

A STUDY OF SELECTED FACTORS THAT MAY CONTRIBUTE TO
THE INCIDENCE OF PREMATURE INFANT BIRTHS IN
TWELVE SOUTHWESTERN MONTANA COUNTIES

by

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ABSTRACT

This study was concerned with three selected factors (socio-economic, geographic, and health facilities) that may contribute to the incidence of premature infant births in twelve southwestern counties in Montana.

The documentary and exploratory method was employed in securing the data.

The results of this study showed no established pattern of the three factors to the incidence of premature infant births.

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CHAPTER I

THE PROBLEM

Introduction

There has been an increasing awareness of the incidence of premature infant births from unknown causes. A physiologic reason for prematurity is apparent in only about one-half of the cases.¹

The infant mortality rate is regarded as a sensitive index of the health level of an area and one readily responsive to environmental conditions. In all studies of causes of infant mortality so far it has been found that prematurity and congenital malformations account for the largest proportions of deaths during the first year of life and the majority of these deaths occur before the end of the first month.²

Although great strides have been made in reducing the number of infant deaths from one month to one year of age, it is in the neonatal period (birth to twenty-eight days) that more research needs to be done. Because prematurity accounts for approximately one-half of these deaths, further studies need to be carried out to see if some of these could be prevented.

Need for the Study

Research to discover other causes of premature infant births is

¹Philip C. Jeans, F. Howell Wright, and Florence G. Blake, Essentials of Pediatrics. (Philadelphia: J. B. Lippincott Company, 1958) p. 238.

²E. Gartly Jaco, Patients, Physicians and Illness. (Glencoe, Illinois: The Free Press, 1960), p. 11, p. 13.

urgently needed, for the majority of premature infants are born to women who show no symptoms of physical illness.³ From statistical studies it is found that approximately 6 per cent of all live births are premature infants. This rate varies in different parts of the country, in different races, and in different social and economic conditions.⁴ Almost one-half (50 per cent) of the infants who die during the first post-natal month are premature infants.

Because infant mortality rate is an important index of the degree of sound development and the measure of the cultural level of any community, it appears that more studies need to be done in this area of unknown causes of prematurity.

Since more than half of the neonatal deaths are due to prematurity, it is felt by those in the health profession that more emphasis needs to be on the prevention of premature infant births. Thus, if suitable preventive measures are employed, a reduction in premature infant births may be anticipated.

Statement of the Problem

The problem in this study was to investigate, in twelve southwestern counties in Montana, some selected factors which may contribute to the incidence of premature infant births. The factors for study were the socio-economic, geographic and health facilities.

³Jeans, op. cit., p. 238.

⁴Wilson, G. Smillie, Preventive Medicine and Public Health. (New York: The Macmillan Company, 1953) p. 318.

Purposes of the Study

The purposes of this study were: (1) to attempt to find if a relationship exists between each of these three selected factors and the incidence of premature infant births in Montana; (2) to provide a preliminary investigation for further study of possible causes of premature infant births in Montana; and (3) to provide information that may serve as a basis for possible prevention of premature infant births in Montana.

Assumptions

The basic assumptions underlying this study were: (1) other factors contribute to the incidence of premature infant births besides the known maternal complications, and (2) these selected factors could have an indirect effect on the incidence of premature infant births through the health status of the mother.

Method of Study

The twelve southwestern counties in Montana selected for investigation were Beaverhead, Broadwater, Deer Lodge, Gallatin, Granite, Jefferson, Lewis and Clark, Madison, Meagher, Park, Powell, and Silver Bow. With the economic structure as the chief criterion for selection, the Bureau of Business and Economic Research School of Business Administration, Montana State University at Missoula, has divided the state into six economic sub-regions and these twelve counties comprise one area. Six of the counties in this area have a high incidence of premature infant births as compared to seven counties scattered throughout the rest of the state. (See Map 1, p. 10).

As the method of study was exploratory and general in nature, the material for this study was obtained from literature written about the subject in obstetric and pediatric textbooks, professional journals, and interviews with a pediatrician, a public health officer, and public health nurses in the field of maternal and child health.

The State Board of Health of Montana made available to this writer the statistics on the percentage of premature infant births in Montana for the five year period, 1955 to 1959.

From the literature and the interviews it was felt that a relationship exists between the number of premature infant births and the socio-economic status of the population, the geographic location and the health facilities available.

Many of the persons who have carried out research on the socio-economic factor, in relation to the incidence of premature infant births, have found that the indigent or ward patients have a higher rate of prematures.

