Illness Associated with Child Day Care: A Study of Incidence and Cost

David M. Bell, MD, Dennis W. Gleiber, PhD, Alice Atkins Mercer, PhD, Robi Phifer, MFA, Robert H. Guinter, MD, A. Jay Cohen, MD, Eugene U. Epstein, MD, and Manoj Narayanan, MD

Abstract: We studied 843 children under 36 months of age enrolled in a prepaid health plan from September 1985 through March 1986, to identify characteristics of day care which might be risk factors for infection and to describe the resulting economic costs. Children cared for in their own home had a mean of 2.03 infections diagnosed during the study period. Adjusted rates of excess infection (95 per cent CI) for children cared for in other settings were: −.09 (−.73, .54) in relatives' homes; .10 (−.51, .71) in day care homes; .79 (.13, 1.45) in day care centers; .60 (−.24, 1.46) in mother's day out programs; and .66 (−.01, 1.34) in multiple settings. Children in day care centers were 4.5 times more likely to be hospitalized than those in other settings (95 per cent CI = 1.55, 13.00), primarily due to an increased rate of tympanostomy tube placement (relative risk 3.79, 95 per cent CI = 1.04, 13.36). The strongest predictor of illness risk was the number of other children in the room. The mean monthly cost of medical care was $32.94 for children in the highest risk settings compared with $19.78 for those in other settings. Illness in a child in our study accounted for 40 per cent of parental absenteeism from work; the mean number of days lost per month was 0.52 for parents of children in day care centers compared with 0.37 for those of children in other forms of full time care outside the home. *(Am J Public Health* 1989; 79:479–484.)

Introduction

Day care for preschool children of working parents has become an integral part of American life. More than half of all mothers with preschool children are in the labor force and more than 60 per cent of their children receive day care outside the home.[1] Many studies show an increased risk of infection for children and their families using at least one form of care—the institutional day care "center".[2–10] A lower risk of illness has been attributed to children cared for by non-relatives in private households known as day care "homes", but few data are available from these settings which are typically small, often unlicensed, and difficult to identify.[5–9]

Reliable measures of the risks and consequences of infections attributable to various forms of child care are needed. Most reports have focused on only a single pathogen or disease, studied day care centers exclusively, or used case-control methods to estimate relative risk of illness rather than prospective surveillance to generate incidence data. With some exceptions,[11–14] most studies have not evaluated specific characteristics of child care which might promote the spread of infection. Finally, despite the fact that child care has become an economic necessity for many families, the economic consequences of varying illness rates among children in different settings have not been examined.

During the winter of 1985–86, we studied a cohort of preschool children in our practice who were enrolled in a prepaid health care plan to compare the incidence of illness among children cared for in different settings, to study the economic consequences of child care-related illness, including increased utilization of health care services and parental absenteeism from work, and to identify characteristics of child care which may be important determinants of illness incidence and health care costs in preschool children.

Methods

The children in our study received prepaid medical care from the Health First Medical Group (HFMG), a 28-physician multi-specialty group having three offices in middle class areas of Memphis, Tennessee. The children studied were all insured under a family health care plan offered through a parent's employer which stipulated that all medical care, in order to be covered, had to be provided or authorized by an HFMG physician. Parents, employers, or both paid a single monthly premium, in exchange for which the costs of all visits to an HFMG office, including laboratory and x-ray studies, as well as referrals to specialists and hospitalizations were covered at 100 per cent with no deductible. Authorized emergency room visits were also covered but incurred a $25 copayment. Prescriptions written by HFMG physicians could be filled immediately at in-house pharmacies for a fee of $3 each. These features were designed to provide strong incentives for patients to obtain all of their medical care from the HFMG.

An HFMG office is located within 20 minutes driving distance of all areas of Memphis and its suburbs. To facilitate access to medical services, HFMG offices are open weekdays from 8:30 am until 9:00 pm, and weekends and holidays from 1:00 to 5:00 pm. A 24-hour telephone consultation service is also available.

