A Controlled Evaluation of Rural Regional Perinatal Care: Impact on Mortality and Morbidity

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Abstract: The impact of a rural regional perinatal care (RPC) program was assessed by a quasi-experimental, controlled, population-based design. Outcome measures included changes in five-year average fetal and neonatal mortality rates as well as short-term obstetric and newborn morbidity. Declines in fetal and neonatal as well as birthweight specific mortality rates were observed for both pilot and control regions, for both races, and especially for 1501–2500g infants. However, comparisons of preprogram (1966–74) and postprogram (1975–80) average yearly changes showed no statistically significant differences between regions. While the incidence of prenatal morbidity was the same for both regions, intrapartum and newborn morbidity significantly favored the pilot region. These results were difficult to interpret. Program relevant implications of the findings in relation to rural RPC in North Carolina are discussed. Specific benefits appeared to be associated with the development of two high-risk maternity clinics and a Level II center capability in the pilot region. The importance of community support and public/private sector cooperation in relation to RPC is noted. (*Am J Public Health* 1985; 75:246–253.)

Introduction

The 1976 report of the Committee on Perinatal Health, *Toward Improving Pregnancy Outcome*,[1] was the culmination of a national movement to promote regional perinatal care (RPC); concurrently, the North Carolina Task Force on Maternal and Infant Health proposed similar recommendations that became the basis for RPC in the state. North Carolina goals included development of a regional system of care with the following components:

- identification of high-risk pregnancies and high-risk newborn infants;
- obstetrical and neonatal consultation and referral services from and to Level II or Level III centers;
- maternal and newborn transport, as required;
- professional education for physicians, nurses, and other health professionals; and
- nutrition, social work, and other necessary consultations.

Emphasis was placed on assuring high-risk patients access to levels of care appropriate to their need.

Because of limited funds and a desire to gain firm experience with RPC, the State Advisory Council decided to concentrate its resources initially in a study or pilot region. Since a relatively large proportion of North Carolina births is rural, a five-county rural area was selected for development of the pilot region, applying the following criteria:

- the area was geographically within a 2½ hours drive to the Duke University and University of North Carolina Level III centers to assure professional education as well as communication, consultation, and referral relationships:
- it contained communities having reasonable potential for meeting the guidelines for Level I and II centers;
- it had a sufficient number of births to hypothesize a statistically significant difference in perinatal mortality rates over a three to five-year period when compared to an appropriate control region; and
- the perinatal health professionals appeared receptive and cooperative in the development of a new RPC program.

Although RPC has been advocated widely to reduce perinatal mortality and short-term as well as long-term morbidity[2–6], Sinclair, *et al*,[7] in a critical review of regional neonatal intensive care raised the issue of RPC program effectiveness, concluding that the overall effectiveness of these programs had not been tested experimentally and further evaluation with rigorous scientific methods was required.

In North Carolina, the State Legislature appropriated funds for evaluation of the pilot RPC program, providing a unique opportunity to carry out a controlled, population-based evaluation. Subsequent federal support and local circumstances permitted a rigorous assessment of the impact of the RPC program on: 1), fetal, neonatal, and perinatal mortality, and 2) short-term obstetric and newborn morbidity.

We shall present an overview of the mortality and morbidity findings and discuss their policy implications for rural RPC programs.

Methods

The RPC program was studied with a quasi-experimental design. A matched population, or control region, was selected which, except for the program, was as comparable as possible to the pilot region. Although the two regions were not equivalent, and extensive effort was made to identify a region with similar socioeconomic status, perinatal health statistics patterns, and perinatal health service systems. In this way, control was sought for a number of factors other than RPC in assessing perinatal outcome improvement. Several groupings of North Carolina counties were considered as possible matches before the three-country control region was selected. Table 1 illustrates the major preprogram characteristics of the two regions—their rural nature, extreme poverty, large non-White population, high perinatal mortality rates, and high percentage of low birthweight infants prior to implementation of the program.

