abuse."[46] Evaluation studies of the New Mexico[47] and Michigan[48] eWIC pilots then reported that WIC state agency staff appreciated that eWIC provided additional information about participants' redemption of benefits as well as the content and prices of their purchases.

In 2006, the GAO issued a report on the value of detailed price and quantity data from the WIC Program.[49] The report praised the collection of WIC transaction data, which includes the type of food item purchased, the quantity purchased, and the price paid in the early eWIC pilots (NM, TX, WY). GAO recommended that this dataset be a federally-required element of all eWIC systems.

In their January 2015 WIC Trends,[50] USDA's ERS took note of the EBT implementation mandate and suggested that the increasing availability of WIC EBT data may make it possible to examine a number of issues, including the food choices of WIC participants, how those choices are affected by the constraints imposed by the WIC State agency, and how they affect food costs."

The difficulty of matching WIC participant characteristic data with issuance and redemption data proved challenging in recent studies of WIC peer groups and fraud detection systems. Data on issuance, participant characteristics, and vendor characteristics are typically in the WIC MIS. Data on foods purchased and prices charged are typically in the eWIC system. The studies of the six early eWIC adopting agencies found a wide-variation in the reliability and definition of data in both systems. In their report, *2015 Transition to EBT in WIC: Review of Impact and Examination of Participant Redemption Patterns*, the Altarum Institute, a nonprofit

health systems research and consulting organization, notes that "WIC State Agencies, once having implemented EBT, have a rich source of detailed data on participants' food redemptions. During the course of this study, the researchers and analysts learned a great deal about the nuances of EBT files and properly interpreting the data within those files. Merging databases, such as participant issuance data, basic demographics, vendor location at which WIC shopping occurred, and even nutrient data on WIC foods purchased could provide new understanding of the 'look and feel' of the WIC program around the nation."

In 2016, the National WIC Association[51] (NWA) reported on the myriad of ways that better quality and use of data could lead to improvements at all levels of WIC. The Association calls for data to be "more easily available for both internal programmatic evaluations and for the broader research community." The Association makes a case that the loss of the Centers for Disease Control and Prevention's (CDC) Pregnancy and Pediatric Nutrition Surveillance Programs (PedNSS/PNSS) has contributed to "a lack of data for program planning and monitoring, for national surveillance, and for setting benchmarks with which to compare state and local agency data." As a result, the NWA says WIC agencies are left to create their own data analysis solutions.

But NWA also articulated the current barriers to effective use of WIC MIS and eWIC system data. NWA reports that there are a variety of WIC MISs across the states. These systems are designed to support clinical services, but NWA says the MIS is not currently designed for data retrieval and analysis. The Report makes a goal of a system that combines "administrative data, health outcome data, and benefit redemption," which would greatly improve program evaluation and research opportunities.

Emphasizing the need for "identification and standardization of key variables" to avoid the cost and labor intensity of current studies, NWA calls for the WIC program to find the most feasible way "to improve the quality and usability of WIC program data." The Report makes note that for most states, adoption of eWIC means adoption of a new MIS, and that the combination holds promise for better data quality and availability going forward. USDA data show that 44 agencies have modern systems and 41 will adopt new ones within the next 2-3 years. As a first step, NWA called for USDA to work with a group of WIC agencies to examine the availability of data in these new systems.

The findings of the *Planning Future Data Collection Needs within the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)* were released in June 2017.[52] In 2016, the National WIC Association[53] Working with eight WIC State agencies and the Los Angeles-based Public Health Foundation Enterprises, the study examined the state agencies' abilities "to collect, store, retrieve, and report data needed to meet policy and program management needs now and in the foreseeable future." The study included the six most commonly used modern data systems, including the three state agency model (SAM) systems.

The study found that some of the eWIC agencies with modern MIS "have more detailed information on the food items, item prices, and purchase locations from EBT redemption information." The analysis concluded that if all systems had this data, it could be reported to USDA and used to conduct an evaluation of "trends in pricing, food utilization, nutritional guidance, or program integrity initiatives." The study identified sixteen data elements that may be of interest to FNS. Interviews with FNS and state agency staff repeatedly underscored that collecting this kind of data would improve WIC program management. The study team categorized these data elements into six topics, three of which deal specifically with eWIC.

