

Factors Predicting Duration of Babies Being Breastfed

Provincial Baby Friendly Grand Rounds

via Telehealth from Thompson, Manitoba


June 22, 2011

Presentation by:

The Babies Being Breastfed Research Committee

Burntwood Regional Health Authority

1



Factors Predicting Duration of Babies Being Breastfed

Objectives of the Babies Being Breastfed Research Study

- 1) To promote a natural, nurturing, economic, and sustainable way to provide the best possible nutrition for babies.
- 2) To identify which factors would contribute to the Duration of Babies Being Breastfed in the population of Mothers who give birth at Thompson General Hospital in Burntwood Regional Health Authority. The factors identified for study were in the areas of: Demographic, Mother, Latch-R Breastfeeding Assessment Guide, Health Care Intervention Factors, and Social Referent Factors.
- 3) To test 33 hypotheses and discover those that impacted the dependent variable, duration of breastfeeding through quantitative analyses.
- 4) To make recommendations that would enhance the number of Babies Being Breastfed in the Burntwood Region.

2

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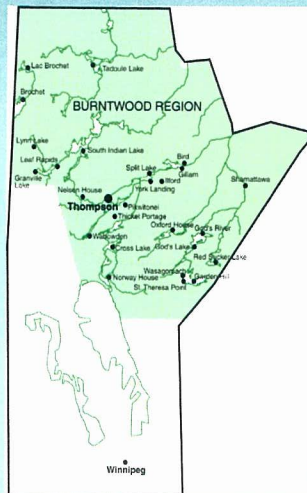
Setting

❖ Burntwood Regional Health Authority:

- Covers half of land mass of Manitoba
- 46,167 people
- 76% of population declares Aboriginal status
- Regional centre – City of Thompson - pop 14,390
- 8 communities service conception to grave, 22 First Nation communities (hospitalization, partnerships)
- Thompson General Hospital (regional)
- 850 births per year
- 16 beds are obstetrical

3

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4





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Health benefits for the infant are gained:

- exclusive at 4 months
- any breastfeeding up to 6 months

Duration rates are even more significant

- 1988 literature – duration rates:
 - Of 62.7 % initiation, 42.4% at 3 months, 30.4 % at 6 months
- 1994 study 4 Ojibwa comm. in MB: 54% bf at discharge, 44% at week 1, 32% at week 4, 25% at week 8, 18% at week 12
- Women of aboriginal descent, low income less likely to breast feed

Breast feeding rate duration is very important

Problem Statement

What are the factors that affect the duration of breastfeeding in the population of mothers who deliver their babies at Thompson General Hospital?

7



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Large volume of literature available:

- scientific evidence of health benefits for babe and mom
- emotional and intellectual component
- Many demographic factors apparent
- Factors that related to the mother specifically
- The mothers support environment
 - Personal
 - Community
- Impact of health professionals

Would the health record provide information on duration?

8



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Research questions:

- What demographic factors are explanatory or predictive of the duration of breastfeeding?
- What mother factors are explanatory or predictive of the duration of breastfeeding?
- What social referent factors are explanatory or predictive of the duration of breastfeeding?

