PQC-VT Perinatal Public Health Summary Report

2017-2021

December 2023

PREPARED BY:

THE VERMONT PERINATAL QUALITY COLABORATIVE (PQC-VT)

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VERMONT DEPARTMENT OF HEALTH

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PQC-VT Perinatal Public Health Summary Report of Births in VT

Objective:

Annual report prepared by the Vermont Perinatal Quality Collaborative (PQC-VT) to understand births and related pregnant person factors and infant outcomes across Vermont using Vital Statistics data.

Among pregnant Vermonters with live births in VT or NH from 2017-2021…

32.2% received WIC benefits during pregnancy

41.1% used Medicaid as the primary payer for delivery services

86.9% abstained from cigarette use

69.1% had adequate prenatal care utilization

Children's Integrated Services (CIS) Strong Families Vermont Nurse Home Visiting Program

2018 - 2021

1,752
referrals to Strong Families Vermont home visiting program

680
pregnant persons served by Strong Families Vermont home visiting program

SUMMARY SCORECARD

Measure	Vermont		
	2017	2021	5-Year Trend
Under recommended gestational weight gain	12.6%	12.2%	-
Over recommended gestational weight gain	35.7%	35.1%	-
Medicaid	43.1%	38.2%	↘
Received WIC benefits	35.0%	28.3%	↘
Abstained from cigarette use	84.6%	90.6%	↗
Quit cigarette use	35.5%	34.5%	-
Hepatitis C positive	2.1%	1.3%	-
Hepatitis B positive	0.3%	0.1%	-
Pre-pregnancy diabetes	1.4%	1.6%	-
Pre-pregnancy hypertension	2.2%	4.1%	-
Gestational diabetes	6.1%	9.3%	↗
*Gestational hypertension or preeclampsia	9.6%	11.5%	-
Adequate prenatal care utilization	76.0%	68.9%	↘
GA < 37 weeks	7.4%	7.9%	-
GA > 41 weeks	1.0%	0.6%	-
Small for gestation age (SGA)	13.3%	13.4%	-
Breastfed	89.3%	89.3%	-

**Note: Gestational hypertension and preeclampsia variables are combined in the NH birth certificate dataset. These variables are collapsed together throughout the report to allow for inclusion of the NH data.*

Statistical trend analysis was used to determine if a change over the five year period was statistically significant. Only statistically significant ($p<0.01$) trends have an arrow with the direction of the trend.

Background

Assessment of health problems faced by pregnant persons and their newborns is a critical function of the family and child health division of the department of health.[1] Analysis of vital records can provide valuable insight as a data source to identify gaps in health care delivery, disparities in outcomes, and trends over time. Such analyses may inform programmatic responses in directed funding, policy or legislation to address identified needs.

Perinatal quality collaboratives (PQCs) are state based teams of multi-disciplinary and inter-disciplinary clinical providers, data analysts, public health professionals and other stakeholders collectively working to improve care and outcomes for pregnant persons and newborns. Improvement science, shared learning and population-based improvements are foundational operational principles of a PQC.[2] State based PQCs serve as important resources for promoting population-based pregnancy and newborn health.

The Perinatal Quality Collaborative –Vermont was organized in 2021 with the purpose of bringing together key family and child health stakeholders, an integrated data team, and quality specialists to focus on pregnancy, newborn and infant health outcomes in Vermont. Using birth certificate data, the PQC-VT created a public health directed outcomes dashboard reflecting care delivery and health outcomes for Vermont pregnant people and their newborns.

The dashboard is formatted following the model of the Vermont family and infant health scorecard.[3]

The report includes a section with regional and statewide information from Strong Families Vermont Home Visiting, which is a continuum of home visiting services that are part of Children's Integrated Services (CIS).[4] Strong Families Vermont has two sustained or evidenced based home visiting programs.

1. Strong Families VT Nurse Home Visiting Program which utilizes the internationally known Maternal Early Childhood Sustained Home Visiting (MECSH) model.
2. Strong Families VT Family Support Home Visiting Program which utilizes the internationally known Parents as Teachers (PAT) model.

Additionally, Strong Families Vermont has responsive home visiting services provided by nurses and family support workers. These visits support and strengthen families' health, wellbeing, parenting skills, social connections, and ability to address stressors.

References

1. Maternal and Child Health. American Public Health Association. Available at: Maternal and Child Health (apha.org). Accessed November 9, 2021.
2. Perinatal Quality Collaboratives. Reproductive Health. Centers for Disease Control and Prevention. Last reviewed May 7, 2021. Available at: Perinatal Quality Collaboratives | Perinatal | Reproductive Health | CDC. Accessed November 9, 2021.
3. Family & Infant Health Scorecard. Last reviewed August 8, 2019. Available at: Maternal & Infant Health Scorecard | Vermont Department of Health (healthvermont.gov). Accessed November 9, 2021.
4. Strong Families Vermont Home Visiting. Available at: https://www.healthvermont.gov/family/pregnancy/strong-families-vermont-home-visiting. Accessed December 14, 2023.

