

SPECIAL REPORT

Survey of Cytological Facilities in Canada

DAVID D. KULCSAR, M.D.,* *Montreal*

with the collaboration of the following regional advisers: Drs. H. K. FIDLER, *Vancouver*; T. A. KASPER, *Edmonton*; J. ARNOTT and J. M. ORTEZA, *Saskatoon*; D. W. PENNER, *Winnipeg*; D. W. THOMPSON, *Toronto*; J. H. DARCHE and J. BELAND, *Montreal*; S. C. ROBINSON, *Halifax*, and I. MACLENNAN, *Moncton*

THIS survey of facilities for cytology in Canada and the utilization of these facilities was undertaken by the Canadian Cytology Council. The regional advisers carried out a detailed survey in 1965 which covered the period up to 1964 inclusive. The tables in the present paper were prepared by the secretary of the Canadian Cytology Council on the basis of this detailed information. However, supplementary provincial reports provide some additional data in some categories for the year 1965, and these reports appear in an addendum.

A previous survey carried out by the Council in 1963 provided statistical information up to and including 1962. Some of the statistical data for 1962 have been incorporated into the tables in the body of this report.

METHOD

Sample questionnaires were submitted by the secretary to the regional advisers with a recommendation that they be adjusted for regional or provincial requirements. Owing to this flexibility in the make-up of the questionnaires, some of the provincial reports lack certain data.

The questionnaires were designed to obtain the following basic information:

1. Location of cytology services;
2. Number of cytologic examinations performed in 1963 and 1964. This item was further subdivided into (a) vaginal examinations and (b) other types of examinations; in many of the provinces, the latter category was further subdivided into pulmonary, gastric, urinary, etc.
3. Sources of vaginal case material;
4. Qualifications of the directors of the services, i.e. whether a pathologist or other physician was in charge of the cytology service;
5. Number of cytotechnologists employed and the number needed;
6. Number of cytotechnologists in training;

7. Adequacy of the existing laboratory facilities for cytology;
8. Costs involved in providing cytology services, including fees or tariffs, etc.;
9. Desirability and feasibility of mass screening;
10. Volume of applications for cytology apart from the detection of cancer;
11. Extent of development of research in cytology.

The population figures referred to in the accompanying tables are those from the 1961 Canadian census. Consequently the percentages which relate to these figures are to a slight degree higher than they would be if 1964 population data were available for these calculations. On the other hand, despite the efforts of the regional advisers to obtain complete statistics, a small percentage of the cases examined have not been reported and have therefore not been included in the survey.

TABLE I.—NUMBER OF LABORATORIES WITH FACILITIES FOR CYTOLOGY—1964
(1962 figures in parentheses)

	Facilities available	Intending to provide facilities
British Columbia.....	7 (*)	4 (*)
Alberta.....	11 (10)	* (*)
Saskatchewan.....	7 (7)	1 (3)
Manitoba.....	5 (4)	* (*)
Ontario.....	68 (43)	5 (25)
Quebec.....	47 (*)	45 (*)
New Brunswick.....	5 (5)	1 (*)
Nova Scotia.....	8 (7)	1 (*)
Prince Edward Island.....	1 (1)	3 (*)
Newfoundland.....	3 (1)	(*) (*)
Total.....	162 (78)	60 (28)

*Figures not available.

The proportion of questionnaires which were returned in the various provinces ranged from 50 to 100%. The larger provinces showed a return of over 70%. In some instances the regional advisers mailed questionnaires only to laboratories known to have cytology services while in Quebec, Prince Edward Island and Newfoundland all of the hospitals with a bed capacity of 50 or more were canvassed. It should be emphasized, however, that all the large cytology services were included in the

Presented at the Annual Scientific Meeting of the Canadian Cytology Council and the Canadian Association of Pathologists, Halifax, June 17, 1965.

*Secretary, Canadian Cytology Council—Conseil Canadien de Cytologie (Section of the Canadian Association of Pathologists).

