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Serratia Marcescens Infection: A Growing Threat

Once upon a time-in 332 B.C. to be precise-some hungry soldiers upon breaking bread told that blood flowed from the loaves. Their commander, Alexander the Great, hastily summoned his soothsayer; fortunately for Alexander, this miraculous event was considered to be a good omen for the Macedonians, who were then laying seige to the important port of Tyre, in Lebanon. Thus encouraged, Alexander persisted and took the port: largely, we now believe, due to the production of a blood-red pigment by a food-contaminating organism later named Serratia marcescens. *On page 79 of this Bulletin,* Digout, MacDonald and vanRooyen spin a more modern tale about this important micro-organism which presents a growing threat, as a potentially serious infection, to our hospitals.

First discovered by Bizio in 1819[1] (the consequence of another incident of red colouration of food), Serratia marcescens is one of the most colourful of micro-organisms. Its long and intriguing history, hindsight tells us, goes back to the 4th Century B.C., when Pythagoras reported the appearance of "blood" on beans. In more modern times, for as long as 140 years after Bizio's original description of Serratia as a discrete micro-organism-this in pre-Pasteurian days – the bacterium was classified as a harmless, saprophytic producer of a characteristic pigment: nothing more serious. Indeed, its apparent lack of pathogenicity led to its being used deliberately for the experimental demonstration of bacterial invasion of the human body. Although human infection due to Serratia had in fact been reported in 1913[2], the benign nature of this organism was upheld until about 1960.

Then, during the last decade, reports began to incriminate Serratia marcescens as a significant cause of infection. While not all infections were serious, others progressed to septicemia, which was sometimes fatal; with the increasing incidence of gram-negative sepsis and septic shock, the name Serratia marcescens began to be noticed. Suddenly, it seems, the pathogenic wolf had shed his sheep-like camouflage, to emerge as a villain of more than archival interest. In brief, Serratia had become a killer. The interesting question then arose as to how, to change the metaphor, the leopard came to change his spots, and how serious a threat Serratia marcescens infection presented to patients.

Two factors appear to be significant. One is the use of large doses of broad-spectrum antibiotics; the other is the administration of these drugs to debilitated patients. It looks as though medical progress, through the development of potent antibiotics, has created an environment in which a commensal can take hold, often as a nosocomial infection, then to flourish as the major bacterial flora; such superabundance tips the scale for the debilitated patient. Moreover, the resistance of Serratia strains to most antibiotics, even according to some reports, to all antibiotics, means that in a new antibiotic-induced environment Serratia is sometimes unapproachable with the modern therapeutic armanentarium. It is therefore interesting that Digout *et al* report a 100% sensitivity to gentamicin.

A secondary explanation for the emergence into clinical daylight of Serratia is this: that accurate identification and classification of Serratia strains is quite recent[3]. Until about 10 years ago, the nonpigmented form of Serratia was not recognized: any such strains were given instead the wastebasket designation of "paracolon". The increasing

incidence of gram-negative infections in hospitals is another factor which has served to spotlight Serratia.

Death due to infection with Serratia makes this organism a threat, especially in hospital practice. Certain conditions are associated with Serratia infection. The administration of antibiotics to debilitated patients has already been remarked. Surgery and instrumentation are important antecedent conditions, but not all infected patients are surgical; Serratia isolates have been cultured from a variety of sources, especially the respiratory tract, the urinary tract, wounds and burns, intravenous catheters, and ventilators and other pieces of inhalational therapy equipment. Serratia marcescens is not only potentially lethal, it has a disturbing ubiquity.

What is the situation in Nova Scotia? Data from the Victoria General Hospital* in Halifax are interesting. During 1966-67, a two-year period, 151 isolates were obtained from in-patients and from out-patients. Among 82 in-patients, there were 5 deaths: from the latter, heart blood of four patients yielded Serratia; pre-existing conditions in these five patients were subarachnoid hemorrhage, head injury, carcinoma of the esophagus, lymphatic leukemia, and neonatal respiratory distress. Many of the infected patients were receiving prolonged courses of antibiotics which were ineffective against Serratia, and some had also been receiving steroids. Most of the isolates were from patients who had urinary tract infections, and at one period as many as nine patients in one ward yielded isolates of Serratia, thus confirming the observation that infection with Serratia is acquired mainly in hospital.

*Van Rooyen, C.E. Personal communication, 1971.

Medicine is kaleidoscopic and ever-changing. The changing role of Serratia marcescens is a small example of this; it also illustrates the truism that much of the knowledge we acquire as medical students sooner or later becomes useless, that medical education is a life-long process. It is at once a sobering reflection and yet a stimulating challenge that there is always more to learn, that medicine remains a dynamic study despite, or perhaps because of, the advances which are continually being made. The Serratia story provides us with an interesting tale; but behind it there is a moral pointing to the changing face of medicine which provides much food for thought. □

D.A.E.S.

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Commentary

What Goes On?

John F. L. Woodbury, M.D.*
Halifax, N.S.

"Policing" the Medical Profession

How do some doctors become wealthy? There are several ways in which it can be done. The first is by working extremely hard for very many hours with considerable efficiency. This type of high medical income is quite justifiable. It is good for the patients. It is good for Governments which collect high taxes from such doctors and provided that the doctor's health can tolerate it, it is good for the physician.

A second way in which a doctor can produce a great deal of service is to hire assistants such as a secretary, nurses, and other paramedical personnel at his own expense, thereby increasing the effectiveness of his services. This also will produce a high medical income. The gross will look extremely high but it will be diminished by the salaries of the employees and by high expenses for office space and equipment. Even the net income may be high and justifiably so.

A third way of quite honestly generating a very high medical income is to perform a small number of services which have traditionally been paid for at moderately high fees. In this instance, the medical Fee Schedule for the specialty may be too high in relation to other Sections because of historical considerations. (Before Medicare a large number of people may have been unable to pay and those who could pay had to provide the doctor with a living.)

The fourth way of getting a high medical income is to see a very great number of patients, each for a very short time. It is this problem which is causing Medical Societies and licensing bodies a great deal of concern because it is not clear whether or not the doctor is practicing good medicine.

In the foregoing instance, the doctor may be overworked by his patients simply because there are not enough doctors in his locale or because his patients have become accustomed to seeing the doctor for minor illness which may not always demand medical care.

Then, unfortunately, since the medical profession is made up of human beings, there are rogues who deliberately encourage multiple visits for trivial illness and those who pad their accounts, that is, charge for services that were not rendered.

What is the medical profession doing about the abuses?

In the first instance, it is essential to identify the doctor who may not be practicing good medicine, or who may be one of the rogues. Co-operatively, the Medical Society of Nova Scotia, the Medical Care Insurance Commission, and Maritime Medical Care Incorporated have brought into being the Medical Advisory Committee whose members are all representative practicing physicians with long experience and noted for their integrity. They are appointed to the Committee by the Medical Society. This Committee is responsible for conducting detailed reviews of certain physicians' practice profiles to determine why, in the continuing routine review of all profiles, these physicians appear to be practicing medicine and its related functions in a manner which differs to a notable degree from those of their like confreres.

M.S.I. data provide a surprising variety of statistics. Each participating physician's total services are recorded in terms of families and individuals, served, together with costs in both these categories. This provides one basis for comparison between one specific physician and others practicing in similar situations. It is relatively simple, after due inquiry, for M.M.C. to determine whether a physician has fraudulently submitted a claim or claims for payment under the Plan, or if he habitually claims under the Plan for services that were not medically required. Having done this, the matter is routine in that the Medical Advisory Committee would probably recommend to the Commission through the M.M.C. Board that the Commission take appropriate action. Any action taken by the Commission would be taken in consultation with the Provincial Medical Board and the Medical Society of Nova Scotia.

The determination that a physician is not practicing good medicine is far more complex. Indications suggestive of a high volume, low quality practice may, on close examination, demonstrate an efficient, well organized, high quality operation. Examination of practices by the Medical Advisory Committee for this purpose will be most demanding and extremely time-consuming.

The general absence of overall standards that would provide the basis for relatively easy comparison of one physician to another is a complicating factor. It is recognized that the Medical Advisory Committee could never hope either to establish the standards or strike the comparisons. It is the responsibility of the Committee, based on the experience and knowledge of its members, to make a judgment on whether or not a particular physician's

*President of the Medical Society of Nova Scotia.

practice shows indications that the quality of medicine being provided may be inadequate. In this event, the Committee will refer the case through its own Board of Directors to the Society for consideration.

How will the Medical Society deal with it? The Society has directed each of its Sections to form a Standards Committee, primarily for the purpose of conducting peer review of physicians' profiles which have been referred to the Society. Quite obviously, each of the Sections must have yardsticks if the process is to succeed. The commitment to establish these yardsticks has been accepted by the Sections. It is assumed that all are ready to function in this new found sphere of interest.

The Medical Society has officially committed itself to maintain and upgrade standards of quality of medical services. I am impressed at the way in which the numerous leaders in your medical community have accepted their individual responsibilities. It is vital to the welfare of the proofession and to the recipients of our service, that this process be made to succeed; only with your co-operation can this be so.

Ultimately, on-site inspections of medical practices will be necessary if the Medical Society is to fulfill its commitment to study the quality of health care delivery. The Medical Advisory Committee is the agency designated by the Society to undertake this study. It will be necessary to undertake a pilot project of examination on the spot of the methods and facilities of certain physicians or groups of physicians. It may well be that you as a practicing physician will be invited to allow one of the members of the Medical Advisory Committee or someone acting on behalf of the Committee to visit you in your office, to accompany you on your rounds, and to examine the business methods used by your staff. I hope you will give them the fullest co-operation.

It seems to be a very human trait to feel envy when somebody else has a much larger income than you have. While it seems appropriate for the public to be interested in what most doctors earn from M.S.I. because the monies expended by M.S.I. comes from taxes, the fact is that interest has been focused upon the largest incomes rather than on the median. This attention to high medical incomes can be expected to continue and to generate public interest. If the income is justified by long hours of hard work and great skill, we need to know it and to publicize it. Because of this you will be more likely to be approached by the Medical Advisory Committee if you enjoy a large income from public funds.

Fee for Service

It is becoming increasingly apparent that with advances in technology and greater government involvement in the delivery of health care, the medical profession needs to become more professional in its approaches to Fee Schedules and other matters of concern to each of us. With the present complexity of Fee Schedules it is grossly unfair to expect a committee of practicing doctors to contribute a significant amount of their spare time in continuing revision and development of the Fee Schedule. Other provincial associations across the country are continuously reviewing and changing items within the Fee Schedule. To keep abreast and to avoid future embarrassment your Society must attend to this matter on a daily routine basis. For this reason, the Officers at their meeting on June 25th agreed to ask the Executive Committee to consider the expansion of staff to include a full-time person to be employed in the field of fees statistics and related areas. This person would also be responsible for the administration of our insurance programs, an area which has not been operating as successfully as it could for the members of the Society. Incidentally over the long run, we expect the insurance program to become self-sustaining or, in fact even show a considerable profit. At the outset, however, we will have to finance this operation without any anticipated return as it takes several years before the plan can operate fully.