In an unpublished Children's Bureau Study of infants born over a period of several years in two hospitals, the hospital service on which the mother's delivery took place was taken as a measure of her economic status. The series comprised 4,704 white single-born infants, of whom 258 weighed less than 2,500 gm. The incidence of prematurity was higher among the 2,192 ward patients (6.8 per cent) than among the 2,512 private and semi-private patients (4.3 per cent).⁵

⁵William A. Silverman, Dunham's Premature Infants. (Paul B. Hober, Inc., 1961) p. 21.

It was found that among a total of 4,163,090 live births in the United States in 1956 the proportion of white infants weighing 2,500 gm. or less at birth was highest (8.3 per cent) in the Mountain Division.⁶

The area under study is largely rural with sparsely settled country areas and scattered small towns. Thus, health facilities are not as readily available as in the urban areas.

Limitations of Study

The study was limited to twelve counties in Montana during a five year period, 1955 to 1959. Although, there are a number of non-obstetric maternal factors which are associated with an increased incidence of premature infant births, factors selected for this study were the socio-economic, geographic, and health facilities.

Because of the general type of research done, the large area selected, and the three factors involved in this study, the investigator does not propose this to be an exacting piece of research. The study is proposed only to identify and present material that may show where further research could be done.

Definition of Terms

Premature infant: The American Academy of Pediatrics has recommended the following: "A premature infant is one who weighs 2,500 gm. (5 lbs. 8 oz.) or less at birth regardless of the period of gestation."

⁶Silverman, op. cit., p. 27.

If weight is not used then a gestation period of 37 weeks or less is given.

Prematurity: As used in this study refers to a prematurely born infant.

Infant mortality: Is based on the number of infant deaths under one year of age per 1,000 live births.

Neonatal mortality: Refers to the number of infant deaths from birth to one month of age per 1,000 live births.

Review of Literature

In reviewing the literature it was found that an increasing number of studies are being done to gain more understanding into the causes of premature infant births. Arthur H. Parmelee listed the following facts which emerge from studies, which give a fairly clear picture of the problem involved: (1) Approximately 6 per cent of all live births are premature infants. (2) Almost 50 per cent of all the infants who die during the first postnatal month are premature infants. Thus a group that constitutes only 6 per cent of the live births accounts for nearly one-half of the total neonatal mortality. (3) The degree of maturity corresponds in general, rather closely to weight at birth, and there is a striking relationship between birth weight and survival.⁷

Because the neonatal death rate has remained fairly constant for many years, the emphasis on preventive care must be stressed. Edith L.

⁷Arthur Hawley Parmelee. Management of the Newborn. (The Year Book Publishers, Inc., 1959) p. 137.

Polter of Chicago says: "the ideal solution to the problem of prematurity is through the mother; more important than salvaging the life of a premature infant is the prevention of a premature birth."⁸

The lack of information on how to prevent premature labor has so far precluded the establishment of a truly preventive program.

In other investigations there appears to be a relationship between the socio-economic status and the premature infant birth rate. Bundesen and his co-workers reported on an investigation of five socio-economic classes in Chicago (1950) that "as the socio-economic area of the city improved the incidence of prematurity decreased." In Great Britain the incidence of prematurity was found to be 4.3 per cent among infants born to wives of professional and salaried workers and 6.5 per cent among those of "black-coated" wage earners.⁹

This writer did not elect to investigate the nutritional factor, but during the review of literature for this study, it was observed that considerable research has been conducted in the field of maternal nutrition. These studies have substantiated a correlation between poor nutritional status of mothers in the lower socio-economic group and an increase in premature infants.

There appears to be a relationship between geographic location and premature infant births. From a limited number of studies done, the

⁸Elsie Fitzpatrick, and Nicholson J. Eastman. Zabriskie's Obstetrics for Nurses. (Philadelphia: The J. B. Lippincott Company, 1960) Chapter 16.

⁹Silverman, op. cit., p. 21.

writers have concluded an association between high altitude and the incidence of infants with low birth weight. Dr. J. A. Lichty and co-workers in Colorado, conducted a five year study (1949 to 1953) in Lake County (altitude 10,000 to 11,000 feet). They found that 30.8 per cent of the infants weighed 2,500 gm. or less as compared with 10.4 per cent for the state average.¹⁰

There are inherent handicaps in some areas of rural society in regard to health facilities available. The United States Public Health Service has set some practical rule-of-thumb standards. The standard for physicians is set at one per 1,000 persons, although, in some rural areas this is probably too low.¹¹ For public health nurses the ratio is one to 5,000 persons, which is not a sufficient number to carry out a good preventive program in maternal and child health.

Actually little is known about the causes of premature infant births, but what we do know indicates factors that are effective in prevention. It is generally held and fairly well established by those in the health profession, that early prenatal care, good nutrition, control of infections and improvement of maternal hygiene are effective measures in lowering the premature infant birth rate.

