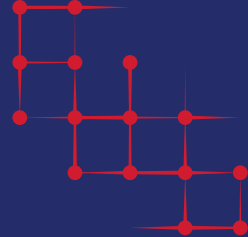


TECHNICAL REPORT: Birth Risks and Timing of Enrollment in Home Visiting



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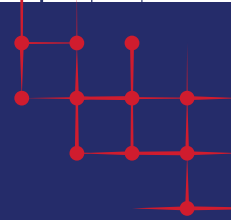
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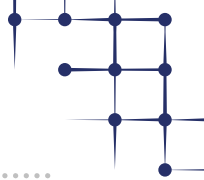
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EXECUTIVE SUMMARY

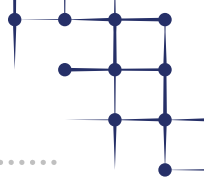
Understanding the importance of data informed decision-making, Iowa has invested in the development of a fully integrated administrative data system for early childhood program and policy research: Iowa's Integrated Data System for Decision-Making (I2D2). I2D2 (i2d2.iastate.edu) is a State-University partnership that brings together administrative records from public health, education, child welfare, and economic development to use for social problem solving and evidence-based decision-making.^{1,2,3} I2D2 includes a system of data governance that maintains state and agency control of data use, in combination with advanced technical and security solutions to ensure the privacy of administrative records used in approved projects is maintained.

The current program evaluation was commissioned by the Iowa Department of Public Health as part of the first set of I2D2 demonstration projects to test this system's utility and value for statewide analytics. Specifically, this project used I2D2 to understand more about families served by Iowa's home visiting programs with a focus on children aged 0-3. It included integrated administrative data from Vital Statistics birth records and comprehensive family support and home visiting programs funded by federal, state, and local sources. Analyses included a sample of 8,680 children who were enrolled in home visiting during 2017 were also born in the state of Iowa. The majority of children were age 3 or under at the time of enrollment (88%), with 49.5% having been enrolled prenatally.

Four primary questions guided this work:

1. What are the characteristics of families and individual birth risks of children who enroll in home visiting compared to all families with children born in the state of Iowa?
2. What is the distribution of cumulative birth risks and co-occurrence of birth risk experiences for families enrolled in home visiting?
3. What are the differences in birth and family characteristics and program enrollment characteristics (e.g., timing, duration) between families enrolled in different types of programs (i.e., federally funded Maternal, Infant, and Early Childhood Home Visiting versus state funded ECI Family Support and HOPES)?
4. How do birth risks and program enrollment characteristics relate to home visiting program completion?

Findings from this project were developed over time in an iterative process that involved community advisory group members from the Iowa Department of Public Health, Early Childhood Iowa, and the Department of Human Services. Through these discussions, findings were generated for specific program and policy-relevant outcomes, including use in the 2020 MIECHV statewide community risk assessment. Program administrators identified the "top 25" counties with children experiencing significant birth risks that could be addressed through family support and home visiting services. Given the foundational nature of this work as one of the first demonstration projects for I2D2, the processes and findings generated were also used to inform ongoing development of the system to benefit future I2D2 work.



PROJECT DESIGN

This project included integrated administrative data from the DAISEY (Data Application Integration Solution's for the Early Years) home visiting database and Vital Statistics birth records. The target sample included all families who participated in home visiting during calendar year 2017. Administrative records from Vital Statistics and DAISEY were integrated at the child level. Extensive data cleaning and verification were conducted prior to the match, following standardized data verification procedures⁵ including internal consistency and missing data reviews.

DAISEY data used for this analysis were drawn from child and caregiver profiles and included whether or not a child was enrolled in a federally funded home visiting programs (MIECHV) or state funded home visiting programs in the Family Support Statewide Database (FSSD), the child's length of enrollment, and whether they completed the program. Vital Statistics birth records from 2013-2017 included data on the birth, care, and health of the mother and child. Table 1 presents a full list of variables used and how they were calculated from the original administrative data.