9



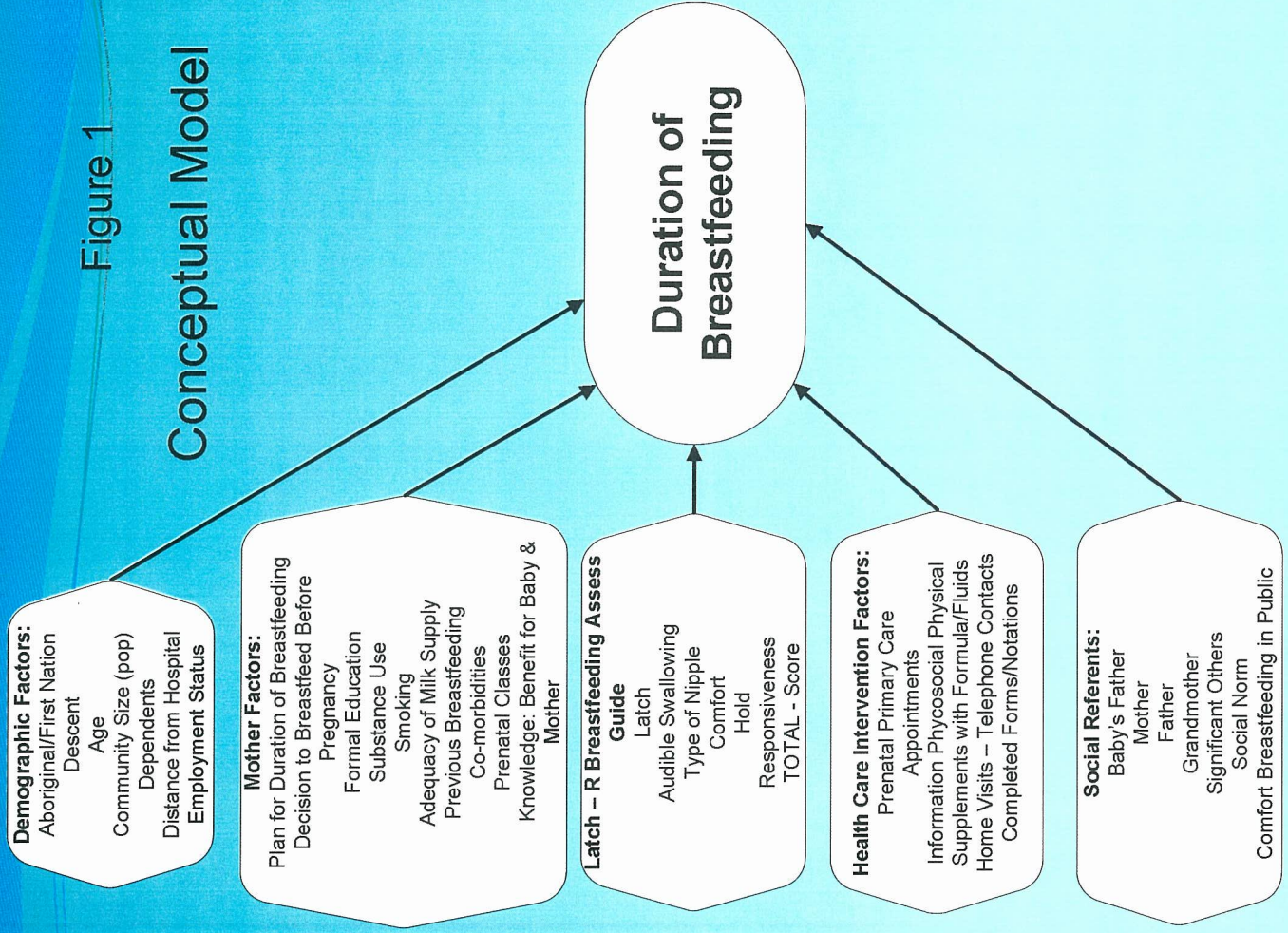
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- What Latch-R Breastfeeding Assessment Guide factors are explanatory or predictive of the duration of breastfeeding?
- What health care intervention factors are explanatory or predictive of the duration of breastfeeding?
- Does completeness of the health care record predict duration of breastfeeding?

10

Figure 1

Conceptual Model





Factors Predicting Duration of Babies Being Breastfed

- Hypotheses

- H1 As the age of the mother increases, duration of breastfeeding increases.
- H2 As the size (population) of the mother's home community increases, the duration of breastfeeding decreases.
- H3 As distance from hospital to the mother's home community increases the duration of breastfeeding decreases.
- H4 As the number of dependent children in the mother's home increases the duration of breastfeeding decreases.
- H5 As the number of prenatal primary care appointments increases, the duration of breastfeeding increases.



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- H6 A lesser proportion of mothers who are of Aboriginal/First Nation descent have longer duration of breastfeeding than those who are not of Aboriginal/First Nation descent.
- H7 A greater proportion of mothers who are employed full time have shorter duration of breastfeeding than those who are not.
- H8 A greater proportion of mothers who use substances have shorter duration of breastfeeding than those who do not use substances.
- H9 A greater proportion of mothers who smoke have shorter duration of breastfeeding than those who do not smoke.
- H10 A greater proportion of mothers who decided they would breastfeed before they were pregnant, have a longer duration of breastfeeding than those who do not.


13



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- H11 A greater proportion of mothers who believe that they have an adequate supply of milk have longer duration of breastfeeding than those who do not believe they have an adequate milk supply.
- H12 A greater proportion of mothers who breastfed previously have longer duration of breastfeeding than those who did not breastfeed previously.
- H13 A larger proportion of mothers with comorbidities, have shorter duration of breastfeeding than those who do not.
- H 13b A larger proportion of mothers with mental stressors, have shorter duration of breastfeeding than those who did not.
- H14 A greater proportion of mothers who have impacts at birth, such as caesarean sections have shorter duration of breastfeeding than mothers who do not.


14



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- H15 A greater proportion of mothers who attended prenatal classes have longer duration of breastfeeding than those who did not attend prenatal classes.
- H16 As mothers' scores on the Latch-R Latch Breastfeeding Assessment Guide increases the duration of breastfeeding increases.
- H17 As mothers' scores on the Latch-R Audible Swallowing Breastfeeding Assessment Guide increase, the duration of breastfeeding increases.
- H18 As mothers' scores on the Latch-R Nipple Breastfeeding Assessment Guide increase, the duration of breastfeeding increases.

