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Effects of Soy on Health Outcomes

Summary

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Introduction

The aims of this evidence report are to summarize the current evidence on the health effects of soy and its isoflavones on the following: cardiovascular diseases, menopausal symptoms, endocrine function, cancer, bone health, reproductive health, kidney diseases, cognitive function, and glucose metabolism. In addition, safety issues and drug interactions of using soy and its isoflavones, as reported in the literature, are summarized. This report also summarizes the formulations of soy products and/or soy food used in clinical trials. The report was requested and funded by the National Center for Complementary and Alternative Medicine (NCCAM) and the Office of Dietary Supplements at the National Institutes of Health (NIH) and was conducted through the Evidence-based Practice Center (EPC) program at the Agency for Healthcare Research and Quality (AHRQ).

There is increasing interest in soy and health since the U.S. Food and Drug Administration approved a health claim in October 1999 for use on food labels stating that a daily diet containing 25 grams of soy protein, also low in saturated fat and cholesterol, may reduce the risk of heart disease. This claim was based on the beneficial results in reducing plasma low-density lipoprotein (LDL) levels from dozens of human controlled clinical trials.[1] The health claim, however, covers only soy protein, since research results surrounding soy isoflavones were controversial.[2] This report summarizes the current evidence on the health effects of soy and its isoflavones.

Methods

Key Questions

Five general questions are addressed in this report:

1. In the clinical trial literature, what formulations of soy were used? At what dose? For what purpose(s) (e.g., trial endpoints)?
2. Does current clinical trial evidence indicate that whole soy products and individual constituents of soy have an effect on:
   a. Cardiovascular events, risk factors, and measures;
   b. Menopausal symptoms;
   c. Endocrine function;
   d. Cancer and tumor-related biomarkers;
   e. Osteoporosis and osteoporosis risk factors;
   f. Reproductive health;
   g. Kidney function; and
   h. Other outcomes, based on results of Key Question 1, above?
3. What is the scientific evidence of a dose-response effect of different forms of soy and

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individual constituents of soy for the conditions specified in Key Question 1?

4. What are the frequency and type(s) of adverse events associated with consumption of soy that are reported in the scientific literature (both trials and epidemiology)?
5. What is the scientific evidence of a dose-response effect of whole soy products and individual soy constituents on their safety?

Approach to Analyzing the Literature

Inclusion Criteria

This report encompasses several health conditions and many outcomes of interest. Therefore, specific inclusion criteria were needed for each of the health conditions and sometimes for different outcomes of the same health condition. The common inclusion criteria for studies analyzed in this report consist of: human subjects 13 years and older; prospective studies including randomized controlled trials, cohorts, crossover and non-randomized comparison studies; at least five subjects in the soy arm; any health condition; quantification of the amount of soy; and reported outcomes of interest. In general, the minimum duration for all serum marker, urine marker, and vascular outcome studies was 4 weeks (exceptions are noted below, under "Specific Inclusion Criteria for Health Conditions Examined").

For assessments of adverse events, we also included prospective observation studies and case-control studies, with no limitations on study size or duration, or quantification of soy product.

Health Conditions of Interest

In addition to the health conditions of interest listed under Key Question 3, the Technical Expert Panel (TEP) convened by the EPC suggested the category of neurocognitive outcomes. NCCAM was also interested in knowing about research that might have been done in other health conditions. Therefore, our literature search was conducted to broadly include soy studies for any health conditions. We screened all citations to identify health conditions not on the list agreed upon with the TEP. During our review process, we included the additional category of endocrine function.

Soy Products (and Controls) Considered

We accepted studies that used soy supplements and foods that quantified the amount of soy ingredients or products. We categorized various soy products and soy food into the following groups:

- Refined soy products
  - Isolated soy protein with isoflavones
  - Isolated soy protein without isoflavones
  - Textured soy protein
  - Soy-derived isoflavone
    - Genistein/genistin
    - Daidzein/daidzin
    - Glycitein/glycitin
- Soy/soya food products (ingested amount must be quantified)
  - Whole soy beans (edamame)
  - Soy flour
  - Soy drink (soy milk)
  - Tofu (bean curd)
  - Miso
  - Other processed soy bean products (tempeh, natto, okara, etc.)

For the purpose of this report, all study arms with a soy product of any type were considered to be soy interventions. Only study arms with a non-soy intervention were categorized as controls.

