ORIGINAL RESEARCH

The Cost of Unintended Pregnancies for Employer-Sponsored Health Insurance Plans

Gabriela Dieguez, FSA, MAAA; Bruce S. Pyenson, FSA, MAAA; Amy W. Law, PharmD; Richard Lynen, MD; James Trussell, PhD

BACKGROUND: Pregnancy is associated with a significant cost for employers providing health insurance benefits to their employees. The latest study on the topic was published in 2002, estimating the unintended pregnancy rate for women covered by employer-sponsored insurance benefits to be approximately 29%.

OBJECTIVES: The primary objective of this study was to update the cost of unintended pregnancy to employer-sponsored health insurance plans with current data. The secondary objective was to develop a regression model to identify the factors and associated magnitude that contribute to unintended pregnancies in the employee benefits population.

METHODS: We developed stepwise multinomial logistic regression models using data from a national survey on maternal attitudes about pregnancy before and shortly after giving birth. The survey was conducted by the Centers for Disease Control and Prevention through mail and via telephone interviews between 2009 and 2011 of women who had had a live birth. The regression models were then applied to a large commercial health claims database from the Truven Health MarketScan to retrospectively assign the probability of pregnancy intention to each delivery.

RESULTS: Based on the MarketScan database, we estimate that among employer-sponsored health insurance plans, 28.8% of pregnancies are unintended, which is consistent with national findings of 29% in a survey by the Centers for Disease Control and Prevention. These unintended pregnancies account for 27.4% of the annual delivery costs to employers in the United States, or approximately 1% of the typical employer’s health benefits spending for 1 year. Using these findings, we present a regression model that employers could apply to their claims data to identify the risk for unintended pregnancies in their health insurance population.

CONCLUSION: The availability of coverage for contraception without employee cost-sharing, as was required by the Affordable Care Act in 2012, combined with the ability to identify women who are at high risk for an unintended pregnancy, can help employers address the costs of unintended pregnancies in their employee benefits population. This can also help to bring contraception efforts into the mainstream of other preventive and wellness programs, such as smoking cessation, obesity management, and diabetes control programs.

KEY WORDS: unintended pregnancy, costs, PRAMS questionnaire, delivery, contraception, employer-sponsored health insurance, employee benefits

Pregnancy and delivery is the single largest group of diagnoses, by cost, for employers providing health insurance benefits, accounting for approximately $30 billion in hospital bills in 2008.1 Avoiding unnecessary hospitalizations is a focus for insurers and employers of cost reduction, but hospital admissions for deliveries are inherently different from other admissions, because they cannot be avoided or substituted with other appropriate outpatient care. Although the majority of pregnancies are planned, many are not; in fact, the unintended pregnancy rate among employer-sponsored health insurance plans was as high as 29% in 2002.2 In this study, we use the term “employer,” because employer-sponsored health programs cover the majority of commercially insured lives, but the results are applicable to other forms of...
KEY POINTS

➤ Unintended pregnancies carry a major cost burden for employer-sponsored health insurance
➤ The most recent studies were published in 2002 based on data from the mid-1990s
➤ This new study analyzed real-world data from a large national database and a large commercial database
➤ Among employer-sponsored health plans, 28.8% of pregnancies were unintended, accounting for 27.4% of the delivery costs to employers, or approximately 1% of an employer’s total healthcare annual costs
➤ In women aged 15 to 19 years, the rate of unintended pregnancies was 78%, almost 4 times higher than in women aged 35 to 39 years
➤ Increasing access to and reducing out-of-pocket costs of oral contraceptives have been suggested as potential strategies to reduce unintended pregnancies and the associated costs
➤ Promoting contraception by employers can also potentially reduce unintended pregnancies
➤ The high cost of unintended pregnancy for employers highlights a need for the identification and stratification of at-risk patients, as well as the need for patient education

