

# Estimating the Economic Costs of Antidepressant Discontinuation During Pregnancy

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**Objective:** Depression is a major public health concern that results in a wide range of economic costs to people, their families, and the health care system. Our study sought to determine the direct medical costs incurred by the Ontario government owing to cessation of antidepressant therapy during pregnancy.

**Methods:** We conducted an economic evaluation by making assumptions based on data obtained from Statistics Canada, federal and provincial government reports, and relevant depression literature. The analysis included the number of pregnant women with depression residing in Ontario and, subsequently, the number of those women who experienced depressive relapse during pregnancy owing to discontinuation of antidepressant medication. The cost of physician services, hospitalizations, and the birth of preterm and low birth weight infants (2 adverse outcomes associated with untreated depression during pregnancy) were also taken into consideration.

**Results:** An estimated 2953 pregnant women with depression in Ontario annually discontinue antidepressant therapy and subsequently have a depressive relapse. An estimated \$20 546 982 is spent annually in Ontario on untreated maternal depression in pregnancy; this is the total after subtracting the cost of risks associated with treated depression during pregnancy (\$3 144 053).

**Conclusions:** Safe treatment options for the management of depression during pregnancy should be actively explored as treated depression translates into cost savings for the Ontario government and society as a whole. Beyond this cost, depression interferes with the quality of childrearing, maternal responsiveness to infants, and other determinants essential for optimal child development.

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### Clinical Implications

- Effective treatment of depression during pregnancy is possible; greater vigilance is required to recognize, diagnose, and treat depression during pregnancy.
- Fetal outcomes and infant health benefit from improved maternal mental health status, thus a woman's mental health should not be overlooked or downplayed, particularly during her reproductive years.
- The Ontario health care system has the potential to realize cost savings by treating maternal depression during pregnancy thereby avoiding preventable morbidity.

### Limitations

- Our study examined only direct medical costs; neither indirect costs nor the costs of rare complications were estimated.
- Because depression goes undiagnosed in many people, we were unable to capture all direct medical costs resulting from depression.
- Ontario-specific data were not always available; therefore, surrogate data from various countries had to be used to estimate some direct medical costs.

**Key Words:** depression, pregnancy, medical costs, Ontario Health Insurance Plan

**M**DD, commonly referred to as depression, is a chronic and recurrent mental illness. The World Health Organization<sup>1</sup> predicts that by 2012 depression will be the leading cause of disease in the world; it is estimated that 121 million people worldwide are currently suffering from depression. Canadian statistics indicate that 4% to 5% of the population suffer from MDD during any given year<sup>2</sup> and that 1 in 5 Canadians will experience mental illness during their lifetime.<sup>3</sup>

While depression affects both men and women, the lifetime occurrence of MDD is about 2 to 3 times higher in women than in men.<sup>4</sup> MDD is the leading cause of chronic disease in women aged 15 to 44 years, overlapping with women's child-bearing years.<sup>5</sup> Further, pregnancy represents a time in which women are more vulnerable to the onset of depression or its reemergence.<sup>6</sup> However, all too often, women who have been diagnosed with depression before pregnancy and have commenced pharmacotherapy to manage their condition, decide on their own, or on the advice of their health care providers, to discontinue or decrease antidepressant therapy owing to fears of teratogenicity when pregnancy is confirmed.<sup>7</sup> Once antidepressant medication is discontinued, many women do not replace it with other forms of treatment (for example, psychotherapy). The end result is that these women are untreated or subtherapeutically treated during pregnancy and are at a high risk for the return of depressive symptoms.<sup>8</sup>

### Consequences of Untreated Depression

The goal of pharmacotherapy during pregnancy is to optimize both maternal and fetal health. Risks and benefits have to be considered in managing and not managing depression with medication during pregnancy; these risks and benefits must be weighed carefully when deciding what course to take. The extent and severity of a woman's depressive symptoms must be taken into consideration, as well as her history of depression; women with a depressive history appear to be at

high risk for recurrent depression during pregnancy, particularly as a consequence of antidepressant discontinuation.<sup>9</sup>

