



# **Enid Charles**

## **1894-1972**

**A socialist, feminist demographer  
and her analysis of the timing of birth**

**Alison Macfarlane**  
**City, University of London**

## **Plan of talk**

### **Enid Charles' life and contributions to demography**

Based on the work of Canadian demographer, Sylvia Wargon

### **Analysis of birth and its timing**

As described in her own papers.

## Education and marriage

1894 Born in Denbigh, Wales

1913 -1916 Studied mathematics, economics and statistics at Newnham College, Cambridge

1916 Went to Liverpool for a one year diploma course in social science

1917 Returned after 10 months to live with Lancelot Hogben.

1918 Despite opposition to marriage, married Hogben as expecting their first child, Sylvia. Kept her own name.

## 1918 - 1930

Followed Hogben from job to job

Had three more children, Adrian, Clare and David.

1925-27 Canada , McGill, Montreal

1927-30 South Africa, University of Cape Town

PhD in physiology followed by papers

Left South Africa with threat of apartheid  
growing

## LSE, 1930-37

Research fellow in Department of Social Biology where her husband was Professor of Social Biology.

**Social biology** defined as

' the application of biology to human society, to cover such topics as variation and heredity in man, selective immunity, relative importance of environmental factors in social structure and changes, questions of race and class in relation to hereditary endowment, economic and biological tests of fitness... Through vital statistics, social biology would connect with public health'

## LSE, 1930-37

Enid Charles' Interest switched to human populations  
Among the first demographers to challenge eugenics

Became associated with the work of the Population Investigation Committee, founded in 1935

'to examine the trends of the population in Great Britain and the Colonies and to investigate the causes of these trends, with special reference to the fall of the birth-rate.'

Initially founded by the Eugenics Society but moved away from it.

## LSE 1930-37

Charted declining birth and marriage rates in the 1930s  
Derived population projections for the future based on data up to the 1930s.

‘The practice of birth control: an analysis of the birth control experiences of 900 women.’ 1932

‘The twilight of parenthood: A biological study of the decline of population growth.’ 1934

Republished as

‘The menace of under-population: a biological study of the decline of population growth.’ 1936

# Trends in reproduction

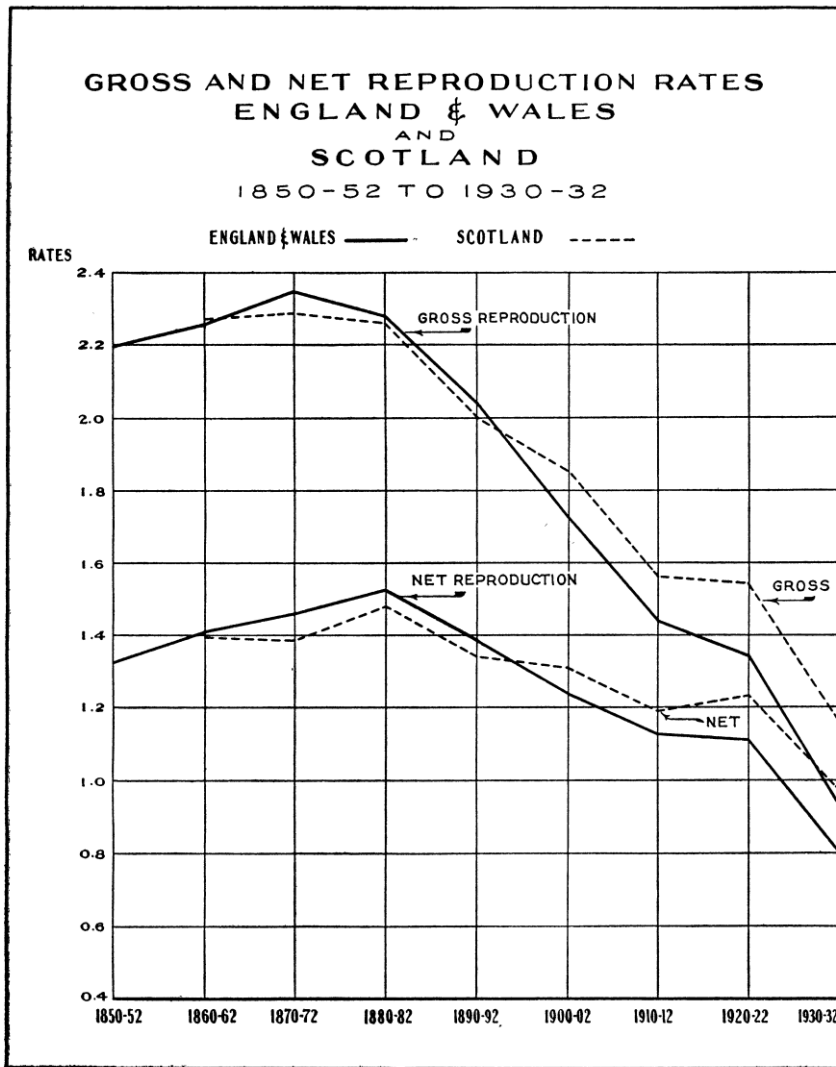


FIGURE 1

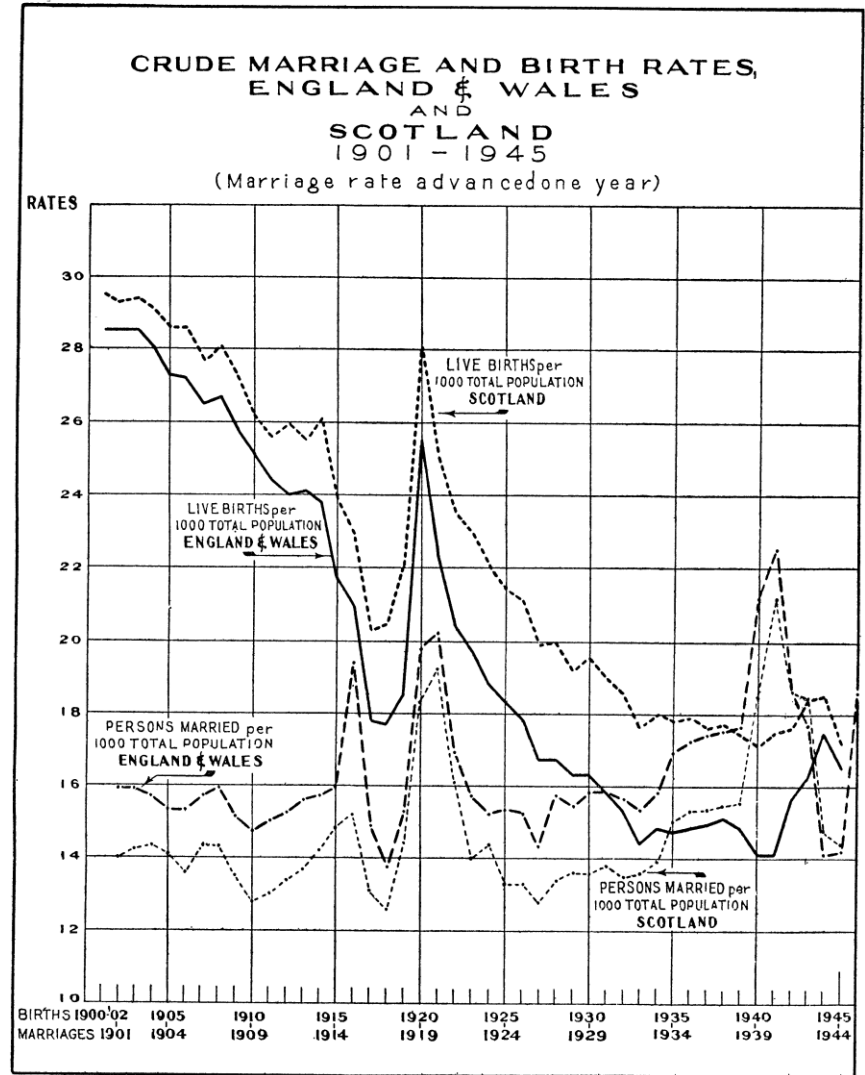


FIGURE 2

Charles E. 'Post-War Demographic Problems in Britain', 1946



# Population projections, 1934

‘ ... the population of England and Wales which was 40.6 million in 1935, would fall to 17.4 million in 2000 and to 4.4 million in 2035, if age-specific mortality and fertility rates were to continue to fall at the rate at which Swedish age-specific fertility rates had fallen between 1921 and 1931.’

Eugene Grebenik, ‘Demographic Research in Britain, 1938-1986’, 1991

**From a review of  
'The twilight of parenthood'**

'Miss Charles writes with vigor and cogency, and has at hand whenever she wants to use it a caustic humor that affords many a pungent sentence'

*New York Times*, August 26 1934

## Aberdeen 1937-40

Leverhulme Research Fellow, Department of Natural History.

Contributed to '*Political Arithmetic*', 1938, edited by Lancelot Hogben.

Accepted invitation to go to Canada in 1940 to do a study of differential birth rates in Canada.

Hogben invited to spend a semester as visiting professor, University of Wisconsin. Returned 1941

## Canada 1940-46

Stayed until 1946, working for Dominion Bureau of Statistics, now Statistics Canada.

Instrumental in developing demography in Canada.

Analysed data from new questions on nuptiality, fertility and internal migration in 1941 decennial census.

Contributed to evaluation of Canadian census and vital statistics.

Lectured at Carleton College, later Carleton University.

## **Birmingham 1946-53**

Joined Hogben who had moved to Birmingham, 1946

No job lined up.