Unintended pregnancy is a major cost component for employer-sponsored health benefits; yet, the most recent cost estimates are based on surveys that were conducted almost 20 years ago (in the mid-1990s), and do not reflect the socioeconomic and healthcare changes that have occurred since that time. Furthermore, published analyses of the costs of unintended pregnancies have often focused on spending by public insurance programs, perhaps because approximately 66% of births resulting from unintended pregnancies are paid for by such programs.1

Analyses based on spending by public insurance programs suggest that implementing or expanding public policies to prevent unintended pregnancies has the potential to provide substantial savings to the public.2 In addition, findings from a recent literature review on the costs of pregnancy suggest that reducing unintended pregnancies may lower the overall economic burden of pregnancy on the US healthcare system.3 Given all these factors, we sought to update the cost to employers of unintended pregnancy with more current data. In women aged 15 to 19 years, the rate of unintended pregnancies was 78%, almost 4 times higher than in women aged 35 to 39 years.

Increasing access to and reducing out-of-pocket costs of oral contraceptives have been suggested as potential strategies to reduce unintended pregnancies and the associated costs.4 Promoting contraception by employers can also potentially reduce unintended pregnancies.5

The high cost of unintended pregnancy for employers highlights a need for the identification and stratification of at-risk patients, as well as the need for patient education.6

Methods

Data Sources

We used 2009-2011 data from the Centers for Disease Control and Prevention’s Pregnancy Risk Assessment Monitoring System (PRAMS) database5 and 2010-2011 data from the Truven Health MarketScan Commercial Claims and Encounters Database6 (hereafter MarketScan) to estimate the probability of unintended pregnancy in a commercially insured population.

The 2009-2011 PRAMS database contains population-based data on maternal attitudes and experiences before, during, and shortly after a live birth from approximately 50,000 women in approximately 40 states.5 The PRAMS questionnaire has more than 300 questions, which focus on topics such as pregnancy intention, contraception use, patient demographic characteristics, health insurance status, and the general health of the mother before and during pregnancy. Researchers can gain access to the PRAMS database through the Centers for Disease Control and Prevention5 and through individual state health departments.

The MarketScan database, which includes medical and pharmacy claims for approximately 50 million commercially insured lives, contains International Classification of Diseases, Ninth Edition diagnosis codes, Current Procedural Terminology codes, National Drug Codes, identifiers of individuals associated with homogeneous benefit design groups, and identifiers that allow longitudinal studies of individuals.6 MarketScan is a proprietary database of Truven Health.

Definitions

The PRAMS questionnaire contains 2 parts. Part 1 is a set of 56 core questions asked in all participating states. Part 2 is a set of standard state-specific questions. In our analysis, we used 7 of the core questions and 4 of the standard state-specific questions. The questions were chosen based on our ability to find responses from the PRAMS questionnaire (eg, the mother’s age) in the MarketScan claims data. Commercial claims databases, such as MarketScan, do not include most socioeconomic information (eg, income and race). We identified pregnancy intention by core question 11 in the PRAMS questionnaire, which asks, “Thinking...
back to just before you got pregnant with your new baby, how did you feel about becoming pregnant?” We mapped the respondent answers to either intended or unintended categories.

Unintended pregnancy was defined as a mistimed (“I wanted to be pregnant later”) or unwanted (“I didn’t want to be pregnant then or at any time in the future”) pregnancy. Pregnancy intended at the time of conception (“I wanted to be pregnant then”) or earlier (“I wanted to be pregnant sooner”) was defined as intended. These definitions based on the PRAMS questionnaire are consistent with definitions found in other publications.

In our analysis, we excluded women who were uninsured or covered by Medicaid, to remain consistent with the MarketScan database, which contains data only from employer-sponsored plans. We included only women with employer-sponsored health insurance plans who indicated that they were covered by health insurance from their job (or the job of their husband, partner, or parents), using respondent answers to PRAMS core question 2, which asks, “During the month before you got pregnant with your new baby, were you covered by any of these health insurance plans?” The age distribution of the survey respondents we considered closely resembled the age distribution of the study population in the MarketScan database, which we used to estimate the employer cost burden of unintended pregnancies.

