Leveraging ACS data to address racial disparities in maternal health: preliminary quantitative steps in a system dynamics group model building project in Texas

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Introduction

- Severe maternal morbidity (SMM) is defined as unexpected health conditions that occur during or shortly after childbirth
- Non-Hispanic (NH) Black women are twice as likely as NH White women to suffer SMM, which increases risk for maternal mortality
- Texas (TX) is the 2nd most populous state and has excessive racial/ethnic health disparities in maternal health
- Project IMPACT (**I**mproving **M**aternal and Re**P**roductive He**A**lth using **C**omplex Simulation **T**echniques) was designed to address SMM in TX

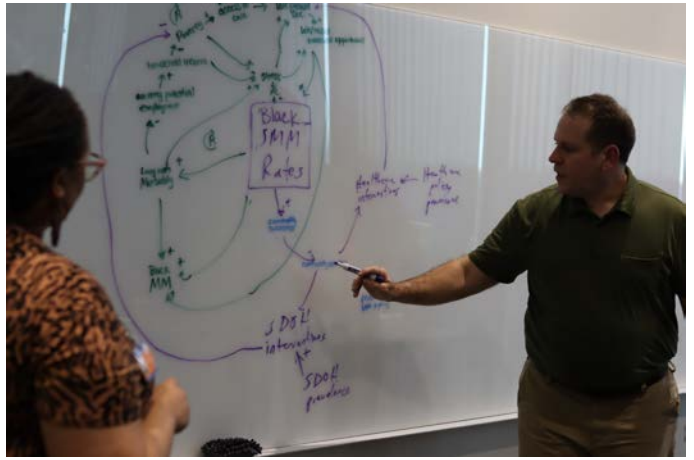
Goal

The overall aim of Project IMPACT is to:

1) generate a holistic, complex systems-grounded understanding the multilevel web of factors that constitute the systems and systems-of-systems that generate SMM disparities among NH Black women in TX using primary and secondary sources
2) translate this understanding into evidence-based guidance for the development of high-leverage interventions

Primary Data Collection Background

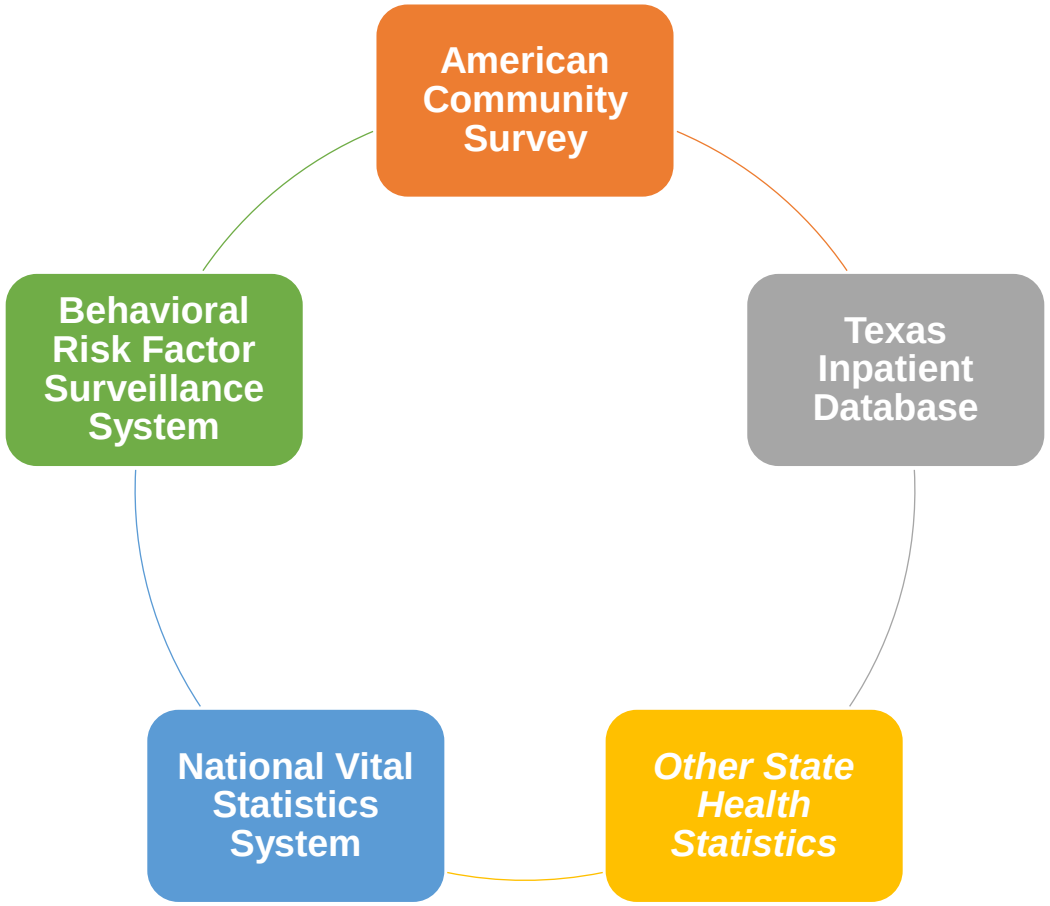
- Primary data were collected from 19 community partners to create a qualitative systems dynamics (SD) model of the complex systems that generate SMM outcomes among non-Hispanic Black women
- To translate the *qualitative* systems dynamics model into a *quantitative* SD simulation model, we will use multiple secondary data sources to quantify feedback mechanisms embodied in the qualitative causal loop diagrams