EWIC RELATED RECOMMENDATIONS FROM THE WIC DATA COLLECTION STUDY

- *WIC Health and Nutrition Data — Nutrition Education:* Nutrition education data (e.g., topic and model) provide FNS with the opportunity to measure the effect of WIC services on participant behavior and outcomes. For example, when analyzed with EBT food purchasing data, WIC State agencies can evaluate the impact of nutrition education topics and modes of delivery on food purchasing patterns. State agencies may also evaluate the impact of nutrition education on birth outcomes.
- *WIC Food Redemption Data:* Data obtained from EBT transactions during participant redemptions of WIC food benefits issued could provide FNS with better access to timely data on participant household purchasing patterns, such as food types, brands, and quantities purchased with WIC benefits, as well as the timing of WIC purchases in the benefit month.
- *WIC Vendor Management Data:* Data pertinent to vendor practices obtained from EBT transactions (e.g., prices paid, discounts, adjustments to payments) will improve the timeliness and comparability of vendor management and program integrity analyses.

The study emphasized the importance of "consistent, comparable data points across State agencies," reporting that "some respondents are concerned that although State agencies may report data fields with the same label/name, there may be differences in when and how the data are captured (e.g., weight and height measures) or in data definitions for potential MDS/SDS data elements (e.g., redemption date) that could result in inconsistencies."

Study interviews conducted with WIC program administrators, researchers, and advocates identified areas where additional WIC data is needed, including financial management, program integrity, cost containment management, food prescription redemption costs, administrative costs, caseload management, health outcomes, and nutrition services. They identified the need for "improving data periodicity,

consistency, and usefulness; using representative sampling; developing EBT analytics; and, creating a central WIC data repository."

The study identified major barriers to adding any desired new data elements or applications to capture data in the modern system. State agencies that have migrated to modern MIS have more flexibility to add new data elements yet continue to face difficulties accessing ad hoc data from their MIS to perform data analytics or build new reports. Common challenges identified by WIC program managers included "a lack of technology resources, staff, and tools to perform this function without support from their agency's technology department or technology vendor." Some agencies have developed data warehouse functionalities, data cubes, dashboards, or specific reporting tools outside of their MIS that enhance their data analytic capabilities. Another challenge faced by agencies is that they are part of a multi-State consortium or SAM which has a complex change control process for coordinating enhancements to their MIS.

The benefit of being part of a consortium or state agency model (SAM) is that group members share the costs associated with MIS development and management. The trade-off is that coordinating with other members of a user group to reach a consensus on requirements and reconcile competing priorities can be cumbersome and time-consuming. State agencies would also like to obtain more unified guidance from FNS on policy directives to minimize differences in policy interpretation among State agencies using a common MIS. These differences are particularly challenging for SAMs that have State agencies supported by multiple FNS offices.

These studies recommended three phases of an initiative to address these challenges: (1) commitment development; (2) gauging data collection support and potential costs; and (3) establishing a shared FNS-stakeholder workgroup.

The Altarum Peer Group Study (June 2017) and a related USDA study (not yet published) focus on fraud monitoring using the same data for four of the first adopter states, and the fraud study included the other two. The lack of standardization in both the MIS and the eWIC systems in the six eWIC states challenged both research teams and delayed both studies in the development of their databases. A significant barrier involved the matching of issuance data from the MIS with redemption data from the eWIC system.

In a manuscript[54] presented at the January 2017 Allied Social Science Association Conference, researchers from Ohio State University report that "one of the current challenges in measuring the impact of the transition to EBT on WIC recipient behavior is the lack of available data. Only select WIC enrollment data are available on the USDA website and transaction level data commonly used in research do not indicate whether or not foods are redeemed with WIC benefits, or paid for out-of-pocket. In addition, state information for WIC EBT implementation is not always readily available or well archived." Clearly there are many challenges but also significant opportunities to integrate data across agencies that would generate very useful information to improve WIC in the years ahead.

V. Early advances in WIC EBT and related technology data

As noted above, over the past 36 years, WIC technology has evolved from use of the old batch computer mainframes to today's web-based applications. eWIC is the first technology in this evolution to enable participants as end-users, employing technology themselves to enhance their WIC experience. From the earliest days of eWIC there have been small pilot programs that have sought to demonstrate the merits of such participant empowerment.

V.1 Introduction of Kiosk Systems in WIC

In the early 1990s, the Maine WIC Program launched the first kiosk-based, participant-directed application called MOMS, Maine's Original Multi-Media System. MOMS was a multi-media, touch-screen computerized health education system for pre-natal and post-partum WIC participants.. Application education modules at the kiosks included an Introduction to WIC, Breastfeeding Information and Techniques, Smoking Cessation Techniques, Healthy Eating Habits, and Good Shopping Habits. The freestanding kiosk platform included animation, full-motion video and audio, and voice over active graphics. The participant could select topics to view and answer questions that tested their knowledge, attitudes, and beliefs about nutrition and health. MOMS was installed in all of Maine's local agencies. A random sample pre- and post-survey of participant knowledge, attitudes, and beliefs after kiosk use reported that 67% of survey responses improved from pre- to post- survey.[55] The evaluation study reported positive response improvement including increasing intention to nurse, enhancing use of shopping lists, decreasing instances of going to the store hungry, not permitting children to eat in front of the television, reducing fat in cooked foods, promoting the proper use of WIC foods, increasing the desire to quit smoking, and improving recognition of the health damaging risks of household smoke to children.