Birmingham City Council Statistical Office, 1947

Reader in Demography and Vital Statistics, University of Birmingham, 1948

Chief Statistical Officer, two Birmingham hospitals, 1949

Joined RSS in 1947

# Developing Birmingham's Maternity and Child Welfare records

*Brit. J. soc. Med.* (1951), 5, 41-61

## STATISTICAL UTILIZATION OF MATERNITY AND CHILD WELFARE RECORDS

BY

ENID CHARLES

*From the Central Statistical Office, City of Birmingham, and the Department of  
Social Medicine, University of Birmingham*

# Aberdeen Maternity and Neonatal Databank

**Started by Prof. Sir Dugald Baird in 1950 in collaboration with the MRC Medical Sociology Unit**



- From punched cards and knitting needles to tapes.....to SiR .....to SQL

AGE		PUERPERAL COMPLICATIONS										CLASS B				
30-4	14	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
40+	35-9	30-4	25-9	20-4	15-9	10-4	5-9	PREXIA	VENOUS	GENITAL	BREAST	URINARY	OTHER	MALE	11	12
NO. OF PREGNANCY																
2	A 20															
3	B															
4+	C															
ABORT																
OTHER PREG. IN A.M.H.		D														
SOCKETED		E														
NOT SOCKETED		F														
NOT A.M.H.		G														
		H														
YEAR		J 1923-29														
UNCERTAIN ( )		K														
UNDER 20		L														
20-36		M														
37-38		N														
39		O														
40		P														
41		Q														
42		R														
43+		S														
5%L. OR LESS		T														
UNCERTAIN		U														
3 OR LESS		V														
4		W														
5		X														
6		Y														
7		Z														
8		CHILD														
9		M. 9-5 1/2														
10		9.5														
11		N														
12		LABOUR														
13		4 20. 30. 30														
14		S.A. P.P.H. 1500														
15		PREGNANCY 1 (23-29)														
16		Oth - post - 27/1 Ann.														
17		PUERPERUM														
18		N														
19		GEAED: PRTE. 5 FUNCT.														
20		INCIDENTAL														
21		HEIGHT 5.2 3/4														
22		MARRIED 15.7. 1ST VISIT 7.9.23														
23		No. CR. 1914 258/														
24		Age 21														
25		28/8 52														
26		A 20														
27		F 20														
28		G 20														
29		H 20														
30		I 20														
31		J 20														
32		K 20														
33		L 20														
34		M 20														
35		N 20														
36		O 20														
37		P 20														
38		Q 20														
39		R 20														
40		S 20														
41		T 20														
42		U 20														
43		V 20														
44		W 20														
45		X 20														
46		Y 20														
47		Z 20														
48		FOCAL DEATH														
49		SPINAL LOCAL														
50		GEN. ANAEST.														
51		IV. INFUSION														
52		VERSION U.A.														
53		OTHER OPS.														
54		OTHER CONDS.														
55		NET. PLAC. P.P.H.														
56		TEARS. EPIS.														
57		FOCAL INFARCT.														
58		DYSFUNCTION														

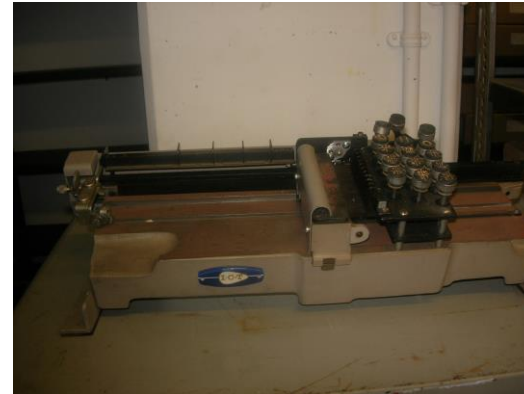


# Data entry and processing in the 1950s

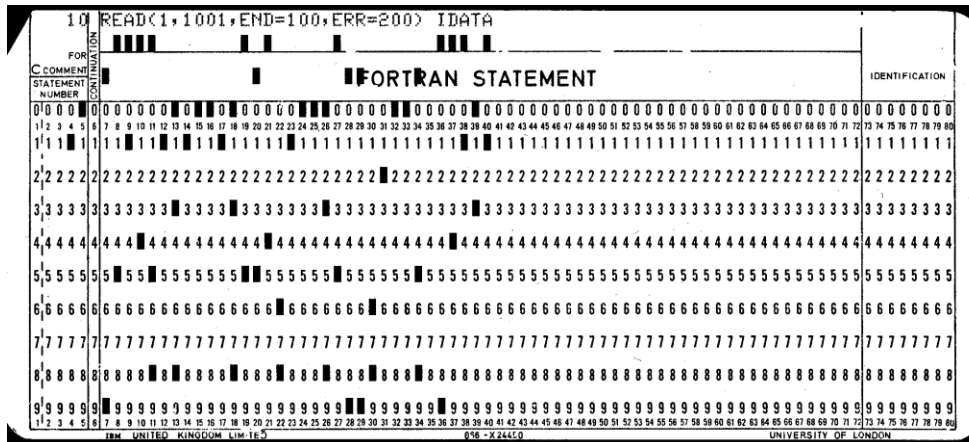
Punched cards, punched tape  
and Cope Chat cards with  
needle



Basic card punch



Close up of 80 column punched card, as adapted for  
entering Fortran code in the 1970s



# Developing a mechanised system of health visiting records

## Aim

Redesigning health visiting records to bring together information about

The family and its circumstances

Antenatal care

Details of birth

Information recorded by health visitors in the first five years of the child's life.

# Birmingham health visiting record, 1948

FIG. 3.—Health Visitor's Record, 1948. Maternity and Child Welfare Department, City of Birmingham.

**CITY OF BIRMINGHAM—PUBLIC HEALTH DEPARTMENT**

Rickets	Chest Conditions	T.B. Conditions	Paralytic Conditions	Orthopaedic Conditions	Mental Conditions	Speech Defects	Sight	Hearing
---------	------------------	-----------------	----------------------	------------------------	-------------------	----------------	-------	---------

Indicate Defect by X

NAME \_\_\_\_\_ BORN \_\_\_\_\_ SEX \_\_\_\_\_

WARD \_\_\_\_\_ ADDRESS (1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_ (4) \_\_\_\_\_

MIDWIFE OR NURSE \_\_\_\_\_ DOCTOR \_\_\_\_\_ BIRTH WEIGHT \_\_\_\_\_ LBO. ? \_\_\_\_\_  
 ANTE-NATAL CARE, WHERE \_\_\_\_\_ NO. OF ATTENDANCES \_\_\_\_\_  
 PREVIOUS PREGNANCIES — If no previous pregnancies have occurred write "none"  
 MARRIAGES \_\_\_\_\_ Stillbirths \_\_\_\_\_ Born Alive (Premature) \_\_\_\_\_  
 Since Dead \_\_\_\_\_ Cause \_\_\_\_\_ Age \_\_\_\_\_  
 MOTHER HEALTH \_\_\_\_\_ AGE \_\_\_\_\_ ROOMS No. \_\_\_\_\_ CONDITION \_\_\_\_\_  
 FATHER \_\_\_\_\_ OCCUPATION \_\_\_\_\_ OCCUPANTS No. \_\_\_\_\_