Methods & Data Notes

Birth certificate data were obtained from the Vermont Department of Health as extracted on March 24, 2022 and from the New Hampshire Department of Health and Human Services.

All births to non-Vermont residents are excluded. Only births occurring in Vermont or New Hampshire to Vermont residents are included in the report.

Discussion of the data and analyses presented in this report can be used to identify areas of excellence, as well as opportunities for improvement. Examination of statewide outcomes can promote continued work toward optimal perinatal care. Data in this report can also provide a basis for structuring and implementing a Quality Monitoring process and for developing local practice guidelines. Variables include risk factors in pregnancy (previous and acquired), measures of pregnancy care and newborn outcomes. Size for gestational age was classified as small (below the 10th percentile), appropriate or large (above the 90th percentile), and adjusted for the gestational age at birth and the actual birthweight distribution of the population of Vermont newborns using the algorithm described in *Appendix III*.

Healthy People 2030 targets are indicated on figures where appropriate. Note the denominator for live birth rate is the population of Vermont based on post-censal estimates from the U.S. Census Bureau.

Strong Families Vermont Home Visiting data was obtained from the Vermont Department of Health and includes data from 2018-2021.

Pregnancy Risk Assessment and Monitoring System (PRAMS) data and graphs were obtained from the 2020 Pregnancy Risk Assessment Monitoring System (PRAMS) Highlights report published in 2022. Available at: https://healthvermont.gov/sites/default/files/documents/pdf/HSI-stats-PRAMS-2020-Highlights.pdf.

Perinatal Public Health Summary Report

Overview & Sociodemographic – Vermont

Figure 1: Number of live hospital births, 2017-2021.

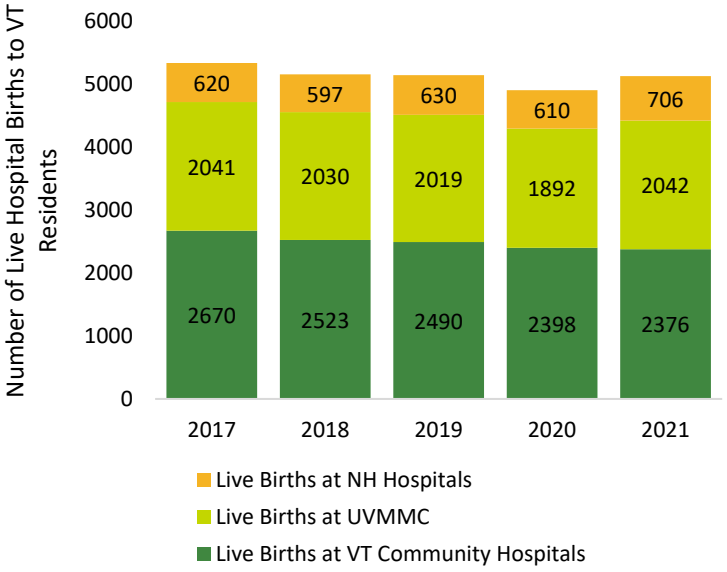
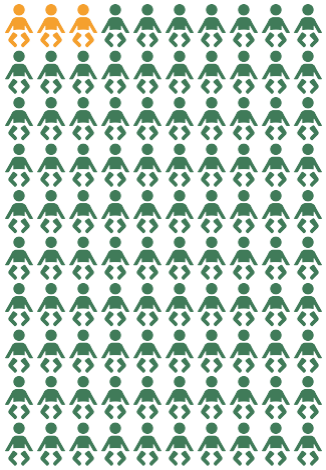


Figure 2: Live births by place of birth, 2017-2021.



3.3 out of 100 live births in VT occurred out of the hospital in 2021

Figure 3: Live birth rate (crude) by AHS District, 2017-2021.