Once women discontinue antidepressant medication, the possibility of MDD reemerging is very real. Generally depression reemerges gradually over weeks.<sup>10</sup> A recent large, multicentre study found that 68% of women who discontinued their medication just prior to pregnancy or in the early stages of their first trimester had a depressive relapse during their pregnancy and relapsed at a rate that was 5 times greater than women who remained on medication during pregnancy.<sup>11</sup>

Potential risks of treating depression with medication may theoretically include fetal risks such as morphological malformation, neurobehavioural complications, and direct toxicity, while risks to the mother of taking the medication include the various side effects of the medication itself.<sup>12</sup> Benefits include restoring maternal mental health, decreasing or alleviating depressive symptoms, and a return to normal functioning.

Risks of not treating depression for the mother include: impaired self-care, failure to follow prenatal guidelines, suicidal ideations, self-injurious behaviour, and lower than expected weight gain. Pregnant women with depression are more likely to use alcohol and (or) illicit drugs,<sup>13</sup> which pose further risks to the fetus. If antidepressant medication is abruptly discontinued, severe side effects may occur both in the mother and in the fetus. Children born to depressed mothers are more likely to be: premature, of LBW, admitted to the neonatal unit, retarded in growth, and delayed in cognitive and behavioural development.<sup>14</sup>

The principal reasons for discontinuation of antidepressants during pregnancy are fear of harming the developing fetus and causing birth defects; these fears may make expectant mothers sacrifice their mental health for the health of their unborn children. It is a commonly held belief that medications should not be used during pregnancy as they increase the risk for having a child born with a birth defect. However, it has been shown that pharmacological agents account for less than 1% of causes of congenital anomalies in the first year of life.<sup>15</sup> Moreover, many studies have found various antidepressants such as SSRIs (the most commonly prescribed antidepressants) to be nonteratogenic and therefore a safe treatment option during pregnancy (Table 1).<sup>16</sup> Although some recent reports suggest increased risk for PPHN and cardiac malformation with the use of SSRIs, the data are controversial and, even if correct, are associated with a very marginal effect size. For example, even if the risk for PPHN is increased, it is estimated to affect less than 1% of exposed fetuses and, in all reported cases, has not been fatal.<sup>17</sup>

#### Abbreviations used in this article

GP	general practitioner
LBW	low birth weight
MDD	major depressive disorder
MOHLTC	Ministry of Health and Long-Term Care
OHIP	Ontario Health Insurance Plan
PNA	poor neonatal adaptation
PPHN	persistent pulmonary hypertension
SSRI	selective serotonin reuptake inhibitor

**Table 1 Selected studies on safety of antidepressants in pregnancy**

Author	Drug		Study	
	Name	Class	Type	Outcome: no increased risk for
Chambers et al <sup>52</sup>	Fluoxetine	SSRI	Prospective controlled study	Birth defects or miscarriage
Addis and Koren <sup>53</sup>	Fluoxetine	SSRI	Meta-analysis	Birth defects
Kulin et al <sup>54</sup>	Fluvoxamine	SSRI	Prospective controlled study	Birth defects
	Paroxetine			
	Sertraline			
Einarson et al <sup>55</sup>	Venlafaxine	SNRI	Prospective controlled study	Birth defects
Einarson et al <sup>56</sup>	Trazodone	Phenylpiperazine	Prospective controlled study	Birth defects
	Nefazodone			
Chun-Fai-Chan et al <sup>57</sup>	Bupropion	Aminoketone	Prospective controlled study	Birth defects

## The Canadian Health Care System: A Brief Overview

The Canadian health care system, known as medicare, is a publicly funded, privately administered system that was founded on the principles of universal care, portability, comprehensiveness, accessibility, and public administration of care.<sup>18</sup> Medicare consists of a group of provincial or territorial health insurance plans in which medical care is free to all Canadian citizens at the point of service; each province or territory funds and administers its own health care system, thus each insurance plan may differ slightly. Despite this autonomy, all provincial and territorial health insurance plans operate within the context of national standards and guidelines set by the federal government in the Canada Health Act.

