THE NOVA SCOTIA MEDICAL BULLETIN

Prevention. Why Not?

The recent introduction of the *Haemophilus influenza* Type B Vaccine in this province once again brings to our attention the importance of immunization (and prevention). The fact that the province did not fully fund a program meeting current recommendations of the Canadian National Advisory Committee on Immunization is noteworthy. Objections from the profession regarding this lack of support for a preventive measure were not heeded.

In a time when prevention seems to be an idea whose time has come, evidence seems to suggest that we lack motivation to implement many preventive strategies that are well known and available. Imagine an "ideal" practice in this province, in which all patients are immunized, with constant monitoring and callback systems in place. This practice would follow the recommendations of the Periodic Health Examination or, at least, take into account the present College of Family Physicians' recommendations in the Health Maintenance Guide. A protocol for well baby care would be in place, as would a program for birth control education and sexually transmitted disease education. Programs regarding abuse in all its forms — child, elderly and sexual — would be a prominent part of the awareness that would touch all patients.

All smoking patients would be identified and targeted for attention, education and motivation. At least minimal dental hygiene would be encouraged. Occupations would be documented, to further identify those with special risk factors. Those people with heart disease and diabetes and those below the poverty line would be identified in our ideal practice, since these people are at a much higher risk to illness. Cautions about drinking and driving, with seatbelt encouragement would be advertised well: in the office and with literature for the home. Proper family counselling and sexual counselling would be available.

In fact, many more screening tests could be incorporated into our office practices, as well as good follow-up of patients identified in other programs, such as described in the article "Enhanced Vision Screening Program in Nova Scotia" in this issue. Despite agreement in principal, screening and education strategies are not being implemented.

A recent survey of physicians' perceptions of community health needs is published in this journal. Also recently, the *Canadian Medical Association Journal* reported on an International Health Conference held in Ottawa, that suggested new public health initiatives. At this conference, we were urged to give up our "dominance" in some areas of medicine and allow a transfer of public funds to self-help groups, disease prevention and health education programs. These alternative programs would not necessarily be better or cheaper than utilizing the present medical model, of course, and in fact might tend to ignore our place in preventive stragies.

Identification of the reasons for our failure to effectively support health promotion must be attempted and in turn acknowledged by both government and the profession as a whole. If we do not believe current recommendations of our Immunization Committee, let us say so. If we do not wish to be involved in educational programs, then we must promote alternatives. However we will have to have good reasons for not using the present contact we have with patients (76% of all Canadians visit their physicians in any given year).

Perhaps those reasons are economic, or intellectual or that we are really overwhelmed by all the possibilities. Whatever those reasons are they should be identified and soon. Our credibility is at stake and we are missing a rare opportunity. The mixture of preventive and curative approaches we use in practice should be evolving; if not, we should know why not.

J.F. O'C.
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An Appreciation

DR. A.G. PATRICK MCDERMOTT

Dr. Pat McDermott passed away on December 5, 1986 at the age of 39 after a prolonged illness. He was born in St. John, New Brunswick, and received his high school education in Kingston, Ontario, and Saskatoon, Saskatchewan. He completed his pre-medical education at the University of Saskatchewan and entered Dalhousie Medical School in 1969.

Following internship and graduation in 1974, he worked as an Emergency Room Physician at the Victoria General and as a medical examiner for Halifax County. He completed his orthopedic residency training at Dalhousie in 1982 when he became a Fellow of the Royal College of Physicians and Surgeons of Canada.

He undertook additional specialty training in Toronto and returned to Halifax in 1984 when he joined the medical faculty of Dalhousie and went on staff at the Victoria General. He established and directed the Bone Bank at the Victoria General. His special interest and expertise was in the management of tumours of the musculoskeletal system.

He received many professional awards and published and presented scientific papers nationally and internationally. At the time of his death, he was an Associate Professor of Surgery at Dalhousie, a member of the staff of the Victoria General, and held numerous other university, hospital and association appointments and positions.

He enjoyed golf, squash, and canoeing.

He maintained an active practice for as long as possible despite his own failing health. He will be sadly missed by his friends, colleagues, and patients.

He is survived by his parents, his wife, Eve, two sons, Sean and Liam, and two brothers.

A.E.J.T.
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Since Dr. Dermott's death, the Pat McDermott Trust, an educational fund for his children has been established. Any contributions should be sent to the Pat McDermott Trust, c/o Dr. R.H. Yabsley, Division of Orthopaedic Surgery, Victoria General Hospital, 1278 Tower Road, Halifax, N.S. B3H 2Y9.

Advances in the Management of Musculoskeletal Tumors

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Primary tumors of bone and soft tissues are uncommon. The most common malignant bone tumor, osteosarcoma, occurs rarely with only about 150 new cases seen annually in Canada. Chrondrosarcoma and Ewing's sarcoma are less frequent and giant cell tumors are even more rare, and there are probably less than 1,000 bone tumors treated in Canada per year. Considering the number of orthopaedic surgeons within the Maritime Provinces, this would amount to about one to two lesions seen per year with an average frequency for lesions such as osteosarcoma, chrondrosarcoma, and Ewing's sarcoma being once every five to ten years. The frequency of soft tissue sarcomas in the Maritime Provinces is between five and ten cases per year. Similar statistics apply to the frequency with which a general surgeon would see these problems.

Because of the infrequency with which these lesions are seen, a concentrated experience with a multidisciplinary approach is necessary in order to provide patients with satisfactory care, especially given more recent advances in the management of these problems. Recently, a Musculoskeletal Oncology Clinic was formed at the Nova Scotia Cancer Treatment and Research Foundation, Halifax Clinic. Members of the Musculoskeletal Oncology Team are the authors of this paper. Since the beginning of the clinic in August 1984, over 50 patients with aggressive benign and malignant primary bone tumors, as well as soft tissue sarcomas, have been operated on. A much larger number of patients with metastatic disease have also been treated.

NEW INVESTIGATIONAL TECHNIQUES

There is little doubt that the development of high quality imaging techniques has been a giant step forward in the diagnosis and management of these lesions. Forty years ago, plain radiographs were augmented with tomography. Twenty years ago, bone scanning techniques and selective angiography were added. These imaging techniques, plus elective intra-abdominal and vertebral studies such as intravenous pyelography, barium studies, and myelography were all that were available to assess the extent of the tumor within a bone, the presence of soft tissue extension, or distant metastases. Computerized tomography was first introduced in the early 1970s and it found rapid application in assessment of bone and soft tissue tumors. The transverse images provide spectacular localization of tumors about the pelvis, sacrum, and vertebrae — areas traditionally difficult to evaluate. Recently, computerized tomography of the chest was added to the sensitivity of full lung tomography and allows us earlier diagnosis of metastatic disease.

Advances in the field of pathology have also been substantial. Work in the last 20 years has provided us with a greater understanding of these lesions. Tumor registries have been developed which enable pathologists to obtain a concentrated experience and they have provided us with important information regarding the biological behaviour of different histological subsets. Further, criteria for using uniform nomenclature in histologic grading of these lesions has been developed. Recently, the pathologist has been asked to assess histologically the effect of pre-operative chemotherapeutic regimens on resected osteogenic sarcomas. In the future, the pathologist will be even more involved in providing this important feedback predicting the effect of various adjuvant treatment modalities.

STAGING METHODS

One of the most important advances in the past five years has been the more or less universal adoption of a staging system for musculoskeletal tumors. This system is simple and utilizes assessments of G (grade of tumor), T (anatomic location: intra-compartmental or extra-compartmental), and M (presence or absence of distant metastases); malignant lesions are staged as Stage 1A, or 1B (low grade, intra- or extra-compartmental), Stage 2A or 2B (high grade, intra- or extra-compartmental), and Stage 3 (any grade, any anatomical location with distant metastases).

The major advantage to this staging system is that it enables the surgeon to choose the optimal management for the patient from a choice of operative

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procedures, based on the margin or normal tissue included with the resection or amputation. The operations are described as *intra-lesional resection* (operations in which the tumor is violated, such as curettage or debulking); *marginal resection* (operations through the reactive zone of compressed but often tumor infiltrated tissue); *wide resection* (procedures in which a viable cuff of normal tissue is resected with the tumor but which do not include the entire anatomical compartment in which the tumor extends); and *radical resection* (procedures that remove the entire compartment in which the tumor resides). Several studies have demonstrated that intra-lesional or marginal procedures are effective for most benign tumors, marginal or wide resection procedures for the majority of Stage 1A and 1B lesions, and wide or radical operation for Stage 2A and 2B tumors.

ADVANCES IN TREATMENT

Armed with improved imaging studies, accurate staging and more sophisticated diagnostic studies of the tissue obtained at biopsy, the Musculoskeletal Oncology Team has a far better appreciation of the nature of the lesion, the extent of involvement, and the propensity of the tumor to recur locally or to metastasize to distant parts. This composite information gives the advantage of accurate and careful staging and cannot be over emphasized. The decision to operate or not to operate is based on these procedures and careful deliberations.

The approach to a lesion surgically involves three aspects: biopsy, resection, and reconstruction. In the past, poor techniques involving biopsy have led to an inability to eradicate the tumor locally and to reconstruct limbs. As a general principle, longitudinal incisions over the site of the lesion should be made. Only one compartment should be violated at the time of biopsy and this is the compartent that should be surgically removed subsequently, e.g., to approach the lesion surgically through a muscle splitting incision where subsequent resection of the muscle will not lead to significant functional disability necessitating amputation.

At the time of surgery, undermining of tissue should not be performed. Frozen section should be made in order to demonstrate adequacy of tissue harvest for pathologic interpretation. The pitfallsof histological assessment are great and frequently histological assessment involves sending tissue to other centres for independent assessment. Drains should not be used at the time of surgery and only the skin should be closed, leaving all other tissues untouched. Intra-operative x-rays should be taken to assure proper anatomical site of biopsy. If bone is being biopsied and it is vascular at the time of surgery, the bone window can be filled with methyl methacrylate cement in order to decrease bleeding. The use of tournaquets is controversial but most investigators feel that a tourniquet should be applied and, if excessive bleeding occurs, it should be inflated.

Following histological confirmation of the tumor, the next essential surgical decision is how to eradicate the tumor completely. With adequate staging data, a resection of the lesion or amputation can be planned and performed with appropriate margins and with the avoidance of major structures necessary to maintain maximal function. The overall safety of the patient should dominate this first phase of the treatment, and any considerations of the functional restoration should only be introduced after maximum control of the local tumor has been planned and achieved.

The second part of the operative procedure is the reconstruction. For the complete standard amputation or disarticulation, this is simply a matter of fashioning the most useful stump for prothetic wear. For some of the newer limb sparing amputations, such as the turn about for high grade distal femoral lesions, the tibial turnup for proximal femoral tumors, the Tikhoff-Linberg conservative forequarter amputation for patients with scapular or humeral tumors, and the internal hemipelvectomy for patients with pelvic tumors, considerable attention is paid to preserving major structures and restoring them in such a way as to provide a useful and functional extremity.

Perhaps the most exciting chapter in this aspect of the management of bone tumors and soft tissue sarcomas are the limb sparing procedures. Recently, at the Victoria General Hospital, a bone bank has been established so that composite autograft, allograft, and metal implants can be formed to restore skeletal continuity and function of the affected parts. Limb salvage surgery has become highly sophisticated, complex, and time consuming. But, most importantly, it appears to be an effective means of limb restoration and maintenance of useful function. At the present time, indications for amputation are limited to patients with pathological lesions below the knee, patients with contaminated tumors secondary to pathological fracture, patients with high grade tumors below the age of ten years, and situations where the neurovascular structures are compromised either by extension of the tumor or surgical intervention.

ADJUVANT TREATMENT

Radiation therapy and systemic chemotherapy are each being used increasingly in adjuvant fashion, i.e., after the radical local regional surgical treatment has been applied. The goal of adjuvant treatment, therefore, is eradication of micro-metastatic disease in patients at high risk of both local and distant relapse and, therefore, the ultimate aim is increase in cure rates.

In osteogenic sarcoma the various protocols pioneered by Memorial Sloan-Kettering Cancer Centre have been used; at the present, the most widely used

is T10 Rosen's protocol, using several drugs given in very intensive in-hospital regimen, at the preoperative and post-operative scheduling. The role of the various components of this regimen is still being investigated and no comment can be made whether it will remain the mainstay of adjuvant treatment in the future, but one of its modified forms most certainly will. Currently our Sarcoma Group is engaged in prospective evaluation of modified Rosen's protocol, with a simplified protocol used by the European Groups using two drugs only. It is a collaborative trial involving several major institutions in Europe, the U.S.A. and Canada.