Presentation Objective

The objective of this presentation is to describe the data from the American Community Survey (ACS) that will be used in Project IMPACT’s systems dynamics simulation model

Secondary Data Sources



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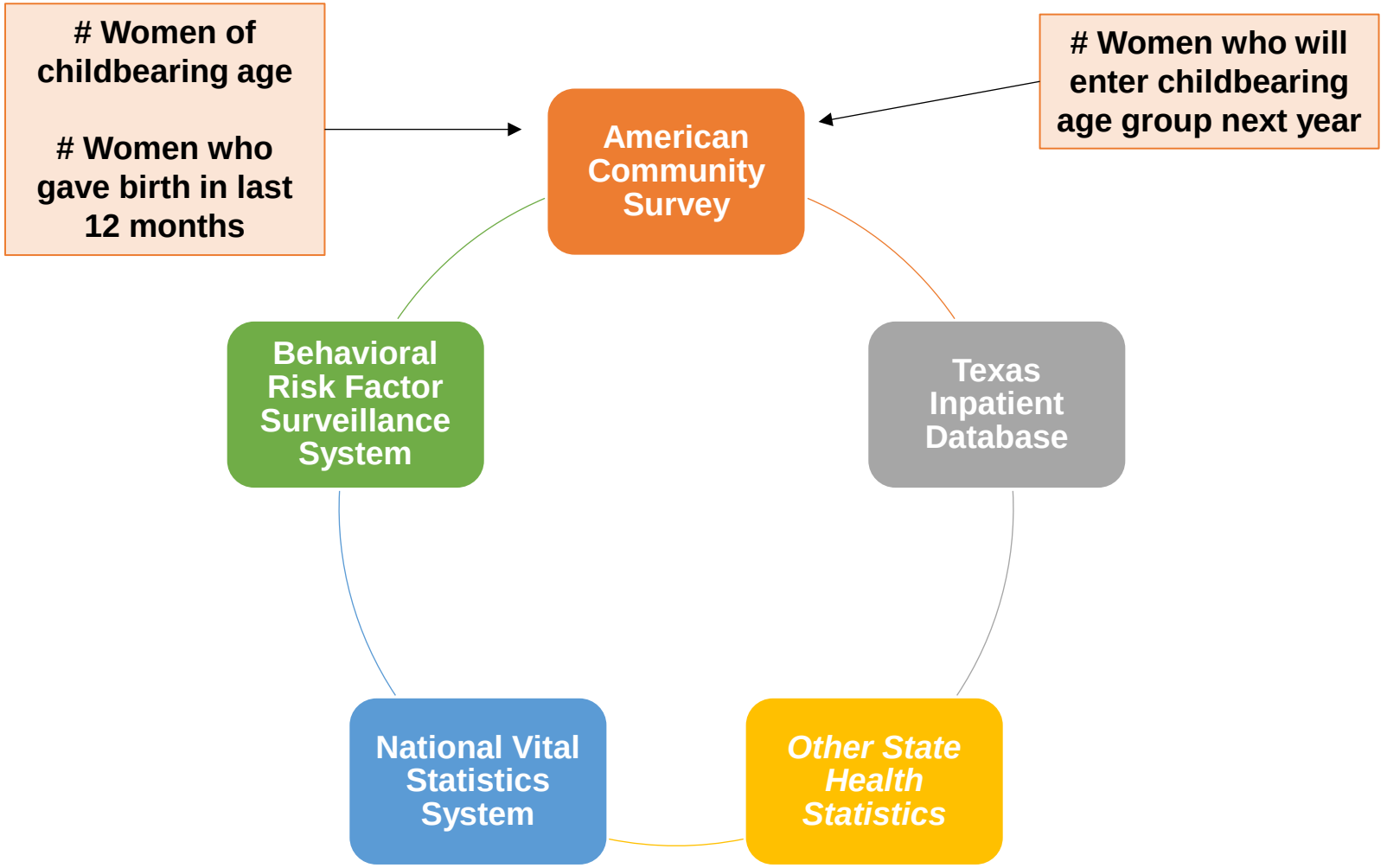

