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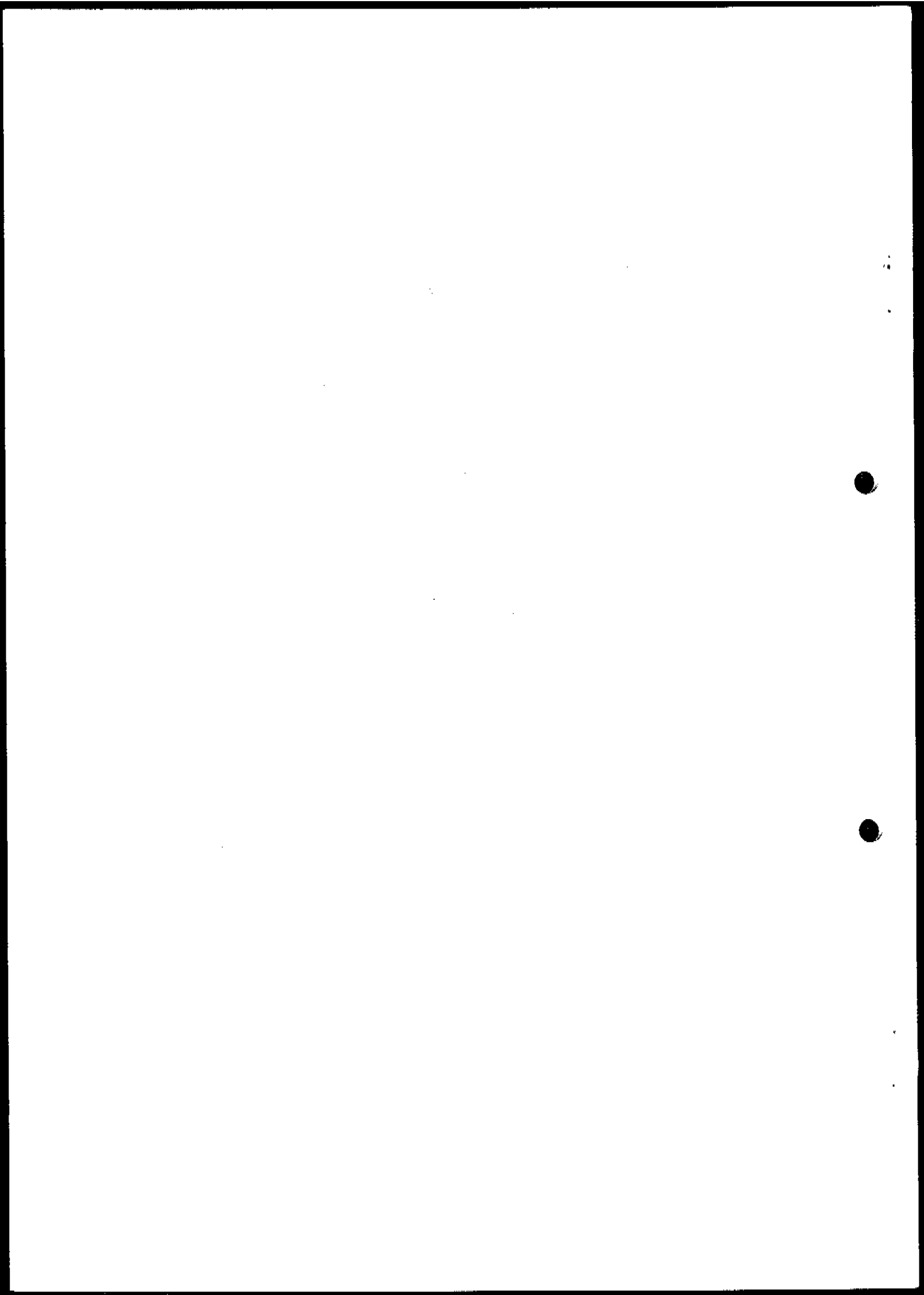
PATHOGNOMONIC VALUE OF SYMPTOMS AND SIGNS
 OF ACUTE RESPIRATORY INFECTIONS

by

David L. Miller
 Professor of Community Medicine,
 St. Mary's Hospital Medical School,
 London W2 1PG, U.K.