Reprint requests to: Dr. David D. Kulcsar, 1538 Sherbrooke Street West, Suite 511, Montreal 25, Quebec.

TABLE II.—VAGINAL CYTOLOGY (CASES EXAMINED)*

Province	Female population over age 25 (1961 census)	Total cases							
		1962	%	1963	%	1964	%	1965	%
British Columbia.....	448,499	115,520	25.7	134,335	29.5	158,181	35.3	185,193	41.3
Alberta.....	320,341	25,000	7.8	35,249	11.0	53,314	16.6	81,562	25.5
Saskatchewan.....	228,527	1657	0.7	2288	1.0	9891	4.3	16,150	7.1
Manitoba.....	242,659	21,873	9.0	46,840	19.5	56,359	23.2	69,498	28.7
Ontario.....	1,711,893	62,000	3.6	108,500	6.3	155,500	9.1	251,000	14.6
Quebec.....	1,294,995	51,741	4.0	79,734	6.2	109,761	8.5	150,000 (est.)	11.5
New Brunswick.....	136,689	2687	2.0	2257	1.6	3710	2.7	5500 (est.)	
Nova Scotia.....	182,791	12,122	6.6	20,402	11.2	25,917	14.2	33,713	18.2
Prince Edward Island.....	25,345	275	1.1	145	0.58	483	1.9	750 (est.)	
Newfoundland.....	91,807	617	0.7	163	0.18	284	0.3	500 (est.)	
Total.....	4,686,526	293,492	6.3	429,911	9.2	573,400	12.2	793,866 (est.)	16.9

*Including both new cases and repeat examinations.

report, since all of the larger facilities were well known to the regional advisers and the pertinent information was obtained from all of these departments. The statistics to be presented, therefore, reflect quite accurately the situation in the various provinces, with an error considered to be less than 5% overall.

RESULTS

Number of Laboratories Providing Cytology Services

Table I records the number of laboratories in each province in which facilities for cytology services currently existed, with 1962 figures in parentheses for comparison.* Also recorded are the number of departments that indicated an intent to establish such facilities in the near future.

Volume of Vaginal and Cervical Cytology

Table II shows the total volume of vaginal and cervical cytologic examinations. In these tabulations no distinction has been made between vaginal and cervical specimens. The number of cytologic examinations for 1962 was 293,492, that is, 6.3% of the female population over 25 years of age.† These examinations increased to 429,913 in 1963 and to 573,400 in 1964. The 1964 total represented 12.2% of the female population over 25 years of age.† In 1965 the figures, though incomplete, indicate that at least 640,000 women were examined, not including an estimated additional 157,000 in Quebec, New Brunswick, Prince Edward Island and Newfoundland. This indicates that the total number of women examined in 1965 was approximately 800,000, which is equivalent to 17% of the population group specified above. This is therefore evidence of a continuing major increase in the percentage of the female population who are being screened.

*As provided by the Canadian Cytology Council report based upon the 1963 survey. Copies of this 1963 report are available from the Secretary of the Council.

†Population figures are those provided by the 1961 census.

As indicated in Table II, however, the total number of cases examined includes both new cases and repeat cases. Therefore the actual number of women screened would be less than the total number of cases examined, but the precise breakdown is not available in most provinces.*

Source of Vaginal Case Material

The questionnaire requested a breakdown of the sources of vaginal case material, namely, whether the material was from in-hospital patients, outpatient departments, or doctors' private offices. The answers cannot be tabulated easily, but it seems clear that laboratories that reported large numbers of cases drew their material mainly from doctors' offices. For example, the sources of vaginal cases for Ontario in 1964 were: in-hospital patients 9.3%, hospital outpatient departments 7.7% and physicians' offices 83%.

Cytology of Special Sites (Other Than Gynecological)

Table III records the number of pulmonary, gastric, urinary and other types of specimens examined, including those from breast, cerebrospinal fluid, oral cavity and other miscellaneous sites. Although there has been a considerable percentage increase in the number of these examinations from year to year, the total volume is still rather low. It should be noted that in some laboratories the material from some of these sites has been examined by the cell-block technique rather than by smears and therefore such cases are not included in the figures presented in Table III.