In Ontario, the MOHLTC administers the provincial health insurance plan, known as OHIP, on a nonprofit basis. The provincial legislation on which OHIP was founded is the Ontario Health Insurance Act. All Canadian citizens, permanent residents, landed immigrants, and convention refugees are eligible to receive OHIP if Ontario is their principal and permanent place of residence.<sup>19</sup> The MOHLTC also regulates and finances general hospitals, long-term care facilities such as nursing homes, and emergency health services, as well as operates psychiatric hospitals and medical laboratories. Ontario spends about 42% of its annual budget on health care; Can\$37.9 billion was allotted for health care in the 2007/08 provincial budget.<sup>20</sup>

Mental illnesses such as depression are a public health concern as they carry with them large economic and societal costs. Mental disorders have been shown to place a large

financial burden on the Canadian health care system; in 1998, the economic cost of mental illnesses was estimated at Can\$14 billion.<sup>3</sup> It is critical to understand the ways in which mental illnesses, particularly during pregnancy, contribute to the overburdening of the health care system.

Our goal is to estimate the direct medical costs resulting from cessation of antidepressant pharmacotherapy during pregnancy; it will be examined from the viewpoint of the public payer (Government of Ontario's MOHLTC). We will limit our scope to women diagnosed with and treated for MDD with antidepressant medications before confirmation of pregnancy and who subsequently discontinued their medication on verification of pregnancy status.

## Methods

### Assumptions

We limited our examination to the direct medical costs that would be incurred by Ontario's MOHLTC owing to untreated depression in pregnancy. The following assumptions were made when estimating the cost of untreated depression during pregnancy: all pregnancies resulted in single births (this may slightly overestimate the actual number of women with depression during pregnancy); women were established on their antidepressant medication and would have continued treatment if not for becoming pregnant (that is, discontinuation was not due to reasons such as side effects).

A study conducted by the Joint Canada–United States Survey of Health<sup>21</sup> reported that Canadians and Americans had similar rates of MDD; about 12% of women of childbearing age

in Canada and the United States experienced MDD. Throughout this analysis, we assume that rates of depression reported in US studies are comparable to Canada.

### **Sources**

To establish the rate of diagnosed but untreated depression in pregnancy that resulted from discontinuation of medication, the following values were determined: number of pregnancies in Ontario in a given year, the rate of depression during pregnancy, the rate at which depression is treated with antidepressants, and the rate at which treatment is withdrawn in pregnancy. Data from scientific, peer-reviewed studies were also used as reference values.

### **Pregnancies in Ontario**

From July 1, 2006, to June 30, 2007, there were 134 141 live births in Ontario.<sup>22</sup> It should be noted that this figure may slightly underestimate the number of pregnant women as it does not include women who miscarried or experienced other events resulting in fetal loss.

### **Rate of Depression During Pregnancy**

A recent meta-analysis using data from the international literature reported that the rates of diagnosed depression during pregnancy were 7.4%, 12.8%, and 12.0% in the first, second, and third trimesters, respectively.<sup>23</sup> To estimate the overall percentage of women that suffer from depression during pregnancy, the mean rate (10.7%) was found from the rates of depression by trimester.

### **Antidepressant Discontinuation in Pregnancy**

Our study considered only women who discontinued their antidepressant medication after confirming pregnancy; these women were otherwise committed to continuing their medication if not for their pregnancy status. We found that, in 2002, 89% of people with diagnosed depression were treated with antidepressant medication.<sup>24</sup> The discontinuation rate of antidepressants for adults was reported in the literature as between 28% and 44%.<sup>25</sup> We estimated the rate of antidepressant discontinuation in pregnancy by pooling data from 3 studies<sup>11,26,27</sup> looking at this phenomenon in which 34% of women were found to discontinue their medication during pregnancy. A 68% relapse rate of depression after cessation of antidepressant therapy has been reported.<sup>11</sup>

### **Maternal Use of Health Care System**

It has been shown that people with depression use the health care system more than their nondepressed counterparts<sup>28</sup>; therefore, pregnant women with untreated depression who experience depressive relapse would be expected to use more health care services than women with depression maintaining treatment. Regarding maternal health, we examine the use of the health care system in the following areas: physician visits

(GPs and psychiatrists) and hospitalizations owing to depression. For fetal health and (or) outcomes, we examine the use of the health care system by depressed mothers in the following areas: hospitalization owing either to preterm delivery or to LBW.