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Introduction

The symptoms and signs of an illness are of interest to the clinician only insofar as they help him to reach decisions about the management of his patient. To do this they must make a contribution to his judgement about the likely aetiological agent or the pathological process it is causing, or the future course of the illness. Unfortunately, pathognomonic symptoms and signs which will unerringly inform his judgement in these respects cannot be specified in the case of acute respiratory infections (ARI) which cause a wide and overlapping range of syndromes. To be certain of the answers to his questions would require him to wait for the results of laboratory investigations to determine the agent, or to carry out histological studies which are usually possible only at autopsy, or to observe passively the natural history of events. Since he can do none of these things, he must rely on an assessment of probabilities. An important role of epidemiological research in the field of acute respiratory infections is to sharpen the

probabilities attached to the predictive power of symptoms and signs, individually and collectively, and thereby to improve clinical management decisions. In the past there has been little impetus for such research because most medical treatment was in the hands of doctors, who usually make their decisions on the merits of the individual case, based on training and personal experience in which there is little explicit recognition of the notion of probabilities. Now, however, with the introduction of the concept of standard management plans which can be used at all levels of care, including health care providers of all ranks, from village aid post orderlies to hospital doctors, the situation has changed.

The development of standard management plans depends on the construction of clinical decision trees (flow charts) in which the treatment end points are reached via a series of critical junctions based on the presence or absence of specific symptoms or signs. The choice of appropriate symptoms and signs for the decision junctions depends on knowledge of the probability that the chosen features will reliably predict aetiology, pathology or prognosis. These probabilities can only be accurately determined through observations of groups of patients with ARI in which critical outcome parameters are related to antecedent clinical features which have been observed and recorded in a standard manner. Such research is expensive and time-consuming. Meanwhile, attempts have been made to develop management plans on the basis of existing knowledge. This paper briefly reviews progress in this direction.

Aims

As stated above, the purpose of trying to define pathognomonic symptoms and signs is to construct decision trees with management end points. It would be ideal to be able to predict the aetiological agent in each case of ARI. In fact, this is impossible because of the extensive overlap in clinical features associated with different agents and the diversity of the clinical response in individuals to infection with the same agent. For practical purposes, however, precision in this respect is not usually critical. It is usually sufficient to be able to distinguish categories of agent, for instance to separate viral from bacterial infection, but not to know which of many different viruses is causing the illness, or which of many serotypes of pneumococcus.

The site of infection may influence management, although in ARI infection is rarely confined to one part of the respiratory tract. Again, however, fine distinctions are not of practical significance and it is generally necessary only to distinguish between upper and lower respiratory tract infections and to recognise cases in which there is life-threatening airways occlusion such as epiglottitis or diphtheria.

From a clinical management point of view the most practically important distinction is the prognosis of the illness. Early recognition of potentially severe illnesses, whichever part of the respiratory tract is affected, is crucial if lives are to be saved, particularly severe lower respiratory illnesses which are generally the most dangerous, especially in young children.

Progress in the Development of Management Plans

During the past few years several reports have been published which contain recommendations for standard management, drawing largely on the clinical experience of the authors. For example, in 1980 the WHO published a Report of a Scientific Group on Viral Respiratory Diseases⁽¹⁾ which included as an Appendix a guide for health workers at the community level on the care of children with all forms of ARI. The construction of treatment flow charts was further explored by another WHO Group the following year⁽²⁾ and detailed advice on the treatment of pneumonia was formulated. However, this report also directed attention to variation between signs selected as critical in different countries, for example in Papua New Guinea and Brazil. (One of the few sets of recommendations for standard management of ARI based on recognition of critical signs and symptoms which has been in routine use for some years was produced by the Papua New Guinea Department of Health⁽³⁾ based on studies done in that country, but it is not certain how applicable this would be in other countries.) Clearly, flow charts must take account of local circumstances, but it seems that variations may owe much to lack of clarity about the validity of the clinical criteria currently used to reach management decisions and failure to evaluate recommended treatments. A Memorandum published in 1982⁽⁴⁾ provided guidelines on this and other relevant research.