Specific Inclusion Criteria for Health Conditions Examined

In addition to the common inclusion criteria listed above, with input from TEP members we established the following additional criteria and specific outcomes for each of the specific health conditions.

Cardiovascular Outcomes: These included total cholesterol, LDL, high density lipoprotein (HDL), triglycerides, lipoprotein(a) [Lp(a)], blood pressure (BP), C-reactive protein (CRP), homocysteine, endothelial function, systemic arterial compliance, and oxidized LDL. We also sought studies of clinical cardiovascular outcomes (e.g., death, myocardial infarction, angina) but found none. The list of outcomes was determined in consultation with the TEP, based on expert opinion of the likelihood of an effect on the outcomes, clinical importance, and estimates of the numbers of studies likely to be available.

Because of the relatively large number of available studies reporting on lipids, triglycerides, and blood pressure, it was decided with the TEP to limit inclusion of these studies to randomized controlled trials with a minimum of 10 subjects consuming a soy product. For all cardiovascular outcomes, we required a minimum duration of 4 weeks.

Menopausal Symptoms: Studies evaluated peri-menopausal women, post-menopausal women, or women on breast cancer therapies with menopausal symptoms. A minimum duration of 4 weeks was required for studies of menopausal symptoms.

Endocrine Function: We included in our analyses the following endocrine markers: testosterone, follicle stimulating hormone (FSH), total estradiol and thyroid stimulating hormone (TSH). In addition, we evaluated menstrual cycle outcomes. The decisions for which outcomes to investigate were based on expert opinion of the likelihood of an effect on the outcomes, clinical importance, and estimates of the numbers of studies likely to be available. Studies that did not report numerical data on effect for these outcomes were not summarized; however, these studies were maintained in the database. For all endocrine outcomes, we required a minimum duration of 4 weeks (or one menstrual cycle).

Cancer and Tumor-Related Biomarkers: To evaluate whether soy may prevent cancer or reduce cancer risk factors, we included only studies that recruited subjects without a diagnosis of cancer. We limited our analyses to studies with tumor-related biomarkers or cancer risk factors as outcomes and to studies of clinical cancer outcomes (e.g., diagnosis of prostate cancer). We did not include studies that used soy products as "treatments" for cancer. The only outcome that fulfilled these criteria was testosterone. The studies that reported testosterone as an outcome in men without diagnoses of cancer were analyzed in the endocrine section. The decision to investigate only testosterone was based on expert opinion of the likelihood of an effect on the outcomes and of its clinical importance. For all tumor-related biomarkers, we broadened the eligibility criteria to include a minimum duration of 1 week.

Bone Endpoints: For bone resorption and/or formation biomarkers, the general inclusion criteria were used, including a minimum duration of 4 weeks. Because effects on bone mineral density occur slowly over time, we used minimum study duration of 1 year, although we did briefly review studies with a duration less than 1 year.

Miscellaneous Outcomes: For all other outcomes (neurocognitive, kidney, glucose metabolism), the general inclusion criteria were used in combination with the restriction to populations without the related specific diseases or conditions.

Literature Search Strategy

We conducted a comprehensive literature search to address the key questions.* Primary literature searches for English language publications on soy studies were conducted in EMBASE on March 25, 2004; in MEDLINE® on April 20, 2004; and in CAB Abstracts on June 24, 2004. Search terms included subject headings and textwords with filters to limit the publications to English language and primary studies of the adult and adolescent human populations. Subject headings and textwords were selected so that the same set could be applied to each of the different databases. A supplemental search was performed in MEDLINE on April 30, 2004, to retrieve articles using the textword "miso." A search update was performed in MEDLINE In-Process & Other Non-Indexed Citations and MEDLINE on September 30, 2004, and in CAB Abstracts on October 4, 2004. A search of the TOXLINE® database was conducted in March 31, 2005, to identify additional reports of adverse events in humans. Additional sources of published and unpublished data were sought by contacting members of the TEP and from reference lists of selected review articles and meta-analyses.

Reporting of Evidence

Methodological Quality Grade

We used a three-category grading system (A, B, C) to denote the methodological quality of each study. This system defines a generic grading system that is applicable to varying study designs, including randomized controlled trials, cohort, and case-control studies:

A: Least bias; results are valid; a study that mostly adheres to the commonly held concepts of high quality.

B: Susceptible to some bias but not sufficient to invalidate the results; a study that does not meet all the criteria in category A.