Study Design and Data Collection

During the seven-month period September 1985 through March 1986, health care utilization data for all children under 36 months of age enrolled in the prepaid plan were collected prospectively without their parents' knowledge that a study was in progress. Information regarding illness diagnosis and laboratory and x-ray studies (obtained if necessary for patient care) were recorded on computerized encounter forms by the examining physician at each HFMG office visit. For this study, common infectious illnesses were classified as: 1) upper respiratory infection without otitis media; 2) lower respiratory infection; 3) acute otitis media; 4) gastroenteritis; and 5) skin infection. We distinguished follow-up visits for the same illness from separate illnesses.

Medical charges were abstracted from the encounter forms; these were charges which would have been billed directly to other HFMG patients not members of the prepaid health care plan. Diagnoses and charges resulting from authorized emergency room visits and hospitalizations were obtained subsequently from hospital and insurance records. The average retail cost per visit of drugs prescribed for children during the study period was obtained from pharmacy

From the Department of Pediatrics, Health First Medical Group, and the Center for Health Services Research, Memphis State University, Memphis, TN. Address reprint requests to David M. Bell, MD, Hospital Infections Program, Centers for Disease Control, Bldg. 1, Rm. 5064, C-10, Atlanta, GA 30333. This paper, submitted to the Journal June 17, 1987, was revised and accepted for publication July 22, 1988.

records. Immediately following the study period, a letter explaining the project and a questionnaire were mailed to parents of all subjects. The questionnaire requested information on child care arrangements for the index child, including household characteristics and other variables which might affect the child's risk of illness (Appendix A). We also asked the number of days and the reasons for which a parent had been absent from work during the preceding three months, the cost of day care for the child, the number of visits the child had made to non-HFMG physicians or emergency rooms during the preceding month and the number of times the child had been ill without seeing a physician during this month. Two weeks after the questionnaires were mailed, a computer generated random sample of 15 per cent of parents who had not responded were interviewed by telephone. This survey was performed by trained interviewers who explained the purpose of the study and administered the questionnaire using a standardized, closed-ended format.

We excluded from the study only those children diagnosed by one of us as having a chronic illness which might lead to increased susceptibility to infection (including asthma, bronchopulmonary dysplasia, congenital heart disease, cystic fibrosis, and Down's syndrome).

Tympanostomy tubes were placed by a single otolaryngologist after referral by one of us for indications of either recurrent episodes of acute otitis media despite daily prophylaxis with antibiotics, or middle ear effusions persisting despite three months of medical treatment. Patients who had received tympanostomy tubes within eight months before onset of the study were excluded from the tabulation of otitis media incidence; patients who received them during the study were excluded from this tabulation for the remainder of the study.

Statistical Methods

Bivariate analysis of illness incidence according to type of child care was performed using the F test for analysis of variance. Rates of excess illness in children cared for outside of their own homes were adjusted using linear regression analysis for the effect of host and family environment variables which differed among children in different forms of care.

Hierarchical multiple linear regression analysis was used to evaluate potential risk factors for diagnosed illness in children who were cared for outside of their homes by non-relatives. Independent variables (Appendix A) were entered into the model in sequential groups of host, family environment, and then child care characteristics and were retained in the model using backward elimination if their p values were $<.05$ (two-tailed).

The suitability of linear regression for modeling non-normally distributed dependent variables (illness incidence) was validated by examination of the error terms. No serious deviation from normality was observed in these terms, and plots of residual terms and predicted values displayed no violation of the homoscedasticity assumption.[15,16]

Results

Cohort Members, Child Care Settings

Of 1,388 children under 36 months of age when the study began, 57 (4.1 per cent) were excluded due to chronic illness. Of the remaining 1,331, data were obtained by mail for 758 (57 per cent) and by telephone for an additional 85 (6 per cent). As there was no difference of consequence in the distribution of child care settings between these two groups of respondents (Appendix B), we combined them to yield a total of 843 children (63 per cent of the target population) upon whom our analysis is based.