Organization of the Remainder of the Study

The remainder of this study is presented in the succeeding two

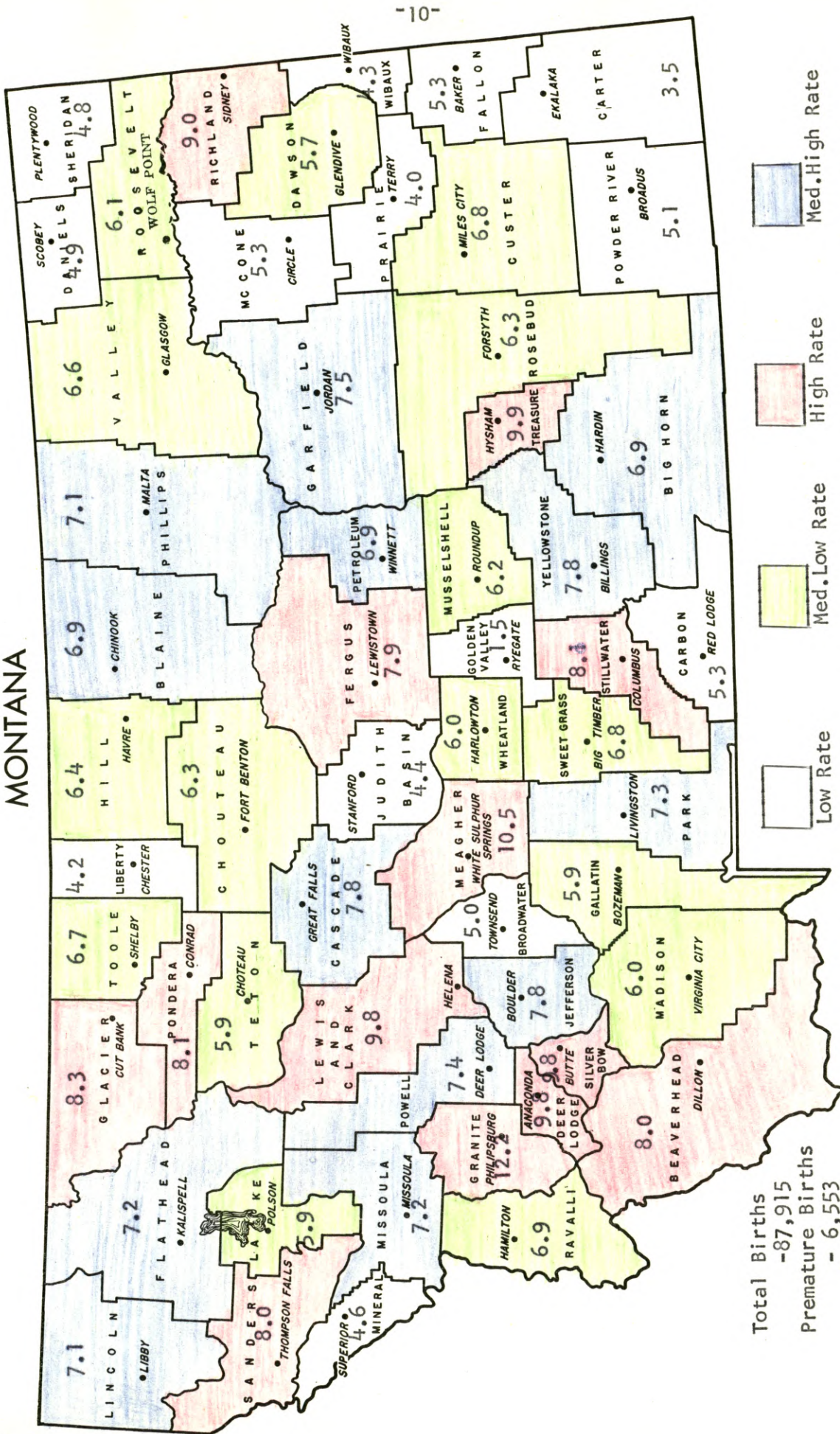
¹⁰Silverman, op. cit., p. 23.

¹¹Earl Loman Koos. The Sociology of the Patient. (New York: The McGraw-Hill Book Company, Inc., 1954) p. 164.

chapters. Chapter II is the presentation and discussion of the data.

The data includes an introduction for a better understanding of the area being studied. There are statistics on the incidence of prematurity, the socio-economic and geography factors and the health facilities. Chapter III presents the summary, conclusions, and recommendations.

MONTANA



Total Births
- 87,915
Premature Births
- 6,553

The percentages of premature infant births to live births in each county, 1955-1959.