Date of Visit or Attendance (First nine months)	MCH (W) Home Visit (U) (V) (W) (X) (Y) (Z) (AA) (AB) (AC) (AD) (AE) (AF) (AG) (AH) (AI) (AJ) (AK) (AL) (AM) (AN) (AO) (AP) (AQ) (AR) (AS) (AT) (AU) (AV) (AW) (AX) (AY) (AZ) (BA) (BB) (BC) (BD) (BE) (BF) (BG) (BH) (BI) (BJ) (BK) (BL) (BM) (BN) (BO) (BP) (BQ) (BR) (BS) (BT) (BU) (BV) (BW) (BX) (BY) (BZ) (CA) (CB) (CC) (CD) (CE) (CF) (CG) (CH) (CI) (CJ) (CK) (CL) (CM) (CN) (CO) (CP) (CQ) (CR) (CS) (CT) (CU) (CV) (CW) (CX) (CY) (CZ) (DA) (DB) (DC) (DD) (DE) (DF) (DG) (DH) (DI) (DJ) (DK) (DL) (DM) (DN) (DO) (DP) (DQ) (DR) (DS) (DT) (DU) (DV) (DW) (DX) (DY) (DZ) (EA) (EB) (EC) (ED) (EE) (EF) (EG) (EH) (EI) (EJ) (EK) (EL) (EM) (EN) (EO) (EP) (EQ) (ER) (ES) (ET) (EU) (EV) (EW) (EX) (EY) (EZ) (FA) (FB) (FC) (FD) (FE) (FF) (FG) (FH) (FI) (FJ) (FK) (FL) (FM) (FN) (FO) (FP) (FQ) (FR) (FS) (FT) (FU) (FV) (FW) (FX) (FY) (FZ) (GA) (GB) (GC) (GD) (GE) (GF) (GG) (GH) (GI) (GJ) (GK) (GL) (GM) (GN) (GO) (GP) (GQ) (GR) (GS) (GT) (GU) (GV) (GW) (GX) (GY) (GZ) (HA) (HB) (HC) (HD) (HE) (HF) (HG) (HH) (HI) (HJ) (HK) (HL) (HM) (HN) (HO) (HP) (HQ) (HR) (HS) (HT) (HU) (HV) (HW) (HX) (HY) (HZ) (IA) (IB) (IC) (ID) (IE) (IF) (IG) (IH) (II) (IJ) (IK) (IL) (IM) (IN) (IO) (IP) (IQ) (IR) (IS) (IT) (IU) (IV) (IW) (IX) (IY) (IZ) (JA) (JB) (JC) (JD) (JE) (JF) (JG) (JH) (JI) (JJ) (JK) (JL) (JM) (JN) (JO) (JP) (JQ) (JR) (JS) (JT) (JU) (JV) (JW) (JX) (JY) (JZ) (KA) (KB) (KC) (KD) (KE) (KF) (KG) (KH) (KI) (KJ) (KK) (KL) (KM) (KN) (KO) (KP) (KQ) (KR) (KS) (KT) (KU) (KV) (KW) (KX) (KY) (KZ) (LA) (LB) (LC) (LD) (LE) (LF) (LG) (LH) (LI) (LJ) (LK) (LM) (LN) (LO) (LP) (LQ) (LR) (LS) (LT) (LU) (LV) (LW) (LX) (LY) (LZ) (MA) (MB) (MC) (MD) (ME) (MF) (MG) (MH) (MI) (MJ) (MK) (ML) (MN) (MO) (MP) (MQ) (MR) (MS) (MT) (MU) (MV) (MW) (MX) (MY) (MZ) (NA) (NB) (NC) (ND) (NE) (NF) (NG) (NH) (NI) (NJ) (NK) (NL) (NM) (NO) (NP) (NQ) (NR) (NS) (NT) (NU) (NV) (NW) (NX) (NY) (NZ) (OA) (OB) (OC) (OD) (OE) (OF) (OG) (OH) (OI) (OJ) (OK) (OL) (OM) (ON) (OO) (OP) (OQ) (OR) (OS) (OT) (OU) (OV) (OW) (OX) (OY) (OZ) (PA) (PB) (PC) (PD) (PE) (PF) (PG) (PH) (PI) (PJ) (PK) (PL) (PM) (PN) (PO) (PP) (PQ) (PR) (PS) (PT) (PU) (PV) (PW) (PX) (PY) (PZ) (QA) (QB) (QC) (QD) (QE) (QF) (QG) (QH) (QI) (QJ) (QK) (QL) (QM) (QN) (QO) (QP) (QQ) (QR) (QS) (QT) (QU) (QV) (QW) (QX) (QY) (QZ) (RA) (RB) (RC) (RD) (RE) (RF) (RG) (RH) (RI) (RJ) (RK) (RL) (RM) (RN) (RO) (RP) (RQ) (RR) (RS) (RT) (RU) (RV) (RW) (RX) (RY) (RZ) (SA) (SB) (SC) (SD) (SE) (SF) (SG) (SH) (SI) (SJ) (SK) (SL) (SM) (SN) (SO) (SP) (SQ) (SR) (SS) (ST) (SU) (SV) (SW) (SX) (SY) (SZ) (TA) (TB) (TC) (TD) (TE) (TF) (TG) (TH) (TI) (TJ) (TK) (TL) (TM) (TN) (TO) (TP) (TQ) (TR) (TS) (TT) (TU) (TV) (TW) (TX) (TY) (TZ) (UA) (UB) (UC) (UD) (UE) (UF) (UG) (UH) (UI) (UJ) (UK) (UL) (UM) (UN) (UO) (UP) (UQ) (UR) (US) (UT) (UU) (UV) (UW) (UX) (UY) (UZ) (VA) (VB) (VC) (VD) (VE) (VF) (VG) (VH) (VI) (VJ) (VK) (VL) (VM) (VN) (VO) (VP) (VQ) (VR) (VS) (VT) (VU) (VV) (VW) (VX) (VY) (VZ) (WA) (WB) (WC) (WD) (WE) (WF) (WG) (WH) (WI) (WJ) (WK) (WL) (WM) (WN) (WO) (WP) (WQ) (WR) (WS) (WT) (WU) (WV) (WW) (WX) (WY) (WZ) (XA) (XB) (XC) (XD) (XE) (XF) (XG) (XH) (XI) (XJ) (XK) (XL) (XM) (XN) (XO) (XP) (XQ) (XR) (XS) (XT) (XU) (XV) (XW) (XX) (XY) (XZ) (YA) (YB) (YC) (YD) (YE) (YF) (YG) (YH) (YI) (YJ) (YK) (YL) (YM) (YN) (YO) (YP) (YQ) (YR) (YS) (YT) (YU) (YV) (YW) (YX) (YY) (YZ) (ZA) (ZB) (ZC) (ZD) (ZE) (ZF) (ZG) (ZH) (ZI) (ZJ) (ZK) (ZL) (ZM) (ZN) (ZO) (ZP) (ZQ) (ZR) (ZS) (ZT) (ZU) (ZV) (ZW) (ZX) (ZY) (ZZ)	Method of Visit	Age	DIET	CLEAN-LINESS General	FRESH AIR AND EXERCISE	MANAGEMENT	HEALTH	TEETH
		1Ma							
11									
12									
1y 3									
1y 6									
1y 9									
2y									
2y 3									
2y 6									
2y 9									
3y									
3y 3									
3y 6									
3y 9									
4y									
4y 3									
4y 6									
4y 9									
5y									

PHYSICAL DEFECTS (Sight, Speech, Hearing, Mental and Chest Conditions, Deformities etc.)

DATE \_\_\_\_\_ SPECIAL NOTES \_\_\_\_\_

IMMUNISED FOR DIPHTHERIA DATE \_\_\_\_\_ WHERE \_\_\_\_\_ VACCINATION DATE \_\_\_\_\_ CONSCIENTIOUS OBJECTOR \_\_\_\_\_

TYPE OF PILLLOW ? \_\_\_\_\_

COT ? \_\_\_\_\_ ADVISED (DATE) \_\_\_\_\_ PROVIDED (DATE) \_\_\_\_\_

AGE AT WHICH WEANED \_\_\_\_\_ REASON FOR WEANING \_\_\_\_\_

DATE \_\_\_\_\_ SPECIAL NOTES \_\_\_\_\_

Revised 1947

RECORD VISITOR'S ESSENTIAL SAFEGUARD NUMBER ILLEGIBLE ETC. MAKE IT RED

Date of Visit	Method of Visit	Age	DIET	CLEAN-LINESS General	FRESH AIR AND EXERCISE	MANAGEMENT	HEALTH	TEETH
1Ma								
11								
12								
1y 3								
1y 6								
1y 9								
2y								
2y 3								
2y 6								
2y 9								
3y								
3y 3								
3y 6								
3y 9								
4y								
4y 3								
4y 6								
4y 9								
5y								

These especially Rickets, Enlarged Testes, Ovaries and Infectious Diseases.

PHYSICAL DEFECTS (Sight, Speech, Hearing, Mental and Chest Conditions, Deformities etc.)

DATE \_\_\_\_\_ SPECIAL NOTES \_\_\_\_\_

Gr. Diseases Measles G. Measles (Wh. Cough) Whooping C. Ho. S. Fever (typhoid)

Year \_\_\_\_\_

FINAL NOTE GEN HEALTH \_\_\_\_\_ DEVELOPMENT \_\_\_\_\_

SCHOOL TO BE ATTENDED \_\_\_\_\_

DEATH? DATE \_\_\_\_\_ CAUSE \_\_\_\_\_

# Page 1 of redesigned record, 1950

Fig. 4.—Health Visitor's Record, 1950 (page 1, front and back). Maternity and Child Welfare Department, City of Birmingham.

### CHILD HISTORY

0-1 months

**FEEDING**

Breast feeding ended during   Not started

Artificial feeding started during   Not applicable

Reason for not starting or failing to complete breast feeding:

Not applicable  Insufficient milk  Change of mother  Mother dead  Condition of baby  Baby dead  Other

\*Specify \_\_\_\_\_

**MEDICAL SUPERVISION OF BABY in 1st year**

None  Centre only  Centre & Doctor  Centre & Hospital

Centre, Dr & Hospital  Doctor only  Home or Nurs. Home  Other

**LIVING WITH—1st year (or death)**

Both Parents  Mother only  Father only  Grandparents  Other Relatives

Adopted  Foster Parents  Residential Institution  Other

**MOTHER STARTED WORKING IN—**

Not applicable  Mother not working in 1st year

Started work when baby was age:

0-1 months  1-3 months  4-6 months  7-12 months

If persons, state here: \_\_\_\_\_

**ROOMS** occupied by household as 1 year (or death):  **REARINGS** in household as 1 year (or death):

**CLINIC RECORD**

At 6 weeks. Weight, lbs.   oz.   Height, in.

Exact age at weighing, Months \_\_\_\_\_ Days \_\_\_\_\_

At 1 year. Weight, lbs.   oz.   Height, in.

Exact age at weighing, Yrs \_\_\_\_\_ Mths \_\_\_\_\_ Days \_\_\_\_\_

If death or removal occurs between 4 weeks and 1 year, complete both sides as far as possible and return to office.

If died of infection state SOURCE   No. Inf.  Home  Hospital  Other

DATE of DEATH (or removal): \_\_\_\_\_ PLACE of DEATH: \_\_\_\_\_

CAUSE of DEATH (Death Certificate): \_\_\_\_\_

POST MORTEM  YES  NO

**OFFICE**

77 (a)   Post. Adm.  Res. Inf.  Dig. Inf.  Dis. Inf.  Accident  T.R.  Other

### PART C. ANTENATAL RECORD

**ANTENATAL DISEASES & COMPLICATIONS**

38  G. None  Typhoid  W.R.  Rubella  Flu-like A.P.H.  Pyelitis  Anæmia

Various Yells  Other \*  Combination of foregoing. Sp. Nos. \_\_\_\_\_

Date of Onset: \_\_\_\_\_ \*Specify: \_\_\_\_\_

**MOTHER—RHESUS TEST**   Pos.  Neg. Agglutins absent  Neg. Agglutins present

**LAST DAY OF LAST MENSES (if known)** \_\_\_\_\_

**PART D. DOCTOR OR MIDWIFE AT DELIVERY**

LABOUR—Onset date: \_\_\_\_\_ Time: \_\_\_\_\_ p.m. / a.m.

Birth date: \_\_\_\_\_ Time: \_\_\_\_\_ p.m. / a.m.

**TYPE OF LABOUR**

Spont. onset  Spont. onset  Med. Ind.  Med. Ind.  Surg. Ind.  Surg. Ind.

