

MIDWIFERY IN DENMARK

By DOROTHY REED MENDENHALL, M.D.

U. S. DEPARTMENT OF LABOR

JAMES J. DAVIS, Secretary

CHILDREN'S BUREAU

GRACE ABBOTT, Chief



MIDWIFERY IN DENMARK

By

DOROTHY REED MENDENHALL, M. D.



Paper Delivered at the Fifth Annual Conference of
State Directors in Charge of the Local Administration
of the Maternity and Infancy Act, 1928



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1929

MIDWIFERY IN DENMARK

By DOROTHY REED MENDENHALL, M. D.

It was my good fortune to have the opportunity of revisiting Denmark in the spring of 1926 after a lapse of over 30 years. The impressions of youth are often dispelled as illusions when reappraised by eyes more accustomed to seeing below the surface of things, but my early impression of Copenhagen as the original of "spotless town" was strengthened by my second visit, while new points of excellence kept constantly appearing. To my more critical adult eyes the orderliness of Copenhagen seemed even more striking than the cleanliness. System and simplicity seemed to be the keynote of governmental activities, including the health program of the Government.

Knowing that Denmark shares the admiration the medical world awards Scandinavia for the safeguards thrown about maternity, I was eager to find out, if I could, why this country has such a uniformly low maternal mortality rate. With this in mind, I paid a visit to the office of what corresponds to the State board of health to learn where I could best find out about the obstetrical procedures of this part of Scandinavia. There I had the good fortune to meet Dr. G. Tryde, the president of the National Board of Health, and Dr. H. J. Hansen, the chief statistician. Both these physicians speak English and are conversant with the American medical situation. Doctor Hansen, indeed, had just returned from a visit to the United States.

After many inquiries on my part and offers from them of printed material for future reference, I realized that normal deliveries throughout the kingdom are left to midwives and apparently have been for so many years that it has become the accustomed way of handling maternity cases. Midwives are trained, licensed, and supervised under State control. As proof of the value of midwifery these officials pointed out the low incidence of puerperal fever and especially its decline since 1900. In Doctor Hansen's own words puerperal fever is surely "a very good indicator of the efficiency of the midwives and of their knowledge of antiseptics and aseptics."¹

During the 33 years from 1890 to 1922, inclusive, the reported cases of puerperal fever have fallen from 93 to 34.1 per 10,000 total births in Denmark. (Table 1.) No information is available on either the incidence or the fluctuation of puerperal septicemia in the United States as a whole. Denmark can furnish these statistics because puerperal septicemia has been reportable for over 50 years, and in Denmark such laws are strictly enforced.

¹ "Danish medical statistics," by Dr. H. J. Hansen, League of Nations Health Organisation: Health Organisation in Denmark, ch. 3, pp. 37, 45. Geneva, 1924.

TABLE 1.—Puerperal fever in Denmark; number of cases and number of deaths, case rates, and mortality rates per 10,000 births, 1890-1922¹

Period	Cases of puerperal fever reported		Deaths from puerperal fever in—			
			Urban districts		Rural districts	
	Number	Rate per 10,000 births	Number	Rate per 10,000 births	Number	Rate per 10,000 births
1890-1894.....	633	93.0	62	26.1		
1895-1899.....	528	74.1	46	18.8		
1900-1904.....	476	64.5	44	15.3		
1905-1909.....	441	58.0	42	14.1		
1910-1914.....	324	43.4	34	11.9		
1915-1919.....	265	36.6	33	11.6		
1920.....	330	41.2	36	11.0	69	14.6
1921.....	329	40.7	35	10.7	67	14.0
1922.....	258	34.1	36	12.0	34	7.4

¹ Health Organisation in Denmark, p. 45.

In Denmark during the 5-year period 1920 to 1924 the number of cases reported and the case rate from puerperal fever declined. During these years the proportion of births delivered by midwives increased, the percentages being 82.3 in 1920 and 84.7 in 1924. The number of midwives was slightly smaller and the number of physicians slightly larger in 1924 than in 1920. (Table 2.)

In the United States the best that can be said in regard to puerperal sepsis is that there is "a strong presumption that the mortality from puerperal septicemia actually decreased throughout the period from 1900 to 1920, while that from other puerperal causes remained approximately the same."² There seems reasonable hope that the decade 1920-1930 may show some further improvement. (Table 3.)