GPs play a critical role in the delivery of mental health care; often they are the sole provider of mental health services for a large proportion of the Ontario population; they also deliver care in conjunction with a psychiatrist to a smaller number of patients. Psychiatrists offer more specialized mental health care; however, they are not accessed as frequently as family physicians for various reasons. A study<sup>29</sup> looking at the use of physician services for mental health (1992/93 data) found that 75.5% of mental health users used only GPs, while 8.7% of users accessed services from GPs in conjunction with psychiatrists, and 10.2% used psychiatrists alone; women of childbearing age were more likely to use GPs together with psychiatrists.

In 2000, Canadians made 7.8 million consultations with office-based physicians for depressive disorders. Canadian adults visited GPs an average of 3.9 times annually,<sup>30</sup> while adults with mental illness made an average of 8 visits to GPs and about 5.5 visits to psychiatrists annually (2000/01 data).<sup>31</sup> Lin et al<sup>29</sup> found that people who used both GPs and psychiatrists averaged between 3 to 4 more visits than the combined averages of people visiting either GPs or psychiatrists. The Lin et al report<sup>29</sup> also produced data detailing the most common fee code categories physicians (GPs and psychiatrists) submitted to OHIP for mental health care in Ontario (1992/93 data).

In 1999, the hospitalization rate for Canadian women with MDD aged 15 to 44 years was 0.12%, and the average length of stay in a Canadian hospital owing to MDD was 15.2 days.<sup>32</sup> In the 2-year period 2002–2003, the average cost of an admission to a hospital (acute and psychiatric) for MDD was \$5568.<sup>3</sup>

### **Use of Health Care Services by Infants Born to Mothers With MDD**

Depression in pregnancy has been associated with adverse neonatal outcomes such as LBW and preterm delivery.<sup>33</sup> LBW refers to neonates who weigh less than 2500 grams at birth. Preterm delivery is defined as birth before 37 weeks of pregnancy; about 1 in 13 births are preterm.<sup>34</sup> LBW and preterm deliveries are often associated with each other; 60% of LBW infants are born preterm. Preterm and LBW infants place a greater burden on the health care system than healthy, normal weight, full-term babies because they generally require longer hospital stays at birth and admissions to neonatal care units, and are hospitalized more frequently, for longer durations of time during the first year of life, and more

likely to experience developmental delays.<sup>35</sup> However, the costs of chronic health problems that develop because of preterm and LBW gestations are not estimated in our analysis.

The rate of preterm delivery is about 8% in the general population; it has been found that women with depression have about a 13% rate of preterm delivery.<sup>36</sup> Applying this rate to the population of depressed women who discontinued their antidepressant medication during pregnancy in Ontario, the number of these women who would have preterm deliveries can be predicted ( $n = 384$ ).

The cost of preterm deliveries depends on the degree to which the infant is born premature; the more premature the infant, the more costly they are. The mean cost of the initial admission at birth was determined by Petrou<sup>37</sup> to be £5064, which converts to about \$10 080, while the mean cost of readmissions to the hospital during the first year of life totalled £6639 (about \$13 215).

About 12% of births are LBW; depressed women have an increased risk of delivering LBW babies ( $RR = 1.6$ ).<sup>33</sup> Thus about 567 LBW babies would be born to the cohort with depression in Ontario. It has been estimated that the mean total hospital cost associated with the delivery of each LBW infant is US\$33 970,<sup>38</sup> which converts to Can\$34 310. The additional costs incurred by the health care system during the first year of life of LBW infants was also determined; the incremental cost for each LBW infants was US\$24 687<sup>39,40</sup> (Can\$24 937).