Program funding in the pilot region, averaging about $750,000 per year from 1975–80, was used to implement the recommended "total package" of RPC. Space precludes a detailed description of the pilot RPC interventions, but, average yearly funding allocations to specific inputs indicate

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TABLE 1—Descriptive Data Pertaining to Pilot and Control Regions before Implementation of Rural Regional Perinatal Care

Descriptive Data	Pilot Region	Control Region
Socioeconomic Status (1975)		
Total Population	222,300	199,500
% Rural	82%	64%
% Below Poverty Level	33%	30%
% Nonwhite	46%	37%
Perinatal Health Status (1975)		
Total Live Births	4093	3301
% ≤2500 g	8.7%	9.2%
Perinatal Mortality Rate	31.0	28.8
Perinatal Health Care Resources (1975)		
Number of Obstetricians	10	9
Number of Pediatricians	6	7
Population to Primary Care Physician Ratio*	3705:1	3912:1
Number of Bassinets	110	94

*Included Family Practice, General Practice, OB/GYN, and Pediatrics.
Sources: Data on socioeconomic status reference 8.
Data on perinatal health status, reference 9.
Data on number of physicians, reference 10.
Data on bassinets, reference 11.

relative inputs: professional education—$104,000; additional hospital nursing personnel—$54,000; high risk maternity clinics—$96,750; physician and hospital reimbursement for medically indigent patients—$379,000; organized systems of communication (RPC program manager, telephone hotlines, transport and part-time perinatal nursing, nutrition, and social work consultation)—$116,250. A first-year hospital renovation and equipment expenditure of $157,400 was used to develop a pilot region Level II center and purchase ultrasound, electronic fetal monitoring, and resuscitation equipment. A detailed time line showing the implementation of RPC inputs in the pilot region is presented in Appendix I.

Although some perinatal medicine advances were adopted by obstetricians and pediatricians, few organizational, communication, professional education, or transport inputs were introduced in the control region during the five-year period. No new high-risk maternity clinics were established to serve the region, but an MIC (maternity and infant care) clinic which had existed in one of the counties for more than a decade continued to function.

Yearly fetal, neonatal, and perinatal mortality trends for resident fetal deaths and live births in both regions were defined for the period before (1947–74) and after (1975–80) regionalization. Using vital statistics data, analyses of these mortality rates were undertaken via an interrupted time series design where the interruption was the introduction of the RPC program in the pilot region. This segmented regression procedure, is fully documented in a previous publication.[12] The analytical method detects changes in trends and then tests for differences betwen pilot and control changes. Also, birth weight-specific mortality rate percentage reductions for resident fetal deaths and live births were compared between the two regions for preprogram (1968–74) and postprogram (1975–79) periods.

Short-term obstetric and newborn morbidity data were based on listings of the high-risk prenatal, intrapartum, and newborn conditions proposed by Hobel, *et al.*[13] The data were collected for all fetal deaths and live births that ocurred in the six hospitals in the pilot and control regions between November 1, 1978 and October 31, 1979, at which time it was assumed the RPC program had become well established. The original purpose of the listings was an RPC program need to identify high-risk obstetric and newborn conditions. But, it seemed reasonable to use the listings for measurement of short-term morbidity when informed consent was obtained (93 per cent of the total events). Systematic chart recordings of the high-risk conditions by physicians and nurses were the sources of the morbidity data. Considerable effort, including use of uniform definitions by project paid and supervised medical records clerks at each of the hospitals, was expended to attain reliable and complete abstraction of the morbidity data onto precoded forms.*

TABLE 2—Average Yearly Changes in Fetal and Neonatal Mortality Rates (per thousand) 1947–80

