other serum values (mmol/*l*) were Na, 136; K, 4.0; Cl, 104 and CO_2, 25; SMA/12 and SMA/7 revealed no abnormalities; the urine pH was 6.5 and the specific gravity, 1.011. Before undergoing ECT the patient was given atropine, 0.4 mg intramuscularly, thiopental, 200 mg and succinylcholine, 40 mg. The blood pressure was 120/80 mm Hg. ECT was given by unilateral stimulation over the subdominant (right) hemisphere; two exposures were required to produce a seizure. The treatment and immediate post-treatment phase were uneventful.

After his return to the ward the patient became increasingly restless and manifested subdelirium. His speech was incoherent, he did not recognize visitors, responses to questions were inappropriate and he did not cooperate during physical examination. Consciousness fluctuated between short, relatively lucid periods and subcoma; the only abnormal physical finding was an equivocal extensor plantar response on the right. Serum electrolyte concentrations were unchanged. All medication was discontinued.

The following day the patient was less restless and more lucid but consciousness was not clear. He complained that he could not recognize objects around him; he said later that he "could see but that it was difficult to recognize things or persons" — probably visual agnosia. The serum lithium concentration then was 0.59 mmol/*l*, standard electrolyte concentrations were within normal limits, and the electrocardiogram showed diffuse, ischemic-looking T-waves.

The next day consciousness was clear though a degree of visual agnosia persisted. Manic symptoms began to return. The serum lithium value was 0.23 mmol/*l*. Haloperidol, 2 mg *tid*, and benztropine mesylate, 1 mg, were given. The patient was discharged 10 days after ECT.

Encephalopathy with an acute organic psychosyndrome has been described as a complication of lithium therapy, usually in association with higher serum concentrations than were present in our case.[1,2] A few cases are on record with confusional states occurring although the serum lithium value was within the therapeutic range.[3-5] Agulnik, Dimascio and Moore[5] showed that the serum lithium concentration can continue to increase even after medication is discontinued and they suggested that the organic psychosyndrome can result from the tissue concentration of lithium, which can be high while the serum value is low. Ray[6] reported the case of a patient who had received 1200 mg of lithium carbonate while being treated with ECT. The serum value at the time of ECT was only 0.46 mmol/*l*. A confusional state accompanied by epileptiform seizures set in 4 days after the last ECT. The serum value at the onset of the confusional state was unfortunately not reported.

In our patient a severe encephalopathy was precipitated by ECT although the serum lithium value was well below the toxic value (toxic effects can be expected if the concentration exceeds 1.5 mmol/*l*) and subsequent assays did show a steady and rapid fall without any rebound rises. The encephalopathy appears to have been produced by the combination of lithium and ECT and one must conclude that if ECT is to be given to a patient who is receiving lithium the serum concentration should first be reduced to very low values.

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Subcutaneous emphysema during dental treatment

To the editor: I report an unusual case of subcutaneous emphysema that heretofore has only been reported in the journals of oral surgeons.[1-6]

I was informed Feb. 7, 1977, that I was urgently needed at a dentist's office adjoining our medical clinic. I found a patient whose entire face and neck was ballooned. My initial impression was that this was an allergic reaction to the local anesthetic the dentist had used before operating on the patient's upper right lateral incisors. After I sent my nurse to obtain medication from our office the dentist informed me that the patient's face and neck had started swelling after he had used a jet of air to clean away some debris from the area in which he was working. He thought he had inadvertently injected air subcutaneously. After ascertaining that the patient's vital signs were normal and that his heart and lungs were functioning properly, I palpated the patient's neck and face and indeed felt crepitations.

Since the patient complained of dyspnea he was admitted to a nearby hospital for observation. Lateral neck and chest radiographs demonstrated subcutaneous emphysema that extended to the upper mediastinum. The patient was discharged the next day.

Treatment included both antitetanus immunization and penicillin as it was believed that the injection of air was not sterile and that it probably introduced foreign debris into the wound. The patient returned to my office 4 days after the incident; the subcutaneous emphysema was nearly gone and he was quite well.

Serious consequences can occur as reported by Lloyd[7] in a case similar to ours with total pneumomediastinum.