Med. & Surg. Ind.  Med. & Surg. Ind.  Caesarian  Other \*

\*Specify \_\_\_\_\_

**FIXATION OF PRESENTING PART AFTER ONSET OF LABOUR**

40  Not known  Normal Vertex  Occipito-Posterior  Brow  Face  Breech  Other presentation due to transverse lie  Other \*

\*Specify \_\_\_\_\_

**MATERNAL COMPLICATIONS OF LABOUR & PUERPERIUM** Specify: \_\_\_\_\_

**ATTENDANT AT BIRTH**

41   Midwife only  Midwife & Mat. Aid  Mat. Service G.P. booked  Pr. Dr.  Ambulance Nurse  S.S.A.

Instrumental Midwife  Hosp.  Post. Nursing Home

**BABY RHEUS TEST**   Pos.  Neg. Birth Length in.

**CONGENITAL MALFORMATIONS OBSERVED IN THE FIRST TWO WEEKS**

42   None  Spina bifida &/or Meningocele  Hydrocephaly  Anencephaly  Talipes  Club Foot &/or Hair Lip

Pharynx  Other \*  Combination of foregoing. Sp. Nos. \_\_\_\_\_

\*Specify \_\_\_\_\_

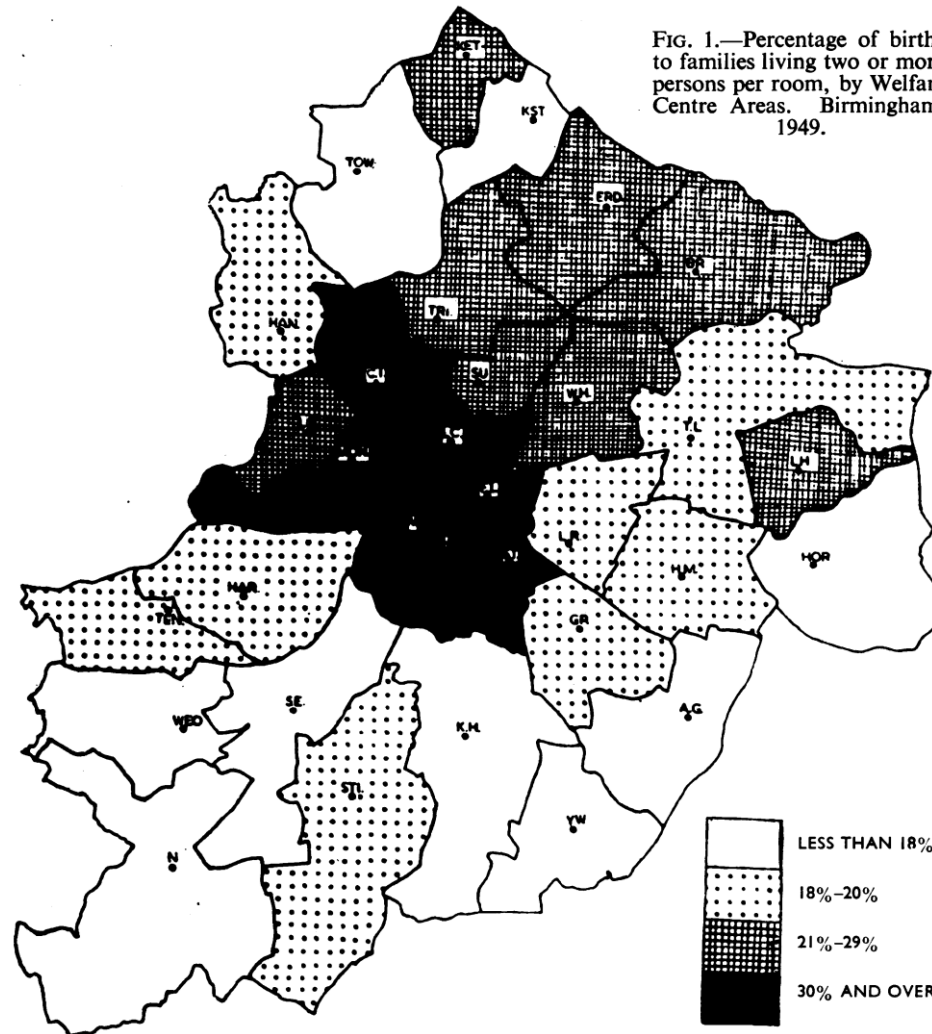
**BIRTH INJURIES & DISEASES OF THE NEWBORN**

43   None  W.R.  Ophthalmia  Dis. infection \*  Infantile scabies  Haemolytic disease

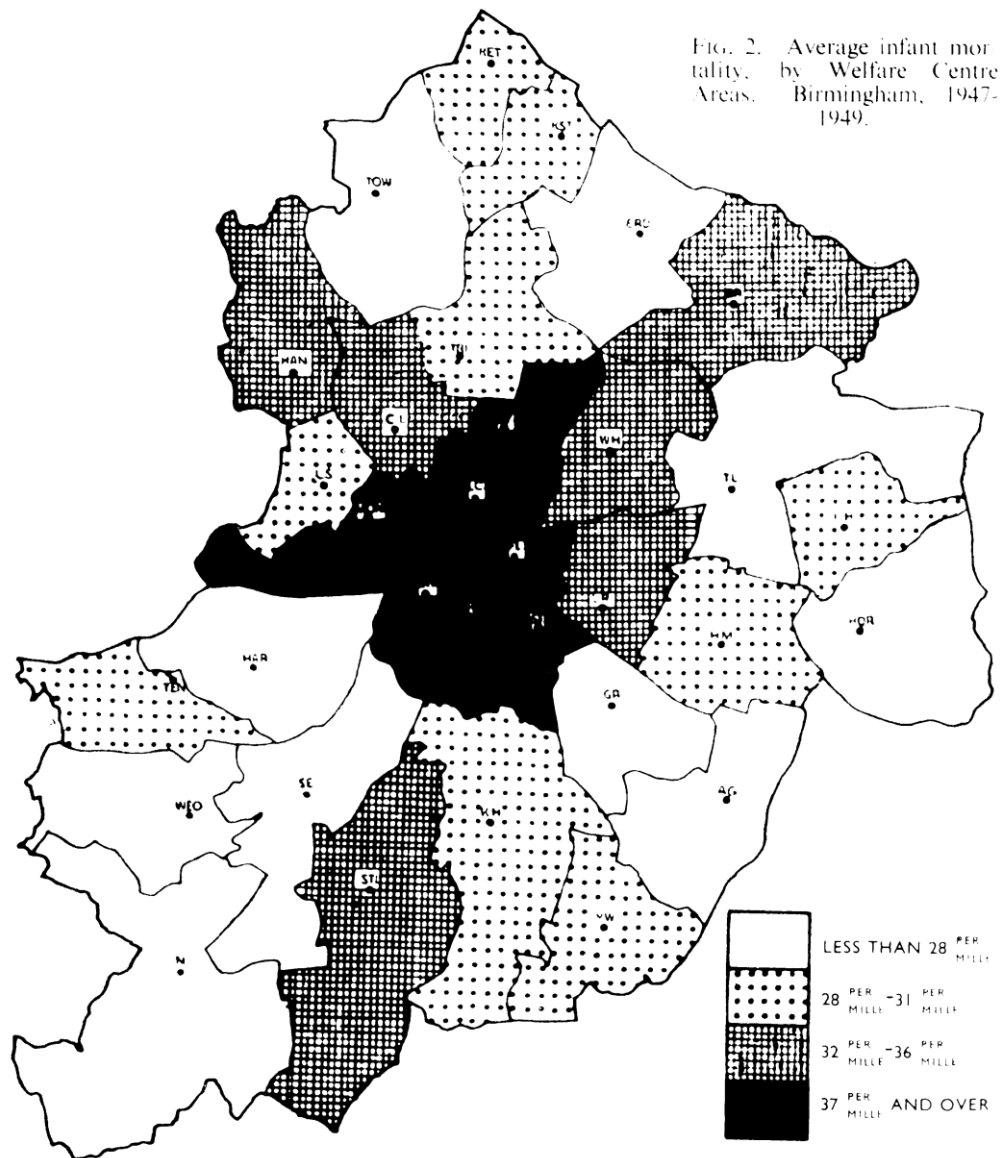
Birth injury \*  Other \*  Combination of above. Sp. Nos. \_\_\_\_\_

\*Specify \_\_\_\_\_

# Percentage of births to families living with two or more persons per room, by Welfare Centre Areas, Birmingham, 1949



# Infant mortality rates



# Hour of birth

*Brit. J. prev. soc. Med.* (1953), 7, 43-59

## THE HOUR OF BIRTH

A STUDY OF THE DISTRIBUTION OF TIMES OF ONSET OF LABOUR AND OF  
DELIVERY THROUGHOUT THE 24-HOUR PERIOD

BY

ENID CHARLES

*Department of Medical Statistics, University of Birmingham, and Queen Elizabeth Hospital, Birmingham*