	Fetal Mortality			
	1947–55	1956–65	1966–74	1975–80
White				
Pilot	−0.76	−0.03	−0.02	−1.27
Control	−0.52	−0.26	−0.35	−0.38
Equal trend 1975–80		p = 0.10		
Equal trend changes 1966–74, 1975–80		p = 0.10		
Non-White				
Pilot	−0.70	−0.10	−1.03	−0.54
Control	−0.96	+0.65	−1.26	−0.52
Equal trend 1975–80		p = 0.98		
Equal trend changes 1966–74, 1975–80		p = 0.82		
	Neonatal Mortality			
	1947–55	1956–65	1966–74	1975–80
White				
Pilot	−0.42	+0.04	−0.68	−0.49
Control	−0.47	−0.51	−0.33	−0.40
Equal trend 1975–80		p = 0.85		
Equal trend changes 1966–74, 1975–80		p = 0.72		
Non-White				
Pilot	−0.39	−0.12	−1.04	−0.38
Control	−0.43	+0.17	−0.75	−1.37
Equal trend 1975–80		p = 0.15		
Equal trend changes 1966–74, 1975–80		p = 0.18		

Results

Mortality Trends (1947–80)

The time series segmented regression method, specially designed for this research, was used to determine program impact on fetal and neonatal mortality trends for Whites and non-Whites. Historically, statistically smoothed, average yearly changes in mortality were analyzed for 1947–80. Four distinct periods were identified: 1947–55, 1956–65, 1966–74, and 1975–80. The latter period represents the RPC program period and enables comparison of two different types of changes in mortality during that interval: 1) Did the smoothed mortality trends for the 1975–80 period significantly favor the pilot region?; 2) Did the change in smoothed mortality trends for the 1975–80 period compared to the previous period (1966–74) significantly favor the pilot region?

Table 2 shows the changes in fetal and neonatal mortality for Whites and non-Whites. No statistically significant differences were observed. Although not statistically significant, fetal mortality among Whites favored the pilot region

*The specific high-risk conditions assessed in this research are listed in Appendix I.

($p = 0.10$). But, for neonatal mortality among non-Whites, a nonstatistically significant tendency favored the control region ($p = 0.15$).

In addition to assessing overall differences in average yearly mortality changes between the regions with the time series segmented regression analysis, birthweight-race-specific changes were investigated in considerable detail. Percentage reductions between the two regions were compared for the preprogram (1968–74) and postprogram (1975–79) periods, controlling for race and the following birthweight groups: ≤1500g, 1501–2500g, and >2500g. Table 3 shows birthweight-specific percentage reductions in perinatal mortality. In general, percentage declines in each birthweight-race category were similar in the pilot and control regions. Most relevant to the controlled evaluation was the lack of consistent differences between the regions for the preprogram and the postprogram periods among the 12 birthweight-specific categories. Expectedly, fetal and neonatal birthweight-race-specific reductions were comparable for the two regions.

Short-term Obstetric and Neonatal Morbidity

The overall incidence of prenatal, intrapartum, and newborn high-risk conditions, or short-term morbidity, is summarized in Table 4. The incidence of prenatal morbidity—presence of one or more high-risk conditions—was almost identical in the pilot and control regions, 31.0 per cent and 30.8 per cent respectively, confirming the comparability of the regions at a point in the maternity cycle prior to possible program impact. The incidence of intrapartum morbidity was significantly lower in the pilot region—34.5 per cent vs 48.1 per cent in the control ($p \leq 0.001$). Overall newborn morbidity also was lower in the study region—23.6 per cent vs the control 32.7 per cent ($p \leq 0.001$).

In considering the obstetric and newborn morbidity findings, it should be noted that they include only mothers and newborns who were delivered in the pilot and control region hospitals and not those delivered in the Level III hospitals outside the region. Transfers to Level III hospitals from hospitals in the pilot and control regions were included. The analysis is complicated by the fact that larger proportions of control region mothers delivered in Level III centers. We assume, therefore, that obstetric and newborn morbidity in the control region probably is underreported.

A more detailed analysis of differences in intrapartum and newborn morbidity between the pilot and control regions may clarify the possible effects of RPC (see Tables 5 and 6).

