# Surveillance methodology for the practice of medicine

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**A multitude of projects and systems are under way in North America for methodically evaluating the efficiency of medical care in terms of cost, accessibility and quality. Developments in this field, designated as "Surveillance Methodology", are reviewed in this report with emphasis on Canadian practice. Trends and problems are identified and predictions made on the direction future developments will take.**

The surveillance of the practice of medicine, in the sense that the work of a physician is systematically and continuously reviewed by someone else, is a controversial subject on which strong positions are often taken. At one extreme it is argued that the individual physician is a law unto himself in respect to his methods and decisions, with an obligation only to do what he thinks best for his client regardless of other authorities or even his own peers.[1]

At the other extreme, it is argued that society, through a political process given expression by duly constituted authorities, can prescribe rules and conditions which the physician must follow, and that there is no limit to the kind of rules the authorities can establish, if they so desire.

The choices on the spectrum between these two extreme positions are many. In this article on surveillance methodology, it is the choices that will be explored as well as the trends in Canada respecting an analytical approach to economy, accessibility and quality of care provided by physicians.

## The setting

The values and powers of the medical profession in Canada, taken together, constitute a sub-cultural base which has been explored at length by others.[2] In brief, the values and powers which have been transmitted, expanded and reinforced through the years, focus upon the independence and freedom of the individual practitioner, and particularly on his freedom from lay control. How these values are acquired by a physician during his training, and how they conflict with social and managerial values has also been explored.[3] The physician in Canada traditionally sits squarely at the top of the health hierarchy, sharing power only with other physicians, and then only in a way by which his individual freedom is substantially preserved. Quality standards for admission to the profession are administered by professional colleges and associations, which, in return for this authority try to ensure that these standards are met on a continuing basis throughout the physician's career.

The dominant mode of remuneration is a fee-for-service system by which each service is charged according to a schedule of fees drawn up by the professional association but to which physicians have not always been required to adhere.

Until the government-sponsored medical plans were introduced in Canada, physicians either billed patients directly for their fees or sent bills to various private or physician-operated prepaid insurance plans to which patients belonged on a voluntary basis by the payment of a premium.

This system of values, powers, and remuneration provides the setting against which surveillance methodology in Canada must be judged.

## Governmental prepaid medical plans

Each of Canada's ten provinces administers a prepaid medical plan to which individual physicians submit accounts for payment according to a fee-for-service system. Costs of the plans are shared on a roughly equal basis by the federal government and by the provincial government concerned.

The advent of government prepaid medicine has brought with it the requirements for financial control which apply generally to the expenditure of public funds. Typically these requirements ensure:

1. That the service billed was actually rendered.
2. That the amount charged was at an acceptable level.
3. That the bill was submitted by an authorized practitioner.

However, since nearly all personal medical care in Canada is paid for through a government prepaid plan, and since bills for individual service must be rendered in every case, there now exists a comprehensive data base on medical care which lends itself to a multitude of analytical approaches. With this data base has been coupled the processing power of large-scale somputers to provide what is potentially a surveillance system of impressive proportions. It is this combination of:

- public financial liability;
- a comprehensive data base; and
- computer power

which is inexorably moving the physician from his traditional position of being answerable only to himself or, marginally, to his peers, to the position where the paying agency and his peers can draw, and act upon, conclusions respecting economy, ac-

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cessibility and quality of care both in general and for individual practitoners.

**Costs of physician-generated decisions**

Through their decisions, physicians generate some 80 percent of all health costs. Hospitalization represents approximately two thirds of personal health expenditures in Canada and when physician remuneration and cost of prescription drugs are added the 80 percent figure is a conservative approximation.[4]

In Canada it is a physician who:

- decides if a patient will be admitted to hospital and how long that patient will stay (subject to qualification in the next paragraph).
- refers a patient to a specialist.
- authorizes laboratory tests.
- authorizes X-rays.
- decides on recalls for further examination.
- decides on a particular course of treatment, including surgery.
- prescribes drugs.

These, and similar physician decisions, generate the great bulk of health costs. The principal costs not generated by a physician include the cost of health education, the decision by a patient for an initial visit, the cost of self-medication, the cost of public health measures, and the cost of hospitalization where a patient could be discharged but is kept in hospital for other than medical reasons.

