The ARS Nutrient Data Laboratory Research

Kelly Day Rubenstein, USDA-ERS

Assessing the Benefits of Agricultural Research Service (ARS) R&D Within an Economic Framework: Preliminary Results Workshop
March 10-11
NDL measures the nutrient composition of foods in the American diet

ARS Human Nutrition National Program (NP 107)

Beltsville Human Nutrition Research Center

The Nutrient Data Laboratory (NDL)
NDL’s primary output is the National Nutrient Database for Standard Reference

Other outputs:
- publications in the professional literature
- the National Nutrient Databank Conference
- direct communications with users
The Standard Reference (SR) database

- Foundation of virtually all public and commercial nutritional databases
- More than 7,000 food items
- Up to 140 nutrients
- Supplementary databases: e.g., fluoride, isoflavone content, choline
- Subpopulations, e.g., American Indian/Alaska Native Foods Database
Selection criteria

• Clearly defined program
• Small in terms of mandate, personnel
• Service/capacity vs. basic/clinical
• Dissimilar subject area
NDL budget summary
Uses for the NDL’s outputs

The NDL’s outputs serve most frequently as tools for other research and information creation.
Use of SR for Medical Research

- The role of nutrition in disease occurrence and modification of risk factors

- Efficacy of different nutrition-related treatments.

- Clinical studies on blood diseases, heart diseases, and cancer (NIH)

- Crossed with intake data for epidemiological and population-based disease studies
  - Example: Harvard Nurses' Health Study

Almost every nutrition-related epidemiological study will make some use of the SR
Use of SR for Nutritional Research

- The biological functions of different nutrients; used in metabolism-related studies
- The nutritional content of dietary supplements and food
- The underlying aspects of the nutritional content of food in the US
- Behavioral research concerning food choices
NDL’s Role in Technological Research

• Determining the most effective and accurate methodology

• Sampling is a significant methodological challenge

• Comprehensive data quality: best methods for data processing and dissemination

• Raising data quality has improved the level of statistical significance
Use of the SR for Public Policy

*Dietary Guidelines for Americans*

government nutrition programs, including research, labeling, and nutrition promotion

Examples:

- Food Stamp programs
- WIC
- Department of Defense feeding plans

International use:

- Guide interventions in countries with malnourishment

- Create national dietary guidelines and national nutrition plans
Use of the SR for Regulatory Requirements

The Child Nutrition Database
- Regulation of school and daycare meals
- Compliance

FSIS/ FDA’s regulation of nutrition labels

The Codex Alimentarius Commission
- Codex standards used worldwide to regulate food safety, protect consumers
- FAO uses the SR to make recommendations to the Codex commission
Use of the SR in Nutrition-Related Education

Formal and self-directed nutrition education programs.

USDA’s Center for Nutrition Policy and Promotion (MyPyramid)

Professionals use the SR database to
• educate clients
• construct dietary plans for:
  ✓ individuals
  ✓ hospitals
  ✓ schools

Professional education:
  Textbooks and student software
Assistance for food surveys

Food and Nutrient Database for Dietary Surveys

What We Eat in America (produced jointly with the Dept. of Health and Human Services)

Standard Reference
SR used in many secondary databases

• Proprietary systems
  – the University of Minnesota’s “Nutrition Data System for Research” designed for clinical research and epidemiological studies
  – “Food Processor” for dieticians and health professionals
  – Systems to generate nutrient labels, as seen in the Nutrition Facts Panels (exp: “Genesis”)

• Large corporations may create their own internal databases using the SR
Evaluation of economic benefits

Public health:
primarily non-market, attribution difficult

- Public health can be measured and, to a degree, valued
  - health care costs
  - loss of productivity
  - “Quality Adjusted Life Years”

- Connecting public policy interventions with improvements in public health is difficult
  - Role of nutrition not fully understood
  - The relationship between health, disease, environment, behavior and genetics is unclear
  - Measurement of nutrition intake is incomplete
  - Gains in science are cumulative – the “Knowledge Value Collective”
## Challenges to conventional techniques

<table>
<thead>
<tr>
<th>Technique</th>
<th>Suitable for NDL?</th>
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<tbody>
<tr>
<td>Quantitative analysis</td>
<td></td>
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<tr>
<td>Bibliometric</td>
<td>No, primarily one product, citations to SR often omitted</td>
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<tr>
<td>Cost-benefit</td>
<td>No, costs easily measured but most benefits are diffuse, non-market goods</td>
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<tr>
<td>Rates of return</td>
<td>No, impacted sector not clearly defined</td>
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<tr>
<td>Benchmarking</td>
<td>No, comparable product does not exist</td>
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<tr>
<td>Retrospective analysis</td>
<td>Options for counterfactuals may be limited; survey may be necessary</td>
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<tr>
<td>Narrative assessments</td>
<td>Yes, but may be less credible</td>
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<tr>
<td>Peer review</td>
<td>Yes</td>
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*(based on Kostnoff, 1995, NAS, 1999)*
National Food and Nutrient Analysis Program (NFNAP)

Research improvement using ex-ante peer review

1997 to present
multi-agency effort to upgrade food composition data; NIH significant supporter

Goals

1) improve information on key foods

2) evaluate existing data

3) develop nationally-based sampling plans

4) analyze samples using state-of-the-art methods

5) compile newly generated data to achieve a representative food composition database.

(Source, Haytowitz et al, 2008)
Pre NFNAP review

• NIH required detailed, highly technical proposal
  – Benefits of improved data were thoroughly developed by the NDL

• Proposal subject to rigorous peer review

  ➢ 1994 GAO report found that the NDL procedures were too vague, better quality assurance needed

• NDL improved standards before receiving grant
Peer and user assessment

- Post NFNAP: Statistical power of data significantly improved

- Nationally-based sampling – critical, unique

- NDL has fostered stakeholder involvement

- External expert review found that the NDL:
  
  “produces, documents and disseminates the most comprehensive and highest quality food composition information in the world... it is considered the ‘gold standard.’”