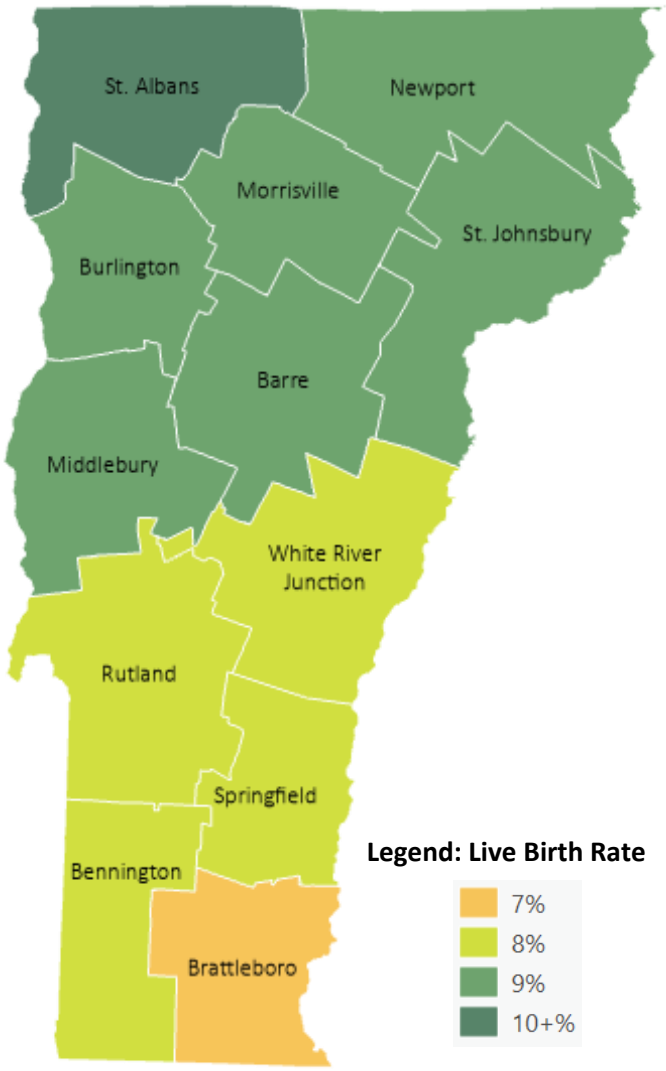


Table 1. Characteristics of pregnant persons, 2017-2021.

		Vermont
Total Pregnant Persons		25,253
Education	**HS or less**	31%
	Some college	18%
	College or more	53%
Age	**< 20 years**	3%
	20-29 years	43%
	30-39 years	51%
	40 or more years	4%

Table 2. Race and ethnicity of pregnant persons, 2017-2021.

	Vermont
Total Pregnant Persons	25,253
White, Non-Hispanic	93%
Black or African American	3.0%
Asian/Pacific Islander	3.0%
Other	0.7%
Hispanic	2.4%

Figure 4: % of pregnant persons with full term singleton pregnancies by gestational weight gain, 2017-2021.

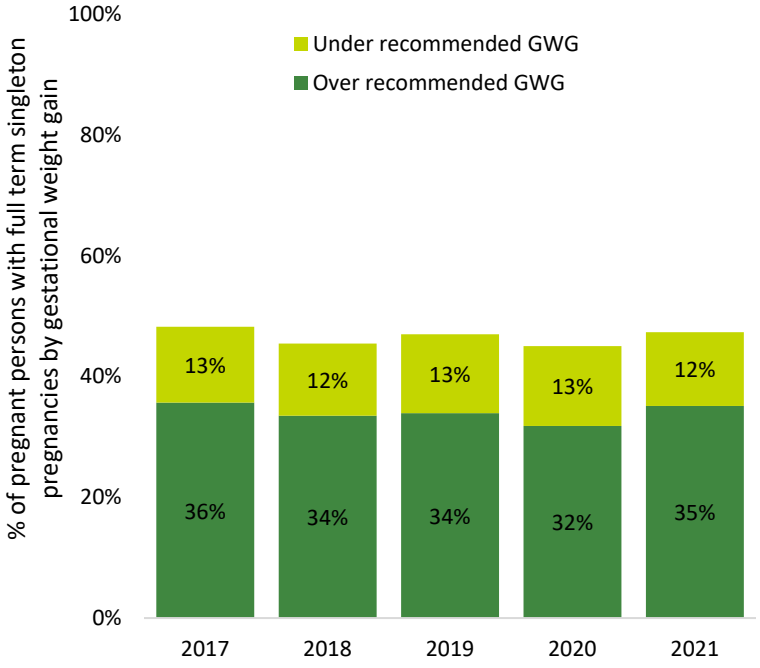


Figure 5: % of live births where Medicaid was the primary payer for delivery services, 2017-2021.