**Statistical Methods**

We conducted 2 distinct analyses. First, we developed regression models from survey data that assigned the probability that each pregnancy was unintended. We used stepwise multinomial logistic regressions to select the variables from the PRAMS data that were significant at the 0.1 level for explaining pregnancy intention. The resulting models retroactively assigned the probability that a given delivery was the result of an unintended pregnancy. Then, we applied the regression model to claims data in MarketScan to estimate the unintended pregnancy rate in employer-sponsored plans. We included only women with employer-sponsored health insurance plans who indicated that they were covered by health insurance from their job (or the job of their husband, partner, or parents), using respondent answers to PRAMS core question 2, which asks, “During the month before you got pregnant with your new baby, were you covered by any of these health insurance plans?” The age distribution of the survey respondents we considered closely resembled the age distribution of the study population in the MarketScan database, which we used to estimate the employer cost burden of unintended pregnancies.

<table>
<thead>
<tr>
<th>Mother’s age-group, yrs</th>
<th>Average probability of unintended pregnancy</th>
<th>PRAMS, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MarketScan before normalization, %</td>
<td>MarketScan after normalization, %</td>
</tr>
<tr>
<td>15-19</td>
<td>102.4</td>
<td>78.0</td>
</tr>
<tr>
<td>20-24</td>
<td>64.1</td>
<td>49.8</td>
</tr>
<tr>
<td>25-29</td>
<td>41.6</td>
<td>32.3</td>
</tr>
<tr>
<td>30-34</td>
<td>30.7</td>
<td>23.8</td>
</tr>
<tr>
<td>35-39</td>
<td>27.0</td>
<td>20.9</td>
</tr>
<tr>
<td>40-44</td>
<td>31.3</td>
<td>24.3</td>
</tr>
<tr>
<td>45-49</td>
<td>28.9</td>
<td>22.4</td>
</tr>
<tr>
<td>Total</td>
<td>36.9</td>
<td>28.7</td>
</tr>
</tbody>
</table>


The logistic regression models were applied to inpatient deliveries that were identified in the 2011 MarketScan database. For deliveries in 2011 that might have begun as pregnancies in 2010, we looked back to 2010 claims, as needed, to obtain the data (eg, existing medical conditions) required for the regression models. The probability that the pregnancy was unintended was determined by the results of the regression formulas.

We applied the results of the regression models to deliveries from the MarketScan database to develop the average cost of unintended pregnancies to employers. By applying the adjusted regression coefficients, each live delivery was assigned a probability of being unintended or intended. The average delivery costs weighted by pregnancy intention were developed by the cost component, which was done separately for unintended and intended pregnancies.

The average claim costs per delivery were developed for the following categories:

- **Anesthesia**
- **Caesarean section delivery**
- **Vaginal delivery**
- **Newborn without complications**
- **Newborn with complications**
Because some payer systems show costs separately for the baby and for the mother, we included all claims for babies that occurred within 30 days of the delivery date. To arrive at the average cost by pregnancy intention, the costs for these categories were weighted by the probability that the pregnancy was unintended.

### Results

We estimated that among employer-sponsored health insurance plans in the United States, 28.8% of pregnancies are unintended, and these pregnancies account for 27.4% of the employers’ maternity delivery costs. The model’s estimate of the portion of deliveries associated with unintended pregnancies is very close to that observed in the PRAMS database.

The probability that a pregnancy is unintended is generally much higher in younger women than in older women, as shown in Table 1. In women aged 15 to 19 years, the proportion of unintended pregnancies was 78%, which is almost 4 times higher than in women aged 35 to 39 years. In addition, we observed an increase in the unintended pregnancy rate in women aged 40 to 44 years and in women aged 45 to 49 years relative to that in women aged 35 to 39 years. This increase could potentially reflect pregnancies in women who might have already had the number of children they wanted and who did not intend to become pregnant at these relatively older ages.