C: Significant bias that may invalidate the results; a study with serious errors in design, analysis, or reporting.

Applicability Grade

In this report, the focus is on the U.S. population and on specific subgroups within that population (i.e., post-menopausal women, peri-menopausal women, pre-menopausal women, men, and people with relevant medical histories such as breast cancer). Even though a study may focus on a specific

* Appendix A (Search Strategy) is available electronically at www.ahrq.gov/clinic/tp/soytp.htm.

target population, limited study size, eligibility criteria, and the patient recruitment process may result in a narrow population sample that is of limited applicability, even to the target population. To address this issue, we categorized studies within a target population into one of three levels of applicability, which are defined as follows: sample is representative of the target population; sample is representative of a relevant subgroup of the target population but not the entire population; sample is representative of a narrow subgroup of subjects only and is of limited applicability to other subgroups.

Meta-analysis

Meta-analysis was performed for several cardiovascular outcomes. We used the random effects model for continuous outcomes to combine studies. We also performed several random effects model meta-regression analyses to explore possible reasons for discrepancies across studies and to address Key Questions related to dose-response.

Results

Soy Products

Soy supplements were used in about three-quarters of all the trials analyzed in this report; soy foods were used in the remaining trials. In this report, soy milk was categorized as a soy supplement. Among the soy supplement trials, 57 percent used soy protein with isoflavones, 36 percent used isoflavones alone, and 6 percent used soy protein without isoflavones. In about one-half of the soy foods trials, textured soy protein was used. Soy flour was used in about one-quarter of the soy foods trials. There are 146 separate treatment arms of soy supplementations and 68 separate treatment arms of soy foods or diets. Across studies, the total isoflavones ranged from 0 mg to 185 mg per day, and the total protein intake from soy ranged from 0 g to 154 g per day. It is notable that the median soy product dose across studies (36 g soy protein per day) was equivalent to over a pound of tofu daily or about 3 soy protein shakes daily.

Cardiovascular Endpoints

No study evaluated clinical cardiovascular events. A total of 68 randomized studies reported data on total cholesterol, LDL, HDL, and/or triglycerides. The total isoflavones ranged from 0 mg to 185 mg per day, with a median of 80 mg. Among studies with soy protein, the total protein intake from soy ranged from 14 to 113 g per day, with a median of 36 g. There is a great deal of heterogeneity in the effects found on lipoprotein and triglyceride levels. Overall, the majority of studies reported small to moderate effects on the lipids, despite a wide range of net effects for total cholesterol, LDL, and triglycerides. Sixty-one studies reported data on the effect of consumption of soy products on total cholesterol levels. The median net change compared to control was approximately –5 (interquartile range –10, +1) mg/dL decrease (about –2.5 percent). A meta-analysis of 52 studies that reported data on the effect of soy consumption on LDL levels yielded a statistically significant net decrease of 5 (95-percent confidence interval [CI] –8 to –3) mg/dL (about –3 percent). A meta-analysis of 56 studies that reported data on the effect of soy consumption on HDL levels found a statistically nonsignificant net change of +0.6 (95-percent CI –0.5, +1.8) mg/dL. A meta-analysis combining 54 studies that reported data on the effect of soy consumption on triglyceride levels yielded a net change of –8 (95-percent CI –11, –5) mg/dL (about –6 percent). Across studies, there is the possible suggestion that higher doses of soy protein are associated with greater LDL reduction among those with elevated baseline LDL (although not if studies with minimal soy protein doses are excluded) but not with HDL or triglycerides. Dose of isoflavones was not associated with effect for any lipid. Higher baseline LDL or triglycerides may also be associated with net effect for these two lipids; the effect of baseline HDL is unclear. For all lipids, in individual studies the effect of dose and baseline was generally inconsistent.

A total of 22 studies reported data on the effect of consumption of soy products on systolic and diastolic BP. Overall, across studies, there was no discernible effect.

Some of the well-known emerging risk factors for cardiovascular disease included for analysis in this report are: Lp(a), CRP, homocysteine, endothelial function, systemic arterial compliance, and oxidized LDL. The total numbers of studies that reported data on the effect of soy consumption are: 18 studies on Lp(a), 3 on CRP, 5 on homocysteine, 10 on endothelial function, 3 on systemic arterial compliance, and 13 on oxidized LDL. Across these studies, there is no discernible effect based on the type of soy products. The majority of studies were of poor quality with a narrow range of applicability. Given the limited evidence and poor quality of studies, no conclusions could be drawn on the beneficial or harmful effects of consumption of soy protein on these putative risk factors for cardiovascular disease.