Of the 843 children studied, the age distribution at entry was 33 per cent 0–11 months, 34 per cent 12–23 months, and 33 per cent 24–35 months; 48 per cent were male; and 57.5 per cent were White, 39.8 per cent Black, 0.1 per cent Hispanic, 1.2 per cent Asian, and 1.2 per cent of other or unspecified race. (In comparison, US Census data indicate that in 1980, the population of Shelby County, Tennessee, which includes Memphis, was 57.3 per cent White, 41.8 per cent Black, and 0.9 per cent of other or unspecified race.) Eighty-two per cent of the children studied lived in households with two adults, 11 per cent lived with only a single adult, and 7 per cent lived with three or more adults. Of the 685 households containing two adults, both adults were employed in 68 per cent.

The customary source of child care varied widely (Table 1), as did host and family environment characteristics of children in different forms of care (Appendix C). Compared with children enrolled in day care centers or mother's day out programs, those enrolled in day care homes were more likely to be permitted to attend if they were febrile (134/185 vs 43/200; odds ratio 9.6; 95 per cent CI = 5.9, 15.8), had symptoms of respiratory illness (162/185 vs 139/200; OR 3.1; 95 per cent CI = 1.8, 5.4), or had vomiting or diarrhea (102/185 vs 38/200; OR 5.2; 95 per cent CI = 3.2, 8.6).

Incidence of Illness and Associated Risk Factors

Bivariate analysis disclosed differences in infection rates according to child care setting (Table 2) which persisted after

TABLE 1—Child Care Arrangements of Study Participants

Child Care Setting	Number of Children Studied (%)	Mean Number of Hours/Week in Child Care	Mean Number of Other Children in Room	Mean Cost per Week (Dollars)
In own home by parent	173 (20)	1.9	3.1	4.12
In own home by sitter	7 (1)	45.0	0.1	48.81
Relative's home	141 (17)	34.2	1.7	23.85
Day care home	194 (23)	42.9	3.4	35.28
Mother's day out	51 (6)	17.5	7.2	20.54
Day care center	159 (19)	42.3	13.0	43.96
Multiple settings	118 (14)	33.2	6.8*	27.75
All study participants	843 (100)	29.9	6.1	32.17

TABLE 2—Mean Number of Infections per Child Diagnosed during Study Period and Reported by Parents during One Month of Recall

Type of Child Care	Diagnosed by Physician in Prepaid Plan						Reported by Parent	
	Upper Respiratory Infection without Otitis Media	Lower Respiratory Infection	Otitis Media	Gastroenteritis	Skin Infection	Total Infections	Illnesses without a Physician Visit, in One Month of Recall by Parent	Illness Resulting in a Physician Visit outside Prepaid Plan, in One Month of Recall by Parent
Own home	0.79	0.16	0.84	0.15	0.09	2.03	0.66	0.28
Relative's home	0.68	0.18	0.77	0.09	0.10	1.82	1.00	0.29
Day care home	0.88	0.18	1.21	0.17	0.09	2.54	0.82	0.22
Mother's day out	1.18	0.20	1.49	0.10	0.18	3.14	0.90	0.16
Day care center	1.03	0.29	1.40	0.10	0.12	2.96	1.03	0.22
Multiple settings	1.13	0.17	1.37	0.21	0.12	3.00	0.99	0.38
All participants	0.91	0.19	1.13	0.14	0.11	2.49	0.90	0.28
P (F test, df = 5)	0.014	0.338	0.0006	0.147	0.723	0.0001	0.18	<0.0001

adjustment for potentially confounding host and family environment variables (Table 3). Hospitalization rates were unaffected by age and were higher for children in day care centers than for children in all other settings combined (relative risk = 4.50, 95% CI = 1.55, 13.00), primarily due to an increased incidence of tympanostomy tube placement (relative risk = 3.79, 95% CI = 1.04, 13.36) (Table 4).