Table 2 shows the average allowed costs per delivery in 2011, which are summarized by major categories of care for unintended and intended pregnancies. The allowed costs include amounts paid by the health plan and by the patient (eg, deductibles and coinsurance).

In per-member per-month (PMPM) terms, unintended pregnancies for a typical employer-sponsored insured population cost approximately $5 of a total monthly medical allowed amount of $359, including prescription drug coverage, based on our analysis of data in the MarketScan database. Table 3 compares the annual frequency of deliveries per 1000 women of childbearing age resulting from unintended and intended pregnancies, presents the monthly allowed costs of these deliveries (including patient cost-sharing), and contrasts these costs to the total monthly allowed medical cost for a typical population covered by employer-sponsored insurance.

Table 4 represents the secondary objective of this study, using a regression model to identify the factors and associated magnitude that contribute to unintended pregnancies in the employee benefits population.
### Table 4 PRAMS Survey Variable Logistic Regression Coefficients

<table>
<thead>
<tr>
<th>Variable-related variables</th>
<th>Variable</th>
<th>Variable description</th>
<th>PRAMS survey question</th>
<th>Regression coefficient (95% CI)</th>
<th>Mistimed</th>
<th>Unwanted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age-group, yrs</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td></td>
<td>Mother’s age between 15 and 19 yrs</td>
<td></td>
<td>-5.96 (-6.47 to -5.45)</td>
<td>-2.06 (-2.14 to -1.99)</td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td></td>
<td>Mother’s age between 20 and 24 yrs</td>
<td></td>
<td>7.02 (6.5 to 7.53)</td>
<td>1.27 (1.21 to 1.34)</td>
<td></td>
</tr>
<tr>
<td>25-29</td>
<td>Core 6 and core 36</td>
<td>Mother’s age between 25 and 29 yrs</td>
<td></td>
<td>4.96 (4.44 to 5.47)</td>
<td>-0.14 (-0.2 to -0.08)</td>
<td></td>
</tr>
<tr>
<td>30-34</td>
<td>Core 6 and core 36</td>
<td>Mother’s age between 30 and 34 yrs</td>
<td></td>
<td>4.48 (3.97 to 5)</td>
<td>-1.17 (-1.23 to -1.11)</td>
<td></td>
</tr>
<tr>
<td>35-39</td>
<td>Core 6 and core 36</td>
<td>Mother’s age between 35 and 39 yrs</td>
<td></td>
<td>3.96 (3.45 to 4.48)</td>
<td>-0.92 (-0.98 to -0.86)</td>
<td></td>
</tr>
<tr>
<td>40-44</td>
<td>Core 6 and core 36</td>
<td>Mother’s age between 40 and 44 yrs</td>
<td></td>
<td>3.54 (3.03 to 4.05)</td>
<td>-0.37 (-0.43 to -0.31)</td>
<td></td>
</tr>
<tr>
<td>45-49b</td>
<td></td>
<td>Mother’s age between 45 and 49 yrs</td>
<td>Reference group</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Contraception use

<table>
<thead>
<tr>
<th>Contraception use</th>
<th>Core 13</th>
<th>Prescription drug contraception use (pill, patch, diaphragm, vaginal ring, or emergency contraception)</th>
<th></th>
<th>2.59 (2.56 to 2.63)</th>
<th>2.9 (2.86 to 2.94)</th>
</tr>
</thead>
</table>