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Several possible approaches to audit

To the editor: Murray, Swanson and Knauf (*Can Med Assoc J* 116: 200, 1977) expressed unqualified enthusiasm for the structured criteria system they described and stated, "The early results of the extension of the clinical appraisal demonstration project to the national field suggests the time is ripe in Canada for introducing this modality of quality appraisal." In promoting the unqualified acceptance of this view they may be performing a disservice to the cause of audit and quality control in a period of limited resources.

They stated, "The structured audit required considerable medical record librarian time." It is necessary to examine the value received in return for this investment in time. The structured criteria system is a form of process audit — that is, it examines what a physician or other health provider does to or for a patient. It can be applied to certain easily defined and clear-cut categories; for example, myocardial infarction, diabetes mellitus and hypertension. It has not yet been successfully applied, even in the Professional Services Review Organization (PSRO) system, to complex, diffuse and ambiguous situations, such as the multiple and chronic pathology of varying severity, often interlinked, of the middle-aged and elderly. It is such clinical complexity that we most often face in the real world.

The authors stated, "These predetermined criteria are agreed upon by the entire medical staff before the study begins," and also, "Most of the audit results confirmed the opinion of the physicians that their patterns of practice largely conformed to the standard model which they had set for themselves." There is a certain circularity in this logic. If the inclusion of criteria requires unanimity it would be surprising if the patterns of practice did not conform to the criteria.

It is necessary to remember that the ultimate objective, the "bottom line", is the effect of audit on quality of outcome. Nobrega and colleagues[1] have recently questioned the validity of the method of explicit process criteria, and their report suggested that in the case of a set of explicit criteria relating to hypertension no relation exists between a process and an outcome assessment of quality of care. They stated, "Perhaps the assumption that a general list of process criteria when applied by physicians to patients with a specific condition will assure a good outcome is inappropriate and unrealistic." The matter is, of course, controversial; Brook[2] raised many of the problematic issues.

What is important is that there are several possible approaches to audit and the study of the quality of care: structural, process, outcome and concurrent peer review. As Brook[2] suggested, one approach may be to focus on very simple process criteria as a means of correcting major deficiencies in care. Such a concept lends itself to audit by exclusion, a much more economical procedure than a comprehensive structured criteria system.

We hope that the already scarce resources available for audit will not be pre-empted by an extension of the clinical appraisal demonstration project throughout Canada, to the exclusion of other types of audit.

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To the editor: We completely agree that there are several possible approaches to audit and study of quality of care. In the "Guide to Hospital Accreditation 1977" we pointed out on page 22 the six essential characteristics of an acceptable patient care evaluation procedure. The words "structural, process, outcome and concurrent peer review" do not appear in the list of essential characteristics.

The Canadian Council on Hospital Accreditation is at present initiating a project to develop a modification of the criteria system of audit applicable to long-term-care centres. By basing criteria on observable elements in the treatment plan it is possible to use this methodology of audit to determine the progress and quality of care of long-term-care patients even when there is no hope of cure.

I cannot close without a reference to "a certain circularity in this logic". While being delighted with this phraseology, I must point out that Dr. Robert Brook,[1] in one of his earlier writings, quoted a study by the American Society of Internal Medicine in which the actual performance of a group of internists was compared with their agreed-upon criteria for the ideal conduct of a case. In this study compliance of actual practice with agreed-upon criteria was very low. We felt that the adoption of realistic criteria by the participants in our trial was worthy of special note.

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Reference

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Existing MRC reviewing procedure

To the editor: In view of the limitation of funds for scientific research and development in Canada, we should not only voice our concern regarding the grave consequences of such a (lack of) policy, but also must review the present system of grant allocation, for researchers must maximally use the available funds and talents through a wider distribution of grant money than the present system permits. For a given system to function properly it is essential that the system be periodically reviewed, and in grant distribution by the Medical Research Council of Canada (MRC) three areas require attention: applicants' notification of the reasons for the action taken by the committee; submission of grant applications (for 2-year and term grants) on a once-a-year basis only and abolition of annual grants; and distribution of available funds among a greater number of meritorious investigators.

Improvement in the reviewing process could be achieved by transmitting