There appears to be a developing need for management consultant service for members of the profession. This is available now from a variety of consulting firms; however, it appears feasible and reasonable to provide this service through the Society office, charging a lesser fee. This would depend, of course, on the additional staff member being competent in this field – not unreasonable when considering the nature of his primary assignments. □

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Sensitivity of Serratia to Gentamicin and Carbenicillin*

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Summary: *Eighty-five strains of Serratia marcescens were tested for susceptibility to gentamicin and carbenicillin by the disk, agar and tube methods, using varying bacterial concentrations. The results showed that in vitro, gentamicin proved to be active against all strains of Serratia tested, including eleven strains which were resistant to more than 200 mcg/ml of carbenicillin. 100 per cent of strains were susceptible to 10 mcg/ml of gentamicin and 87.1 per cent were sensitive to 100 mcg/ml of carbenicillin. The number of strains susceptible to gentamicin and carbenicillin were similarly reduced by increasing the inoculum size from 10^4 to 10^6 cells per ml.*

Once considered to be a harmless saprophyte, *Serratia marcescens* is now recognized as a potential cause of human infection in various circumstances. Recently, its opportunist role in several clinical states, both as a primary and as a nosocomial invader in the hospital environment, has been emphasized. Thus both the pigmented and the non-pigmented strains of *Serratia* have been recovered from such conditions as urinary tract infections[1,2,3], respiratory infections[2,4], empyema[5], post-operative infections[1,6,7], endocarditis[8], septicemia[9,10,11,12,13] and pyogenic arthritis[14], while infections associated with leukemia and drug addiction have also been reported[12]. Patients with *Serratia* infection not infrequently give a past history of instrumentation, impaired general resistance, prolonged antimicrobial therapy, treatment with immunosuppressive drugs, and chronic debilitating maladies[1,2,11].

Strains of *Serratia* are, moreover, resistant to many common antibiotics and they are usually susceptible to only a few, such as gentamicin, kanamycin, neomycin and naladixic acid[1,6,7,8,11,15].

In this paper, we compare the susceptibility *in vitro* of strains of *Serratia marcescens* to gentamicin and carbenicillin; we also report a study of the effect of bacterial inoculum size on the minimum inhibitory concentration (MIC) and minimum bacterial concentration (MBC) levels of these antibiotics on the isolates.

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Materials and Methods

Seventy-six strains of *Serratia* isolated from 76 different patients suffering from a range of clinical conditions were studied. Our observations were controlled by conducting comparative parallel tests on American Type culture strain *S. marcescens,* ATCC No. 9103. Eight additional strains obtained through courtesy of Dr. von Graevenitz of Yale University, New Haven Hospital, Conn. were included.

All isolates were identified as *Serratia marcescens* on the basis of recommended biochemical tests[16,17,18]. Strains were motile; they fermented glucose with little or no gas, and sucrose and mannitol without gas, while they did not ferment lactose within 48 hours; the strains were indole-negative, and Voges-Proskauer-, Simmons citrate- and gelatin-positive; and they produced DNase. Rhamnose, arabinose, raffinose and xylose tests were negative.

The *minimum inhibitory concentration* (MIC) of gentamicin* and carbenicillin† against these strains was determined by three methods, namely, the disk, agar dilution and tube dilution methods. These tests were performed in duplicate using inocula of 10^4 and 10^6 cells per ml.

DISK METHOD The appropriate dilutions of culture were spread evenly over the surface of a trypticase soy agar plate with a sterile cotton swab. Commercial disks (BBL)†† of 5 mcg and 10 mcg of gentamicin and 25 mcg and 100 mcg of carbenicillin were placed on the inoculated surface. After incubation at 37°C for 18 hours, plates were

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examined and zone sizes were recorded. Zone diameters of 12 mm around the 5 mcg disk of gentamicin and one of 12 mm around the 25 mcg disk of carbenicillin were accepted as evidence of sensitivity.

AGAR DILUTION METHOD Trypticase soy agar plates containing gentamicin in concentrations of 25, 10, 5, 1, 0.5 and 0.25 mcg respectively were prepared, as were similar plates containing carbenicillin in concentrations of 200, 100, 50, 25, 5 and 1 mcg respectively. The plates were inoculated with one drop of culture from the appropriate dilution. After incubation at 37°C for 18 hours, the plates were examined. The MIC was recorded as the lowest concentration which completely inhibited growth.

TUBE DILUTION METHOD Gentamicin and carbenicillin, at the concentrations used for agar dilutions, were incorporated into trypticase soy broth, which was then dispersed in 1 ml amounts in sterile test tubes and inoculated with one drop of the appropriate dilution.

The concentration of the antibiotic in the last tube showing complete inhibition was accepted as the MIC. The *minimum bactericidal concentration* (MBC) of each strain was determined by plating a loopful from each tube in the tube dilution test, to blood agar, after the MIC had been recorded. The concentration at which all organisms were killed was ascertained by the presence or absence of growth on these plates after 18 hours incubation at 37°C.

Results

GENTAMICIN The minimum inhibitory concentrations of gentamicin for 85 strains of *Serratia,* as determined by the agar and tube dilution methods, are shown in Table 1. In an inoculum of 10^4 cells per ml and using the tube

TABLE 1

Inhibition of Serratia Marcescens by Gentamicin

Method	Cumulative inhibition (%) at concentration (mcg/ml) of:								
	<0.25	0.25	0.5	1.0	2.5	5.0	10	25	>25.0
Inoculum of 10^4 cells/ml M.I.C.									
Agar Dilution	3.5	3.5	27.0	93.9	100	100	**100**	**100**	**100**
Tube Dilution	1.1	1.1	7.0	64.6	94.0	98.9	**100**	**100**	**100**
MBC	0.0	0.0	0.0	14.1	48.2	77.6	97.6	**100**	**100**
Inoculum of 10^6 cells/ml M.I.C.									
Agar Dilution	1.1	1.1	2.2	19.9	65.8	94.1	100	**100**	**100**
Tube Dilution	3.5	3.5	7.0	15.2	51.7	83.5	96.4	**100**	**100**
MBC	1.1	1.1	1.1	4.6	16.4	48.2	78.8	95.3	**100**

TABLE 2

Inhibition of Serratia Marcescens by Carbenicillin

Method	Cumulative inhibition (%) at concentration (mcg/ml) of:								
	<1.0	1.0	5.0	10.0	25.0	50	100	200	>200
Inoculum of 10^4 cells/ml M.I.C.									
Agar Dilution	3.5	3.5	48.2	71.7	84.6	87.1	87.1	87.1	**100**
Tube Dilution	7.1	8.3	64.8	81.2	84.7	84.7	87.1	87.1	**100**
MBC	0.0	1.1	35.2	74.1	82.3	84.7	87.1	87.1	**100**
Inoculum of 10^6 cells/ml M.I.C.									
Agar Dilution	0.0	0.0	15.3	37.6	67.0	81.1	85.9	85.9	**100**
Tube Dilution	3.5	3.5	15.3	36.5	71.8	81.3	84.8	85.9	**100**
MBC	0.0	0.0	1.1	16.4	47.0	61.1	68.2	75.3	**100**

TABLE 3

Disk Sensitivities

Antibiotic	Concentration (mcg)	Percentage Sensitivity
Gentamicin	5	100
	10	100
Carbenicillin	25	87.1
	100	87.1

and agar methods, 100% of strains of *Serratia* examined were sensitive to a gentamicin concentration of 10 mcg/ml, a level readily attainable in man. Following increase of inoculum size to 10^6 organisms per ml, the percentage of strains sensitive to 10 mcg/ml by the tube method was reduced to 96.4, but by the agar method, it remained at 100.

As to the minimum bacterial concentration, with an inoculum of 10^4 cells per ml, 97.6% of the strains showed an MBC of 10 mcg/ml, whereas with an increased inoculum of 10^6, 78.8% gave an MBC of 10 mcg/ml.

CARBENICILLIN Table 2 demonstrates that with an inoculum of 10^4 cells/ml, 87.1% of strains were inhibited at the 100 mcg/ml level of carbenicillin by both methods. At an increased inoculum of 10^6 cells/ml, 85.9% of strains were inhibited by the agar technique and 84.8% by the tube method.

With the lesser inoculum, and at a level of 100 mcg/ml, the proportions of strains inhibited (MIC) and killed (MBC) was similar. With a greater inoculum, 68.2% of strains were killed by the 100 mcg/ml concentration. Thus, in comparing the *in vitro* behaviour of gentamicin and carbenicillin, it would appear that at a clinically attainable level, more strains of *Serratia* are sensitive to gentamicin than carbenicillin.

Table 3 shows that results obtained by the disk method are a fair assessment of relative susceptibility and in general agreement with results reported in Tables 1 and 2. □

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A young wife resigned her position. She said: "My reason will soon be apparent, and so will I".

* * * *

A lot of today's troubles arise from workers who don't think and thinkers who don't work.

An impatient business executive fumed because the elevator didn't arrive quickly. "Where have you been?" he snapped at the operator. "Where can you go in an elevator?" was her reply.

How to Choose an Antibiotic: The Value of Sensitivity Tests

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Summary: *A survey of the results of laboratory antibiotic sensitivity tests conducted at Colchester Hospital for the month of September 1970, is reported. Such periodic tests indicate which antibiotics are likely to be effective for the initial treatment of infections due to gram-positive cocci and gram-negative bacilli. Their value in suggesting which antibiotics should be tested routinely against various species of bacteria is also emphasized.*

Antibiotic Sensitivity Tests and the Choice of an Antibiotic

It is often difficult to choose an antibiotic for the initial treatment of a patient with an acute infection, but the patient's life may depend on making the correct choice. Antibiotic sensitivity tests should be performed if possible, but they may be useless because the results are not available for two days. In these circumstances the physician has to decide which type of micro-organism is probably causing the infection, and he has to prescribe an antibiotic which previous experience has shown to be effective.

Several years ago most life-threatening infections were due to gram-positive cocci. Septicemia due to streptococci and staphylococci is now less common than formerly, and most bacteremias and septicemias are caused by gram-negative bacilli. If an infected discharge is available for examination, a gram-stained film can be used to determine which type of bacteria is present. More often the diagnosis has to be made on clinical grounds alone. Once a decision has been reached about the type of bacteria, then the results of laboratory tests on similar bacteria can be used to indicate which antibiotic may be effective. Surveys of the results of antibiotic sensitivity tests should be made periodically because gradual changes occur. For example, a few years ago 50% of strains of staphylococci isolated at Colchester Hospital were sensitive to penicillin G, but now only 20% are sensitive.

This report describes the results of antibiotic sensitivity tests performed in Colchester Hospital laboratory during September 1970. Over 200 strains of bacteria were isolated from clinical specimens, and were tested for sensitivity to six or more antibiotics. Standard two-disc tests were used, and the results were reported thus: sensitive, moderately resistant, and resistant. In preparing this report the moderately resistant and resistant strains have been grouped together.

The number of strains of different species of bacteria which were isolated and tested is shown in Table 1. For the common species of bacteria the percentage sensitivity figures shown in the subsequent tables are probably significant. For the less common organisms the percentage sensitivity results may not be statistically significant, but are reported here because this information is clinically useful and has not shown any recent change.

TABLE 1
Species of Bacteria Isolated and Tested

BACTERIA	NUMBER OF STRAINS
Gram-Positive Cocci	
Staphylococcus pyogenes	41
Streptococcus pyogenes	1
Pneumococcus	2
Enterococcus	23
Gram-Negative Bacilli	
Escherichia coli	66
Aerobacter aerogenes	35
Pseudomonas	12
Proteus	15
Miscellaneous Species	8
Total	203

Staphylococcus, Streptococuss, and Pneumococcus

Table 2 shows the percentages of strains of pathogenic staphylococci, streptococci, and pneumococci which were sensitive to six nontoxic antibiotics. *Streptococcus pyogenes* and strains of pneumococci were sensitive to all six antibiotics, but only 20% of strains of *staphylococcus pyogenes* were sensitive to penicillin G (benzylpenicillin). The remaining strains of staphylococci were able to destroy penicillin by producing penicillinase. This indicates that penicillin G should not be used by itself for the initial treatment of a patient seriously ill with an infection

*From Colchester Hospital, Truro, N.S.

TABLE 2
Types of Penicillin

Route of administration	Penicillinase status	
Parenteral only	Destroyed by penicillinase Penicillin G (benzylpenicillin)	Resistant to penicillinase Methicillin
Oral: stable compounds	Penicillin V Phenethicillin	Isoxazolyl penicillins (oxacillin, cloxacillin dicloxacillin)

possibly caused by *staphylococcus pyogenes.* Such a patient can be given a penillinase-resistant type of penicillin in addition to or instead of penicillin G, or another antibiotic can be used. For patients who are allergic to penicillin, four other non-toxic antibiotics are available. When penicillin is to be used it is necessary to decide which type is most suitable. This depends on whether or not the bacteria can produce penicillinase, and whether the antibiotic will be given by injection or orally. Generally one should not rely on absorption of an orally administered drug in a seriously ill patient. Indications for the uses of different types of penicillin are summarized in Table 2.