#### Family-related variables

<table>
<thead>
<tr>
<th>Previous live birth</th>
<th>Core 8</th>
<th>Mother had other babies born alive</th>
<th></th>
<th>0.43 (0.42 to 0.44)</th>
<th>1.37 (1.35 to 1.39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 dependent</td>
<td>Core 8</td>
<td>Number of people, including mother, depending on household income during the 12 months before the birth of the new baby</td>
<td>Core 55</td>
<td>-0.32 (-0.34 to -0.29)</td>
<td>-0.49 (-0.53 to -0.46)</td>
</tr>
<tr>
<td>2 dependents</td>
<td>Core 55</td>
<td></td>
<td></td>
<td>-0.51 (-0.53 to -0.49)</td>
<td>-1.23 (-1.26 to -1.19)</td>
</tr>
<tr>
<td>3 dependents</td>
<td>Core 55</td>
<td></td>
<td></td>
<td>-0.08 (-0.11 to -0.06)</td>
<td>-0.03 (-0.06 to 0.01)</td>
</tr>
<tr>
<td>4 dependents</td>
<td>Core 55</td>
<td></td>
<td></td>
<td>-0.04 (-0.07 to -0.01)</td>
<td>0.34 (0.3 to 0.37)</td>
</tr>
<tr>
<td>5 dependents</td>
<td>Core 55</td>
<td></td>
<td></td>
<td>0.29 (0.26 to 0.32)</td>
<td>0.52 (0.48 to 0.56)</td>
</tr>
<tr>
<td>6+ dependents</td>
<td>Core 55</td>
<td></td>
<td></td>
<td>-0.44 (-0.47 to -0.42)</td>
<td>-0.21 (-0.25 to -0.17)</td>
</tr>
</tbody>
</table>

#### Husband/partner

| Boyfriend/other | Standard P2 | Relationship to new baby’s father at time of conception |                | 0.93 (0.88 to 0.99)          | 0.78 (0.71 to 0.85) |

#### Medical conditions variables

| Hypertension | Standard N5 | Mother received weekly shots of progesterone, Gestiva, or 17 alpha-hydroxyprogesterone |                | -0.38 (-0.42 to -0.35)       | -0.74 (-0.8 to -0.68) |
| Anemia       | Standard N5 | Mother received weekly shots of progesterone, Gestiva, or 17 alpha-hydroxyprogesterone |                | -0.38 (-0.42 to -0.35)       | -0.74 (-0.8 to -0.68) |
| Heart problems | Standard L11 | Mother’s health problems during the 3 months before pregnancy |                | 0.76 (0.7 to 0.82)           | 0.11 (0.01 to 0.21)  |
| Seizures     | Standard L11 | Mother’s health problems during the 3 months before pregnancy |                | -0.5 (-0.6 to -0.4)          | -1.18 (-1.41 to -0.96) |
| Thyroid      | Standard L11 | Mother’s health problems during the 3 months before pregnancy |                | -0.36 (-0.39 to -0.33)       | -0.53 (-0.59 to -0.48) |
| Mental health | Standard L11 | Mother’s health problems during the 3 months before pregnancy |                | 0.22 (0.18 to 0.26)          | 0.25 (0.20 to 0.30)  |

#### Other variables

| Progesterone use | Standard N5 | Mother received weekly shots of progesterone, Gestiva, or 17 alpha-hydroxyprogesterone |                | -0.38 (-0.42 to -0.35)       | -0.74 (-0.8 to -0.68) |
| Previous miscarriage | Standard FF1 | Mother had a miscarriage, fetal death, or stillbirth during the 12 months before pregnancy |                | -0.69 (-0.75 to -0.62)       | -0.2 (-0.28 to -0.12) |
| Low state unintended pregnancy rate | Standard FF1 | Mother had a miscarriage, fetal death, or stillbirth during the 12 months before pregnancy |                | -0.39 (-0.39 to -0.38)       | -0.41 (-0.43 to -0.4) |
| Medium state unintended pregnancy rate | Standard FF1 | Mother had a miscarriage, fetal death, or stillbirth during the 12 months before pregnancy |                | -0.39 (-0.39 to -0.38)       | -0.41 (-0.43 to -0.4) |
| High state unintended pregnancy rateb | Standard FF1 | Mother had a miscarriage, fetal death, or stillbirth during the 12 months before pregnancy |                | -0.39 (-0.39 to -0.38)       | -0.41 (-0.43 to -0.4) |