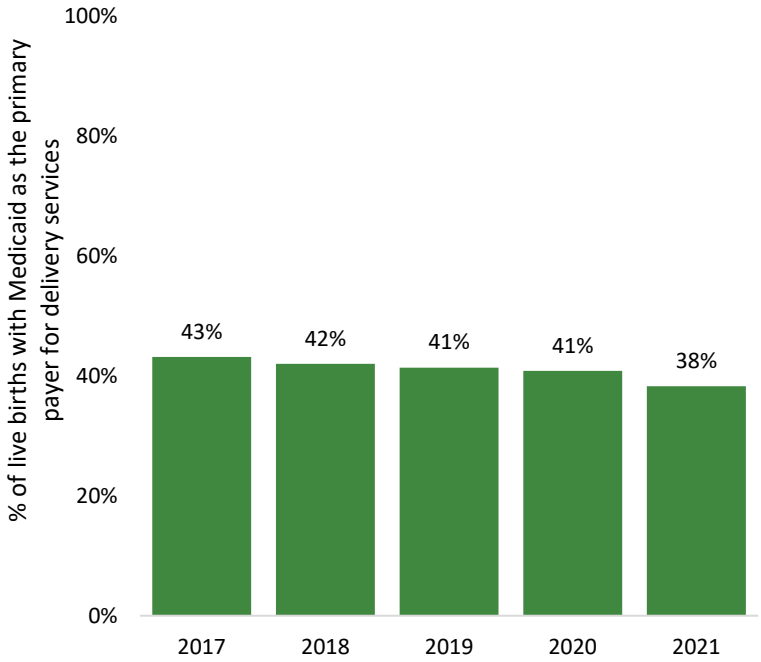


Figure 6: % of pregnant persons receiving WIC benefits during pregnancy, 2017-2021.

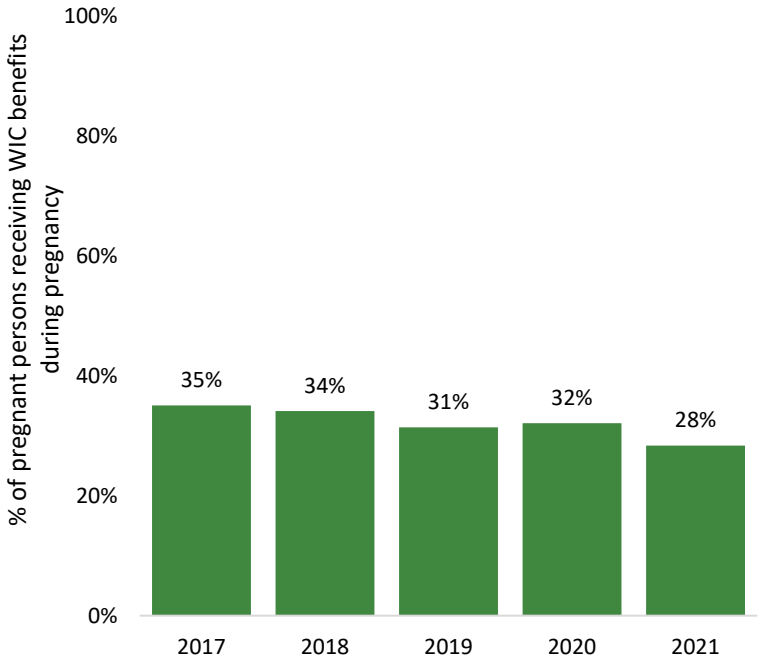


Table 3. Pre-pregnancy and pregnancy acquired risk factors, 2017-2021.

Vermont	2017	2018	2019	2020	2021	Mean
Diabetes	1.4%	1.3%	1.1%	1.2%	1.6%	1.3%
Hypertension	2.2%	3.5%	2.9%	3.8%	4.1%	3.3%
Hepatitis B Positive	0.3%	0.2%	0.2%	0.2%	0.1%	0.2%
Hepatitis C Positive	2.1%	1.8%	1.5%	1.7%	1.3%	1.7%
Gestational diabetes	6.1%	6.6%	6.3%	7.6%	9.3%	7.2%
Gestational hypertension/preeclampsia	10%	9%	11%	11%	11%	10%

Figure 7: % of pregnant persons who abstained from smoking cigarettes during pregnancy, 2017-2021.

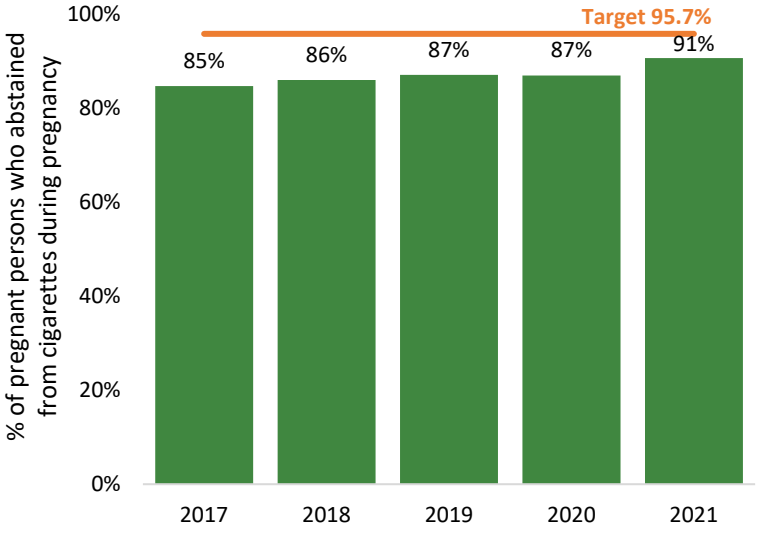


Figure 8: % of pregnant persons who quit smoking cigarettes during pregnancy, 2017-2021.