TABLE 2.—Population, number of live births, number of stillbirths, cases of puerperal septicemia, number of midwives, number of physicians, and number and percentages of cases delivered by midwives; Denmark, 1920-1924^a

Year	Population			Live births			Stillbirths		
	Rural	Nonrural	Total	Rural	Nonrural	Total	Rural	Nonrural	Total
1920.....	1,758,950	1,327,770	3,086,720	46,243	31,981	78,224	1,079	845	1,924
1921.....	1,896,250	1,387,250	3,283,500	46,868	31,939	78,807	1,170	828	1,998
1922.....	1,916,800	1,405,900	3,322,700	44,632	29,255	73,887	1,159	672	1,831
1923.....	1,927,400	1,415,100	3,342,500	45,464	29,335	74,799	1,151	685	1,836
1924.....	1,948,950	1,423,200	3,372,150	45,683	28,160	73,843	1,128	670	1,798

Year	Cases of puerperal septicemia reported			Number of midwives	Number of physicians			Cases delivered by midwives	
	Rural	Nonrural	Total		Rural	Nonrural	Total	Number	Per cent
1920.....	187	143	330	1,112	547	1,425	1,972	65,962	82.3
1921.....	202	127	329	1,026	561	1,531	2,092	67,021	82.9
1922.....	158	100	258	1,097	561	1,501	2,062	63,354	83.7
1923.....	152	92	244	1,106	578	1,499	2,077	64,378	84.0
1924.....	148	92	240	1,091	612	1,588	2,200	64,081	84.7

^a Compiled from a communication July 2, 1926, from Dr. H. J. Hansen, chief of the Medical Statistical Bureau of the Danish National Board of Health.

² Maternal Mortality, by Robert Morse Woodbury, Ph. D., p. 56. U. S. Children's Bureau Publication No. 158. Washington, 1920.

The mortality rates from puerperal septicemia in Denmark have been less than half the rates from this cause in the United States birth-registration area each year during the period 1920 to 1926. (Table 3.) The difference in the rates for the two countries has been practically the same throughout this period, although there has been a slightly greater percentage decrease in Denmark than in the United States. In 1922, 1924, and 1925 Denmark had a rate of 0.9 for every 1,000 live births, as compared with 2.4 in the United States during these same years. The rate in 1926 was slightly higher in Denmark (1.1), while in the United States it was the same as in the earlier years. The death rate from all other puerperal causes has increased in Denmark during these years and in the United States has remained practically stationary since 1921. However, in 1926 the rate from these other causes in Denmark was only about one-third that of the United States. The maternal mortality rate (deaths from all causes associated with pregnancy and childbirth per 1,000 live births) for Denmark is one of the lowest and that for the United States one of the highest among the countries for which comparable figures are available.

TABLE 3.—*Maternal mortality rates (deaths from puerperal causes per 1,000 live births); Denmark and the United States birth-registration area, 1920-1926*

Year	Denmark ¹			United States birth-registration area ²		
	All puerperal causes	Puerperal septicemia	Other puerperal causes	All puerperal causes	Puerperal septicemia	Other puerperal causes
1920.....	2.4	1.3	1.0	8.0	2.7	5.3
1921.....	2.0	1.3	.7	6.8	2.7	4.1
1922.....	2.0	0.9	1.0	6.6	2.4	4.2
1923.....	2.6	1.0	1.6	6.7	2.5	4.1
1924.....	2.3	0.9	1.4	6.6	2.4	4.1
1925.....	2.4	0.9	1.5	6.5	2.4	4.0
1926.....	2.6	1.1	1.5	6.6	2	4.1

¹Aperçu de la Démographie des Divers Pays du Monde Publié par l'Office Permanent de l'Institut Internationale de Statistique, pp. 116, 269. The Hague, 1927.

²U. S. Bureau of the Census: Mortality Statistics, 1920-1926.

Differences in the maternal mortality rate of Denmark and certain other foreign countries and the United States have been shown by Mr. Woodbury to exist irrespective of differences in the statistical methods followed in the several countries and of such factors as age of mother or race. In his discussion of the effect of racial factors on deaths of mothers in childbirth, Mr. Woodbury shows conclusively that the mortality in the groups of mothers of Scandinavian origin in the United States was "practically the same as that in the native white population" in the birth-registration area. (Table 4.) "Furthermore, comparisons between the rates for certain States, such as Minnesota, in which a large proportion of the population is of Scandinavian stock, and the rates for Norway or Sweden may be made without having to consider the possible influence of racial factors." The results of "all such comparisons tend to indicate higher mortality in the United States than in the other countries with similar racial stocks."³

³Maternal Mortality, pp. 57-63.

Another difference which suggests itself as liable to affect the death rate of mothers might be, as Mr. Woodbury points out, the "kind or quality of maternity care." It was in the hope of finding some explanation of Mr. Woodbury's conclusion "that the high rates in the United States both from puerperal septicemia and from other puerperal causes indicate conditions which are less favorable to safe maternity than those which are found in other countries"⁴ that I undertook my visit to Denmark and the Netherlands.

