Perspective
LanguaL Structured Vocabulary:

USDA Perspective

Joanne Holden
Perspective: Earth Rise from the Moon
Perspective: Population Density
Perspective: Lightening Strikes

1999 September, October, November
Perspective: Pollution in the Atmosphere
Perspective: Water
Perspectives

• Each is a different view on the same object – the earth
• Each provides unique information about the same object
• People who research the common object can share information to discover relationships among their perspectives
USDA Data Customers

Keyword search
Integrate

Generate label

Pack, stock, and label

Food growers
Food manufacturers
Food preparers

Trace illness to origin
Analyze

World wide
Data: FDA, EPA, WHO, EuroFIR, UN FAO

Foods and Dishes

National Institutes of Health
Environmental Protection Agency
FDA
Environmental Protection Agency: Perspective

- Descriptions of foods and commodities for integration with pesticide and contaminant analysis and estimation
LanguaL, EPA and Potential Contamination

**WHO GEMS**

Global Environment Monitoring System - Food Contamination Monitoring and Assessment Program studied:

<table>
<thead>
<tr>
<th>Food description</th>
<th>LanguaL facet term codes (FTCs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, raw, with skin</td>
<td>A0143 A0669 B1245 C0137 E0150 F0003 G0003 H0003 J0001 K0003 M0001 N0001 P0024</td>
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<tr>
<td>Banana, raw</td>
<td>A0143 A0673 B1266 C0167 E0150 F0003 G0003 H0003 J0001 K0003 M0001 N0001 P0024</td>
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<td>Tomato, raw</td>
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<td>Milk, whole, fluid</td>
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</table>

**WHO GEMS CCPR Total Diet Study**

The GEMS Codex Committee on Pesticide Residues (CCPR) analyzed the occurrence of the following contaminants in the LanguaL-coded foods:

<table>
<thead>
<tr>
<th>Examples of pesticides</th>
<th>Examples of heavy metals</th>
<th>Examples of industrial chemicals</th>
<th>Byproduct by Cooking</th>
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</thead>
<tbody>
<tr>
<td>Aldrin/dieldrin</td>
<td>Cadmium</td>
<td>Polychlorinated biphenyls</td>
<td>Acrylamide</td>
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<tr>
<td>DDT (complex)</td>
<td>Lead</td>
<td>Polybrominated dibenzo-p-dioxins</td>
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<tr>
<td>Endosulfan</td>
<td>Mercury</td>
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</table>

**FDA Food/Analyte Matrix from FDA Total Diet Study**

The FDA Total Diet Study also used LanguaL to measure the occurrence of the following contaminants:

<table>
<thead>
<tr>
<th>Food description</th>
<th>LanguaL facet term codes (FTCs above)</th>
<th>MRM</th>
<th>CPA</th>
<th>Phen</th>
<th>Carb</th>
<th>ETU</th>
<th>Benz</th>
<th>VOC</th>
<th>Merc</th>
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Abbreviations for the analytes listed in the food/analyte matrix are:

- FTCs: (LanguaL) Facet Term Codes
- MRM: multi-residue methods for pesticides
- CPA: chlorophenoxy acids
- Phen: phenylureas
- Carb: carbamates
- ETU: ethylenethiourea
- Benz: benzimidazoles
- VOC: volatile organic compound
- Merc: mercury
FDA Perspective

- Needs a method to describe changes to food as it moves – from farm to fork – thru the food chain, and the means to locate the source of food borne illness
Perspective: Origin of the Food
Perspective: Food Preparation Processes

THE HACCP FOOD SAFETY MANUAL

JOAN K. LOKEN, CTE
LanguaL, FDA and Traceability

- Lot-level information to trace food borne illness to its origin

GS1 GTIN

- GS1 GPC Brick code
- Brick attribute values
- Brick equivalence set of LanguaL facet terms

An extensive but incomplete data record

Additional data to complete a single record

- Member of the Brick equivalence set of LanguaL facet terms.
- Additional LanguaL facet terms.
- Nutrient data base ID
- Nutrients values for a nutrition fact panel

Production Input
- Supplier ID
- Supplier Lot Number
- Food ID
- Food description
- Expiration date

Production Output
- Output Lot Number
- Food ID
- Food description
- Expiration date

Unified food packaging, description, nutrition and trace data
Food Pyramid Perspective

- Need for specific information about popular food choices

- US Dietary Guidelines and Food Pyramid provide consumers with guidance for choosing a healthy diet
Dietary Intake and the Health Perspective of the NIH

• How does dietary intake of components affect incidence of major health conditions: e.g., CVD, diabetes, cancer
Collaboration

• Each entity can make a contribution based on their exposure and knowledge and perspective
Names Are Not Enough!