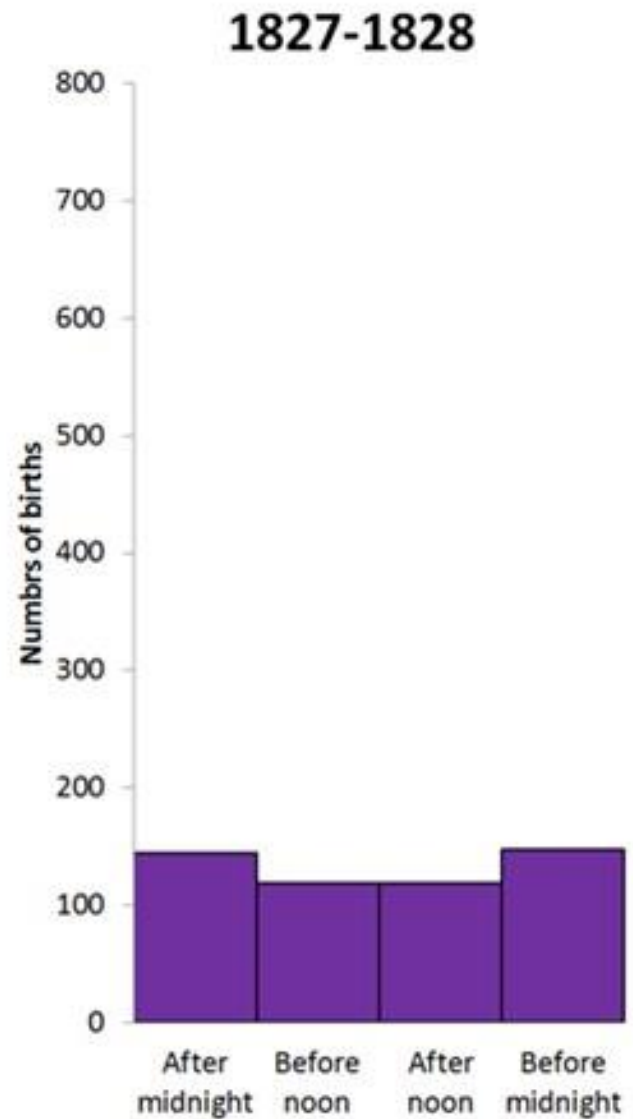
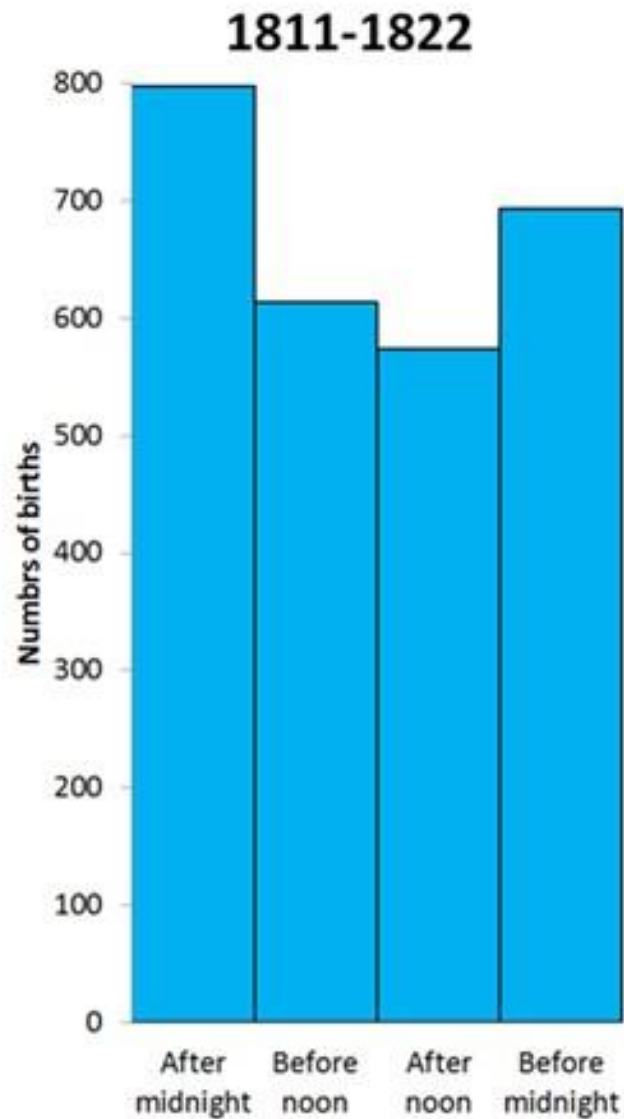
# Births by time of the day, Hôpital St Pierre, Bruxelles 1811-22, 1827-28

HEURES.	NAISSANCES.	MORTS-NÉS.	NAISSANCES.
	1811-1822.	1811-1822.	1827-1828.
Après minuit.	798	53	145
Avant midi...	614	51	119
Après midi...	574	59	119
Avant minuit.	691	55	148
TOTAUX...	2680	218	531

Source: Essai de physique sociale, Adolf Quetelet, 1835



# Births by time of the day, Hôpital St Pierre, Bruxelles 1811-22, 1827-28



Source: Essai de physique sociale, Adolf Quetelet, 1835

# Background to Enid Charles' analysis

Analyses up to the mid twentieth century showed similar patterns, with births being more common at night and in early hours of the morning.

Correspondence in the British Medical Journal in 1952 showed that some analyses of births in the mid twentieth century found similar patterns while others did not.

# Birmingham analysis

Time of onset of labour

Recorded by parents rather than clinical staff

Risk of digit preference, described as  
'clumping'

Differences in definitions

Time of birth

Neither of these items were punched onto cards, so analysis of 12,359 births was done manually using data from delivery records.

# Purpose of analysis

‘To clarify processes which initiate health parturition’

Exclusions:

- a) stillbirths
- b) second twins, second and thirds stillbirths
- c) specified antenatal complications
- d) medical or surgical induction or delivery
- e) all presentation other than vertex
- f) ‘all congenital malformations of the infant’

If the purpose had been administrative, all births would have been included.

# Sources of diurnal rhythms

‘Physical events such as light and temperature impose on the *material* environment a diurnal rhythm ...

The normal routine of work, meals and sleep imposes a diurnal rhythm on the *social* environment.’

‘Superimposed on each diurnal pattern of external change are seasonal regularities ...’

# Tabulations of times of onset and birth

Place of birth – domiciliary / institutional

Season – analysed births in one month periods surrounding equinoxes and solstices

Additional analyses by parity

Remaining births from August 1 to September 7 and from November 1 to December 7 tabulated by parity extracted from health visiting cards.

# Results - extract from summary

APPENDIX TABLE A  
TIME OF ONSET OF LABOUR—SELECTED CASES, BIRMINGHAM, 1950, 1951

Time of Day	Date of Birth															All Births	
	Domiciliary Births							Institutional Births									
	March 8 to April 4	June 8 to July 5	Aug. 1 to Sept. 7		Sept. 8 to Oct. 5	Nov. 1 to Dec. 7		Dec. 8 to Jan. 4	March 8 to April 4	June 8 to July 5	Aug. 1 to Sept. 7		Nov. 1 to Dec. 7		Dec. 8 to Jan. 4		
			Primi-gravidae	Multi-gravidae		Primi-gravidae	Multi-gravidae				Primi-gravidae	Multi-gravidae	Primi-gravidae	Multi-gravidae			
12 Midnight	52	61	14	45	36	10	55	32	59	44	28	28	57	25	42	56	644
1 a.m.	73	77	28	64	66	11	64	57	55	71	45	31	63	30	34	42	811
2 a.m.	89	91	30	82	82	21	64	72	54	64	34	51	49	35	30	62	910
3 a.m.	88	70	23	52	64	8	55	47	55	56	38	35	51	34	27	51	754
4 a.m.	68	72	8	51	59	15	64	52	52	46	24	29	46	24	26	50	686
5 a.m.	47	32	10	34	41	9	40	39	26	39	18	29	44	17	17	33	475
6 a.m.	58	48	9	59	62	10	31	45	41	44	25	28	34	13	24	27	558
7 a.m.	47	51	11	39	38	4	37	34	30	38	15	28	34	15	26	35	482
8 a.m.	48	45	6	44	45	8	41	45	25	24	20	26	24	6	17	27	451
9 a.m.	53	32	9	36	29	6	32	31	29	29	21	20	23	22	21	36	424
10 a.m.	47	31	6	32	29	5	24	27	25	21	20	23	18	20	13	29	370
11 a.m.	34	32	8	23	26	4	28	23	29	22	20	16	19	15	19	28	346
12 Noon	21	25	5	22	27	5	21	22	36	33	16	18	29	14	21	16	331