TABLE 4.—*Maternal mortality rates (deaths from puerperal causes per 1,000 live births) in certain countries*

Country	All puerperal causes	Puerperal septicemia	Other puerperal causes
Denmark (1921) ¹	2.0	1.3	0.7
Norway (1921) ¹	2.2	.8	1.5
Sweden (1921) ¹	2.7	1.3	1.4
United States birth-registration area (1921) ²	6.8	2.7	4.1
Native white.....	6.6	2.6	3.9
Foreign born (natives of Denmark, Norway, and Sweden).....	6.4	2.3	4.2

¹Aperçu de la Démographie des Divers Pays du Monde Publié par l'Office Permanent de l'Institut Internationale de Statistique, pp. 116, 118, 119, 269, 278, 279, 280, 281.

²Maternal Mortality, p. 39.

After considering these figures I was most interested in learning the history of midwifery in Denmark⁵ and the regulations regarding midwife practice and in witnessing the actual training received by these professional accoucheurs.

Before the first midwife commission was established by law in 1714 the midwives were supervised by ministers of the church.⁶ In the same year an examination for midwives was provided by law. In 1787 a system of instruction for midwives was started, and the place of training of midwives was assigned to the free Midwife Hospital, which a few years earlier (1771) had been incorporated with the Frederick's Hospital as the "new hospital for pregnant women in Copenhagen." In 1910 this foundation was removed to the newly built Royal Hospital, the present "Rigshospitalet" of Copenhagen.

For over 140 years the systematic instruction of midwives has been carried on in Denmark as part of the maternity-hospital service, the training being given by physicians assisted by graduate midwives and nurses. There are now two lying-in hospitals in Denmark under Government control, the large one in Copenhagen and another at Aarhus on the east coast of the mainland in mid-Denmark.

This maternity service was intended primarily for unmarried women, but some married women are also accepted, chiefly normal cases whose homes are unsuitable for confinement, or women presenting special obstetrical difficulties, or operative cases. The physicians at these hospitals may be called upon night or day by any midwife in town to assist free of charge at a difficult labor of an indigent woman.

⁴Maternal Mortality, p. 61.

⁵"The personnel in the medical service," by Dr. Gordon Norrie, and "Child welfare in Denmark," by Prof. S. Moyrad. Health Organisation in Denmark, pp. 65-66, 274-275.

⁶Manuscript article by Miss Johanne Rodtness, chief midwife of the Rigshospitalet, Copenhagen.

Candidates for midwife training may be recruited from any group of society. Their ages vary between 20 and 30 years. They are "bright, healthy-looking, intelligent young women of the type from whom our best class of trained nurses would be recruited in this country, who are proud of being associated with an important community work and whose profession is recognized by medical men as an important factor in the art of obstetrics."⁷ Some have previously had a nurse's training. All must have had a complete course in the so-called primary schools. They are nominated by the district health officer in the county or town in which they reside, subject to the approval of the physician in charge of their training, and the director of the Royal Hospital. All candidates come on a month's probation and are then given a comprehensive examination; if they do not pass they are sent home.

The instruction, which now lasts two years, is under the direct supervision of Dr. E. Hauch, who ranks as professor of obstetrics, with his colleague, Dr. S. A. Gammeltoft, of the State Medical School. These two men are of equal rank and divide between them, share and share alike, the maternity service of the Royal Hospital. The chief midwife for the past 18 years has been Miss Johanne Rodtness, and the high level of training which has been maintained in the school is due largely to her excellent organization and cooperation.

The best description of the training and restrictions of the midwife is given in a paper prepared by Miss Rodtness for a recent symposium on midwifery in England:

The midwives are sent for at all confinements in Denmark, and as a rule they conduct all normal deliveries. Only in case anything dangerous may occur the physician must be called. * * * [The midwives'] instruction usually lasts one year. [Last year the course was increased to two years through the efforts of the midwives themselves.] Every year several midwives receive permission to take a further year's training, being appointed assistant [teacher], midwife at the lying-in hospital or in a private nursing home, these positions affording a splendid training. In November a "refresher" course at the Royal Hospital is always held for older midwives, conducted by Professor Hauch and the chief midwife.