In addition to the pre-post surveys, the MOMS evaluation conducted interviews with a small, randomly selected sample of WIC participants (n=70) at nine WIC clinics. The interviews revealed a high level of acceptance, with ninety-three percent of respondents reporting positive feelings about the kiosk interaction, citing the value of this self-directed and self-paced learning opportunity. Only seven percent of respondents had negative comments such as not liking the non-human nature of the

experience, or not learning anything from the modules, or experiencing difficulties managing a child while using the kiosk.

About one-half of the respondents reported having previously used a computer, but the evaluation found no correlation between previous computer use and "feeling comfortable" using the touch-screen application on the kiosk. Fifty-four percent of individually interviewed participants (19 were interviewed in a focus group format) indicated that using the kiosk was preferable to talking to a person. The remainder reported either no preference (27%), thought a combination of the kiosk and personal interaction was better (12%) or preferred dealing with another person (7%).

The Health Passport (HPP) (discussed earlier in this paper on page 26) also featured a kiosk application and added health records to the Wyoming PayWest eWIC card. The HPP kiosk application allowed the participant to insert their card in the kiosk to check-in at the WIC clinics and to view their food benefits, immunizations, appointments, health/general medical information, and personal/general client data. The kiosks could also be used without reading the smart card to learn about the HPP or other government programs.

Under the auspices of a USDA grant, the kiosks were placed in a WIC clinic, two supermarkets and a Head Start center in Bismarck, ND; a Public Health Nursing center, public library, a Head Start center, and a medical center in Cheyenne, WY; and three WIC clinics and two public libraries in Reno and Sparks, NV.

Although plagued with maintenance problems, the Urban Institute evaluation reported that use of the kiosks increased over time and were used most often to check appointments and print immunization records. While limited by a very small sample (ND: n=31; NV: n=136; WY: n=70), the 2001 participant survey did report a high level of client satisfaction and responses indicated no direct correlation between client use of kiosks and client experience using ATMs to get cash from their bank accounts. Like the MOMS evaluation, the HPP study found no significant correlation between prior computer use and participant satisfaction in their experience interacting with the kiosk.

V.2 Use of smart cards for eWIC

Early efforts to apply technology to improve the participant's experience in the WIC Program, and to enhance nutrition and health education through participant empowerment, captures the philosophy of the early adopters of eWIC. HPP and New England Partners (NEP -Maine was a part of NEP) envisioned the smart card as a client-controlled platform that provided participants with a convenient interface for the WIC program and retail systems. In the process, they demonstrated that this approach improves service delivery efficiency, program integrity, and administration while providing important services to a high-risk population.

The smart card established a platform for transporting between providers a de facto universal client identifier (UCI) that the participant controlled and was transported by chip EBT. The client no longer would have to complete paper forms with much of the same information at each health and human service assistance program they visited. Partnering programs including Head Start, immunization services, and WIC that could share a UCI without having to rebuild their respective legacy client information systems.

In the early 2000s, the New England Partners (NEP) had a more ambitious plan: to share a smart card based eWIC and health record application across six states and over a dozen types of providers. In HPP's case, the eWIC application was already deployed and operational when the health record application was added. The complexity of building both simultaneously slowed the NEP project and may have contributed to its demise in that it slowed design and development to the stage where the initiative lost stakeholder support and funding.

The early eWIC adopters thought that smart cards would soon replace magnetic stripe cards in the marketplace, bringing down the costs of EBT cards, systems and equipment. Major food retailers participating in WIC, led by Walmart and the Council of State Retail Associations, strongly favored the smart EBT card because it would avoid the not uncommon outages in the SNAP online EBT networks.

Government and commercial smart card systems already had become ubiquitous in Europe and Asia at this time. Spain had adopted the chip card for its Social Security program in 2006.[56] France's national health network established a patient-carried benefits and medical record chip card. This system enabled ER physician-controlled chip cards to use a special terminal whereby they could unlock the card of an nonresponsive patient.