Supervision of Cytology Services

A summary of the information gained from the replies to the questionnaire indicates that in 145 laboratories pathologists were in charge and that 10 laboratories were supervised by physicians other than pathologists.

*See provincial addendum for British Columbia (Appendix).

TABLE III.—CYTOLOGY OF SPECIAL SITES (OTHER THAN GYNECOLOGICAL)—1964

Province	Pulmonary	Gastric	Urinary	Serous fluid	Miscellaneous	1964 total	(1962) (total)
British Columbia.....	5362	146	247		1763	7518	(6080)
Alberta.....	1508	80	27	179	1197	2991	(500)
Saskatchewan.....	1260	73	77		484	1894	(1025)
Manitoba.....	4596	461	965		764	6786	(5857)
Ontario.....	17,269	594	792	2757	4588	26,000	(12,000)
Quebec.....	*	*	*		*	18,457	(10,511)
New Brunswick.....	*	*	*		*	965	(118)
Nova Scotia.....	3824	168	180		43	4215	(4488)
Prince Edward Island.....	43	8	5			56	(30)
Newfoundland.....	184	41	203		100	528	(1028)

*Breakdown not available.

Number of Cytotechnologists

Table IV records the number of cytotechnologists employed, the number of trainees, and the present estimated requirements for trained technologists. One hundred and eighty-three cytotechnologists were employed in 1964, a figure more than double that in 1962. However, at the time of the survey it was indicated that 71 additional cytotechnologists were needed, an increase in the number employed at that time of almost 40%. The survey also indicated that 55 cytotechnologists were in training at the time. Information accompanying the replies to the questionnaire revealed that existing training schools were being expanded and that some new training schools would be developed to meet anticipated demands on training facilities.

TABLE IV.—NUMBER OF CYTOTECHNOLOGISTS IN CANADA—1964

Province	(1962 figures in parentheses)		
	Employed	Suggested additional requirements	Number in training (1964)
British Columbia.....	17 (14)	2	3
Alberta.....	11 (10)	*	4
Saskatchewan.....	6 (4)	*	2
Manitoba.....	18 (*)	*	7
Ontario.....	68 (27)	23	18
Quebec.....	52 (23)	33	19
New Brunswick.....	*(1)	4	1
Nova Scotia.....	8 (4)	8	1
Prince Edward Island...	*(*)	1	*
Newfoundland.....	3 (1)	*	*
Total.....	183 (84)	71	55

*Figures not available.

Adequacy of Existing Physical Facilities

Comments concerning the adequacy of existing physical facilities were included in 37 of the replies to the questionnaire. Nineteen directors (52% of those commenting) stated that their facilities were not adequate at present.

Economic Aspects of Cytology

The survey revealed that a considerable variation exists from province to province in the method of payment for cytologic examinations. In a few of the provinces there is no direct charge, which

means that the service is paid for by the provincial government or its agencies. In the other provinces either hospitalization insurance or medical insurance, or both, covers fees for cytologic examinations. The number of individuals who are billed directly in the various provinces therefore varies. In the various provinces, fees, where applicable, ranged from \$3 to \$7 for vaginal cytologic examination, the fee including both technical and professional services.

Extent of Applications for Cytological Examinations Apart from the Detection of Cancer, and the Extent of Research in Cytology

The figures presented in Table III, under the heading "Miscellaneous" include specimens not directly related to the detection of cancer, such as those taken for sex chromatin determination. In addition, some of the examinations recorded under vaginal cytology were primarily for cytohormonal assessment. A detailed breakdown of these figures was not feasible. However, many laboratories indicated that such procedures were becoming a part of their routine.

As might be expected, the heavy demand on existing facilities for the provision of the various services of routine type has not allowed, except in a few instances, the extensive development of facilities for basic research in cytology. The statistics derived from this survey relating to sporadic research activity, however, will form a valuable base-line for comparison in any future surveys.