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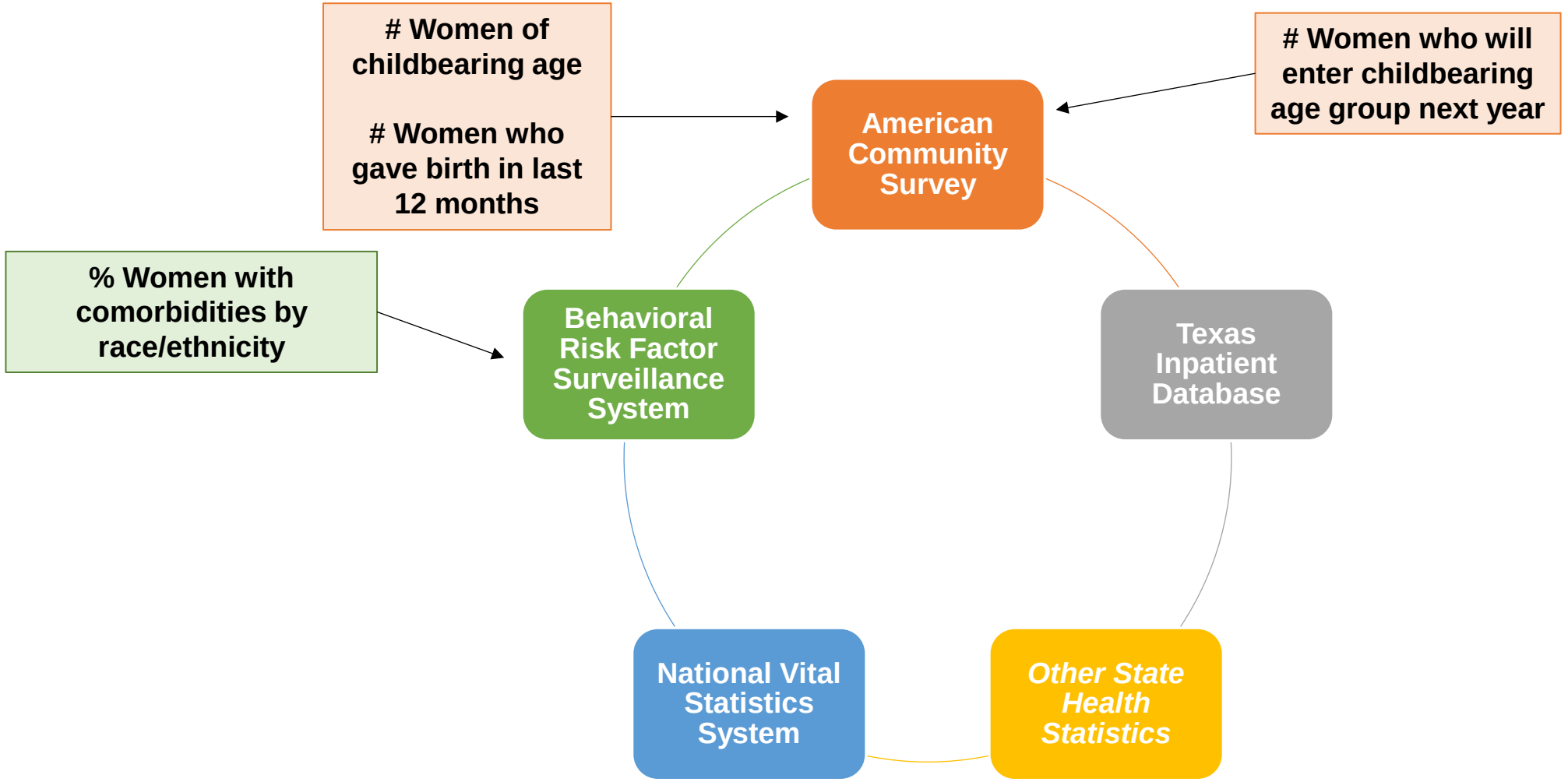