Meanwhile, action must be taken based on the best available empirical knowledge⁽⁵⁾. With this in mind a further WHO Working Group on Case Management of ARI in Developing Countries met in Geneva in April, 1984. Its purpose was to make recommendations on the technical content of training material being produced by the Center for Professional Development and Training of the Centers for Disease Control

in Atlanta. A classification of ARI based on critical symptoms and signs with management end points⁽⁶⁾ was devised, relying again largely on the experience of the participants, although with an increasing body of research to support their judgements.

The training material was intended to enable supervisors of health workers in rural areas of developing countries to plan and implement training of primary care workers, to educate the community about ARI, and to monitor the performance of health staff. The plan proposed by the Group recognised that two major decisions have to be made by a primary health worker confronted with a child with ARI, which relate to the severity of the illness: (a) whether to prescribe antimicrobials or not, and (b) whether to treat the child at home or refer to a higher level of health facility. The management options available become wider and the decisions to be made become more complex at the higher levels. Therefore, three plans of increasing sophistication were agreed, ranging from one suitable for the needs of a village community health worker, through one for staff who had six months' to two years' training, to one for those who had more training, including medical practitioners.

For the community health worker (less than six months' training) decisions were to be made in four steps, in the order required for practical management purposes, i.e. recognising and acting on the most severe cases first.

- Stage 1 Recognition of ARI. One or more of the following are present:
blocked or running nose, sore throat, earache or discharge,
cough, noisy or fast breathing, chest indrawing.
- Stage 2 Severe ARI. The key signs are:
Chest indrawing in the presence of cough, wheezing, stridor or

fever, OR

Too ill to feed with cough or fever.

Stage 3 Moderate ARI. The key signs are:

Fast breathing (> 50 per minute with cough, wheeze or fever in the absence of chest indrawing.

Stage 4 Mild ARI. Signs of ARI as in Stage 1 with no Stage 2 or 3 signs.

It will be noted that at this level basically only three signs were regarded as essential to reaching key management decisions: rapid breathing, chest indrawing and too sick to feed. Certain modifications may need to be made in the scheme to take account of local circumstances, for example if diphtheria is prevalent.

Plans for use at higher levels of care follow similar principles, but become progressively more elaborate, depending both on the skills of health personnel and the availability of investigative techniques, such as otoscopy and X-rays, and of therapies, such as oxygen and i.v. fluids.

The above scheme was used by the Group as a framework for management recommendations, including first and second line antibiotic treatment and details of supportive care both at home and in hospital. The CDC is now using these to develop training manuals which it is hoped will assist developing countries to strengthen and systematise practice.

Problems in the Definition of Pathognomonic Symptoms and Signs

While the construction of decision trees or flow charts is a useful way of focussing what are the most critical symptoms and signs in relation to clinical outcomes and management decisions, they have

limitations and dangers.

First, they are not a practical way in which to present decision making for primary care workers. They are difficult to follow and cumbersome to use, even for experienced clinicians. They have to be translated into simple narrative form, taking account of local idiom and practice.

Second, they do not readily accommodate continuous variables such as respiratory rates, which need to be categorised into groups - preferably dichotomised - in which the appropriate dividing points may vary, for example with age.

Third, they do not readily allow the incorporation of patterns of symptoms and signs which may have a significance for management distinct from that of any one selected feature. In clinical practice, doctors can and do take such patterns into account when making management decisions and accord them their own particular significance.

Despite these problems, flow charts which identify key features are much to be preferred to the indiscriminate compilation of long lists of clinical features traditionally elicited and recorded by doctors, most of which have little or no predictive value either singly or in combination.

The major properties required of symptoms and signs to be clinically useful are that:

- they are easy to observe by mothers and health care workers with minimum training at the primary care level
- they require a minimum of special equipment and skill to elicit at the health centre or hospital level
- they are reproducible between observers

- they are not subject to variation between patients for reasons other than the nature of their illness
- they discriminate reliably between the major categories of aetiological agents, or pathologies or severities of illness.

These are very exacting requirements, but it is important that they are not compromised or, in the end, the quality and value of management plans will suffer. Research to improve the basis of present plans by establishing the credentials of pathognomonic symptoms and signs of ARI in these respects deserves high priority.

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