The midwifery pupils daily receive from one to two hours theoretical instruction, partly by the head of the school, the first assistant physician, and the chief midwife. The practical instruction is conducted by the chief midwife after advice of the head of the school. [About 1,500 confinements a year are available as teaching material for a class of about 40 midwives.] Instruction is given in disinfection, hygienic treatment of the skin, on bacteria and infection, on the human body, biology, and normal pregnancy; also on giving advice during the latter. The pupils learn to know the symptoms of the different diseases which may arise, especially during pregnancy. In the latter case we are bound to apply to a physician. At the same time instruction is given how to conduct a normal delivery. The pupils are also taught about diseases which may occur during delivery, and here it is impressed on them to immediately call a physician if anything irregular should occur, the physician then taking charge of the delivery with the midwife as his assistant. If the patient desires an obstetric narcosis, the midwife must call the physician at the proper time; to give one on her own responsibility is allowed only if it is impossible for the physician to come at such time and if there is any special danger. I may name as such cases: First, transverse presentation; secondly, placenta prævia; thirdly, accidental hemorrhage; fourthly, retention of the placenta or part of it; fifthly, inversio uteri; sixthly, postpartum hemorrhage; seventhly, possible eclampsia; eighthly, prolapse of the cord or limbs; ninthly, irregular head presentation; tenthly, breech presentation by primipara.

⁷ Kosmak, George W., M. D.: "Results of supervised midwife practice in certain European countries." *Journal of the American Medical Association*, vol. 89, no. 24 (December 10, 1927), pp. 2009-2012.

It is permissible to act on one's own responsibility [without calling a physician] in cases such as the following: First, extraction of breech presentation with multipara; secondly, version of the second twin, if it lies in transverse presentation; thirdly, rupture of the membranes with normal head presentation, if the uterine orifice is completely dilated; fourthly, suturing of lesser ruptures of the perineum; fifthly, administering of ergot with lesser hemorrhages from the uterus postpartum (if the hemorrhages are more violent we must send for the physician); sixthly, blue asphyxia of the child; and, seventhly, normal care of the puerperal mother and child.

The conditions under which a midwife must call a physician are thus carefully defined, and any transgression of these rules is speedily discovered and penalized. The amount of preparation necessary to equip a midwife to conduct all normal cases competently in the absence of medical aid as well as in the six emergencies she is specifically allowed to care for speaks eloquently for the excellence of her training and the thoroughness of supervision when the results following midwife practice throughout Denmark are taken into account.

At the end of the training an examination is held by Professor Hauch, a representative of the National Board of Health, and a midwife appointed by the National Board of Health. The pupils may take a first, second, or third class diploma, and the two highest receive as a prize a midwife's bag containing a complete midwife obstetrical outfit. Between 35 and 40 midwives are graduated annually, the number in practice being for the past few years nearly stationary at 1,100. In 1921 there were 1,100 midwives, or 1 for each 3,100 inhabitants of Denmark, and in 1920, 2,100 practicing physicians, or about 1 for each 1,600 inhabitants. The midwives averaged about 73 births each in 1921.⁸

All physicians wishing to be licensed in Denmark must be graduates of the University of Copenhagen, which is the only recognized center for medical education in Denmark. Only graduates of this university (seven years' training) or of the national school for midwives can act as accoucheurs. Quackery practically does not exist in Denmark, as it has been controlled by law since 1672, and such restrictions are rigorously enforced.

The duties of a midwife are definitely stated by the Department of Justice in an edict of 1921, and she must not undertake any duties not contained in these instructions. A graduate midwife may apply for a district or go into private practice. In either case she must report to the district physician or a representative of the National Board of Health, and she is subject to his orders with the right of appeal to the National Board of Health or the Department of Justice. There are 84 district health officers in Denmark, 26 of whom are also county officers, each county having a medical health officer. A medical officer of health must have 26 months' theoretical and practical training in addition to his medical degree from the University of Copenhagen. This 26 months of graduate work includes 4 months of special courses, 19 months of hospital training, and 3 months of experience as practitioner in the country or a small town. Continuation courses of two weeks' duration are held annually in Copenhagen for health officers.⁹

⁸ Health Organisation in Denmark, p. 42.

⁹ The Public Health Organization of Denmark (Public Health Reports, vol. 42, no. 21, May 27, 1927, pp. 1417-1445); Health Organisation in Denmark, pp. 59-61, 65-68, 410-417.

A county medical officer holds an annual conference of midwives when he goes through their registers, "an actual record in diary form of every bit of work which they have done,"¹⁰ and gives any new information which concerns them before renewing their licenses. He is not merely the adviser and counselor of midwives but also their judge, as he can fine a midwife from 2 to 200 kronen (1 krona equals 27 cents) for neglect of duty. The district medical officer must inspect any dwelling in his district where a midwife takes confinement cases at her home and give orders and instructions in event of puerperal fever or other infectious diseases occurring in her practice. He supervises and keeps records of all maternity and nursing homes. A midwife in whose practice a case of puerperal infection occurs may be suspended for a short or a long period; very few midwives ever merit having their license taken away, and such a case does not occur once in many years. Miss Rodtness could remember only one case of malpractice in 20 years.