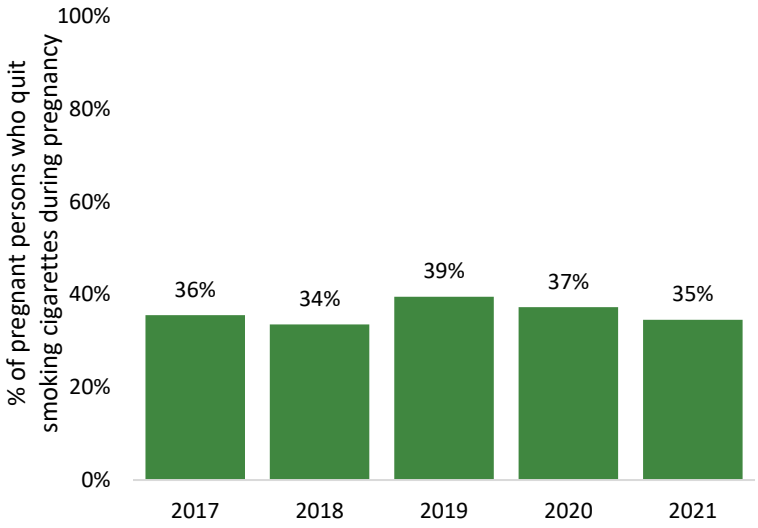


Table 4. Characteristics of newborns, 2017-2021.

Vermont	2017	2018	2019	2020	2021	Mean
GA < 34 weeks	1.9%	2.0%	2.1%	1.8%	2.1%	2.0%
GA 34-36 weeks	5.5%	6.5%	6.1%	5.7%	5.8%	5.9%
GA 37-41 weeks	91.4%	90.6%	91.3%	92.0%	91.4%	91.3%
GA > 41 weeks	1.2%	1.0%	0.5%	0.5%	0.7%	0.8%
NICU admission	6.9%	7.1%	7.2%	7.2%	8.0%	7.3%
SGA	13%	14%	13%	14%	13%	14%
Breastfed	89.3%	89.6%	90.8%	90.1%	89.3%	89.8%

*See *Appendix II* for SGA calculation algorithm.

Figure 9: % of pregnant persons with (at least) adequate prenatal care utilization (Kotelchuck), 2017-2021. See *Appendix I* for details regarding the adequacy of prenatal care utilization index.

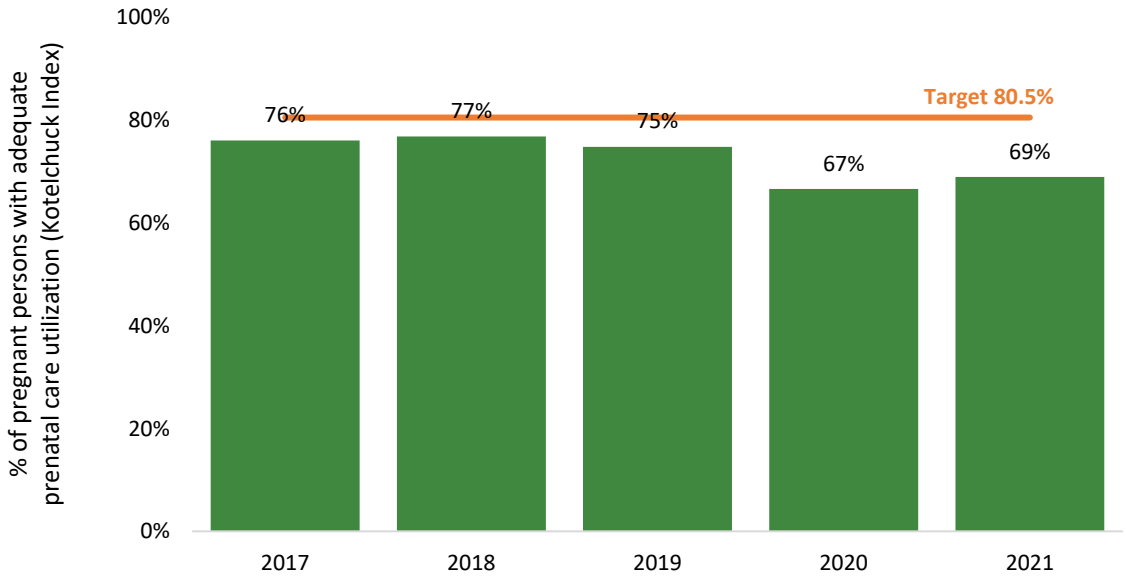


Figure 10: % of pregnant persons by primary payer for delivery services and adequacy of prenatal care utilization, 2017-2021.