15



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- H19 As mothers' scores on the Latch-R Comfort Breastfeeding Assessment Guide increases, the duration of breastfeeding increases.
- H20 As mothers' scores on the L-R Hold Breastfeeding Assessment Guide increases, the duration of breastfeeding increases.
- H21 As mothers' scores on the L-R mother's responsiveness to infant cues and confidence in Breastfeeding Assessment Guide increases, the duration of breastfeeding increases.
- H22 As the mothers' scores on the Latch-R TOTAL Breastfeeding Assessment Guide increase, the duration of breastfeeding increases.

16



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- H 23 As the number of social referents increases the duration of breastfeeding increases.
- H24 A greater proportion of mothers who perceive that the social norm in their community is to breastfeed, will have longer duration of breastfeeding than those who do not.
- H25 A greater proportion of moms who feel comfortable breastfeeding their babies in public will have longer duration of breastfeeding than moms who do not.
- H26 A greater proportion of moms who receive information, psychosocial or physical health care interventions related to breastfeeding at hospital or at home will have longer duration of breastfeeding than those who do not.

17



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- H 27 A greater proportion of moms who receive telephone contact or a home visit after discharge from hospital, have longer duration of breastfeeding than those who do not.
- H28 A greater proportion of mothers who supplement with formula prior to 6 months will have shorter duration of breastfeeding than those who do not.
- H29 A greater proportion of mothers who perceive that breasts are for feeding baby and sex will have a greater duration of breastfeeding than those who do not.
- H30 As the number of mothers who have increased knowledge about the benefits of breastfeeding increases, the duration of breastfeeding increases.

18



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- H31 As the formal education of the mother increases, the duration of breastfeeding increases.
- H32 A greater proportion of mothers who planned how long they would breastfeed their babies have longer duration of breastfeeding than those who did not.
- H33 As the number of incomplete or absent forms or notations increases, the duration of breastfeeding decreases.
- H34 A linear combination of two or more of the independent variables included in the hypotheses will predict duration of breastfeeding.

19



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Sampling

- 500 charts to be reviewed, from Delivery room record used to count from January 2009 back in time until 500 was reached
 - Any mother who breast and breast/bottle fed her baby in hospital


Data sources

- mother and baby chart, child health clinic records from moms, phone discussion questionnaire with mother
 - Maternal nursing data base, Latch-R breastfeeding assessment guide, nursery baby record, postpartum referral record

Difficulties

- It was difficult to reach moms
- Due to volume of time on charts and difficulties, the number was reduced to 400, then 300 and then 200
- Data for 234 mothers was reviewed

20




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Limitations:

1. Ability to contact mothers through phone interviews
2. Workload of staff, time to review records restricted, may have impacted amount of detail gained from the chart
3. The number of missing forms for Latch-R and incomplete data on other forms restricted the information
4. Mental stressors were added specifically after data collection began. Some mental stressors may have been missed.
5. First research project undertaken with BRHA as lead – learning curve

21



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Limitations:

- 4 communities in the population designated as Burntwood Regional Health Authority are not included in the study
Island Lake Communities deliver in Winnipeg historically

22



Summary of the Variables: Operational Description, Type, Code, Level of Measure, Predicted Association with Hypothesis

Table 1

Duration of Breastfeeding					
Independent Variable	Independent Variable Description	Code	Level of Measure	PA	
H1 Age	Age of mother Whole number Continuous	1 = <23 2 = 23-27 3 = >27	Trichotomous ordinal	+	
H2 Population	Size of mother's home community Whole number continuous	1 = <2000 2 = 2000-4999 3 = 5000+	Dichotomous Ordinal	-	
H3 Distance	Distance from hosp. to mother's home in km Whole number Continuous	0 = 0 1 = 1-249 2 = 250+	Trichotomous Ordinal	-	
H4 Dependents	Number of dependent children in mother's home Whole number Continuous	0 = 0 1 = 1 2 = 2+	Dichotomous Ordinal	-	
H5 Pnappts	Number of prenatal primary care appts. Whole number Continuous	1 = 0-4 2 = 5-7 3 = 8+	Trichotomous Ordinal	+	
H6 Ethnic (Cultural background)	Ethnicity of mother: Aboriginal, First Nation, Metis, Caucasian Nominal	1 = Other, 2 = Aboriginal/ First Nation	Dichotomous	-	
H7 Employment	Employed full time Yes, no Nominal	1 = Yes 2 = No	Dichotomous	-	
H8 Substance	Mother's use of substance Yes, no	1 = Yes 2 = No	Dichotomous	-	



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Dependent Variable was Duration of Breastfeeding

Duration of Breastfeeding:

- defined by the mother in the phone interview
- Did not need to be exclusive breastfeeding
- Expressed in months or partial months
- Continuous variable



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Analytic Techniques:

Chi - Square

Multiple Linear Regression

Discriminant Analysis

25



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Chi-Square χ

Examines the difference extent of frequencies that are actually observed differ from those that are expected
Measures nominal, ordinal data

The result is called the chi-square statistic χ^2 .
The formula for the statistic is:

$$\chi^2 = \sum \frac{(\text{observed count} - \text{expected count})^2}{\text{expected count}}$$

$$\text{expected cell count} = \frac{\text{row total} \times \text{column total}}{n}$$

26



Table 17

Chi-Square Analysis: Association between the mothers who believe they have adequate supply of milk and duration of breastfeeding.