But it would be two decades before smart cards became common in the United States. Over the years, some stakeholders would point to the high cost of the chip card (about $5 at the time) and that other countries were quicker to adopt offline commerce because they lacked the widespread and reliable telecommunications infrastructure present in the U.S. The Federal Trade Commission (FTC) believed that electronic funds tranfer (EFT) network owners were themselves part of the cause of the delay in U.S. smart card adoption. In 2001, the FTC unsuccessfully sued Mastercard and VISA for anti-trust collusion related to an effort to delay adoption of smart cards in the U.S. for all credit and debit transactions.[57] The companies successfully argued that they had delayed smart card adoption because it would be very costly and they were not able to identify a strong business case for adoption in America.

It took the decision of the governing body of Europay, Mastercard, and Visa (EMV), a global standard settting organization for chip technology financial transactions, to set a deadline for adoption of the standard. The governing body now includes all

major world brands, including American Express and Discover. After October 1, 2015, the liability for any fraudulent transactions and charges not compliant with EMV shifted from the card issuer to the retailer.

In the interim, funding for innovative eWIC pilots ended. Electronic fund transfer (EFT) networks became faster and more reliable. WIC retailers began to adopt a technology-neutral stance and emphasized the importance of converting to eWIC; whatever system was used, WIC retailers in Michigan and New England became strong advocates for online solutions.

Today, only eleven WIC agencies have or are expected to have offline eWIC. Whether online or offline, eWIC cards' only function is to provide access to WIC food benefits at retail strores. In that regard, eWIC systems are superior to SNAP EBT because WIC requires identification and capture of data about food products purchased. These features strengthen program integrity and provide valuable information for analysis by providers and researchers. *The Agricultural Act of 2014*, Section 4002 (also known as the 2014 Farm Bill) required that all SNAP retailers use scanning technologies to redeem SNAP benefits to prevent the purchase of ineligible items. However, the legislation did not require the capture and reporting of data about the items purchased.

There is no health data residing on an eWIC card. Other than a few recent Summer Food Service Program demonstration projects, which used the eWIC system but issue specific Summer Food cards and not WIC cards to participants), no other Federal programs use the eWIC card. Since the conclusion of the Ohio PayEase and the Wyoming PayWest pilots, there have been no joint SNAP-WIC EBT systems. Since then, FNS at USDA has made the case that eWIC is best served by operating on a single card.[58] Any initiative to implement multi-function eWIC cards will first require a thorough feasibility study to determine if the challenges and concerns presented by FNS can be overcome.

As reported above, the use of eWIC purchase data by agencies and researchers is still an arduous task, but it could be richly rewarding. For example, one early study was able to analyze eWIC purchase data to evaluate the effectiveness of nutrition education in the program.[59] Most studies will require data from both the eWIC and client information systems. The efforts by WIC agencies to build and maintain data warehouses must continue to advance and address these constraints. A Federal mandate would be most helpful to facilitate these goals. Absent this, researchers will need to work with each of the 90 WIC agencies to access their data. With some creativity, developing innovative national strategies to collect this data from all WIC agencies could be well worth the effort, yielding important information about participants' purchases, the impact of nutrition education on health outcomes, and other variables across the program.

VI. WIC EBT-related technology innovations: present and future

Mobile technology holds great promise to promote health among low-income populations. According to the Pew Research Center, 84% of low-income adults in the United States have access to a mobile phone, and one in three mobile phone owners in America have used their phone to look up health information. Fifteen percent of people in the U.S. report that their only method of accessing the Internet is through their cell phones. With over 72% of Americans seeking health related information online within the past year, there are significant opportunities to improve health behaviors through online and mobile resources.[60] Furthermore, the percentage of smartphone users is expected to rise sharply as the costs for these devices continue to decrease. For example, this year a telecommunications company in India released a $4 smartphone. With new generations of affordable smartphones, more low-income Americans will have access to online resources in a variety of settings. Whether through an app that tracks food purchases and nutritional content or with personalized text messages containing tips and words of encouragement about nutritional choices, information technology could potentially play an important role in innovating Federal food assistance programs including WIC with opportunities to help improve the health of program beneficiaries and their communities.

ONLINE EDUCATION TOOLS

Although one-to-one counseling is the method employed on the first WIC clinic visit (e.g. "primary" nutrition education [NE] contact), "secondary" (mid-certification) NE contacts have heavily relied on paper and passive viewing (e.g. pamphlets and videos) for client's health education experiences. However, some eWIC state agencies have begun offering online modules for secondary nutrition education encounters. The participant can go online and complete an NE module after which their next three months of benefits is issued automatically (in online eWIC systems) without the client having to return to the clinic. However, high risk WIC clients may not be offered this option.

In addition, the WIC community has been developing social media messaging to enhance WIC participant education. In 2015, the National WIC Association led the way through the development of a series of YouTube videos targeted to the WIC audience.