*The logistic regression formula details are provided online in the Technical Appendix (www.AHDBonline.com). **Mother’s age between 45 and 49 yrs** and “high state unintended pregnancy rate” were used as the reference groups for the logistic regression analysis. Lookback for MarketScan contraception claims is 1 month before pregnancy date. CI indicates confidence interval; N/A, not applicable; PRAMS, Pregnancy Risk Assessment Monitoring System.
Discussion

The most recent article on the cost to employers and commercial insurers of unintended pregnancy was published in 2002 and was based on maternal delivery dates that occurred between October 1, 1995, and March 31, 1996. This 2002 survey-based study by Green and colleagues reported that the unintended pregnancy rate among commercially insured lower-risk women was 29%. One purpose of our analysis was to update this outdated information for employers and commercial insurers, and to provide a tool for health plans to determine the extent of unintended pregnancies in their population.

Based on our analysis of the MarketScan database, we estimated that 28.8% of deliveries in employer-sponsored health insurance plans in 2011 were a result of unintended pregnancies, and that the direct cost associated with these deliveries, which was mostly borne by employers, was approximately $5 PMPM before cost-sharing (or approximately 1% of the typical employer’s annual spending on health benefits, including patient cost-sharing, as shown in Table 3). The $5 PMPM cost, in the authors’ experience, is comparable with the cost of other conditions that employers attempt to manage. These findings suggest an opportunity for better health management, and we argue that the target population for appropriate intervention can be easily identified through methods that we developed and presented in this article.

Much of the literature pertaining to unintended pregnancy involves the impact of contraception. In particular, the available estimates of the cost-effectiveness of public spending on contraception and family planning indicate that there is significant opportunity to reduce the taxpayers’ cost of maternal and newborn care that is associated with unintended pregnancy.

Numerous studies describe how access to contraceptives varies as a result of cost or convenience. The American College of Obstetricians and Gynecologists recommends making oral contraceptives available over the counter to increase contraception access and use, and to possibly reduce unintended pregnancy rates. Cost barriers, such as out-of-pocket expenses, have also been identified as major deterrents to the use of contraception. More effective long-acting reversible contraception tends to be associated with higher upfront patient cost-sharing, but it is more cost-effective than short-acting reversible methods.

The Affordable Care Act (ACA), which requires that commercial health plans cover certain women’s health medical services without cost-sharing, has ameliorated concerns over out-of-pocket expenses for contraception services. The federal Health Resources and Services Administration (an organization that is responsible for improving access to healthcare) used recommendations from the Institute of Medicine (an independent nonprofit organization that provides unbiased and authoritative advice to decision makers and the public) to establish the provision that women with reproductive capacity will have access to all US Food and Drug Administration–approved contraceptive methods, sterilization procedures, and patient education and counseling. This provision applies to all nongrandfathered plans starting with the plan year that began on or after August 1, 2012. Plans eligible to be grandfathered have been in existence since March 23, 2010 (and, in some cases, even earlier), and have not made significant benefit reductions or beneficiary cost increases since that time. Exceptions also exist for nonprofit religious organizations under certain circumstances.

Because of the time lapse between the provision of health services (including contraception) and the availability of claims data, it was too early at the time of this study to tell whether the ACA’s no cost-sharing contraception mandate has had any effect on the use of contraception services or on the rate of unintended pregnancy. We believe this topic merits follow-up research.

Lower cost-sharing is associated with increased use of services, including preventive services. Despite this effect, there are well-known examples of the suboptimal use of other preventive services (eg, cancer screening). It is likely that contraceptive preventive services are similarly underutilized or misused, suggesting the need to further promote awareness of the availability of contraceptives via communication efforts by providers and health insurers.