In the laboratory, for routine purposes, it is sufficient to test staphylococci, streptococci, and pneumococci for sensitivity to the six antibiotics shown in Table 3. These antibiotics are nearly always effective, and are relatively harmless to the patient. On rare occasions it will be necessary to test resistant staphylococci for sensitivity to more toxic antibiotics such as vancomycin and novobiocin. There is no need to test these three species for sensitivity to ampicillin. Ampicillin is less effective than penicillin G against these organisms, and like penicillin G it is destroyed by staphylococcal penicillinase. The combination of two antibiotic-impregnated discs, one containing penicillin G and the other methicillin, is used to determine whether staphylococci produce penicillinase. It is not necessary to test all the other types of penicillin.

Enterococcus

Bacteriologists seem to delight in confusing clinicians by changing the names of common bacteria. Enterococci used to be classified as *Streptococcus fecalis;* they are common inhabitants of the intestinal tract. By contrast with other gram-positive cocci the antibiotic sensitivities of enterococci are difficult to predict.

The percentage sensitivities of 23 strains of enterococci are shown in Table 4. Ampicillin is one of the most consistently effective antibiotics against these organisms, and may be better for the treatment of enterococcal infections than the traditional combination of penicillin G and streptomycin. Patients who are allergic to penicillin can be given either cephaloridine or a combination of erythromycin and streptomycin. Tetracyciine is not so likely to be effective.

Enterococci are sometimes present in mixed infections where there are also gram-negative bacilli. Therefore in the laboratory it is necessary to test enterococci for sensitivity to a wide range of antibiotics including those which are likely to be used for treating gram-negative infections.

TABLE 3
Antibiotic Sensitivity of Gram-Positive Bacteria

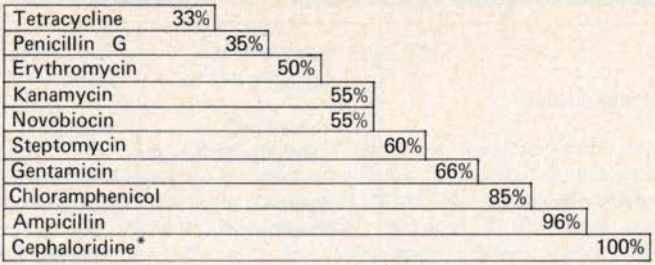
Antibiotic	Percentage sensitivity of: Staph. pyogenes	Strep. pyogenes	Pneumococcus
Penicillin G	20	100	100
Methicillin	100	100	100
Erythromycin	100	100	100
Lincomycin	100	100	100
Cephaloridine	98	100	100
Tetracycline	90	100	100

Gram-Negative Bacilli

In this report only aerobic gram-negative bacilli (coliforms) are considered. Some infections, such as peritonitis, may be caused by anaerobic gram-negative bacilli (Bacteroides) and will require different treatment. However the majority of life-threatening septicemias are due to aerobic gram-negative bacilli.

It can be seen in Table 1 that E. coli accounted for only 50% of the gram-negative bacilli isolated. Therefore the sensitivities of the whole group of these organisms must be considered when choosing an antibiotic for the treatment of a seriously ill patient with gram-negative septicemia. The survival rate of these patients is significantly higher when effective antibiotics are used.

TABLE 4
Antibiotic Sensitivity of Enterococci



*In previous surveys the percentage of enterococci sensitive to cephaloridine has been as low as 50. Therefore the 100% figure here is considered misleading.

TABLE 5
Antibiotic Sensitivity of Gram-Negative Bacteria

Antibiotic	Percentage sensitivity of:				
	E. coli	Aer. aerogenes	Pseudo-monas	Proteus	Miscellaneous
Ampicillin	12	0	10	33	25
Carbenicillin	–	–	100	100	–
Cephaloridine	93	75	10	50	50
Chloramphenicol	84	70	10	50	75
Gentamicin	96	95	70	95	100
Kanamycin	90	100	10	85	85
Tetracycline	45	65	15	5	60

Three of the antibiotics commonly used for treating gram-negative infections are relatively non-toxic: these are ampilillin, cephaloridine, and tetracycline. Three other antibiotics, chloramphenicol, gentamicin, and kanamycin are also available. These three are much more effective but are potentially harmful. Streptomycin can be used, but is just as toxic as gentamicin while being less effective. Polymyxin B was used for treating serious infections caused by pseudomonas, but now it is better to use carbenicillin.

Table 5 shows the percentage sensitivities of gram-negative bacilli to the antibiotics mentioned above. The relatively poor performances of ampicillin and tetracycline should be noted. These drugs are not considered adequate for the initial treatment of serious infections caused by gram-negative bacilli. At present gentamicin is the obvious drug of choice for treating gram-negative sepicemia. Kanamycin is almost as effective, but fails to control most Pseudomonas infections. Carbenicillin is effective against almost all strains of pseudomonas and proteus, and should be used with gentamicin while waiting for identification of the organism. In patients who are allergic to penicillin, a combination of gentamicin and cephaloridine given together may cause renal damage.

In the laboratory the seven antibiotics shown in Table 5 are sufficient for routine tests. In addition, gram-negative bacilli isolated from urinary tract infections should be tested for sensitivity to nalidixic acid, furadantin, and sulphonamides.

Conclusions

It is important to be aware that changes occur in the range of antibiotics to which various species of bacteria are sensitive. When penicillin first became available it was particularly useful because it was effective against almost all staphylococci; now only 20% of staphylococci are sensitive to penicillin. Similarly, ampicillin and tetracycline are becoming less useful than they were originally. Fortunately there has been continuous development of new antibiotics to supplement and replace the old. Some of these newer antibiotics are relatively toxic, but should be used when justified by the clinical situation. □

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Ureterocoele*

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Summary: *Some aspects of ureterocoele are presented. The clinical picture, pathology, diagnosis, and treatment are briefly described. The salient features of four cases of ureterocoele seen at Colchester Hospital are included to illustrate this clinical entity, a potential cause of serious renal disease.*

Ureterocoele is an intravesical dilation of the wall of the ureter. Secondary to a congenital narrowing of the ureteral meatus, almost complete obstruction at the meatus produces increased intraureteral pressure; accumulated urine then distends and balloons the suburothelial ureter. Serious renal disease may be caused. The diagnosis of four cases of ureterocoele within the past two years at Colchester Hospital warrants a brief account of this condition.

Etiology

Chwalla studied the possible method of formation of ureterocoele[1]. Embryos at the 12-30 week stage show a distinct membrane at the ureteral orifice which separates the ureteral lumen from the primary excretory duct. Later, this membrane is absorbed and the ureteral orifice is established. According to this theory, failure of Chwalla's membrane to absorb completely leads to the development of a pin-point ureteral meatus and ureterocoele. Other theories[2], based on an acquired etiology, are discounted as they are inconsistent with the clinical picture of ureterocoele.

Pathology

All layers of the intravesical ureter are involved in the dilation. The outer layer is composed of vesical epithelium, the inner layer of ureteral epithelium; between the two are diffusely scattered muscle fibres and connective tissue. Active peristalsis of this thinned out wall is evidenced by periodic contraction and relaxation. In size, a ureterocoele varies from 1 cm in diameter to one which fill the entire bladder. Ureterocoeles may be classified as follows:

i. Simple: a. unilateral;
b. bilateral;
c. reduplicated;
ii. Prolapsed;
iii. Ectopic: a. opening into urethra;
b. opening into vesical diverticulum;
iv. Blind-ending intravesical cyst.

*From Colchester Hospital, Truro, N.S.

Complications

Once there is persistent obstruction, both upper and lower parts of the urinary tract may become affected. The main complications are:

i. Obstruction. As the ureterocoele enlarges, the proximal ureter and the renal pelvis dilate, and progressive hydronephrosis and atrophy of renal parenchyma results. A ureterocoele may also compress and obstruct an ipsilateral reduplicated ureteral orifice, or even the contralateral orifice.

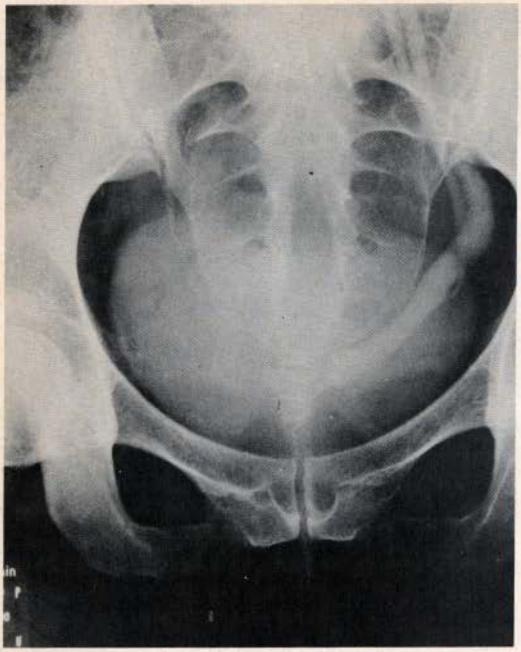
ii. Infection. Most patients with ureterocoele present with persistent pyuria due to infection, which is refractory to treatment. Superadded infection in an already obstructed collecting system destroy the kidney rapidly.

iii. Prolapse. The ureterocoele may become elongated and pass through the bladder neck. In females, it may present at the external urethral meatus as a "polyp", and it may also be mistaken for eversion of the bladder.

iv. Calculi formation. Calculi form in about 5% of patients with ureterocoeles. Stasis and infection favour this process. The common site is the ureterocoele sac itself; calculi may also form in the renal calyces.

Clinical Picture

Ureterocoeles are not uncommon. Campbell reported an incidence of 1-2% among the general population who undergo cystoscopy, while about 4% of infants and children referred because of pyuria are found to have ureterocoeles[3]. The female: male ratio is 3:1. The symptoms are those of persistent infection or obstruction, persistent pyuria, frequency of micturition, fever, and vesical distress. Intravenous pyelography reveals a characteristic opacity surrounded by a halo, variously described as resembling a cobra head or spring onion. (see Figure). Cystoscopic examination demonstrates rhythmic ballooning and collapse of the ureterocoele.



Differential Diagnosis

When the ureteral orifice is absent, the blind-ending ureter will resemble a ureterocoele. Bladder papillomata should also be distinguished from ureterocoeles. When the bladder is over-distended, as at cystoscopy, a ureterocoele may become evaginated, giving the appearance of a diverticulum.

Treatment

Ureterocoele results from obstruction, and if it is not corrected, it will gradually result in impaired function of the ipsilateral kidney. Although the pinhole meatus can be dilated, improvement is temporary and therefore not satisfactory. Transurethral resection of the ureterocoele is the treatment of choice. Resection enlarges the ureteral opening with improved drainage of urine. However, the valvular mechanism of the intramural ureter is often jeopardized, and reimplantation of the ureter may be necessary later.

Discussion

Four patients seen at Colchester Hospital in the past two years were diagnosed as having ureterocoele. Their average age was 38 years, and the female:male ratio was 3:1. Two of them presented with recurrent urinary tract infections. IVP and cystoscopic findings were characteristic in all. Transurethral resection of the inferomedial aspect of the ureterocoele was performed in the four patients. Post-operative follow-up with cystourethrograms indicated that three patients had competent uretero-vesical junction, while the fourth manifested vesico-ureteral reflux.

