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# Evaluation of Progesterone Agent Utilization and Birth Outcomes in a State Medicaid Plan

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# Evaluation of Progesterone Agent Utilization and Birth Outcomes in a State Medicaid Plan

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## BACKGROUND

- Preterm birth (PTB), or delivery before 37 weeks of gestation, is the leading cause of infant morbidity and mortality in the United States, affecting 9.6% of births.[1]
- History of PTB and cervical shortening during pregnancy are among the strongest risk factors for PTB. Progesterone has been shown to reduce PTB rates by one-third among women at high risk.[2-4]
- The Massachusetts Medicaid Program (MassHealth) has required prior authorization (PA) for use of hydroxyprogesterone caproate injection (Makena®) and progesterone vaginal gel (Crinone®) since 2011 and 2012, respectively.

## OBJECTIVE

### Primary Objective:

- To report medication adherence and birth outcomes among members receiving progesterone for the prevention of PTB in a state Medicaid program.

### Secondary Objectives:

- To evaluate the association between member characteristics and medication adherence and birth outcomes.
- To estimate the change in cost of care for study pregnancy compared to prior preterm pregnancy.

## STUDY DESIGN

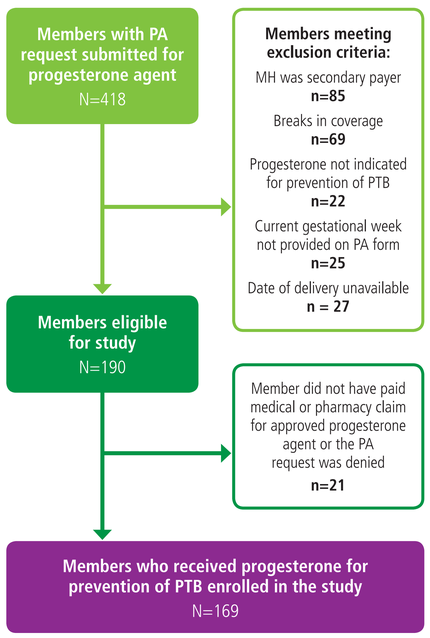
- This retrospective cohort study evaluated MassHealth Primary Care Clinician (PCC) plan members who had a PA request submitted for hydroxyprogesterone caproate injection or progesterone vaginal gel for the prevention of PTB between January 1, 2011 and March 31, 2015.
- Data was obtained from medical claims, pharmacy claims, eligibility and enrollment records, and PA requests.
- Members were excluded if MassHealth was the secondary payer, there were any breaks in MassHealth coverage, progesterone was not indicated for the prevention of PTB, the current gestational week was not provided on the PA form, or date of delivery was not available in claims data.

## METHODS

- **Outcomes collected included:**
  - Member (age, race) and prescriber (type, specialty) demographics
  - Clinical comorbidities (nutritional disorders, anemia, depression, anxiety, bacteriuria, sexually transmitted disease, and substance use disorder), identified through ICD-9 and -10 codes
  - Medication adherence (defined as proportion of days covered [PDC] ≥0.8)
  - Birth outcomes (term vs. preterm)
- **For members who had information regarding their prior pregnancy on the PA request, a cost of care subanalysis comparing the prior pregnancy and study pregnancy was performed.**
  - Medical costs alone were used to calculate cost of prior pregnancy, and medical cost plus cost of progesterone therapy was used to calculate cost of study pregnancy
  - Costs of progesterone therapy were based on wholesale acquisition cost and medical care costs were obtained from literature[5]
  - The gestational age for prior pregnancy was obtained from the PA request and the gestational age of the study pregnancy was calculated based on date of delivery in claims data
- **Statistical Analysis:**
  - Descriptive analyses were conducted to report study population characteristics.
  - Bivariate analyses were conducted to evaluate the associations between member characteristics and medication adherence and birth outcome.
    - For the birth outcome analysis, the independent variables included demographic characteristics, clinical comorbidities, and medication adherence
    - For the medication adherence analysis, the independent variables included demographic characteristics and clinical comorbidities
  - A multivariate logistic regression model was used to quantify the associations between birth outcome and the potential predictors, adjusting for age, race, number of clinical comorbidities and PDC
  - All analyses were completed using SAS 9.4.