In soft tissue sarcomas, the role of adjuvant systemic chemotherapy is controversial, as many large studies have not shown any benefit in disease-free survival and overall survival between patients treated with chemotherapy and the control groups. The only study which has shown a benefit for adjuvant chemotherapy comes from NIH Surgical Branch. However, its numbers are quite limited and the benefit appears to be restricted to extremity sarcoma, high grade only. Again, because of a controversial issue and small numbers of patients seen at any given institution, our Sarcoma Group is engaged in collaborative study developed by the Canadian Sarcoma Group and The European Organization for Research and Treatment of Cancer, trying to establish the relative role of chemotherapy and radiotherapy given in adjuvant fashion in soft tissue sarcoma.

The diagnosis and management of patients with tumors of bone and soft tissue is a complicated and demanding process requiring specific resources not universally available. Multi-disciplinary approach, with the involvement of disciplines such as orthopaedic surgery, general surgery, radiation and medical oncology, diagnostic radiology and pathology, is necessary. It is hoped that with the development of such a clinic at the Cancer Treatment and Research Foundation of Nova Scotia, that patients throughout Atlantic Canada would be served by the state-of-the-art patient management.

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Subcapital Femoral Fracture Prevelant Injury: Controversial Treatment

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Subcapital fracture remains a common injury amongst our elderly population.[1] About seventy of these patients are treated at the Halifax Victoria General Hospital every year. Morbidity may be great; urinary tract infection, pneumonia, congestive heart failure, cerebro-vascular accidents, and thrombo-embolic disease, are all well known systemic complications, with an overall incidence of 30%.[4 9] While treatment may vary from centre to centre, three main methods are employed: open reduction and internal fixation; hemiarthroplasty; or total hip arthroplasty.

It is believed that impacted, or undisplaced fractures (Garden Stage 1 or 2) should be treated with open reduction and internal fixation, regardless of the patient's age. This is based largely upon the review of 1,503 patients by Garden, *et al.* who reported an overall surgical success rate of 94%.[1]

However, partially or completely displaced fractures (Garden Stage 3 or 4) are prone to three local complications: non-union (35%); avascular necrosis of the femoral head (27%); and failure of fixation (22-50%).[1] These difficulties make hemiarthroplasty an attractive alternative, and many authors have related their experience with this method.[4]

Only three prospective, randomized studies of open reduction and internal fixation, versus hemiarthroplasty, have been completed.[5 7 8] These all found no advantage to open reduction and internal fixation in patients over 70 years of age. Sikorski and Barrington concluded that "the anterior hemiarthroplasty is the safest primary mode of treatment in the elderly patient".[7]

Hemiarthroplasty, while good for short term function, consistently fails to provide long term, acceptable results. Acetabular chondrolysis, protrusio acetabulae, and prosthetic loosening, all contribute to chronic pain states. Total hip arthroplasty performed for arthritic disease has provided excellent long term results.[6] Recent advances, such as cementless fixation, and improved prosthetic design, make this a safe, effective alternative. While there remain few published results of this treatment of displaced subcapital fractures, early experience seems promising.[9] Perioperative dislocation is reported with an alarming frequency of 8%, but 85% of these stabilize after one to three weeks of traction.[9] No prospective studies are yet available.

The Orthopaedic Division at Dalhousie University has designed a prospective, randomized clinical trial to help solve this difficult problem. All patients over 70 years of age, with displaced subcapital fractures, will be treated with either a total hip arthroplasty or a hemiarthroplasty. All patients between the ages of 60 and 70 will be treated with either open reduction and internal fixaion or with a total hip arthroplasty. These patients will be followed and many measures of success, or failure, shall be continuously analyzed. Exclusions from the sudy shall include: patient age under 60; Garden Stage 1 or 2 fractures; pathologic fracture; infection; or symptomatic antecedant hip pathology.

Hopefully, we shall be able to provide useful information which will enable physicians in Nova Scotia to provide optimal treatment for their patients. □

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Congenital Dislocation of the Hip

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In 1966 Dr. A. Trias entitled his paper "Are we missing Congenital Dislocation of the Hip?"[1] The experience from the IWK Hospital suggests that this remains a pertinent question.

This condition presents a spectrum of hip instability extending from the extreme of the dislocated irreducible hip at birth, through the reducible, dislocable, to dysplasia of the acetabulum. Neurological dislocation (cerebral palsy) (meningomylelocele) is excluded.

ETIOLOGY

The hip is most unstable in the flexed adducted position, and this is seen more commonly on the left side because this side is trapped against the sacrum in the usual delivery, perhaps stretching the posterior capsule of the hip. The opposite hip is pressed upon perhaps by the more yielding anterior structures and these pressures may all be a little greater in the firstborn.

In the breech presentation, the hip is held in acute flexion, stretching the capsule, and this is aggravated by extension of the knee, with resulting stretching of the hamstrings which become a dislocating force. The female capsule is perhaps more susceptible to circulating hormones that relax ligaments of the mother's pelvis. Maintaining the hip, after delivery in the adducted position by wrapping in swaddling clothes may slow down spontaneous recovery of the unstable hip.

INCIDENCE

Incidence of this condition in newborns at the Grace Maternity Hospital, in the five-year period ending in 1983 was 1.7 per thousand live births. It is an unusual situation for one of these children to require admission to the Children's Hospital at a later date. Access to records of those infants treated as outpatients at the Children's is limited. The expected incidence in the population is about three per thousand but this varies depending on how much of the spectrum is included in the figures. (Table 1)

Can a hip, which appears to be normal on early screening, go on to dislocation? This is somewhat controversial, and there may be a rare occasion that this happens. The problem is that it is difficult to separate this event from the "missed hip" when we are dealing only with a clinical examination.

HIP AT RISK

A higher risk situation is present in the left hip, of female first deliveries, especially of the breech presentation.

A. NEWBORN

Diagnosis (see Figure 1)

The emphasis in the newborn is to look for the signs of the stretched capsule. Classically this is the Ortolani klunk — the sensation of the head returning to the acetabulum.

Th examination begins by fully flexing the hips and bringing them down in wide abduction. At 90 degrees flexion, slowly adduct the hip and the head will slide out but it can be returned to the joint (by lifting forward with the third finger and abduction slightly) with a klunk. The true dislocation requires no pressure to go out. The dislocable requires pressure. The irreducible will not go in and will not abduct. (Rare — usually accompanied by other anomalies or severe moulding signs).

The Arc of Instability

This refers to a range of abduction in which the hip is stable e.g. stable at 90 degrees, unstable at less than 60. It is essential to understand this because it determines the success of management.

Principle of Management in Infants

Maintenance of reduction until the stretched capsule snugs up to stabilize the hip.

Dislocatable — this unstable hip needs only simple extra diapering to encourage the otherwise natural flexion abduction position which is self-curing.

Dislocated — the very unstable hip (small arc of stability) requires careful flexion abduction splinting and close followup in the first few weeks, and this is best achieved by a Pavlik harness. The more stable hips may respond to triple diapering but this technique is so variable as to be untrustworthy. I have seen hips show persistent dislocation in well done triple diapers. If there is any question, an A.P. of the pelvis in the device is done. Although 4-6 weeks should suffice,

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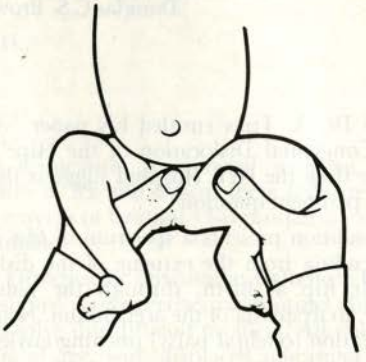
EXAMINE EVERY NEWBORN'S HIP FOR DISLOCATION

1. FLEX HIPS TO 90 . ABDUCT TO 45 .
2. HOLD THIGH WITH THUMB IN GROIN MIDDLE FINGER ON GREATER TROCHANTER.
3. PRESS FORWARD WITH MIDDLE FINGER AND BACK WITH THUMB.



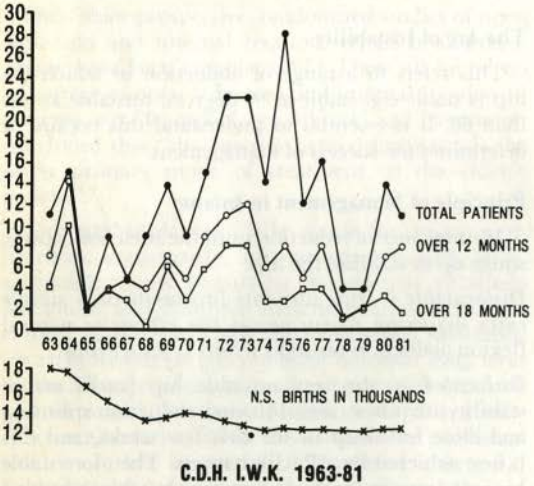
4. IF THE FEMORAL HEAD DISPLACES, THERE IS DISLOCATION!

• THE EXAMINATION SHOULD BE CARRIED OUT ON A FIRM SURFACE • RELAXATION IS ESSENTIAL • A BOTTLE MAY BE GIVEN IF NECESSARY • THE EXAMINER SHOULD BE GENTLE AND USE WARM HANDS

EARLY TREATMENT IS SIMPLE • DELAY MEANS OPERATION

FIGURE 1

TABLE I



C.D.H. I.W.K. 1963-81

persisting dislocation usually means followup was too casual.

Irreducible — these are rare; have been out for months of intrauterine life and come to surgery.

Complication — failure to obtain and maintain reduction.

B. THE OLDER INFANT

Diagnosis (see Figure 2)

Adaptive changes increase with time. These are tight adductors and psoas, acetabular dysplasia, and valgus anteverted femoral neck. Limited abduction, unequal buttock creases, and short leg are sought for in the pre-walker. Unilateral trunk shift is seen in walkers. Bilaterality delays diagnosis by 6 months because the waddling gait of a bilateral trunk shift is less readily thought abnormal.

Management

The principles are the same. Longer periods of immobilization are needed. Traction followed by open reduction may be needed. After 18 months boney procedures — femoral and/or innominate osteotomies are used to stabilize reduction.

Complications

Avascular necrosis of the femoral head, redislocation and subluxation lead to later salvage surgery. Secondary growth changes over the years do occur necessitating followup to adolescence.

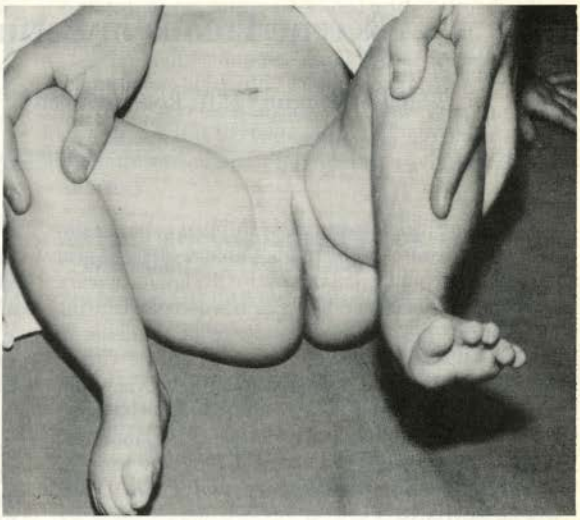


FIGURE 2

SUMMARY

Congenital dislocation of the hip continues to be with us, and they continue to elude the early examination. The diagnosis has to be excluded in a very positive manner in any child, (pre-walker or early walker) if there is a suggestion of a short leg, limited abduction, unequal buttock creases, or a little abnormality in the giant. If there is any question on examination a simple A.P. x-ray of the pelvis is indicated.

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Marlboro Man, RIP

In an article dealing with cigarette advertising in the United States, *The Economist* for July 26, 1986, reports:

"Surveys show that only 10% of smokers switch brands every year. Yet the manufacturers spend $2 billion on cigarette promotion — which is equal to 10% of their gross receipts. So wooing brand switchers alone would be a no-win game and the companies might actually come out ahead if advertising were banned. But advertising clearly has another function, which is to replace the 350,000 smokers a year who die from their habit, the 1m former smokers who defect and the 500,000 who die from natural causes. This means that the industry must find some 2m new smokers every year just to stand still. Since 90% of smokers get hooked before the age of 20, the main new market must be teenagers."