The satisfactory management of these four patients by transurethral resection confirms this method as the treatment of choice. Obstruction was relieved and infection was successfully cleared. Vesico-ureteral valvular function can be preserved by taking care to resect the distal half of the ureterocoele; the proximal part then functions as a flap-valve, preventing reflux. However, if reflux does occur, careful follow-up with urine studies and cystograms is important; any persistent infection and reflux will require careful assessment, long-term antibiotic therapy, and, if necessary, ureteral reimplantation. In the present group, one patient continues to have reflux, but the urine remains sterile; any impairment of renal function as evidenced by IVP would justify reimplantation of the ureter. □

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Memorandum

Standard Immunization Program of the Nova Scotia Department of Public Health*

H. B. Colford, M.D., M.P.H.†

Halifax, N.S.

Summary: *From time to time the Department of Public Health distributes information to all Health Units in the Province concerning our immunization program. This information is for all persons involved in the immunization program and is designed to bring them up-to-date with the most recent relevant information. Our policy is based, for the most part, on the recommendations of experts in immunology as set forth by the National Advisory Committee on Immunizing Agents. The current recommendations concerning the basic immunizations (smallpox, diphtheria, pertussis, tetanus and poliomyelities) form the basis of this report.*

Smallpox

The Department of Public Health recommends smallpox *vaccination* no earlier than the second year of life but before school entry, and at least one *revaccination,* preferably during the late school years or early adult life.

Persons *especially exposed to risk* of smallpox such as nurses, doctors, medical and nursing students, all hospital personnel, persons employed at ports of entry, international travellers, armed forces personnel, should be properly vaccinated at regular intervals: every three years.

Since a live vaccine is used, certain precautions should be taken. *It should be given only to persons in good health.* These precautions apply as well to all live virus vaccines.

Other **contraindications** to smallpox vaccination are:

i. Presence of eczema or any septic skin condition in the individual or household contacts;

ii. A BCG vaccination which is unhealed or the simultaneous administration of any intracutaneous sensitivity test;

iii. Corticosteroid treatment;

iv. Pregnancy;

v. The administration of another live virus vaccine during a period extending at least two weeks before to two weeks after smallpox vaccination and corticosteroid therapy.

Diphtheria, Pertussis, Tetanus, and Poliomyelitis.

It is recommended that the *quadruple (QUAD) vaccine* be given at the following ages:

1st. dose	3 months
2nd. dose	4 months
3rd. dose	5 months
4th. dose	1 year
5th. dose	5-6 years

Following this, a dose of *triple antigen* (diphtheria and tetanus toxoids combined with polio vaccine) should be given at about grade 5 or 6, and a second dose at about grade 9 or 10. The triple antigen may be given between the ages of 15 to 18 but 0.5 ml is recommended instead of the usual 1 ml in this age group.

Persons over 18 years of age should be given *T-polio vaccine* (Tetanus Polio) instead of *D.T.-polio vaccine* (Diphtheria-tetanus polio).

Oral Polio Vaccine is being held in reserve for use should an outbreak of polio occur in the province.

Diphtheria

Persons especially exposed to risk of diphtheria such as nursing personnel, doctors, medical students and all hospital and laboratory personnel should have a *Schick Test* every three to five years; they should receive *diphtheria toxoid* if indicated.

Tetanus

It is recommended that all adults, especially agricultural workers, who have not been immunized or whose immunization status is unknown, receive *three doses of Tetanus*

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Toxoid, with not less than four weeks between doses. At the present time, *Tetanus-Polio Vaccine (BIAD)* is recommended for this purpose. A reinforcing dose is recommended 12 months after initial series, then at about five-year intervals.

In addition to the above recommendations the Department recommends immunization against certain other diseases where persons are especially exposed to risk of contracting these diseases. These include **typhoid, paratyphoid fever,** and **tuberculosis.**

More recently, immunization against **Red measles** and **German measles** (rubella) have been incorporated in our program. In the case of **Red measles** the vaccine is recommended for all children over one year of age. German measles vaccine is recommended for all children between one and ten years of age, and for women of child-bearing age *only when the possibility of pregnancy in the three months following vaccination is nil.*

Our policies regarding immunization procedures have always been based on recommendations of the National Advisory Committee on Immunizing Agents.[1] This committee is made up of experts in the field of immunization in Canada; including two eminent Canadian paediatricians, it also relies heavily on the advice of experts in the United States and other countries.

Task Force Recommendations

Recently the Task Force on Costs of Public Health Services made certain recommendations with respect to immunization programs.[2] The following recommendations are relevant:

> "28. – That guidelines be prepared and revised as indicated so that medical health officers will be aware of what might be considered an adequate level of immunization and that immunization procedures be standardized within each province at least. That consideration be given to reducing the number of booster shots, particularly for the school-age child, and that the possibility of utilizing a smaller dosage of vaccine than that recommended by the manufacturers be explored."
>
> "29. – That since immunization procedures can be carried out more economically and efficiently by public health agencies than by practicing physicians, the agency approach be emphasized."
>
> "30. – That all immunization procedures generally be carried out by the public health nurses under physicians' supervision, in the interests of reducing costs of medical care and of improving record keeping. Expansion of this program will have long-term beneficial effects maintaining costs while the change to standardization and use of public health nurses exclusively, can have an immediate effect in reducing costs."
>
> "31. – That the public health nurse be trained to give routine immunizations and that she be knowledgeable as to contra-indications and any sensitivity reactions that might occur and trained in giving the necessary treatment. Written guidelines and the necessary material for emergency treatment should be made available to her."

It should be pointed out that one of the aims of the Task Force was to study health services with a view to combating the rising cost of health care in Canada and the provinces.

Discussion

Already some of the recommendations of the Task Force have been implemented in Nova Scotia. For example, we have recently reduced the number of reinforcing doses of immunizing agents for smallpox, diphtheria, whooping cough, tetanus and polio, and these procedures have been standardized throughout the province in our Public Health Immunization Clinics. Recently we have permitted our Public Health nurses to administer certain immunizing agents under the supervision of Health Unit Directors. Written guidelines and the necessary materials for the emergency treatment of sensitivity reactions have been made available to all Health Units.

Over the past year this Department has received some complaints regarding our immunization program. Among other things there have been complaints about the fact that we do not use oral polio vaccine nor do we make it available free of charge for use in physicians' offices. This Department is not unaware of the virtues of oral polio vaccine. In fact the first field trials in Canada were carried out in Wedgeport, Nova Scotia, by Dr. van Rooyen and other members of this Department.[3] We are also aware of the dangers associated with the use of this vaccine, having had one case of paralytic polio following the administration of 200,000 doses, in 1962. Apart from this case there has not been a single case of polio in Nova Scotia for the last ten years. During this same period there have been cases of paralytic polio in other provinces where oral polio vaccine is being used. There would seem to be no need for using oral polio vaccine in this province at this time. Should an outbreak of polio occur, oral vaccine could be made available very quickly.

Another frequent complaint has been regarding the use of German measles vaccine. The chief criticisms have been that we are offering it to the wrong age group, that is school beginners. To date our financial resources have not permitted us to extend this program to other age groups and so, again, we have acted in accordance with the recommendations of the National Advisory Committee. The latest recommendation of this committee concerning German measles is: "The Committee, therefore recommends, when live Rubella vaccine is licensed in Canada, it should be administered in public health programs to all children beginning in grade one. As vaccine availability and

programs allow, vaccination should be extended progressively up to and including grade five."[1]

During 1970 many arguments were put forward for the immediate, widespread use of rubella vaccine. It was argued that according to laboratory, epidemiological and clinical evidence at that time, a profound upsurge in the incidence of rubella could be expected in late 1970. In other words, an epidemic of rubella was predicted for Canada in that year. Actually there were 12,467 cases of rubella reported in Canada in 1970 as against 8,934 in 1969. Since reporting of rubella was only started in Canada in 1969 this difference could well be due to a difference in reporting practices by physicians during this time. In Nova Scotia there were 260 cases in 1969 and 276 in 1970. This could scarcely be classed as a major epidemic.

In *conclusion*, the immunization program in Nova Scotia is designed to provide as adequate immunization coverage as is possible with the means at our disposal. Our policies, based on the recommendations made by the National Advisory Committee on Immunizing Agents attempt to provide a standardized guide to immunization procedures for those who are concerned with public health in Nova Scotia. □

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I find the great thing in this world is not so much where we stand as in what direction we are moving.

– Oliver Wendell Holmes.

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Memorandum

Nova Scotia Hospital Insurance Commission Standards Evaluation and Assistance Program for Clinical Laboratories*

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Halifax, N.S.

Summary: *A province-wide clinical laboratory standards evaluation and assistance program has been in operation in Nova Scotia since 1957. Operated jointly by the Nova Scotia Hospital Insurance Commission and the Nova Scotia Department of Public Health (Pathology Institute), a threefold program is offered to hospitals: evaluation surveys of selected laboratory procedures, technical assistance when required, and visits by consulting pathologists. The results of NSHIC evaluation surveys may be made available to staff members of the hospital concerned; it is emphasized that the philosophy of the entire program is to provide a facility and service to hospital laboratories rather than to conduct a policing operation; together with technical assistance and visits by consulting pathologists the maintenance of high standards of laboratory work may be maintained.*

A clinical laboratory standards evaluation and assistance program was initiated in Nova Scotia under the aegis of the Department of Public Health in 1957. This program has been continued by the Nova Scotia Hospital Insurance Commission (NSHIC) to the present date. Many clinicians are either unaware of the existence of this program or they are unfamiliar with its details and its significance to them in their practice; an outline of the program is therefore considered appropriate.

The philosophy of the program has been to provide a facility and a service to hospital laboratories, rather than to conduct a policing operation. For this reasons, in addition to the periodic submission of test samples for evaluation to a laboratory, the program provides for educational and specialized technical assistance to any hospital laboratory requesting it, as well as visits by consulting pathologists.

Evaluation Surveys

The NSHIC evaluation program provides for the periodic

TABLE
Clinical Laboratory Standards Evaluation Program
1971 Schedule of Surveys

	Number of tests evaluated per year
Differentials, RBC analysis Antibiotic sensitivity	2
Pregnancy testing Autoclave testing Blood bank techniques Enteric bacteriology Parasitology General serology Syphilis serology	3
SMA 12/60 Hemoglobin Biochemistry	4

*From the Nova Scotia Hospital Insurance Commission.

†Consultant in Laboratory Services, Nova Scotia Hospital Insurance Commission.

submission of preparations, with values unmarked, to each hospital laboratory. The preparations, made at intervals during the year are selected for each laboratory so that no laboratory is asked to conduct an examination that it is not currently and routinely performing. Thus smaller local laboratories with limited facilities receive a limited number of samples to evaluate while regional laboratories may receive the entire lot.

The extent, nature and frequency of the sampling program for 1971 is outlined in the Table. In some instances unavailability of suitable sampling material has restricted the extent of the evaluation program. Limited availabilty of personnel and other resources have also restricted the program.

Evaluation samples are sent out to hospital laboratories from the Commission offices or the Pathology Institute according to a prearranged schedule. Information accompanies the sample, thus indicating its nature and the constituents for which it is to be examined. No information is given on the *values* for these constituents which have been obtained by reference laboratories.

The results of the examination of the 'unknown' preparation by the hospital laboratory are returned to the Hospital Commission offices. There they are tabulated in a coded form, each hospital having its own code number. The values obtained by a reference laboratory or reference laboratories are then added to the tabulation. The entire tabulation, under confidential cover, is then returned to each hospital participating in the survey. Each laboratory receiving the report is identified by its own code number. Thus each participating laboratory is aware of the values obtained by it and by all other laboratories participating in the survey, although it is not aware of their identity.

A commentary discussing the results of the survey and outlining possible causes of difficulties experienced is sent out with the survey report when appropriate. Commentaries are prepared by senior specialized technologists in the Pathology Institute in conjunction with the department head. They often provide information which leads to the resolution of any difficulty experienced without further assistance.

The Commission regards evaluation survey reports as being confidential to the hospital concerned. They may however be made available to medical staff members at the discretion of the hospital's administration.