Multivariate analysis identified the following predictors* of the total number of infections diagnosed: age in months (B = −.07, SEB = .01), breastfeeding prior to the study (B = .86, SEB = .24), median household income of census tract in $1000's (B = .094, SEB = .021), number of other children in the room in child care (B = .05, SEB = .02), lack of a separate room for diaper changing/potty use (B = .76, SEB = .28), and food furnished by the child care provider (B = .81, SEB = .37). Results were similar for individual categories of infection except that no child-care variables were predictive of upper respiratory infection without otitis media and presence of infants less than 12 months of age, acceptance of children with vomiting or diarrhea, and bringing food from home were predictive of gastroenteritis.*

No risk factors for skin infection were identified. Host, family environment and child care variables, respectively, accounted for 10, 4 and 5 per cent of the variance (R^2) in total number of infections diagnosed. Entry of an additional set variable, "child care setting", into the multivariate model resulted in a net increase in explained variance of only 0.7 per cent, suggesting that most of the variance attributable to child care was accounted for by variables specified in our model.

*Complete data from multivariate analyses are available from authors on request. B = unstandardized regression coefficient, SEB = standard error of B.

Financial Costs

The mean monthly cost of medical care, including prescription drug costs, for children in the highest risk settings (day

TABLE 3—Mean Number of Excess Episodes of Diagnosed Infection per Child for Children Receiving Care Outside of Their Own Homes, as Compared with Those Cared For in Their Own Homes, Adjusted for Host and Family Environment Variables (Appendix C)

Child Care Setting	Upper Respiratory Infection without Otitis Media	Lower Respiratory Infection	Otitis Media	Gastroenteritis	Skin Infection	Total Infections
	MEAN ACTUAL NUMBER OF EPISODES					
Own home (referent)	.79	.16	.84	.15	.09	2.03
	MEAN EXCESS EPISODES (95% CI)					
Relative's home	−.10 (−.42,.21)	.03 (−.10,.15)	.08 (−.35,.50)	−.07 (−.19,.04)	−.02 (−.12,.07)	−.09 (−.73,.54)
Day care home	−.11 (−.41,.20)	−.05 (−.17,.07)	.31 (−.10,.72)	−.01 (−.12,.10)	−.06 (−.15,.03)	.09 (−.51,.71)
Day care center	−.10 (−.23,.43)	.11 (−.02,.24)	.66* (.22,1.10)	−.09 (−.22,.03)	−.02 (−.11,.08)	.79* (.13,1.45)
Mother's day out	−.15 (−.28,.57)	.04 (−.13,.20)	.44 (−.13,1.01)	−.07 (−.22,.09)	−.06 (−.06,.19)	.60 (−.24,1.46)
Multiple settings	−.15 (−.19,.48)	.02 (−.11,.15)	.51* (.06,.96)	−.04 (−.09,.16)	−.04 (−.14,.06)	.66 (−.01,1.34)

*Significant excess compared with referent group (95% CI does not include 0.0).

TABLE 4—Incidence of Hospitalization during Study Period

Child Care Setting	Per Cent of Children Hospitalized	Reason of Hospitalization (number of patients)
Own home	1.7	Tympanostomy tubes (2) Croup (1)
Relative's home	0.0	—
Day care home	2.1	Tympanostomy tubes (3) Croup (1)
Mother's day out	2.0	Tympanostomy tubes (1)
Day care center	5.7	Hemophilus influenzae meningitis (1) Bronchiolitis (1) Gastroenteritis (1) Tympanostomy tubes (6)
Multiple settings	0.8	Tympanostomy tubes (1)
All participants	2.1	

care centers, mother's day out programs, and multiple child care settings) was $32.94, compared with $19.78 for other children (Table 5). Parents reported being absent from work a mean of 0.40 days per month between January and March 1986, of which a mean of 0.16 days (40%) was due to illness in a child in this study. The mean number of days absent from work per month because of illness in a child in this study was 0.52 for children in day care centers compared with 0.37 for children in other forms of full time day care outside the home (i.e., day care homes or relatives' homes).

