Appendix B
Core Data Analysis

The standard definition and expression of core data elements is necessary to support interoperability and electronic exchange of data between health and human service programs. Recommendation 1.1 provides that Federal agencies and States administering health and human services programs use the National Information Exchange Model (NIEM) guidelines to develop, disseminate and support the standards and processes that enable the consistent, transparent exchange of data elements between programs and States.

This recommendation is not intended to suggest that Federal agencies or States should modify either their core data elements or the way they collect and display those data elements within their own systems. Rather, the NIEM process ensures that common data elements can be sent between programs using a consistent standard such that the receiving program can easily identify and incorporate the data element into their own systems.

Overview of Core Data Analysis

As a first step, a review of the data elements collected from a consumer during the application process by a sample of Medicaid, CHIP, SNAP and TANF programs was conducted. This review revealed a core set of eleven data elements currently collected by all four programs (see Table 1 for a complete list).

Subsequently, a sample of 34 health and human services programs across ten States was used to identify similarities and gaps in data element definition across the programs and to assess the complexity of data harmonization. The following considerations were used to determine complexity:

- Variation of data name and definition across programs;
- Prevalence of similar variations across programs;
- Similarity and range of data values sets across programs; and
- Existing data standards such as those identified in HL7, X12, and NIEM.

Table 1 highlights initial findings regarding the anticipated complexity of harmonization for a given data element.

Table 1 – Core Data Element Complexity Rating

| Core Data Element Name	Complexity of Harmonization	Key Findings
Name	Low	Consistent terminology and similarity in foundational data values will enable creation of a harmonized data element definition and mapping to existing standards.
Date of Birth	Low	Consistent data values and semantics will facilitate creation of a harmonized data element definition and mapping to existing standards.
Social Security Number	Low	Consistent terminology and similarity in foundational data values will enable creation of a harmonized data element definition and mapping to existing standards.

Core Data Element Name	Complexity of Harmonization	Key Findings
Gender	Low	Consistent data values and semantics will facilitate creation of a harmonized data element definition and mapping to existing standards.
Address	Medium	Creation of a harmonized data element definition and mapping to existing standards must consider sub-concepts of address (e.g., mailing address, home address, etc.).
Citizenship	Medium	To harmonize data element definition and accurately map to existing standards, clarification of business rules and interfaces is required.
Immigration Status	Medium	To harmonize data element definition and accurately map to existing standards, clarification of business rules and interfaces is required.
Incarceration	Medium	To harmonize data element definition and accurately map to existing standards, clarification of business rules and interfaces is required.
Race/Ethnicity	High	Wide variability occurring in the nomenclature and definition of race/ethnicity values within standards and between programs.
Household Composition	High	Harmonization to a consistent data definition across programs requires further understanding of underlying program and jurisdiction business rules.
Income	High	*Income* is a derived data concept, determined through calculation of several associated concepts. Harmonizing to a unique definition requires further elaboration of underlying program and jurisdiction business rules.
Primary Care Provider	N/A	Data element was only found in 1 of 34 State program enrollment applications.

An important aspect of the data analysis effort is mapping to existing data standards such as HL7, NIEM, and X12. In addition to providing for the reuse of existing standards, such mapping provides a mechanism to increase interoperability between eligibility and enrollment systems and creates an opportunity to address gaps, duplications, and/or overlaps in information.

Interoperability Specification Development

The Affordable Care Act describes a set of guidelines and requirements that are intended to facilitate consumer enrollment in State health and human services programs. Figure 1 provides high-level use cases focusing on the consumer eligibility and enrollment process. It includes verification of core data elements to determine eligibility, as well as the exchange of data between programs for additional eligibility determinations.