TABLE I

INCIDENCE OF PREMATURE
INFANT BIRTHS IN TWELVE COUNTIES IN MONTANA, 1955-1959

County	Number of Live Births	Number of Prematures	Percentage of Premature
Beaverhead	833	67	8.0
Broadwater	340	17	5.0
Deer Lodge	2416	236	9.8
Gallatin	3111	183	5.9
Granite	345	42	12.2
Jefferson	387	30	7.8
Lewis and Clark	3363	331	9.8
Madison	453	27	6.0
Meagher	277	29	10.5
Park	1279	93	7.3
Powell	809	60	7.4
Silver Bow	6731	658	9.8

TABLE II

GEOGRAPHIC AND ECONOMIC STATISTICS IN TWELVE COUNTIES IN MONTANA, 1955-1959

County	Land Area Square Miles	Number of Persons Per Square Mile	Altitude at the County Seat	Approximate 1956 Population	Approximate 1956 Per Capita Personal Income
Beaverhead	5580	1.2	5089 ft.	6,985	\$2,028
Broadwater	1245	2.4	3800 "	2,851	1,586
Deer Lodge	741	22.4	5288 "	17,805	2,310
Gallatin	2540	9.6	4771 "	24,388	1,532
Granite	1737	1.6	2450 "	2,918	1,601
Jefferson	1645	2.5	4914 "	4,184	1,566
Lewis and Clark	3385	7.8	4110 "	26,620	2,283
Madison	3541	1.6	5760 "	5,526	1,307
Meagher	2356	0.9	5280 "	2,401	1,943
Park	2631	4.8	4490 "	12,700	1,601
Powell	2340	2.8	4519 "	6,722	1,624
Silver Bow	716	67.6	5755 "	47,241	2,173

TABLE III

HEALTH FACILITIES FOR TWELVE COUNTIES IN MONTANA, 1955-1959

County	City	Number of Hospitals		Bed Capacity	Number of		Number of
		Hospitals			Doctors May 1, 1956	Public Health Nurses	
Beaverhead	Dillon	1		25	4	1	
Broadwater	Townsend	1		32	2	0	
Deer Lodge	Anaconda	1		99	18	0	
Gallatin	Bozeman	1		82	26	5	
Granite	Philipsburg	1		14	3	0	
Jefferson	None	0		0	3	0	13
Lewis and Clark	Helena	2		75 & 85	35	3	
Madison	Ennis	1		8	4	0	
Meagher	White Sulphur Springs	1		8	1	0	
Park	Livingston	1		58	10	0	
Powell	Deer Lodge	1		25	10	0	
Silver Bow	Butte	2		166 & 56	58	0	

CHAPTER II

PRESENTATION AND DISCUSSION OF DATA

Introduction

To have a better understanding of this study, the writer feels that some description of Montana as a whole and each of the counties will be beneficial to the reader. It is felt there may be some relationship between geographic location, socio-economic status and health facilities and the incidence of premature infant births.

Montana is a state of great expanses and relatively few people. It ranks fourth in area among the fifty states of the Union, and is exceeded in number of people by forty states and the District of Columbia. Montana's population increased by 83,743 persons from 1950 to 1960. The average density of population in 1950 was 4.1 persons per square mile and this has increased to slightly less than five persons per square mile in 1960.

Montana's population is distributed quite unevenly, with the more rugged mountain areas in the western portion of the state, having the least number of people. Population in the state tends to cluster in the valleys of the west and on the major rivers in the east. Cascade County, located in the north central part of the state and Yellowstone County, in the south central portion of the state have the largest population. Although, Montana continues to be a rural state in terms of residence, the population of urban residence is increasing. The population is predominantly white, with American Indians being the most important non-white group.

The mean elevation of Montana is approximately 3,400 feet, although considerable inhabited areas have elevation in excess of 5,000 feet. The highest elevation in Montana is 12,850 feet at the summit of Granite Peak located in Park County. The lowest elevation, 1,800 feet, occurs in Lincoln County located in the northwest corner of Montana.¹

Montana ranks in the upper fourth of the states in per capita income. Its standard of living is high, with the rural population enjoying a standard of living among the highest of any rural group in the United States. Agriculture continues as the most important economic activity.²

Montana is divided into six economic sub-regions identified by the Bureau of the Census. These regions were established largely by grouping geographically adjacent counties on the basis of similarity in economic composition, though certain other non-economic factors such as demography, climate, physiography and culture were also considered. The sub-region selected for this study was twelve counties which are located in the mountain region of the state. This area is largely rural, with the major proportion of the population living on farms and in small towns and communities. Agriculture, livestock raising and copper mining are the main sources of income. The altitude of the county seats range from 2,450 feet in Granite County to 5,760 feet in Madison County. However, most of the counties

¹Montana State University, The Montana Almanac 1959-1960, Missoula, Montana.