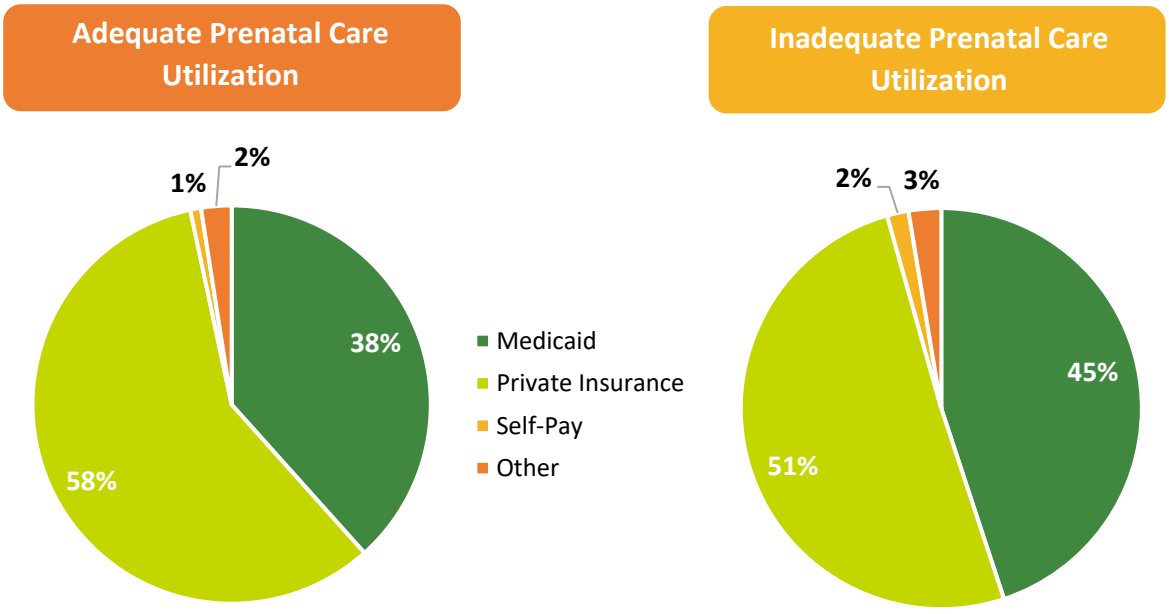


Table 5: Strong Families Vermont Nurse Home Visiting Program, 2018-2021.

Year	# referrals	# families served	% smoking cessation
2018	414	249	NA
2019	581	473	94%
2020	389	430	82%
2021	368	423	85%
Mean/Sum	1752	1575	87%

Figure 11: Number of pregnant persons served by the Strong Families Vermont Nurse Home Visiting Program, 2018-2021.