Figure 1 – Consumer Eligibility and Enrollment Use Case Model
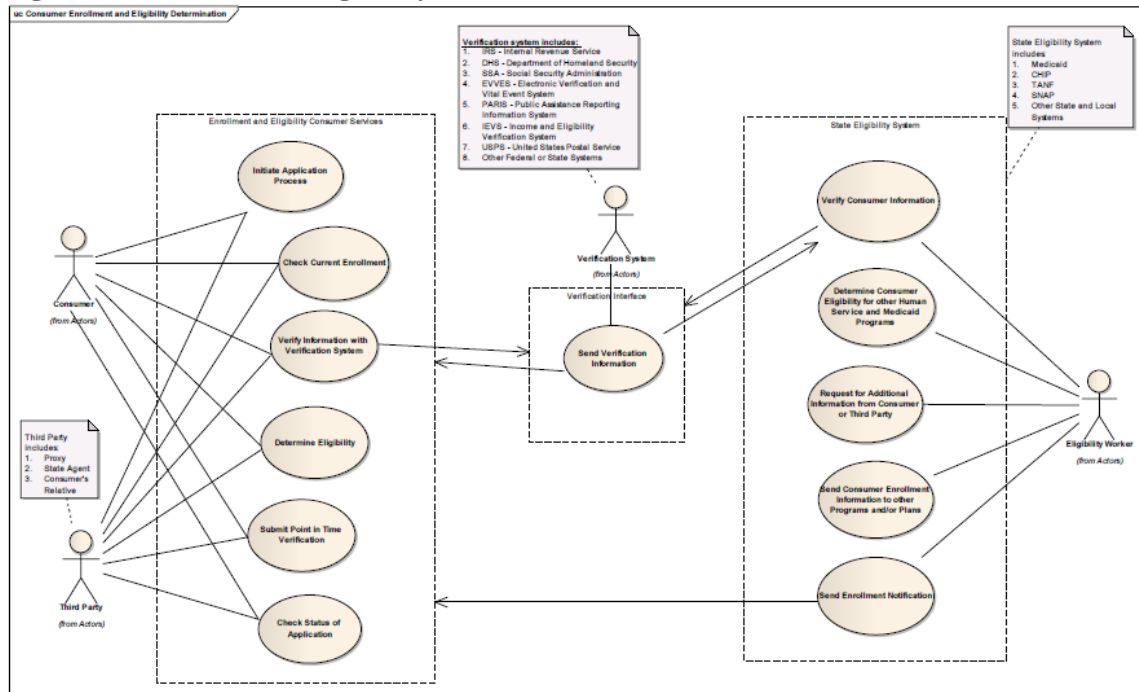
Details for each use case are described in Table 2.

Table 2 – Foundational Use Cases Supporting Enrollment and Eligibility Processes in Health and Human Services Programs

Use Case	Description
Initiate Application Process	A consumer or third party applies for a program by entering basic demographic information into the Enrollment and Eligibility Consumer Services.
Check Current Enrollment	The Consumer or Third Party checks for the Consumer's existing coverage. Matching is initially done using a single identifier, followed by a probabilistic formula, or other method to obtain current enrollment information.
Verify Information with Verification System	The Consumer electronically verifies their demographic information in real-time with the Verification System. The information received from the Verification System may be pre-populated in real-time on the Application. The Consumer may verify the following information: • Identify • Residency • Income • Citizenship • Legal Status • Household Size
Determine Eligibility	The Consumer reviews information about their potential eligibility for private insurance, subsidized insurance, Medicaid, CHIP, and other HHS programs.