Recent Trends in Pertussis in Nova Scotia

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Whooping cough (pertussis) continues to be a major infectious disease problem in Canada, despite near universal acceptance of a vaccine for the last forty years. Although the incidence of disease has decreased during this period, the reported incidence of pertussis in Canada is 5-10 fold higher than that in the United States.[1] The purpose of this article is to review four important issues in pertussis: the clinical characteristics, its epidemiology in the Maritimes, its laboratory diagnosis, and controversies in therapy and prophylaxis. Current research efforts to resolve these issues will be described.

THE DISEASE

Pertussis is an acute disease of the respiratory tract caused by *Bordetella pertussis*, a minute Gram-negative cocobacillus for which man is the only natural host. The disease is characterized by three clinical stages: a catarrhal phase, a paroxysmal cough, and a convalescent phase. Following an incubation period of 7-10 days, the patient enters the catarrhal phase characterized by rhinorrhea, sneezing, mild conjunctivitis, dry cough, and low grade fever — symptoms indistinguishable from a minor respiratory infection. Within 7-14 days the patients enters the second phase characterized by the paroxysmal cough — a series of 5-10 short, rapid, forceful coughs, followed by a brief pause and finally by an inspiratory whoop. Increased salivation, lacrimation, vomiting, and cyanosis may also be present. The convalescent phase begins after a variable period, usually less than 4 weeks, and is marked by decreased paroxysms and gradual improvement.

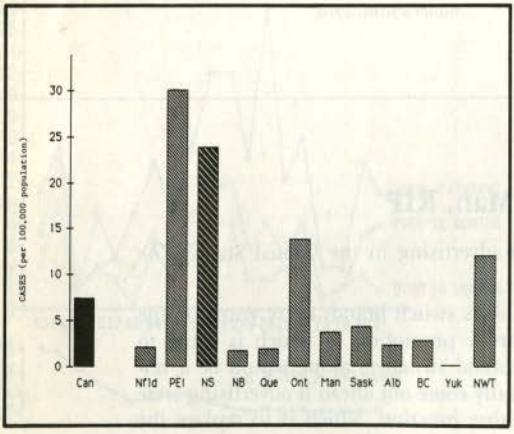

Figure Incidence of pertussis in Canada in 1985 by province or territory (data tabulated from Canada Diseases Weekly Report).

Complications of pertussis include otitis media, subconjunctival hemorrhage, rib fracture, bronchopneumonia, atelectasis, and neurological problems such as seizures, encephalopathy, brain anoxia, and residual brain damage. Classical symptoms of paroxysmal cough and whoop may be absent in young infants in whom the illness is most severe; most of the deaths and serious complications occur in children under 12 months of age. Pediatric texts have commonly recommended hospitalization for infants thought to have pertussis.[2-4]

EPIDEMIOLOGY

In the forty years since the introduction of pertussis vaccine, the reported incidence of whooping cough in Canada has fallen from 160/100,000 in 1940 to 7.4/100,000 in 1985. Although this is a remarkable improvement, the results lag significantly behind the achievements in the United States where the incidence has fallen to 1.4/100,000 population. Of greater concern are the regional differences in incidence seen across Canada (Figure). Nova Scotia on average has a two to three fold higher incidence of pertussis than the national average with epidemic peaks every 5-6 years. The high incidence of disease persists in the face of excellent vaccine compliance; immunization rates in Nova Scotia are approximately 90% at the time of school entry and have reached 95% by the end of the first school year.

Even this high level of pertussis activity is likely to underestimate the true incidence of the disease in Canada. Beginning in January 1985, the Nova Scotia Department of Health and the Infectious Diseases Group at the Izaak Walton Killam Hospital for Children undertook an enhanced pertussis surveillance program in the Halifax metropolitan area in an attempt to obtain a more accurate assessment of the level of pertussis in the community. Primary care physicians and pediatricians were encouraged to report to the Department of Health all patients who fulfilled the clinical criteria of pertussis. Community Health Nurses investigated the case through a home visit and a questionnaire was completed assessing symptoms,

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immunization status, and antibiotic use. A nasopharyngeal aspirate for pertussis culture was obtained.

Preliminary results of the enhanced surveillance support the impression that pertussis is greatly underreported. In 1984, fifty-five cases of pertussis were reported to the Nova Scotia Department of Health. In the first seven months of the program, an additional 58 cases were reported (rate of 100/year). Following an intensified information campaign among the primary care physicians and pediatricians, 303 cases were reported over the next seven month period (rate of 519/year). Further analysis of these data indicated that the increased pertussis activity was due to better reporting rather than increased activity since the increment was entirely attributable to the region where enhanced surveillance was being conducted.

LABORATORY DIAGNOSIS

The diagnosis of pertussis is often difficult to establish on clinical grounds alone. Many patients, particularly infants, have an atypical course presenting with cyanosis, vomiting, and apnea but without the characteristic paroxysmal cough and whoop. Older children may have an attenuated illness with no whoop. The diagnosis is equally difficult to confirm using present laboratory techniques. Although *B. pertussis* can be isolated in the catarrhal and early paroxysmal phases, it is a slow growing, fastidious organism, difficult to identify, and often obscured by normal nasopharyngeal flora. Moreover, the organism normally cannot be isolated soon after the start of classical symptoms which continue for several weeks. Antimicrobials do not alter the symptoms, but may interfere with the laboratory diagnosis of pertussis by eliminating the organism from the nasopharynx. In addition, subsequent viral respiratory infections during the convalescent phase can trigger the characteristic cough and whoop and further confuse the diagnosis since the bacteria are not present.

In order to increase the probability of identifying *B. pertussis* in the nasopharyngeal secretions from patients who have received antibiotics or who have presented late in their illness, direct immunofluorescence staining of secretions for detection of bacterial antigens has been attempted. This method, however, has not gained wide acceptance because the technique is difficult to perform and positive and negative results do not always correlate with clinical disease. A variety of serological methods of confirming the diagnosis using agglutination, complement fixation, and indirect hemagglutination have been attempted with little success; all require acute and convalescent specimens. An IgM specific enzyme immunoassay in combination with nasopharyngeal culture established the diagnosis in 85% of cases; paired serologic studies with an IgA and IgG enzyme immunoassay further enhanced the diagnostic potential.[5]

Thus, almost 80 years after Bordet and Gengou first isolated an organism associated with pertussis, there is difficulty establishing the diagnosis if bacterial cultures or direct immunofluorescence are relied upon exclusively. Since the vast majority (if not all) of microbiology laboratories in Canada rely on these techniques, it is likely that many or most cases cannot be confirmed or are misdiagnosed as viral or allergic ailments.

ANTIMICROBIAL THERAPY FOR PERTUSSUS INFECTION

Although no antibiotic regime has ever been shown to alter the clinical course of established disease, erythromycin is the recommended drug for therapy of *Bordetella pertussis* infection.[2 4 6] These recommendations are based on *in vitro*[7] and *in vivo*[8 9] studies in which erythromycin was shown to eliminate *B. pertussis* from the nasopharynx in a mean of 3-4 days. Ampicillin, chloramphenicol, kanamycin, and tetracycline also showed good *in vitro* activity, but the widespread use of the latter three was limited by their significant toxicities. Ampicillin, despite adequate *in vitro* activity, was no more effective than no therapy, with clearance of the organism from the nasopharynx in a mean of 18 days. The superiority of erythromycin over ampicillin was further demonstrated at the Hospital for Sick Children in Toronto. Cultures from all 131 patients treated with erythromycin were sterile by day 6 of therapy, whereas cultures from 8 of 36 children treated with ampicillin were still positive on day 8.[10]

In contrast to the excellent bacteriologic effect of erythromycin, no amelioration of the clinical illness has been demonstrated following erythromycin therapy.[8-11] Therapy with ampicillin, chloramphenicol, or tetracycline was equally ineffective.[8] However, antimicrobial therapy continues to be recommended to shorten the duration of infectivity and decrease the risk to susceptible contacts.

ANTIMICROBIAL PROPHYLAXIS FOR EXPOSURE TO PERTUSSIS

Communicability of pertussis is high, with attack rates of nearly 80% in susceptible contacts.[12] Efficacy of the current whole cell vaccines used in the U.S. ranges from 60-80% with protection declining to negligible levels over 12 years.[12 13] Infection can occur in fully immunized contacts of an infected patient although the illness may be modified by prior immunization. Erythromycin is widely used in an effort to prevent infection in susceptible contacts of pertussis patients.

No controlled studies have assessed the efficacy of erythromycin prophylaxis in pertussis. Brem first suggested its use after the observation that two children treated prophylactically with erythromycin did not develop clinical illness.[11] Bass[8] also reported anecdotally the successful use of prophylactic erythromycin

during his study of antimicrobial therapy for pertussis infection, and Altemeier[14] and Linneman[15] supported its use following hospital outbreaks of pertussis. However, others have been less enthusiastic.[5] Halsey[16] reported a case of prophylaxis failure, although the delay in the institution and the duration of prophylaxis may have been suboptimal.[17 18 19] Two other reports of the failure of erythromycin prophylaxis were published in the editorial correspondence of the *Lancet* but since these were uncontrolled studies, they are difficult to interpret.[20 21] The current recommendation for managment of individuals exposed to *B. pertussis* is to offer erythromycin prophylaxis since there is a high risk of infection in unimmunized children and a significant risk even in those children who have been previously immunized.[2-4 6 22] Thus, erythromycin prophylaxis is universally recommended for contacts of pertussis based on little scientific data.

CURRENT AREAS OF PERTUSSIS RESEARCH IN NOVA SCOTIA

In view of the many persistent problems with diagnosis, therapy, and prevention through immunization, pertussis continues to be an active area of research endeavour. Investigations into the structure and function of several of the biologically active products of *Bordetella pertussis* have given new insight into the pathogenesis of this organism and have provided the necessary foundation for current efforts to develop a less toxic, acellular vaccine.

Nova Scotia, with its high incidence of pertussis, is becoming a centre for pertussis research in Canada. The enhanced pertussis surveillance program by the Nova Scotia Department of Health and the I.W.K. Hospital will be continued and augmented to include a more intensive effort to confirm cases in the laboratory through use of acute and convalescent serology to pertussis antigens as well as to other common viral pathogens. Through grants of over $140,000 from Health and Welfare, research will be expanded at the I.W.K. Hospital to improve diagnostic tests for pertussis. In 1981, research conducted at the I.W.K. demonstrated that IgA antibody to *B. pertussis* could be detected in secretions collected by nasopharyngeal aspirate as an indicator of recent infection.[23] These studies will be extended to see if detection of antibody to specific *B. pertussis* virulence factors or detection of these virulence factors themselves in nasopharyngeal secretions can be used for early rapid diagnosis of pertussis.

The controversies surrounding optimal duration of antimicrobial therapy and the efficacy of antimicrobial prophylaxis in pertussis will be investigated with the assistance of a second federal grant. Physicians in the Halifax metropolitan area will have an opportunity to contribute to this project by identifying clinical symptoms and ordering the appropriate culture (nasopharyngeal aspirate for *B. pertussis*). If the culture is positive for pertussis, the patient and family are eligible to be entered into the study. After the investigators have discussed the study with the primary physician, families of children with culture confirmed pertussis will be invited to participate in a study in which patients will be randomized to receive 7 or 14 days of erythromycin therapy. Serial cultures will be obtained to determine which treatment regimen is most effective in permanently eradicating the organism from the nasopharynx. Other family members will also be invited to participate in another aspect of the study in which the efficacy of erythromycin prophylaxis will be tested. All family contacts of a case of pertussis will be randomized to either receive 10 days of erythromycin or placebo and clinical symptoms, nasopharyngeal culture, and serological response to pertussis antigens will be monitored. Secondary attack rates will be compared in placebo or active drug treated groups in an effort to determine the usefulness of this widely recommended intervention.

SUMMARY

Pertussis persists as a major health problem in the Maritimes and remains one of the most common vaccine preventable diseases in Canada. Incidence of pertussis is probably grossly underestimated where passive methods are relied upon for disease reporting; an enhanced surveillance program in the Halifax metropolitan area identified a 9 fold increase in pertussis cases in Nova Scotia compared to the previous year, all attributable to the surveillance area. Although diagnosis of pertussis on clinical grounds alone is not difficult when classical symptoms are present, the diagnosis is often difficult in older children, individuals with partial immunity, and in infants in whom the disease is most severe. Current laboratory diagnostic tests lack sufficient sensitivity and methods aimed at more rapid diagnosis have met with little success to date because of technical variability in performing the assays.