²Roland R. Renne and J. Wesley Hoffman. The Montana Citizen. (Helena, Montana: State Publishing Company, 1960).

have mountain peaks that range from 6,000 to 10,000 feet. The largest and smallest counties in the state are in this area, Beaverhead with 5,580 square miles and Silver Bow with 716 square miles. The approximate 1956 census, derived by taking six-tenths of the difference between the 1950 and 1960 Montana census, showed a wide variation in population in these counties. Meagher County is populated by 2,401 persons in comparison to 47,241 persons in Silver Bow. In 1956 the twelve counties studied ranked first in total personal income payments in Montana. The per capita personal income ranged from \$1,307 in Madison County to \$2,310 in Deer Lodge County, a difference of approximately \$1,000.

Incidence of Prematurity

Table I, page 11, Incidence of Premature Infant Births in Twelve Counties in Montana, 1955-1959, lists the number of live births, number of prematures and the percentage of prematures. The number of live births in the twelve counties studies was 20,344, of this number 1,773 were premature infants. The total number of live births in Montana was 87,915, of this number 6,553 were prematures. The State Board of Health of Montana set 8.0 per cent and above as a high rate of prematurity. For the entire state of Montana the per cent of premature infant births was 7.4 for the five year period, 1955-1959, while for the area studied it was 8.7 per cent.

The six counties in this area with a high rate of premature infant births are: Beaverhead, 8.0 per cent; Deer Lodge, 9.8 per cent; Granite,

12.2 per cent; Lewis and Clark, 9.8 per cent; Meagher, 10.5 per cent and Silver Bow, 9.8 per cent.

The three counties in this area with a medium high rate of prematurity are: Jefferson, 7.8 per cent; Park, 7.3 per cent; and Powell, 7.4 per cent.

The two counties in this area with a medium low rate of prematurity are: Gallatin, 5.9 per cent and Madison, 6.0 per cent.

The one county in this area with a low rate of prematurity is Broadwater, 5.0 per cent.

Socio-economic and Geography

Table II, page 12, Geographic and Economic Statistics in Twelve Counties in Montana, 1955-1959, lists the land area, the altitude, the approximate 1956 population, the number of persons per square mile and the per capita personal income for the year 1956.

Beaverhead County, the largest county in the state, has a land area of 5,580 square miles and with a population of 6,985 persons in 1956, has approximately 1.2 persons per square mile. The major concentration of population is at Dillon, the county seat, and Dillon's rural division. The altitude varies from 5,089 feet at Dillon to mountain peaks of 10,000 feet. The per capita personal income in 1956 was \$2,028. Stock raising and farming are the chief sources of income. Western Montana College of Education is in Dillon.

Broadwater County, with a land area of 1,245 square miles and a population of 2,851 persons in 1956, has approximately 2.4 persons per

square mile. The majority of the population is centered in and around Townsend, the county seat. The altitude is 3,800 feet, as Broadwater is located in a valley. The per capita personal income in 1956 was \$1,586. Agriculture and stock raising are the main industries.

Deer Lodge County, with a land area of 741 square miles and a population of 18,640 persons in 1956, has approximately 22.4 persons per square mile. The majority of the population lives in Anaconda, the county seat or within the immediate vicinity. The altitude is 5,288 feet at Anaconda to mountain peaks of 10,000 feet. The per capita personal income in 1956 was \$2,310. Copper smelting, farming and livestock raising are the chief sources of income. The Montana State Hospital, Warm Springs and the Montana Tuberculosis Sanitarium, Galen are both located in the county.

Gallatin County, with a land area of 2,540 square miles and a population of 24,388 persons in 1956, has approximately 9.6 persons per square mile. The center of the population is in Bozeman, the county seat, and surrounding vicinity. The altitude is 4,771 feet at Bozeman to mountain peaks of 10,000 feet. The per capita personal income in 1956 was \$1,532. The source of income is derived from diversified agriculture and purebred cattle. Montana State College is in Bozeman.

Granite County, with a land area of 1,737 square miles and a population of 2,918 persons in 1956, has approximately 1.6 persons per square mile. The population is centered around Philipsburg, the county seat, and Drummond. The altitude at Philipsburg is 2,450 feet, the lowest elevation in this area, but there are elevations to 10,000 feet. The per

capita personal income in 1956 was \$1,601. Granite County is unusually well diversified in industrial as well as agricultural resources.

Jefferson County, with a land area of 1,645 square miles and a population of 4,184 persons in 1956, has approximately 2.5 persons per square mile. The population is centered around Boulder, the county seat, and Whitehall. The altitude at Boulder is 4,919 feet, with altitudes to 8,000 feet in other areas of the county. The per capita personal income in 1956 was \$1,566. Agriculture and livestock raising were the chief sources of income. The Montana State Training School is in Boulder.