TABLE 3—Birthweight-Specific Percentage Reductions in Perinatal Mortality between 1968–74 and 1975–79

	≤1500 gms	1501–2500 gms	>2500 gms	≤1500 gms + Missing Birthweights
White				
Pilot	4.2% (752 720)	37.6% (117 73)	47.5% (10 5)	6.9% (742 691)
Control	18.4% (735 600)	44.0% (115 65)	15.6% (8 7)	21.6% (735 576)
Non-White				
Pilot	14.2% (678 582)	47.1% (91 48)	42.3% (12 7)	13.9% (686 590)
Control	14.1% (719 617)	19.5% (80 65)	50.4% (14 7)	15.8% (723 609)

NOTE: The entries in parentheses denote the 7-year (1968–74) perinatal mortality rate (per thousand) followed by the 5-year (1975–79) perinatal mortality rate (per thousand).

TABLE 4—Per Cent Obstetric and Newborn Morbidity Livebirths and Fetal Deaths Classified by Prenatal, Intrapartum and Newborn Risk Status, November 1, 1978–October 31, 1979

High-Risk Status	Per Cent Pilot (N = 3384)	Per Cent Control (N = 2966)	Statistical Significance*
Prenatal	31.0	30.8	N.S.
Intrapartum	34.5	48.1	$p \leq 0.001$
Newborn-Total	23.6	32.7	$p \leq 0.001$

*Chi Square Test of Significance.

Four clinically important intrapartum conditions significantly favored the pilot region: premature rupture of membranes, fetal distress, intrapartum hypertension, and preeclampsia. These conditions affected relatively large numbers of women, and the latter three probably were influenced by RPC. Poor progress in labor and premature labor <33 weeks significantly favored the control region, with the latter explained by the greater proportion of mothers from that region who delivered at Level III centers. The remaining obstetric high-risk conditions favored neither region.

With regard to newborn morbidity, the specific conditions significantly favoring the pilot region were Apgar ≤6, cyanosis relieved by O_2, intrauterine asphyxia, bilirubin 15.1–20, and positive Coombs test. While the latter two conditions may be difficult to attribute to RPC, the former appear plausibly related to its effects. Gestational age <33 weeks, birth weight <1500g and 1500–2500g significantly favored the control region, but again are most likely the consequences of the larger proportions of control region mothers delivering in Level III centers. Cyanosis unrelieved by O_2 may be explained by the delivery and retention of sicker infants in the pilot region. The remaining newborn conditions favored neither region.

Discussion

Recent reports indicate that declines in neonatal mortality rates were associated with marked improvements in birthweight-specific mortality among LBW infants, suggesting the changes were chiefly the result of rapid advances in,

TABLE 5—Per Cent Intrapartum Morbidity Statistically Favoring Pilot and Control Regions, November 1, 1978–October 31, 1979

High-Risk Condition	Total Births: Per Cent Pilot (N = 3384)	Total Births: Per Cent Control (N = 2996)	Statistical Significance*
Favor Pilot Region			
Premature rupture membranes	6.3	11.4	.001
Fetal distress	5.9	14.2	.001
Intrapartum hypertension	3.9	13.8	.001
Pre-eclampsia, eclampsia	2.2	4.1	.001
Other problems, intrapartum	2.2	4.1	.001
Favor Control Region			
Poor progress in labor	9.0	7.5	.05
Premature labor, <33 weeks	2.5	1.5	.01

(Remaining nine high risk conditions statistically favored neither region: See Appendix I.)

*Chi Square Test of Significance.