Source: Enid Charles, Hour of birth. Br J prev soc Med.1953

# Timing of onset of labour by parity, 4-hour moving averages

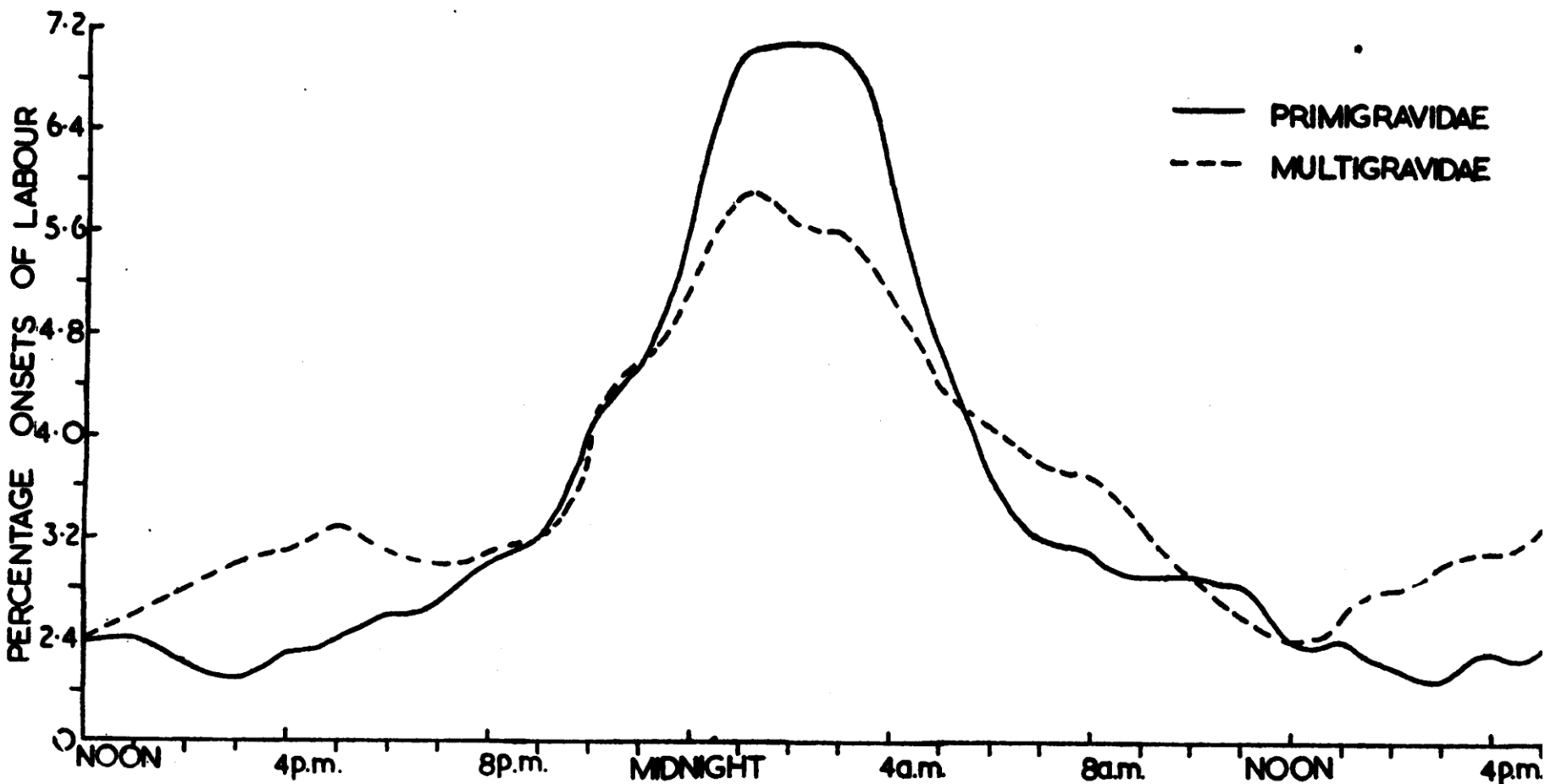


FIG. 3.—Percentage distribution of times of onset of labour by parity. 4-hour moving averages.

Source: Enid Charles, Hour of birth. Br J prev soc Med.1953



# Timing of onset of labour by place of birth, 4-hour moving averages

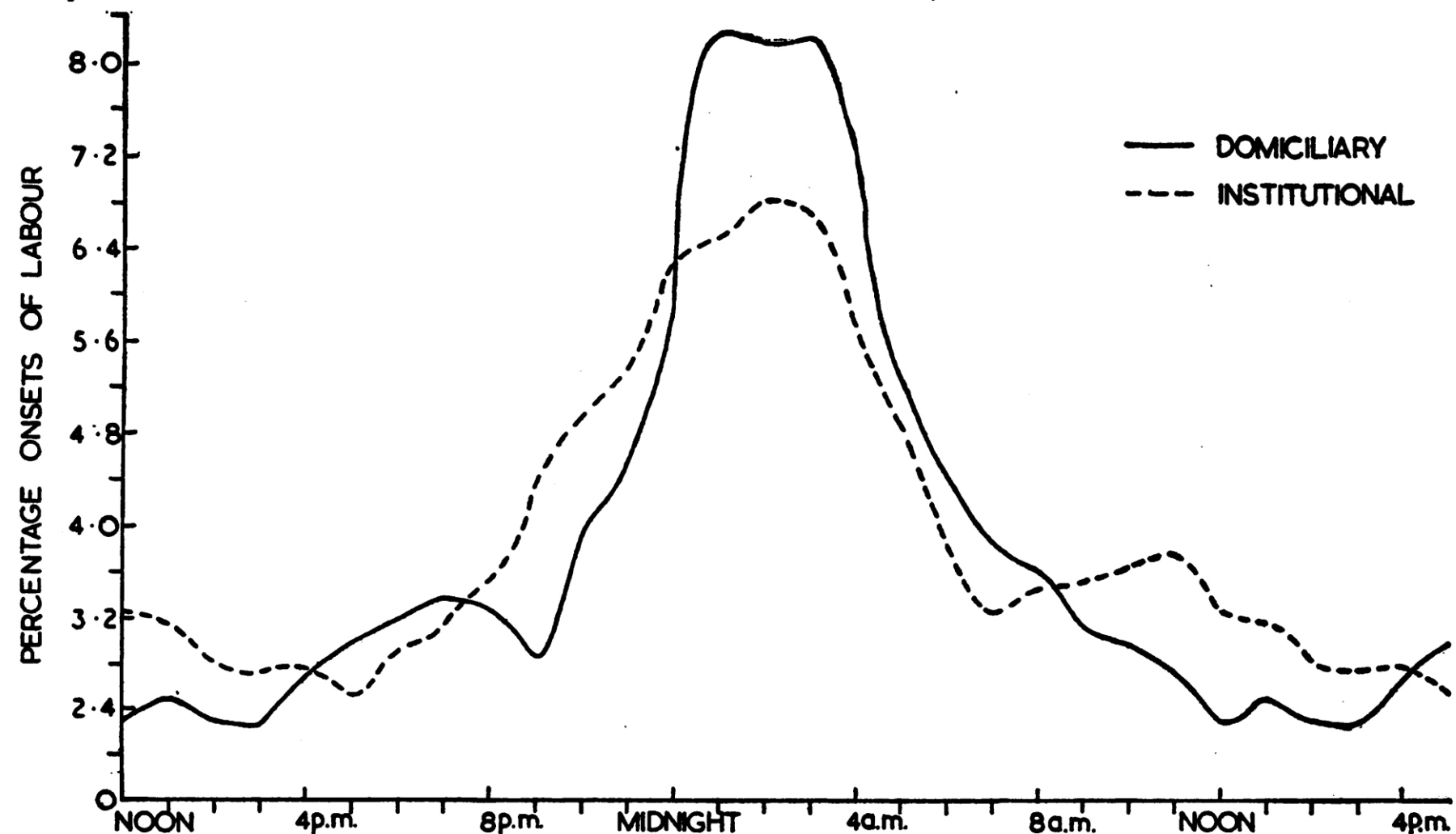


FIG. 5.—Percentage distribution of times of onset of labour in primigravidae. Domiciliary and institutional onsets in the month of August, 4-hour moving averages.

# Timing of onset of labour by season

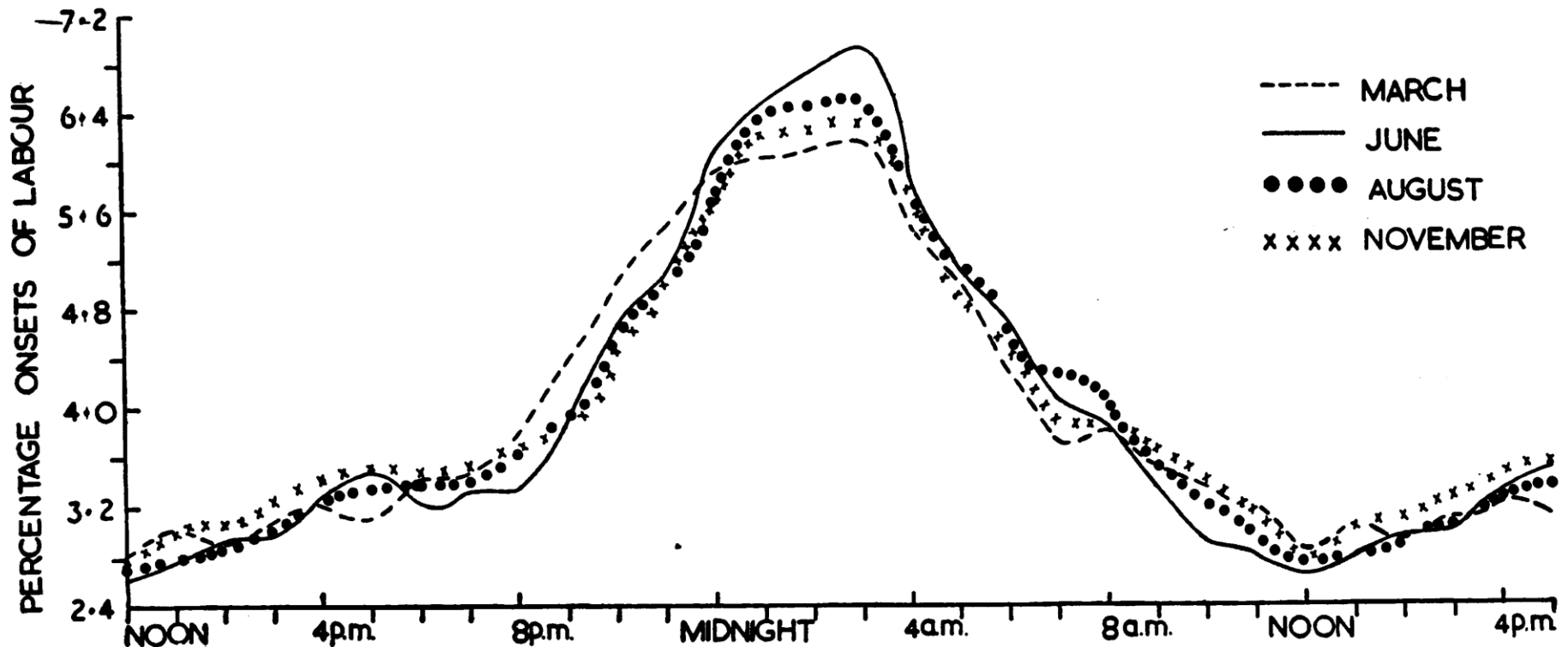


FIG. 7.—Percentage distribution of times of domiciliary onsets of labour in March, June, August, and November.