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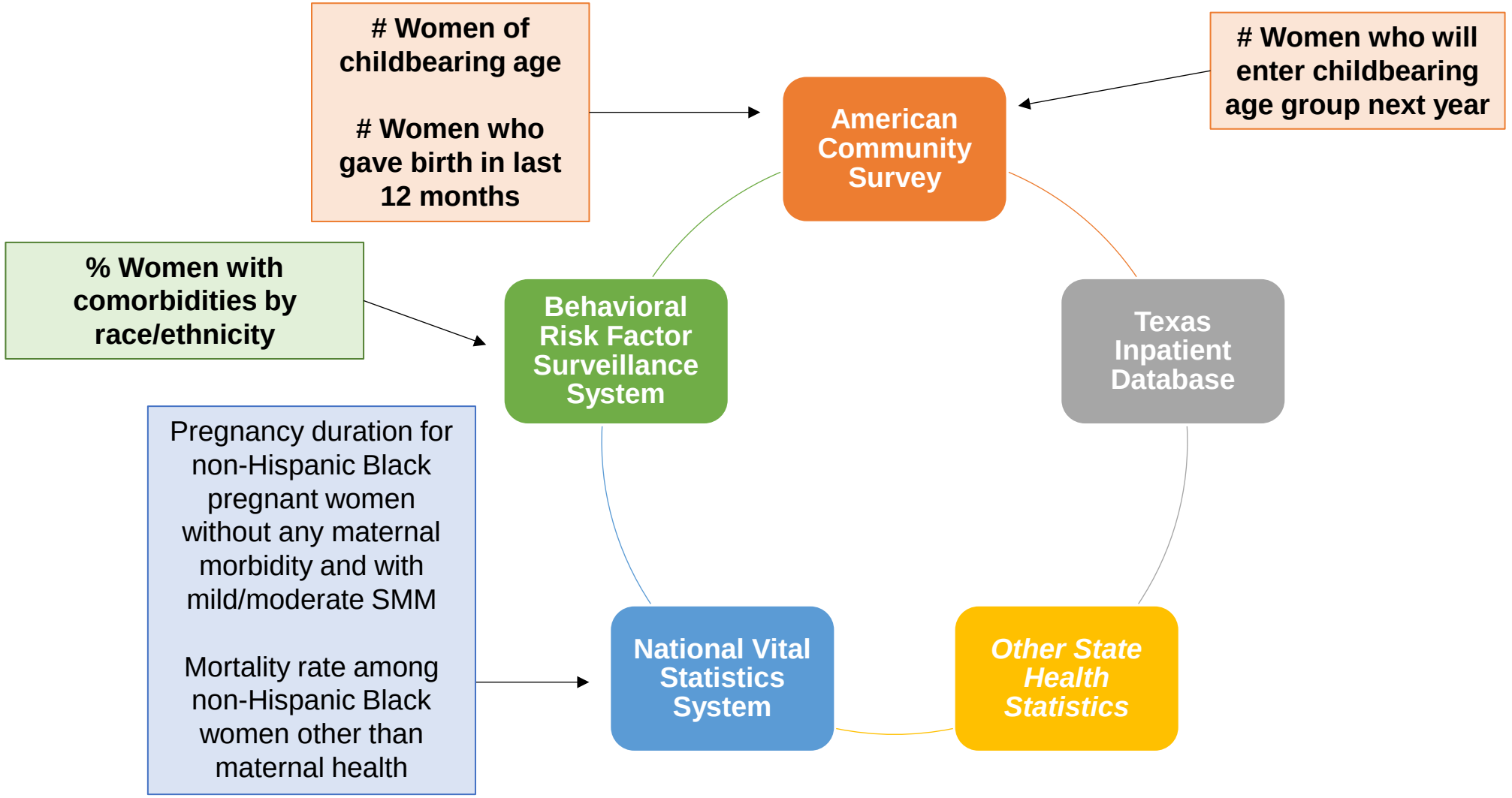

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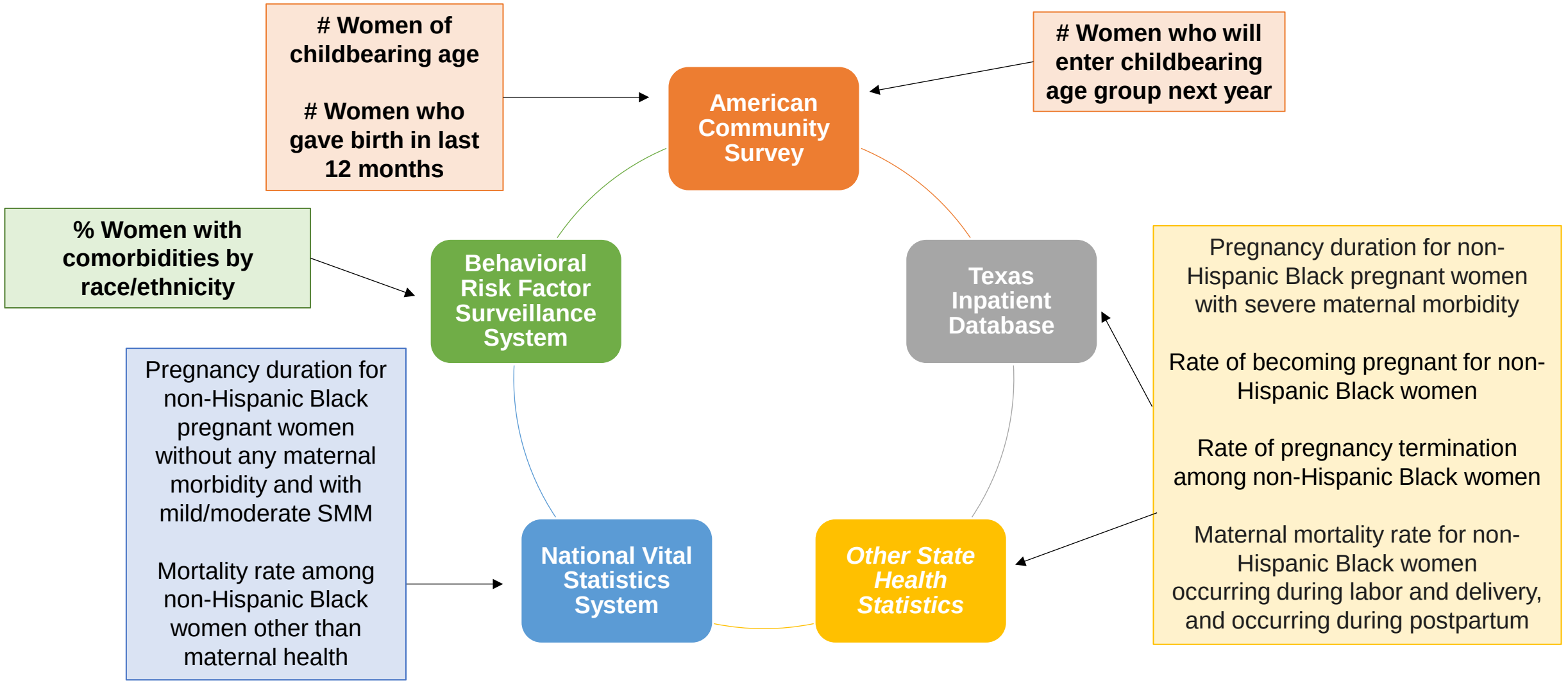