TABLE 6—Per Cent Newborn Morbidity Statistically Favoring Pilot and Control Regions, November 1, 1978–October 31, 1979

High-Risk Conditions	Total Newborns: Per Cent Pilot (N = 3354)	Total Newborns: Per Cent Control (N = 2955)	Statistical Significance*
Favor Study Region			
Apgar ≤6	7.5	9.2	.01
Cyanosis relieved by O_2	3.2	9.8	.001
Positive Coombs test	1.1	3.1	.001
Bilirubin 15.1–20 mgm	1.1	2.4	.001
Intrauterine asphyxia	0.5	3.3	.001
Other newborn complications	1.6	4.1	.001
Favor Control Region			
Cyanosis unrelieved by O_2	2.9	0.9	.001
Gestational age <33 weeks	1.6	0.9	.001
Weight <1500 gms	1.4	0.7	.001
Weight 1500–2500 gms	6.9	5.4	.05

(Remaining 18 high risk conditions statistically favored neither region.)
*Chi Square Test of Significance.

and dissemination of, perinatal intensive care.[14–17] Others reported decreases in neonatal mortality following the establishment of intensive care in selected areas[6,18] and differences among hospitals with and without such care.[19–21] On the other hand, an attempt to correlate reductions in neonatal mortality between 1971 and 1977 with the number of Level III newborn intensive care unit (NICU) bassinets per 1,000 live births at the end of the period for each state revealed no consistent relationship.[22] As suggested by Sinclair, *et al*,[7] the impact of regionalization on neonatal mortality and other outcome measures still requires investigation.

In 1975, the Robert Wood Johnson Foundation (RWJF) funded eight RPC regions, involving about 6 per cent of births in the United States; an evaluation of this multicenter program also was undertaken.[23] The RWJF evaluation compared 1974/75 and 1978/79 neonatal mortality rates as well as centralization of LBW and VLBW deliveries at Level III hospitals in the program and comparison regions. Neonatal mortality rates declined in both areas, but no greater reduction was noted for the RWJF regional network. Similarly, centralization of LBW and VLBW deliveries was not accelerated beyond that experienced in the nondemonstration regions. The investigators concluded that regionalization had become widespread and extended into the comparison as well as the RWJF regions.

The North Carolina RPC program involved a much smaller number of births than the RWJF's and was confined to a rural, underserved area typical of many in the state. Considerable effort was made in the pilot region over a five-year period to regionalize perinatal care, following the national recommendations of the Committee on Perinatal Health. The carefully matched control region was left to function without attempts to implement RPC. We compared preprogram (1966–74) and postprogram (1975–80) average yearly changes in perinatal and infant mortality as well as birthweight-specific rates. Declines were found for both regions, both races, and especially for 1501–2500g infants, but no statistically significant differences were observed between regions. Differential shifts in pilot and control region low birthweight (LBW) distribution between the preprogram and postprogram periods could have influenced the mortality results. We therefore determined the LBW distributions of resident live births in each region for 1969–74 and 1975–80, using ≤1500g, 1501–2500 g, and ≤2500g categories. No significant changes were found in the LBW categories for either region. We did not systematically determine the centralization of VLBW and LBW deliveries at Level III hospitals. But, compared to the control region, twice the proportion of ≤1500g and almost three times the proportion of 1501–2500g infants from the pilot region were delivered in its Level II centers.

From the program's beginnings, a number of inputs in the pilot region were directed toward improving referral patterns to, and capabilities of, Level II hospital care. The success of these efforts also is supported by the average length of stay of ≤1500g infants (including transfers and deaths), in Level II comparison hospitals: Pilot Hospital A, 23.7 vs Control A, 5.8 days, and Pilot B, 15.5 days vs Control B, 6.0 days. Thus, our results in relation to centralization vary somewhat from the RWJF findings. Pilot region VLBW and LBW infants were much more likely to be delivered and retained in Level II hospitals specifically designed for their care, while control region infants were more likely to be delivered in or transferred to Level III centers. These practices, which had no adverse effect on mortality, represent a cost-effective feature of the pilot program.

