ATTENDING(1), a computer system built using artificial intelligence (AI) techniques, has been developed to critique a preoperative plan for anesthetic management. Input to ATTENDING includes 1) a list of a patient's medical problems, 2) the planned operation, and 3) a list of the techniques and agents proposed for premedication, induction, intubation, and maintenance of general or regional anesthesia. ATTENDING then critiques this plan by analyzing the risks and benefits of the proposed approach as compared to other reasonable approaches.

Initially, the system will be used to allow anesthetist self-evaluation, with the computer describing hypothetical patients for consideration. In this tutorial mode, ATTENDING can be experimentally evaluated with a small database, since it need only know about those medical problems which relate to the hypothetical cases.

An Example
To permit anesthetist self-evaluation, ATTENDING first describes a hypothetical case:

"A SIXTY YEAR OLD MAN, WITH A LONGSTANDING HISTORY OF CHRONIC RENAL FAILURE AND A PRIOR STROKE, COMES TO THE OR FOR REPAIR OF A METAL SPLINTER EMBEDDED IN HIS RIGHT EYE. HE RECENTLY ATE LUNCH."

The anesthetist then proposes a plan for anesthetic management, e.g.:
1. induction with thiopental
2. rapid sequence intubation using succinylcholine
3. maintenance using halothane, curare, nitrous oxide, and oxygen.

ATTENDING'S current prototype implementation produces the following critique of this plan:

"THERE ARE A NUMBER OF BASIC PRINCIPLES INVOLVED IN THIS PATIENT'S MANAGEMENT. FIRST, IN THE PRESENCE OF A FULL STOMACH, ONE MUST ATTEMPT TO PREVENT ASPIRATION. SECOND, IN A PATIENT WITH A PENETRATING EYE WOUND MUST BE PROTECTED FROM INCREASED INTRAOCULAR PRESSURE. THIRD, IN A PATIENT WITH CHRONIC RENAL FAILURE, ONE MUST CONSIDER THE PROBLEM OF COMPROMISED EXCRETION OF DRUGS.

"INTUBATION OF THIS PATIENT IS CLEARLY IMPORTANT BECAUSE OF A FULL STOMACH. RAPID SEQUENCE INTUBATION IS A REASONABLE APPROACH. THE CHOICE OF SUCCINYLCHOLINE, HOWEVER, COULD HAVE TWO POSSIBLE RISKS. FIRST, IF THE STROKE IS RECENT AND INVOLVES HEMIPARESIS, THERE IS THE RISK OF LIFE-THREATENING HYPERKALEMIA. SECOND, THERE IS THE RISK THAT SUCCINYLCHOLINE COULD CAUSE EYE MORBIDITY FROM INCREASED INTRAOCULAR PRESSURE. AN ALTERNATIVE WOULD BE HIGH DOSE PANCRUORINUM. HERE, HOWEVER, IN A PATIENT WITH CHRONIC RENAL FAILURE, THERE IS THE RISK THAT IT COULD CAUSE PROLONGED POSTOPERATIVE PARALYSIS DUE TO COMPROMISED RENAL EXCRETION. THUS, THERE IS NO IDEAL WAY TO PERFORM RAPID SEQUENCE INTUBATION. AN ALTERNATIVE APPROACH, PERHAPS, TO RAPID SEQUENCE INTUBATION WOULD BE INTUBATION AFTER MASK INDUCTION WITH CRICOID PRESSURE."