TABLE 1. ANALYTIC VARIABLES USED FROM DAISEY AND VITAL STATISTICS

DAISEY January 1- December 31, 2017		
Analytic Variable	Variable (original name)	Description of how the analytic variable was created
Child age at enrollment	enrollment date child date of birth	Child age (months) at enrollment was generated by subtracting child birth date from caregiver enrollment date. Negative values of child age (months) at enrollment indicate prenatal enrollment and those values were replaced with 0
Prenatal enrollment	See above	Children with negative values on the child age at enrollment variable (see above) were identified as prenatal enrollees, whereas those with values at or above 0 were identified as non-prenatal enrollees.
Successful completion	discharge reason	Caregivers who responded <i>completed program or child aged out</i> were coded as 1 (<i>successfully completed</i>). Those who responded the following responses, <i>moved out of service area, no contact or could not locate, no longer interested in services, too busy, parental rights were terminated or lost custody, miscarriage or still birth, and other</i> , were coded as 0 (<i>didn't complete</i>).
Enrollment duration	discharge date enrollment date child date of birth	For prenatal enrollees, child enrollment date is the same as their birth date, whereas child enrollment date for postnatal enrollees is the same as caregiver enrollment date. Enrollment duration (months) was constructed by subtracting child enrollment date from discharge date.
Average number of visits per month	total number of home visits in period	Total number of home visits in the available period of enrollment was divided by enrollment duration (months) to create an average number of visits per month.



Vital Statistics 2010-2017 : At the time of the focal child's birth		
Analytic Variable	Variable (original name)	Description of how the analytic variable was created
Preterm/low birth weight (LBW)	weight_infant gestation	Weight_infant and gestation were combined into a preterm/low birth weight variable identifying children who were either born prior to 36 weeks or less than 2500 grams.
Teen mother	year_born_parenta, month_born_parenta, birth_yr_vs, and birth_mo_vs	These three source variables were used to construct both mother and child's birth dates. Teen mothers were identified when the mother's age was younger than 20 years old at the time of the child's birth.
Low maternal education	education_parenta	Mothers with low education were identified if they had less than a HS education.
Single mother	married_during_pregnancy	Mothers unmarried at the time of delivery were identified as single mothers.
Inadequate prenatal care	month_prenatal_care_start and total_prenatal_care_visits	Month_prenatal_care_start indicated a month a mother started prenatal care. Total_prenatal_care_visits included the number of visits to prenatal care. Mothers with inadequate prenatal care were identified if they received no prenatal care during the first trimester or having fewer than four prenatal visits total.
Poverty	wic_received payment_source	Wic_received indicates whether mothers received WIC during pregnancy. Payment_source includes responses, <i>Medicaid, private insurance, self-pay, Indian Health Service, CHAMPUS/TRICARE, other government (federal, state, local), and other as their primary source of payment for delivery</i> . Poverty was defined as receiving WIC or Medicaid.
Tobacco	pregnancy_tobacco_use_derived, average_daily_cigarettes_prepreg, average_daily_cigarettes_trimester1, average_daily_cigarettes_trimester2, and average_daily_cigarettes_trimester3	Pregnancy_tobacco_use_derived identified whether they ever smoked during pregnancy. Average_daily_cigarettes_prepreg indicated an average number of cigarettes smoked during three months pre-pregnancy. Average_daily_cigarettes_trimester1, average_daily_cigarettes_trimester2, and average_daily_cigarettes_trimester3 indicated an average number of cigarettes smoked during each trimester. Mothers who smoked at any time during their pregnancy was coded.
Cumulative Risk	*generated variables [Preterm/low birth weight, teen mother, low maternal education, single mother, inadequate prenatal care, poverty, tobacco]	Count of the 7 generated birth risk variables. Maximum possible score of 6 as low maternal education and teen mother were not allowed to co-occur. Variable was truncated for analyses to 0, 1, 2, and 3 or more risks due to small sample sizes in the highest risk categories.