The NSHIC evaluation program must be distinguished from individual laboratory "quality control" programs. These are considered an essential feature for any laboratory operating having a high standard. Such programs determine the precision (reproducibility) and accuracy (adherence to true known values) of procedures, and by means of determining their standard deviations establish their confidence limits in the laboratory concerned. Standard samples with known values and samples with values unknown to the operator, are introduced into the routine at periodic intervales. The results obtained indicate whether the procedure is "in or out of control", on a daily basis. The practice is particularly adaptable to clinical chemistry. Many advanced laboratories display their quality control charts prominently where they can be observed and consulted by clinicians.

Physicians, hospital administrators, and laboratory technologists should be aware that there is no national or provincial legislation in Canada to ensure that clinical laboratory equipment meets reasonable standards of accuracy and preformance. Manufacturers of clinical chemistry systems consisting of pre-calibrated direct reading colorimeters and prepared reagents are currently pushing their products in small hospitals. Claims are made that "anyone" can perform a wide range of determinations accurately with such equipment. A number of these systems have been independently evaluated and several have been found deficient and defective in varying degrees. The purchaser of such systems should realize that the claims for their accuracy and adaptability made by their promoters are only substantiated by their manufacturers. Under such circumstances, the purchase and use of such systems by unqualified personnel is dangerous under any circumstances but particularly in the absence of a well designed quality control program.

The NSHIC program is not intended to replace individual laboratory quality control programs. The NSHIC program is entirely inadequate for this purpose and can merely supplement local quality control regulations. The immediate responsibility for ensuring that every laboratory institutes its own quality control program rests with the responsible authorities in the hospital in which it is located.

Technical Assistance Program

If the survey reveals technical difficulties which are not resolved by the commentary, or which are otherwise apparent in a laboratory, the hospital may request assistance from the Commission. An experienced laboratory technologist in the person of its Technical Counsellor (Laboratory) may then visit the laboratory in question or give such advice which may resolve the particular problem.

If the difficulty cannot be resolved in this manner senior technical personnel can be made available to the laboratory from the specialized departments of the Pathology Institute. This is arranged with the Department of Public Health which cooperates in making this and other features of the program available.

The Department of Public Health, through the Pathology Institute, also provides facilities for refresher and supplementary training of technologists when required. Applications for such training are made through the Hospital Insurance Commission by the administrator of the hospital. Such training may be made available for a period of a few days, a week, or longer, depending on the requirements of the technologist concerned.

Details of both evaluation and assistance programs are administered by the Technical Counsellors (Laboratory) of the Nova Scotia Hospital Insurance Commission. These counsellors are selected not only for their experience and

technical qualifications but also for their tact and ability to work with hospital administrative and technical personnel. They visit all laboratories periodically in order to familiarize themselves with conditions in each hospital laboratory. During these visits they are also available for advise and help in resolving any technical difficulties that laboratories may be experiencing.

Visits by Consulting Pathologists

This program has been carried out with the cooperation of hospital pathologists located in regional laboratories throughout the province. In most instances technical difficulties revealed by the survey in hospital laboratories coming under their direct supervision have been minimal and have been quickly corrected by their personal intervention. However, in other situations pathologists have considered it preferable to request specialized technical assistance.

In order to maintain high standards in the laboratory services of smaller hospital, special provision has been made by the Commission for the appointment of consulting pathologists. Regional pathologists may then make periodic visits to smaller hospitals in their region. The number of visits authorized each year is dependent on the size of hospital served and the extent of the services provided. The services of consultant pathologists are essential in initiating and supervising adequate quality control programs and otherwise assisting in the maintenance of high standards and efficiency in smaller hospital laboratories. □

ACKNOWLEDGEMENT

The assistance of Miss Shirley Brothers, R.T., Technical Counsellor, N.S.H.I.C. and of the many departmental Head Technologists at the Pathology Institute, who are responsible for the continued success of this program, is gratefully acknowledged.

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Advantages of Quantitative Cultures in Diagnosing and Treating Acute Bacterial Pneumonia

Summary: *Quantitative culturing of homogenized sputum led to more frequent isolation of pathogens than did routine qualitative culturing. It also provided pertinent information on superinfection and the effectiveness of antimicrobial chemotherapy.*

Identification of the specific pathogen in acute baterial pneumonia is necessary for rational and appropriate therapy. Routine qualitative bacteriologic cultures of sputum may lead to erroneous diagnosis and inappropriate therapy, particularly in patients with chronic obstructive lung disease.

Because tracheobronchial secretions are bacteriologically sterile, sputum cultures should show growth of only an etiologically significant organism. Rarely are such clear-cut results obtained. Even a carefully produced deep sputum from the bronchi becomes contaminated in passing through the bacteria-laden pharynx.

An organism which can cause inflammation of the lungs should be present in sputum in greater numbers than the contaminating pharyngeal residents. However, pneumonia pathogens, particularly *D. pneumoniae* and *H. influenzae* are irregularly distributed in sputum. This leads to inaccurate results when the portions of sputum which contain few or no pathogenic organisms are inoculated into media. Liquefaction and thorough mixing of sputum permit more uniform sampling.

The present study of 20 pneumonia patients admitted consecutively into two hospitals at different periods was designed to evaluate the usefulness of quantitative cultures of fresh homogenized sputum in the diagnosis of bacterial pneumonia and in following its clinical course. Medical histories, physical examinations, and pulmonary-function tests revealed that the 19 men and one woman in this study had chronic obstructive lung disease. None had received antimicrobial treatment before admission.

Preparation of Cultures

All sputum specimens collected on admission and at intervals during illness were liquefied, homogenized, and buffered before being streaked onto a culture medium of blood, chocolate eosin-methylene blue, and Sabourand dextrose agar. Estimates of culturable aerobic microorganisms were obtained after 24-hour incubation at 37° C. Routine cultures from 18 were also studied by the usual clinical laboratory techniques.

The quantitative technique led to the isolation of pathogens in all 20 patients whereas the conventional qualitative technique led to isolation of pathogens in only 7 out of 18.

The initial quantitative cultures prepared from sputum taken on admission uncovered predominant colonies (minimum of 10^7 per ml of sputum) of *D. pneumoniae* in 7 patients, *H. influenzae* in 8, predominance of both of these pathogens in 3, and *Staphylococcus aureus* in 2. They also uncovered colonies of other microorganisms in fewer numbers, including *S. viridans,* Candida, and Neisseria.

Quantitative culturing uncovered "superinfection" from gram-negative organisms in 7 patients. In the present study, superinfection was arbitrarily designated as the presence of 10^5 per ml or higher concentrations of microorganisms other than *S. viridans* and Neisseria. In these mixed infections there were actually three times as many superinfecting organisms as all other organisms combined.

Pathogens or Contaminants?

Other investigators have noted that mechanical homogenization without mucolysis increases the sensitivity of sputum cultures. As has already been noted, quantitative culturing uncovered pathogens in all 20 patients.

A number of factors appear responsible:

In the present study, smaller colony counts of common pharyngeal flora, which more uniform sampling permits, provided a reliable guide for differentiating lower-tract pathogens from contaminating pharyngeal flora.

Actually, the sample plated by routine methods constitutes a very small portion of a sputum specimen. Identification of the predominant organisms is necessarily limited to the microorganisms therein. This problem of adequate sampling may be the most important source of error in routine cultures.

Homogenization overcomes the problem in providing culture samples of different portions of a single specimen. Other workers have shown that *D. pneumoniae, H. influenzae,* and *S. aureus* are not always isolated more frequently from purulent than from mucoid portions of sputum.

J. Kin Pirtle, M.D.; Patrick W. Monroe, M.D.; Tim K. Smalley, M.D.; John A. Mohr, M.D.; and Everett R. Rhoades, M.D. *American Review of Respiratory Disease,* December, 1969 (Vol. 100).

Reprinted from the Abstracts of the National Tuberculosis Association, May 1970, and made available by courtesy of the Nova Scotia Tuberculosis Association.

Previous studies reveal that a much greater yield of *H. influenzae* is obtained from saline-washed sputum than unwashed specimens from the same patients. Apparently, inhibitory factors are removed or destroyed by the washing procedure. In the quantitation procedures, saline diluting solutions appear to have a similar effect.

One study revealed that a combination of *N. catarrhalis* and mucin inhibited *H. influenzae* growth in unwashed sputum, while the liquefying agent, *N*-acetycysteine, promoted its recovery. In addition, relatively slow growing *D. pneumoniae* and *H. influenzae* in diluted sputum are not as easily masked by faster growing organisms, such as gram-negative bacilli.

Quantitative sputum analysis provides information as to whether new organisms appearing in the sputum are responsible for true superinfection. When colony counts are low (10^5 or less), use of more toxic antimicrobial agents is usually less urgent than when this information is not available. If the colony count is high, clinical evidence of superinfection will develop in 30 to 50 per cent of these patients. Quantitative analysis also reveals pertinent information concerning the efficacy of antibacterial therapy and a better understanding of the cooperative, competitive, and antagonistic interactivities of bacteria.

The high incidence of *H. influenzae* and *D. pneumoniae* in sputum from pneumonia patients in this study may have been related to the high incidence of underlying lung disease. These are the two most common pathogens associated with exacerbations of bronchial infection in patients with chronic lung disease. Colonization of at least one of them was found on admission in all but two patients who were also found to have chronic lung disease, suggesting that chronic lung disease is common in patients admitted with pneumonia.

There appeared to be significant correlation between elevated bacterial colony counts and the presence of clinical disease. Quantitation culture procedure was found to be rapid and simple and yielded consistent results. Further studies of larger numbers of patients are needed to define more precisely the concentrations of organisms in the sputum that may be significant in various circumstances. □

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The doctor and his leisure

2. Sailing

J. F. Filbee, M.B., B.S., D.M.R.T.,

Halifax, N.S.

'Believe me, my young friend, said the water rat seriously, there is nothing, absolutely nothing, half so well worth while doing, as simply messing about in boats.' – Kenneth Grahame.

As I write this, my fingers encrusted with paint, and sore with sandpaper scars and blisters, while I look despairingly out of the window hoping for a fine day for painting the topsides tomorrow, I wonder if Mr. Grahame is quite accurate. But by the time you read this, you can think of me, hunched over a tiller with one eye on the luff of the jib, while spray sparkles at the lee bow in a warm afternoon sun. Then the water rat's advice becomes a truism.

.....

It is 8.30 p.m. of a damp May night as I pile out onto Dover Station for my first offshore passage. Nigel, the owner and a student friend of mine, are to take *Restive* to Cowes over the weekend. Nigel's wife Barbara gets too seasick for the short seas of the Channel. As we go on board, the half-light makes the quay mysterious and the water takes on an oily look as if smoothed by a knife.

Restive is 30 ft. 7 in. long with moderate overhangs and accomodation for three. Like all Nigel's boats she is of his own design. Never intended to race she will take any weather – in fact probably more than her crew – and yet will cruise fast and comfortably under her inboard sloop rig. That night her decks were damp with dew, her mooring lines stiff yet pliable to the touch. I threw my duffle bag (warned that no crew who brings suitcases aboard is welcome) into a locker after changing into old pants and a heavy fisherman's jersey.

We set off before midnight to catch the tide with our main well off before a moderate North-east wind. The water creaming under the lee bow flashed and glowed with a brilliant phosphorescence that made us seem to run through a path of fire. My first watch was below, and the deep rolling of a boat running before the wind gave me my first taste of seasickness. I doubt if I slept more than ten minutes of the next four hours, and was glad to be roused out at 0400 for my watch on deck. With something to do, and the dark line between the blackness of the night sky and the blacker water, my turbulent stomach regained a semblance of ease, and I concentrated on keeping the 260° mark on the compass glued to the lubber line. Steering a compass course takes practice. It is all too easy to try to swing the compass rose rather than the lubber line that shews the direction of the boat's head. The lack of landmarks gives the oddest feeling that the wind is shifting in all directions, leaving a serpent's coil in the wake that should stretch in a straight line astern.