Antimicrobial therapy has no effect on the course of established disease but succeeds in eliminating the organism from the nasopharynx; optimal duration of therapy to permanently eliminate the organism is not known. Use of prophylactic antimicrobials in contacts of pertussis cases is controversial; no studies are available documenting the efficacy of this intervention. Studies investigating these areas of controversy have been initiated in Nova Scotia and will continue over the next three years. In order to obtain the most information from these studies and thus be able to make firm recommendations for appropriate therapy and prophylaxis, physicians in Halifax, Dartmouth, Bedford, and Halifax County are asked to request appropriate cultures if a suspected case of pertussis appears. In addition, since antibiotics do not alter the clinical course of disease but may interfere with the isolation of the organism on diagnostic culture,

physicians are reminded to prescribe antibiotics for pertussis only after the organism is confirmed by culture. □

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A Systematic Approach to Emergency Medical Services in Nova Scotia

WHY WE NEED IT

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An Emergency Medical Services System (EMSS) provides for the personnel, facilities and equipment to effectively co-ordinate and deliver health care services under emergency conditions.[1] In a given area, it is known as a regional EMSS and it is usually administered by a public or private entity which has the authority and resources to provide effective functioning of the system. An EMSS consists of Emergency Medical Services (EMS), Emergency Measures Organizations (EMO), Emergency Room Physicians (ERPs), trauma centres and associated personnel and facilities that are responsible for the delivery of emergency medical care. In Canada today, many people do not understand the role of EMSS in the delivery of emergency health services. Lack of awareness of this component of the health care system results in the low priority assigned to it by physicians, their medical societies and governments. Many aspects of EMSS are either misunderstood or poorly understood and there has not been a concerted effort by any group to overcome these problems.

The purpose of this paper is: 1) to give a brief historic perspective of EMSS; 2) to outline the components of well established American EMSS; 3) to make observations of emergency health care in Nova Scotia; 4) to make recommendations regarding the improvement of emergency care in N.S.; and 5) to promote the development of an effective EMSS in N.S.

HISTORY

Organization of Emergency Medical Services into Systems was relatively unknown till the early 1960s. Experience gained from the Korean and Vietnamese Wars demonstrated that rapid transport of the critically injured to hospitals dramatically decreased morbidity and mortality.[2] As these results became known, concern over pre-hospital care in civilian life grew.[3] A timely and important report was the 1966 National Academy of Science National Research Council (NAS-NRC) Report *Accidental Death and Disability — The Neglected Disease of Modern Society*. The report concluded that trauma and, in general, emergency medicine was neglected in American society. As well, it was shown that lives were being lost needlessly due to this neglect and that those lives were primarily from the young, vital workforce since accidents were and still remain the primary cause of death in people under 40.[4] Among the recommendations of the report were: 1) studies in accident prevention; 2) improvements in first aid and medical care; 3) improvements in ambulance services and, in particular, co-ordination with hospitals, traffic authorities and communication systems; 4) improvements in communications with attention given to assessing equipment and exploring the feasibility of a single nationwide emergency telephone number; 5) assessment of the role of Emergency departments in and EMSS as well as inter relationships of the Emergency Departments with Critical Care Areas; and 6) support of further research into trauma.[4]

At the same time that increased effort was being placed on studying the critically injured, other studies assessed the importance of prompt medical intervention in the critically ill patient. Seven categories of critically ill and injured who require EMSS response if their prognosis is to improve have been identified:

i major trauma
ii burns
iii spinal cord injuries
iv acute cardiac illness
v poisonings
vi high risk infants and mothers
vii behavioural emergencies[5]

The rapid growth of EMSS in the U.S. is testimony to the fact that such systems contribute significantly to reductions in morbidity and mortality. Studies of such systems support this statement.[6]

In Nova Scotia, the development of governmental control in prehospital care was initiated in 1970 with the establishment of the Ambulance Subsidy Program under the Department of Municipal Affairs. The program was transferred to the Department of Social Services in 1976 in the hope of receiving Federal aid, but it was learned later that a means test would be required for persons receiving ambulance service. In October 1980, the Program was transferred to the

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Department of Health.[7] This fulfilled a recommendation that this department should be responsible for ambulance services in the province.

The Ambulance Subsidy Program is comprised of an Ambulance Advisory Board whose function is to make recommendations pertaining to Ambulance Services in Nova Scotia to the Minister. The Board's duties are diverse and include negotiation of the funding agreement with the Ambulance Operators' Association of Nova Scotia annually; the inspection of all subsidized vehicles to ascertain that they conform to the minimum standards as set out in the annual agreement; and processing of all claims submitted for payment. The Ambulance Subsidy Program is essentially administrative in nature and was formed by an Order in Council from the cabinet and is not an Act of the Legislature. There is no long term planning undertaken and each owner is allowed to operate in isolation within his own jurisdiction. The result is an industry that is fragmented with little central authority.

In 1985 there was a total of 153 ambulance vehicles in 59 locations throughout the province. The amount spent by the Program in 1984-85 fiscal year including training, subsidy to ambulance operators and administration was $6.57 million. There were 53,800 subsidized calls made in that period. As well, the Victoria General Hospital Ambulance Service performed approximately 4000 calls in 1984-85. When these and the non subsidized calls are added to the total subsidized the number of ambulance runs in Nova Scotia exceeds 60,000.

TABLE I

SUBSIDIZED AMBULANCE RUNS PER REGION, NOVA SCOTIA, 1984-85

1. Cape Breton	15,617
2. Metro Area including Bedford and Sackville	17,948
3. Northern sector of N.S., using Truro as a cut-off and including easternshore	8,268
4. Southern sector of N.S.	11,967
Total Subsidized Runs	53,800

THE EMSS ACT

An obvious question at this point is: "What features characterize an effective EMSS and how does Nova Scotia compare?". It was not until the passage of the EMSS Act in 1973 by the U.S. Congress that a comprehensive systems approach was developed that encompassed all aspects of emergency medical care and response. As well, the EMSS Act provided for development of a uniform granting mechanism for distributing and prioritizing federal aid. A similar approach guided Canadian leads in B.C., Alberta and Ontario. Several of the important aspects of the Act will be discussed with particular attention to prehospital care.

The intent of the EMSS Act was to foster the development of systems of emergency care that would decrease the death and disability rates that currently existed. The goal of the program was to initiate the planning of regional EMSS by encouraging the addition or integration of fifteen components to an existing system.[8] These fifteen components were felt to be essential to a comprehensive, smoothly functioning EMSS. The U.S. experience has demonstrated the veracity of this approach. This fifteen component approach aids analysis and will be discussed in detail below. The mechanism of implementation of the various components addressed in the Act was to be by way of a grant structure which benefitted those regions which were intent on improving the emergency services in the area. All fifteen components were to be developed with special attention to those components which were more difficult to accomplish (new constuction of facilities) or took a longer period of time to complete (training manpower). In the U.S., local initiative of private enterprise characterized the development of new systems. Federal grant bonuses, which rewarded improvement and development at the local level, provided incentive for system planners. This contrasts with the situation in N.S. where strict government determination of priorities regulates the industry.

Many of the problems which faced planners of early EMSS in the U.S. were compounded by the enormous numbers of people who accessed the system each year. Of the 80 million Americans who use the EMSS today, approximately 80% require primary care only. Fifteen percent are real emergencies which require urgent care (i.e. minor trauma, infectious disease, and other acute medical and surgical problems). The remaining five percent are critically ill and injured patients. (Fig. 1) Although improvements in the EMSS would benefit all emergency patients, the system was specifically designed to help the critical patient who needs initial, definitive and rehabilitative care to promote optimal recovery.[9]

Specific planning for regional EMSS response to the seven target critial care categories anticipated that with time, all critical medical emergencies would receive better care, more efficient handling and would benefit from sound regional EMSS planning and operation. The seven special target groups provided early EMSS an opportunity to develop plans, programs and evaluation criteria for systems performance and patient outcome studies. It should be noted that there are other emergent conditions (unique medical and surgical emergencies) which an EMSS will encounter but do not lend themselves to regional planning and are therefore excluded from planning studies.

Each global EMSS plan includes a description of general and specific sub-plans and, usually, protocols for the emergent and non-emergent patients in the delivery system. It includes a detailed explanation of

triage patterns for critial groups per patient need. It also delineates operational elements of the system. These protocols and destination policies depend on the patient status, the sophistication of transport capability, level of care during transport and categorization of emergency facilities. Sophistication of inpatient facilities and postrecovery rehabilitation capabilities may also influence choice of protocols. The specific receiving emergency facility and destination policies must be established by written agreement among the various provider elements, (both prehospital and institutional) in order to insure a comprehensive and efficient regional EMSS.[1]

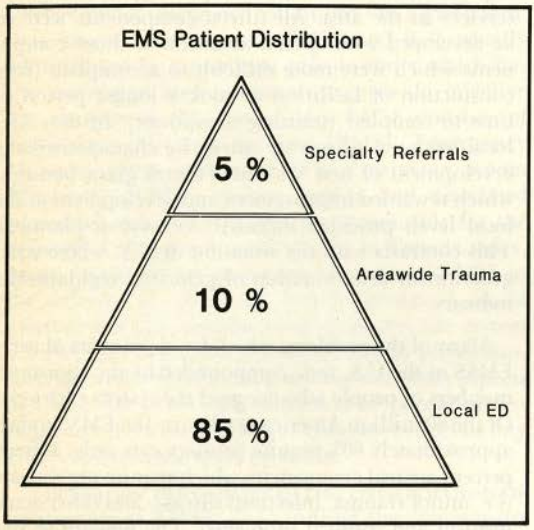

Fig. 1. Cowley's Triangle showing breakdown of patients presenting to Emergency Rooms. Used with permission.

EMSS REQUIREMENTS: COMPONENTS

The 1973 US EMSS Act required that plans developed and systems established, expanded and improved must address the following fifteen components:

1. Manpower
2. Training
3. Communications
4. Transportation
5. Facilities
6. Critial Care Units
7. Public Safety Agencies
8. Consumer Participation
9. Accessibility to Care
10. Transfer of Patients
11. Standard Co-ordinated Record Keeping
12. Public Information and Education
13. Evaluation
14. Disaster Linkage
15. Mutual Aid Agreements

It should be noted that the fulfillment of all of these components represents the ideal EMSS. Few individual EMSS's have completed the implementation of all components with priority remaining a state or local decision. However, they are a valuable guide for the analysis and evaluation of current emergency services in Nova Scotia. While a detailed explanation of all components is beyond the scope of this paper it is important to address each and explain those components of pre-hospital care as they apply in Nova Scotia. This discussion constitutes the remainder of the paper.

1. Manpower. An adequate number of health professionals, allied health professions and other health personnel including ambulance personnel, with appropriate training and experience must be present.[8] This means sufficient number of all types of personnel to provide emergency services on a 24 hours a day basis, 7 days a week, within the service area of the system. The major manpower elements are the following: first responders — fire, police and other public safety elements; communications — EMS/Resources dispatchers; emergency medical technicians or assistants; registered nurses — emergency department and critical care units; specialists in ER medicine; and EMSS Director and Co-ordinators.

2. Training. The EMSS must provide for appropriate training and continuing education programs co-ordinated within the system to provide an integrated approach to EMS by all subsets of personnel.[8] All levels of EMSS personnel, including lay citizens, technicians, nurses, physicians and administrative and government categories must be exposed to a wide variety of educational experience to ensure that a thorough understanding of the system exists by all members.

Training programs in N.S. display no co-ordinated approach. It is generally accepted that each individual component will take appropriate measures to ensure that personnel are adequately trained. As well, it is often left to the discretion, interest and motivation of the individual worker, and at his own expense to receive this training. While advances have been made in recent years a more concerted effort is needed to establish training programs which integrate various aspects of emergency care.