DISCUSSION

One of the primary and most important purposes of a cytology laboratory is the discovery of cancer in its early stages. Cytological examination, for the detection of cancer of the cervix in particular, will be effective only if a major proportion, and preferably all, of the female population over the age of 20-25 years is screened. In the opinion of some of the regional advisers who contributed to this survey, women over the age of 20 years should be considered the population at risk because several cases of carcinoma of the cervix have been diagnosed in women before the age of 25 years.

Some of the regional advisers also emphasized that a comprehensive screening of the female population did not require huge centralized laboratories.

Although there are numerous reports on the mass screening of population groups, to our knowledge only one other national cytological survey has been published.¹ In Table II of this current survey we find that in Canada 12.2% of the female population over the age of 25 (based on 1961 census figures) had been screened in the year 1964. As a national average this is too low to produce a major decrease in the death rate from cervical cancer. However, if the present rate of annual increase in cervical screening can be maintained, a sizeable reduction in death rates from cancer of the cervix can be expected within a few years. There is every indication that this increase in cytologic services will occur. Handy and Wieben,² in their recent report entitled "Detection of Cancer of the Cervix: A Public Health Approach", postulate that a cytologic examination every third year on every woman aged 30 and over is a very reasonable objective. Statistically, British Columbia has already reached that goal and Manitoba is very close to it. When assessing the statistics on the volume of vaginal specimens, however, it is important to make the distinction, as the volume increases, between new cases and repeat examinations.* There is no doubt that complete coverage of the female population would, from a practical point of view, be difficult to attain.

Cytology may be used as an aid in establishing the diagnosis of non-gynecological lesions that are clinically evident but relatively inaccessible to biopsy. It can provide information on operability, recurrence of tumour, presence of residual tumour and presence of multifocal tumours and it may be used in the assessment of very early and equivocal mucosal lesions. However, its basic *raison d'être* is still the detection of asymptomatic or pre-clinical carcinoma, particularly in sites with a high risk. There are now in progress extensive investigations which will clarify to what extent the greater development of facilities and improvement of techniques may aid in the detection of pre-clinical carcinoma of pulmonary and other sites.

The Canadian Medical Association at its annual meeting at Halifax in June 1965³ acknowledged the importance of mass screening and supported the expansion of cytological services.

A more extensive development of cytological services requires more pathologists and/or other laboratory-oriented physicians who are adequately trained in cytology; more cytotechnologists; more adequate laboratory facilities; and a continuation of professional and lay education.

The following steps have already been taken to achieve these objectives:

1. The Canadian Association of Pathologists has recommended that cytology should be a part of the residency training in pathology, and this measure has been in effect in Canada to an increasing degree in recent years.

2. Standards for the establishment of cytotechnology training schools have been established through the co-operation of the Canadian Society of Laboratory Technologists and the CMA-CAP Committees on Technologist Training and Accreditation of Training Programs. Several approved training schools for cytotechnology are now scattered throughout Canada.

3. More adequate laboratory facilities are now being provided in a number of areas. Fidler *et al.*⁴ reported that 5000 sq. ft. of space should be available to handle an annual volume of 100,000 screening tests. Recently, Thompson⁵ indicated in a special study that 1000 to 1500 sq. ft. is the minimum space requirement for processing 50,000 vaginal cytological examinations annually. These figures, however, do not take account of space requirements for training facilities or for extensive data processing.

4. The Canadian Cancer Society and some cancer societies at the provincial level have prepared pamphlets and other educational material regarding the basic principles, applications, techniques, and facilities for cytology. Educational material on these themes is available for medical and public use. Some provincial agencies primarily concerned with cancer have made available substantial grants for the training of both cytotechnologists and physicians directly concerned with the provision of cytology services. Some agencies also have made grants available for the provision of equipment required for the establishment of cytology laboratories.

