

I wish to thank Dr. Ross Robertson, who was in charge of these reported cases, and Dr. Barbara Kraft, who gave the anaesthetic for Case 1.

ADDENDUM

Since this paper was prepared, the concept has developed of cardiac resuscitation for "medical" diseases—ventricular fibrillation due to cardiac infarction, Stokes-Adams disease and toxic reactions due to digitalis, quinidine and procaine amide. Beck *et al.*⁹ have successfully treated a physician who "died" from a heart attack and who was receiving cardiac massage in a hospital within five minutes. Zoll *et al.*¹⁰ have successfully revived a patient with Stokes-Adams disease with an external defibrillator, the current used being 200-700 volts for 0.15 sec., with one electrode applied to the left of the sternum and the other on the anterior axillary line.

Ventricular fibrillation is now classified as either fine or coarse. Apart from massage, de-

fibrillation is more likely to be successful with the coarse variety, and the fine type should be converted to the coarse with adrenaline before shocks are applied. To differentiate and treat the various forms of arrhythmia it is now felt that a thoracotomy should be done in every case, even if the surgeon is operating in the upper abdomen.

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HOME CARE PROGRAM FOR RESPIRATOR PATIENTS*

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NEW ADVANCES in the medical management of both acute and chronic cases of poliomyelitis with respiratory paralysis, together with the occurrence of large epidemics, have resulted in an increasing number of patients requiring permanent respiratory care. Although in recent years home care programs have been evolved in a few American centres for such patients, there is scant reference to these schemes in the medical literature.¹ The purpose of this paper is to briefly review the evolution of such a program in Manitoba, to present our preliminary results, and to indicate the many factors involved in the selection of patients.

*From the Winnipeg Municipal Hospital, Winnipeg. Presented by the senior author at the 4th Annual Meeting of the Canadian Association of Physical Medicine and Rehabilitation, London, Ont., May 1956.

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CASE MATERIAL

During the poliomyelitis epidemics of 1952 and 1953, the Winnipeg Municipal Hospital was the major treatment centre for Manitoba, particularly for the care of respiratory cases. In 1952, 43 cases admitted required respirator treatment, and in 1953 there were 185 such cases, a total of 228 in all. Of these patients, 71 had

TABLE I.

RESPIRATOR CASES ADMITTED TO THE WINNIPEG MUNICIPAL HOSPITAL				
Year	Total respirator cases	Died	Recovered (free of respirator)	Chronic respirator cases
1952	43	7	26	10
1953	185	64	87	34
Total	228	71	113	44

died by the time the present study was undertaken, most of them during the acute phase of the disease,^{2, 3} and 113 had improved to the point of no longer requiring regular respiratory assistance, leaving 44 long-term respirator patients (Table I).

However, this does not represent the actual number of potential home respirator cases. On

TABLE II.

FIVE HOME RESPIRATOR PATIENTS										
Patient sex age	Family situation	Residence	Distance from Resp. centre	Resp. time hrs/day	Resp. equipment	Other equip. and devices	Attendant	Follow-up	Functional activities	Notes
D.W. F. 32	Mother of three young children. Husband farmer.	On farm	65 miles	8	Tank respirator; portable chest respirator.	Wheelchair; gatch bed; auxillary power supply; hydraulic invalid hoist.	Patient's mother has been trained. Help hired for house-work.	Regular 3-monthly attendance at O.P.D. Occ. home visit by district nurse.	Practically complete spinal paralysis.	To be given a trial of self-feeding devices. General health good. Has been home for 18 months.
D.D. F. 29	Four children. Husband farmer.	On farm	85 miles	8	Tank respirator; portable chest respirator.	Wheelchair; auxillary power supply.	Hired attendant.	Regular 3-monthly attendance at O.P.D. Occ. home visit by district nurse.	Able to walk short distances. Can do light work with hands. Helps with children.	Multiple right renal calculi—all passed but one. To be readmitted for re-constructive hand surgery.
G.L. F. 29	Mother of one child. Husband accountant.	City	5 miles	10-12	Tank respirator only.	Wheelchair; ramp to house; feeders.	Hired attendant.	Regular 3-monthly attendance at O.P.D.	Complete paralysis both arms. Able to walk short distances.	Had multiple bilateral renal calculi; residual solitary calculus.
P.S. M. 29	School teacher. One child. Wife works as reg. nurse.	City	5 miles	8	Rocking bed.	Wheelchair	Wife	Regular 3-monthly attendance at O.P.D.	Practically independent re dressing, ambulation, eating.	Is working part-time at home. This should increase to the point of economic independence.
G.R. M. 12	School child. Two parents, one brother.	Sub-urban	10 miles	12	Tank respirator only.	Wheelchair	Mother	Attended at O.P.D. twice.	Able to walk short distances. Both arms paralyzed.	Permanent tracheotomy. Died of respiratory infection 6 months after discharge.