Since 1980, the Ambulance Operators Association has been increasing the emphasis placed on a program of training to upgrade the standards of prehospital care. As of mid-1985, 300 ambulance drivers/attendants have voluntarily taken and received the Emergency Medical Attendant (EMA) I training program. This program is intended to be an ongoing process with recertification courses for ambulance personnel to be held every 24 months. Recertification is used to determine that the ambulance personnel are maintaining the skills they have learned, and also to take advantage of new techniques that might have been introduced. The training program is funded by the Province, through the Ambulance Operators, with

$75,000 set aside yearly for this purpose. This fund makes available a full-time instructor, training facilities and van, instructional materials and expenses paid to physicians who provide input into the training program. It should be noted that the program is voluntary and that there is no compulsory training program for EMA's in Nova Scotia. At the present time, the minimal requirement for an ambulance driver/attendant in N.S. is that they are 19 years of age and hold a Class iv driver's licence. As well there are no programs for training nurses or physicians in E.M. in N.S. and no Royal College certified specialists in E.M. practising. Obviously, appropriate training of hospital staff is essential for the proper functioning of an EMSS.

3. Communications. The communication system is responsible for linking personnel, facilities and equipment of the EMS system by a central communications system. By this means, requests for emergency health care services would be handled by a communication facility which: 1) utilizes emergency telephone screening; 2) utilizes or will utilize the universal emergency number: 911; and 3) will have direct communications, connections and interconnections with the personnel, facilities and equipment of the system and other appropriate EMSS.[8]

The EMSS communication system should include a system command and control centre. This would be responsible for establishing those communication channels and allocating those public resources essential to the most effective and efficient management of the immediate problem. The centre should have the immediate exchange of information essential for the system's resource management and control. The essentials of such a command and control centre are that: 1) all requests for system response are directed to the centre; 2) all system resource response is directed from the centre; and 3) all system liaison with other public safety and emergency response systems is co-ordinated from the centre. The EMSS communication system must address citizen access, allocation of resources and management, and medical control for basic life support (BLS) and advanced life support (ALS).

Provision for telecommunications equipment must be made at the command control centre with appropriate interface to the public safety agency to provide for access by persons with auditory handicaps. As well, provision must be made for predominant population groups in areas where English is not the first language.

The emphasis on communication systems design should be to provide the most effective and feasible technology to provide for systems access, vehicular dispatch, and direction of medical control of all extra-hospital emergency medical care. Operational experience with "911" universal access numbers providing access to fire, police and EMSS has shown that approximately 85% of the incoming calls involve police services, 10% fire services and 5% EMSS. Any implementation of a 911 number should take into account these factors and attempt to provide the best overall coverage.

To understand the importance of an easily identifiable emergency number one has to break down the system access time into two parts. The first part is the decision of the patient or passerby that emergency aid is required and the process of accessing the system is initiated. The second part is the actual response time of the unit from dispatch. Response time is dependent on distance, transport conditions, and mode of transport. The most effective method to decrease access time is to provide an appropriate, easy to remember number to the public.

The communication system described above simply does not exist in Nova Scotia. The existance of an access arrangement presupposes that there is a system to access. There is no EMSS in Nova Scotia. A System requires the 15 components and above all, dedicated ER physicians to provide ongoing retrospective and prospective analysis. The existance of an EMSS depends on "cornerstone" physicians.

Since April 1982, all approved ambulance vehicles have been equipped with the communication capability to contact hospitals and other ambulance operators. This communication equipment is also capable of contacting the RCMP, fire departments, Department of Transportation and the Department of Lands and Forest, through a patching method at a central exchange located at Shubenacadie. The communication equipment provided to the approved operator is funded by the Province under a leasing agreement with M.T.&T. The present system does not allow for efficient allocation of equipment or medical control of emergency response. As well, the lack of central command leads to a lack of co-ordination in the response of police, fire and emergency medical vehicles.

4. Transportation. This component includes an adequate number of necessary ground, air and water vehicles and other transportation facilities properly equipped to meet the geographic and EMS characteristics of the serice area.[8] Such vehicles and facilities must meet appropriate standards relative to design, location, performance and equipment and personnel for such vehicles and facilities must meet appropriate training and experience requirements.

The elements of ground transportation in BLS are the following: ambulance vehicles meeting set standards; approved radio communications equipment providing dispatch, medical consultation and destination information; at least two EMA I's on each ambulance; a five-minute response time in metro areas for 95% of calls and a twenty-minute response time in rural areas for 95% of calls.[1 8]

Elements of ground transportation ALS include all elements of BLS plus personnel training to the EMA II, EMT-T or EMA III Level, communication equipment to provide advanced biomedical telemetry and sufficient medical equipment for critical care procedures.

At the present time, ground transport in urban areas of N.S. usually meet BLS levels. Any additional degree of sophistication is lacking. However, in the outlying, rural areas, the quality of transportation, measured in terms of response time or care provided, is inadequate for the population. Two distinct periods of time are used when assessing the adequacy of response. The first is the 5 minutes within which CPR must be started on the cardiac arrest patient to prevent permanent damage. The second is the "Golden Hour" of trauma patients within which definitive care must be established to decrease morbidity and mortality.[8] It has been shown that ground transport over fifteen miles is less effective than air transport with helicopters. While the acquisition of helicopters solely for emergency medical services is impractical, the possibility of an expanded role with another public safety agency such as the police, Department of Lands and Forests, Department of National Defence or private industry should be pursued. Maryland Institute of Emergency Medical Services System (MIEMSS) has established a very effective co-operative system with the state police for the provision of air ambulance service. The primary duty is to provide emergency medical service with police duties being secondary. For reasons of size and geography, the same system could apply in N.S. and would help bring those patients in outlying areas significantly closer to definitive medical care in terms of response time.

5. Facilities. The facilities component required the categorization of hospital emergency capabilities within the context of a regional emergency medical services concept.[8] The basic idea was to identify the readiness and capability of each hospital within an EMSS region to receive, diagnose and treat emergency patients, especially those who are critically ill or injured. This component attempted to insure that an adequate number of appropriately designated, easily accessible emergency services were available on a continuous (24-hour) basis. To this end, the American College of Surgeons Trauma Committee categorized ER's depending on capability.

In Nova Scotia, there has been no categorization of hospitals' emergency capabilities. Without this classification, response teams which are often inadequately trained, especially in more rural areas, must use their own judgement with regards to patient destination when two facilities are reasonably close. This classification of hospitals dictates that prehospital personnel deliver the critically ill or injured to a facility competent to handle illness or injury of such magnitude. Such trip destination policies to designated centers reduces delay to definitive treatment and improves morbidity and mortality. As the N.S. system now exists, such decisions are not made in a logical, co-ordinated fashion.

6. Critical Care Units. This component requires providing access to designated specialized critical care units. These units should be in number and variety to meet the demands of the service area.[8] If there are no such units in the EMSS region, then access to units in neighbouring areas should be provided where feasible. Specialized critical care units include EMS trauma intensive care units, burn units, spinal cord centres, poison control and detoxification centres, drug overdose and psychiatric centres and others as appropriate.

This is perhaps the easiest component to incorporate into an EMSS in N.S. Many of the applicable facilities already exist and are in reasonable physical condition with regional centres and tertiary care referral centre. What is needed is matching of the critical care facilities to emergency services so definitive care is both appropriate and expedient.

7. Public Safety Agencies. There must be effective co-operation among public safety agencies, regional EMS and disaster organizations.[8] The shared use of personnel and equipment appropriate for medical emergencies should also be encouraged. This includes participation of most public safety agencies within the EMSS. Public safety agency personnel are usually the first responders to an emergency patient. The regional EMSS Plan must be co-ordinated with these agencies to ensure the use of special equipment, proper staff training, linked communications, and the development of co-operative operating procedures. The system must demonstrate appropriate co-ordination and mutual aid plans for day-to-day emergency conditions as well as during major disasters.

Although public safety personnel in N.S. are usually trained in basic first aid, there is no integrated EMS framework for them to work within. An example of this problem is volunteer fire departments in rural areas with emergency response vehicles. At the present time, these units are overlooked in planning for emergency response; however, they may be the most appropriate first responder. An EMSS framework could increase the effectiveness of the facilities and personnel which already exist.

8. Consumer Participation. The EMSS must make provisions within its system management that persons residing in the area and having no professional training or experience may participate in the policy making of the system. Public participation must be sought in N.S. when planning for the EMSS begins.

9. Accessibility to Care. The EMSS must provide necessary emergency services to all patients without prior inquiry as to ability to pay. Regional EMSS providers are not permitted to require evidence of

ability to pay prior to care for services of ambulance, initial hospital or advanced critical care units. In N.S., the medicare system protects patients from possible financial discrimination.

10. Transfer of Patients. The transfer and triage component requires the EMSS to provide transfer of patients to appropriately categorized and equipped facilities capable of providing the definitive followup care and rehabilitation necessary to effect optimum recovery of the patient.[8] Within N.S., the transfer of patients is important due to the concentration of advanced care in Halifax. Obviously patient transfer between municipal hospitals, regional health care centres and Halifax is essential to the proper functioning of the EMSS.

11. Co-ordinated Record-keeping. Each EMS regional system must provide for a patient record-keeping system, covering treatment of the patient from initial entry into the system through their discharge from it. This includes the prehospital, hospital and critical care phases within the system. Data elements must be consistent in patient records used in followup care and rehabilitation of the patient. Such a record-keeping capability allows tracing of those patients so studies might aid in operational, medical and fiscal decision making. Such a capability does not currently exist.

12. Public Information and Education. The EMSS should provide programs of public education and information in the systems service area to foster public appreciation and support while at the same time teaching when and how to access the system. Programs should also include the general dissemination of information regarding appropriate methods of self-help and first aid and the availability of first aid training programs in the area.

13. Review and Evaluation. Each EMSS must submit to periodic comprehensive and *independent* review to report on the status of Emergency health care services provided in the systems services area.[8] It is intended that review and evaluation be periodic and comprehensive so that deficiences and oversights in emergency care can be determined and correction planned.

14. Disaster Linkage. The EMSS must have a plan to assure that the system will be capable of providing emergency medical services in the services area during mass casualties from any cause or national emergencies.[8] The EMSS is not the regional disaster organization but rather should work closely with the EMO to provide emergency medical care. The EMSS must be linked to the local and regional disaster plans and participate in exercises to test disaster plans. This linkage is important in N.S. where may pre-hospital workers now act in isolation. A co-ordinated plan between EMO and EMSS would avoid frustration by professionals and volunteer agencies and avoid unnecessary duplication.

15. Mutual Aid. Each EMSS must provide for the establishment of appropriate arrangements with neighboring EMS regional systems to provide emergency medical services in bordering areas on a reciprocal basis. This arrangement ensures co-operative interplay to ensure smooth interaction of regional EMSS in the interest of optimal patient care on one level and disaster situations on another.

EVALUATION AND RECOMMENDATIONS

The preceding sections have outlined the current state of EMS in N.S. It is obvious that at the present time, Nova Scotia's EMS capability does not meet current U.S. standards as presented in the EMSS Act of 1973. From a Canadian perspective, present standards fall far short (especially in urban areas) of EMSS in the remainder of the country. This paper has concentrated on the prehospital phase of delivery of care in N.S. because it is believed that a systematic approach to the components would provide the most direct and expedient improvement in services to the public. *Quite often duplication and lack of co-ordination are the major faults.* More frequently than not, simple planning and co-ordination between these components would improve care without involving either large expenditures of money or long startup times.

In particular what is needed is recognition by the body responsible for health care of Nova Scotians of the importance of competent prehospital and emergency care in reducing morbidity and mortality. Once realized, a specific action plan would include:

a) recruitment of physicians trained and certified in E.R. Medicine to guide and evaluate the system. Regional needs, skills, maintenance of prehospital personnel and ongoing medical control are important considerations.

b) the establishment of an agency of the Department of Health to formulate legislation, plan the organization of the EMSS, allocate resources, provide evaluation of delivery, support training and be integrally involved in other aspects of EMSS as discussed.

c) to consider specific expanded legislation regarding ambulance services.

Following the laying of the foundations, consideration of other aspects of an EMSS can be intelligently and appropriately integrated into the system.

An effective EMSS in Nova Scotia will improve the morbidity and mortality of critically ill and injured patients.[6] *While many individual aspects already exist in isolation what is lacking is an integrated "systems" approach.* The establishment of a Provincial Agency to guide and develop emergency medical services in

Continued on page 24.

Enhanced Vision Screening Program in Nova Scotia

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Effective January 1, 1987, the Nova Scotia Department of Health implemented a province-wide Enhanced Vision Screening Program (EVSP). It has been developed in conjunction with the Departments of Orthoptics and Ophthalmology of the IWK Hospital for Children in Halifax, Nova Scotia. The purpose of the program is to provide valid and scientifically sound vision screening to preschool children throughout the province.

This article describes the various aspects of the screening program as well as points out the relevant screening methodology used in development.