As cost estimates for preterm delivery and LBW were determined from studies not performed in Canada, and therefore not in Canadian dollars, a transferability checklist was used (employing the method of Boulenger et al<sup>41</sup>) to ensure that the studies from which the estimates were taken were appropriate for use in the current population. In its original form, the checklist consists of 42 questions; however, a subchecklist of 16 essential items was found to be more concise; both checklists have been validated. There are 4 possible responses that can be given for each question; yes (score = 1), partially (score = 0.5), no, meaning, no information provided (score = 0), or not applicable. The transferability score is reported as a percentage; it is calculated by summing the scores and dividing them by 16 and multiplying by 100. If an item in the list is not applicable to the study under review, the denominator is reduced by the number of nonapplicable items and the score is subsequently generated from the remaining items. The Petrou study<sup>37</sup> had 12 applicable questions and received a transferability score of 71%, while the Schmitt et al study<sup>38</sup> had 11 applicable questions and received a score of 77%; the Lewit et al study<sup>39</sup> had 13 applicable questions and received a transferability score of 76%. An arbitrary cut-off score of 70% was

used to represent an acceptable transferability score; no standard cut-off levels have been reported in the literature.

#### ***Costs Associated With Continuing Antidepressant Therapy During Pregnancy***

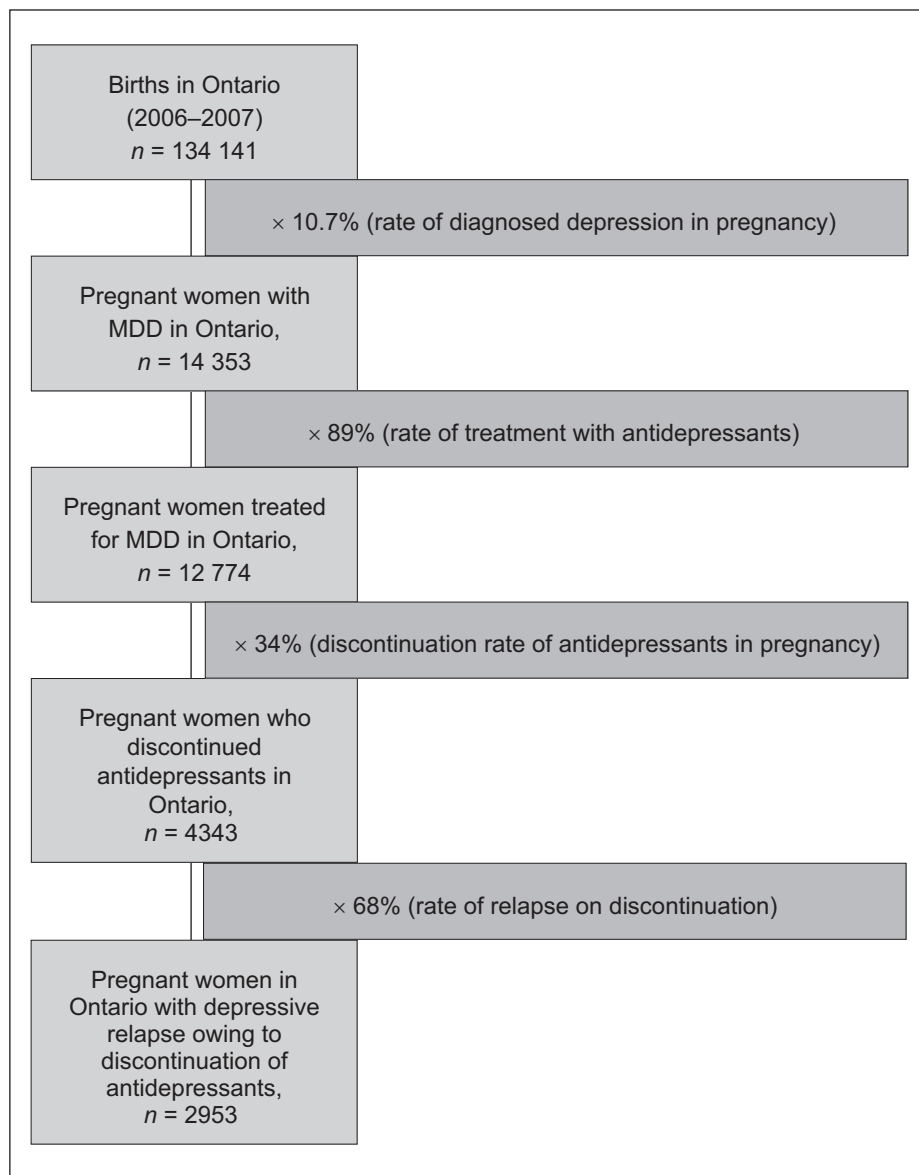
To obtain a more accurate estimate of the cost of untreated depression during pregnancy, the direct medical costs associated with continuing antidepressant therapy during pregnancy must also be considered. Potential adverse events associated with the use of newer-generation antidepressants (for example, SSRIs and selective norepinephrine reuptake inhibitors) are usually minor and include gastrointestinal disturbances such as nausea and diarrhea, sexual dysfunction (decreased libido), and central nervous system effects such as anxiety, sedation, and headaches.<sup>42</sup> These side effects usually subside within the first few weeks of therapy and do not normally require medical intervention. More serious but rare adverse events include bleeding events (0.63 per 1000 patient-months of treatment),<sup>43</sup> cardiovascular effects (rate = 0.0003%),<sup>44</sup> and serotonin syndrome (0.5 to 0.9 cases per 1000 patient-months of treatment).<sup>44</sup> Because the rates of serious adverse events were so low (less than 0.5 women who continued antidepressant therapy during pregnancy), the medical costs associated with these events were assumed to be negligible.