The unit of local government in Denmark is a commune, which may be a large city such as Copenhagen, a town, or a rural district. Thus each county contains many "communes," and each rural commune or small town has at least one midwife partly paid from public funds. There are over 700 of these district midwives in Denmark. Of the rest of the 1,100 midwives, nearly half are employed in Copenhagen itself.

The duties of a midwife are not covered by conducting confinements as she has been taught and calling a doctor in all serious cases. She must keep a careful record of births, more particularly if illegitimate; she must report all cases of childbirth; and in case of a still-born child she may make out the death certificate; and she must carry out the prescribed treatment of the eyes of the newborn to prevent ophthalmia. She has also been carefully instructed in the proper puerperal care of the mother and baby and in the importance of breast feeding, as well as in the principles of artificial feeding, and she is responsible for the conduct of the puerperium. To my mind the most important part of the training is that, as Doctor Kosmak has pointed out, they are taught "that pregnancy, labor, and the puerperium are physiologic acts in a woman's life in the majority of cases," and it is their business to try to prevent pathologic conditions from developing.

The district midwife receives a salary of 700 to 1,000 kronen besides a suitable house, instruments, and disinfectants, and where possible a telephone. She is paid for an indigent case in town 20 kronen, in the country 15 kronen, and if she can not collect fees from pay patients she is paid at these rates on application to the board of guardians. A midwife may receive a fee agreed upon in advance with her patient, but for district midwives the regulations set a minimum fee (for other than indigent cases) of about 1 per cent of the husband's income, though not less than 15 nor more than 150 kronen. A midwife's fees are a preferential claim on the estate of a deceased person.

Health insurance plays an important part in any medical work in Denmark. In 1921 about 60 per cent of the Danish population over 15 years of age were participating in the system of sick-benefit insur-

¹⁰ See footnote 7.

ance,¹¹ which receives partial support from the Government. A portion of the expense of women in childbirth is obtained as part of the regular service to insured club members, and in case of serious complication or hospitalization following childbirth further aid may be furnished by the club or the Government. A large proportion of a Danish physician's income comes from this contract practice, which has the hearty support of the National Board of Health. In Copenhagen the best doctors make \$5,000 to \$10,000 a year from these examinations.¹²

A district midwife must retire at the age of 70, but her services may be dispensed with at the age of 65 on account of old age. In this case, as well as if she is dismissed for no fault of her own, she receives a pension of 600 to 1,300 kronen annually (calculated on the length of her service and the number of births she has attended), besides compensation allowance. Salaries and pensions are paid partly by the communes and partly by the State, which gives 345,000 kronen annually toward this fund.¹³

A definite organization, or midwives' union, was a slow growth in Denmark and came over 100 years after their education was started in 1787. The first midwife textbook (in Danish) was published in 1864, but it was many years before magazine reports of scientific interest to midwives appeared. After the *Journal for Midwives*, edited by the first assistant physician of the national school for midwives, was started in 1890, agitation was begun for a Danish midwife organization. The first society was started in 1891 and in 1902 was reorganized, with branch societies all over the country, to guard the interests of midwives and to keep in touch with the main organization at Copenhagen. The society has over 1,000 members; the Copenhagen branch alone is made up of 165 midwives. The aim of the organization is to unite the midwives, to raise the standard of education and ability in the recruits, and to guard their economic and professional interests. It is interesting to find that nurses are not licensed in Denmark and that such licensing is discouraged by the health authorities on the ground that it would result in higher wages for nurses and make it difficult for people of small means to have the necessary nursing care.

A midwife, like a medical practitioner, can be deprived of her right to practice on charges such as lunacy, alcoholism, morphinism, gross incapacity, or disgraceful action. It gives food for thought to read the statement of the National Board of Health that "there have hitherto been no cases of gross incompetence in connection with the discharge of professional work, and only a few arising from the abuse of narcotics," among all the physicians, dentists, dispensing chemists, and midwives under supervision of the board.¹⁴

The difficult thing for us to realize is the position of trust and respect in which the midwife is held in Denmark, and in fact in all Scandinavian countries, and especially the cordial relations existing between the physicians and midwives. Conducting a normal labor is not considered part of a physician's duty; it is really a little "infra

¹¹ "The sick-benefit club systems of Denmark," by Johan Kuhn, M. D. *Health Organization in Denmark*, pp. 180-193.

¹² Personal interview with Dr. G. Tryde, president of the National Board of Health.

¹³ *Health Organization in Denmark*, pp. 65-66.