Lewis and Clark County, with a land area of 3,385 square miles and a population of 26,620 persons in 1956, has approximately 7.8 persons per square mile. The majority of the population lives in Helena, the county seat and surrounding vicinity. The altitude at Helena is 4,110 feet; however, there are mountain passes from 6,000 to 8,000 feet. The per capita personal income in 1956 was \$2,283. The chief sources of income are from the smelting and refining of copper, farming and livestock. The state capitol is in Helena.

Madison County, with a land area of 3,541 square miles and a population of 5,526 persons in 1956, has approximately 1.6 persons per square mile. The population is divided fairly evenly through the county. The altitude at Virginia City, the county seat, is 5,760 feet. Here also, there are mountain peaks from 8,000 to 11,000 feet. The per capita personal income in 1956 was \$1,307 in 1956. Mining and agriculture are the main sources of income.

Meagher County, with a land area of 2,356 square miles and a population of 2,401 persons in 1956, has approximately 0.9 persons per square mile. The center of population is in and around White Sulphur Springs, the county seat. The altitude at White Sulphur Spring is 5,280 feet, with mountain peaks to 8,000 feet. The per capita personal income in 1956 was \$1,943. Farming and stock raising are the main sources of income.

Park County, with a land area of 2,631 square miles and a population of 12,700 persons in 1956, has approximately 4.8 persons per square mile. The majority of population is centered in and around Livingston, the county seat. The altitude at Livingston is 4,490 feet, the highest elevation in the county is 12,850 feet at the summit of Granite Peak. The per capita personal income in 1956 was \$1,601. The chief sources of income is from farming and livestock raising.

Powell County, with a land area of 2,340 square miles and a population of 6,722 persons in 1956, has approximately 2.8 persons per square mile. The center of population is in and around Deer Lodge, the county seat. The altitude at Deer Lodge is 4,519 feet, with mountain peaks to 8,500 feet in the county. The per capita personal income in 1956 was \$1,624. Livestock industry and some mining are the main sources of income.

Silver Bow County, with a land area of 716 square miles and a population of 47,241 in 1956, has approximately 66.0 persons per square mile. The population is centered in and around Butte, the county seat. The altitude at Butte is 5,755 feet. The per capita personal income in 1956

was \$2,173. The source of income is from the mining of copper. The Montana School of Mines is in Butte.

With the exception of Granite County, the counties with a high incidence of premature infant births had altitude elevations from 4,000 to 10,000 feet.

Beaverhead, Deer Lodge, Meagher, Lewis and Clark, and Silver Bow Counties which had a relatively high per capita personal income, showed a high incidence of premature infant births. Granite had a low per capita personal income and a high incidence of prematurity. Broadwater had a fairly low per capita personal income and a low incidence of premature infant births. Madison had a low per capita personal income and a medium low rate of prematurity.

Health Facilities

The health facilities, which include the number of hospitals, their location and bed capacity, the number of doctors and public health nurses in each county is shown in Table III, page 13. The number of doctors in each county was obtained from the Roster of Physicians and Surgeons registered in Montana May 1, 1956. The number of hospitals, their location and bed capacity, and the number of public health nurses in each county was obtained from the State Board of Health. Jefferson County is the only county in this area without a hospital, while Lewis and Clark and Silver Bow each have two hospitals.

As previously stated in the review of literature, the ratio of doctors to population is approximately one doctor for every 1,000 persons,

while the ratio of public health nurses is one to every 5,000 persons. Six of the counties in this area appear to meet the requirement of one doctor for every 1,000 persons or less, while in the other six counties the ratio was one doctor for every 1,200 to 2,400 persons. Only three of the counties have public health nurses. Beaverhead with one nurse, Lewis and Clark with three nurses and Gallatin with five nurses.

Beaverhead County has one hospital, 25 beds, located in Dillon. There were 4 doctors and 1 public health nurse for the entire county. The approximate 1956 ratio of doctors to population was 1 doctor for every 1,746 persons, and 1 public health nurse for the entire population of 6,985.

Broadwater County has one hospital, 32 beds, located in Townsend. There were 2 doctors and no public health nurses. The ratio of doctors to population in 1956 was one doctor for every 1,425 persons.

Deer Lodge County has one hospital, 99 beds, located in Anaconda. There were 18 doctors in the county, six of these were doctors at the Psychiatric Hospital, Warm Springs. The ratio of doctors to the population in 1956 was one to every 989 persons. There was no public health nurse.

Gallatin County has one hospital, 82 beds, located in Bozeman. There were 26 doctors in the county, the ratio being one doctor for every 930 persons. With five public health nurses in the county, the ratio of public health nurses to the population in 1956 was one for every 4,900 persons.

Granite County has one hospital, 14 beds, located at Philipsburg. There were three doctors and no public health nurse. The ratio of doctors to the population in 1956 was one doctor for every 972 persons.

Jefferson County has no hospital or public health nurse. There were three doctors in the county in 1956, the ratio of doctors to the population was one doctor for every 1,394 persons.