Menopausal Symptoms

A total of 21 trials examined the effects of soy and/or its isoflavones on hot flashes and night sweats in women. These

trials generally measured frequency and severity of the symptoms. However, the investigators used a large number of vasomotor symptom scores or indexes that employed a variety of frequency intervals. These factors made meta-analyses unsuitable and limited the comparisons of results across studies. Furthermore, many of the studies had high withdrawal or dropout rates, which were frequently uneven between soy treatment and control arms, further limiting the validity of these trials. Overall, the effects of soy protein and/or its isoflavones are inconsistent across studies. Every trial found a decrease in hot flash frequencies or scores in both the treatment groups and the control groups. Thus, the results are difficult to interpret. A third of the studies found no or worsening effects compared to control; two-thirds showed that soy protein and/or its isoflavones either nonsignificantly or significantly decreased hot flash frequencies or scores compared to control in post-menopausal women. The evidence of a benefit was stronger among the randomized trials of isoflavone supplements, which mostly showed positive results—the net reduction in weekly hot flash frequency ranged from 7 percent to 40 percent. However, these trials are mostly rated as poor quality due to high dropout rates. Only four studies evaluated the effect of soy consumption on menopausal symptoms in peri-menopausal women or those receiving breast cancer therapy. Among these studies there is no evidence that soy consumption is better than control to reduce menopausal symptoms.

Endocrine Function

Measures of endocrine function from 50 trials were reported in 47 articles. Five studies with a total of 179 participants reported testosterone levels in healthy males before and after soy consumption. Four of these trials found a statistically nonsignificant decrease in testosterone levels. The small total number of subjects, as well as the low quality of these studies, precluded any meaningful conclusion. No statistically significant effect was found on FSH level, which is commonly measured in the initial evaluation of male and female infertility; results were conflicting.

Twelve studies reported estradiol levels at the follicular phase in 434 pre-menopausal women. The overall effect of soy on estradiol levels was not consistent. Most of the studies showed a trend for soy to reduce estradiol, although they failed to demonstrate a statistically significant effect. Six randomized trials reported the effect of soy on TSH. No overall effect of soy on TSH and thyroid function is clear.

An additional 11 trials (in 10 publications) evaluated the effect of soy on menstrual cycle length in pre-menopausal women. A wide range of soy interventions were used in these trials, making a conclusion on the effects from soy difficult. These trials did not show statistically significant changes in menstrual cycle length after treatments of soy and/or its isoflavones.

Cancer and Tumor-Related Biomarkers

Twenty-four trials evaluated subjects without a history of cancer for effects of soy on tumor-related biomarkers. No study reported the development of cancer as an outcome. Most studies measured the effect of soy on estrogens and estrogen metabolites as well as on estrogenicity indicators. There were also trials that evaluated correlations between soy and possible cellular pathways of cancer prevention. No causal relationship could be established between these markers and cancer because they do not represent known risk factors for cancer disease. Only four studies reported on testosterone level, which is a risk factor for prostate cancer and is discussed above under "Endocrine Function."

Bone Endpoints

Overall, 31 studies evaluated various markers of bone health, including bone mineral density (BMD), bone formation biomarkers (bone specific alkaline phosphatase and osteocalcin) and bone resorption biomarkers (urinary hydroxyproline, urinary cross-linked N-telopeptide, urinary pyridinoline, and urinary deoxypyridinoline).

Because there are few long-term randomized trials and a wide variety of soy interventions used across studies, it is difficult to draw an overall conclusion about the effects of soy on bone outcomes. Overall, among the five studies of 1-year minimum duration, no consistent effect on BMD was seen with soy consumption. Studies of shorter duration likewise found no effect of soy. Similar to the results for BMD, studies of bone formation biomarkers generally found no effect of soy consumption when compared to control. While a number of studies reported reductions in two markers of bone resorption—urinary pyridinoline and deoxypyridinoline—no effects were found on the other markers of bone resorption, and the effects were not consistent across studies. For these markers, there is no clear evidence of a dose effect for either soy isoflavones or soy protein.

Only one study found a consistent effect on these markers. The study differed from other studies in that it evaluated a unique formulation of soy genistein and that it excluded subjects with denser femoral neck BMD.