¹⁴ "Denmark: The country and its population," by G. Tryde, M. D. *Health Organization in Denmark*, p. 14.

dig." As in this country a dentist calls in a dental surgeon or physician in consultation, so in Denmark a midwife brings a medical attendant to a maternity case which is giving evidence of some unusual symptoms. In the large towns a physician has a number of midwives working, as it were, under him, in the relation young assistant physicians have to medical men with large practices in our cities. The doctor would never hesitate to consult with the midwife or help her out in emergencies considered beyond her training, for in many instances he has referred her to the family and expects in future cases to be called in by her in consultation.

During my stay in Copenhagen I made it my business to ask women I met socially where their children were born and who brought them into the world. The answer was invariably at home, with a midwife, or at a nursing home conducted by a midwife. One university professor's wife described the midwife she had had with each of four children and said the midwife always stayed two days and when she left sent in a nurse to take charge of the mother and baby.

It is interesting to compare the records of the two obstetrical services at the Royal Hospital of Copenhagen, the one instructing medical students and the one for training midwives, even though a report for only one year is available. According to this report there is quite a difference in the number of operative cases and the results of the two services. The year 1924, I understood when in Denmark, did not differ essentially from other years as far as the obstetrical hospital service was concerned.

*Maternity service of Rigshospitalet*¹

	For instruction of medical students (Division A)	For instruction of midwives (Division B)
Number of women delivered.....	1,577	1,549
Number of births.....	1,590	1,585
Number of operative deliveries.....	214	146
Number of cases of puerperal infection in operative deliveries.....	71	69
Number of maternal deaths in operative deliveries.....	8	4
Number of infant deaths in operative deliveries.....	50	39
Total number of maternal deaths.....	13	7
Maternal mortality rate per 1,000 births.....	8.1	4.4
Percentage of morbidity.....	27.5	30.8
Total number of stillbirths and of infant deaths occurring before mother's discharge from hospital.....	107	104
Percentage of stillbirths and infant deaths.....	6.7	6.6
Cases having anesthesia.....	Not given.	267
Percentage having anesthesia.....	Not given.	17.2

¹ Beretning om Rigshospitalet fra April, 1924, til Marts, 1925. Copenhagen, 1925.

The first suggestion from these statistics is that a maternal mortality rate of more than 6 per 1,000 births is not a remarkable record (6.3, or 20 deaths for 3,184 births). The best maternity hospitals in the United States usually show a better rate than this. It is necessary to remember, however, in considering this record that it is for one year only, that there are but two large lying-in hospitals in all Denmark, and that the Rigshospitalet, the larger one, receives a considerable portion of all the abnormal maternity cases of Copenhagen and the vicinity. There is a rather striking difference in the maternal

mortality for the two services; the medical-student training service (Division A) had a maternal mortality rate of 8.1 for 1,599 births and the midwife training service (Division B) a mortality rate of 4.4 per 1,585 births. In Division A (medical students) 214 (13.5 per cent) of the 1,577 deliveries were operative, 8 (3.7 per cent) resulting in maternal deaths. Infant deaths occurred in 50 (23 per cent) of these operative cases. In Division B (midwives) 146 (9.4 per cent) of the 1,549 deliveries were operative, 4 (2.7 per cent) resulting in maternal deaths. Infant deaths occurred in 39 (26.7 per cent) of these operative deliveries. I was given to understand that the maternity cases were evenly divided; but it seems probable from the record that Division A receives more women that are obviously going to have abnormal labors, for in 1924 it took care of 28 more women and had 68 more operative deliveries than Division B.

In regard to infant mortality the United States record is more favorable. Denmark's infant mortality rate since 1919 (Table 5) has been considerably higher than that of the United States; and the disparity seems to be increasing, although in the 33 years between 1890 and 1922 the Danish infant mortality decreased 40 per cent, the greatest drop being in the rate for towns. "Whereas 30 years ago the infant mortality rate was about 50 per cent higher in the towns than in the country, it is now approximately the same for the urban and rural populations."¹⁸

Norway and Sweden—the two other Scandinavian countries where the midwife is extensively employed—have much lower infant mortality rates than the United States. (Table 5.)

TABLE 5.—*Infant mortality rates (deaths under 1 year per 1,000 live births); United States birth-registration area and Scandinavian countries, 1915-1926*¹

Country	Deaths of infants under 1 year of age per 1,000 live births											
	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Denmark.....	95	100	100	74	92	91	77	85	83	84	80	84
Norway.....	68	64	64	63	62	58	54	55	50	50	46	-----
Sweden.....	76	70	65	65	70	68	64	62	56	60	55	-----
United States birth-regis- tration area.....	100	101	94	101	87	86	76	76	77	71	72	73

¹ Compiled in the Children's Bureau from U. S. Census figures and official statistics of Scandinavian countries.