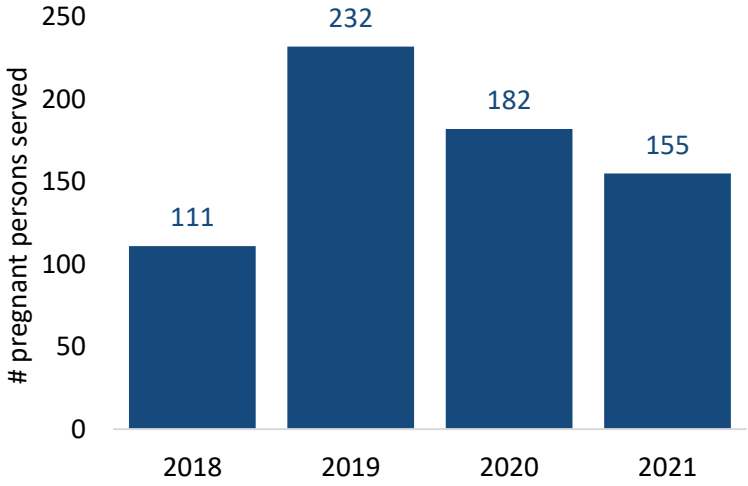
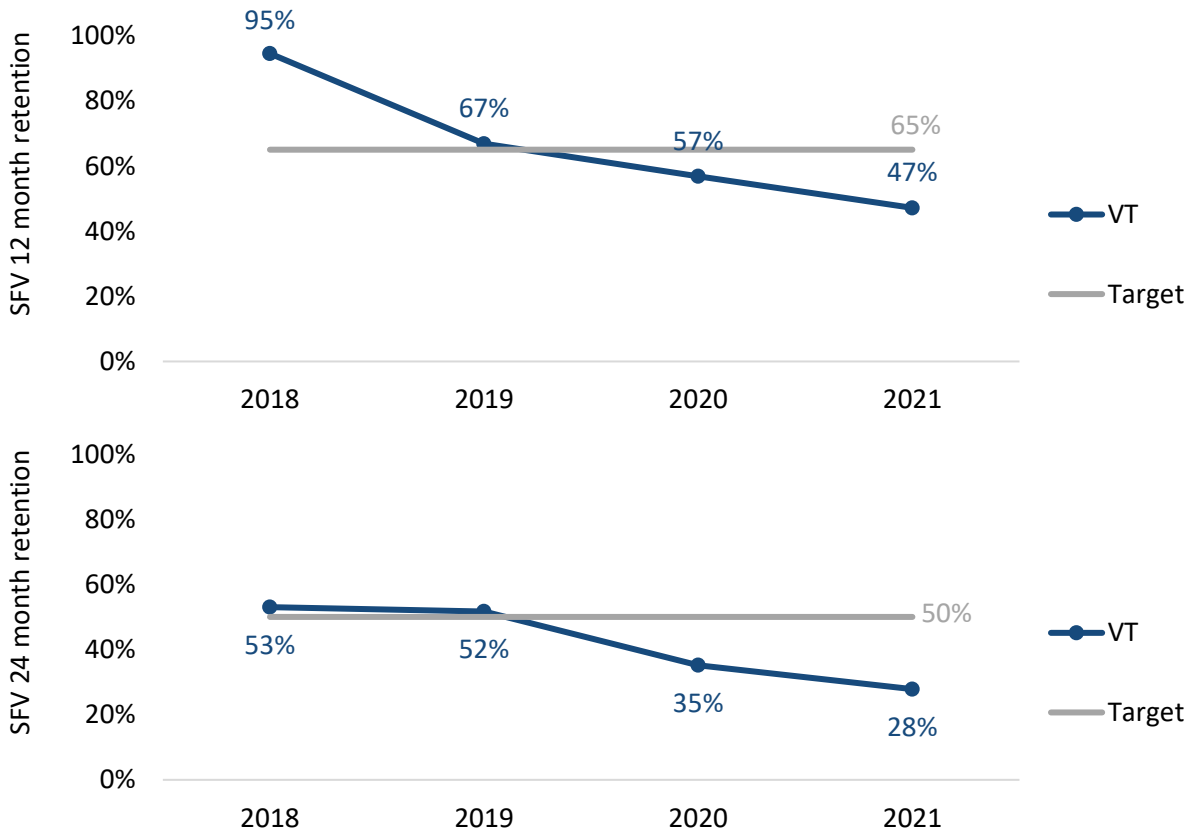
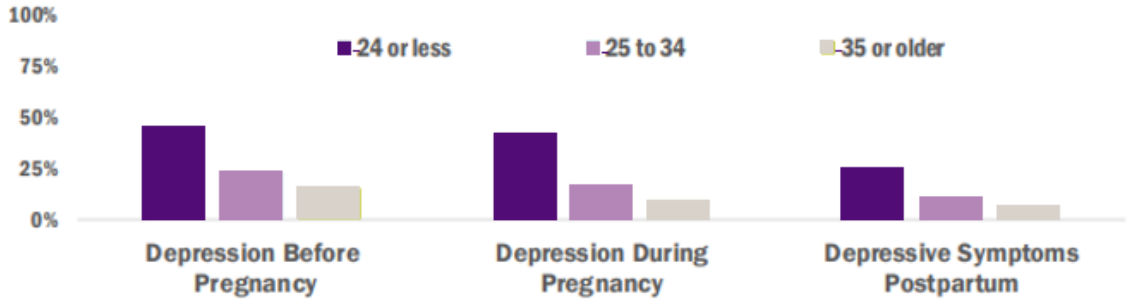


Figure 12 & 13: % Strong Families Vermont Nurse Home Visiting Program retention at 12 and 24 months, 2018-2021*.



**Although the program is designed to provide support and education through 24 months postpartum, clients can graduate from the program prior to this point if the nurse and family agree the family has met their goals and is ready to graduate.*

Figure 14: Pregnant person age and depression by pregnant person age, 2020.



25 out of 100 pregnant persons had depression at some point during the three months before pregnancy

20% of pregnant persons reported depression at some point during pregnancy

12% of pregnant persons had symptoms indicating a risk for depression in the postpartum period

25% of pregnant persons reported using a substance other than tobacco or alcohol during the month before pregnancy.

14% of pregnant persons reported the use of a substance other than alcohol or tobacco during pregnancy.

Figure 15: Marijuana use before and during pregnancy, 2016-2020.