Lewis and Clark County has two hospitals, with bed capacities of 75 and 85; both are located in Helena. The number of doctors was 35 in the county, five of these were doctors at the Veterans Hospital, Fort Harrison. The ratio of doctors to population in 1956 was one doctor for every 760+ persons. With three public health nurses in the county, the ratio was one nurse for every 8,900 persons.

Madison County has one hospital, 8 beds, located at Ennis. The number of doctors was four, so that the ratio of doctors to the population in 1956 was one for every 1,381 persons. No public health nurse available in the county.

Silver Bow County has two hospitals, one is 166 beds and the other 56 beds; both are located in Butte. In 1956 there were 58 doctors in the county. The ratio of doctors to population was one doctor to every 812 persons.

This writer did not propose to evaluate the health facilities, only to present the facilities in each of the twelve counties.

The doctors are listed in each county by number, the number of specialists, general practitioners or their field of practice is unknown.

There were six counties which had a ratio of one doctor for every 1,000 or less persons. The counties were Deer Lodge, Gallatin, Granite, Lewis and Clark, Powell, and Silver Bow. Four of the counties, Deer Lodge, Lewis and Clark, Granite and Silver Bow, which appeared to have a sufficient number of doctors had a high incidence of prematurity. The ratio in the other six counties was one doctor for every 1,200 to 2,400 persons. Beaverhead and Meagher Counties had a high rate of prematurity; Jefferson and Powell Counties had a medium high ratio; Broadwater had a low incidence of premature infant births; and Madison County had a medium low rate.

Public health nurses were employed in only three of the twelve counties. Beaverhead with one public health nurse, the ratio was one to every 6,985 persons; Lewis and Clark with three public health nurses, the ratio was one public health nurse to every 8,900 persons; and Gallatin with five public health nurses, the ratio was one public health nurse for every 4,900 persons. Both Beaverhead and Lewis and Clark Counties had a high incidence of prematurity, while Gallatin had a medium low rate.

All counties, except Jefferson, had hospital facilities.

Findings relevant to Gallatin County seem to support the importance of adequate health facilities to the prevention of prematurity.

CHAPTER III

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDY

Summary

The primary objective of this study was to investigate, in twelve southwestern counties of Montana, some selected factors which may have a relationship to the incidence of premature infant births. The factors for study were the socio-economic, geographic, and health facilities.

The purposes of this study were: (1) to attempt to find if a relationship exists between each of these certain selected factors and the incidence of premature infant births in Montana; (2) to provide a preliminary investigation for further study of possible causes of premature infant births in Montana; and (3) to provide information that may serve as a basis for possible prevention of premature infant births in Montana.

The basic assumptions underlying this study were: (1) other factors contribute to the incidence of premature infant births besides the known maternal complications; and (2) these selected factors may have an indirect effect on the incidence of premature infant births through the health status of the mother.

The documentary and exploratory method was used to obtain data. The review of literature stressed the need for more research in the area of unknown causes to the incidence of premature infant births. From statistical studies approximately 6 per cent of all live births are premature infants, and almost 50 per cent of all the infants who die during

the first post-natal month are premature infants. Because the neonatal death rate has remained fairly constant for many years, the emphasis should be directed toward prevention of premature infant births.

As previously stated six of the counties in the area studied had a high rate of prematurity, three had a medium high rate, two a medium low rate, and one county a low rate.

This writer did not investigate the socio-economic status of the individual families (sufficiently enough) to determine the standard of living. Diversified agriculture (farming and livestock raising) and copper mining and smelting are the chief sources of the per capita personal income. Five of the counties with a high incidence of premature infant births had a relatively high per capita personal income. Granite with a low per capita personal income had a high incidence of prematurity.

The twelve counties are located in the mountainous region of Montana, the altitude ranging from 2,450 feet to 12,800 feet. The majority of the counties have mountain peaks with elevations of 8,000 to 10,000 feet. With the exception of Granite County, the other five counties with a high incidence of premature infant births had altitude elevations from 4,000 to 10,000 feet.

Of all the counties studied, Gallatin is the only one which seems to support the importance of adequate health facilities to the prevention of prematurity.

Conclusions

Definite conclusions cannot be drawn from this study, due to the

nature of the study and the limited amount of data available.

From the results of the study the following conclusions were formulated:

1. The data does not support or refute a relationship between the socio-economic status and the incidence of premature infant births.

2. It would seem probable that there may exist a relationship between altitude and the incidence of premature infant births.

3. The data does not support or refute a relationship between the health facilities and the incidence of premature infant births.

This writer feels there is no established pattern in the data presented and the incidence of premature infant births.