DESCRIPTION OF THE SCREENING PROGRAM

The program follows a six month pilot project during which it was tested in two Health Units of the province. A few modifications ensued and, following appropriate educational inservices, the province-wide Enhanced Vision Screening Program (EVSP) was implemented in January 1987. The Community Health Nurse has been identified as the appropriate professional to perform the EVSP. The program consists of: a) an educational inservice; b) visual inspection, visual acuity and stereopsis testing; c) data recording and referral guidelines; d) follow-up evaluation.

Educational Inservice

The inservice consists of 1½ days of lectures, workshops and discussions provided by ophthalmologists, orthoptists and Department of Health staff. A booklet is provided containing all the information conveyed during the inservice which includes basic anatomy and physiology of the visual system, pathophysiology and therapeutic principles of amblyopia and strabismus, the principles of screening and the important aspects of the inspection procedure. Emphasis is also placed on the actual screening techniques and the follow-up procedures (forms, telephone contacts).

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Diseases

Amblyopia and strabismus have a combined prevalence of 3-6%.[3] Untreated, amblyopia leads to significant and permanent loss of vision in the affected eye but is treatable if recognized early.[1] Strabismus often leads to severe amblyopia and it can also be a harbinger of serious neurologic disease. Untreated, strabismus is always associated with loss of fine depth perception. Therefore, these two diseases fulfill the criteria of high prevalence and significant morbidity required for screening. Color vision defects are not screened for since there is no effective treatment. Non-specific "tracking" and "hand-eye coordination" anomalies are not part of vision screening since evidence is lacking as to the exact nature of the defects, and more importantly, the role of intervention and effectiveness of treatment modalities are not established.

Target Population

The EVSP is directed to the preschool population. This is the population in which the defects screened are most prevalent and treatment most effective. Indeed, amblyopia rarely develops after the age of 7 years.[3] Treatment is shorter and more effective if instituted at an earlier age. It is anticipated that the EVSP will eventually be targeted to 3½ year old child, for whom even a higher success rate of treatment is expected. At the present time, we can safely say that visual acuity and stereopsis defects screened between the ages of 3½ and 5 years are the only visual anomalies which meet acceptable criteria for vision screening in children.

Screening Tests

Good screening tests should have a high sensitivity and specificity. They should also be reliable and valid. Furthermore, screening tests must be simple, brief and acceptable to the population being screened.[2] In children, comprehension and cooperation are two elements that are also important in trying to identify ideal vision screening tests.

a. **Inspection:** The Community Health Nurse will observe for eyelid, globe and orbital symmetry, tear drainage, inflammation and signs of infection. Corneal light reflexs and extraocular muscle movements will be assessed. The use of a penlight facilitates the inspection procedure. Any abnor-

mality detected on inspection will be documented on the referral form.

b. **Visual Acuity:** The HOTV® test has been identified as the best tool available for assessing visual acuity in our target population. It is based on the same principle as the familiar Snellen test but its advantage lies in its ease of usage with illiterate children who have not mastered the up-down/right-left orientation concept.

The HOTV® requires only that the child match the letters on his own card with those on the test chart (figure 1). The chart is calibrated for use at 3 meters (10 feet). Each eye is tested separately and the total administration time is three minutes. Children who wear glasses are tested with them on to determine their best visual acuity.

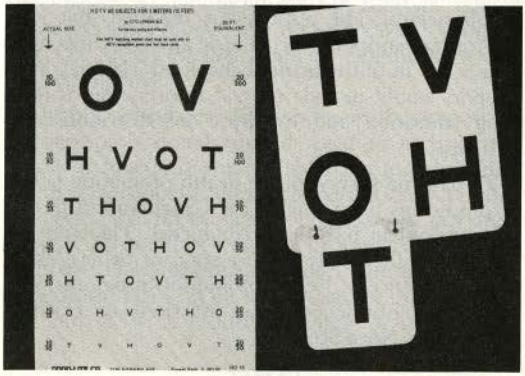

Fig. 1 HOTV® Test Kit for Visual Acuity.

Fig. 2 Randot® Stereotest booklet with polarizing glasses — used for detecting defects in binocular vision.

c. **Stereopsis.** The Randot® stereo test (figure 2) is the tool selected to screen for defects of binocular vision. As a random dot stereo acuity of test it has been proven to be a specific and sensitive tool.[2 5] The test is constructed of two plates of random dots superimposed on each other. Polarizing glasses allow the left eye to visualize one plate, the right eye the other plate. To successfully identify shapes within the random dots, a child must possess binocular vision. The Randot® takes 45 seconds to administer.

Data Recording and Referral

Children who have any abnormality detected on inspection, visual acuity of 6/9 -3 (20/ 3-3) or less in either eye, or who fail the stereotest will be referred to their family physician. Given the very nature of the diseases screened for (amblyopia and strabismus), the child who fails the visual acuity and/or stereopsis components should likely be referred for further ophthalmologic evaluation and treatment.

Follow-up and Program Evaluation

Follow-up of the referral will be agressive and is the key factor in determining the effectiveness of the EVSP.

The Community Health Nurse will be responsible for collecting data for evaluation. This will be done through the family physician's office by obtaining final diagnosis and outcome (treatment) of the child. Facilitation of this information through the physician's receptionist will assist the Community Health Nurse when she calls for the follow-up information.

Only by careful analysis of the results will we be able to ascertain of the effectiveness of the different components of the Program.

CONCLUSION

We are confident that the medical community will be supportive of this renewed effort on the part of the Nova Scotia Department of Health to standardize and upgrade vision screening for preschool children. All the children of Nova Scotia entering school will be tested by Community Health Nurses using three simple components: inspection, visual acuity and stereopsis testing. All those with abnormal findings will be referred to their family physician for further evaluation and treatment. Finally, agressive follow-up of children who fail will allow a comprehensive evaluation of the Program. □

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Physicians' Perceptions of Community Health Promotion Needs in Halifax-Dartmouth

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The purpose of this study was to examine physicians' beliefs about the importance of a number of health promotion programs. One hundred and fifty primary care physicians who practised in the Halifax-Dartmouth area were approached and 63 surveys were suitable for analysis. The programs perceived as being very important by the majority of physicians were prenatal education and smoking prevention/cessation, while stress management and medication compliance were frequently cited as important but lacking in the catchment area. This study revealed that while many patients present to physicians with lifestyle-related ailments, little if any time is spent on health promoting activities. Offering relevant continuing education, literature for dissemination to patients, and referral to reputable health promotion programs offered by the interdisciplinary health team, are a few stategies deserving investigation.

Many of the leading causes of morbidity and mortality in Canada are linked to lifestyle practices.[1] Tobacco smoking, excessive alcohol consumption, a poorly balanced diet, non-use of seat belts, inactivity, and excessive stress are all factors predisposing individuals to an increased risk of illness and early death. Regardless, many Nova Scotians continue to jeopardize their well-being by practising unhealthy behaviors.[2]

While the general public perceives physicians as the most credible source of health information, only a limited amount of research exists on physicians' beliefs about the importance of health promoting behaviors.[3] Catford and Nutbeam concluded, from a survey of the preventive practices of 214 British general practitioners, that physicians believe health promotion is important and that the physician can and does play a significant role.[4] Similarily, a 1983 Massachusetts study revealed that over half of 433 family physicians and internists believe that smoking cessation, caloric restriction, seat belt use, knowledge of drugs and eating a balanced diet are very important in determining patients' health status.[5]

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Sobal *et al.* surveyed 1040 primary care physicians by mail on the perceived importance of 25 health behaviors and the perceived need for physicians to acquire new skills to help patients modify their health behaviors.[6] Survey results revealed that elminating smoking was ranked to be the most important modifiable behavior, while taking vitamin supplements was rated as least significant by the majority of physicians. The respondents reported that with appropriate support they could be up to six times more successful in influencing behavioral change. Such support would include referral information, continuing education and literature for distribution to patients.

To date, no surveys of the health promotion beliefs of physicians practising in the Canadian health care delivery system have been conducted. Therefore the purpose of this study was to examine beliefs, about the importance of health promotion programs, in a sample of physicians who practised in Halifax-Dartmouth, Nova Scotia.

METHODS

A questionnaire was mailed in April 1986, to 150 practising physicians in the Halifax-Dartmouth area. This number included the total population of primary care practitioners in the catchment area. They were queried on the following: ages of their patients; percent of patients who presented with lifestyle related ailments; percent of physician time spent on health promotion activities; and the perceived importance of 20 listed health promotion programs.

Seventy completed questionnaires were returned, constituting a response rate of approximately 50 percent. Sixty-three of these questionnaires were suitable for computational analysis. Time and cost constraints prohibited further follow-up. Furthermore, follow-up efforts conducted in previous mail surveys, which included three reminder letters in one case, six elicited only slightly higher rates of return.[6] Based on a comparison with similarily conducted studies, the physicians surveyed in this study appeared to be quite receptive to disclosing their beliefs about the health promotion needs of their patients.

FINDINGS

As anticipated, the majority of those who responded stated that they were general practitioners. Most (66.2%)

also indicated that they had a special area of interest, predominently in the areas of internal medicine or obstetrics/genecology.

One half of those polled stated that the majority of their patients were within the 21 to 50 year old age range, while 16% reported that most were 51 years old or older, and 12.9% responded that the majority were under 21 years of age. The remaining 21% reported that they treated patients from all age groups equally.

In this study, lifestyle related behaviors were defined as those activities that people practise through choice and that are dependent on an individual's conduct.[9] Examples include the use of tobacco products, excessive caloric ingestion, alcohol abuse and general inactivity. Approximately one half (53%) of the respondents felt that only 21% to 40% of their patients were being treated by them for lifestyle related disorders, while about one quarter (23%) responded that 41% to 60% of their patients exhibited lifestyle related ailments.

The physicians were asked to report the proportion of their professional time devoted to each of the following functions: curative medicine; teaching other health professionals; administrative duties; and health promotion. On the average, the physians in this study spent 62.5% of their time on treatment or curative medicine, 13.4% on teaching others within the health professions, 11.7% on the administrative aspects of the job, and 12.7% on health promotion activities. Over one half (57%) of the respondents reported that they spent less than 5% of their time on health promotion activities.

The respondents ranked from "not important" to "very important" their patients' needs for 20 listed health promotion programs. A fourth response, "very important and presently lacking in the Halifax-Dartmouth area", was added in order to gain information about programs deemed essential but currently unavailable. Table I presents the number of physicians who perceived a program as being "very important" or "very important and presently lacking".

Those programs which most physicians perceived as being "very important" were: pre-natal education (62%), smoking prevention/cessation (54%), weight control for adults (52%) and cardiac rehabilitation (52%). The community based services perceived as being very important and not currently offered in the study area were stress management (33%), medication compliance (28%) and self-help groups (25%). The last category included self-help groups for coping with terminal illness, single parenthood and death of a spouse.

TABLE I

PHYSICIANS' PERCEPTIONS OF IMPORTANCE LEVEL OF HEALTH PROMOTION PROGRAMS (n=63)

Topic	Very Important n	Very Important Lacking n
Weight Control		
— adolescents	23	5
— adults	32(3)	5
— older adults	21	4
Back Strengthening	16	7
Stress Management	17	20(1)
Pre-natal Education	38(1)	3
Post-natal Education	23	6
Cardiac Rehabilitation	32(3)	4
Respiratory (Asthma)	20	1
Drug Education	14	12
Medication Compliance	12	17(2)
General Fitness	27	4
Human Sexuality	24	6
Self-Help Groups	10	15(3)
Pre-Retirement Planning	3	11
Health Programs - Lower income	2	13
Health Programs - Older adults	10	7
Prementrual syndrome	6	3
Smoking Prevention/Cessation	33(2)	13
Accident Prevention	11	12

Note: numbers in brackets denote rank

DISCUSSION

There is remarkable similarity between the results of this study and surveys reported in the literature. For example, smoking cessation, medication information/compliance and stress management programs were also rated highly in other studies.[6 9]

Primary care physicians are in a unique position to influence their patients' health beliefs and behaviors.[7] There is increasing evidence that patient education strategies, employed by office-based physicians, improve patients' behaviors.[8] Our study reveals, however, that while many patients present to physicians with lifestyle related ailments, little time, if any, is spent on health promoting activities.