However, one additional cost must also be calculated as infants of women who continue to use antidepressants during pregnancy may be at risk for PNA syndrome, a condition resulting from the use of antidepressants (for example, SSRIs) in late pregnancy. It is characterized by self-limiting symptoms such as jitteriness, irritability, hypoglycemia, and respiratory distress; these symptoms typically appear within the first 48 hours after birth and resolve within 2 to 4 weeks after birth.<sup>46</sup> It is important to note that no neonatal deaths have been reported in association with third trimester exposure to antidepressants.<sup>46</sup>

Using the upper end of the range for the absolute risk of PNA, it is estimated that 30% of infants would be affected by PNA after maternal use of antidepressants in late pregnancy.<sup>47</sup> Using this rate, it would therefore be expected that infants in our analysis ( $n = 2529$ ) would be expected to experience PNA; we calculated this using the number of pregnant women with depression in Ontario who did not discontinue antidepressant therapy, assuming they used antidepressant medication throughout their entire pregnancy including the third trimester ( $n = 8431$ ).

While there is no current consensus on the management of PNA, supportive care in a special care nursery for a minimum of 48 hours is often provided. In Canada, the hourly cost associated with being in a special care nursery is \$25.90.<sup>48</sup>

**Figure 1 Estimating the number of women in Ontario with depressive relapse owing to discontinuation of antidepressants in pregnancy**



**Results**

We estimated that 2953 women in Ontario discontinued their antidepressant medication in pregnancy and consequently suffered depressive relapse; the calculation is illustrated in Figure 1.

**Maternal Health Care Costs**

Using the data on physician visits and the OHIP Schedule of Benefits and Fees (Schedule of Benefits for Physician Services 2006)<sup>49</sup> and applying these numbers to the current population of interest (*n* = 2953), the average number of physician visits was determined and subsequently the cost produced by these visits (Table 2). The ensuing calculations determined

that a total cost of \$1 277 198 would be incurred by the MOHLTC owing to physician services sought by pregnant women with depression no longer receiving antidepressant therapy.