Because physicians' decisions are so important, from a cost point of view, it was inevitable that they would become a focus of attention as costs of health care continue to climb.

**Peer review**

Peer review has been the only acceptable authority to physicians in Canada in respect of how they practise medicine. Until the adoption of prepaid medicine, either public or private, the peer review was carried out only on a fragmented basis. In the first instance peer review decides if qualifications merit entry into the profession and a licence to practise. Medical audit and tissue committees in hospitals have provided a measure of peer review over a physician's work in a hospital. Several studies[5-7] indicate, however, that in other settings, and especially in the care given patients outside the hospital, there has been little systematic review. Even where episodic review takes place, advice by one physician need not be accepted by another because the ultimate responsibility for the patient's welfare rests with his own physician. Peer review also takes place when a charge of ethical impropriety is brought before a licensing college or association for decison and discipline.[8, 9]

In spite of the fragmentary and episodic nature of peer review within the profession's own surveillance system, it is put forward by physicians as a keystone of their code and as a principal instrument for the protection of the public. With prepaid medicine, the medical profession's own surveillance initiatives have been supplemented by those deriving from the data base generated by the medical plan. These supplementary initiatives have led to more systematic peer reviews, usually by a council of physicians to whom the cases are referred for decision by the plan.

Differences exist as to what constitutes a "peer." A salaried physician working full-time for a medical plan may or may not be accepted as a peer by practising physicians. In several U.S. systems, a "peer" is defined as someone who practices 50 percent of his time in the field he is reviewing. This excludes both academics and salaried plan physicians. In this paper a "peer" is defined as a licensed physician, other than a salaried employee of a prepaid medical plan, to whom a matter is referred for review by a competent authority either governmental or professional.

**Fee for service and Canadian surveillance methodology**

Many elements of Canadian surveillance practice are an administrative consequence of the fee-for-service system. Where a physician gets a fee for each service performed, and where that fee must conform with an agreed schedule of rates, the paying agent understandably must verify the account before payment.

The fee-for-service system has one principal advantage. It motivates physicians to work hard because there is a direct link between the amount of work and the level of income. With the accelerating demand for health care which follows from the introduction of prepaid medicine, this motivating characteristic is highly valued. A second important advantage is that the billing system provides data for surveying what each physician is doing. On the other hand, the fee-for-service system has certain weaknesses.

> *"In marginal cases even the most scrupulous of providers will have an incentive to undertake a procedure. Less scrupulous providers may engage in "remunerative surgery" or needles hospitalization. Doctors may decide to perform services in cases which they would refer to others more qualified were there no financial element involved. Physicians who serve so many patients that they can treat only symptoms rather than reach the cause of illness might be unwilling to reduce the number of patients, in part out of fear of thereby reducing income. The incentives might not operate consciously or in all cases: on the whole, however, their effects are felt."*[10]

It is to guard against some of these weaknesses that many elements of the medical plan surveillance system in Canada is designed.

There are elements, however, which are designed to monitor practices which are likely to occur under any system of remuneration. Quality of care, the utilization of laboratory tests, hospital admission rates, and the rate of referral to other specialists are all matters in which problems might arise under any system of remuneration.

Finally, there are elements of surveillance which are not re-

quired under a fee-for-service system which might be needed where salary or capitation systems are in use. Under-working and under-servicing may be problems requiring monitoring in salary or capitation system of remuneration.

In this review of Canadian practice, care must be exercised by the reader in distinguishing between elements of the surveillance system, particularly administrative and financial procedures, so as to identify those that are required only as a consequence of the fee-for-service system.

### Administrative methods

All ten provincial plans carry out administrative and financial surveillance of the bills submitted by physicians for services rendered. Initially an **assessment** procedure is followed by which all bills are checked against the plan's fee schedule. There are a number of assessment rules which set out the manner in which the fee schedule is applied under differing conditions. These rules are applied either by the computer in an automated system or by assessment clerks in a manual system. Where a case does not fit the established assessment rules, or involves a complex medical question, it is referred to a physician, usually employed by the plan on a full or part-time basis. This medical adjudicator can authorize payment. If he refuses to authorize payment, and the billing physician disagrees with this decision, an appeal can be launched by the billing physician to a committee of physicians who review the case and make a decision. In this way, difficult cases of assessment are handled eventually by a committee of peers.