Adequate Supply of Milk		Breastfeeding Duration (Months)				Total
		< 4	4-6	> 6		
Yes	Count	37	37	86	160	
	Expected Count	60.6	33.8	65.6	160.0	
	Column Percent	43.0%	77.1%	92.5%	70.5%	
No/Don't Know	Standardized Residual	-3.0	.5	2.5		
	Count	49	11	7	67	
	Expected Count	25.4	14.2	27.4	67.0	
Column Totals	Column Percent	57.0%	22.9%	7.5%	29.5%	
	Standardized Residual	4.7	-.8	-3.9		
	Count	86	48	93	227	
Expected Count		86.0	48.0	93.0	227.0	
Column Percent		100.0%	100.0%	100.0%	100.0%	

* The standardized residual is the square root of (O-E)/E and is negative if O<E.
 % O cells (.0%) have expected count less than 5. The minimum expected count is 14.17
 † Missing count is 7.

Chi-Square = 53.793 df=2 P-Value = <.0005

Result:

The p-value for this hypothesis is < .0005 which is less than the decision rule (p-value < .05). Therefore the null hypothesis is rejected.

The data show that there is a significant association between mothers who believe that they have an adequate supply of milk and the duration of breastfeeding.

The data show that a direct relationship exists for mothers who believe that they have an adequate supply of milk and the duration of breastfeeding. Therefore the working hypothesis is accepted.



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Multiple Linear Regression

- The weights are selected to minimize the sum of the squared differences between the observed values and those predicted. R^2 symbolizes the proportion of the variance of the dependent variable that the regression equation explains.

- The regression equation takes the form

$$Y' = B_0 + B_1X_1 + B_2X_2 + \dots + B_nX_n$$

- where Y' is an estimate of the value of the dependent variable Y , B_0 is a constant, B_1, B_2, \dots, B_n are regression weights, and X_1, X_2, \dots, X_n are n independent variables.
- Sensitive to missing data – removed Latch-R variables



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Discriminant Analysis

Discriminant analysis is a multivariate method used to classify observations into discrete groups.

Independent variables are combined in a weighted sum called the discriminant function that maximizes the differences between the groups. (centroids)

Measures unexplained portion of the variance

29



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The discriminant equation takes the form

$$D = D_0 + D_1X_1 + D_2X_2 + \dots + D_nX_n.$$

- Where D is the discriminant score, D_0 is a constant, D_1, D_2, \dots, D_n are discriminant weights, and X_1, X_2, \dots, X_n are n independent variables.

Stepwise discriminant analysis was used to analyze the data and test the variables against the hypothesis.

30



Table 55
 Summary of Independent Variables used to Predict Longer Duration of Breastfeeding through Chi-Square, Multiple Linear Regression, and Discriminant Analysis

Independent Variable	Longer Duration of Breastfeeding			
	χ^2	MLR (Hard rule)	DA (Hard rule 6/8)	
+ direct				
- inverse				
n/s not significant				
Age (in years)	+	n/s	n/s	
Size of community (pop)	+	n/s	n/s	
Distance from hospital	-	n/s	n/s	
Dependents in the home	Accept null	n/s	n/s	
Prenatal appointments	+	n/s	+	
Aborig./First Nations descent	-	-	-	
Employment of any kind	n/s	n/s	n/s	
Use of Substances	-	n/s	n/s	
Smoking at time of delivery	-	+	n/s	
Decision before pregnancy	+	n/s	+	
Adequacy of milk supply	+	+	+	
Breastfed previously	+	n/s	n/s	
Comorbid condition	-	n/s	n/s	
Mental stress	-	-	-	
Impacts at birth	Accept null	n/s	-	
Prenatal classes	Accept null	n/s	n/s	
Latch R latch score	Accept null	Not tested	Not tested	
Latch R swallow score	Accept null	Not tested	Not tested	
Latch R nipple score	Accept null	Not tested	Not tested	
Latch R comfort score	Accept null	Not tested	Not tested	
Latch R hold score	Accept null	Not tested	Not tested	
Latch R response score	+	Not tested	Not tested	
Latch R TOTAL score	+	Not tested	Not tested	
Social referents	Accept null	n/s	n/s	
Social norm	Accept null	n/s	n/s	
Comfort: breastfed in public	+	n/s	n/s	
Info phi/psych	Accept null	n/s	n/s	
Telephone/home visit	Accept null	n/s	+	Home visit
Supplement with formula	-	-	-	
Breasts are for food and sex	Accept null	n/s	n/s	