CONCLUSIONS

In Canada in recent years there has been a major increase in the number of laboratory facilities for cytology and in the volume of material examined cytologically. Considerable variation exists from province to province in this regard. To date, the major emphasis has been on detection of cancer of the cervix, but other applications have been developed to an increasing degree. The expanded activity in the field of cytology has resulted in an increased demand for trained personnel. However, through the co-operative efforts of the various agencies and groups concerned there has been a continuing development of the necessary training programs.

REFERENCES

1. HORN, D. AND WATANABE, G.: *CA.*, 15: 161, 1965.
2. HANDY, V. H. AND WIEBEN, E.: *Obstet. Gynec.*, 25: 348, 1965.
3. Canadian Medical Association, Annual meeting, Transactions, Committee on Cancer: *Canad. Med. Ass. J.*, 93: 499, 1965.
4. FIDLER, H. K. *et al.*: *Ibid.*, 86: 823, 1962.
5. THOMPSON, D. W.: Report of the Committee on Cytology, Section of Clinical Pathology, Ontario Medical Association, 1965. Unpublished.

*See provincial addendum for British Columbia (Appendix).

APPENDIX

Cytology in British Columbia, 1965

In British Columbia in 1965 the increase in numbers of cytology specimens examined has continued. Most uterine cytology is referred to the Central Laboratory in the British Columbia Cancer Institute. During 1965, 185,193 cervical smear examinations were performed, more than 99% in the Central Laboratory. Somewhat over 50% of these were from women who had been examined in previous years. Since the objective of the program is a total population survey, it is discouraging to note that about 30% of the women have not yet been reached. In order to determine the factors which influence the women in this segment of the population, an attitude and fact-finding survey was conducted which represents samples of all geographic areas in the province. The results, to be published shortly, indicate that women in the younger and older age groups and those in the lower economic bracket are inadequately covered at the present time.

Whereas cervical cytology can be handled adequately through the facilities of a central laboratory, pulmonary and gastric cytology are best done at the local level, i.e. in the Hospital Diagnostic Laboratory. In 1965 approximately 7300 respiratory cytological specimens were examined, 55% of these in hospital laboratories other than the Central Laboratory. Gastric, urinary and other examinations totalled 3877, of which 80% were performed in the Central Laboratory.

It is planned that an oral cytology program will begin in 1966. The facilities of the Central Laboratory will be used and close collaboration and co-operation will be maintained with the Faculty of Dentistry at the University of British Columbia.

The assistance of all hospital pathologists throughout the province in providing statistical data is gratefully acknowledged.

H. K. FIDLER, M.D.,
Regional Adviser, British Columbia.

Cytology in Alberta, 1965

In Alberta a crash program has been in operation since 1961, to increase the volume and quality of cytology services. The demand for such services has been created both by clinicians and patients. To achieve the volume described in this report, the services of partially trained technicians were used at times. The strain on the professional personnel involved in the supervision and training of technicians has been acute. The objective in the future will be to create, through the co-operative effort of interested bodies and agencies, an atmosphere in which a larger number of cytological facilities can be developed. This means that more pathologists and other physicians will have to become involved in cytopathologic diagnosis. It is anticipated that these developments will, to some extent, relieve the Provincial Laboratory at the University of Alberta in Edmonton from the burden of the presently excessive load of routine cases, allowing this laboratory to carry out more effectively its role as a high-quality reference centre devoted to teaching, training of technicians and cytopathologists, and the development of new techniques and research.

The development of cytology other than gynecological has been somewhat neglected because of the concentration on gynecologic screening. This imbalance should be corrected as more facilities, technicians and,

most important, interested cytopathologists become available.

The future needs for personnel are great. An average experienced technician can comfortably process 5000 vaginal specimens per year without reaching the danger point where accuracy is compromised. To handle the annual case load from 320,000 women over 25 years of age in Alberta, therefore, some 64 technicians are required, with an additional 20 to 30 to process the more difficult, onerous and specialized extravaginal specimens. Taking into consideration further population growth, over 100 technicians will be required in the foreseeable future. An equal number of ancillary personnel will be needed to provide supporting services. To provide essential professional direction and supervision, at least 15 to 25 pathologists must enter this field.