In a 1986 study, Valente *et al.* found that the majority of physicians surveyed felt that their attempts to modify their patients' health behaviors were ineffective.[9] This pessimistic perception may lead to a decrease in the time that physicians spend on risk reduction and health promotion functions. As observed earlier, however, many of the physicians felt that they could be more effective. Physician education in behavior modification, pre-printed risk factor questionnaires, and literature disseminated to patients are three possible strategies that could serve to meet this end.

In this context, it is noteworthy that 90% of the physicians in the Valente *et al.* study reported that they were the person most responsible for the health education of their clientele.[9] Yet, the findings of this study reveal that only 12% of physician time is devoted to health promotion and education. Clearly, a sizeable service gap exists.

A fourth strategy could involve having physicians refer patients at risk to appropriate, credible health agencies or programs. At present, patients are all too often left to their own devices and, as a result, find themselves in disreputable programs offered by unqualified entrepreneurs. A referral system would require that physicians be informed of reputable health promotion programs offered by members of the interdisciplinary health team, and readily refer patients to appropriate programs. The physician could also choose to "monitor" the patient's attendance and progress in a community-based program, during future office visits.

In spite of the perceived lack of self-help programs, a substantial amount of material and numerous mutual-aid organizations exist. Physicians could become cognizant of these lay groups, offer professional input, and refer clients to them.

While the referral method may be feasible in a community where suitable programs exist, this study found that a few of the health promotion programs specified by physicians as being of major importance to patients are not currently available in the Halifax-Dartmouth area. These findings provide valuable direction for future program development to agencies that offer supplementary supportive resources such as the Preventive Medicine Centre (Halifax YMCA), and the Nova Scotia Heart Foundation, Lung Association and the Nova Scotia Division of the Canadian Cancer Society.

Nevertheless, caution is warranted in the intepretation of the results of this study. While the data are informative, they rely upon the accuracy of self-reported information. Valente *et al.* maintain that overestimation of true levels of activity may occur when utilizing this data collection technique.[9] As well, physicians' beliefs about the importance of programs for the "average" patient may not accurately reflect their beliefs about the importance for specific high risk patients.[6] Regardless of these potential threats to the study's validity, the investigation has revealed some important insights into physicians' perceptions of health promotion program needs. Significantly, physicians identified health programs that are deemed important to patients and that are currently provided in the metropolitan core of Nova Scotia. As well, they identified programs such as stress management that are considered important but are unavailable to patients in the Halifax-Dartmouth area. These findings offer future direction in the design and delivery of necessary and effective community health promotion programs. □

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A SYSTEMATIC APPROACH TO EMERGENCY MEDICAL SERVICES IN NOVA SCOTIA

Why We Need It

Continued from page 19.

the region is essential to the critical and emergent patient. The present government's approach to highway safety with seatbelt legislation and impaired driving laws is obviously the right direction. An EMSS is the necessary next step. □

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The Neuroleptic Malignant Syndrome

A Case Report and Literature Review

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The neuroleptic malignant syndrome (NMS) is a rare but potentially fatal complication of neuroleptic therapy that carries a mortality rate of 20-30 percent.[1] The incidence of this syndrome is unknown and the patheogenesis remains obscure. I report here a patient with NMS who was admitted to our hospital twice following treatment with neuroleptics.

CASE REPORT

A 53 year-old woman with manic-depressive illness was first transferred to our hospital from a local mental institution on March 30, 1984 because of fever and stupor. Recently, she had been found to be hypothyroid and started on thyroxine therapy. Prior to her transfer she received treatment with haloperidol and methotrimeprazine. On the day of admission she was reported to be febrile and obtunded.

Initial physical examination showed a confused disoriented woman with a rectal temperature of 40.5°C. Neurological assessment did not disclose any obvious abnormality other than unilateral leg tremors. The remainder of the examination was reported to be unremarkable. The CBC, serum electrolytes, urea and creatinine were normal except for elevated WBC count at 14,000. The creatine kinase (CK) level was more than 12,000 U/L (normal: 15-120); SGOT 591 U/L (normal: 8-29); SGPT 399 U/L (normal: 1-20) and LDH 2236 U/L (normal: 117-259). The CSF was normal. The urine gave positive result for benzodiazepines and phenothiazines. The thyroid indices were normal.

The patient was admitted to the hospital and put under observation. An EEG and a brain CT scan were normal. Blood, urine and CSF cultures were negative. The patient received supportive treatment and she made gradual spontaneous recovery. She was discharged to the mental institution three weeks later with no specific diagnosis, although possibility of NMS was raised.

The patient was readmitted to our hospital from the same mental institution on September 18, 1985 with fever and abnormal renal function. She was treated with five doses of chloropromazine nine days prior to admission. Three days later she was noted to be febrile and had a CK level of 32,000 U/L, urea 42.5 mM/L (normal: 2.8-7.7) and creatinine of 767 μM/L (normal: 60-100). She was treated with intravenous fluids but the urea and creatinine continued to rise while the CK started to fall. On the day of admission the CK was 1310, urea 47.9 and creatinine 862. There was no history of trauma or seizure activity.

Initial assessment showed a confused agitated diaphoretic woman with a pulse rate of 110 per minute, BP of 140/90 and temperature of 38.5°C. Generalized muscular hypertonicity was obvious from the initial assessment but the remainder of the physical examination was otherwise unremarkable. She was treated with intravenous fluids, intravenous diazepam and five days later, with Amantidine HCl. Because the urine grew *E.coli*, she was also treated with ampicillin. The CT scan of her head was normal, and the thyroid indices were again normal.

The patient made a good recovery in the hospital, with some improvement in the mental status together with the disappearance of the fever and return of the CK to normal. She was discharged to the mental institution nine days later with a creatinine level of 202 μMol/L which continued to improve and became normal on later testing.

COMMENT

In 1968 Delay and Deniker descibed a varient of drug fever in which hyperpyrexia associated with neurological and autonomic abnormalities developed during treatment with phenothiazines. They termed this the neuroleptic malignant syndrome.[2] Now, it is recognized that the syndrome is associated with other antipsychotic agents including butyrophenones, thioxanthines and miscellaneous antipsychotic agents such as loxapine.[3]

The NMS usually arises in patients with pre-existing psychiatric illness but has been reported after the use of phenothiazines for preoperative sedation.[4] The clinical features consist of fever, diffuse muscular rigidity, akinesis and extrapyramidal symptons. Autonomic dysfunction and changes in the level of consciousness ranging from agitation to coma are other features of the syndrome.[1] Various non-specific laboratory abnormalities have been described in NMS including leukocytosis with or without left shift, abnormal liver function tests and elevated CK level.[3]

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The later may suggest myonecrosis developing during intense muscle contraction which may result in rhabdomyolysis and acute myoglobinuric renal failure.[5]

Treatment of NMS consists mainly of immediate withdrawal of the offending neuroleptic and general supportive measures. Several agents have been reported to be of value in the management of this syndrome including Amantidine HCl, Dantrolene sodium, Bromocriptine, ECT and more recently, sodium nitroprusside.[6-10]

Despite the fact that our patient received treatment with neuroleptics in another hospital and that there had been some delay in presentation to our hospital, she still manifested various features typical of NMS with fever, altered level of consciousness, diffuse muscular rigidity and to lesser extent, disturbance of the autonomic function as manifested by some degree of tachycardia and variable blood pressure (Figure 1).

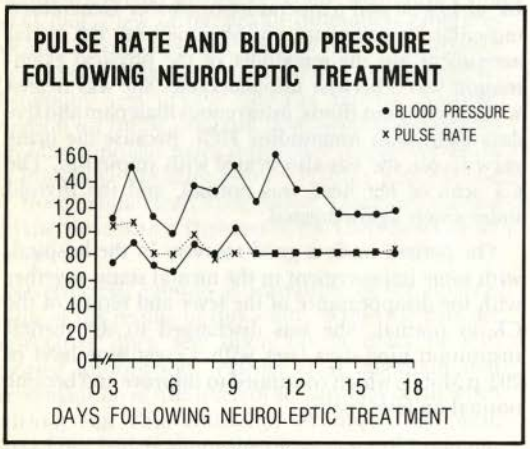

Figure 1

The isolation of *E.coli* from the patient's urine during her second admission was considered to be an incidental discovery of a urinary tract infection that cannot be held responsible for this peculiar clinical and biochemical presentation.

The patient showed signs of recovery on supportive treatment in both admissions. The addition of Amantidine HCl to her therapy during the second admission was actually begun after she started to show signs of recovery, which makes any comment on the effect of this agent on her recovery invalid.

She had significant myonecrosis as reflected by the degree of the CK elevation. This myonecrosis together with the resulting myoglobinuria were considered to be the major factor behind the development of acute renal failure.

Our patient was not on monoamine-oxidase inhibitors and showed no catatonic features which made the exclusion of drug interaction with MAO inhibitors and idiopathic lethal catatonia, the major differntial diagnoses, a rather safe task. □

ACKNOWLEDGEMENT

I appreciate the assistance of Dr. O.E. Mann in preparing this report.

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NOTICE

ADVANCED CARDIAC LIFE SUPPORT

May 1, 2, & 3, 1987
Highland View Hospital
Amherst, N.S.

ADVANCED TRAUMA LIFE SUPPORT

May 8, 9 & 10, 1987
I.W.K. Hospital for Children
Halifax, N.S.

Those who are interested in registering for either A.C.L.S. or A.T.L.S. please contact Christine Smith, Division of Continuing Medical Education, Dalhousie University, Halifax, N.S. (902) 424-2061.

Current Topics in Community Health

Prepared by: Dr. Frank M.M. White,
Department of Community Health and Epideminology
Dalhousie University, Halifax, N.S.

1986 SURGEON GENERAL'S REPORT: THE HEALTH CONSEQUENCES OF INVOLUNTARY SMOKING

Inhalation of tobacco smoke during active cigarette smoking remains the largest single preventable cause of death and disability in the United States. The health consequences of cigarette smoking and of the use of other tobacco products have been extensively documented in the 18 previous Surgeon General's reports issued by the Public Health Service. More than 300,000 premature deaths that are directly attributable to tobacco use — particularly cigarette smoking — occur each year in the United States. The magnitude of the disease risk for active smokers, secondary to their high dose exposure to tobacco smoke, suggests that the lower doses of smoke received by involuntary smokers also puts them at risk. The 1986 Surgeons General's Report explores the health consequences incurred by involuntary smokers. It was developed by the Office on Smoking and Health, Center for Health Promotion and Education, Centers for Disease Control (CDC) as part of the U.S. Department of Health and Human Services' responsibility under Public Law 91-222 to report new and current information on smoking and health to the U.S. Congress.

Data in the 1986 report presents evidence that the chemical composition of sidestream smoke (smoke emitted into the environment by a smoker between puffs), is qualitatively similar to the mainstream smoke inhaled by the smoker and that both mainstream and sidestream smoke act as carcinogens in bioassay systems.[1] Data on the environmental levels of the components of tobacco smoke and on nicotine absorption in nonsmokers suggest that non-smokers are exposed to levels of environmental tobacco smoke (ETS) that would be expected to generate a lung cancer risk. In addition, epidemiological studies of populations exposed to ETS have documented an increased risk for lung cancer in those nonsmokers with increased exposure. Of the 13 epidemiological studies that were available for review in the scientific literature, 11 reported a positive relationship and six of these observed statistically significant results. It is rare to have such detailed exposure data or human epidemiologic studies on disease occurrence when attempting to evaluate the risk of low-dose exposure to an agent with established toxicity at higher levels of exposure. The relative abundance of data reviewed in the report, their cohesiveness, and their biologic plausibility allow a judgment that involuntary smoking can cause lung cancer in nonsmokers.

The 1986 Surgeon General's Report comes to three major conclusions:

- Involuntary smoking is a cause of disease, including lung cancer, in healthy non-smokers.
- Compared with children of nonsmoking parents, children whose parents smoke have an increased frequency of respiratory symptoms and infections. They also have slightly smaller rates of increase in lung function as the lung matures.
- Simple separation of smokers and nonsmokers within the same air space may reduce, but does not eliminate, ETS exposure.

The report also reviews policies restricting smoking in public places and the workplace and states that, in the 1970s, an increasing number of public and private sector institutions began adopting policies to protect individuals from ETS esposure by restricting the circumstances in which smoking is permitted. Local governments have been enacting smoking ordinances at an increasing rate since 1980. Restrictions on smoking at the workplace have resulted from both governmental action and private initiative, and an increase in workplace smoking policies has been a trend of the 1980s. Laws restricting smoking in public places have been implemented with few problems and at little cost to state and local governments. Public opinion polls document strong and growing support for restricting or banning smoking in a wide range of public places.