The fact that the total infant mortality rate of Norway and Sweden is so low would suggest the probability that the difference in the infant mortality rate between Denmark and the United States is not due primarily to difference in method of obstetrical delivery. A study of the neonatal death rates of the two countries confirms this opinion. (Table 6.) The neonatal death rates for Denmark from 1921 to 1926, inclusive, have been from 6.5 to 9 points lower than the rates for the United States birth-registration area.

It would be interesting to know whether the percentage of deaths from birth injuries is increasing in Denmark as it is in the United States. Apparently the large proportion of deliveries by midwives

¹⁸Health Organisation in Denmark, p. 35.

(85 per cent) and the infrequent use of anesthetics during labor are not associated with a high neonatal death rate. Denmark has a much higher total infant mortality rate than the United States, but a considerably lower neonatal rate. Evidently Denmark needs to concentrate its efforts on reducing the deaths of infants from one month to one year of age, whereas this country faces the more difficult problem of reducing the neonatal deaths. Probably less intensive work is being done in Denmark in preventive child-health measures that reach the infants beyond one month of age.

TABLE 6.—*Neonatal mortality rates (deaths under 1 month per 1,000 live births); Denmark and the United States birth-registration area, 1921-1926*

Year	Neonatal mortality rates			
	Denmark ¹		United States birth-registration area ²	
	Deaths under 1 month	Rate per 1,000 live births	Deaths under 1 month	Rate per 1,000 live births
1921.....	2,446	31.0	68,021	39.7
1922.....	2,448	33.1	70,541	39.7
1923.....	2,331	31.2	70,823	39.5
1924.....	2,319	31.4	74,527	38.6
1925.....	2,068	28.8	71,078	37.8
1926.....	2,222	31.4	70,427	37.9

¹ Aperçu de la Démographie des Divers Pays du Monde Publié par l'Office de l'Institut Internationale de Statistique, 1927, pp. 116, 184.

² U. S. Bureau of the Census: Birth Statistics, 1921-1926.

On my first visit to the maternity hospital I called on the professor of obstetrics in personal charge of the obstetrical and gynecological service in which instruction of medical students is given. In answer to the statement that I was interested in the Danish contribution to the very important question of reduction of maternal mortality, I was surprised to have him promptly respond: "It is easy to see what is the cause of the high maternal mortality in the United States. You interfere—operate too much. We give nature a chance." He explained that forceps could not be used in his section of the hospital unless he was called; he lives in a house adjoining the maternity hospital.

When I visited the other professor of obstetrics in charge of that part of the maternity hospital given over to the training of midwives I was shown over the entire maternity hospital and given every opportunity to see the details of midwife training, including the actual delivery of cases. I talked with the head midwife, the head nurse, and the assistant medical instructors. From all those I met I received most help from a young woman assistant resident physician who had had a medical internship in Chicago and who could therefore compare American obstetrical methods and the Danish procedure. The midwife training, as I observed it, was most careful, and the technique used at delivery by the pupil midwife with the graduate midwife supervising was the extreme of simplicity and skill. No smallest detail went unmentioned by the supervisor in her instruction.

It was a marvel to an American doctor to see a long difficult delivery of a primipara by a pupil midwife without the use of any anesthetic, the woman making absolutely no outcry until the actual expulsion of the head. The child was skillfully brought into the world vigorous and uninjured. No exhaustion, apparently, followed the delivery, for a few seconds after the birth of the baby the mother inquired in a loud voice, "Is it a boy?" I wondered if the Scandinavian woman has more fortitude or less sensibility than her American descendant—or have we developed a fear complex in our mothers?

Through many observations I was made to realize how almost uniformly good the prevailing customs are in Denmark in regard to bringing children into the world. Operative interference in maternity cases in Denmark, indeed all through Scandinavia, is undoubtedly much less frequent than in the United States. This is due to a number of causes, but there can be no doubt that the small percentage of obstetrical operations is greatly influenced by the fact that the majority of deliveries are performed by midwives, who can not use anesthetics except in certain specified emergencies when a physician is not available. The district health officer must see the records of such cases, and the midwife must justify her interference or use of anesthetic, if a physician was not present at the confinement. Obstetrical anesthesia or operation necessitates the presence of a physician and calls for an extra charge for medical services. Whether or not the small use of anesthetics is wise it certainly is directly responsible for the small amount of operative interference. Few women, even in Scandinavia, will submit to any operative procedure without the help of narcotics. As a result, while in the United States operative interference has been shown to vary from 10 to 30 per cent, the incidence of operations averages about 4 per cent of all maternity cases in the several Scandinavian countries.¹⁷