The major statistics concerning cytological examinations in Alberta for 1965 are given below, with comparative figures for 1964 in parentheses.

STATISTICS FOR ALBERTA, 1965

Total gynecologic cases examined.	81,562	(53,314)
% of female population at risk* . . .	25.5	(16.6)
Total number of active		
laboratories	14	(11)
Number of facilities processing		
over 500 cases/year	8	
Number of technicians employed.	14	(11)
Technicians in training	7	(4)
Training schools in province	1	(1)
Volume of cases		
(other than gynecological) † . . .	3433	(2991)

*A more complete breakdown of the provincial survey showed that the population group which is least frequently examined by a vaginal smear is the hospital in-patient group.

†This does not include a great number of fluids handled by standard pathologic sectioning methods.

The centres in which cytopathologic diagnostic facilities are now available include Edmonton, Calgary, Lethbridge and Medicine Hat.

T. A. KASPER, M.D.,
Regional Adviser, Alberta.

Cytology in Saskatchewan, 1965

A small number of cytologic examinations have been carried on for several years in the laboratories of Saskatchewan's larger hospitals. The only screening service, however, has been that maintained at the Regina General Hospital, now in the fifth year of operation. In the past two years an unprecedented rise in the total number of cytologic examinations has taken place coincident with the establishment of a provincial cytology screening service. This service is directed primarily at the female population within the age groups susceptible to uterine cervical cancer. The decision made by the Department of Public Health to establish such a service at the Regina Grey Nuns' Hospital was the culmination of discussions over a number of years between the Exfoliative Cytology Committee of the College of Physicians and Surgeons of Saskatchewan and the Minister of Health. Recommendations of the committee were implemented.

In 1964 the availability of the service was made known in a gradual manner so that the personnel and facilities then available would not be overwhelmed. After the first six months, the volume of work increased significantly. At present 95% of the specimens

processed daily come from almost 70% of the physicians engaged in active practice.

During 1965, a total of 35,000 cytologic examinations were performed, 70% of these at the Grey Nuns' Hospital.

The 32,300 vaginal smears from approximately 16,150 females represented a 250% increase over the total recorded before and up to the end of 1964. Thus, of the 228,527 women at risk, 8% have been screened, twice as many as in 1964. Examinations were also done on 1875 pulmonary, 70 gastric, 85 urinary and 670 miscellaneous specimens. The increase in the number of examinations of specimens of these types is not impressive, however. Buccal smears, oral smears, etc., were among those occasionally examined.

It is encouraging to note the increased utilization of the cytology services in Saskatchewan in the past year. To cope with the anticipated expansion of these services, the training of cytotechnicians has been started in four of these laboratories.

To keep the medical profession informed, educational programs on exfoliative cytology are arranged from time to time by designated committees or members of the College of Physicians and Surgeons. Public education in cytology in certain strategic regions of the province is now being planned.

Almost all of the pathologists engaged in cytology in Saskatchewan contributed to the information contained in this report. To them I am exceedingly grateful.

J. M. ORTEZA, M.D.,
Regional Adviser, Saskatchewan

Cytology in Manitoba, 1965

Although cytological examination has been employed as a diagnostic procedure in Manitoba for over 20 years, it was not used to any significant extent until the introduction of a "free" cytology service in January 1963. In the following three years a threefold increase in case load occurred. The provincial government made funds available to the Manitoba Cancer and Research Foundation; the Foundation, in turn, paid the cytology departments of the Winnipeg General Hospital and St. Boniface General Hospital on a fee-for-service basis to provide a cervical cytologic screening service for Manitoba. This service applied to all patients outside hospital. The eventual objective was to screen the entire normal female population over the age of 25 years. No positive effort was made to promote this procedure among the medical profession or the public. The result has been a fairly orderly expansion of the service without any serious overloading of facilities. There are now two formally approved cytotechnologist training programs in Manitoba, and the necessary cytotechnologists have thus been supplied. At the present time there is an actual shortage of such technologists, but this is not yet a significant problem. The decision was recently made to begin an educational campaign concerning the value of cytological examination; this will be directed initially at the medical profession and later at the public. The introduction of an oral cytology service is also now under consideration.