Kidney Function, Neurocognitive Function, and Glucose Metabolism

Only one small study in patients with type 2 diabetes assessed the effect of soy on kidney function. No statistically significant change in glomerular filtration rate was seen after 8 weeks of soy protein diet. Four studies examined the effects of soy on cognitive function of post-menopausal women and college students of both sexes. Overall, no statistically significant or consistent effect was noted on neurocognitive functions such as verbal episodic memory. Six studies evaluated the effect of soy on fasting blood glucose. No statistically significant changes were reported.

Adverse Events

In general, the rates of adverse events reported were greater in the soy treatment arms than in their respective control arms, but adverse events related to soy consumption were generally minor. Overall, soy products including isoflavones were well tolerated in the trials we examined.

The most frequently reported adverse events among a total of 3,518 subjects in 49 studies (including 5 nonrandomized and 3 pharmacokinetic studies) that reported adverse events were gastrointestinal in nature. These were reported in 33 of 41 comparison studies of soy diets, soy proteins, isoflavones, and phytoestrogen supplements. Most of the gastrointestinal adverse events were reported in soy diet and soy protein trials, especially the 12 studies that used purified isoflavone interventions in dosages ranging from 40 to 100 mg/day. The amount of soy protein in these trials ranged from 20 to 60 g/day, but there was no clear dose relationship between the amount consumed and subsequent adverse events. Menstrual complaints, reported in 15 studies, were also common. Six of these studies used purified isoflavone interventions in dosages ranging from 40 to 80 mg/day. However, most women in these studies were post-menopausal, and the controls frequently included hormone therapy regimens. Other adverse events included musculoskeletal complaints, headache, dizziness, and rashes. In addition, there were somewhat more withdrawals from the soy arms due to taste aversion.

Limitations

Despite the large number of trials that have been performed, the health effects of soy for many conditions that have been studied remain uncertain. The methodological quality of over half the studies (about 55 percent) evaluated in this report was poor (Grade C). One-third of the poor-quality studies were either uncontrolled single-cohort studies, nonrandomized comparative studies, or comparative studies for which it was unclear whether they were randomized. Another third of the poor-quality studies had dropout rates that exceeded 20 percent or unequal dropout rates between the soy and control arms. Other reasons that studies were graded poor quality included lack of reporting of baseline data; inadequate accounting of important confounders; major discrepancies between text, tables, and/or figures or irreconcilable data that indicate likely improper statistical analysis; and substantial missing data.

There was also great heterogeneity among studies, particularly among the interventions analyzed. Comparisons across the myriad types of soy are intrinsically very difficult. This difficulty was compounded by the use of soy both as a supplement and as an integral part of the diet; furthermore, for numerous studies, it is difficult to distinguish between supplement and diet. It is likely that studies of supplements and diet are not easily comparable. Most studies involved a small number of study subjects and were of short duration. About one-half of studies were of less than 12 weeks duration and about one-third were shorter than 6 weeks. Few studies directly compared soy products, mostly comparing soy protein with varying amounts of soy isoflavones. Only one performed a factorial design study comparing both present and absent soy protein and present and absent soy isoflavones, thus allowing analysis of the effect of both soy protein and soy product. The universal issue of possible publication bias, where negative studies are less likely to be published and are more likely to be published later, is a potential concern. However, for most outcomes, the majority of studies reported negative outcomes, and there was no obvious evidence of publication bias among the lipid studies (where there is evidence of a positive effect).

Conclusions

Most of the studies evaluated the effects of soy on various biomarkers or measures, not clinical outcomes, although several of the endpoints, such as blood pressure, LDL, and bone mineral density, do have known meaningful correlations with clinical outcomes. Cardiovascular surrogate endpoints were assessed by the largest number of studies. Overall, soy was found to have a small effect on lipids. However, the duration of these studies was generally short, and it is uncertain whether the results would be sustained. No study evaluated clinical cardiovascular disease.

Reduction of hot flashes by soy was seen in trials involving post-menopausal and peri-menopausal women. Most of the trials lasted only 3 to 4 months; thus the long-term benefits remain unclear. In addition, different measurements were used to assess benefits across studies, making comparisons and synthesis difficult. Soy phytoestrogens are seen by some as an alternative to estrogen therapy to treat post-menopausal symptoms. However, the estrogenic effect of soy in potentially promoting tumor recurrence raises concern for its use by breast cancer survivors. The current literature provides no data to address this issue.