However, much more could be done to leverage new technologies (including smartphones, mobile apps, the web and social media) to enhance the quality and effectiveness of WIC nutrition education initiatives.

MOBILE APPLICATIONS

In recent years, there has been the development of mobile app personalized interventions that aim to improve nutrition and prevent obesity. One such app, called *PlateMate*, allows users to take a photo of a meal pre- and post-consumption and then estimates caloric intake.[61] Another app, *SNAPFresh*, helps participants locate SNAP retailers. Additionally, motivational text messages, such as the HEALTHeME weight loss program, are being used to promote weight loss and share healthy habits with participants.[62] There are also increasing opportunities to access health tools online, to use wearables like Jawbone and Fitbit, to share results with friends and family, to discuss health issues with other mobile phone and Internet users facing similar medical concerns, and to share best practices among health professionals.

Recently, WIC has begun to leverage smart phone apps to assist program beneficiaries. A few WIC shopping apps have become available in several states. However, they only provide information about food eligibility and vendor locations; these apps do not currently include nutritional information about food products or interactive feedback with clients. An example is WICShopper,[63] now being offered free of charge to participants in 18 WIC agencies, which allows a partricipant to use their smart phone to verify the eligibility of food products at a store. The app also permits participants to monitor their benefit balance, watch WIC tutorials, get food recall alerts, find recipes, contact WIC agencies and help desks, and find WIC clinics and authorized store locations. Other examples include QuickWIC,[64] which, like WICShopper,[65] is a commercial product, and the State of Minnesota's FoodFinder, which is in the public domain. However, the WIC phone apps do not include the eWIC application, and there are no known plans at this time to include it. The current regulations and guidance for eWIC is card-centric and would require significant revisions to permit implementation of the eWIC benefit on smart phones. There is also concern that most WIC vendors do not have the capacity to conduct phone-based payments. But that is today; the technological infrastructure for WIC could change with innovations in the future.

MOBILE PAYMENTS (MPAY)

In the commercial sector, mobile payments (mPay) are expanding rapidly. While the earliest adoption of mPay at retail point-of-sale (POS) were small merchants like coffee shops and fast food chains[66], today major chains like Albertsons, Kroger and Wal-Mart have or are planning to implement mPay functionality at their POS. Were mPay to become universal it is possible to envision a migration of eWIC in that

direction. The slow pace of conversion to card-based eWIC suggests it would likely be several years before WIC could integrate their new functions in this direction.

ONLINE PURCHASING

Online purchasing may be a more likely direction for WIC in the years ahead. The Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA) issued a request for proposals (RFA) in 2017 to conduct a formal evaluation of EBT mobile and online pilots in SNAP and WIC.[67] These two approaches were authorized by *The Agricultural Act of 2014* (The Farm Bill Section 4011).

In SNAP, FNS has selected seven retailers to participate in an online purchasing pilot demonstration project. The Agency reports that "previous technical barriers, lack of a cost effective method to ensure secure PIN entry via any personal computer (PC) or other internet connection device, has been resolved" through use of the Acculynk™ PaySecure™ product. PaySecure™ provides a secure method to enter PIN data on the Acculynk™'s secure server with no special hardware or PC client software required. These technical improvements would make online shopping more feasible and accessible to WIC participants.

Certain types of SNAP retailers, such as delivery routes, farmers markets, and group living facilities, were not eligible for this WIC online purchasing pilot. In selecting retailers for the pilot, FNS reports that it took into account factors such as online sales expertise and track record of the applicant, past customer satisfaction, and product delivery in food deserts or for hard-to-reach households in selecting Internet retailers for the demonstration projects. On January 5, 2017, FNS announced the selection of seven retailers for the pilot program,[68] as shown below in Figure 11.

RETAILER	LOCATION
Amazon	Maryland, New Jersey, New York
FreshDirect	New York
Safeway	Maryland, Oregon, Washington
ShopRite	Maryland, New Jersey, Pennsylvania
Hy-Vee, Inc.	Iowa
Hart's Local Grocers	New York (based in Rochester)
Dash's Market	New York (based in Buffalo)

FIGURE 11

Retailers included in FNS Online Sales Pilot.

FNS has also commented that several other retailers are likely to be added before the start of the online ordering pilot evaluation.

This particular WIC demonstration project will only address online ordering. Currently, Federal WIC regulations do not allow online purchasing transactions and there are no known systems capable of doing so. In the planned Federal eWIC pilot, payment will be made in the store at the time the participant picks up their food order. It may also be possible to arrange for home delivery with payment at that time, but current regulations strictly limit home delivery options and would need to be reviewed and the guidelines amended.