To describe the cost owing to hospitalizations, the hospitalization rate for Canadian women of childbearing age with depressive disorder (0.12%) was applied to the number of pregnant women with depression in Ontario (*n* = 2953); about 3.5 pregnant women with depression would be admitted to a general hospital owing to depression (assuming they are not hospitalized for pregnancy related complications). An

**Table 2 Estimated cost of physician services incurred by pregnant women with depression who discontinued antidepressant therapy**

Health care provider, visit type	Visits annually		Cost, \$
	By health care provider, <i>n</i>	By type, <i>n</i>	
GP	17 836		
Individual psychotherapy		9956	514 725
Counselling		6938	358 695
Other <sup>a</sup>		1302	55 140
GP and psychiatrist	4367		90 999
Individual psychotherapy (psychiatrist)		1463	46 272
Individual psychotherapy (GP)		895	33 343
Inpatient assessments and (or) consultations (psychiatrist)		511	27 340
Inpatient psychiatric care (psychiatrist)		419	44 747
Other <sup>b</sup>		856	
Psychiatrist	1656		
Individual psychotherapy (psychiatrist)		962	59 836
Inpatient psychiatric care (psychiatrist)		391	25 513
Other <sup>c</sup>		331	20 588
Total	23 859		1 277 198

<sup>a</sup> Visits not specified, therefore categorized as a general visit  
<sup>b</sup> Visits not specified, therefore categorized as a general visit; one-half of visits attributed to GPs and one-half to psychiatrists  
<sup>c</sup> All figures based on women in Ontario with depressive relapse owing to discontinuation of antidepressants (*n* = 2953)

estimated \$19 488 would therefore be spent on hospitalizations owing to depression in pregnancy.

### **Infant Health Care Costs**

The total cost of caring for preterm infants born to mothers with depression in the first year of life was estimated to be \$8 945 280. Given that 60% of LBW infants are born preterm, it is assumed that the cost of these infants would be included in the above calculation. Thus the cost of caring for the remaining 40% of LBW infants (*n* = 227) during the first year of life would be an estimated \$13 449 069.

### **Total Cost to Ontario Health Care System**

Totalling the above estimates, the overall cost to the MOHLTC resulting from the discontinuation of antidepressants during pregnancy would be \$23 691 035 yearly, with most of the cost resulting from the care of preterm and (or) LBW infants.

However, the cost associated with continuing antidepressant therapy during pregnancy must also be taken into consideration. The direct medical cost associated with continuing antidepressant therapy throughout gestation would be the cost of caring for infants born with PNA. It was assumed that all infants displaying PNA required care in a special care nursery

for 48 hours; the resulting cost was estimated at \$3 144 053. This cost must then be subtracted from the overall cost to the MOHLTC of not treating depression during pregnancy (\$23 691 035), resulting in a net cost of \$20 546 982 yearly.

### **Discussion**

Depression is a major public health issue given its prevalence in North American society and the ensuing health care costs. Depression is a treatable disease and can be actively managed in most populations with depression, particularly vulnerable populations such as pregnant women. We estimated that \$20 546 982 is spent annually on untreated maternal depression. Not only does depression carry with it economic consequences, more importantly it interferes with the quality of childrearing, maternal responsiveness to infants, and other elements essential for optimal child development.

There are several limitations to this analysis. It is important to keep in mind that this estimate only included the direct costs owing to medically diagnosed depression that went untreated. As previously stated, only 50% of depression is diagnosed; therefore, there is use of the health care system for depression that goes undiagnosed; depression may manifest itself as other somatic symptoms that are treated instead of

the depression itself. Consequently, this would lead to an underestimation of the direct costs associated with untreated depression during pregnancy as some women with depression are using the system more than the average person but are not identified as sufferers of depression.

Some methodological limitations of this analysis arise from having to make assumptions regarding some of the data used. For example, the preterm delivery rate used for pregnant women with depression came from a specific American population. However, as limited data exists on the rate of this condition in pregnancy, this was the best available estimate for this analysis.

Another consideration is that women with depression not receiving treatment during pregnancy may end up excluding themselves from health care all together. The literature shows that these women have poor prenatal care and as such their pregnancy outcomes are also poor; the resulting outcomes of their pregnancies may be an additional burden on the health care system.