The Surgeon General, in his preface to the report, states, "Cigarette smoking is an addictive behavior, and the individual smoker must decide whether or not to continue that behavior: however, it is evident from the data presented in this volume that the choice to smoke cannot interfere with the nonsmokers' right to breathe air free of tobacco smoke".

Editorial Note: A review recently published by the National Academy of Sciences states that approximately 20% of the estimated 12,200 lung cancer deaths occurring annually in non-smokers are attributable to environmental tobacco smoke.[2] This estimate falls close to the mid-point of the range published by Repace and Lowery, who state that between 500 and 5,000 lung cancer deaths may occur annually as a result of nonsmokers' exposure to tobacco smoke.[3] By comparison, figures published in the *Journal of the Air Pollution Control Association* estimate that between 1,300 and 1,700 total cases of cancer resulting from other air pollutants in the general environment occur each year in the United States.[4] Thus, while the number of lung cancer deaths that may be related to ETS exposure is small compared

with those caused by active smoking, the actual number of lung cancer deaths caused annually by involuntary smoking is large. In addition, ETS causes more cases of cancer annually than many other agents in the general environment that are regulated because of their potential to cause disease.

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Source: Centers for Disease Control, *Morbidity and Mortality Weekly Report,* 1986; **50:** 769-770.

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

Global Data

During the Thirty-Ninth World Health Assembly in May 1986, the WHO Member States affirmed that AIDS and infection with the human immunodeficiency virus (HIV) had become a global health concern. As of 14 November 1986, a total of 34,448 cases had been reported to the WHO Global Control Programme on AIDS (CPA) (Table I). Reporting on AIDS is voluntary and these data have been obtained through regional surveillance systems, national committees or task forces for the containment of AIDS, epidemiological newsletters and other official sources of information.

The 34,448 cases were notified by 77 countries; an additional 24 countries reported no cases. Ten of the 77 countries reporting cases were in Africa, 33 in the Americas, 9 in Asia, 23 in Europe and 2 in Oceania. Since August 1985, when global AIDS case reporting began in WHO, the number of countries reporting cases of AIDS has increased from 35 to 77. The data from the United States of America account for 77% of all cases, which reflects the severity of the epidemic and the excellence of AIDS surveillance in that country. The total number of cases reported from other countries increased from 2199 in August 1985 to 7882 in the middle of November 1986.

The yearly distribution of cases by date of report or of diagnosis and by continent is shown in Table I. Approximately 85% of cases (mainly those from North America, some European countries and Australia) are tabulated by date of diagnosis and the remainder are by date of report. The time lapse between diagnosis and reporting can be considerable, reaching 2 years or more. Thus, the actual distribution of AIDS cases geographically and temporally may not be accurately reflected. Rather, at this stage of national and international surveillance, these data document increasing awareness of the disease and establishment of national surveillance programmes. The WHO global AIDS control and prevention strategy includes technical cooperation with developing countries in the establishment of AIDS surveillance systems.

Source: *WHO Weekly Epidemiological Record, Vol. 61, No. 47, 1986.*

TABLE I

AIDS Cases Reported to WHO, By Continent and Year of Report/Diagnosis, as of 14 November 1986

Continent	Year of Report or Diagnosis Unknown	1979	1980	1981	1982	1983	1984	1985	1986	Total	Reporting Cases	Reporting Zero
Africa	—	—	—	—	3	4	9	20	1033	1069	10	5
Americas	24	14	56	264	1032	3134	5989	10424	8336	29273	33	11
Asia	—	—	1	—	1	8	4	24	30	68	9	4
Europe	1	—	1	6	47	235	536	1326	1542	3694	23	4
Oceania	—	—	—	—	1	6	44	123	170	344	2	—
TOTAL	25	14	58	270	1084	3387	6582	11917	11111	34448	77	24

□

ERRATUM

We erred in a recent issue of the *Bulletin,* and wish to note that L.P. Heffernan, M.D., F.R.C.P.(C) is the current Head, Division of Neurology, Department of Medicine, Dalhousie University, Halifax, N.S. We apologize for this oversight.

BOOK REVIEW

The Royal College of Physicians and Surgeons of Canada, 1960-1980. By Dr. David A.E. Shephard. Published by the Royal College of Physicians and Surgeons of Canada, Ottawa, 1985, pp. 551, with appendices and index.

David Shephard is, by his major speciality, an anesthetist, and a Fellow of the Royal College, in addition to being a medical editor of considerable skill. The anesthetist's skills include perceptive observation, the detection of emerging trends from small beginnings that might otherwise pass innoticed, and an ability to synthesize what to others appears to be a cacophany of discordant happenings or events into a harmonious whole which evolves magnificently over the stages of the years. Like many musicians, he has chosen to be repetitious, returning again and again to certain themes, yet each repetition brings an entirely new treatment that sheds new light on the evolving theme.

Examining the original mandate of the College, facing the constitutional crisis of the double standard of Fellowship and Certification, and demonstrating its courageous resolution in spite of much questioning and agonizing by many Fellows, is but the opening theme, but one which recurs continually.

The development of a modern educational philosophy based on the attainment of measurable objective, and the methods of ensuring that adequate facilities are available for residents to meet those objectives is the second major theme that evolves over time. There is no doubt that the College educators have at times been ahead of the university educators in their knowledge and application of modern education theory, and the astounding change from a series of hospital based residency programs to a series of university supervised programs, each applying common standards of evaluation, is one of the major educational achievements of the College, unmatched by any other comparable educational institution in the world.

The last major and recurring theme is the drive to maintain unity among the more than 35 specialties that constitute the Fellowship of the Royal College. Here again the College is unique in the world in having maintained all its specialties under one umbrella, when the pressures to split and form independant colleges has been so strong.

The recurring appearance of men of dedication as committee members, chairman, vice-presidents and presidents helps to explain the extra-ordinary nature of the Fellowship of the College. These men did not dominate or direct: with good humour and common sense and rational argument they persuaded their Fellows of the advantages of unity.

In bringing this period so vividly to life, David Shephard has done a great service to the College, and to medical history in Canada, and incidentally, provided an eminently readable chronicle of the events of this period.

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Professor Department of Anaesthesia,
Faculty of Medicine,
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Editor's Note: Dr. David Shephard was a former editor of *The Nova Scotia Medical Bulletin.*

Correspondence

To the Editor:

In his letter to The Nova Scotia Medical Bulletin of December 1986, Dr. Eric J. Cleveland makes a reasoned plea to physicians to avoid designating and treating a patient's hypochondriacal concerns as though they were an actual physical illness. I would wholeheartedly support this plea and add that there is good evidence that doctors can accentuate and perpetuate psychogenic hypochondriacal complaints by over-investigation and inappropriate physical treatment.

However, one must be careful not to over-generalize. There is no question that, as well as being inappropriately treated physically, many hypochondriacal patients are given psychotropic medications when psychotherapy might be more appropriate. But psychiatric diagnosis is improving and some hypochondriacal disorders can now be diagnosed and treated with a degree of specificity and effectiveness. Where the initial treatment is properly psychopharmacological it is as wrong to withhold the appropriate medication as it is to over-prescribe. Sometimes nowadays, we see previously inaccessible patients improve with medication to the point where psychological treatments can at last reach and help them.

I think that Dr. Cleveland would agree that good psychiatric treatment is a flexible combination of approaches rather than something which is doctrinaire and pre-determined, or which tries to bend the patient to the therapy.

Yours sincerely,

Alistair Munro, M.D., F.R.C.P.C.,
Professor and Head,
Department of Psychiatry,
Dalhousie University, Halifax, N.S. □

Personal Interest Notes

SENIOR MEMBERSHIP CITATION
THE MEDICAL SOCIETY OF NOVA SCOTIA

Dr. Stephen Borden Bird

Dr. S. Borden Bird was born on the fifth of August, 1917, at Burdett, Alberta, the son of a United Church minister. He received his public schooling in Nova Scotia, mainly Queens County, before entering Mount Allison University where he completed his pre-medical training in 1936. Five years later, in 1941, he graduated from Dalhousie University and came to Liverpool to practise for one year with Dr. John Wickwire. He then joined the Royal Canadian Army Medical Corps as so many of his brother doctors did. During the Second World War he served as Captain from 1942-1945. Following the war he remained a Medical Officer in the 14th Field Regiment of the Reserves from 1947-1969 when he received his Canadian Decoration (CD) and Rosette for his service to his country.

After the war, Borden returned to practise in Liverpool for 41 years; initially he was solely in general practice but quickly he was doing some anaesthesia. From 1975 until his retirement in 1985, he limited his practice totally to anaesthesia. At the time of his retirement he was a member of the Canadian Anaesthetist's Society and the American Society of Anestheologists.

Borden and his wife, Clair (née Nickerson, of Halifax) were married in 1942 and they have continued to be as active in the community now as when he was in fulltime practice. He is an Officer Brother of the St. John Ambulance, a member of the Zion United Church, and for twenty years he was director of the Health Services for the Emergency Measures Organization of Queens County. He was Chairman of the Liverpool High School Board at one time and, until very recently, he was very active as a member of the Liverpool-Queens Development Commission.

Borden has always been interested in photography and gardening, but he waited until 1974 to start perhaps his most cherished hobby, that of flying. A sign could often be seen swinging from Borden's anaesthetic cart which read "Gone Flying". He still has his licence today. He is a life member of the Canadian Society of Aviation Medicine and a life member of the Liverpool Flying Club. He has been a very active member of the Queens County Historical Society and, recently, he put together an exhibit of early medical instruments used in Queens County.

The President of the Medical Society was proud to make a special presentation at the recent meeting of the Lunenburg/Queens Medical Society. Dr. Bill Acker presented the Senior Membership Citation to Dr. S. Borden Bird of Liverpool who was unable to attend the Awards Banquet at the last Annual Meeting. Above, left to right: Dr. Acker, Dr. Bird, and Dr. Ewart Morse, President of the Lunenburg/Queens Branch.

His son, John, a very active musician, today resides in Liverpool. Carolyn, his daughter, is a Marine Biologist with the National Research Council in Halifax. Throughout his life, Borden has been well respected by his collegues for his skills in medicine and anaesthesia. With only a family name to go on, he was well known for his uncanny ability to place his patient's house to within a few hundred yards of its correct location anywhere along the thirty miles of Nova Scotia coastline.

The Queens-Lunenburg Branch of the Medical Society takes great pride in recommending him for the Honor of Senior Membership in The Medical Society of Nova Scotia.

W.H. Lenco, M.D.
Queens-Lunenburg Branch Society □

OBITUARIES

Dr. A.G. Patrick McDermott, (39) of Halifax, N.S. died on December 5, 1986. Born in Saint John, N.B. he received his medical degree from Dalhousie Medical School in 1974, and finished his training for orthopedic surgery in 1984. His special interest was management of tumors of the musculoskeletal system and he established the bone bank at the Victoria General Hospital. He is survived by his wife and two sons. The *Bulletin* extends sincere sympathy to his wife and family.

Dr. E. (Devere) T. Mosher, (60) of Louisburg, N.S. died on December 18, 1986. Born in Windsor, N.S. he graduated from Dalhousie Medical School in 1955 and practised medicine in the Louisburg area for 30 years. He was a member of The Medical Society of Nova Scotia, The Canadian Medical Association, and the Branch Medical Societies in Sydney and Cape Breton. He is survived by his wife, a son, and a daughter. The *Bulletin* extends sincere sympathy to his family.

Dr. Samuel Marcus, (84) of Bridgewater, N.S. died on January 24, 1987. Born in White Russia, he received his medical degree from Dalhousie University in 1925. After establishing his practice in Bridgewater, he became chief of surgery at Dawson Memorial Hospital. He was made senior member of The Medical Society of Nova Scotia and the Canadian Medical Association in 1973. He is survived by two daughters, to whom the *Bulletin* extends sincere sympathy.

Dr. Agnes Threlkeld, (65), of East Uniacke, N.S. died on January 26, 1987. She received her medical degree from Dalhousie Medical School in 1950 and served with the Royal Canadian Navy during World War II. She operated a Nursing Home on Carlton Street in Halifax for a number of years. She retired from practice in 1977. The *Bulletin* expresses sincere sympathy.

□

FREE PAMPHLETS

The Arthritis Society has free pamphlets available with information for patients, physicians and families dealing with types of arthritis, medication and general information.

For more information on ordering pamphlets, contact:

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