We also studied another hypothesized effect of RPC—short-term obstetric and neonatal morbidity, assessed by systematic measurement of the incidence of high-risk conditions. The results, favoring the pilot region, are difficult to interpret. Despite the described preprogram comparability of the regions, no baseline morbidity data were collected in either region. In addition, we lack morbidity information regarding live births and fetal deaths to residents of these region occuring in the Level III centers. But, since mothers and infants were transferred at a higher rate from the control region, we assume the pilot region was more likely to deliver and retain at the Level II center patients with a greater incidence of obstetric and newborn morbidity. On the other hand, the differences in morbidity may reflect the residual of the most difficult cases which could not be predicted early enough to permit transfer. Thus, it is unclear whether the RPC program was responsible for the reported lower morbidity. It should be noted, however, that a major RPC input in the pilot region was the early establishment of two high-risk maternity clinics to which large numbers of low-income women were referred. These interdisciplinary staffed (obstetrician, perinatal nurse, social worker, and nutritionist) clinics, with regular on-site consultation from the Level III centers responsible for professional education, may have generated the lower incidence of morbidity in the pilot region. Sokol, *et al*, found such high-risk maternity clinics were effective in reducing intrapartum and newborn morbidity.[24]

Why was the hypothesized mortality impact not achieved by the program? The pilot region's socioeconomic and perinatal health statistics indicated it was in great need of improved perinated care. The program was adequately funded and professional education, consultation, and access to referral were committed by Duke University and University of North Carolina at Chapel Hill Level III perinatal centers. In addition, the North Carolina Division of Health Services invested considerable administrative and organizational energy in the program. Although not supported by quantitative data, observers of the pilot region were struck by the fragile nature of provider and institutional relation-

ships in the largest county in the region, where private/public sector cooperation periodically was threatened. Also, evidence of community involvement in the project appeared limited. These circumstances in the pilot region may have biased the evaluation results. However, we doubt that they are unusual in North Carolina or other areas of the US.

What does this study have to recommend for regionalization in other rural areas? A "total package" strategy of implementing various RPC components was sought in the North Carolina pilot project. The more cost-effective course may be a modified approach of emphasizing selected RPC components based on the favorable experiences associated with development of the Level II center and the high-risk maternity clinics. These clinics may have reduced the incidence of intrapartum and newborn morbidity and, since they were closely linked to the Level II center, allowed selected high-risk mothers and infants to receive less costly hospital care in the pilot region. For the main part, high-risk clinics should support care in multicounty districts, emphasizing consultation and referral between counties.

Finally, funding for regionalization must be conditional on well-developed private and public sector community support for RPC activities. In those geographic locations where it fails to reach levels that are consistent with reasonable prospects of success, careful nurturing of the necessary relationships should be undertaken before RPC programs are funded.

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Although too numerous to mention individually, the project would not have been possible without the continued participation of all providers, administrators, and medical records personnel at the hospitals and health departments in both regions. This paper was read in part at the 111th Annual Meeting of the American Public Health Association, Maternal and Child Health Section, Dallas, Texas, November 1983.

APHA 113th Annual Meeting Set for Washington, DC

The American Public Health Association's 113th Annual Meeting will be held November 17–21, 1985, in Washington, DC. The theme for the five-day convention is "Government's Responsibility and the Public's Health."

APPENDIX I
Time Line Implementation of Regional Perinatal Care (RPC) Inputs in Pilot Region

Note: ▲ indicate specific dates for events
<—> indicate inclusive dates of ongoing activities

Time Line for RPHC Project Inputs

Yr.	1975					1976						1977						1978						1979						1980			
Mo.	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7