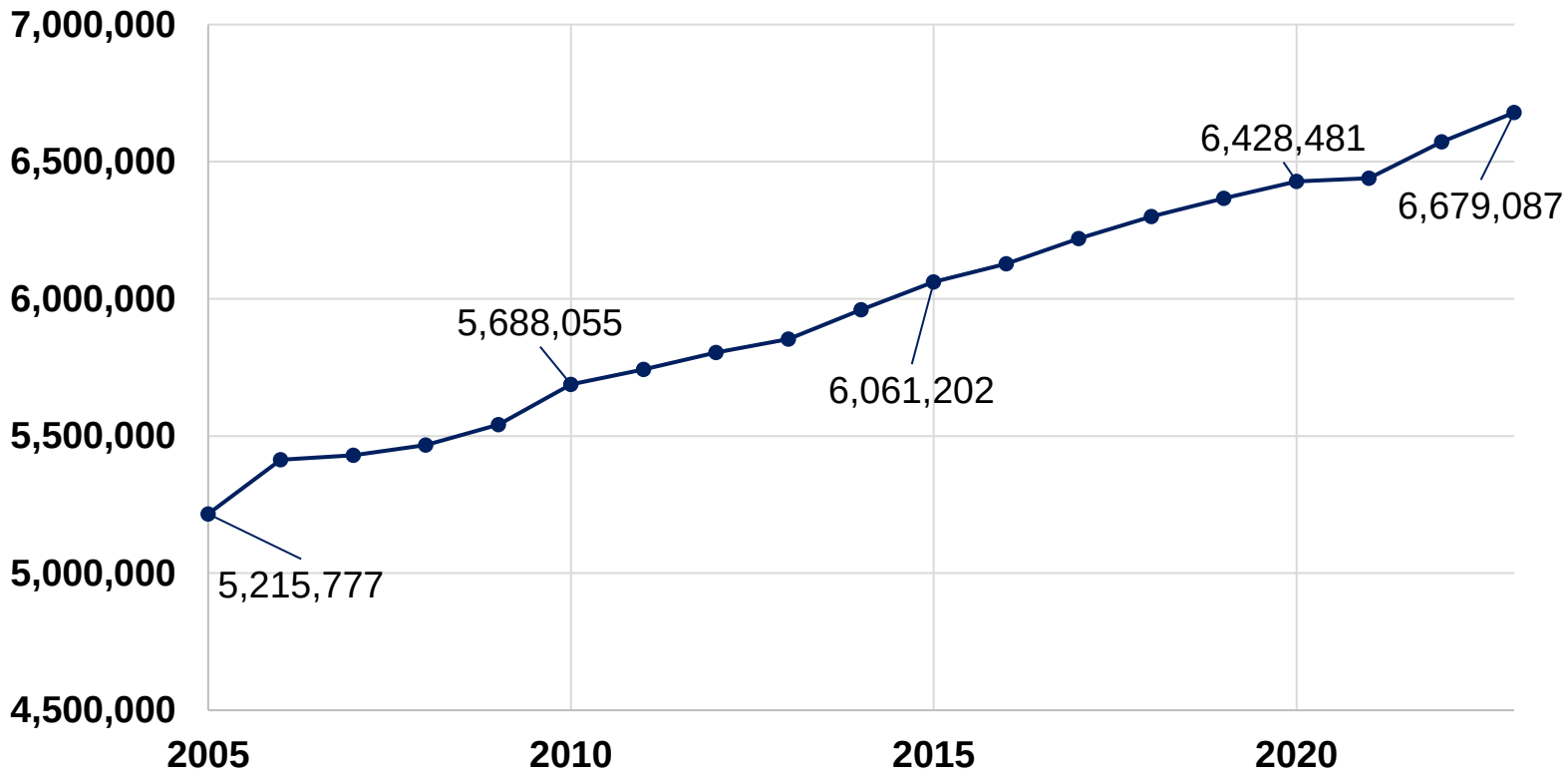
Methods

2005-2023 ACS data used in systems dynamics model

- Women of childbearing age
- Women who gave birth in the last 12 months
    - Number of women ages 18-49 years in TX by year
        - Limited to 18-49 due to consistency with other data sources
- Women who transition to part of childbearing age group
    - Number of women age 17 years in TX by year