Source: Enid Charles, Hour of birth. Br J prev soc Med.1953

# Timing of all births

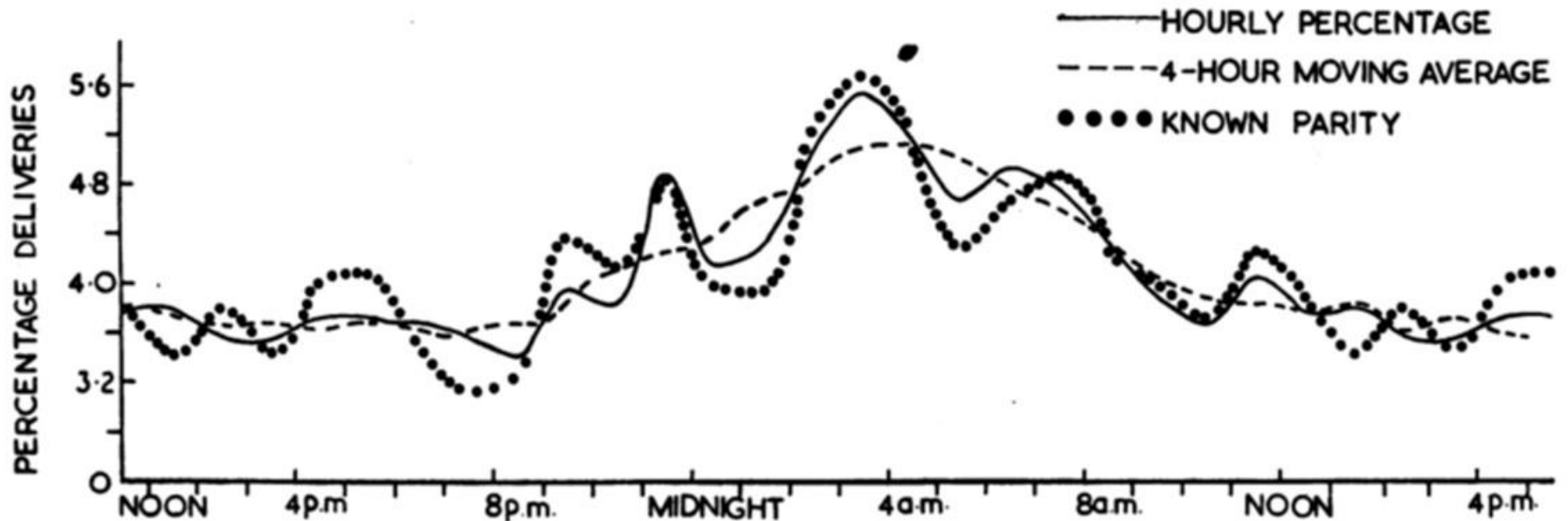


FIG. 10.—Percentage distribution of times of delivery in all selected births.

Source: Enid Charles, Hour of birth. Br J prev soc Med.1953

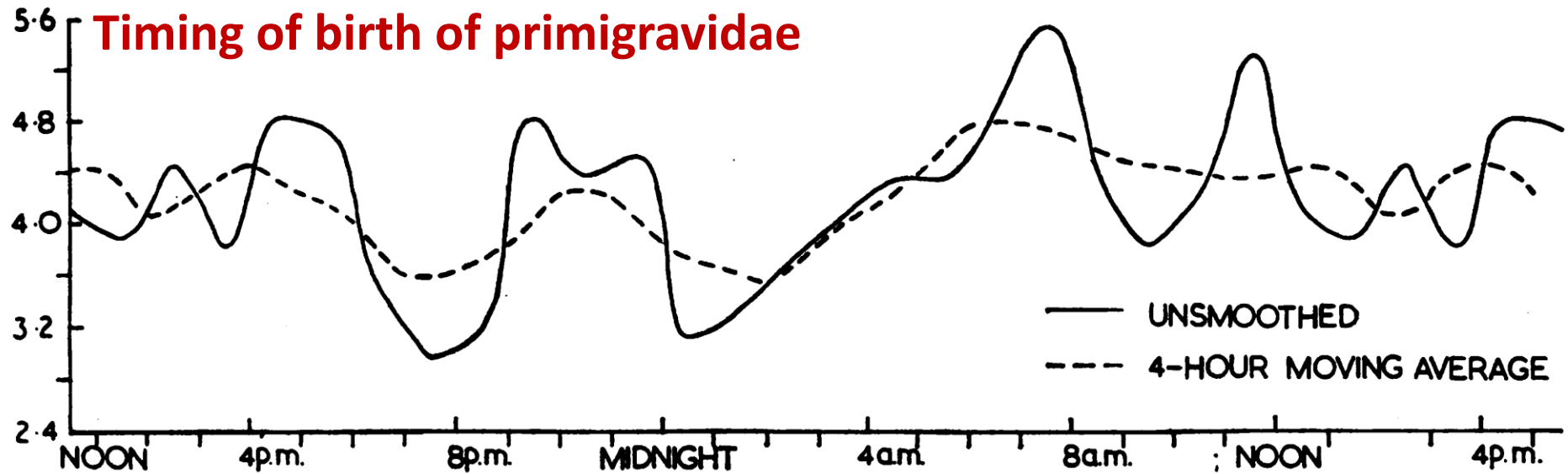


FIG. 11.—Percentage distribution of times of delivery of primigravidae, unsmoothed and 4-hour moving averages.

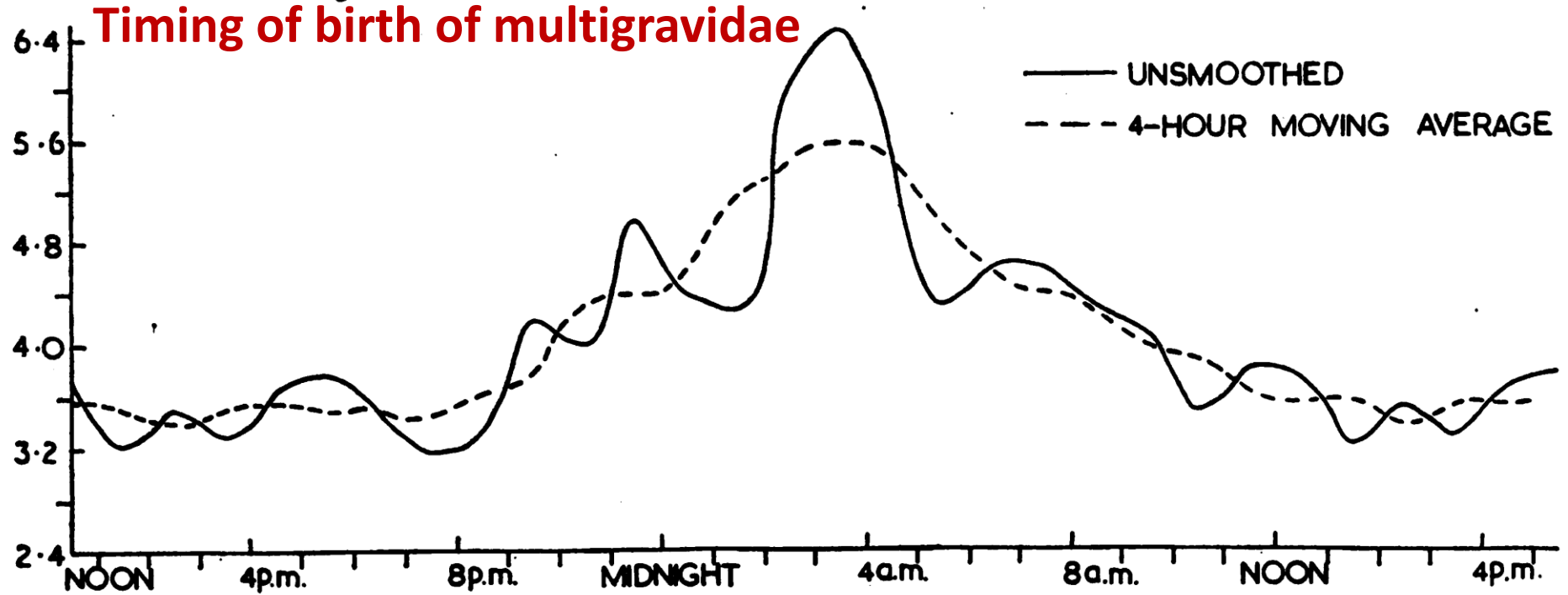


FIG. 12.—Percentage distribution of times of delivery of multigravidae, unsmoothed and 4-hour moving averages.

# Distribution of duration of labour of primigravidae by onset

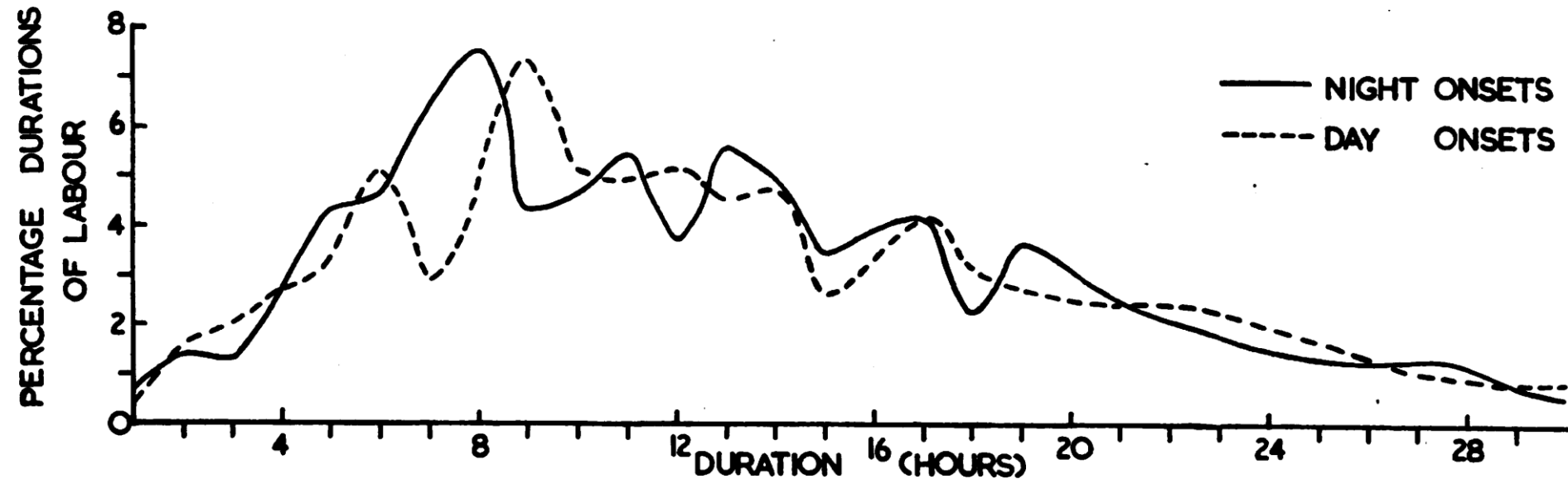


FIG. 13.—Percentage distribution of durations of labour by day and night onset in primigravidae.