In addition to the provincially sponsored program, several private laboratories and medical clinics provide a cytologic diagnostic service. Payment for this is mainly through insurance plans. A small volume of cytology is also done in hospitals, other than those named, which have pathologists.

During 1965, 77,794 cytologic specimens were examined. Of these, 69,498 were cervical, approximately 5300 were respiratory, 1050 were urinary, and the remainder included gastric, oral and fluids.

The volume of cervical cytology represents a 23% increase over that of 1964. The present annual volume of cases is equivalent to 28.5% of the female population over the age of 25 years.

I wish to acknowledge the help received from my professional associates who so readily provided the data on which this report is based.

D. W. PENNER, M.D.
Regional Adviser, Manitoba

Cytology in Ontario, 1965

It has been the policy in Ontario that the development of decentralized cytology facilities should be encouraged in order that all of the major types of cytological examination would be available to patients in any active treatment hospital with supervised laboratories. Under these circumstances a close clinical-cytological-histological liaison can be maintained. Seventy-eight laboratories in Ontario (26 in Metropolitan Toronto) now provide facilities for cytology, and there is no major regional area in which such facilities are not available.

The implementation of this policy depended on the preliminary training of a large number of screening technicians, the interest and active participation of most of the clinical pathologists in the active treatment hospitals, and the enthusiasm of the clinicians in the individual hospitals. Much of the required training, both technical and professional, was supported by grants from the Ontario Cancer Treatment and Research Foundation.

Now that satisfactory basic facilities have been established, it is apparent that a period of major increase in the utilization of these facilities is at hand. Despite the increasing total volume of cases and despite the fact that there is no "free" service, the actual *rate of annual increase* (now 60%) is being maintained. Nevertheless even if this rate of increase is maintained, it is evident that—specifically in the application of vaginal cytology to cancer detection in the adult female population—the optimum level for Ontario of 800,000 to 1,000,000 cases a year will not be reached for three to four years.

The total female population at risk (i.e. women over the age of 20 years) in Ontario in 1964 was 2,359,300. One way of increasing the percentage of women screened each year is to screen medical and surgical patients while in hospital. In Ontario in 1964 there were approximately 480,000 female "admissions" (over the age of 20 years), of which 234,000 were medical and surgical admissions with an average hospital stay of 16 days. Several hospitals in 1965 and many more in 1966 have begun to screen these patients while they are in hospital. Hitherto in Ontario approximately 85% of the vaginal specimens examined in hospital laboratories came from the physician's private office.

In the training of technologists and pathologists in Ontario considerable emphasis has been placed on the respiratory, gastric, oral, urinary, pleural and peritoneal, sex chromatin and other non-gynecological applications of cytology. It is encouraging to note that 36,000 specimens of these types were examined in

1965. In gynecological material there has been a major increase in emphasis on cytohormonal patterns apart from routine cancer detection.

Two years ago an oral cytology program was established in Ontario, co-ordinated by the Department of Dentistry of the University of Toronto. By the end of 1965, over 2000 specimens had been examined and about 700 dentists had made use of this service.

In Ontario, research projects in cytology include an evaluation of the use of the self-examination pipette for vaginal smears, the feasibility of screening sputum in heavy smokers, a correlation of cytohormonal patterns with various types of malignancy and their course, a continuing long-term assessment of the significance of the finding of circulating tumour cells in peripheral blood in patients with cancer, the significance of various histochemical alterations in cells, the long-term changes in dysplastic epithelial lesions (cervical and respiratory), and various projects in the field of cytogenetics.