**Verification** has two purposes: to ensure that the service was performed as billed and to inform the beneficiary of the amount paid on his behalf. By a sampling system, which varies from one plan to another, beneficiaries are selected to whom a verification form is sent. This form, typically, indicates the date, type of service, physician and amount for a medical service paid for by the plan on the beneficiary's behalf. Usually, the beneficiary is asked to return the form only if he finds errors in the statement. This practice is called "negative confirmation." Less frequently the beneficiary is asked to return the form with his comments, regardless of whether the information is right or wrong. This is called "positive verification."

Routine verifications are usually carried out on a monthly or quarterly basis. A number of claims are selected randomly and verification forms sent out. When errors are reported these are followed up by plan officials who contact the physician to find the reason for the error.

If there is reason to suspect that a physician is abusing the plan, a special verification may be ordered by plan officials. The special verification is usually directed toward a specific type of service (e.g. a physician is billing for what appears to be an excessive number of emergency house calls). Typically, verification notices are sent out to one hundred beneficiaries who have recently received the service being investigated. Each beneficiary is asked to return the form, completed, whether the service has been received or not. Under some plans the physician is advised that a special verification is taking place but other plans make no effort to inform him. Somtimes the physician becomes aware of the special verification only when patients seek advice from him on how to complete the form.

Some plans have attempted one hundred percent verification by sending a copy of each physician's statement to the beneficiary. Abuses are usually so infrequent that the one hundred percent verification is not worthwhile.

Inherent in the verification system is a program of public education. The system keeps them informed of costs and where an error has been confirmed they are advised of the results. In this way they are made aware of how their medical plan works.

One problem with verification is that it might conflict with the confidentiality of the patient-doctor relationship. A housewife who receives in the family mail a verification form for a service provided by a genito-urinary specialist to her husband may ask unpleasant questions, as will a father who is asked to verify the services of a gynecologist to his young, unmarried daughter. Tragic consequences can ensue where the system breaks a confidence of this kind. One plans has an effective solution to this problem. It asks the physician to indicate, on his account form, if he does not want the service verified. Even further, certain clinics, such as for unmarried mothers, are exempted **in toto** from verification procedures.

### Profiles of practice

A physician profile is a summary listing of all the services provided by a particular physician to his patients over a given period of time (monthly, quarterly, annually). It may also show the number of services and costs generated by the physician in other parts of the health care system, such as laboratory services and consultations with specialists. As well as numerical lists, ratios are also calculated where they are useful as indices, such as cost per patient and service per 100 patients.

From the individual physician profiles a mean or average profile is developed which groups physicians with similar types of practices in similar geographic locations.

With the group or bloc profile it is possible to match a physician's pattern of practice with the pattern of his peer group. Significant deviations can be identified for review by plan officials and, if warranted, referred for review to a committee of peers. As a rule profiles are not referred for review unless they reflect a major and continuing deviation.

It is also possible with the same data base, to reconstruct the physician's daily schedule.

The peer committees to which deviant profiles are submitted for review are typically chosen by the medical association or college of physicians and surgeons in the province concerned. Both cost and quality of care are considered but even where quality is involved the sanctions are principally economic ones. A physician's earnings may be reduced by a large percentage of the amount billed for services unnecessary or excessive.

In one province, the peer committee has used its authority to charge physicians, from their own billings, a percentage of the costs of using referred services excessively, such as laboratory services.

Amalgamation, into a single profile, of the data obtained from both the prepaid medical and hospital plans is in the infant stage. In the provinces where this amalgamation is being developed it will be possible to add to the present profile, hospital admission data and length of stay, by diagnosis if so desired, and to compare these to either pre-determined norms or the averages for the peer group.

At this point the only generated cost not recorded will be the cost of prescription drugs, and the only pattern missing will be the pattern of prescription.

### Drug prescriptions

Except for one private prepaid pharmaceutical plan, no system has yet been implemented for monitoring the prescription practices of individual physicians, save for particular drugs, such as narcotics, which are subject to special government control. However, pressures for a monitoring system are starting to build up from several sources. Some 30 percent of all drug prescriptions in Canada are written for mood-modifying drugs and their cost is approaching 40 percent of the annual prescription drug bill of some $300 million. This situation is causing alarm both from a social and from a financial point of view.