DATA INTEGRATION

Approximately 60% of the DAISEY records from 2017 were statistically matched with birth records in the Vital Statistics data (N = 8,680). Birth records from Vital Statistics were integrated with DAISEY home visiting records using weighted probability at the child level using identifiers from each system including child first name, last name, date of birth, gender, and race. After integration, a comparison was conducted between the full DAISEY population and the resulting match (see Table 2) to document the relative representativeness of the match. Several significant differences were found in the areas of caregiver and child race and ethnicity size, child age at enrollment, child well and dental visits, household size, whether the caregivers speak English, and experiences of poverty. Specifically, the matched sample had a significantly higher proportion of white, non-Hispanic children and families that enrolled prenatally compared to the overall population of families in home visiting in Iowa programs. These differences should be considered when discussing findings contained in the subsequent analyses.

TABLE 2: DESCRIPTION OF I2D2 MATCHED COHORT OF FAMILIES IN HOME VISITING

Variables	Number missing in matched cohort	Matched cohort % (N = 8,680)	All children in home visiting % (N = 14,396)	p
<i>Child Characteristics</i>				
Not Hispanic	26	85.2	82.5	<0.001
Hispanic	26	14.9	17.5	<0.001
Race	47			
White		76.5	73.2	<0.001
Black		10.7	12.8	<0.001
Asian		5.7	7.2	<0.001
Native American/Alaskan Native		0.9	0.8	
Native Hawaiian/Pacific Islander		0.3	0.3	
Multiple		0.1	5.7	<0.001
Age at Enrollment (does not include prenatally enrolled families)	3			
0		49.5	42.7	<0.001
1		15.9	17.3	0.009
2		13.4	14.9	0.004
3		9.8	11.4	0.001
4		7.3	8.6	0.001
5 or older		4.1	5.0	0.050
Child read to in the home ²	8032	84.6	83.7	
Child developmental delay ²	8024	12.0	12.1	
Up to date well-child exams	1405	98.3	97.9	0.008
Child sees regular dental provider	1445	64.7	66.5	0.001
<i>Caregiver Characteristics</i>				
Not Hispanic	11	88.2	85.1	0.001
Hispanic	11	11.8	14.8	0.001
Race	20			
White		81.1	78.2	0.001
Black		10.4	12.3	0.001



Asian		5.9	7.2	0.001
Native American/Alaskan Native		1.0	.9	
Native Hawaiian/Pacific Islander		.3	.3	
multiple		1.3	1.3	
Household size	9			0.002
1		.6	.8	
2		11.9	11.9	
3		29.3	28.0	
4		29.3	29.0	
5		17.0	17.3	
6+		12.1	13.3	
Low education ²	7921	66.3	68.0	
Caregiver employment ²	7920	53.2	51.5	
Single mom at enrollment ¹	786	52.2	52.0	
Caregiver non-English speaker	12	15.8	20.7	0.001
Caregiver uses tobacco ²	7925	33.2	34.3	
Primary language	12			
English		84.2	79.3	
Spanish		7.6	10.1	
Burmese		1.1	1.6	
Karen		0.5	0.6	
Karen		1.3	1.3	
Chin		0.7	.8	
Arabic		0.9	1.2	
Other		3.8	5.2	
Home Visiting Enrollment Variables				
Ever experienced poverty		56.3	58.6	0.001
Child born with low birth weight		3.7	4.0	
Child ever been breast fed ²	8099	23.9	22.7	
Caregiver ever used substances ²	7924	22.6	22.2	
Child enrolled prenatally		27.5	28.2	
Average enrollment duration	2861	14.6 mo	14.2 mo	
Average visits per month	4153	1 visit/mo	1 visit/mo	
Retention (program completion)	2876 ³	43.1	42.2	

Note: All values reflect percent unless otherwise indicated

¹Not asked for MIECHV families, ²Not asked for FSSD families, ³Families currently enrolled so no termination codes existed



SUMMARY OF KEY FINDINGS

Sample Description of Birth Risks

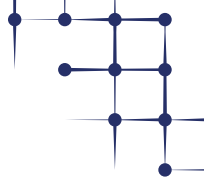
Question 1. *What are the characteristics of families and individual birth risks of children who enroll in home visiting compared to all families with children born in the state of Iowa?*

Using data from Vital Statistics birth records, we were able to document birth characteristics of families enrolled in home visiting programs in Iowa compared to all families in Iowa (see Table 3). Given the purpose and nature of home visiting enrollment, we expected to find certain differences in areas of maternal education and cumulative family risks since many home visiting programs are designed to serve low income families and single or teen mothers. Significant differences were in expected directions, and are indicated where p values are $< .05$. Findings suggest that there is a significantly higher percentage of non-White families enrolled in home visiting compared to all families with children born in Iowa. Families in home visiting also demonstrated significantly higher rates of each of the seven birth risks ($p = .001$).

