additional information required in the reply form. The coordinator then sends the reply form back to the referring hospital for follow up or other purposes.

Structured Documents and eXtended Markup Language

Standard Generalized Markup Language (SGML) has been in common used by the government and military organizations in Taiwan since 1986. However, it is too complex to be used for general purposes. In order to establish a standard document for web applications, the World Wide Web Consortium (W3C) proposed an eXtended Markup Language (XML), which is a subset of SGML.[12] Similar to SGML, XML provides tagging mechanisms for constructing structures of documents and allows tags to appear at significant points in a document. Tagging is a powerful tool that enables a computer to capture the meaning and structure of a document, and facilitates searching on the web. Most web applications can support XML documents.

An XML document contains the following parts: the structural specification of a document (i.e., document type definition, DTD), the instance of the document specified by a DTD, and the presentation specification of the document (i.e., XML Style-sheet Language, XSL).

(1) Document Type Definition (DTD)

A DTD is a set of rules that describe structural components or elements. Each rule specifies the name of an element type and the valid sub-elements for that element. The name of the element can be the markups

```
<?xml version="1.0" encoding="big5"?>
<!ELEMENT    Emergency chart (blood exam)+>
<!ELEMENT    Blood exam (Hb, Wbc-dc, blood type)>
<!ELEMENT    Hb (#PCDATA)>
<!ELEMENT    Wbc-dc (EMPTY)>
<!ATTLIST    Wbc-dc band CDATA #REQUIRED
             baso CDATA #REQUIRED
             seg  CDATA #REQUIRED
             mono CDATA #REQUIRED
             eos  CDATA #REQUIRED
             lymph CDATA #REQUIRED>
<!ELEMENT    blood type (EMPTY)>
<!ATTLIST    blood type default (A|O|B|AB|RH) "A">
```

(or tags) in an XML-based document. The structure hierarchy of the document is created through the use of markups that specify the beginning and ending of each element. An element may require attributes to annotate itself with additional information. Attributes can be defined by using an ATTLIST declaration. we use an example to illustrate the specification of a DTD.

Referring to Fig. 1, a chart summary for an emergency patient is transported. The chart must contain the patient's blood tests, the blood tests must include items Hb, Wbc-dc, and blood type. Again, the item, Wbc-dc, may further be annotated by the detailed items such as band, baso, seg, mono, eos, and lymph. The blood type can only be one of the types, A, O, B, AB, or RH. The default is type "A".

As indicated above, the statement in the first line specifies that this is version 1 of XML encoded by the big5 Chinese character set. The second line and below describe the structure of elements including the name of each element and its sub-elements. In this example, "emergency chart" can have one or more than one set of elements "blood examination". However, each "blood examination" must contain one and only one list of items "Hb, Wbc-dc, blood type". The attributes of item "wbc-dc" can be declared using "ATTLIST". Note that, since the blood type can only be one of the

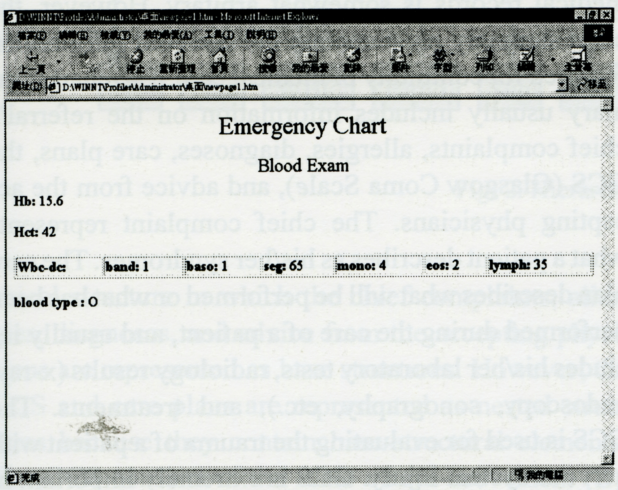

Fig. 1. Presentation of a part of medical records.