Factors Predicting Duration of Babies Being Breastfed

(Table 55 Continued)
 Summary of Independent Variables used to Predict Longer Duration of Breastfeeding through Chi-Square,
 Multiple Linear Regression, and Discriminant Analysis

Telephone/home visit	Accept null	n/s	+ Home visit
Supplement with formula	-	-	-
Breasts are for food and sex	Accept null	n/s	n/s
Knowledge of benefits	+	n/s	n/s
Formal education	+	n/s	n/s
Planned length of breastfeeding.	+	n/s	n/s
Incomplete and absent forms	Accept null	n/s	n/s
Linear combination	Not tested	+	+
Direction	+ 12 - 7	+ 2 - 3	+ 4 - 4
Total Associated Variables	19	5	8



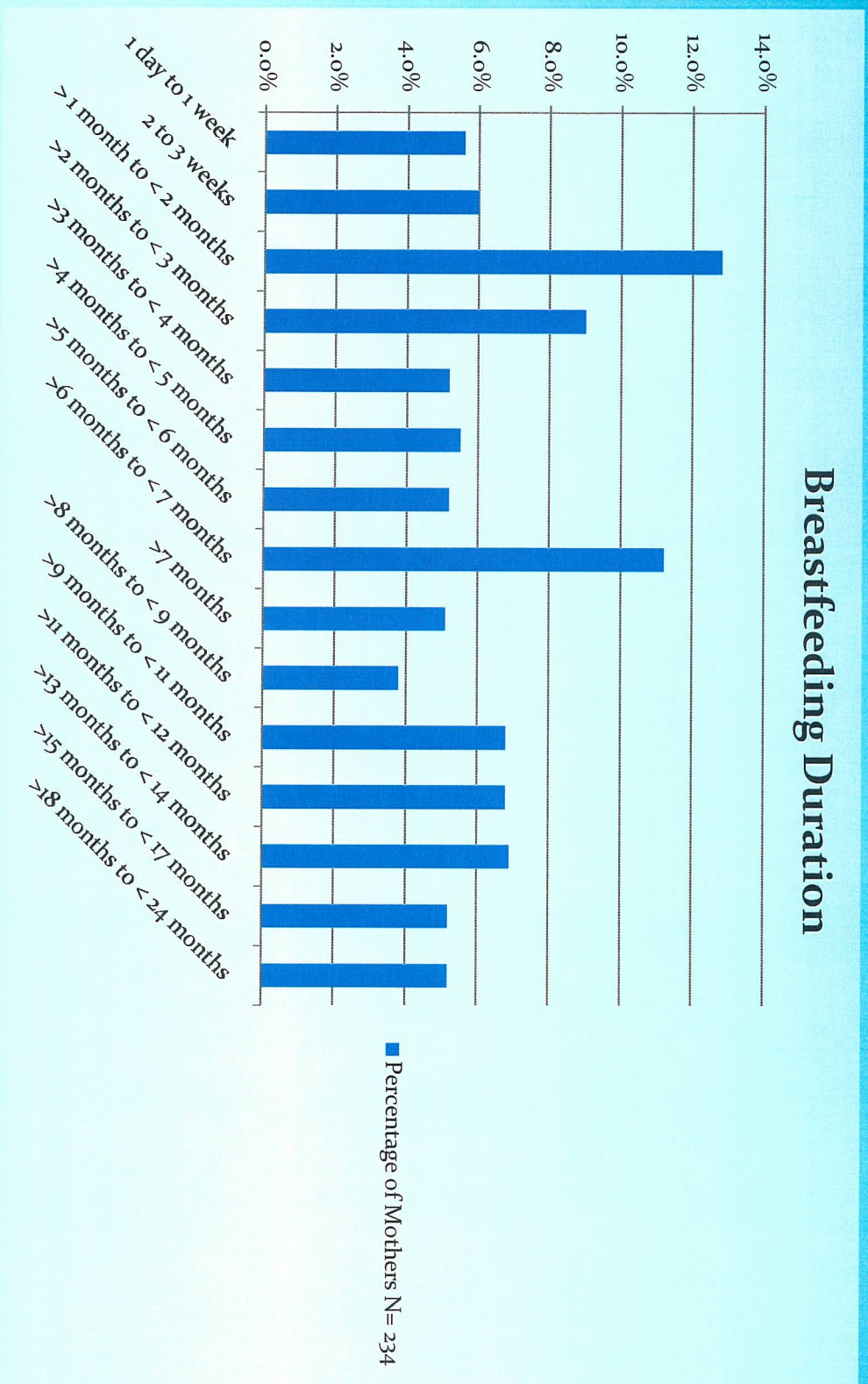
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Figures presented:

- **Histogram, Bar Graphs of Numbers and Per Cent of mothers and duration of breastfeeding in Burntwood Region 2007 - 2009**



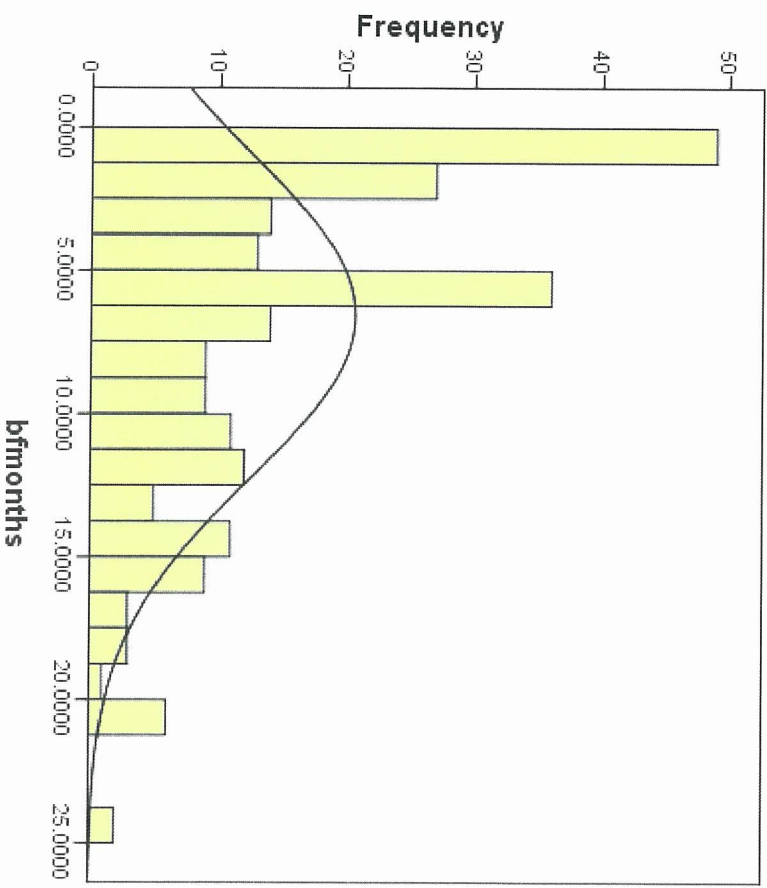
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Factors Predicting Duration of Babies Being Breastfed

Histogram



Mean = 6.59
Std. Dev. = 5.639
N = 234



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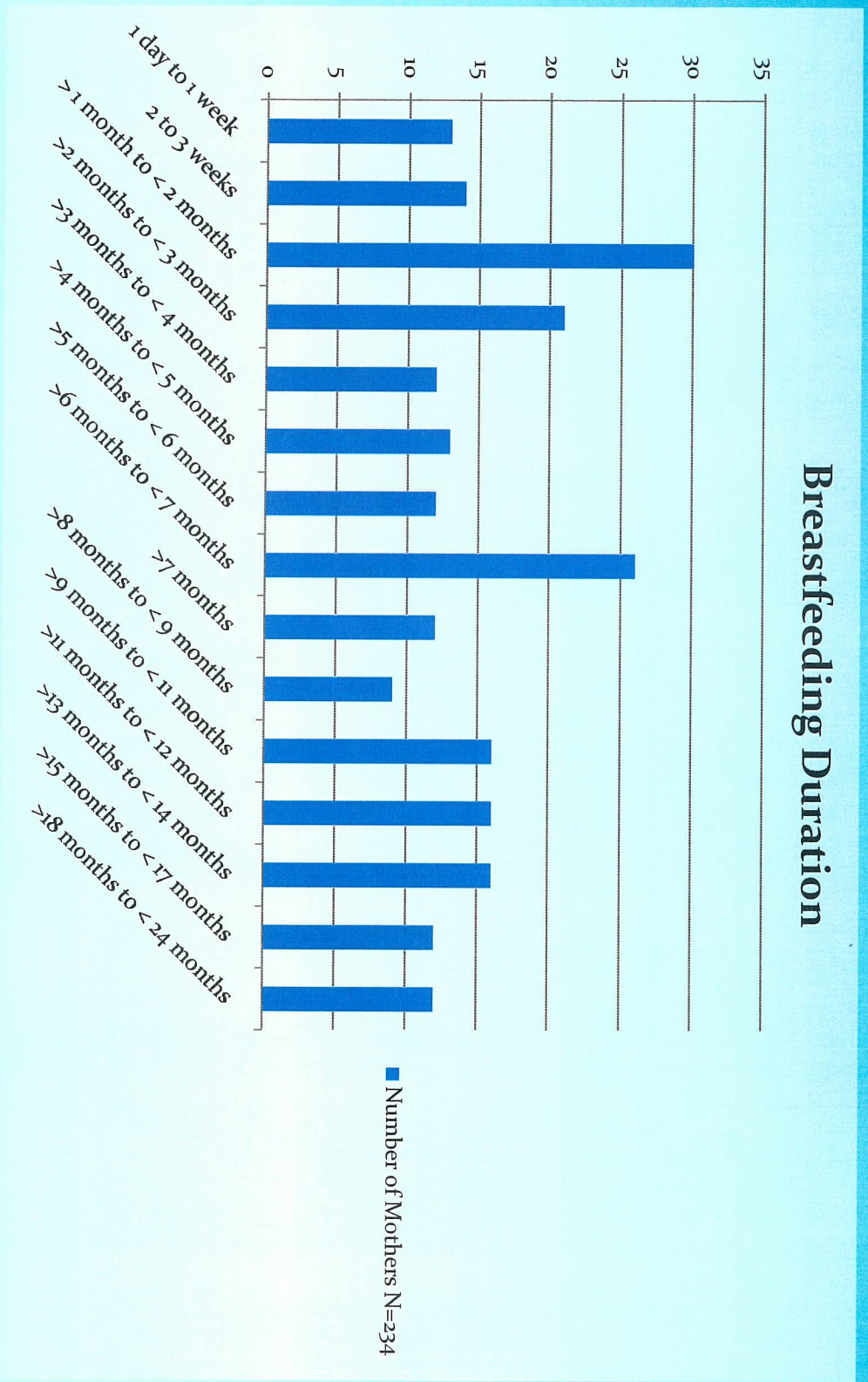