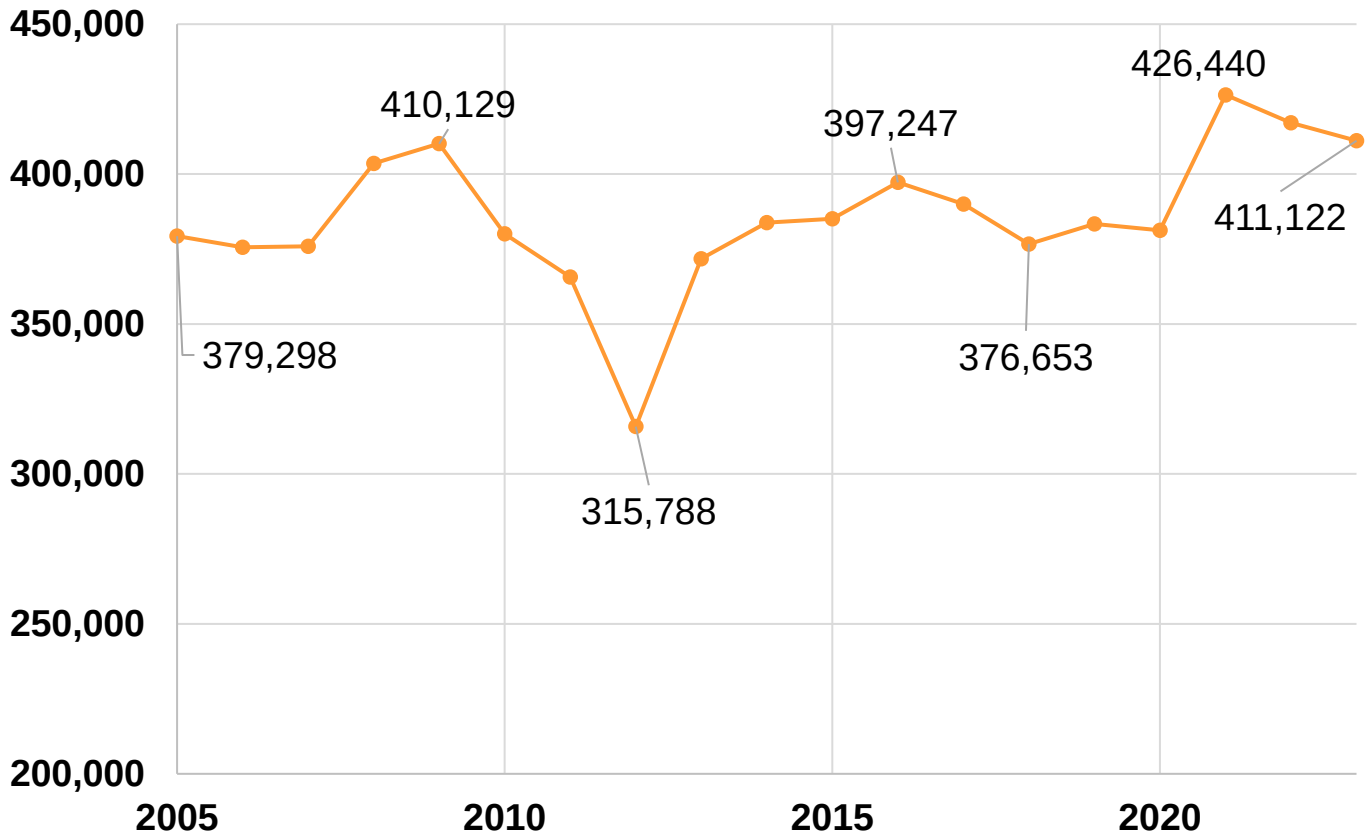
Women ages 18-49 years in Texas, ACS 2005-2023

Year	Weighted N	Unweighted N
2005	5,215,777	47,914
2006	5,413,498	48,986
2007	5,429,381	49,612
2008	5,466,552	49,562
2009	5,541,553	50,395
2010	5,688,055	51,006
2011	5,742,649	49,888
2012	5,804,299	50,602
2013	5,853,303	51,530
2014	5,960,664	51,313
2015	6,061,202	51,976
2016	6,127,765	52,307
2017	6,220,020	53,814
2018	6,299,617	53,781
2019	6,366,580	53,596
2020	6,428,481	34,898
2021	6,439,685	51,231
2022	6,572,336	58,061
2023	6,679,087	59,418
Total	**113,310,504**	**969,890**