In comparison to the population of births in Iowa, there is a significantly higher percentage of non-White families enrolled in Home Visiting.

TABLE 3: DESCRIPTION OF BIRTH CHARACTERISTICS

Variables	Missing	Matched Cohort ($N=8,680$)	All Iowa Births 2013-2017 ($N=194,357$)	p value
Parent A Race (% white)		77.1	84.8	0.001
Parent B Race (% white)		55.5	73.0	0.001
Birth Risks, Individual				
Poverty (at any wave) ¹	5	80.1	46.3	0.001
Preterm/low birth weight ²	6	9.5	7.7	0.001
Low maternal education ³	8	16.8	9.4	0.001
Single mother at birth ⁴		52.4	35.5	0.001
Inadequate prenatal care ⁵	20	11.6	8.8	0.001
Teen mother ⁶		11.1	5.8	0.001
Tobacco Use ⁷	1	28.8	18.8	0.001



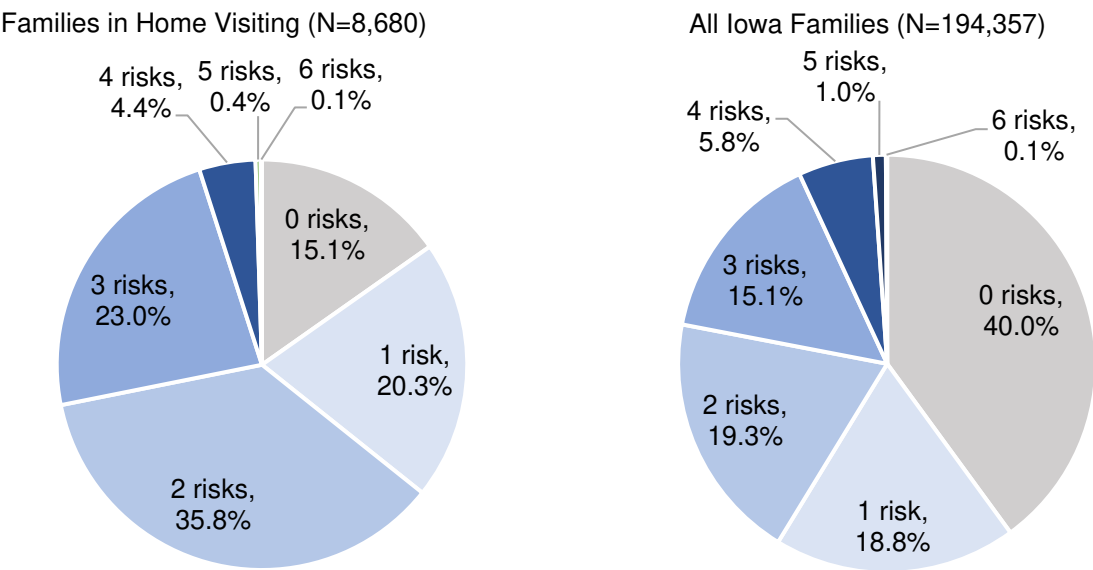
Cumulative and Co-Occurring Risk

Question 2. What is the distribution of cumulative birth risks and co-occurrence of birth risk experiences for families enrolled in home visiting?

Using the individual risk factors from birth records, indicators of cumulative risk and the co-occurrence of risk were calculated for every child. As shown in Figure 1, there were significantly higher rates of cumulative risk in the merged cohort of home visiting families compared to all families with children born in Iowa: only 15% of families in home visiting had zero risks, compared to over 40% of all Iowa families, with differences in each additional risk category as well.