Despite all these wanderings, the knack soon came back, and by 0530, as the eastern sky began to pale astern, the loom of Dungeness light appeared faintly ahead. It seemed to close more and more slowly, until at 0630 when it lay almost abeam, our forward movement nearly stopped. With the tide turning firmly against us, we could now see how valuable was our night start, to gain the benefit of three knots of fair tide in a boat that was making six through the water; now the three knots was subtracted from our speed past the land, and we watched the sun come up off Dungeness.

By 0800 and the change in watch, with a little morning warmth beginning to percolate through our heavy clothes and stop some of the shivering, we discovered a ravenous appetite. Hot coffee and bacon and eggs. Lots of eggs. Helped down with thick slices of bread and jam. No more sign of *mal-de-mer,* and as we slipped past the overfalls off Dungeness we found a slacker current in Rye Bay.

In a well run ship daytime watches change as punctually as at night, but in fair weather nobody pays too much attention, so we were all on deck to watch Hastings, Bexhill and Eastbourne pass. As we neared Beachy Head the current turned in our favour, so that we once again made good time past the land.

We never saw Brighton. As the evening came on the wind fell almost to a calm and a mist blotted out the land. I think we must have spent several hours bucking the tide off Worthing, and sailed entirely by dead reckoning (that is by charting course, water speed, leeway, and tidal set, to arrive at a calculated position). We heard the foghorn on Selsea Bill – as always misleading as to its direction in the mist – and as morning came the Owers lightship appeared just where it should have been. Lightship men are the most friendly of acquaintances of the sea, and they always welcome a newspaper, even if it is two days old. The wind was by now light from the South West, forcing us to tack so we went about to speak to the lightship and pass them Friday's paper. Then back onto port tack to head in for the Nab Tower with Chichester harbour to starboard.

This wide estuary is the source of the word holystone: seamen would scrub the decks with lumps of sandstone taken from the gravestones in an old forgotten churchyard on Hayling Island. *(continued on page 97)*

Selected abstracts*

Survivorship following treatment for cancer of the colon and rectum. – J. H. MacLeod, M. L. Chipman, P.C. Gordon, and C. H. Graham, in CANCER: **26**, December 1970.

The 5-year survival rate following treatment for colorectal carcinoma at Victoria General Hospital, Halifax was analyzed. The overall survival rate was 33%. Survival was further examined according to the anatomical site and pathological classification. Two-thirds of the lesions were found in the left colon or rectum. Rectal cancer, more common in males, carried a particularly poor prognosis; this was reflected in the finding that nearly one-third of these lesions had spread to central lymph nodes by the time of operation. Taking all cancers, the least common finding, relating to growth, was confinement to the wall of the intestine: this was classified as Stage A. Stage B, involvement of the paracolic nodes, was the commonest stage, except in rectal lesions. Patients having symptoms of short duration had a pathological classification predominantly of Stage A or B, while symptoms of long standing were associated with disease in Stage C1 or C2, when the intermediate or central nodes were involved. However, this relationship between symptom duration and stage of disease was much less consistent than the clearer relationship linking stage with survivorship. After 2 years, the survival rate for Stage A stabilized at 80-85%, while for Stages B, C1 and C2 there was a steady decline over the 5-year period. An interesting finding in this study was that patients having had symptoms for less than 4 months had a survival rate only slightly greater than those with symptoms of longer duration. This suggests that so-called early lesions have a better prognosis not because of their short duration but because of either a strong host resistance or the inherently low malignant potential of the cancer.

* * *

Heparin control of venous thrombosis. – W. A. Dale and M. R. Lewis, in ARCHIVES OF SURGERY: **101**, 744, 1970.

The principles of the management of venous thrombosis are discussed in this article, which is based on the care of 133 patients who had 159 episodes of venous thrombosis. For diagnosis, X-ray studies, phlebography, pulmonary scan, and pulmonary angiography, are advocated for delineation of the vascular tree. 75% of patients in the acute phase were found to have thrombi or occlusion of the veins of the legs, while a negative phlebogram led to immediate reevaluation of the patient, and usually cessation of anticoagulation therapy. The need for heparin was confirmed by this retrospective analysis; the authors were unable to support any proposed change toward operative treatment as a standard measure, and they stressed the need for continued anticoagulant therapy. A one-week or 14-day course of heparin given intravenously was the regimen recommended for deep venous thrombosis, whether or not pulmonary embolism had occurred. The recommended course was as follows: initially, heparin, 50mg, was injected intravenously; then a maintenance dose, averaging 125mg, was added to 500 ml 5% dextrose and water and infused over the next 8 hours; for each following 8-hour period, this was repeated, although the precise dosage of heparin was adjusted depending on twice-daily clotting times (if the Lee-White time was less than 20 minutes, heparin 25-50 mg was immediately injected intravenously, and the concentration of heparin in dextrose was increased). Subsidence of symptoms prompted cessation of therapy earlier, continued pain and swelling dictated the longer duration of therapy. In addition to heparinization, elevation of the foot of the bed, hot compresses for pain, elastic support unless this was uncomfortable, and ambulation if feasible, were other recommended measures. Warfarin sodium was given orally following heparinization, for a period of approximately eight weeks after discharge from hospital, the dosage being adjusted according to twice-weekly prothrombin times. With this regimen, there was failure of control of embolism in only 3%.

The authors belive that superficial phlebitis rarely requires hospitalization. At the other extreme, surgery was restricted to: (1). venous thrombectomy, when arterial ischemia is associated with massive venous thrombosis, or when heparinization is likely to cause bleeding, and (2). ligation of inferior vena cava, for further pulmonary embolization after heparin therapy had been started. Indications for pulmonary embolectomy were considered to be rare. Another recommended measure, for heparinized patients but in whom embolization has not occurred is dextran, although the authors were not able to assess its overall efficacy.

Several questions were raised by the authors: the necessity for warfarin following a course of heparin; whether there is any difference between various methods of heparin administration; how soon heparin may safely be given after operations; what factors affect the long-term recovery of the lower limbs; and finally, why some patients with a typical syndrome of venous thrombosis have a normal phlebogram.

* * *

The dilemma of vasopressors and vasodilators in the therapy of shock. – W. C. Shoemaker and R. S. Brown, in SURG. GYN. OBST.: **132**, 51, 1971.

Hemodynamic responses to vasoconstrictors, vasodilators, and hydrocortisone were studied in three groups of patients who developed shock. Cardiac output, peripheral resistance and blood flow were the main parameters studied. Of the sympatheticomimetic agents, isoproterenol

*Selected by Dr. M. A. Naqvi.

produced the greatest increase in cardiac output, and there was marked hemodynamic as well as clinical improvement in about one-third of the patients so treated. The response of vasodilators was an improvement in cardiac output in one-third of the cases, and in addition there was a signifcant reduction in peripheral resistance which was associated with only inconstant improvement in blood flow. Although there was some clinical improvement following the use of hydrocortisone, significant increase in blood flow nor cardiac output.

Thus neither the vasoconstrictor group nor the vasodilator group could be regarded as consistently and significantly producing improvement in cardiac output and clinical condition. Both forms of therapy were beneficial to some degree. However, on the basis of such simplistic evidence, the controversy between vasoconstrictors and vasodilators could not be resolved. That said, the vasodilators were associated with the greatest improvement in blood flow when these were given either before or after volume loading. The greatest use of vasodilators is considered by these authors to permit volume loading without the production of excessively high venous pressure. □

Sailing – *continued from page 95*

So we entered Spithead, with some trepidation as the great liners out of Southampton, and the warships from Portsmouth all come through this narrow channel. Fortunately we met none, but with the slow passage it was now Sunday morning, and Nigel had to be in his office on Monday. So we gave up our plan of reaching Cowes, and headed in for Gosport, a mooring in Camper and Nicholson's yard, and the afternoon train home. □

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A man should share the passion and action of his time at peril of being judged not to have lived.
– Oliver Wendell Holmes.

NEW MEMBERS

The Physicians listed below have joined The Medical Society of Nova Scotia between January 1, 1971 and June 30, 1971. A most cordial welcome is extended from the Society.

Dr. E. C. Abbott	Halifax, N.S.	Dr. Eily C. McDonagh	Sydney, N.S.
Dr. L. P. W. Abbott	Halifax, N.S.	Dr. J. D. McLean	Guysborough, N.S.
Dr. Sunanda Bijoor	Halifax, N.S.	Dr. G. K. Macmichael	Lunenburg, N.S.
Dr. J. A. Cameron	Halifax, N.S.	Dr. D. L. MacQuarrie	Halifax, N.S.
Dr. P. H. Cardew	Sydney, N.S.	Dr. K. S. Patel	Bridgetown, N.S.
Dr. R. G. Chokshi	Inverness, N.S.	Dr. M. B. Shaikh	Sydney Mines, N.S.
Dr. R. E. Colborne	Lower Sackville, N.S.	Dr. G. L. Sharpe	Halifax, N.S.
Dr. J. M. Dunn	Halifax, N.S.	Dr. Rajinder Singh	Sydney, N.S.
Dr. R. J. H. Harris	Canso, N.S.	Dr. Frances M. Smith	Dartmouth, N.S.
Dr. B. H. Heikamp	Halifax, N.S.	Dr. W. M. F. Snow	Sydney, N.S.
Dr. A. J. Hill	Halifax, N.S.	Dr. A. L. Steeves	Mahone Bay, N.S.
Dr. K. S. Hoque	Antigonish, N.S.	Dr. K. N. Subhani	St. Peter's, N.S.
Dr. M. F. Husain	New Ross, N.S.	Dr. Hsien-Chang Wang	Yarmouth, N.S.
Dr. P. K. John	Halifax, N.S.	Dr. Francis Whyte	Halifax, N.S.
Dr. V. W. Krause	Dartmouth, N.S.	Dr. A. J. Wort	Halifax, N.S.
Dr. D. D. McCarthy	Port Hawkesbury, N.S.	Dr. Harold Yazer	Sydney, N.S.

Of pelvics, patients, and physicians .....

Lying on my hospital bed, my belly bared for inspection, I had to ask why the two very serious, well-starched ladies peering at me should need, of all things, an automobile engine lamp. Was this how my insides were to be explored? "Looking for little hairs that might have been missed by the razor", was the answer.

A cheerful nurse had shaved me down to the second layer of skin, taking a mole here and chunk there. Then at least one of the senior nurses and another impartial judge had to check, and if there were any remaining hairs, one of the scrutineers would have to take them off with a dry razor. They were most serious, but I thought it very funny. However, they told me that some of the doctors were prone to screaming fits if any hair was found where they were just about to slice away.

The patient's view of an operation, provided it isn't an emergency, requires a sense of humour; otherwise, no matter how nice everyone is, it all becomes a nightmare.

Probably the best part is that great needle they give you at six o'clock in the morning. You just float along the corridors grinning at everyone and humming nice little tunes. If you're lucky, rather than being parked in the hall outside the OR, you get shuffled into a little room that looks like a broom closet, only it has big tanks of oxygen and little sharp metal things lying around.

Then you get treated to a display of the efficiency of the OR nurses as they shift and unwrap the sharp knives and needles in the operating room. Then, nothing.....

The next thing you hear is someone saying, "Wake up now, take some deep breaths and move your arms and legs. If you don't, you know, the circulation gets bad. Come on, take deep breaths." The first breath you take feels like a sledge hammer and you wonder if it wasn't your chest they operated on, it hurts so to breathe deeply.

After a little while, you begin to hear other people coming up for air. The fellow over in the corner is nearly all cast, with one leg and two arms swathed in white. He wakes up bellowing and hollering and embarrasing all the little old ladies in the place with his choice of words. People are mumbling and moaning and mewing all over the place. My neck hurts like blazes; I wonder why. My mouth is so dry. "No water, sorry. Remember to move your arms and legs; if that circulation stops, you know what that means."