Figure 5

Derived Model Multiple Linear Regression

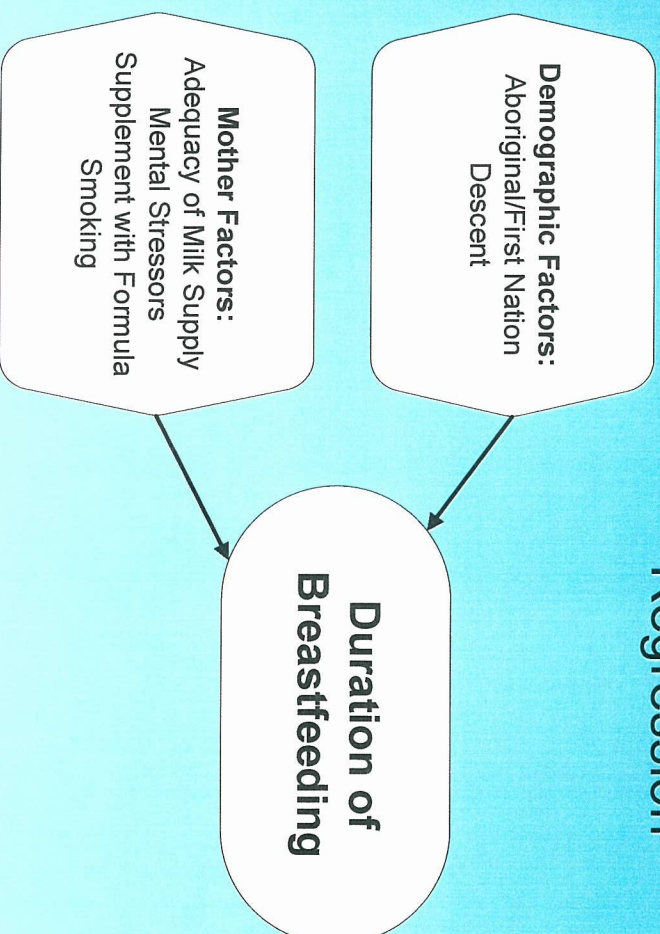
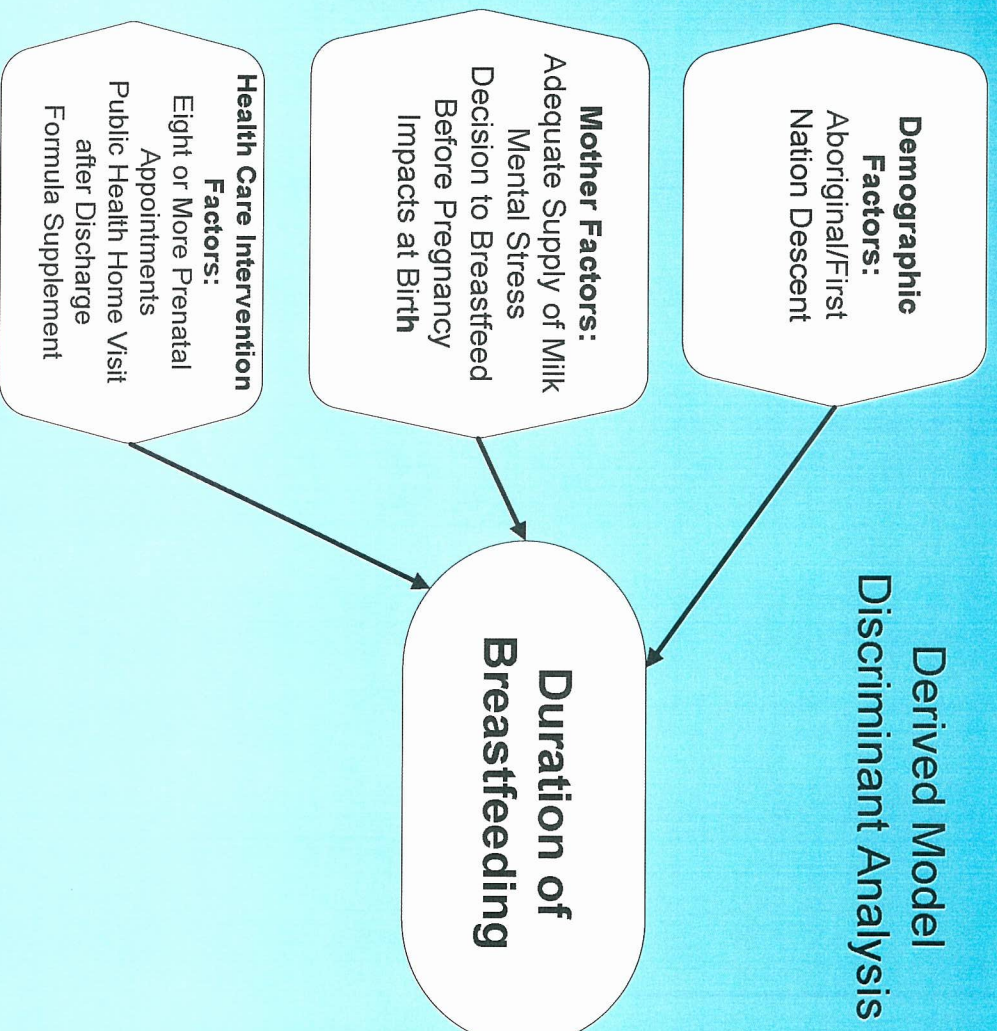