PROGRESS IN CYTOLOGY IN ONTARIO

	1961	1964	1965
Total cases examined (all types)	46,000	180,500	287,000
Total cases examined (vaginal)	36,000	155,500	251,000
Rate of increase over previous year		45%	60%
Total specimens examined (non-gynecological)	10,000	26,000	36,000
Number of laboratories providing facilities for cytology	43	68	78
Number of laboratories with annual volume over 2000 cases (eight cases/day)	8	26	38
Number of screening technicians employed	27	68	91
Technicians trained in Ontario during year	6	19	26

The foregoing summary of the progress of cytology in the province was completed with the co-operation of the directors of laboratories throughout Ontario.

D. W. THOMPSON, M.D.,
Regional Adviser, Ontario.

Cytology in Quebec, 1965

Although cytology had an early start (1944) in Montreal, its evolution was slow for many years. About 1953 interest in such examination became more evident and more generalized. In a survey of existing facilities in 1962, we postulated that all hospitals over 100 beds should provide some form of cytological examination, just as each hospital over 200 beds should have the immediate services of a pathologist. Therefore the survey questionnaire was sent to all hospitals in this category. As a result, we found that 13 hospitals accounted for 95% of the cytology done in the Province of Quebec. Following a similar survey in 1964, we found that the volume had increased from 62,212 specimens in 1962 to 128,685 in 1964. In proportion to the total population this number is still small. The increase was probably due, in part at least, to the fact that the Quebec Hospital Insurance Services now pays \$4 for individual cytological examinations.

No attempt has yet been made to screen large blocs of our population. However, from the responses to the questionnaires, it is evident that there is a great deal of enthusiasm for cytological examination. Most of the hospitals asked where trained personnel, cytologists

and cytotechnologists could be obtained. Many pathologists, although expressing an interest in cytology, reported that they could not spare enough time for it.

An interesting trend was noted in 1964 and appears to have increased in 1965, viz. the change from inpatients to the doctor's office as the source of case material. This is probably an indication that the cytology was done prior to the hospital admission, especially in the course of obstetrical and gynecological procedures, and that the examination was not repeated. It follows that in other places duplication of examinations may occur when routine examination is done on admission to hospital.

In two large hospitals in Montreal, the source of material was the doctor's office in 84 and 70% of their cases, respectively. The number of cytotechnologists and cytologists available is still far short of the demand, and a concerted effort towards establishing training facilities is definitely needed.

J. H. DARCHE, M.D.,
Regional Adviser, Quebec.

Cytology in Nova Scotia, 1965

The steady growth in the facilities for and the use of cytology in Nova Scotia is indicated in the following tables:

VOLUME OF GYNECOLOGIC CYTOLOGY

1960	3054
1961	7195
1962	15,397
1963	20,402
1964	25,917
1965	33,713
Estimated—women over age 20	200,000
Estimated—women over age 25	182,000

OTHER STATISTICAL DATA (1965)

Cytology laboratories—total	8
No. of trained cytotechnicians in 1965	8
No. of cytotechnicians in training in 1965	7
No. of cytopathologists	1
No. of pathologists doing cytology	10
No. of other physicians doing cytology	1

Cytology is performed in seven regional laboratories and one central laboratory. A Technician Training School supervised by a trained cytopathologist is located in the Central Laboratory. It appears that there is sufficient staff to carry out the screening needed in this province. Because of the current policy under which cytology is considered to be a regional laboratory service, a significant amount of screening is still being done by pathologists in small laboratories which do not have cytotechnicians.

Cytology is a "free" service in Nova Scotia, i.e. it is paid for on a unit basis as an insured service of the Hospital Insurance Commission. For five years a Uterine Cancer Detection Program, sponsored by the Medical Society of Nova Scotia, has operated under a National Health Grant. This program, primarily an educational and follow-up service, has resulted in a greatly increased use of cytology by practitioners and the expected increase in identification of pre-invasive uterine cancer. Although no specific program encourages the other uses of cytology, in 1965 approximately 9713 non-gynecologic cytology specimens were examined.

S. C. ROBINSON, M.D.,
Regional Adviser, Nova Scotia