I. *Project Inputs—Study Region*

A. Organizational Developments

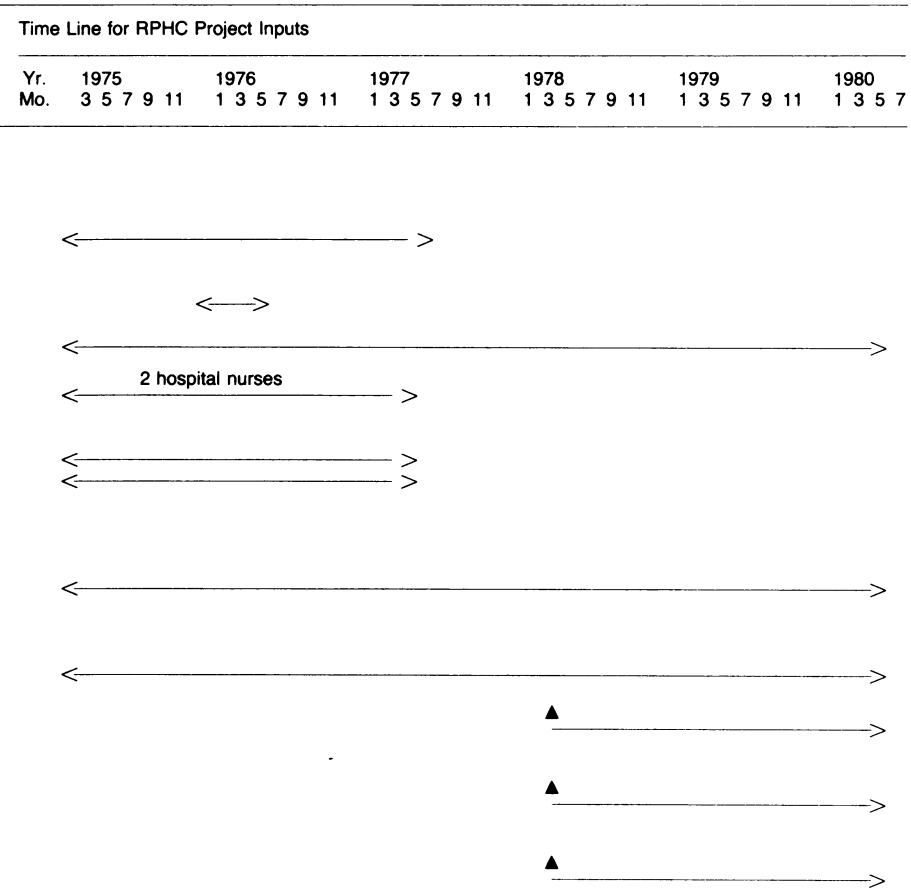
1. District Center (Level II) established at Southeastern General (SGH) ▲ <—————————————————————>
2. Renovation complete at SGH ▲
3. Community Centers (Level I) established at Scotland Memorial (SMH) and Columbus County Hospital (CCH) ▲ <—————————————————————>
4. Referral criteria developed ▲
5. Grants to SGH, SMH, and CCH for renovation, equipment, and staff ▲ (SGH-$128,940), (SMH-$93,940), (CCH-$8,400)
6. Activities associated with grants <—————————>
7. Grants to CCH and Bladen County Hospital (BCH) for resuscitation and transportation of sick infants ▲
8. High-risk maternity clinics established at Robeson (RHD) and Scotland County (SHD) Health Departments (RHD-$22,006 extended to $75,865) (SHD-$15,000 extended to $67,340) <—————————————————————>
9. Reimbursement fund for physicians and hospitals for care of indigent mother-infant pairs $213,000 $230,000 $450,000 $575,000 $615,000
10. Study Regional Council developed ▲ <—————————————————————>
11. Regional Staff hired ▲ <—————————————————————>
12. Intensive and intermediate care nurseries at SGH and SMH, respectively <—————————————————————>
13. Four full-time nurses employed ▲ <—————————————————————>
14. Ultrasonography established at SGH ▲ <—————————————————————>
15. OB physician in Columbus County ▲ <—————————————————————>
16. Neonatologist to SGH ▲ <—————————————————————>
17. Move to newly constructed hospital in Columbus County ▲ <—————————————————————>
18. Pediatrician in Columbus County ▲ <—————————————————————>

B. Communication, Consultation, and Referral Developments

1. 24-hour telephone consultation numbers made available to all participating health departments and hospitals <—————————————————————>
2. Credit card system for telephone linkages ▲ <—————————————————————>
3. Streamlined communication link to Division of Perinatal Medicine at Duke and UNC established <—————————————————————>
4. Communication links among hospitals in study region <———>
5. Radio and newspaper used to educate public about importance of prenatal care <—————————>
6. Recruitment of board eligible OB in Columbus County