Discussion

Our finding of an increased incidence of illness in children attending day care centers, but not day care homes, is consistent both with previous reports[5–9] and with the results of our multivariate analysis, which suggest that the major risk factor for infection in a child care setting is the number of other children in the room.

Our study has certain potential limitations. First, illness ascertainment bias may have been introduced if children in certain forms of child care were more likely to seek medical attention when ill or if, despite the incentives of the prepaid plan, they were more likely to make an unauthorized visit to a physician outside of our group. Our questionnaire data for one month within the study period suggested that neither of these possibilities occurred. Since symptoms in young children may be non-specific, a strength of our study was that illnesses were diagnosed by a physician.

Second, information on child care settings came from parents rather than from day care providers. We believed that the answers to our questions would be readily known to the parents and that they would respond truthfully to their child's pediatrician. This impression was corroborated by the prompt, unhesitating responses obtained in the telephone survey and by the fact that the average completion rate for questionnaires returned by mail was over 95 per cent.

Third, some risk factors identified in our multivariate model may actually have been proxies for other variables that were not studied. For example, the curious observation that a history of breastfeeding in the past was associated with a higher incidence of both total infections and upper respiratory infection without otitis media might be explained if breastfeeding, or its discontinuation, was a proxy for lack of immunologic experience or for a constellation of sociocultural practices that we could not better identify, but which led to an increased infection rate in the preschool years.

Finally, the financial data reported in this study pertain to families in Memphis, Tennessee enrolled in a prepaid health plan. These figures may not be applicable to other areas of the United States where medical charges may be different or to children covered by other types of health insurance in which there may be financial barriers to seeking medical care or different practicing styles of participating physicians. Our financial data, like our illness incidence data, are most useful in offering estimates of the magnitude of differences among children in different child care settings within a single study population. Our data indicate that there are certain potentially modifiable characteristics of day care which are risk factors for illness and that excess illnesses result in excess financial costs. The health of children in day care should be of concern not only to parents, physicians, and public health officials, but also to employers and health insurors who might find it worthwhile to subsidize the possibly increased cost of child care in settings designed to minimize illness rates.

ACKNOWLEDGMENTS

We thank Dianne B. Bowen for retrieving computerized records, David M. Morens, MD, Michael T. Osterholm, MPH, PhD, Grant W. Somes, PhD, and Alex Heckert, MS, for reviewing the manuscript, and Mary Kathleen Copeland and Shelia Barber for assistance in its preparation.

TABLE 5—Mean Monthly Cost of Illness per Child in Study Participants (Dollars)

Type of Care	Physician's Office Visits	Emergency Room Visits	Prescription Drugs	Hospitalization	Total Medical Charges	Lost Parental Income* (Days per Month Absent from Work†)	Total Cost
In own home	12.74	0.08	4.11	2.51	19.45	9.17 (0.19)	29.50
Relative's home	11.19	0.77	3.52	0.00	15.48	16.05 (0.31)	31.22
Day care home	16.40	0.41	5.07	1.35	23.22	25.39 (0.42)	48.64
Mother's day out	21.23	0.07	6.34	1.90	29.54	12.21 (0.23)	39.75
Day care center	19.72	0.42	5.90	10.32	35.63	33.94 (0.52)	61.64
Multiple settings	19.16	0.31	5.95	4.31	30.78	26.61 (0.42)	58.30
All participants (N = 843)	16.05	0.37	4.96	3.52	24.90	23.01 (0.38)	46.68

*Reported for 651 children for whom the income of the parent staying home from work was known.
†To care for an ill child in this study.