The financial case for employers to promote contraception as a preventive service has not been made, although the prevention of unintended pregnancies is a public health goal and benefit. Our findings suggest that employer promotion of contraception has the potential to reduce unintended pregnancies, as well as costs to employer-sponsored insurance. We argue that family planning fits well into broader wellness and health promotion efforts that are aimed at improving overall employee well-being and health cost-savings.

The high cost of unintended pregnancy for employers suggests the need for research that identifies the most effective patient management methods. Typical processes used for managing patients who are at risk for medical conditions include identifying at-risk patients; stratifying at-risk patients so that certain patients receive more intense or less intense outreach efforts; and offering patient education, reminders, or other services aimed at the patient’s clinical situation.

Limitations

We acknowledge several limitations in our analysis, which include potential survey bias, our inability to cap-
tural socioeconomic status in the MarketScan database, potential mismatches between PRAMS survey-reported conditions and diagnosis codes in claims, and the exclusion of terminated pregnancies.

In the PRAMS database, the survey responses pertaining to pregnancy intention are self-reported; intention is inherently subjective, and our results may have been affected by respondent bias. Nonetheless, the rates of unintended pregnancy in the PRAMS database, overall and specific by demographic characteristics, are consistent with those noted by other reputable sources, such as the Guttmacher Institute and the Centers for Disease Control and Prevention.23,24

None of the known major risk factors associated with unintended pregnancy (eg, minority race, fewer years of education, and lower income)25 is available in typical commercial claims data. We therefore attempted to capture some of the differences in socioeconomic factors by adding a regional variable to the regression analysis based on the mother’s state of residence. We ranked states according to their unintended pregnancy rate for mothers with employer-sponsored health insurance, as defined earlier. We established 3 categories to reflect the aggregate unintended pregnancy rates, and then assigned each state to 1 of 3 categories (low, medium, or high), with an equal number of states in each category. Although our goal was to reflect race or income regional differences, we did not expect this simple approach to capture the full range of socioeconomic influences.

Although the MarketScan database is representative of the national aggregate employee and dependent population that is typically covered by employer-sponsored health insurance with regard to size, geography, and health benefits, the conclusions of this study may vary from the experience of any given employer-sponsored health plan.

Finally, the way in which we identified the medical conditions and events used in our model differed by database. In the PRAMS database, medical conditions and events are self-reported, whereas in the MarketScan database, they are based on diagnoses and procedure codes that appear in the administrative claims data. We also recognized the potential for varying degrees of accuracy or underreporting or overreporting in the 2 databases. For example, in the PRAMS database, a woman may have self-reported elevated blood pressure, whereas in the MarketScan database, a woman with hypertension was identified based on the diagnosis codes in her medical claims.

Pregnancies that ended in abortion or miscarriage are not included in the PRAMS database, because this database contains only data on live birth deliveries. We were therefore able to estimate the probabilities and cost burdens of live births only.

Conclusion

In our analysis, we used the 2009-2011 PRAMS database and the 2010-2011 MarketScan database to demonstrate that a significant proportion of pregnancies recently paid for by employer-sponsored health insurance programs are unintended. We also developed a regression model that can be applied to readily available medical claims databases to retrospectively quantify the cost and aggregate risk for unintended pregnancies, in particular, employer-sponsored health insurance benefit populations.

The cost-effectiveness of contraceptive methods has been widely demonstrated elsewhere.9,10 Population health management efforts for other conditions are popular with employers. The ability to identify women who are at high risk for an unintended pregnancy, as demonstrated in this analysis, is one important step toward promoting proved methods to address unintended pregnancies in the employee benefits population.

When this study was conducted, it was too early to assess whether the ACA’s no cost-sharing contraception mandate has had any effect on the use of contraception services or on the rate of unintended pregnancy. We believe this topic merits follow-up research.

Acknowledgments

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Author Disclosure Statement

Ms Dieguez and Mr Pyenson received actuarial consulting fees for this research from Bayer Pharmaceuticals; Dr Law is an employee of Bayer Pharmaceuticals; Dr Lynen is an employee and stockholder of Bayer HealthCare; Dr Trussell reported no conflicts of interest.