In the evaluation solicitation, FNS suggests that obtaining WIC benefits via online transactions could potentially reduce stigma for WIC participants who face challenges at shopping checkout when the store clerk must verify that their purchases are eligible and authorized. With this pilot demonstration project, FNS also wants to explore whether online ordering might additionally reduce costs and confusion about eligible items, as well as improve WIC redemption rates.

Recent developments suggest that online food shopping is of significant interest to web marketers as well. In particular, there is evidence suggesting that Amazon is interested in attracting low-income customers. FNS reports that some 90% of SNAP clients now shop at supermarkets and big box stores. Amazon has recently provided low income people with an incentive to change their shopping preferences, announcing on June 6, 2017, that it would offer a discount on its Prime subscription service for people who receive U.S. government aid, a population that is a major component of the customer base of supermarket and Big Box stores.. Amazon is offering the $10.99-per-month or $99-per-year Prime service—which includes fast two-day shipping as well as online streaming of movies and TV shows—for $5.99-per-month to people who receive government assistance including participants in SNAP, WIC, and TANF.

Prime subscriptions are key to Amazon's growth. Now shoppers with valid EBT cards for SNAP, TANF and other Federal assistance programs will be eligible to purchase the Prime service at a significant discount. However, there could be a problem with this development: USDA SNAP regulations emphasize that food and beverage pricing and promotions should not be different for SNAP program beneficiaries than for other customers. It is also unclear how Amazon will be able to verify that the person's EBT card is valid.

Ten days after announcing the Prime service discount for shoppers receiving Federal government assistance, Amazon rocked the grocery industry when it announced that it was acquiring the grocery chain, Whole Foods. Given the impact Amazon has had on other retail sectors, media reports have speculated that there is significant potential for the company to reshape the grocery business as well.

At least one start-up company, though much smaller than Amazon, is also attempting to attract SNAP customers. On April 27, 2017, technology startup Propel announced it had raised $4 million in seed funding[69] for its SNAP client app called *FreshEBT*. *FreshEBT* allows SNAP clients to monitor their card balance, browse for sales, make shopping lists, and locate authorized stores free of charge. In its announcement, Propel reported that it already has 250,000 SNAP clients using the app at least once per week.

Given the growth in online food shopping, SNAP appears to be moving in the direction of allowing this method of food purchasing. With the recent RFP announcement for an online shopping pilot project, WIC appears to be considering this method of purchasing food for its beneficiaries as well. If online shopping is proven effective by these demonstration projects, changes in Federal regulations and policies will need to be enacted to permit WIC online food purchasing and also home delivery of products. Additionally, it is also very important to understand how profits will be linked to advertising on all SNAP and WIC related apps and online ordering functions. Here again policies will need to be put into place to address advertising and other issues that may arise related to online and mobile Federal food assistance shopping experiences.

VII. Conclusion

Serving 53 percent of all children in the United States,[70] the WIC Program is an essential and highly effective initiative to promote good nutrition and health for mothers, infants and young children. Research findings have demonstrated that WIC improves birth weight, physical wellbeing and cognitive development for children who participate in the program.[71]

But WIC is now losing some of its caseload and, as illustrated below, underserving the eligible child population in America (see Figure 12).