## RESULTS

FIGURE 1:
**Study Enrollment**




MH – MassHealth, PA – prior authorization, PTB – preterm birth

TABLE 1:
**Descriptive Characteristics and Birth and Adherence Outcomes**

| Characteristic | Members who received progesterone for prevention of PTB N=169[a] |
|---|---|
| **Age** | |
| Mean age, in years (SD) | 29.2 (5.2) |
| 16-24 | 39 (23.1) |
| 25-34 | 107 (63.3) |
| 35-45 | 23 (13.6) |
| **Race** | |
| Black | 30 (17.8) |
| Non-black | 139 (82.2) |
| White | 59 (42.5) |
| Other | 28 (20.1) |
| Unknown | 52 (37.4) |
| **Prescriber type** | |
| MD | 125 (74.0) |
| DO | 16 (9.4) |
| NP | 14 (8.3) |
| CNM | 14 (8.3) |
| **Prescriber specialty** | |
| OB/GYN | 98 (58.0) |
| MLP | 28 (16.6) |
| OB/GYN, MFM specialty | 26 (15.4) |
| Family Medicine | 17 (10.0) |
| **Term delivery[b]** | |
| Term | 105 (62.1) |
| Preterm | 64 (37.9) |
| Average difference in GA between pregnancies, in weeks (SD)[c] | 8.25 (6.11) |
| **Adherence** | |
| Mean PDC (SD) | 0.79 (0.26) |
| Number of adherent members | 112 (66.3) |
| **Number of clinical comorbidities** | |
| 0 | 16 (9.4) |
| 1 | 64 (37.9) |
| 2 | 52 (30.8) |
| ≥ 3 | 37 (21.9) |
| **Type of clinical comorbidity** | |
| Nutritional disorder or anemia | 139 (51.3) |
| Depression or anxiety | 57 (21.0) |
| Bacteriuria | 38 (14.0) |
| STD or SUD | 37 (13.7) |

[a] All numbers presented as n (%) unless otherwise noted, [b] Term = delivery at > 37 weeks gestational age, Preterm = delivery at < 37 weeks gestational age, [c] n = 142
CI – confidence interval, GA – gestational age, GYN – gynecology, MFM – maternal family medicine, MLP – mid-level practitioner, PA – prior authorization, PDC – proportion of days covered, OB – obstetrics, SD – standard deviation, STD – sexually transmitted disease, SUD – substance use disorder

TABLE 2:
**Birth Outcome Bivariate Analysis**

| | Term Delivery[a,b,c] | | P-Value[d] |
|---|---|---|---|
| | Term N (%) | Preterm N (%) | |
| **Race** | | | |
| Black | 16 (53.3) | 14 (46.7) | 0.2734 |
| Non-black | 89 (64.0) | 50 (36.0) | |
| **PDC categories** | | | |
| ≥ 0.8 | 65 (58.0) | 47 (42.0) | 0.1240 |
| < 0.8 | 40 (70.2) | 17 (29.8) | |
| **Number of clinical comorbidities** | | | |
| 0 | ‹ | ‹ | 0.8715 |
| 1 | 42 (65.6) | 22 (34.4) | |
| 2 | 31 (59.6) | 21 (40.4) | |
| ≥ 3 | 23 (62.2) | 14 (37.8) | |
| **Type of clinical comorbidity** | | | |
| Nutritional disorder or anemia | 89 (64.0) | 50 (36.0) | 0.2734 |
| Depression or anxiety | 34 (59.6) | 23 (40.4) | 0.6352 |
| Bacteriuria | 24 (63.2) | 14 (36.8) | 0.8821 |
| STD or SUD | 22 (59.5) | 15 (40.5) | 0.7047 |

[a] Numbers presented as n (%), [b] Term = delivery at > 37 weeks gestational age, Preterm = delivery at < 37 weeks gestational age,
[c] Data for category not presented to protect member privacy due to low numbers, [d] Chi-square Test
PDC – proportion of days covered, STD – sexually transmitted disease, SUD – substance use disorder