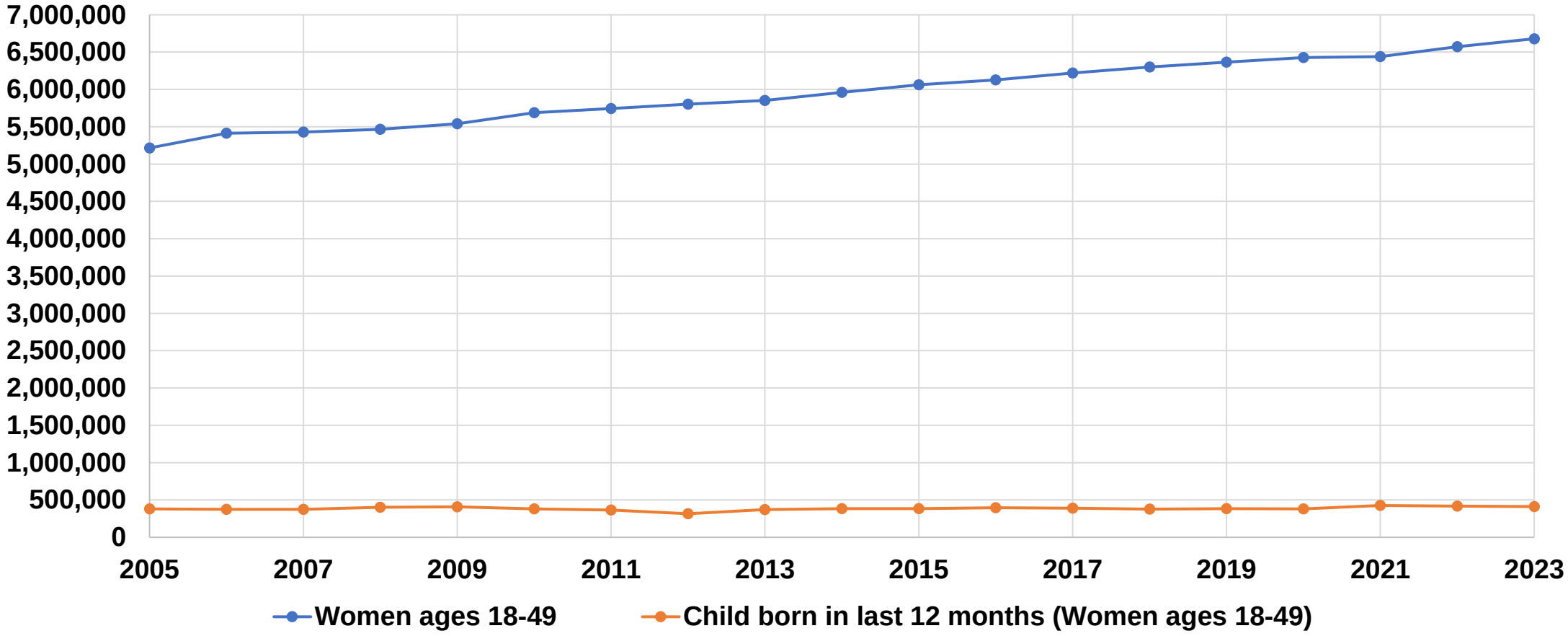


Women ages 18-49 years in Texas who gave birth in the last 12 months, ACS 2005-2023

Year	Weighted	Unweighted
2005	379,298	3,304
2006	375,615	3,335
2007	375,904	3,413
2008	403,606	3,735
2009	410,129	3,691
2010	380,129	3,402
2011	365,652	3,230
2012	315,788	2,745
2013	371,751	3,235
2014	383,779	3,284
2015	385,150	3,311
2016	397,247	3,336
2017	390,009	3,368
2018	376,653	3,246
2019	383,414	3,192
2020	381,222	1,985
2021	426,440	3,212
2022	417,067	3,483
2023	411,122	3,505
Total	**7,329,975**	**62,012**