Source: Enid Charles, Hour of birth. Br J prev soc Med.1953

# Distribution of duration of labour of multigravidae by time of onset

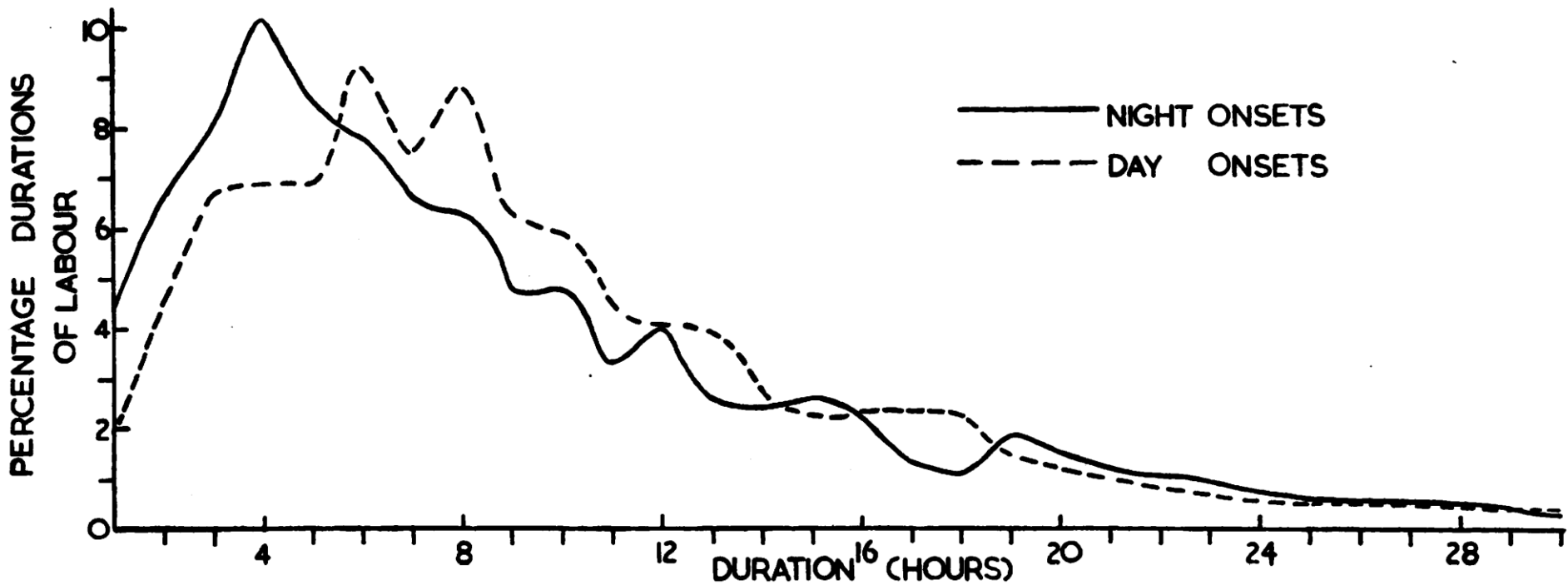


FIG. 14.—Percentage distribution of durations of labour by day and night onset in multigravidae.

Source: Enid Charles, Hour of birth. Br J prev soc Med.1953

## Some summary comments

‘ With respect to diurnal rhythm, we have seen that it is necessary to draw a sharp distinction between solar time and that of the socially calibrated clock.’

‘The results obtained suggest a tendency for normal labour to start more readily when the mother is at rest, if not actually asleep.’

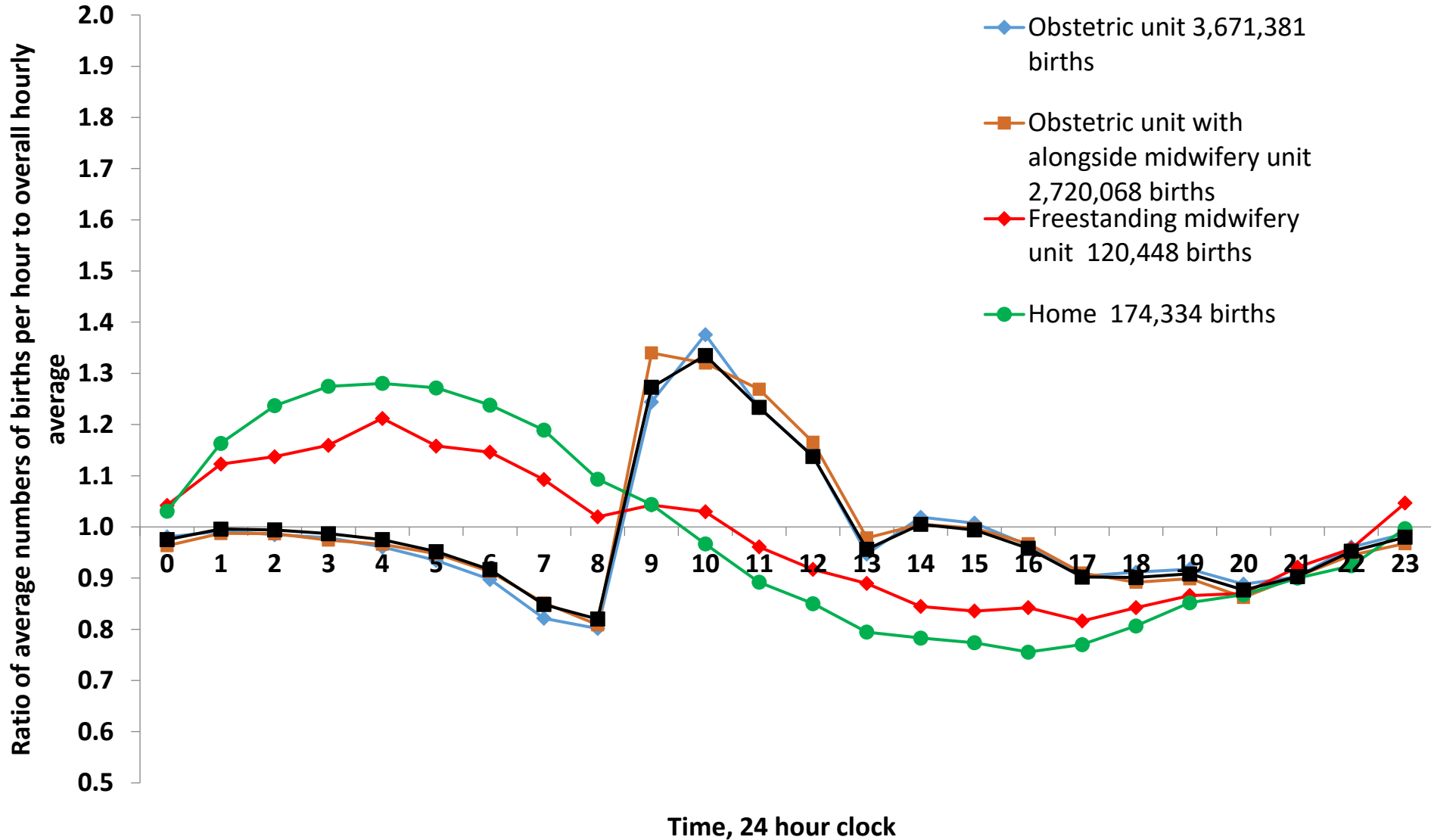
# Summary comments

‘The author, no less than the reader, is well aware that this inquiry has raised many more questions than its outcome can answer.

One reason for this is to be found in the limitation of hand processes. Owing to the complexity of the phenomena, more comprehensive and decisive conclusions would be justifiable only if based on more elaborate cross-classification, involving recourse to a much larger number of cases. Without mechanization, the labour involved in an inquiry planned on such a scale would be prohibitive.’



## Variations in singleton births by time of day in NHS maternity units and at home, England and Wales, 2005-14



# 1953 onwards

1953 Split up with Hogben.

Started work with World Health Organisation in many countries in South East Asia.

Produced many reports, not widely available.

1959 'Retired' to the United States, where her sons and daughters then lived.

Continued to work for World Health Organisation on a consultancy basis until 1962.

Eventually returned to England because of opposition to US policies in Vietnam. Joined a retirement community in Exeter and died in Exeter, March 26, 1972

# References

Wargon ST. Enid Charles: One hundred years 1894-1972-1994. *Canadian Studies in Population* 1994; 21(2): 181-185

Wargon S. Legacy of Enid Charles, 1894-1972. *Canadian Studies in Population* 2005; 32(2): 137-153.

Grebenik E. Demographic research in Britain, 1936-1986. *Supplement to Population Studies*, 1991.

Charles E. Post-War Demographic Problems in Britain  
*American Sociological Review* ,1946; 11(5): 578-590

Charles E. Statistical utilization of maternity and child welfare records. *Brit. J. soc. Med.* (1951), 5, 41-61

Charles E. Hour of birth. *Br J prev soc Med.*1953; 7: 43-59