Figure 6



Recommendations : Administrative

Burntwood Regional Health Authority - Internal

- 1. Increase breastfeeding rates to provincial average by 2015**
- 2. Increased minimum breastfeeding duration rates to 6 months by 2015**
- 3. Medical Record Form review for Obstetrical Unit**
 - Reduce duplication, ensure key information**
- 4. Revise provincial post partum referral for specific and individualized breastfeeding follow up**

39

Recommendations: Administrative

Burntwood Regional Health Authority - INTERNAL:

- 5. Policy for formula supplements to be medically ordered**
- 6. Primary Care Practitioners and Specialists to help mother to determine specific targets for breastfeeding**
- 7. Breastfeeding Duration Support and Encouragement, trouble-shooting in the postpartum period**
 - role of father in initiation and duration**

40

Recommendations: Administrative

Burntwood Regional Health Authority - INTERNAL:

- 8. Monitoring of breastfeeding duration in Child Health Clinics with aim of supportive follow up**
- 9. Revise content for prenatal classes:**
 - formula supplementation education
 - duration plan
 - comfort and strategies for breastfeeding in public
- 10. Quality Improvement Audit**
 - Latch-R Breastfeeding Assessment Guide

41

Recommendations: Administrative

Burntwood Regional Health Authority - INTERNAL

- 11. Targetted interventions with moms who use substances:**
 - Pump and Dump Education (loan pumps)
 - Smoking education and cessation – culturally sensitive

42

Recommendations: Administrative:

Burntwood Regional Health Authority - INTERNAL:

- 12. Approach mothers in for confinement for breastfeeding/prenatal classes**
- 13. Ensure follow up to First Nation Communities for mother who had difficulty with initiation**

43

Recommendations: Administrative

Burntwood Regional Health Authority - EXTERNAL

Jurisdictional Partnerships:

First Nations and Inuit Health

- need to support mothers with comorbidities
- Trial program for Community Health Nurse, Peer and Counsellor
- Impact of Tobacco – culturally sensitive

44

Recommendations: Administrative

Burntwood Regional Health Authority: EXTERNAL

Chiefs and Councils, Mayors and Councils:

- **Community support for Breastfeeding**
- **Community Support Groups (Elders)**
- **Present public friendly science on lactation**
- **local artists paintings to naturalize (contest)**

45

Recommendations: Administrative

Burntwood Regional Health Authority: EXTERNAL

Provincial:

- **revision of post partum referral form**
- **Reporting - Community utilization of Health Links**
- **monitoring for utilization and trends in Breastfeeding hotline**
- **change name of Lactation Consultant**

46