APPENDIX A
Variables Entered into the Multivariate Models for Incidence of Infection

Host Variables

Age (months)
Sex
Breastfeeding during study
Breast-fed prior to study
Length of time (months) in child care prior to study

Environmental Variables

Median household income of census tract of residence
Sibling in day care
Number of household members in the age groups
<12 months, 12 months–4 years
Household crowding index (people per room)
Number of smokers in household

Child Care Variables

Hours per week in child care
Number of other children in room
Age group(s) of other children in room
(<12 months, 12 months–4 years)
Children/caregiver ratio in child's room
"Drop-in" children permitted
Child accepted with: 1) respiratory symptoms
2) vomiting or diarrhea
Food furnished by child care provider
Food brought from home
Separate room for diaper changing, "potty", and toilet use
Caregivers known to smoke in room with children
Cost per hour of child care

Child Care Settings

Day care home
Mother's day out program*
Day care center
Multiple settings

*A form of group care common in the Memphis area, usually sponsored by a church one or two days per week.

APPENDIX B
Comparison of Respondents and Non-Respondents

Data from Questionnaires	Questionnaire Returned by Mail N = 758	Questionnaire Administered by Telephone N = 85	Non-respondents N = 488
Child Care Setting			
% In own home	21	26	N.A.
% Relative's home	16	20	N.A.
% Mother's day out	6	4	N.A.
% Day care home	23	24	N.A.
% Day care center	19	18	N.A.
% Multiple settings	15	7	N.A.
Mean age (mos)	17.6	17.4	18.8
% White	58	46	N.A.
Median household income of census tract of residence	$20,291	$18,412	$17,797
Mean no. of prepaid plan visits	4.40	3.14	3.09
Mean no. of prepaid plan visits for infection	2.57	1.87	1.77
Mean no. of prepaid plan visits for well child care	0.82	0.61	0.57
Mean no. times child sick but not seen by physician in one month of recall by parent	0.80	0.91	N.A.
Mean no. visits to emergency room or outside prepaid plan in one month of recall by parent	0.29	0.13	N.A.
Mean no. days absent from work by parent January–March 1986	2.5	3.7	N.A.
Mean no. days absent to care for ill index child, January–March 1986	1.1	1.5	N.A.
Income of parent staying home	$10,750	$11,650	N.A.

N.A. Not available

APPENDIX C
Host and Family Environment Characteristics which Varied Significantly among Children in Different Child Care Settings

Setting	Mean Number of Respondents*	Mean Age (months)	Per Cent White	Median Income of Census Tract of Residence	Per Cent of Infants under 12 Mos of Age Breast-fed Throughout Study	Per Cent of All Participants Who Had Been Breast-fed Prior to Study
Own home	171	15.4	53	$19,494	9	51
Relative's home	136	16.5	31	$18,068	1	40
Day care home	189	14.4	58	$20,110	2	52
Mother's day out	50	19.7	85	$22,769	2	70
Day care center	149	22.9	68	$20,513	1	55
Multiple settings	112	18.6	68	$20,986	4	52
All participants	813	17.6	57	$20,104	3	52

Setting	Mean Time in Child Care Prior to Study (months)	Mean Number of Household Members	Per Cent of Children with ≥1 Sibling in Child Care	Mean Household Crowding Index (persons/room)	Mean Number of Smokers in Household
Own home	1.0	4.4	11	0.75	0.6
Relative's home	9.2	3.9	15	0.70	0.8
Day care home	9.8	3.7	51	0.59	0.7
Mother's day out	5.9	3.8	20	0.81	0.3
Day care center	14.3	3.6	20	0.64	0.5
Multiple settings	11.1	4.3	34	0.66	0.6
All participants	8.7	3.9	33	0.68	0.6

*N varies slightly among cells within each row.