the one hand, ten of the remaining respirator patients cannot survive for more than a few minutes without artificial respiration and therefore are not considered suitable cases to be anywhere but in a special respirator centre. On the other hand, many of the 113 patients have achieved only a very tenuous freedom from their respirators and these are potential respirator cases again whenever they develop upper respiratory tract infections.⁴ Such cases require the same special consideration on discharge as do patients actually using respirator aids for some part of the day.

RESULTS

Since this home care program has been put into effect, five patients have been discharged to their homes with some form of respirator aid. Some of the pertinent data concerning these cases are shown in Table II. In addition, nine patients who no longer require artificial ventilation, but who remain severely disabled, have

also been successfully discharged. There are another seven respirator patients who have been partly or completely processed and their discharge will be effected as soon as all necessary requirements are fulfilled. Approximately 25 of the 113 ex-respirator patients discharged have required short-term readmission to hospital for mechanical ventilation on account of respiratory tract infections.

One patient died at home from respiratory infection six months after discharge in spite of living within easy reach of the centre. The family of one patient was justifiably concerned about the possibility of being snowed in for weeks at a time and that patient was readmitted for the winter. None has requested permanent return.

FACTORS INVOLVED IN HOME CARE

During the planning stage of this program and the subsequent accumulated experience certain factors of importance became evident. These are

discussed here in some detail to illustrate the problems encountered, although we are aware that these problems may be to some extent peculiar to Manitoba.

Medical aspects.—The first consideration in the selection of candidates for discharge is the degree of freedom from their respirators achieved either by the recovery of respiratory muscle function or by their proficiency at “frog breathing.”⁵ The patient should be free of his respirator for at least several hours a day but, beyond that, each case must be judged individually depending on many other circumstances, the chief of which is the *time* required to transport the patient back to the respirator centre in an emergency. The possibility of roads being blocked by snow or rendered impassable by wet weather and the alternative methods of transport are factors which require careful evaluation. This is of particular importance in Manitoba where, although approximately half the respirator patients come from the urban area of Greater Winnipeg, the remaining half come from widely scattered rural areas.

With regard to their general health, our experience with long-term respirator patients leads us to look for likely complications such as renal calculi,⁶ frozen chest,⁷ and secondary polycythæmia,⁸ as well as respiratory tract infections.⁴ Stiffness and deformity of the limbs and spine are also common.

Not only do we look for these and treat them if necessary before discharge, but these same considerations prompted us to set up a system of regular medical reviews at the respirator centre. For these reasons, as well as the possibility of acute respiratory conditions, the rapport between the centre and the family doctor is most important.

Social considerations.—It is essential that both the patient and the family should be anxious to have a home trial. A careful social survey of various facets of the home situation should be carried out before discharge. However, it is difficult to visualize the patient in the home environment. Not only has he been away for a long time, but he will be returning home crippled. It is, therefore, of great importance to keep the success of the social adjustment under critical review for several months. This is carried out by regular home visits by a social worker or public health nurse, as well as by interviews at the time of medical reviews.

Housing.—A limiting factor in some cases has been the inadequacy of housing. This is often evident only after a trained worker has visited the home. For example, doors may be too narrow; bedrooms may be too small to accommodate the necessary equipment; there may be difficult stairs; there may be no inside toilet; or the electrical circuits may be insufficient to take safely the extra load of the respirator. Some of these deficiencies may be easily remedied but others may pose serious problems. The important thing is to discover and remedy them before discharge.

Equipment.—It is considered, in the interests of safety, that patients, particularly those living in outlying districts, should have two types of respirators available. One of these should be a portable type operated with batteries, not only to facilitate transport but for use in case of interruption of power. The other may be a tank respirator, although we have subsequently found that most patients prefer a rocking bed. As it was considered most important that respirators be maintained in good working order and be serviced regularly, the Provincial Department of Health has maintained ownership of all respirator equipment. The machines are on loan to the patient and can be called in for servicing. In the same way, necessary accessories such as spare batteries are kept up.