It should also be recognized that women with depression are more likely to smoke and to use alcohol and (or) illicit substances, which can result in poor pregnancy outcomes (for example, fetal alcohol syndrome); the costs of such outcomes were not factored into the analysis. The use of allied health professionals such as social workers and psychologists must also be considered as they are not covered by OHIP outside a primary care setting, and would only be paid for by the government if women received social assistance (for example, welfare). The number of pregnant women with depression receiving social assistance or referred to an allied health professional was not available and, therefore, the final cost to the MOHLTC may be underestimated.

The risks of untreated depression does not end with birth; perinatal depression is one of the best predictors of depression during the postpartum period.<sup>50</sup> Mothers with depression have been found to have unfavourable patterns of health care use for their babies in early infancy. They may be more likely to seek care for their infants in emergency departments and have children who are hospitalized.<sup>51</sup> These additional services would add to the estimated costs for the MOHLTC. We only examined direct medical costs, but future analyses ought to consider the broader societal perspective, which would include indirect costs as well as the direct costs incurred from untreated depression to patients and their families. Factors such as time lost from work, loss of income, years of life lost, and number of deaths could then be taken into consideration.

Future analyses could also include costs associated with any potential longer-term consequences of babies exposed to antidepressants in utero who subsequently exhibited PNA; these costs were beyond the scope of our analysis. Although our

analysis focused on health care costs and potential savings, it is essential to remember that irrespective of costs, it is always important to weigh the health risks and benefits of treating and not treating depression in pregnancy; minimizing negative maternal and fetal health outcomes is paramount.

## Conclusion

An estimated \$20 546 982 is spent annually in Ontario on untreated maternal depression. Depression is a treatable disease and therefore safe treatment options for the management of this condition during pregnancy should be actively explored as treated depression translates into cost savings for the Ontario government that can then be passed on and used in other priority areas.

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### **Résumé : Estimation des coûts économiques de l'interruption des antidépresseurs durant la grossesse**

**Objectif :** La dépression est une préoccupation de santé publique majeure qui entraîne un vaste éventail de coûts économiques pour les gens, les familles et le système de santé. Notre étude cherchait à déterminer les frais médicaux directs engagés par le gouvernement de l'Ontario en raison de l'interruption des antidépresseurs durant la grossesse.

**Méthodes :** Nous avons mené une évaluation économique en émettant des hypothèses fondées sur des données obtenues de Statistique Canada, de rapports des gouvernements fédéral et provinciaux, et de documentation pertinente sur la dépression. L'analyse comprenait le nombre de femmes enceintes souffrant de dépression résidant en Ontario et subséquemment, le nombre de ces femmes qui ont eu des rechutes de dépression durant la grossesse parce qu'elles avaient interrompu les antidépresseurs. Les coûts des services des médecins, de l'hospitalisation et de la naissance de bébés prématurés ou présentant une insuffisance pondérale (2 résultats indésirables associés à la dépression non traitée durant la grossesse) ont aussi été pris en considération.

**Résultats :** On estime à 2953 le nombre de femmes enceintes souffrant de dépression en Ontario qui interrompent annuellement leur traitement aux antidépresseurs et qui subséquemment ont une rechute de dépression. L'estimation des sommes allouées annuellement en Ontario à la dépression maternelle non traitée durant la grossesse se chiffre à 20 546 982 \$; c'est le total obtenu après avoir retranché le coût des risques associés à la dépression traitée durant la grossesse (3 144 053 \$).

**Conclusions :** Les options de traitement sûres pour la prise en charge de la dépression durant la grossesse devraient être activement explorées car la dépression traitée se traduit par des coûts réduits pour le gouvernement de l'Ontario et l'ensemble de la société. Au-delà des coûts, la dépression nuit à la qualité de l'éducation des enfants, à la réceptivité maternelle aux bébés, et à d'autres déterminants essentiels pour le développement optimal de l'enfant.

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