Home visiting programs are enrolling significantly higher risk children than the general population.

FIGURE 1. CUMULATIVE COUNT OF BIRTH RISKS



Given the higher rates of cumulative risk observed, we also examined each of the combinations of co-occurring risks to identify patterns among risk experiences (see Table 4, below). As expected, the indicator of poverty at birth significantly co-occurred with each of the other six risks. Other significant co-occurrences include a child being preterm or a low birth weight and being born to a single mother, a mother with low levels of education, a mother who used tobacco during the pregnancy, and a mother with inadequate prenatal care. Inadequate prenatal care occurred significantly with being unmarried, a teenager, and tobacco use during pregnancy. Being a teenager and a single mother also co-occurred significantly as did inadequate prenatal care during the pregnancy and being a teenager. All significant co-occurrences of cumulative risk occurred significantly ($p < .05$) more frequently in the matched DAISEY sample than in the overall population.



TABLE 4: PREVALENCE AND CO-OCCURRENCE OF BIRTH RISKS (N=8,680)

	1 (80.1%)	2 (9.5%)	3 (16.8%)	4 (52.4%)	5 (11.6%)	6 (11.1%)	7 (28.8%)
1. Poverty	-	10.0*	20.4*	61.8*	13.0*	13.3*	33.7*
2. Preterm/Low Birth Weight	85.2*	-	18.5	57.8*	14.1*	11.7	38.7*
3. Low maternal education	96.8*	10.3	-	51.8	16.5*	NA	28.4
4. Single mother	94.5*	10.4*	16.6	-	13.8*	19.4*	40.2*
5. Inadequate prenatal care	89.7*	11.5*	24.1*	62.2*	-	13.1*	32.3*
6. Teen mother	95.9*	10.0	NA	91.8*	13.8*	-	28.7
7. Tobacco use	93.7*	12.7*	16.6	73.2*	13.0*	11.0	-

Note. Numbers in parentheses represent the overall matched cohort percentage. Numbers represent percentages of children within a risk group (row) who also experienced each of the other risks (column). Significant chi-square differences ($p < .05$) are indicated (*). For example, of the children with low maternal education, 96.8% also experienced poverty at birth.

Program Comparisons

Question 3. *What are the differences in birth and family characteristics and program enrollment characteristics (e.g., timing, duration) between families enrolled in different types of programs (i.e., federally funded Maternal, Infant, and Early Childhood Home Visiting versus state funded ECI Family Support and HOPES?)*

The next set of analyses examined differences between families enrolled in federally funded (i.e, MIECHV) and state funded (FSSD) programs (see Table 5). Overall, children in MIECHV children had higher rates of all risks (other than low maternal education) than children enrolled in FSSD, with statistically significant differences identified for poverty, single mother, teenage mother, and a mother that used tobacco during pregnancy.

Children enrolled in MIECHV programs had higher rates of most birth risks in comparison to FSSD programs including poverty, single mother, teenage mother, and tobacco use by a mother during pregnancy.

TABLE 5: BIRTH RISK DISTRIBUTION ACROSS MIECHV AND FSSD PROGRAMS

Vital Statistics Birth Risks	Full Merged Sample (N=8,680)	MIECHV (N=782)	FSSD (N=7,898)	p value for MIECHV vs FSSD
Poverty	80.1	94.0	78.7	<0.001
Preterm/Low Birth Weight	9.5	11.0	9.3	
Low maternal education	16.8	15.2	17.0	
Single mother	52.4	73.9	50.3	<0.001
Inadequate prenatal care	11.6	12.3	11.6	
Teen mother	11.1	17.4	10.5	<0.001
Tobacco use	28.8	34.8	28.2	<0.001

Note: Birth records from Vital Statistics were integrated with DAISEY home visiting records using weighted probability at the child level using identifiers from each system including child first name, last name, date of birth, gender, and race.