APPENDIX I Continued

Note: ▲ indicate specific dates for events
<—> indicate inclusive dates of ongoing activities



APPENDIX II

Prenatal, Intrapartum and Neonatal High-Risk Conditions:* RPC Evaluation, November 1, 1978–October 31, 1978

PRENATAL CONDITIONS	INTRAPARTUM CONDITIONS
Biosocial	Poor Progress in Labor
No Prenatal Care	Fetopelvic Disproportion
Age 14 or under	Intrapartum Hypertension
Age 35 or over—Prima Gravida	Prolonged Membrane Rupture
Age 38 or over—Gravida 2	Premature Membrane Rupture
Weight less than 100 lbs	Premature Labor, less than 33 wks
Weight greater than 250 lbs	Intrapartum Hemorrhage
Alcohol or Drug Addiction	Fetal Distress
	Intrapartum Sepsis
Past Reproductive Problems	Breech Presentation
Consecutive Spontaneous Abortion	Transverse Lie
1 Perinatal Death	C-Section
2 Premature Labors	Placenta Previa
Para 7 or Greater	Abruptio Placenta
Previous C-Section	Pre-Eclampsia; Eclampsia
History—Baby with Major Congenital Anomaly	Other Intrapartum Problem (Specify)
Historical Risk—Diabetes	
Developmental Anomaly—Genital Tract	NEWBORN CONDITIONS
History—Intrauterine Growth Retardation	
Previous Myomectomy	Birthweight less than 1500 gms
	Birthweight 1500–2500 gms
Medical Problems	Birthweight greater than 4000 gms
Blood Pressure over 140/90	Gestational Age 32 wks or less
Cardiac Disease	Cyanosis Relieved by O_2
Diabetes Mellitus	Cyanosis Unrelieved by O_2
Renal Disease	Infant of Diabetic Mother
Thyroid Disease	Hypoglycemia
Anemia	Jaundice, Bilirubin > 20 mgms
Sig. Viral Infection—this Pregnancy	Jaundice, Bilirubin 15.1–20 mgms
Pap Smear—Classes 3–5	Hypocalcemia
Thromboembolic Disease	Undiagnosed Metabolic Problem
	Congenital Malformation
Obstetric Problems	Chronic Intrauterine Infection
Intrauterine Growth Retardation	Acute Perinatal Infection
Multiple Pregnancy	Birth Injuries
RH Sensitization	Disorders of Muscle Tone
Polyhydramnios	Seizure Disorders
Persistent Transverse Lie 3rd Trimester	Hemolytic Anemias
Persistent Breech Presentation 3rd Trimester	Blood Loss Anemia
Pre-Eclampsia, Eclampsia	Positive Coombs Test
Hospitalized 2nd/3rd Trimester Bleeding	Undiagnosed Abdominal Mass
Prolonged Pregnancy ≥42 wks	Renal Failure
Premature Membrane Rupture	Intrauterine Asphyxia
Pregnancy—IUD in Place	One Minute Apgar 6 or Less
Inadequate Weight Problem (Specify)	Respiratory Distress Syndrome
Other Prenatal Problem (Specify)	Other Newborn Problems (Specify)

*Adapted from Hobel CJ, *et al*, ref. 13.

ERRATUM

The theme of the National Rural Health Care Association's 8th national conference, to be held in Charleston, West Virginia, May 8–11, 1985, is "Transitions: Creating a Positive Future for Rural Health." The Journal regrets that the theme was not correctly worded in the published notice in the December 1984 issue.

The conference will offer a comprehensive education program and an organized recreational and social program. The educational program will focus on six areas of major interest: health policy, management, special populations, clinical, health promotion and disease prevention, and research. For information on registration and the final conference program, contact: National Rural Health Care Association, 2220 Holmes Street, Kansas City, MO 64108.