• What are these products?
  – Fudge
  – Corn dogs
  – Bangers and Mash
  – Chicken Fricassee

• What are the ingredients? What was added?
• What is the source of the food? How was it prepared?
• What is the nutritional value of the food? What contamination may be present?
• What allergies might be triggered by the food?
Fluid Milk Types

• Milk, whole, 3.25% milk fat, with added vitamin D
• Milk, reduced fat, 2% milk fat, with added vitamin A and vitamin D
• Milk, low fat, 1% milk fat, with added vitamin A and vitamin D
• Milk, nonfat, with added vitamin A and vitamin D (fat free or skim)
US Databases and LanguaL

- USDA databases for composition and consumption are used to create a universe of commonly consumed products.
- The LanguaL controlled vocabulary provides a common definition of foods with diverse facets.
- Manufacturers can use the vocabulary to create a specific catalog of descriptors for their products.
- Agencies, vendors and consumers can:
  - Access the data they need
  - Retrieve foods and products information to address challenges (e.g., allergies) within the food network
Controlled Vocabulary For Food

- Source
- Part of the source
- Physical state, shape or form
- Extent of heat treatment
- Cooking method
- Treatments applied
- Preservation method
- Packing medium
- Container or wrapping
- Food contact surface
- Consumer group, dietary use, label claim
- Geographic origin
- Adjunct characteristic
Perspective: Part of the Source

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Perspective: Physical Shape or Form
Perspective: Physical Shape or Form
Perspective: Cooking Method
Perspective: Treatments Applied
Perspective: Preservation Method
Perspective: Packing Medium
Perspective: container
Perspective: Food Contact Surface
Perspective: Religious Customs
How to Stay Current with Reformulation and Innovation?

• Every vendor can differentiate their products
• Food authorities need to help them register and document their “differentials”
• Make it easy!
Development and Dissemination of LanguaL Files

• For foods NDL will factor or code and disseminate with the SR (23…) database
• Langual codes will be distributed with SR releases
• Interaction among federal agencies, industry and other stakeholders is critical
• Data analysis and retrieval according to facets will be possible through various existing search mechanisms
• Facilitate product indexing and/or registration
And, So...

- USDA, US-FDA and EPA seek a common language for food information integration
- Controlled vocabulary provides the basis for a food classification system
- Multiple hierarchical approach can include diverse facets about foods and DS
- Clear definition of the elements is driven by science, the regulations, and the accepted conventions of the food systems
- "State of the art" approach to indexing and retrieval is critical
How to describe Dietary Supplements?

• Let’s start with a blank sheet of paper
Benefits of Common Perspectives

• Standardized vocabulary
• Specialized authorities
• Distributed responsibilities
• Shared information systems
• Integrated research results
US DS Databases and LanguaL

• US databases for composition and consumption of DS are used to create a universe of commonly consumed products.

• The LanguaL controlled vocabulary can provide a common definition of DSs with diverse facets.

• Manufacturers can use the vocabulary to create a specific catalog of descriptors for their products.

• Agencies, vendors and consumers can:
  – Access the data they need
  – Retrieve DS products information to address challenges (e.g., intended uses) within the DS network.
Proposed Vocabulary For Dietary Supplements

- **Source**
- **Part of the source**
- **Physical state, shape or form**
- **Extent of heat treatment**
- **Cooking method**
- **Treatments applied**
- **Preservation method**
- **Packing medium**
- **Container or wrapping**
- **Food contact surface**
- **Consumer group, dietary use, label claim**
- **Geographic origin**
- **Adjunct characteristic**
Conclusion

• USDA, ODS, NCHS, and US-FDA and other stakeholders seek a common language for food (and DS) information integration
• Controlled vocabulary can provide the basis for a classification system
• Multiple hierarchical approach can include diverse facets about foods and DS
• Clear definition of the elements should be driven by science, the regulations, and the accepted conventions of the food and DS systems
• “State of the art” approach to indexing and retrieval is critical
A Global Food Supply Requires Global Integration of Dietary Information Systems

- Food and DS safety and traceability
- Nutrient content and intake studies
- Trade and regulation
Acknowledgements

• Jayne Ireland
• Anders Moller
• Johanna Dwyer
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• Connie Hardy, FDA
• Leila Saldanha, ODS
• Gig Graham, Benetta Corporation
• Janet Roseland and Karen Andrews, DSID
# Collaboration among Perspectives

## Comprehensive Dietary Supplements Record

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<th>International</th>
<th>Jurisdiction</th>
<th>Vendor</th>
<th>Registration</th>
<th>Tarrifs/Trade</th>
<th>Description</th>
<th>Nutrition</th>
<th>Valuation</th>
<th>Distribution</th>
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### Dietary Supplements record

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