In the analysis of the maternity services for 1924 at the Royal Hospital of Copenhagen it has been shown (see p. 10) that where medical students are taught the percentage of operative cases was 13.5; where midwives are trained, with 28 fewer deliveries, the percentage of operative cases was 9.4. Of course, the figures for one year give too small a basis for comparison of the results of these two services; but how many large free lying-in services in this country can show for a total of 3,126 deliveries an operative interference of only 11.5 per cent of all deliveries? In 1,549 midwife deliveries anesthesia was given 267 times, or in only 17.2 per cent of the cases.

The operative incidence in this great maternity hospital of the whole country is greater probably than the percentage of operative cases in other hospitals or nursing homes in Denmark and much larger than for home deliveries, because of the restrictions relative to operative interference by midwives, who deliver the great majority of all nonhospital cases.

The benefit of careful supervision of obstetrics, whether of midwife or physician, which is such an important part of the Danish system, must be considered in analyzing their records.

In Denmark the results of obstetrical technique are carefully and closely supervised by the National Board of Health. "A striking

¹⁷ See footnote 7.

observation concerning Scandinavia was a nation's requirement of statistics of operative incidence and mortality. The practical sense of one of the smaller States has thus undertaken a measure for community conscientiousness in surgery which our great scientific bodies have these many years not ventured to approach directly."¹⁸

Another and less apparent question is brought up here and should be carefully considered, and that is, What is the effect on maternal mortality of a high incidence of hospitalization of confinement cases? Is it possible that normal deliveries are less endangered at home than in hospitals? And if so, what effect on our maternal mortality must be expected from the growing trend of hospitalization? As Mr. Woodbury has clearly stated, "Though the best type of care can be obtained in well-regulated hospitals, confinement in a hospital does not necessarily insure such care. Information concerning the proportion of births in hospitals, therefore, without further evidence as to the management and the routine precautions taken in these hospitals, can not be considered completely satisfactory evidence as to the quality of confinement care."¹⁹ Hospitalization and incidence of operative interference run somewhat parallel and are to some extent interdependent. Danish women are generally confined at home, and the incidence of operations per total births is small. Rickets is not prevalent in Scandinavia, and rachitic deformities of the pelvis are relatively uncommon. This also may be a factor in the low incidence of operative interference.

The effect of the small number of operative cases is evident at once, I believe, in the low maternal mortality rates of Denmark and the lowering of the puerperal septicemia rate. Operative interference must mean greater chance of infection in the hands of even the best surgeons. When we realize how prone an imperfectly trained physician in this country is to shorten a maternity case by some kind of operation and how incomplete and unsatisfactory are the planning, isolation, and separation of both nursing service and operating-room in most lying-in wards in the hospitals of the United States, it would seem to me that we need look no further for the chief cause of the high maternal mortality rate in this country, especially the high rate from puerperal septicemia.

The best obstetricians in the best lying-in hospitals in the United States may safely resort to operative interference with actually less risk to mother and child than they would be subject to in a protracted natural delivery. Less well-trained and less careful physicians, working in homes or hospitals unsatisfactory from the standpoint of obstetrical technique and resorting to operative procedure because they have seen it advocated by a great obstetrician or because they like to operate or even because they are in a hurry, can not be expected to show such good surgical results.

Hurry has become a part of our national temperament and has even affected the medical profession. When hurry in the confinement attendant meets fear in the mother the combination certainly militates against safe and sane obstetrics. Anybody who has talked to the average expectant mother of to-day must be aware of the great fear she feels for the pending trial, developed possibly from listening

¹⁸ Holden, Frederick C.: "Gynecology and foreign governments." *Journal of the American Medical Association*, vol. 89, no. 24 (Dec. 10, 1927), p. 2015.

¹⁹ *Maternal Mortality*, pp. 86-87.

to old women's tales of the horrors of maternity of the past. Women to-day actually order a Cesarean-section operation because a laparotomy entails less suffering than labor, and some physicians actually allow themselves to be dictated to in the matter of operation regardless of the risk to the patient.

So it seems to me that hurry and fear, resulting in too frequent operative interference, are the basis of our high maternal mortality. No thinking person would say the European-trained midwife is comparable to our best-trained obstetrician. It is not primarily a question of midwife or physician. The problem we have to solve is to prevent so much operative interference, to develop a greater "obstetrical conscience," to bring about more careful supervision of obstetrical practices and results, and to provide maternity hospitals where every precaution is taken to make obstetrics safe for either operative or normal deliveries.