The practice by some patients of obtaining prescriptions from several doctors is growing and is also causing alarm. Finally there is a growing recognition of a need for a single record, by patient, of drugs prescribed or taken.

A landmark study on the prescription practices of physicians in an outpatient department of a large hospital, has just been published[11] and reveals the scale of over-prescribing and of the prescription of contra-indicated drugs in that institution.

Finally, there is in Canada a surveillance and control system for manufacturing and distribution which is administered by the Food and Drug Branch of the Department of National

Health and Welfare. This control system includes the licensing of new drugs, the monitoring of adverse drug reactions, the inspection of drug manufacturing facilities and quality control systems, and the assessment of the quality of drugs on the market.

### Accessibility of physician care

Two problems of physician distribution beset Canada, one the distribution of physicians among specialties and the other the geographical distribution of physicians. There is, in both cases, sufficient maldistribution to warrant concern and steps are now being taken to establish surveillance methods for determining and maintaining accurate records of the distribution of physicians on both counts.

All of the national physicians' associations have been convened and the process has now been started by which special incentives will eventually be developed to bring specialty and geographic distribution more into line with the needs of Canadians.

The maldistribution of physicians between urban and rural areas is a serious problem and various incentives are being developed to correct it. One province has succeeded, in the two years its incentive program has been functioning, in filling 77 of 203 applications by rural areas for physicians. Another province proposed direct action by a law which would give it the power to determine a physician's right to admit patients to a particular hospital. By refusing admission privileges in overdoctored areas it hoped, eventually, to force a better geographical distribution. The proposed law was modified in consultation with the provincial association of physicians but the goals have been accepted as valid and will be acted upon by the association.

### Effect on costs

There is no doubt that surveillance methods in use today in Canada focus on cost control rather than on the quality and accessibility of medical care. It is wrong, however, to judge the effect of surveillance solely by the amount recovered through the detection of errors and abuse. On the contrary, when the system is operating properly and is well understood by both physicians and beneficiaries, errors and abuse should decrease. Plan officials, based on their experience, state that the economic effects of the **administrative** surveillance system stem more from the deterrent aspect than from the direct recovery of funds.

As surveillance methods are extended to cover referred costs such as laboratory use and hospital admissions, much greater improvements in efficiency can be achieved than by simply monitoring the services provided, and billed for, by the physician.

### Quality of care

The ultimate goal of quality of care would be to have instantly available at all times to all Canadians the very best physicians and treatment facilities, and to provide these without discrimination and according only to need. No one claims that this goal has been achieved nor does anyone expect it to be achieved in the foreseeable future.

The use of a surveillance system based on physician data from medical plan billings has severe limitations as an instrument for improving the quality of care. One cannot base a quality of care judgment solely on a physician's gross activity figures compared to those of his peer group. Poor quality medicine could easily go undetected by this measure alone.

At the same time certain judgments can be made from medical plan data, and these judgments will become more certain as the methods become more sophisticated. Should a physician continually and excessively undertake procedures which are not acceptable this can be identified. In one provincial plan, for instance, injections of certain vitamins are accepted for payment only for specific therapeutic reasons.

One avenue which remains to be explored is the use of medical plan data to establish the overall frequency of the various medical procedures. This information can be used to determine the volume of relatively simple procedures which could be carried by paramedical personnel, freeing the physician for health problems of a more complex nature. It could also be used to help determine the need for refresher training or even for changing the emphasis of various subjects at medical schools.

Admitting the limitations of using medical plan data for improving quality, there are still some important opportunities which have not yet been seized.

Model courses of treatment are being developed for various illnesses against which the actual practice of a given physician can be matched.[12] Serious deviations from the model courses are questioned.

One important record which has not yet been adequately developed by most Canadian plans is a record of the services received by each patient, including the outcome of actual courses of treatment received by that patient. Preventable impairment from a particular disease can be estimated in advance, and compared with what actually occurred, to identify areas where significant improvements in quality can be made. This aspect of prognostic epidemiology has been explored by Sanazaro and Williamson.[13] Patient profiles, which focus on quality or care have tended to be neglected because attention so far has been mainly focused on costs.