Another odd thing about being a patient is the number of people you meet in various states of undress. People in regular clothes look overdressed. Pajamas, nighties and dressing gowns for those who have had operations in unobtrusive places: half a pair of pajamas for those with other kinds. Casts make dressing very difficult and people tend to look a little lopsided when walking. Bent over and shuffling is the most common position you see when you walk the halls. That's another thing, everyone wanders. By the time you leave the hospital, you have discovered everything there is to know about your own ward, you've found the canteen and met the TV addicts in the lounge.

Now, out of the hospital and into the doctor's office.

One of the most interesting routines in a doctor's office is the pelvic examination by a male doctor. The routine varies with each doctor; it probably depends on how many examinations a doctor has to make, and whether he still feels self-conscious about the whole thing.

For a woman, the first time is nearly a traumatic experience, especially if no one has seen her totally naked since she was nine and having a bath. The routine goes something like this: "Now you just hop up on that table, leave your skirt and shoes on but everything else off. I'll be back in a minute" You are handed a sawed off sheet, and pointed at THE table, usually cold and slippery, with its stirrups and paper. At this point, the routine begins to vary. Somehow, your doctor has to let you know that he is on his way back, so that you can get up on the table and put that sheet over you, and be looking casual. Some clear their throats loudly near the door, others clatter with that cold metal thing that is used: I remember one who liked to whistle a well-worn ditty. A good patient recognizes these signals and is ready when the door opens. Some get caught somewhere between looking for some place to put their clothes, and, if it is winter, trying to put their boots back on so their feet won't slip out of the stirrups. At this point, two kinds of routines: lots of cheerful chatter, "Nice weather we're having" kind of stuff; or an uncomfortable nothing.

These are some reactions of just one female patient, but all patients must be able to add their own variations on the same basic theme. I will leave you with one small thought: It requires an enormous sense of humour to be a patient and to come out of these experiences slightly sane; so first, doctors should develop their own, and second, I wonder what happens to a patient who has none. □

A.S.

[To Members of the Medical Society of Nova Scotia : In view of the advantages of a strong professional organization, kindly make this page available to a non-member associate.]

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Personal Interest Notes

The Western Nova Scotia Medical Society was pleased to act as host for the meeting of the Executive of the Medical Society of nova Scotia, at the end of May. The meeting was held in Yarmouth for the first time. It was followed by an enjoyable social evening, at which many new friendships were made and older ones renewed; to some of the Executive it was a homecoming. On the eve of the meeting, **Dr. Margaret Churchill** hosted an open house. Events such as this prove the value of meetings of this kind in bringing members of the Medical Society, each with varying contributions to offer and problems to solve.

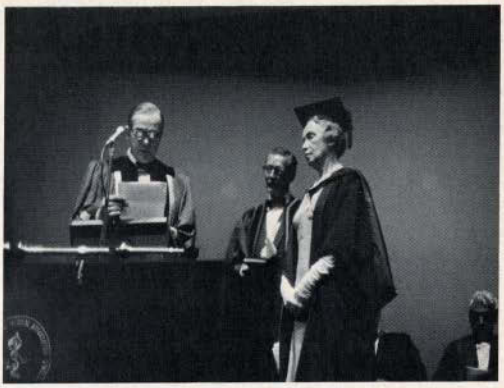
Another meeting which successfully steered diversity into at least an approach to unity was the Annual Meeting of the Canadian Medical Association, held in Halifax early June. The Medical Society has expressed many times during the past few months its pleasure in working with the Newfoundland Medical Association, who hosted the meeting; it was good to observe co-operation in so many fields. Despite the unfriendly weather, all who attended found the meeting interesting and stimulating, while the social events, particularly the lively "Newfoundland Night" and the mammoth Lobster Soiree, will provide happy memories of Atlantic hospitality. Following is a report of the C.M.A. meeting, at which we in Nova Scotia were delighted to welcome back many old friends.

It wasn't all business.

Throats parched in General Council debate (CMAJ, June 19, 1971) responded smoothly enough to voice collective accolades when honors were announced during the June, 1971, CMA Annual Meeting in Halifax, N.S.

Fittingly, as the Newfoundland was hosting this year's sessions, a Newfoundland native with a long history of medical service in Nova Scotia, **Dr. Norman H. Gosse,** was one of those applauded as a CMA Medal of Service recipient.

A charter member of the Canadian Cancer Society, a former Medical Society of Nova Scotia and CMA president, 35 years as a Victoria General Hospital surgeon and as an associate professor of surgery at Dalhousie University ... Dr. Gosse can place national and international credits beside his name in receipt of the award. Of particular note was his work toward establishing Nova Scotia's Maritime Medical Care Inc.



Dr. Margaret Gosse receiving the citation on behalf of her husband Dr. Norman H. Gosse.

Dr. C. J. W. Beckwith being presented with his Senior Membership by Dr. D. L. Kippen.

Halifax's **Dr. Charles J. W. Beckwith,** honored this year as a Senior Member, had his provincial society nomination underlined by the Western Nova Scotia Medical Society, a determined and deserved manifestation of respect for an illustrious career.

A 1927 Dalhousie medical graduate, he moved into the public health field with a staff appointment to the Nova Scotia Sanatorium. He became the first Nova Scotia recipient of a Rockefeller Fellowship, developed the first public health unit on Cape Breton Island and completed a hat trick of "first" to become the first fulltime executive secretary of the Medical Society of Nova Scotia. Coupled with a career as Provincial Director of TB Control and as an assistant professor of medicine at Dalhousie University, these and many other services to medicine and the profession have earned Dr. Beckwith his Senior Membership at the national level.

Photos of CMA Annual Metting by Charles Lapp, Dalhousie Student Union Building.

Dr. D. L. Kippen congratulating Dr. H. R. Corbett on receipt of his Senior Membership.

Cited as a Cape Bretoner by self-determinined adoption, **Dr. H. R. Corbett,** Sydney, also joined the Senior Membership ranks in the national organization.

In 1923 Dr. Corbett went from Dalhousie University to the Nova Scotia Sanatorium to start a career in diagnostic radiology, a career which took him to Indiana and Michigan and, of course, to Glace Bay and Sydney. He also served as a consultant to the Point Edward DVA Hospital and to the Radiological Services sector of the N.S. Hospital Insurance Commission.

Dr. H. D. Roberts installed as President of C.M.A.

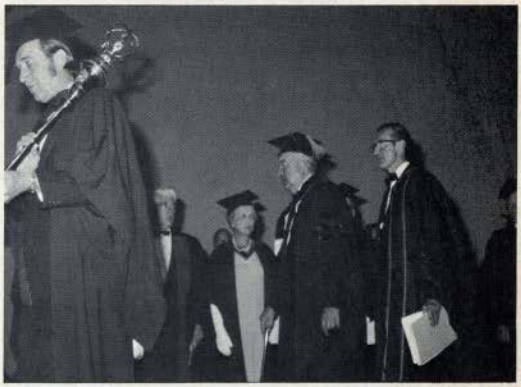
These significant contributions to the profession and his devotion to medicine over a long successful career can now be capped with CMA Senior Membership.

Still in the formal vein, **Dr. H. D. Roberts,** St. John's Nfld., received the reins of presidency from his predecessor **Dr. D. L. Kippen** and, somewhat less formally, Newfoundland **Premier Joseph R. Smallwood** hosted a dinner to General Council on behalf of the Province of Newfoundland.

Outside the deliberations of Council, visitors and resident delegates alike took advantage of fine June weather to make the most of reunions and new acquaintances with harbor cruises and coastal tours.

Halifax area golf courses felt the tread of medical feet and, in sharp contrast to green turf; doctors, their wives and children became guests of the Royal Canadian Navy to take a first hand look at the business end of the country's North Atlantic defence hardware.

Social highlight of the meeting was a concerted effort on the part of over 1,000 delegates to put a sizable dent in Nova Scotia's lobster harvest at a grand lobster soiree in the cavernous shoreside Immigration Sheds. □



Mace bearer and Platform Party.

Dr. Doris Hirsch, Dr. Sol Hirsch, and **Dr. R. J. Weil** attended the annual meeting of the American Psychiatric Association in Washington, the week of May 3rd.

Dr. J. F. Nicholson was in Bercatesgaden, teaching for the first 10 days in May, in his capacity as Psychiatric Consultant to the Surgeon General.

Dr. R. O. Jones spoke to the Medico-Legal Society of Great Britain in London during May on the topic, "The Uses and Abuses of Psychiatry in Canadian Courts." Following this address he joined members of the American Psychiatric Association to participate in joint meetings of the American Psychiatric Association with the respective national bodies of psychiatry in Amsterdam, Copenhagen, Moscow, and Leningrad.

Following these meetings Dr. and Mrs. Jones visited their daughter, Dr. Louisa E. Jones, Dalhousie 1964, who is involved in a program of the University of Washington for American student in Avignon, France.

On July 1, 1971, as most readers will know, seventeen years – "the Stewart years" – of distinguished deanship closed. **Dr. Chester Stewart,** the doyen of Canadian medical deans, retired, having given in many ways, some memorable, many difficult, but all in the true medical tradition of service. Perhaps retirement is not an appropriate word: his new post as Vice-president of Health Services at Dalhousie will ensure that the wisdom of the Stewart years will not be lost to us in Nova Scotia. We wish Dr. Stewart well.

The Western Branch sends family news: for **Dr. and Mrs. T. G. H. Eow,** Gregory was born recently; for **Dr. and Mrs. C. R. Wyman,** a boy, Scott Palmer, and for **Dr. and Mrs. J. J. Mallett,** a girl, Barbara Anne.

Dr. Anne Hammerling, of Halifax, was recently elected President of the Federation of Medical Women of Canada.

Dr. Brian Mainwaring has lately opened a practice in Upper Musquodoboit. In Sheet Harbour, **Dr. Stan Potter** recently returned after a long illness to part-time practice.

To mark more than 50 years of service to the people of Wedgeport and the surrounding area, a testimonial reception was held recently for **Dr. W. C. O'Brien.** Dr. O'Brien is still in active practice; as is his son, Dr. Milton O'Brien.

Dr. J. F. L. Woodbury, Halifax, was recently awarded an associateship by the Canadian Arthritis and Rheumatism Society. This will enable further research to be made in the field of rheumatology in Nova Scotia. Some idea of the work that is presently being carried out in Nova Scotia can be gleaned from the second Annual Report of the Dalhousie Rheumatic Disease Unit, contained in this issue of the *Bulletin.*

Dr. Allan S. MacDonald, Halifax, who has been engaged in renal transplant work, has been awarde a Centennial Fellowship by the Medical Research Council of Canada. Dr. MacDonald recently left for Cambridge, England, where he will continue research in the field of organ transplantation.

Dr. B. G. Ozyany, Sydney River, recently attended the First International Magnesium Symposium, which was held in Vittel, France.

Dr. J. A. Noble recently retired after 25 years as chief of service – surgery – with Camp Hill Hospital, Halifax. At the time of his retirement Dr. Noble was honored by the medical staff of Camp Hill Hospital and presented with gifts from various bodies within the hospital.

Dr. Noble holds the appointment of honorary surgeon to Queen Elizabeth.

Dr. R. M. Read, Halifax, recently participated in a conference on glaucoma in San Francisco. His papers included one on "Optic Disc in Glaucoma" and one on the "Differential Diagnosis of the Angle Closure Glaucomas."

We congratulate **Dr. Norman H. Gosse** on being awarded the C.M.A.'s highest honour, the Medal of Service. At this year's Annual C.M.A. Meeting, awards of Senior Membership went to **Drs. C. J. W. Beckwith,** St. Margaret's, and **H. R. Corbett,** of Sydney.

Sympathy is extended to the family of **Dr. Alvin M. Siddall,** of Yarmouth. Dr. Siddall, recently deceased, was a member of the Medical Society. □

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Supplement to the Nova Scotia Medical Bulletin – Volume 50, August, 1971

dalhousie rheumatic disease unit

second annual report

1 july 1969-30 june 1970

CARS physiotherapists provide continuing care for patients unable to attend clinics.