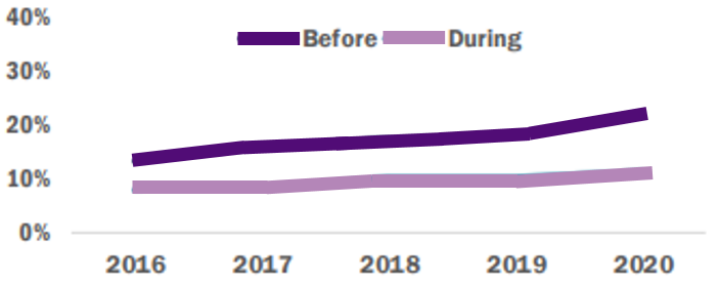
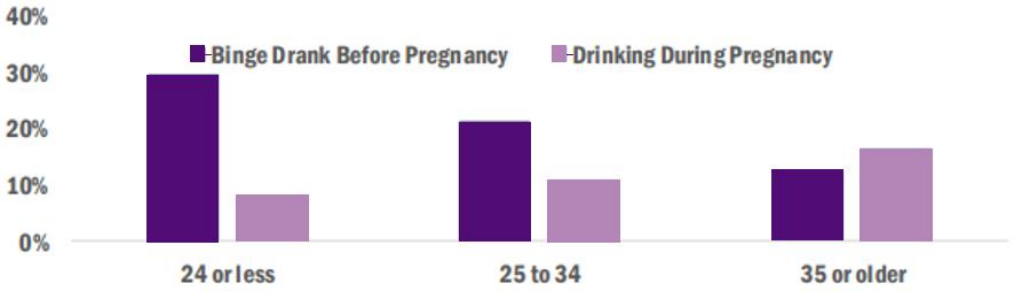


Figure 16: Alcohol use before and during pregnancy by pregnant person age, 2020.



Source: 2020 Pregnancy Risk Assessment Monitoring System (PRAMS) Highlights.

Appendix I: Adequacy of Prenatal Care Utilization (Kotelchuck Index)

The Adequacy of Prenatal Care Utilization Index (APNCU; Kotelchuck) uses prenatal care initiation and number of prenatal visits from birth certificate data to create a summary score indicative of the adequacy of prenatal care received. The number of prenatal care visits attended is compared to the expected number of visits, based on the American College of Obstetricians and Gynecologists prenatal care standards for uncomplicated pregnancies and is adjusted for gestational age. For the purposes of this report, adequate and adequate plus categories are combined.

- Inadequate: Prenatal care started after month 4 or under 50% of expected visits were received
- Intermediate: Prenatal care started by month 4 and between 50-79% of expected visits were received
- Adequate: Prenatal care started by month 4 and of 80-109% of expected visits were received
- Adequate plus: Prenatal care started by month 4 and 110% or more of expected visits were received

Appendix II: Small for Gestational Age (SGA) Weight Percentile Documentation

The classifications of SGA and LGA represent weights below the 10th and above the 90th percentiles respectively. Birthweights that fall below or above these cutoffs are considered small or large for gestational age. To adjust for the progression of growth during pregnancy, birthweight cutoffs are tied to gestational age. Classification of SGA and LGA are most meaningful when based on the actual birthweight distribution of the population being studied – Vermont infants. The following formula is used to compute percentile cutoffs for birthweights based on gestational age, using the normal birthweight distribution of Vermont's live born infants.

$$\mathrm{pN}_{GA} = \left(1 + \mathrm{Z}_N \times \mathrm{P}\sigma \times {}^{\mathrm{P}\bar{\mathrm{X}}}/_{\mathrm{H}\bar{\mathrm{X}}}\right) \times {}^{\mathrm{P}\bar{\mathrm{X}}}/_{\mathrm{H}\bar{\mathrm{X}}} \times e^{0.578+0.332(GA+0.5)-0.00354(GA+0.5)^2}$$

Where pN_{GA} is the birthweight cutoff in grams at the Nth percentile for gestational age of GA. For simplicity, days are ignored. Z_N is the Z score of the Nth percentile. For 10th percentile (SGA), that is -1.282. For the 90th percentile (LGA) that is 1.282. $\mathrm{P}\sigma$ is the standard deviation of birthweights $40^{+0} – 40^{+6}$ expressed as a decimal percentage of the mean of birthweights $40^{+0} – 40^{+6}$ in the population of interest. **Based on Vermont's Birth Certificate Registry data from 2016 through 2020, this is 12.428%, or 0.1248.** $\mathrm{P}\bar{\mathrm{X}}$ is the mean of birthweights $40^{+0} – 40^{+6}$ in the population of interest. **Based on Vermont's Birth Certificate Registry data from 2016 through 2020, this is 3577.3 grams.** $\mathrm{H}\bar{\mathrm{X}}$ is the mean birthweight at 40.5 weeks based on Hadlock's Formula, $e^{0.578+0.332(40.5)-0.00354(40.5)^2} \approx \mathbf{3705}$ **grams**. For more information on this method of Gestational Age and Birthweight classification, see Mikolajczyk et al, 2011.[6] For more details on Hadlock's weight standard, see Hadlock et al. 1991.[7] The WHO's worksheet for Weight percentile calculation, based off of Mikolajczyk et al, 2011, can be found here: https://www.who.int/reproductivehealth/topics/best_practices/weight_percentiles_calculator.xls