TABLE 3:
**Medication Adherence Bivariate Analysis**

| | PDC[a,b] | | P-Value[c] |
|---|---|---|---|
| | ≥ 0.8 N (%) | < 0.8 N (%) | |
| **Race** | | | |
| Black | 16 (53.3) | 14 (46.7) | 0.0984 |
| Non-black | 96 (69.0) | 43 (31.0) | |
| **Number of clinical comorbidities** | | | |
| 0 | [b] | [b] | 0.9261 |
| 1 | 41 (64.1) | 23 (35.9) | |
| 2 | 34 (65.4) | 18 (34.6) | |
| ≥ 3 | 26 (70.3) | 11 (29.7) | |
| **Type of clinical comorbidity** | | | |
| Nutritional disorder or anemia | 91 (65.5) | 48 (34.5) | 0.6339 |
| Depression or anxiety | 36 (63.2) | 21 (36.8) | 0.5413 |
| Bacteriuria | 24 (63.2) | 14 (36.8) | 0.6446 |
| STD or SUD | 25 (67.6) | 12 (32.4) | 0.8504 |

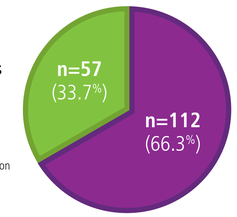
[a] Numbers presented as n (%), [b] Data for category not presented to protect member privacy due to low numbers, [c] Chi-square Test
PDC – proportion of days covered, STD – sexually transmitted disease, SUD – substance use disorder

TABLE 4:
**Cost Comparison Between Prior Pregnancy and Study Pregnancy by Gestational Age***

| Gestational age of prior pregnancy (weeks) | <28 (n=55) | | 28 to 31 (n=32) | | 32 to 36 (n=65) | | Total (n=152) | |
|---|---|---|---|---|---|---|---|---|
| | Prior pregnancy | Study pregnancy | Prior pregnancy | Study pregnancy | Prior pregnancy | Study pregnancy | Prior pregnancy | Study pregnancy |
| Cost of medical care | $14,561,202.15 | $1,913,519.87 | $4,349,034.78 | $504,008.44 | $1,230,657.35 | $1,191,092.39 | $20,140,894.28 | $3,608,620.70 |
| Cost of medication | - | $822,583.50 | - | $473,167.50 | - | $1,008,210.75 | - | $2,303,961.75 |
| Total cost of care | $14,561,202.15 | $2,736,103.37 | $4,349,034.78 | $977,175.94 | $1,230,657.35 | $2,199,303.14 | $20,140,894.28 | $5,912,582.45 |
| Difference in cost between pregnancies | ($11,825,098.78) | | ($3,371,858.84) | | $968,645.79 | | ($14,228,311.83) | |

*Inflation rate of 1.39 for 2005 to 2015 dollars applied

FIGURE 2:
**Proportion of Adherent Members**




Adherence is defined as proportion of days covered ≥ 0.8

## DISCUSSION

- Birth outcomes for members receiving progesterone for the prevention of PTB in the MassHealth PCC plan were consistent with clinical trial data.[6]
- Medication adherence among MassHealth PCC plan members was similar to or lower than findings from other studies.[7,8]
- Bivariate and multivariate analyses did not identify member characteristics associated with either birth outcomes or medication adherence.
- Differences in cost of care in a prior pregnancy and current pregnancy are driven by differences in the estimated cost of medical care between gestational ages of delivery.

## LIMITATIONS

- A significant percentage of race data was reported as unknown.
- Identification of delivery and clinical comorbidities were based upon ICD-9 and ICD-10 medical claims data. It was not feasible to investigate all potential risk factors that are not routinely recorded in medical claims.
- The date of progesterone administration used for the PDC calculation is assumed to be the date of the paid pharmacy claim.

## CONCLUSIONS

- Timely availability and access to data are important for monitoring risk factors and evaluating programs.
- Medicaid members receiving progesterone for the prevention of PTB may benefit from additional care management services, including adherence programs.

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## DISCLOSURES/ACKNOWLEDGMENTS

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