One province in Canada supplies physicians with their profiles on request permitting them to evaluate their own pattern against the average for their peers. In one large clinic the profiles are obtained from the medical plan and used for reviewing the work of member physicians. This practice is likely to grow as group practices and community clinics become more prevalent. A recent study of the future, carried out by the Bell Telephone Company of Canada,[14] indicates that group practice will grow sharply, by comparison with solo practice, in the next

15 years, providing an organized setting for the peer review of patterns of practice and quality of care.

### Record abstract review

This system consists of the routine abstraction and coding of selected information from patients' hospital records and the processing of it in a variety of ways to provide statistical data for surveillance and for conducting the medical audit.

Two principal systems are in use, the P.A.S. (Professional Activities Study) system and, in Canada, the H.M.R.I. (Hospital Medical Records Institute) system; both utilize computers.

Data selected for abstraction are designed to give an indication of how the physician and the hospital have managed the patients under care. Diagnosis, physician, length of stay, procedures performed, investigations and complications are abstracted as well as a gross measure of outcome such as discharge, death or transfer to another facility.

There are now 1500 hospitals in the U.S. using P.A.S. while H.M.R.I. abstracts data on 50 per cent of the patients dischared in the Canadian province of Ontario.

Progress in implementing record abstract reviews and in using the data for improving medical care has been painfully slow for the following reasons:

- Medical records do not have the confidence of some physi cians as a basis for judging quality of care.
- Practising physicians assigned to peer review committees cannot always give the time really needed for the adequate investigation of results.
- Statistical and other reports are not always designed for easy evaluation.
- Hospital administrations have limited authority and competence for evaluating quality of care, especially in aberrant cases.

In spite of these difficulties there is no doubt that a records abstract review system, coupled with computer technology, is a powerful data base for evaluating hospital and medical care, and that prepaid hospital and medical care will hasten the use of the data for both cost and quality aspects of care.

### Retrospective and prospective approaches

Retrospective surveillance, as the name implies, consists of the analysis of historical data. It takes place after the event and is the dominant mode for surveying the practice of medicine in Canada. Medical records, physician profiles, tissue samples, and other sources of information are examined and analysed after the procedures have taken place. It is, of course, intended that the surveillance will result in actions which will have an effect on the way medicine is practised in future but its goal is corrective rather than preventive.

Prospective review, by contrast, is an ongoing process and is intended to affect procedures as they are initiated or while a therapeutic program is being carried out. Typically, prospective methodology defines, for a particular disease, a model course of treatment to which a physician can refer for guidance in his actual practice. The goal of prospective review is preventive rather than corrective.

While the dominant mode for surveillance in Canada has been retrospective in nature, some medical care plans have used the historical data to develop norms for specific therapeutic programs, and physicians are expected to justify any deviance from these norms. In this way retrospective surveillance techniques have formed the basis for more prospective surveillance programs.

An example of prospective or ongoing surveillance is the system used by one of the provincial Workmen's Compensation Boards in Canada. Every injured workman is reported upon, after examination, by a physician and from this report a course of ongoing review, including progress reports, is established. If unforeseen complications develop, the board may suggest consultation with, or referral to, another physician.

Continuing education has been a subject of growing concern to the professional colleges and associations in Canada. Both retrospective and prospective surveillance techniques provide wide scope for continuing education. As quality standards are being established the physician participating in their formulation must review his own experience, the collective experience of his peers as well as examine the relevant literature in the field. The surveillance techniques also allow the practising physician to measure his present performance against his own historical experience, that of his peers, and the norms recommended. When fully developed a surveillance system allows the physician to update himself on an ongoing basis, without the necessity of taking time off and travelling to medical education centres which may not be easily accessible to him. A sophisticated surveillance system is therefore a key factor in a continuing education program.

### Enforcement of findings

There is no point in operating a surveillance system unless there are instruments by which sanctions can be applied.

First there are the sanctions that can be applied by the licensing body, such as a withdrawal of the right to practise, suspension, withdrawal of the right to prescribe narcotics and so on. These are rarely needed.

Next, there are sanctions applicable through the courts such as penalties for fraud.

The medical plan regulations provide a number of sanctions including the recovery of money for an improperly billed account.