Other non-respirator equipment, such as hydraulic hoists, gatch beds, overhead frames, ramps, feeders and many other self-help devices, often facilitates home care. Many of the devices are constructed in the occupational therapy department of the Municipal Hospital.

Attendant.—The success or failure of home care often depends on the availability of a suitable attendant. Usually an attendant is employed to look after the patient, but this responsibility may be taken by a member of the family. Arrangements are made for the attendant to spend one or two weeks with the patient before discharge in order to learn from the hospital staff the many details of care of that particular patient.

Financial considerations.—A careful assessment of the family's financial status is made before discharge and arrangements are made to help them with the necessary additional expenses, if such help is needed.

Administrative arrangements.—When consideration was first given to the planning of a pro-

gram designed to meet the situation peculiar to Manitoba, it was immediately apparent that the hospital alone could not carry out such a program.

The above factors involve a wide range of services and require the co-operation of many agencies. Senior amongst these is the provincial government, which not only gives the plan its general support but also supplies the respirators and other necessary items of heavy equipment. The program is directed by conferences of the Home Care Committee convened by the medical director of the respirator centre. This committee is made up of a medical consultant representing the Provincial Department of Health and Public Welfare, a public health nurse, the hospital social worker, a representative from the Society for Crippled Children and Adults, and the Provincial Co-ordinator of Rehabilitation, as well as physicians on the staff of the centre. Various other agencies such as Family Bureau, City Health Department and the Victorian Order of Nurses are called in from time to time, depending on the needs of the case.

Cases are usually proposed by the hospital physician: a preliminary report on the medical and social aspects of the case is submitted and the various requirements to be met before discharge are listed on a special form.

Necessary arrangements such as alterations to the home, electrical survey, purchase of equipment and provision of an attendant are all made before discharge. A final discharge conference is held with the patient, the relatives, the attendant and the family physician, and any other interested parties. After discharge, regular home visits are made either by a social worker or a public health nurse and the patient is also followed up in the outpatient clinic at the respirator centre.

SUMMARY AND CONCLUSIONS

The evolution of a home care program for chronic respirator cases left after two large epidemics of poliomyelitis in Manitoba has been outlined; the preliminary results have been presented and the various medical and social factors involved in the selection of patients have been discussed.

By means of this program, patients who would previously have been permanently confined to hospital have been successfully discharged in care of their families; and those who remain in

hospital may see some hope for themselves in the future. A general advantage to the community lies in the saving of long-term hospital costs. These advantages must be balanced against the increased risk to the patient and the possible increased social and financial strain on the family.

We consider the regular comprehensive reviews at the respirator centre to be the keynote of success in this program. With an adequate follow-up service, the risks involved are more than compensated for by the benefits that the patients derive from such a scheme.

We are indebted to Dr. Morley Elliott, Deputy Minister of Health, Manitoba, and Dr. J. D. Adamson for their encouragement in inaugurating this scheme; to Miss Mary Wilson, Nursing Consultant, Department of Health and Public Welfare; and to the other members of the Home Care Committee for their co-operation.

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SURVIVAL RATES AFTER ACUTE MYOCARDIAL INFARCTION WITH LONG-TERM ANTICOAGULANT THERAPY

Keyes, Drake and Smith (*Circulation*, 14: 254, 1956) present evidence for the value of long-term anticoagulant therapy in selected cases of coronary artery disease. This form of treatment has been particularly effective in the group with recurrent infarcts.

The incidence of acute myocardial infarction among patients discontinuing therapy is high; the mortality rate among those having infarcts is 44%. Haemorrhagic manifestations do not constitute a contraindication to this form of therapy.

A trained anticoagulant team, working with a well-equipped laboratory, is necessary for the success of the treatment.

Bleeding episodes are an undesirable feature, believed to be less of a hazard to the patient with coronary disease than the risk from the disease itself. In over five years of prolonged anticoagulant therapy, what may be termed "serious" or "major" bleeding occurred in 13% of the cases, minor bleeding episodes in 42%. In the last two years of this study the incidence has been greatly reduced, to less than 5%.