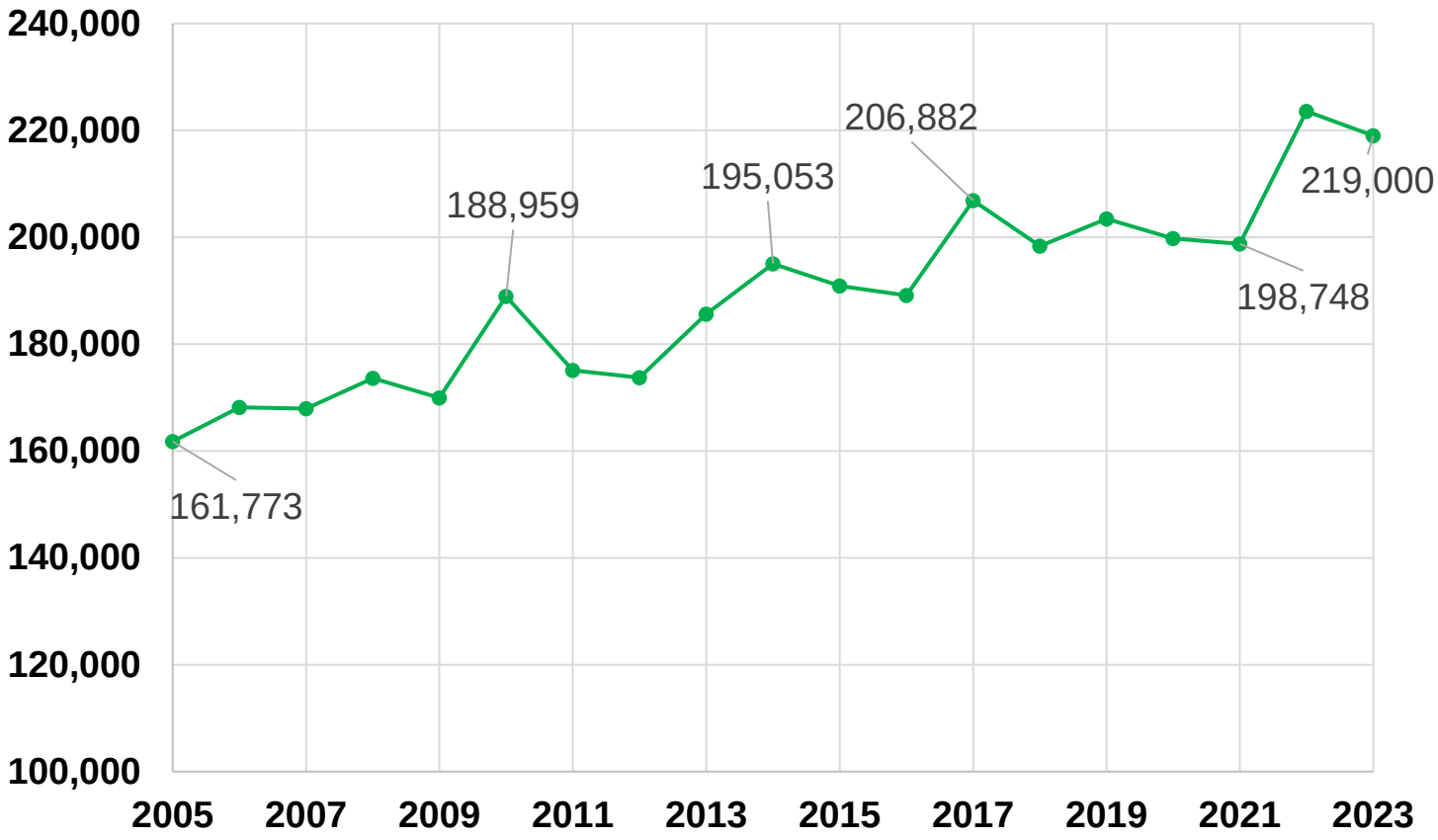


Women ages 18-49 years in Texas and those who gave birth in the last 12 months, ACS 2005-2023



Women ages 17 years in Texas, ACS 2005-2023

Year	Weighted	Unweighted
2005	161,773	1,662
2006	168,182	1,619
2007	167,928	1,628
2008	173,607	1,721
2009	169,955	1,673
2010	188,959	1,772
2011	175,077	1,695
2012	173,710	1,653
2013	185,654	1,753
2014	195,053	1,712
2015	190,871	1,739
2016	189,088	1,715
2017	206,882	1,873
2018	198,345	1,802
2019	203,456	1,724
2020	199,784	1,092
2021	198,748	1,607
2022	223,580	1,979
2023	219,000	1,964
Total	**3,589,652**	**32,383**



Other ACS data that may be considered

Social	Economic	Healthcare
Demographics	Occupation	Disability
Married/Couple Families	Earnings	
Citizenship	Insurance	
	Housing	

Summary of Current ACS Data Calculated for Systems Dynamics Model

- The base model includes 969,890 women of childbearing age in TX, which represent 113,310,504 women across 2005-2023
  - Among them, 62,012 women reported giving birth in the last year, ranging from 1,985 to 3,735 births during the past 12 months per year
- There were 32,383 women age 17 years in TX who entered our childbearing age group, ranging from 1,092 to 1,979 women per year

Next Steps and Conclusions

- Our next steps are to determine additional data sources that provide the estimates that we need for severe maternal morbidity and mortality on the state level
- Upon completion of this model, we will translate this understanding into a novel, evidence-based simulation model to assess the effectiveness of interventions aimed at reducing SMM among non-Hispanic Black women in Texas, with the potential for replication in other states

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