The evidence does not support an effect of soy products on endocrine function, menstrual cycle length, or bone health, although evidence was often limited and of poor quality. No study evaluated clinical endocrine or bone disease.

This report was limited to human studies, and thus was unable to fully respond to biological or biochemical hypotheses of benefits or harms of phytoestrogens suggested by various animal, in vitro, or assay detection studies: the correlations between specific nutrients and their effects remain unclear. While the evidence does suggest a greater likelihood of adverse events with soy consumption, these were mostly minor in nature. There were a limited number of studies with duration of 1 year or longer; thus the long-term adverse effect of soy in a large population is uncertain.

For all outcomes, including adverse events, there is no conclusive evidence of a dose-response effect for either soy protein or isoflavone. However, for LDL reduction, there is a suggestion of a possible dose-response effect for soy protein.

Future Research

This report dealt with a broad range of health conditions and endpoints; thus it is difficult to focus research recommendations on a specific area. As is the case with most bodies of evidence regarding medical fields, better quality, well-reported, larger, and longer duration studies are needed to address the questions of interest. Future studies should fully report the components of soy products being tested; compare different doses, soy products, and populations; more closely evaluate the effects of different soy components, including non-protein, non-isoflavone components; fully consider the types of foods being replaced by soy products and the controls being used; and use the CONSORT statement as a guide to designing and reporting studies.[3,4]

Conducting clinical trials in the area of health effects of food substances is fraught with difficulties. There is a complex interplay among the various components and potentially active substances within the foods and with other foods. Dietary variations, as well as other lifestyle and clinical variations among individuals, are also complex. Controlling for these factors is difficult within a trial. Interpreting discrepant results among trials is even more difficult. Isoflavones are believed to be the key active substance in soy, but this is by no means certain. Little data suggest that the amount of soy isoflavones is associated with an incremental effect, and studies of soy protein with little or no isoflavones frequently had similar effects as isoflavone studies. Difficulties with attempting to ascribe a food health benefit to a specific component of the food are highlighted by the recent spate of disappointing results from antioxidant trials, which suggest that the evaluation of potential nutrient benefits may need a paradigm different from the traditional clinical trial model.

The bioavailability of an ingested nutrient may also be an important factor in the determination of the beneficial effect. Several factors may affect the bioavailability of ingested nutrients: (1) absorption rate, which is affected by the interactions with competitive nutrients, the usual diet compositions, and types of foods or supplements; (2) incorporation rate into the blood stream, in which complex mechanisms might be involved, such as the functions of facilitated transporters, receptors on the membrane, or cellular binding proteins; (3) metabolism of the intestinal bacterial environment. Any one of these factors alone does not determine the bioavailability. In order to gain insights on the question of dose-response relationship, we need information not only on the soy isoflavone contents, including types and amount, but also on the bioavailability of the ingested soy isoflavones.

Unfortunately, studies that attempt to control for the myriad factors that interfere with clear interpretation of the effect of food products such as soy tend to be highly artificial, with little applicability to the average person. Clarity is needed to define what study questions are of interest. Metabolic laboratory studies or investigations of highly structured or restricted diets (such as those where soy protein constitutes the bulk of daily protein consumption) are of potential value only to possibly determine which components of soy are bioactive or to determine what extremes of diet may be necessary to achieve a benefit. Studies that substitute practical amounts of soy products into average people's diets would better address

the question of whether people should make the effort to include more soy in their diets, but these studies will invariably be difficult to interpret. An exception to this may be studies of soy isoflavone supplements (e.g., nonfood capsules), which may be interpreted more like usual drug trials.

Carefully controlled efficacy studies (those conducted under the artificial conditions of a clinical trial) may still be useful to pin down the relative effects of various components of soy. Once this is better clarified, more practical effectiveness studies that aim to test the value of an intervention in more real-world scenarios with feasible interventions might be more important.

Availability of the Full Report

The full evidence report from which this summary was taken was prepared for the Agency for Healthcare Research and Quality (AHRQ) by the Tufts-New England Medical Center Evidence-based Practice Center under Contract No. 290-02-0022. It is expected to be available in August 2005. At that time, printed copies may be obtained free of charge from the AHRQ Publications Clearinghouse by calling 800-358-9295. Requesters should ask for Evidence Report/Technology Assessment No. 126, *Effects of Soy on Health Outcomes.* In addition, Internet users will be able to access the report and this summary online through AHRQ's Web site at www.ahrq.gov.

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