Another sanction is to reduce the amount billed. This method is known as "taxing"—or proration and is relatively widely used. In its simplest form, an account can be reduced, or "taxed" when the fee demanded exceeds the scheduled fee and there are no extenuating or complicating factors to justify the higher charge. In a more complex form a lower amount is paid when the service is deemed to be different from that given on the account. Thus an "emergency house call" might be reclassified as a "routine house call" at a lower rate. Sometimes a physician's accounts are taxed on a wholesale basis, i.e. all services of a particular kind are reduced by a stated amount or percentage because of the abnormality of the physician's pattern of practice compared with that of his peers. At least one province sometimes taxes a physician's accounts because of an excessive use of referral services, such as laboratories. This practice, which takes from the physician a large proportion of his referred costs (for services provided by others at his request) was authorized by the physician-operated plan which preceded the government plan in that particular province and was therefore "inherited" by the government plan.

Some plans withdraw a physician's right to bill the plan, forcing him to bill the patient who must himself recover the money from the plan. The deterrent element in this sanction is that it forces the physician to collect his own accounts. There are some physicians, of course, who prefer to bill the patients directly from the outset.

For those physicians who are sensitive to peer judgment, surveillance findings can be given effect by simply advising them that in the judgment of the medical review committee certain of their practices are questionable.

For all the foregoing plan sanctions, there is an appeal mechanism by which any physician who disagrees with the sanction can appeal it through a variety of stages. He may appeal to the medical director of the plan or if he wishes to a medical committee formally constituted as the peer review group. Some physicians, undertaking new lines of treatment in their work, advise the plan in advance that their patterns of practice are going to deviate significantly from normal during the period the experimentation will take place and do so without penalty.

The amount of uncertainty inherent in the art of medicine limits the extent to which a peer can impose his conclusions on another, particularly when the treating physician must bear the responsibility for the patient's welfare. Surveillance methodol-

ogy, to the extent that it reduces uncertainty, gives peer review much more "referrent power" than it would otherwise have, "referrent power" being the power to influence another's decision in the direction of those of the power source.

As data are gathered and peer-norms are established for hospital admissions and length of stay, for model courses of treatment, for prescription practices and for the prognoses of the courses of particular diseases, so will "referrent power" grow and uncertainty be reduced.

### The future

Under various headings in this paper indications of future trends in Canada have been given. These, in summary, are as follows:

1. Surveillance will increase, both in range and intensity;
2. The conflict between surveillance and the traditional values of independence held by the medical profession is a real one, but is being resolved;
3. The data now collected on medical and hospital care, when coupled with computer technology, gives the potential for a surveillance system of impressive proportions;
4. Peer review, in one form or another, will be the principal link between surveillance methodology and the medical profession;
5. Systems of remuneration other than fee for service require different forms of surveillance;
6. Trends away from solo practice to group practice will increase the amount and effectiveness of peer review;
7. Hospital admission and discharge records will come under increasing scrutiny;
8. Prescription practises will come under increasing scrutiny;
9. Prospective surveillance, such as model courses of treatment and standard prognoses, will significantly reduce uncertainty in arriving at peer judgments;
10. Patient profiles will be used increasingly for surveilling over-utilization and evaluating the quality of medicine;
11. Sanctions against the excessive use of referred facilities, such as laboratories, will increase;
12. The distribution of physicians, both among specialties and geographical areas will come under increased surveillance and correction;
13. The quality of care, in its purest sense, will increase as new data sources and norms are analysed through surveillance systems;
14. The annual earnings of some physicians will be subject to greater control and limitation, through control of the schedule of fees and by other means;
15. Controls will be put on the plan budgets so as to force a reduction in the rate at which health costs increase.



### Conclusion

The subject of surveillance methodology is one to which the medical profession is very sensitive as it conflicts with the value placed by the profession on the freedom of action of the individual practitioner. With the advent of universal prepaid medicine in Canada, giving governments a direct interest in the efficiency of the health care system, powerful methods of surveillance have been developed and will become increasingly more effective. There does not appear to be any turning back from this course nor would such a reversal be desirable.

At the same time, the involvement of both the public and the profession varies widely from one province to another. It is essential that this involvement be accelerated in an orderly way.

The process of education, consultation, involvement and shared decision making is, at this time, the most important aspect to develop and has been often neglected. If this neglect continues, progress will be hampered by confrontation and misunderstanding, problems no amount of data processing technology can solve.

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