**ABSTRACT**

Objective: The study was conducted to estimate the relative cost-effectiveness of contraceptives in the United States from a payer’s perspective.

Methods: A Markov model was constructed to simulate costs for 15 contraceptive methods and no method over a 5-year period. Failure rates, adverse event rates, and costs and cost-effectiveness were derived from the literature. Sensitivity analyses were performed on costs and failure rates.

Results: Any contraceptive method is superior to “no method”. The three least expensive methods were the copper-T IUD (84%), LNG-20 IUS (80%), and injectable contraceptive (70%). Results were sensitive to the cost of contraceptive methods, the cost of an unintended pregnancy, and plan disenrollment rates.

Conclusions: The copper-T IUD, vasectomy, and the LNG-20 IUS are the most cost-effective contraceptive methods available in the United States. Differences in method costs, the cost of an unintended pregnancy, and time horizon are influential factors that determine the overall value of a contraceptive method.

**BACKGROUND**

Nearly half (46%) of the 6.4 million pregnancies each year in the United States are unintended. In 2011, there were more than 3 million unintended pregnancies. 1 The direct medical costs of these unintended pregnancies totaled $5 billion. Contraceptive use saves nearly $50 billion in direct medical costs each year. 2 Currently available contraceptive methods vary greatly in their efficacy and overall cost.

Long-acting methods, such as intrauterine contraceptive devices and implants, have large upfront costs but are highly effective over a long time frame. In contrast, user-dependent methods (e.g., condoms, oral contraceptives) incur pregnancy-related costs that may greatly exceed the method costs themselves.

There is a need for good evidence on the costs and effectiveness of different contraceptive options so that individuals can make an informed choice and health plans can provide the right mix of contraceptive options.

**OBJECTIVE**

The purpose of this study was to conduct a cost-effectiveness analysis of contraceptives available in the United States from a private payer’s perspective.

**METHODS**

A Markov model was constructed from the health care payer perspective to evaluate the costs and effectiveness of 15 contraceptive methods, including various IUDs, vaginal and tubal ligation, and oral contraceptives as well as injectable contraceptives (OCs), transdermal contraceptive patch, vaginal ring, copper 380A intrauterine device (Cu380A), levonorgestrel (LNG)-20 intrauterine system (20µg), male condom, female condom, injectable contraceptive, implant, diaphragm, spermicides, and barrier methods. We included efficacy, effectiveness, and adverse event rates for each contraceptive method. The costs of contraceptive methods, failure, and adverse events were developed from the literature.

Model time horizon: 5 years.

In each yearly cycle, subjects transition to “continue contraception”, “method failure” with one of four outcomes: ectopic pregnancy, spontaneous abortion, induced abortion, or “plan dropout.” Subjects remain on the method for the model duration after method failure or adverse event. The effectiveness is predicted from the estimated average annual probability of not becoming pregnant over a 5-year period, assuming typical use. Failure rates, probabilities of outcomes following failure, and adverse event rates were derived from a comprehensive review of the literature and supplemented with expert opinion.

**RESULTS**

Any contraceptive method is superior to “no method” in terms of costs and effectiveness.

1. Costs of unintended pregnancies reflect the majority (>90%) of costs of contraception.

2. Costs of non-hospital abortions calculated from Henshaw 9,318 x (1.0-0.60/(1.03)^2) = $923.

3. Costs of induced abortions calculated from Medical Expenditure Panel Survey (MEPS) 2004. Inflated using the medical component of CPI to 2007$. Assuming 60% births are mistimed and would occur 2 years later, a 3% discount rate per year is applied.

4. Costs of non-hospital abortions calculated from Henshaw 9,318 x (1.0-0.60/(1.03)^2) = $923.

5. Costs of induced abortions calculated from Medical Expenditure Panel Survey (MEPS) 2004. Inflated using the medical component of CPI to 2007$. Assuming 95% of abortions are performed in the hospital.

6. Failures rates, probabilities of outcomes following failure, and adverse event rates were derived from a comprehensive review of the literature and supplemented with expert opinion.

7. Probabilities of all failure except ectopic pregnancy were estimated to have the following distribution: 1st year: 17% spontaneous abortion and 45% induced abortion, regardless of method (Source: Personal communication from L. Finer, August 30, 2007).

8. Contraceptive failure was not considered when the sensitivity analyses were conducted to handle the uncertainty around model inputs.

9. Limitations of Analysis

In this model, switching between methods was not allowed even if failure occurred. In reality, given their changing preferences and situations, individuals switch between different methods. However, there are no national representative data on probabilities of switching among all methods. Moreover, allowing switches precludes a pure comparison of contraceptive methods. If all switches are assigned an average cost of a matched contraceptive method, then the costs of the different methods will converge over time.

In the model time horizon was restricted to 5 years only.

The model did not account for certain costs incurred by women with tubal ligation, including follow-up costs for those desiring future pregnancy. Non-medical costs (e.g., costs of contraception, transportation costs, and the protective role of condoms against sexually transmitted infections) were not considered.

**CONCLUSION**

1. Copper-T IUD, vasectomy and LNG-20 IUS are the most cost-effective contraceptive methods currently available in the US market.

**REFERENCES**