Use Case	Description
Submit Point in Time Verification	The Consumer or Third Party submits a Point in Time Verification where there is a change in the Consumer's circumstance or the information received from the Verification System is inaccurate or incomplete.
Check Status of Application	The Consumer checks the status of an existing enrollment application.
Send Verification Information	The verification system sends requested verification information to the consumer and Eligibility Worker. The verification information may include: • Identity verification • Residency verification • Income verification • Citizenship verification • Legal Status verification • Household Size verification
Verify Consumer Information	The Eligibility Worker obtains verification information from the Verification System after the Consumer has indicated that the information returned by the Verification System is inaccurate or does not reflect the Consumer's current circumstances. The Eligibility Worker may verify the following Consumer information: • Identity • Residency • Income • Citizenship • Legal Status • Household Size
Determine Consumer Eligibility for other Programs	The Eligibility Worker determines a Consumer's eligibility for other programs. This only happens if the Consumer indicates that the information returned by the Verification Systems is accurate and reflects the Consumer's current circumstances, and the program does not require additional information.
Request for Additional Information from Consumer or Third Party	If the information received from the consumer is incomplete or if the consumer's circumstances have changed the accuracy of information in the eligibility system, the Eligibility Worker may request additional information from the Consumer or Third Party.
Send Consumer Enrollment Information to other Programs and/or Plans	The Eligibility Worker sends the Consumer's enrollment information to other programs and/or plans, as authorized by the Consumer or otherwise permitted by law.
Send Enrollment Notification	The Eligibility System creates an official notice explaining the outcome (Approval or Denial) of the eligibility determination. This notice is mailed to the Consumer and also sent to the Enrollment and Eligibility Consumer Services. The Consumer is given an opportunity to appeal the decision.

Verification of consumer enrollment data against a verification system exemplifies the need to establish a common understanding of data elements prior to information exchange. For example, the "Verify Information with Verification System" use case above may require the exchange of personally identifiable information (e.g., name, date of birth, address, income, etc.) between a program system and multiple verification systems (e.g., SSA, DHS, IRS). The program system passes data elements to the respective verification system(s) to facilitate conclusive identification of a record in the verification system containing information belonging to the consumer applying for benefits. If the program system and the verification system do not use the same definition to define each data element, a discrepancy is created which could affect the consumer's eligibility for benefits if there is no standard method to bridge the gaps between the two definitions.

Table 3 illustrates how different definitions of income may result in different calculated values by the State program and Federal or State verification source.[1]

Table 3 – Sample Income Calculation Scenario for a Human Services Program

	Human Services Program	**Verification Source**
Definition of Income	Net adjusted monthly income	Gross monthly income
Example Income Calculation	**Scenario**: • One household member • Gross monthly income of $828.00 • Monthly medical costs of $41.91 • Standard credit of $141.00 for households of 1-3 people • Medical Expense Credit is applied when medical expense are greater than $35.00 per month **Calculation**: $828.00 Gross Income - $141.00 Standard Credit - $ 6.91 Medical Expense Credit **=$680.09 Net Adjusted Monthly Income**	**Scenario**: • One household member • Gross monthly income of $828.00 • Monthly medical costs of $41.91 • Verification Source does not apply a Standard Credit • Verification Source does apply a Medical Expense Credit **Calculation**: $828.00 Gross Income - $ .00 Standard Credit - $ .00 Medical Expense Credit **=$828.00 Gross Monthly Income**

Summary of Proposed Enrollment Data Standards

Table 4 presents proposed data standards derived from preliminary data analyses findings, use case identification, application of known business rules, and mapping to existing data standards. The findings outlined below are intended as representative data standards and require further refinement and elaboration based on elaboration of use cases, business rules, and interface descriptions.

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[1] Note that this example is limited the calculation of income for a human services programs, as the ACA establishes modified adjusted gross income (MAGI) as the measure of income for the health insurance Exchanges.

