9. SUMMARY AND CONCLUSION
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Computer-based medical diagnosis consultations, when provided by clinicians familiar with the limitations of the system, were found both accurate and educationally helpful in most cases. The interest in the development of Computer-Aided Diagnosis In Neurotology (CADINO) began with a desire to overcome the problems of knowledge gaps so often felt by ENT surgeons in dealing with patients of dizziness, which is one of the most common medical complaints, second to headache.

The dizziness gives not only the horrifying experience to the patient but also perplex the treating ENT surgeons and neurologists. A seemingly endless number of disorders can result in symptoms of dizziness and disequilibrium. The symptoms of dizziness can be difficult for the patient to describe and for the physicians to categorize. As humans, busy ENT surgeons making complex decisions under stressful circumstances in a short time, may forget to consider important diagnostic possibilities during workup. The consequences of such errors may range from nothing to life-threatening complications.

The CADINO is developed in Microsoft (R) Word 2000 using hyperlinks. CADINO addresses the problem of taking detail and proper clinical history in cases of dizziness. Given a patient’s findings, CADINO, which is meant for use as a near-patient decision support tool, aids the ENT specialists in the diagnoses of dizziness. It aims to reduce diagnostic errors and improve patient care. CADINO enhances the knowledge and cognitive skills of the consultants and provides them a checklist of reasonable, relevant dizziness diagnoses for the consideration. So CADINO reminds the ENT surgeons of diagnoses they know about but may not have thought of.

The capabilities of the CADINO derive from its extensive knowledge base and computer programs that provide differential diagnoses of dizziness. CADINO differs from most other programs for computer-assisted diagnosis in the generality of its
approach and knowledge base. Problem-solving algorithms represent the intellectual core of CADINO. The behavior of CADINO results mainly from the application of two principles: the formation of problem areas through a partitioning algorithm and the conclusion of diagnoses within problem areas, using strategy of diagnosis by exclusion.

To document the strengths and weaknesses of the program I performed a systematic evaluation of the capabilities of CADINO. Its performance appeared similar to that of ENT surgeons. The diagnostic sensitivity of the CADINO was 84.78%. CADINO provided reasonable diagnostic suggestions not previously considered by the ENT surgeons. It was found improving patient safety and quality of care by enhancing knowledge and cognitive skills of the otolaryngologists.

Average time per consultation for CADINO on a standalone basis took less than 10 minutes. In CADINO there is no data entry therefore it is very quick. The user simply selects the pertaining item and no typing/printing is needed. ENT surgeons had to select from a series of options for each clinical feature. So, the CADINO system would be most useful in clinical settings with rapid turnover.

While the CADINO system is primarily a clinical decision support system, its educational value cannot be underestimated. Even if the diagnostic advice did not change practice for one patient, the information gained from its knowledge might help the next dizziness patient. In addition, it has an invaluable role to play in medical education at any level to illustrate the art of history taking (most important in cases of dizziness) and diagnostic decision-making. In 21 (84%) of the 25 participants rated the CADINO consultation to be educationally helpful. The same proportion of participants 21 (84%) rated CADINO consultation useful for patient management.

The diagnostic sensitivity of the CADINO, 84.78% (Patients 84.38%, simulated cases 87.50%, case reports 83.33%), was approximately similar to that of faculties 81.25%, but better than that of residents, 62.5%. The CADINO was found to remind the users to consider a major diagnosis they had not considered and thus could reduce diagnostic omissions and the number of medical errors.
The cognitive factors contribute to diagnostic error in majority of cases. The most common cognitive problem is faulty synthesis. Premature closure, which is the failure to continue considering reasonable alternatives after an initial diagnosis was reached, was found to be the single most common cause. There is immense value of compiling a complete list of differential diagnoses to combat the tendency to premature closure. CADINO addresses these issues very well.

CADINO can be used in ambulatory settings and outpatient departments as a reference tool. Rural people do not get the services of otoneurologist in their areas. CADINO has the potential to serve as a neurotologist. After some training and practice even general practitioner (GP) and primary healthcare providers should be able to use CADINO. Thus it can prove to be a boon to the less privileged people of remote areas. The CADINO system is easily portable and can be run on different models of PCs. Lab Tops are becoming ubiquitous now.

Because of its transparency it enthuses the confidence of the patients. So both consultants (ENT surgeons, neurologists, psychiatrists, audiologists, physiotherapists) as well as postgraduate students can use the CADINO. Medical students can use it as a tutor. It is an aid to the specialists to look up complex information quickly and also provides them second opinion to review the case from other angles. The system will list different diseases on the basis of findings of the patient. The physicians who are not efficient in typing can also quickly learn and use the CADINO because they simply select one pertinent finding of the dizzy patient from the short list of options.

Specific deficiencies of CADINO include its inability to reason temporally and construct differential diagnoses spanning multiple problem areas. Though the CADINO was found improving patient safety and quality of care by enhancing knowledge and cognitive skills of the clinicians, yet remains a research tool. After refinement of knowledge base and diagnostic programs, a further large prospective clinical evaluation will be required in terms of diagnostic accuracy and danger to the patient. CADINO has the potential to broaden the clinicians’ scope and awareness of data important for the diagnosis of dizziness.