Recommendations for Further Study

This technical paper was limited to three selected factors (socio-economic, geographic, and health facilities) in twelve counties in Montana. Due to the limitations of the study and the general type of research, it would seem desirable that more extensive and specific studies be performed in the area of unknown causes and the relationship to the incidence of premature infant births.

Recommendations for further study which might utilize information from this study are:

1. The utilization of the medical facilities in relation to the incidence of premature infant births.

2. An analysis of the economic status of parents of premature infants.

3. The social class of the population in relation to the incidence of prematurity.

4. The effects of altitude on human beings and reproduction.

5. A comparison of rural and urban areas and the incidence of premature infant births.

LITERATURE CITED

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LITERATURE CITED

BOOKS

- Blake, Florence G. The Child, His Parents and The Nurse. Philadelphia: J. B. Lippincott Company, 1954.
- Hanlon, John J. Principles of Public Health Administration. St. Louis: The C. V. Mosby Company, 1960.
- Jeans, Philips C., F. Howell Wright, and Florence G. Blake. Essentials of Pediatrics. Philadelphia: J. B. Lippincott Company, 1958.
- Kolb, John H. and Edmund de S. Brunner. A Study of Rural Society. Chicago: Houghton Mifflin Company, 1952.
- Koos, Earl Lomon. The Sociology of the Patient. New York: McGraw-Hill Book Company, 1954.
- Parmelee, Arthur Hawley. Management of the Newborn. Chicago: The Yearbook Publishers, 1959.
- Renne, Roland R. and J. Wesley Hoffman. The Montana Citizen. Montana: State Publishing Company, 1960.
- Silverman, William A. Dunham's Premature Infants. New York: Paul B. Hoeber, 1961.
- Smillie, Wilson G. Preventive Medicine and Public Health. New York: The Macmillian Company, 1953.
- Van Blarcom, Carolyn Conant and Erna Ziegel. Obstetrical Nursing. New York: The Macmillian Company, 1958.
- Fitzpatrick, Elsie, and Nicholson Eastman. Zabriskies Obstetrics for Nurses. Philadelphia: J. B. Lippincott Company, 19__.
- Wohl, Michael G. and Robert S. Goodhart. Modern Nutrition in Health and Disease. Philadelphia: Lea and Febiger, 1955.

PERIODICALS

- Baird, Dugald. "Social and Economic Factors Affecting the Mother and Child". American Journal of Public Health. Vol. 42. May, 1952, pp. 516-520.

- Baumgartner, Leona and Jean Pakter. "Challenge of Fetal Loss, Prematurity, and Infant Mortality". The Journal of the American Medical Association. Vol. 167. June 21, 1958, pp. 936-944.
- Elist, Martha M. "Deaths Around Birth--The National Score". The Journal of the American Medical Association. Vol. 167. June 21, 1958, pp. 945-949.
- Foster, Robert G. "Effect of Mobility on the Family". American Journal of Public Health. Vol. 46. July, 1956, pp. 812-818.
- Hepner, Harold J. and Richard Shaver. "Perinatal Mortality as Related to Prenatal Care". Rocky Mountain Medical Journal. Vol. 57, No. 2. February, 1960, pp. 45-48.
- Hogan, Aileen. "The Premature Baby". The American Journal of Nursing. Vol. 54, No. 5. May, 1954, pp. 575-577.
- Jeans, P. C., Mary B. Smith and Genevieve Stearns. "Incidence of Prematurity in Relation to Maternal Nutrition". Journal of the American Dietetic Association. Vol. 31. June, 1955, pp. 576-581.
- Pasamanick, Benjamin, Simon Dinitz and Hilda Knoblock. "Geographical and Seasonal Variations in Births". Public Health Reports. Vol. 74. April, 1959, pp. 285-288.
- Taylor, E. Stewart and Louise C. Walker. "Causes and Prevention of Premature Infant Deaths". Rocky Mountain Medical Journal. Vol. 57. January, 1960, pp. 42-49.
- Taylor, E. Stewart. "The Prevention of Deaths from Prematurity". Public Health Nursing. Vol. 42. May, 1950, pp. 280-281.
- Whitridge, John and Edward Davens. "Are Public Health Maternity Programs Effective and Necessary?" American Journal of Public Health. Vol. 42. May, 1952, pp. 508-515.

PUBLICATIONS OF THE GOVERNMENT
LEARNED SOCIETIES, AND OTHER ORGANIZATIONS

- Bureau of Business and Economic Research School of Business Administration. Personal Income Estimates for Montana Counties Selected Years 1939-1956. Regional Study No. 13. Montana: Montana State University Press, June, 1960.
- Montana State University. The Montana Almanac 1959-1960 Edition. Montana: Montana State University Press, 1958.

United States Bureau of the Census. United States Census of Population
1960 Montana. Washington, D. C.: Government Printing Office,
1960.