Table 4 – Proposed Enrollment Data Standards

Data Element Name	Data Type	Data Definition	Source
Name	niem-xsd: string	A combination of names and/or titles by which a person is known.	Source: NIEM v2.1 Path: nc:PersonName
Date of Birth	niem-xsd:date	The date a person was born	Source: NIEM 2.1 Path: nc:PersonBirthDate Reference: National Center for Vital Health Statistics http://www.ncvhs.hhs.gov/ncvhsr1.htm
Social Security Number	niem-xd: string	A unique reference to a living person; assigned by the United States Social Security Administration.	Source: NIEM v2.1 Path: nc:PersonSSNIdentification Reference: Social Security Administration http://www.socialsecurity.gov/cbsv/docs/CBSVUserGuide042310.pdf
Gender	niem-xsd: string	A gender or sex of a person.	Source: NIEM v2.1 Path: nc:PersonSex/nc:PersonSexCode Reference: National Center for Vital Health Statistics http://www.ncvhs.hhs.gov/ncvhsr1.htm
Address	niem-xsd: string	A postal location to which paper mail can be directed.	Source: NIEM v2.1 Path: nc:Address Reference: United States Postal Service http://ribbs.usps.gov/aec/documents/tech_guides/AEC_AECII_UG.PDF
Citizenship	niem-xsd: string	The legal standing of a person assigned by a country which provides rights, duties, and privileges due to the person's birth or naturalization.	Source: NIEM v2.1 Path: scr:Citizenship Reference: 1. Department of Homeland Security http://www.dhs.gov/files/statistics/stdfdef.shtm#2 2. Social Security Administration http://www.ssa.gov/gix/Bendex%20record.pdf

Data Element Name	Data Type	Data Definition	Source
Legal Status	niem-xsd: string	A role type used to qualify a person's legal status within a country or nation.	Source: HL7 Reference Information Model (RIM_0231). V 02-31 (3/21/2010) Path: RoleCode> AssocativeRoleType> MutualRelationshipRoleType> FormalRelationshipRoleType> CitizenRoleType Reference: Department of Homeland Security http://www.dhs.gov/xlibrary/assets/privacy/privacy_pia_uscis_pcq_vis.pdf
Incarceration[2]	niem-xsd: boolean	A mandatory confined supervision of a person.	Source: NIEM v2.1 Path: j:Incarceration
Race[3]	niem-xsd: string	A classification of a person based on factors such as geographical locations and genetics.	Source: NIEM v2.1 Path: nc:PersonRaceCode Reference: Office of Management and Budget http://www.whitehouse.gov/omb/fedreg_1997standards
Ethnicity[4]	niem-xsd: string	A cultural lineage of a person.	Source: NIEM v2.1 Path: nc:PersonEthnicityCode Reference: Office of Management and Budget http://www.whitehouse.gov/omb/fedreg_1997standards
Household Composition[4]	N/A	N/A	N/A
Income[5]	N/A	N/A	N/A
Primary Care Provider[6]	N/A	N/A	N/A

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[2] Incarceration may require further definition and metadata elaboration to account for Federal and State program requirements. Business rules may require programs to collect information such as history of incarceration, duration of previous incarceration, facility name and facility type.

[3] Race and Ethnicity were originally recommended as the single data element. Splitting this data element into two separate data elements will allow for more accurate definition

[4] Proposed Household Composition definition and metadata are not provided, as further elaboration and comparison of applicable business rules are required to express the unambiguous definition of this attribute.

[5] Proposed Income definition and metadata are not provided, as further analysis is required to outline how discrete data elements (e.g., employment income, self-employment income, unearned income, utilities, medical expenses, etc.) are used to calculate income, as well as how States apply business rules to derive income.

Further Elaboration

While we have identified data standardization priorities that will ultimately facilitate consumer enrollment and enable consistent eligibility and enrollment information exchange across health and human services programs, additional work is needed. The use cases, derived from the Affordable Care Act, should be refined to ensure proper workflows that support consumer eligibility determinations and enrollment processes. As information becomes available, the use cases and associated artifacts should address system interactions and process flows in greater depth.

Future iterations in the interoperability specification development process will include a platform independent model that provides a logical data representation of the use cases. It will also include platform specific models with a representative physical data model and service description, specifying data types, data lengths, and other key metadata such as the originating source of data, data owner and system of record for ongoing maintenance and updates.

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[6] Proposed Primary Care Provider definition and metadata are not provided, as this data element was only found in one of 34 State program enrollment applications. Further analysis will be done to determine the definition and metadata attributed to this data element by health plans.