Figure 2 shows the comparison between MIECHV and FSSD for rates of cumulative risk. MIECHV served children who had a greater frequency of cumulative risk than children enrolled in FSSD. In comparison with children enrolled in FSSD children enrolled in MIECHV had higher rates of: 1 risk, 2 risks, and 3 or more risks. There were no children enrolled in MIECHV who had zero risks while 15.5% of children enrolled in FSSD had no risks.



FIGURE 2: DISTRIBUTION OF CUMULATIVE RISK BY HOME VISITING PROGRAM

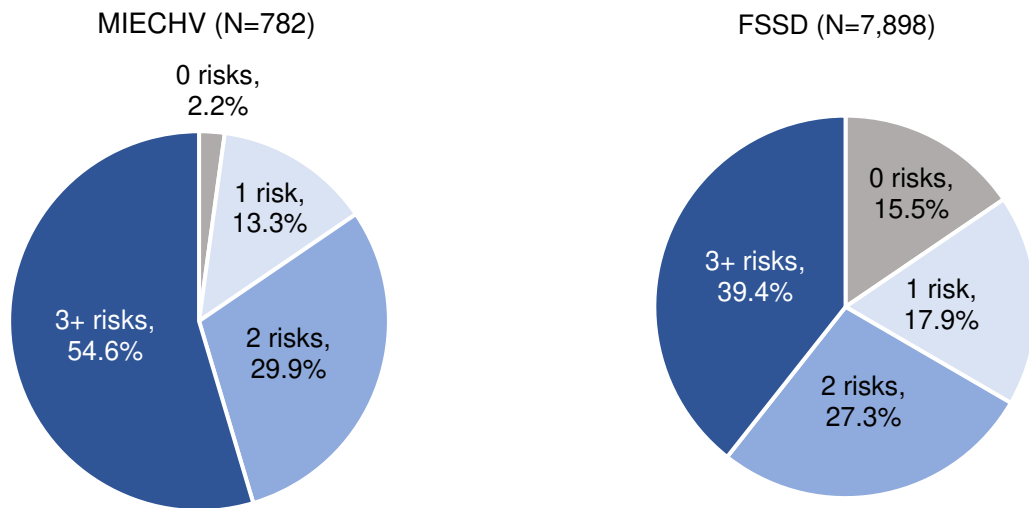


Table 6 shows the rates at which the birth risks co-occur in the MIECHV sample. MIECHV participants saw higher rates of single motherhood co-occurring with poverty, teenage motherhood, and tobacco use, inadequate prenatal care co-occurring with low maternal education, and teen mothers co-occurring with tobacco use. Given the high rates of cumulative risk in the MIECHV sample, the risks largely co-occur as expected. In comparison in the FSSD sample shown in Table 7, we see less predictable patterns of co-occurrence. Poverty co-occurs at higher than expected rates with all of the other birth risks. Since FSSD has a larger sample of children with 0 or 1 birth risk, the remaining sample experiences co-occurrence at higher than expected rates.

TABLE 6: PREVALENCE AND CO-OCCURRENCE OF BIRTH RISKS FOR MIECHV (N=782)

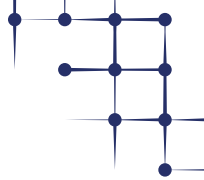
	1 (94.0%)	2 (11.0%)	3 (15.2%)	4 (73.9%)	5 (12.3%)	6 (17.4%)	7 (34.8%)
1. Poverty		11.0	15.7	75.2*	11.8	17.8	35.5
2. Preterm/low birth weight	94.2		15.1	79.1	14.0	17.4	40.7
3. Low maternal education	96.6	10.9		75.6	20.2*	NA	41.2
4. Single mother	95.7*	11.8	15.6		12.3	22.3*	38.8*
5. Inadequate prenatal care	90.6	12.5	25.0*	74.0		18.8	30.2
6. Teen mother	96.3	11.0	NA	94.9*	13.2		26.5*
7. Tobacco use	96.0	12.9	18.0	82.4*	10.7	13.2*	

Note. Numbers in parentheses represent the population percentage. Numbers represent percentages of children within a risk group (row) who also experienced each of the other risks (column). Significant chi-square differences ($p < .05$) are indicated (*).