REFERENCES

1. US Bureau of the Census: Trends in child care arrangements of working mothers, June 1982. *In:* Current Population Reports, series P-23, No. 129. Washington, DC: Govt Printing Office, 1983.
2. Centers for Disease Control: Public health considerations of infectious diseases in child day care centers. J Pediatr 1984; 105:683–701.
3. Haskins R, Kotch J: Day care and illness: evidence, costs, and public policy. Pediatrics 1986, 77 (suppl):951–982.
4. Osterholm MT, Klein JO, Aronson SS, Pickering LK (eds): Infectious diseases in child day care: management and prevention. Rev Infect Dis 1986; 8:513–679.
5. Strangert K: Respiratory illness in preschool children with different forms of day care. Pediatrics 1976; 57:191–196.
6. Bartlett AV, Moore M, Gary GW, Starko KM, Erben JJ, Meredith BA: Diarrheal illness among infants and toddlers in day care centers: II. Comparison with day care homes and households. J Pediatr 1985; 107:503–509.
7. Wald ER, Dashefsky B, Byers C, Guerra N, Taylor F: Frequency and severity of infections in day care. J Pediatr 1988; 112:540–546.
8. Anderson LJ, Parker RA, Strikas RA, *et al:* Day care center attendance and hospitalization for lower respiratory tract illness. Pediatrics 1988; 82: 300–308.
9. Johansen AS, Leibowitz A, Waite LJ: Child care and children's illness. Am J Public Health 1988; 78:1175–1177.
10. Fleming DW, Cochi SL, Hightower AW, Broome CV: Childhood upper respiratory tract infections: to what degree is incidence affected by day-care attendance? Pediatrics 1987; 79:55–60.
11. Black RE, Dykes AC, Anderson KE, *et al:* Handwashing to prevent diarrhea in day care centers. Am J Epidemiol 1981; 113:445–451.
12. Hadler SC, Erben JJ, Francis DP, Webster HM, Maynard JE: Risk factors for hepatitis A in day care centers. J Infect Dis 1982; 145:255–261.
13. Lemp GF, Woodward WE, Pickering LK, Sullivan PS, DuPont HL: The relationship of staff to the incidence of diarrhea in day care centers. Am J Epidemiol 1984; 120:750–758.
14. Bartlett AV, Moore M, Gary GW, Starko KM, Erben JJ, Meredith BA: Diarrheal illness among infants and toddlers in day care centers. I. Epidemiology and pathogens. J Pediatr 1985; 107:495–502.
15. Overall JE: Calculation of adjusted response frequencies using least squares regression methods. Appl Psychol Measurement 1980; 4:65–78.
16. Cohen J, Cohen P: Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences, second edition. Hillsdale, NJ: Lawrence Erlbaum Assoc, 1980; 128–9, 241.

NCHS Quarterly Report Cites New Publications, Findings

The National Center for Health Statistics recently announced, in its Quarterly Report, several new publications to be available from the Center in February 1989. These include the following:

- *Characteristics of Nursing and Related Care Homes: The 1986 Inventory of Long-Term Care Places.* (Describes facility characteristics such as ownership, certification status, numbers of beds and residents. Examines occupancy rates, per aged population, and numbers of Black and Hispanic residents.)
- *The National Nursing Home Survey: 1985 Summary for the United States.* (Provides descriptive tables on characteristics of nursing homes, registered nurses at the facilities, current residents, data on cost of providing care, health and functional status of residents, payment for care.)
- *Children of Divorce.* (Analyzes trends in the number and proportion of children whose parents are divorced, as well as characteristics of divorcing couples with and without children, and geographic variations.)
- Also, Coming Soon: *NCHS 1988 Year in Review* (A new publication featuring two series of articles published during 1988 on NCHS data and programs. And an overview of surveys conducted and information available from NCHS for 1988.)

To be included on an NCHS mailing list, or to receive copies of any of the reports listed above, write or call:

Office of Public Affairs
National Center for Health Statistics
3700 East-West Highway, Room 1-20
Hyattsville, MD 20782
(301) 436-7135
Contact: Sandra Smith or Farrell Wolfson