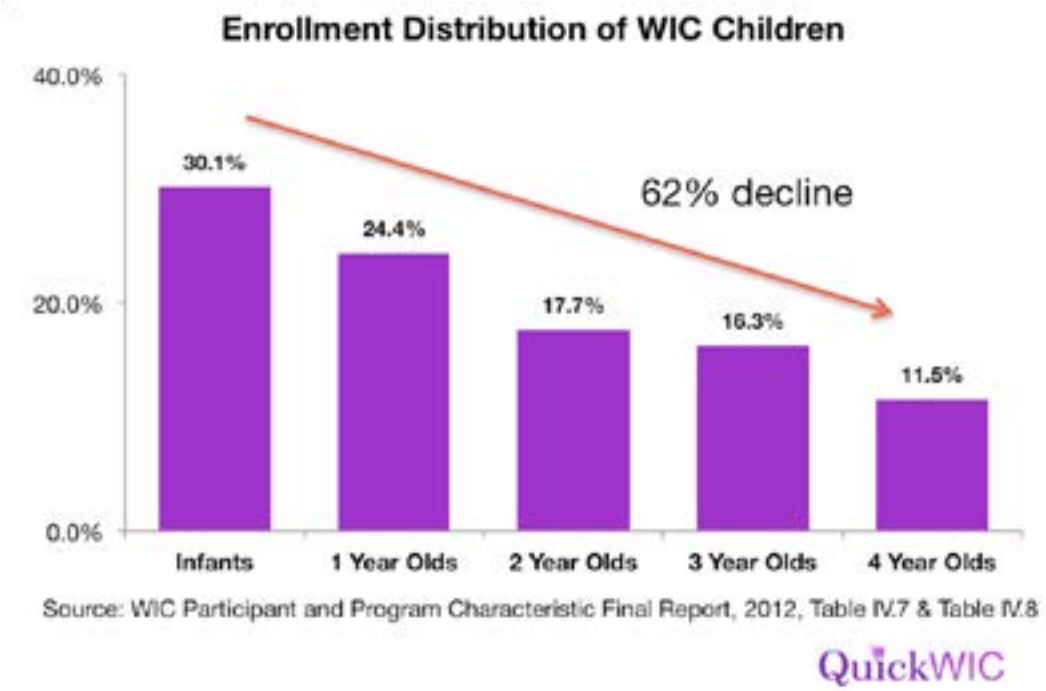


FIGURE 12

Why do so many families stop participating in WIC as their toddler ages? What are the differences between those families with young children who continue to participate in WIC and those who do not? Could purchasing data collected by eWIC help to solve this important question? Could innovative technologies and social media help retain families in the Federal food assistance program? These are some of the important research issues that can be potentially answered by implementation of eWIC in all states by 2020 and through the application of new technologies to collect and analyze data collected from the program.

For 40 years, WIC's paper-based food delivery system successfully supported the program's mission and objectives. However, the paper based process has been complex and cumbersome, for both participants and store clerks (see Figure 13).

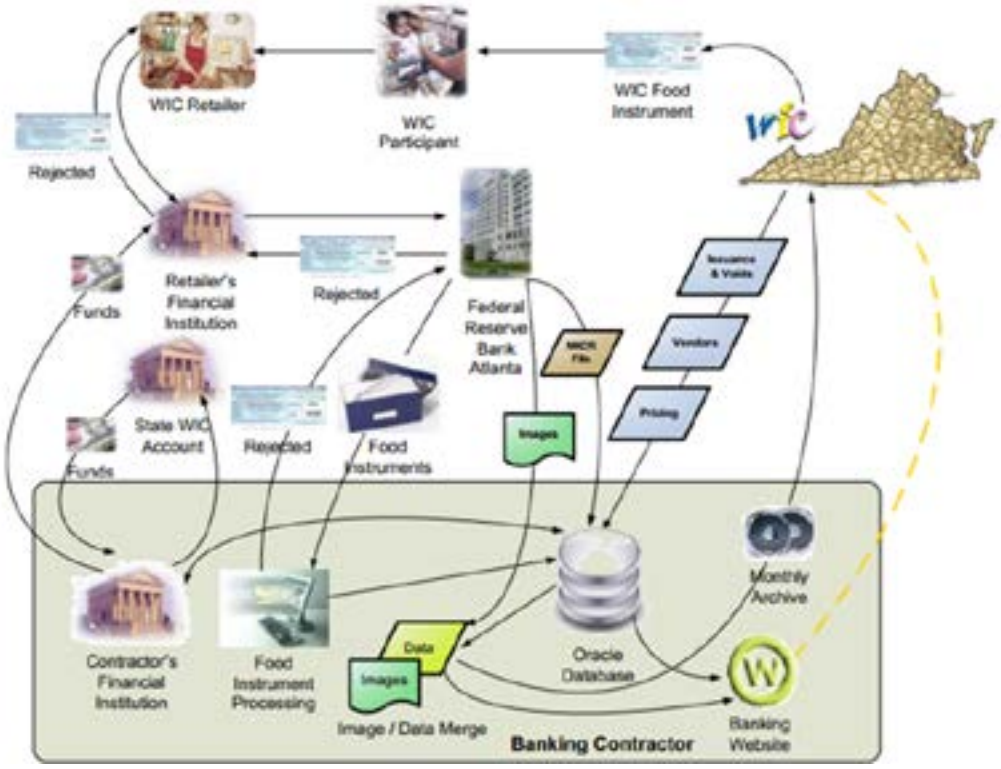


FIGURE 13

Complexity of Current (Paper-Based) WIC Benefits Redemption Method

eWIC removes the requirement that the store clerk determine food product eligibility for shoppers and thereby reduces client stigma through the establishment of a more mainstream shopping transaction. eWIC also provides program managers, policymakers and researchers detailed data on the purchasing patterns of WIC participants. Major barriers to the collection and use of this data include a lack of a standardized, national system for data collection across agencies and states, and the need to gather and link data from both the eWIC and WIC information systems.