Social worker interviews arthritis patients to determine emotional problems relating to or aggravating the arthritic condition.

CARS Fellow measures joint movement of RDU patient while Registrar records findings for patients case history.

The **DALHOUSIE RHEUMATIC DISEASE UNIT** opened officially on November 13, 1969; representatives of Dalhousie University, the Victoria General Hospital, the Department of Public Health of Nova Scotia, and the Canadian Arthritis and Rheumatism Society attended-an augury of future cooperation.

The need for a Rheumatic Disease Unit

A Rheumatic Disease Unit is necessary today because exemplary care of patients suffering from rheumatic diseases requires the cooperation of a specialized team; the patient's family physician, rheumatologists, nurses, physiotherapists, occupational therapists, social workers, and members of other medical and paramedical disciplines are all important. It is especially necessary to develop a continuing working relationship with specialists in physical medicine, orthopedic surgery, plastic surgery, psychiatry, and other medical specialists. The Rheumatic Disease Unit (RDU) was created, then, to provide exemplary medical care of patients with the rheumatic diseases, and in addition, to teach the medical profession, undergraduate and postgraduate, and to conduct research. These objectives are much more easily attained when beds are geographically contiguous and administrative facilities are adequate and close at hand. The development of Rheumatic Disease Units has been a long-declared objective of the Canadian Arthritis and Rheumatism Society. The Society believed, soon after its birth, that its first responsibility was to provide medical and paramedical personnel with expertise in the treatment of the rheumatic diseases. When this objective had been partially attained, the focus shifted to the development of a research program which should provide clues to the causation and eventual control of the rheumatic diseases.

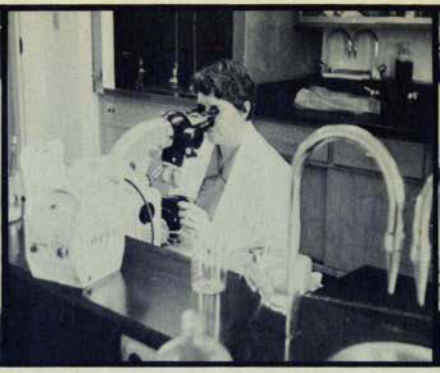
Facilities

The present facilities are considered the first section (Victoria General Hospital) of the Dalhousie Rheumatic Disease Unit. They consist of 10 teaching beds, eight geographically contiguous. In these 10 beds, first priority is given to patients with the rheumatic diseases, chosen for admission by members of the Rheumatic Disease Unit medical staff. In addition to these in-patient facilities, there are out-patient clinics each week. One of these out-patient clinics is concerned with the follow-up of patients discharged from the RDU. The most notable feature of this clinic is the close liaison maintained with the family physician by a written report after every visit of his patient; the second clinic day is devoted to treatment measures, such as frequent reassessments of patients receiving gold salts or immuno-suppressive drugs, and the third is our original combined General Medicine and Arthritis Out-Patient Clinic.

Staff

The medical staff of the Unit, the Medical Director, Consultants, and Fellows, are jointly appointed by Dalhousie University and the Victoria General Hospital. Secretarial and research members of the Unit staff are appointed by the Director of the Unit in conjunction with the University and Hospital authorities. For nursing, physiotherapists, occupational therapists, social workers, and other needed staff, the Unit draws upon the Victoria General Hospital, the various departments of which designate specific individuals to associate themselves with the Unit rotating their members frequently or occasionally, depending upon the

CARS Fellow studies X-rays in investigation of changes in neck movement of people with rheumatoid arthritis.



Studies of joint fluid being conducted in RDU laboratory.

RDU staff examines patients' X-rays in discussion of treatment.

a particulate cause of the various inflammatory polyarthritides. In concert with the Department of Pathology, we have begun to investigate humoral and cellular mechanisms of autoimmunity, and also the diaphragmatic contribution to ventilation of the lungs in patients with ankylosing spondylitis.
We have studied our experience with gold salt therapy in rheumatoid arthritis and we have embarked upon a detailed study correlating clinical and radiological findings in the cervical spines of rheumatoid arthritis patients. Detailed synovianalyses have also interested us, and have added something to our ability to diagnose the rheumatic disease states. Finally, we are continuing to document patients with the arthritides in a form which can be analyzed by computer.

From July 1, 1969 to June 30, 1970, 92 patients were treated in the beds of the Rheumatic Disease Unit. The diagnostic breakdown may be of interest:

Rheumatoid Arthritis	– 72
Polyarthritis-Unspecified	– 5
Ankylosing Spondylitis	– 6
Reiter's Syndrome	– 3
Scleroderma	– 1
Psoriatic Arthropathy	– 1
Rheumatic Fever	– 1
Non articular Rheumatism	– 1
Unclassified	– 2

Our patients made 489 visits to the Special Arthritis Follow-Up Clinic. The Special Treatment Clinic came into operation on February 23, 1970 and we cared for our patients at 92 visits. In addition to these activities, 24 synovial biopsy specimens were submitted for microbiological study, 101 synovial fluids were cultured, and 332 synovianalyses were done by our own staff.

WHAT OF THE FUTURE – We would like to see the Unit enlarged, and office space developed in contiguity with our centre of activity. We feel that the building of a larger, modern, and safe structure for the rehabilitation of arthritic and other patients would, of course, be a tremendous step forward in providing specialized care and continuing research.

Victoria General Hospital physiotherapist helps patient exercise to preserve joint movement.

Warmth and buoyancy of water assist patient to strengthen muscles weakened by arthritis.

V. G. Hospital occupational therapist makes rest splint for protection of joint from undesired movement to allow condition to subside.

much in the care of our patients. The Physiotherapy Department has been associated with us almost as long. We also maintain liaison with the Canadian Arthritis and Rheumatism Society's physiotherapists who work in home care and hospital care in the province. It has been our intention to arrange that the CARS therapist assess the patient before his admission to the RDU and at a given time after discharge from the Unit, to maintain a longitudinal record of the patient's progress. This program is not yet fully operational. The patient is assessed on admission by the RDU physiotherapist from the standpoint of range of movement and muscle strength, and physiotherapy is ordered as soon as the patient is admitted. The occupational therapist assesses the patient's ability to carry out the activities of daily living, and occupational therapy programs are then devised. Great use is made of the occupational therapist in the provision of rest splints and action splints, local rest being of importance because active movement of a joint appears to play a role in maintaining the activity of the pathogenetic process.

During the year covered by this report, 197 patients were treated by our occupational therapist and 93 splints were made. Our O.T. is kept busy devising splints for special purposes. We find the reports of our social workers extremely helpful and have recently embarked upon a research project to determine the value of having a student of social work visit the homes of patients following their discharge from the Unit. Preliminary assessment of this program suggests that valuable information is likely to be provided in this way.

We would like to spend time instructing our patients in greater detail about the nature of their disease, both in group and individual sessions but have not yet devised a good way of doing this except on an individual basis.

Teaching

The medical staff of the Unit carries a very heavy teaching load. RDU teaching rounds, one medical, one surgical, are held weekly in addition to regular working rounds and there is very frequent requirement for attendance of the RDU staff at Teaching conferences, demonstrations, and occasionally lectures. Most of this effort is directed at undergraduate medical teaching but a large contribution is also made to postgraduate and continuing medical education. Seven lectures are given to the students of the School of Physiotherapy each year.

The treatment and follow-up outpatient clinics should be especially mentioned for their value to the medical staff, medical trainees, paramedical staff, and to the patients. It is in these clinics that the interns and residents first discover (to their amazement) that the measures of treatment advocated by rheumatologists actually do result in improved health and performance by patients suffering from arthritis, an observation difficult to make on the in-patient service.

Research

As the medical members of the RDU staff are all clinicians, research is of two varieties: (1) bedside research carried out by the RDU team, and (2) multi-disciplinary research carried out in cooperation with other departments of the medical school. For the past two years, we have been carrying out studies of salicylates prepared in enteric-coated form, these have contributed to our understanding of the effect of such preparations and we have consequently modified our dosage regimens. In cooperation with the Department of Radiotherapy of the Halifax Infirmary, we have studied the long term effects of allopurinol in the treatment of gout. With the Dalhousie Department of Microbiology, we have searched for

Registrar completes computer forms for keypunching. Computers provide mechanical selection of patients with history of certain disabilities and eventual findings in disease treatment.

Therapist assists RDU patient to perform prescribed exercise.

Hydrotherapy assists patient to move limbs more easily during treatment in RDU.

needs of the Department and of the Unit. Trainees of Dalhousie University's Faculty of Medicine, School of Physiotherapy, and School of Social Work, rotate throughout the Unit and contribute to the care of its patients. Consultants in medical specialities are available from the staff of the hospital and university. For the most part, specific designations of consultants by other departments have not been made, but the interests of individual surgeons and specialists in other fields have led to a close association with the Unit, a nonsystem which has both advantages and disadvantages. Most encouraging has been the increase in numbers of fine plastic and orthopedic surgeons and the advent of young physicians seeking residency in rheumatology, surgery, and especially physical medicine.

STAFF MEMBERS as of June 30,1970:

Dr. J. F. L. Woodbury	– Director
Dr. P. A. MacGregor	– Clinician
Dr. S. Ahmad	– Clinician
Mrs. Carolyn Corkery	– Registrar
Miss Faith Hatton	– Secretary
Dr. Adel Abdalla	– Fellow
Dr. J. Rodriguez Llano	– Fellow

Of eight CARS Fellows trained at Dalhousie, three are teachers on Dalhousie medical faculty, one is a consultant in Nova Scotia, one is a consultant in Ontario. Fellowships were awarded to five persons of foreign birth and of these, so far, three have become Canadians.

Patient Care

The inflammatory polyarthritides (chiefly rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis), occupy much of the time and most of the hospital beds of rheumatologists. The philosophy of treatment of these diseases has been expounded by rheumatology teachers on many occasions. However, the last twenty years have been disappointing in that patients continue to arrive in the hospital or in the offices of these consultants having been given adrenal glucocorticoid as the first measure of treatment. (The degree of dependency, amounting to addiction, of rheumatic disease patients on corticosteroids has had terrible results.) Among these are the gradual wasting of the tissues of the patient's body, most notably the bone, sometimes the skin, gastrointestinal tract, and capillaries; occasionally, too, an arteritis develops, which is apparently more likely to occur in corticosteroid-treated patients. There is some evidence that our younger graduates are commencing to seek advice about the treatment of patients with **early** inflammatory arthritis. This is most encouraging.

The medical staff members of the Dalhousie RDU believe that it is the proper role of the physician, confronted with a person having initial evidence of rheumatoid arthritis, to study how he can lessen the emotional and physical strain on the patient; to help the patient understand the nature of the disease and of its treatment; and to embark upon the provision of a physical regimen which may include splinting and an active exercise program, sometimes accompanied by the use of adjunctive measures such as heat, cold, or other modalities. We still believe in acetylsalicylic acid and we urge that the dosage be pushed to the limit of its usefulness. If these measures do not result in total remission of the disease process within a few weeks, we feel that the patient should receive drugs which are likely to promote a temporary remission in the hope that this will continue after the drug is stopped. Above all, we believe that for these patients their physicians should take the onus of advocating periodic re-examination and adjustment of treatment: their patients deserve no less.

Some members of our nursing staff were caring for patients with arthritis in cooperation with us for several years before the RDU was formally opened. Their experience counts for

Patients' disabilities are demonstrated to RDU staff as they plan treatment sequence.

RDU Secretary is responsible for issuing progress reports to referring doctors . . . posting notices of staff conferences . . . admission of patients . . . and liaison with CARS.

Charge Nurse of Special Arthritis Follow-Up Clinic for the continuing examination of out-patients to determine progress and improvement.

Canadian Arthritis and Rheumatism Society
5670 Spring Garden Road, Halifax, N.S.
Telephone: 429-7025