TABLE 7: PREVALENCE AND CO-OCCURRENCE OF BIRTH RISKS FOR FSSD (N=7,898)

	1 (78.7%)	2 (9.3%)	3 (17.0%)	4 (50.3%)	5 (11.6%)	6 (10.5%)	7 (28.2%)
1. Poverty		9.9*	20.9*	60.3*	13.2*	12.8*	33.5*
2. Preterm/low birth weight	84.2*		11.9	55.3*	14.1*	11.0	38.4*
3. Low maternal education	96.9*	10.3		49.7	16.2*	NA	27.2
4. Single mother	94.3*	10.2*	16.8		14.0*	19.0*	40.4*
5. Inadequate prenatal care	89.6*	11.4*	24.0*	61.0		12.5*	32.6*
6. Teen mother	95.8*	9.8	NA	91.3*	13.9*		29.0
7. Tobacco use	93.4*	12.7*	16.4	72.0*	13.3*	10.8	

Note. Numbers in parentheses represent the population percentage. Numbers represent percentages of children within a risk group (row) who also experienced each of the other risks (column). Significant chi-square differences ($p < .05$) are indicated (*).



Risks, Enrollment, and Program Type

Question 4. *How do birth risks and program enrollment characteristics relate to home visiting program completion?*

Table 8 presents the prenatal risk by enrollment for children in the matched sample. Overall children who enrolled prenatally had lower frequencies of risk in instances of preterm/low birth weight, single mothers, inadequate prenatal care, and tobacco use than children who enrolled after birth. Table 9 demonstrates rates of cumulative risk by enrollment timing.

Children who enrolled in home visiting services prenatally had lower frequencies of risk in preterm or low birth weight, single mothers, inadequate prenatal care, and tobacco use.

TABLE 8: BIRTH RISK BY ENROLLMENT TIMING

Risk	Non-Prenatal Enrollment (N=6,295)	Prenatal Enrollment (N=2,385)
Poverty	76.7	89.1
Preterm/Low Birth Weight	9.6	9.0
Low maternal education	15.3	20.9
Single mother	53.0	50.9
Inadequate prenatal care	12.0	10.7
Teen mother	11.0	11.3
Tobacco use	30.5	24.3
Cumulative Risk		
0	16.7	7.8
1	16.3	20.7
2	25.6	32.6
3+	41.4	39.0

Analysis of duration found no significant difference between discharge reasons and duration of enrollment (see Table 9). In fact, the families with the highest average duration in months had a discharge reason of “too busy”.

TABLE 9: DURATION OF ENROLLMENT BY DISCHARGE REASON

Discharge Reason (N=5,810)	Duration in Months	Percent
1 (completed program or child aged out)	14.5	43.1
2 (moved out of service area)	15.5	12.4
3 (no contact, could not locate)	13.3	16.9
4 (no longer interested in services)	14.6	11.2
5 (too busy)	16.9	7.5
6 (Parental rights were terminated or lost)	12.1	1.5
7 (miscarriage or stillbirth)	-	0
8 (other)	18.4	7.5



Table 10 displays rates of completion for the entire sample of children in the matched DAISEY sample. Overall, children who completed their home visiting program were enrolled for an average of 14.51 months and children who did not complete their home visiting program were enrolled for an average of 14.78 months. As cumulative risk increased, participants completed the program at lower rates. State funded FSSD programs also saw higher rates of completion in comparison to MIECHV programs, which may be due to MIECHV programs serving a more at-risk population as shown in Table 8. Rates of completion also varied with regard to prenatal enrollment. In the sample as a whole, 45.69% of participants who enrolled after the child's birth were more likely to complete the program as compared to those who enrolled prenatally (34.49% of participants).