References

A Call to Action to Address Burden of Unintended Pregnancies in Plans’ Benefit Design

By F. Randy Vogenberg
Partner, Access Market Intelligence and Principal, Institute for Integrated Healthcare, Greenville, SC

EMPLOYERS/HEALTH PLANS: Self-funded or fully funded employers who provide health insurance to their employees have significant costs related to unintended pregnancies, as Dieguez and colleagues point out in their article in this issue of American Health & Drug Benefits.1 The risk (ie, cost) associated with providing health insurance is affected by a variety of factors that may be controllable, as well as a variety of options for managing that risk in an imperfect US health insurance world.

Unintended pregnancies remain a significant problem to be tackled through the input and involvement of purchasers of care, such as self-funded employers. As seen in the current analysis by Dieguez and colleagues, the consistently high estimate of unintended pregnancies that persist today represents a general call to action for those in charge of benefit plan design in terms of the medical and the pharmacy benefits provided to plan members.

The US Centers for Disease Control and Prevention (CDC) Division of Reproductive Health monitors maternal and infant health, including many issues related to the consequences of pregnancy.2 A number of surveillance systems, data, and reports are available to inform benefit decision makers on the CDC’s website about the extent and potential burden of unintended pregnancies in the United States.3

In terms of maternal and fetal medicine, for example, neonatal costs continue to be a significant economic driver for variations in clinical care. The March of Dimes produces an annual scorecard of premature births in each...
The South Carolina Birth Outcomes Initiative, a collaborative effort that focused on population health and engages all healthcare stakeholders, including employers and commercial insurance plans, was launched in July 2011. The South Carolina Birth Outcomes Initiative is now a best practices case study for turning the situation around with regard to the elimination of elective inductions for nonmedically indicated deliveries before 39 weeks, unless medically necessary.

The change in rating in 1 year alone can represent a true quality shift in Leapfrog Hospital Safety scores for participating hospitals, in addition to Medicaid and commercial health insurance benefits, in terms of avoiding maternal or infant complications, as well as preventing increased medical costs. The multistakeholder South Carolina Birth Outcomes Initiative illustrates how population health can include the employer as part of the solution, as well as contribute to improving the health of a population.

EMPLOYERS/PROVIDERS/PATIENTS: The article by Dieguez and colleagues can assist employers as purchasers of care, along with providers (ie, medical groups, hospitals, and health systems) and patients (ie, employee plan members) to know all the factors and options related to dealing with value-based decision-making on an important issue such as unintended pregnancies. These factors include economics as well as clinical outcomes from various stakeholder perspectives related to today’s shared responsibility of managing healthcare risk.

Technical Appendix

The regression formula for the probability of a pregnancy being mistimed is presented below.

Let $Y$ be a binary variable that is defined as

$$
Y = \begin{cases} 
1 & \text{Pregnancy was mistimed} \\
0 & \text{Pregnancy was not mistimed} 
\end{cases}
$$

and $P = \Pr(Y = 1 \mid X_1, \ldots, X_k)$.

The logistic regression is then defined as:

$$
\text{logit}[P] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k
$$

where \text{logit}[P] is the maximum likelihood estimate of $P$.

Using the coefficients from our PRAMS regressions and applying them to the MarketScan data, we calculated \text{logit}[P] for our sample.

Finally, $P$ is calculated as

$$
P = \frac{1}{1 + \exp[-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k)]}
$$

The variables $X_1 \ldots X_k$ and the coefficients $\beta_0 \ldots \beta_k$ are listed in this Technical Appendix (Table 4 in the body of the article), along with the SAS version 9.2 (SAS Institute; New York, NY) code that was used for the logistic regression calculation.

A similarly structured (but independent) regression formula was also developed for unwanted pregnancies.

PRAMS indicates Pregnancy Risk Assessment Monitoring System.