WIC's nutrition and health education initiative has also been heavily reliant on paper in the past, although one-to-one counseling is common on the first clinic visit. Some state agencies have begun offering online modules for "secondary" nutrition education encounters. Videos are also common in classroom based WIC education sessions. There have been recent efforts to develop social media messaging to enhance WIC participant education. Additionally, in the past two years, several WIC shopping apps have become available in a few states but they only provide

information about food product eligibility and vendor locations without nutrition information about items or interactive feedback to clients.

Clearly, there are numerous opportunities to leverage innovative technologies as shown below (see Figure 14), including smartphones, the web, and social media to enhance access, efficiency, education, and the impact of this critical Federal food assistance program.

FIGURE 14

Applying Technology to Innovate WIC: Recommendations for the Future

Several recommendations emerge from this review to facilitate the application of innovative technology to enhance WIC's impact that will be further explored at the WIC Digital Health Summit to be convened at the MIT Media Lab in collaboration with New America and the Harvard T.H. Chan School of Public Health:

- USDA and WIC state agencies should work with the research community to design and establish a national database for use by WIC officials, policymakers and researchers, consisting of routine uploads of participation and eWIC data and combining administrative data, health outcome data, and benefit redemption information.
- USDA should further explore the feasibility of enabling online purchasing with WIC benefits.
- USDA and WIC state agencies should study the emerging role of mobile payments including a phone-based application for WIC transactions.
- USDA and WIC state agencies should explore and consider facilitating the development of new features including mobile apps, social media, and text messaging to enhance nutrition education and interactive feedback to clients for promoting improved nutrition and better health.

Innovation in the Federal Food Assistance programs proceeds slowly but does happen eventually. It took 36 years to get from the Reading Food Stamp EBT pilot in 1984 to a Federal mandate for nationwide rollout of electronic benefit technology (EBT) in WIC by 2020. It will be 31 years since the WyoCard pilot was implemented before eWIC is nationwide. While the WIC EBT mandate by 2020 is a significant enhancement over paper purchasing, benefiting clients, staff and retailers, it too may become a dated technology platform in the years ahead.

Considering the rapid proliferation of apps, mobile pay, online purchasing, and social media, there are many emerging technologies that have the potential to significantly improve the WIC client's experience and ease of participation as well as transform nutrition education and boost the well-being of program beneficiaries. Policymakers, researchers, public health practitioners and technology experts alike are strongly encouraged to focus on these new directions for WIC innovation and accelerate their application to further enhance the effectiveness and impact of this vital program serving 53% of young children and their mothers in the United States.

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This project is an initiative of New America. The views expressed do not necessarily reflect the views or the institutional affiliations of any or all of the members of the Project Team.

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The Aetna Foundation, a national foundation based in Hartford, Connecticut supports projects to promote wellness, health and access to high-quality health care for everyone. The Aetna Foundation mission is to promote wellness, health, and access to high-quality health care for everyone, while supporting the communities that it serves.

Glossary

ACH	Automated Clearinghouse
APL	Approved Product List
CCV	Cash Value Voucher
CSFP	Community Supplemental Food Program
EBT	Electronic Benefit Transfer
EFT	Electronic Funds Transfer
EFTA	Electronic Funds Transfer Association
eGPC	eGovernment Payments Council
EPC	Electronic Payment Card
ERS	Economic Research Service, under USDA
ESD	Electronic Services Delivery
eWIC	Electronic WIC
FBC	Food Basket Cost
FFY	Federal Fiscal Year
FNS	Food and Nutrition Service
FTC	Federal Trade Commission
GAO	Government Accountability Office
HPP	Health Passport
IOM	Institute of Medicine
ITO	Independent Tribal Organization
MDS	Minimum Data Set
MIS	Management Information System
NACHA	National Automated Clearinghouse Association
NEP	New England Partners

NSA	Nutrition Services and Administration Grant
NTE	Not-to-exceed
NWA	National WIC Association
OA	Operational Adjustment
PAN	Permanent Account Number
PC	Personal Computer
PIN	Personal Identification Number
PLU	Price Look Up
POS	Point of Sale
QUEST	Operating standards for electronic benefits set by NACHA
RFP	Request for Proposal
SA	State Agency
SAM	State Agency Model
SDS	Supplemental Data Set
SNAP	Supplemental Nutrition Assistance Program
SSI	Supplement Security Income
TAD	Turnaround Documents
TANF	Temporary Assistance to Needy Families
UHT	Ultra-high Temperature Processing
UPC	Universal Product Code
USDA	United States Department of Agriculture
WIC	Women, Infants, and Children

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