TABLE 10: PROGRAM COMPLETION BY RISKS, PROGRAM TYPE, AND PRENATAL ENROLLMENT

	Complete	Did Not Complete
Risks		
0 risks	72.8	27.2
1 risk	45.6	54.4
2 risks	40.6	59.4
3+ risks	31.5	68.5
Program Type		
MIECHV	24.4	75.6
State Funded	44.6	55.4
Enrollment timing		
Prenatally Enrolled	34.5	65.5
Non-prenatally Enrolled	45.7	54.3
Enrollment Duration (months)	14.5 mo	14.8 mo

Note: Program Completion is defined as completion of the program as defined by the model or child aged out. Completion percentages may not add up to 100% as some families were currently enrolled at the time of data collection



LIMITATIONS AND FUTURE RESEARCH

Results from this analysis reveal significant and important finding about the children served by both federal and state funded programs in Iowa:

- 1) **All children who are served by home visiting are likely to have a higher occurrence and co-occurrence of birth risks than children in the general population.** These birth risks include poverty, preterm birth or low birth weight, low maternal education, single mother, inadequate prenatal care, teenager mother, use of tobacco during pregnancy.
- 2) When federally funded MIECHV programs and state funded FSSD programs are compared, results indicate that **MIECHV programs are serving children and families who are at greater risk than those served by FSSD.** All families served by MIECHV have at least one risk while there is a portion of children served by FSSD who do not have any birth risks.
- 3) The presence of birth risk impacts completion of a home visiting program. **Children who are enrolled with MIECHV, and who are more likely to experience greater levels of risk, are less likely to complete the program, as compared to children enrolled in FSSD.** Overall children who are enrolled in FSSD programs are more likely to complete their home visiting program. These results suggest that when a child and family have greater amounts of risk and may be in most need of the support that a home visiting program provides, the co-occurrence and presence of these risks may impede their completion of the program and general access to this service.
- 4) Results demonstrate the relationship between levels of risk and time of enrollment. In this investigation there was more variability in the amount of risk present for children who were enrolled after birth. Results also revealed that **children who were enrolled after birth were more likely to complete their home visiting program than children who were enrolled prenatally.**
- 5) **The lower presence of birth risks in the sample of children enrolled prenatally suggests that home visiting services are having their intended impact by decreasing birth risk.** It is unclear why these children are then less likely to complete their home visiting program. It is possible that since home visiting programs are having their intended impact and decreasing birth risks participants who are enrolled prenatally feel as though their needs have been met and are therefore more likely to end services prematurely.

The limitations of this investigation highlight the need for additional research and promote the need for precision home visiting. First, there is a need for additional exploration of the interactions among multiple risks, program type, and completion rates. For example, are there critical patterns or co-occurrence of risks that impact completion rates? With this information it may be possible to predict which families are at greatest risk to dropout or discontinue services prematurely and increase contact with these individuals. It may be possible that families with certain characteristics are best served by a specific model of home visiting program and that program delivery or model could better target that family's needs. In addition, future research will separate HOPEs programs out from FSSD to create three program groups.

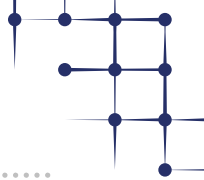
A second limitation we discovered was inaccurate dates surrounding birth and enrollment. Since a family only has one enrollment date, it is difficult to track receipt of services in relation to individual children's outcomes as the system lacks a family indicator. Since many programs seek to impact children's developmental outcomes, this important change needs to be addressed for more accurate tracking.

Future research identified in this partnership also seeks to understand more about what experiences families are having within programs. For example, do both FSSD and MIECHV programs prioritize prenatal enrollment and what does prenatal enrollment look like (e.g. number of visits, lengths of visits, topics covered etc.) for each of these programs. For families who are not enrolled prenatally a closer look at time of postnatal enrollment may also be critical as enrollment at this time may or may not co-occur with the caregiver's return to work following parental leave.

Additional research should explore other factors that may affect child and family outcomes such as the availability of nearby birthing hospitals or other government support programs and early access to development screeners and early intervention. Utilizing additional administrative datasets (e.g. Department of Education) it may be



possible to determine whether various child and family outcomes were impacted by the presence of a birthing hospital or prenatal enrollment in home visiting services. Future research could explore enrollment patterns and outcomes, administration of developmental screenings, and referral and enrollment patterns in early intervention.



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