Taken as a whole, and from the standpoint of the potential for data processing applications, the health-care industry is in a state of very rapid growth and change. This growth and change taxes anyone's ability to make accurate projections at this time, for several reasons:

1. The suppliers of data processing technology, products, systems, and applications can, in effect, create their own industry's growth through the delivery of systems and products which become accepted by physicians, nurses, allied professionals, and health-care administrators. This kind of acceptance will depend on three principal factors:
   - Workability and reliability of the systems and products, and the credibility of the people supplying them.
   - Reasonable initial installation cost and ongoing costs.
   - Demonstrable cost recovery through:
     - Labor saving where skills are in short supply,
     - Reduced operating costs compared with alternatives that do not utilize the data processing assistance,
     - Staving-off of capital investment in beds, facilities and equipment capacity to allow in-place resources to serve more patients through shortened lengths of stay or increased usage. (This assumes that reimbursement formulas will be revised to eliminate incentives for hospital inefficiency -- negative incentives which make it possible for a high cost to result in higher reimbursement. Such revisions are already underway).

2. New modes of health-care delivery are on the horizon, such as:
   - Health Maintenance Organizations (HMO's);
   - Health Systems Agencies (HSA's) created by PL 93-641 -- the National Health Planning and Resources Development Act -- which agencies will act as centers and clearing-houses for area and regional coordination, balancing, and prevention of redundant facilities;
   - Professional Standards Review Organizations (PSRO's) which will be set up by physicians for their own peer-monitoring of the quality and consistency of the care they provide to their patients.

3. New federal legislation in the field of National Health Insurance (NHI) may be enacted which can provide a more uniform method than the present mixture for financing health care and may provide a more liberal or realistic basis for reimbursing the costs incurred by health-care establishments in their use of data processing technology as a cost-reduction tool. Such liberalization - encouraged by demonstrable economics and maintenance of quality in health-care delivery, will stimulate investment in data processing.

4. The continual rush of new technology in the treatment and monitoring of patients, with the inevitable attendant role of computer applications in these areas.

5. The expanding role of research, requiring data of broader scope and more detail for describing and defining population trends and requirements for health-care programming and medical records creation, retention, and retrieval on both macro and individual-patient levels.

6. Additional expansion and institutionalization of existing and emerging organizational forms of health-care delivery at the clinical level, such as physician group practices, which will have to coordinate informationwise with hospitals, area planning agencies, HMO's, and reimbursing institutions.

The above factors can be summarized as follows to define the future logical opportunity areas for data processing applications:

I. Health Care Programming and Facility Planning.

II Hospital Budgeting and Reimbursement Rate Setting.

III Utilization Review and Quality-of-Care Measurement.

IV Hospital Information Systems for Patient Care (HIS) (including communications to...
and from physicians' offices).

Systems for Accounting and Administration

Medical Records.

The above six areas offer some logic for an otherwise complex and seemingly unstructured environment -- for these two reasons:

(A) Each area covers the function that could be performed by a logical grouping of cooperating organizational entities or management responsibility centers within the total health services delivery environment.

(B) Each area has a fairly well established requirement, or desired set of key specifications, for the data processing system serving it.

Point (A) can be supported by considering the present organizational structure of health-care delivery, financing and regulation, or the structure that could logically emerge in the future.

Point (B) refers to two key specifications that are of major usefulness in guiding the choice of a data processing system:

- Required data shelf life
- Required system response time in providing the user with a reply to his query or request.

In Table 2 those two system design criteria are specified for each area.

It can be seen from Table 2, that the basic performance requirements for the "total" health-care information system cover a wide range. There is a 1,000 to 1 range of data shelf life among the seven areas, and a 10,000,000 to 1 range of response time, which is the time interval between user query and required response of the system to the user's request for data.

Thus, for the purposes of defining the mission of the "total data processing system that ultimately will be required by the nation's health-care delivery system, three basic kinds of data processing system performance will be needed:

- Performance to provide continuous, high-priority and immediate retrieval and interactive communication between health-care personnel and the data. This will be required for:
  
  IV. - HIS
  
  V. - Some requirement in the accounting areas, e.g. credit/collection and accounts receivable.
  
  VII. - Parts of Medical Records, e.g.,

- Performance that can handle and report data in batches with a response time that can be scheduled. This will be required for:

  III. - Utilization Review and Quality-of-Care Measurement
  
  V. - Hospital Systems Administration Accounting.
  
  VI. - Reimbursement Claims Processing and Health Insurance Accounting.

- Performance to handle inquiry and response requirements that must search large files with no urgency, but with system capability for user/system interaction.

  I. - Health Care Programming and Facility Planning.
  
  II. - Hospital Budgeting and Reimbursement Rate Setting.
  
  VII. - The bulk of Medical Records information. (With a word-processing, additional capability and also a graphic or photographic capability).

The views expressed above are not intended to be final, but only illustrative. The idea is that, by expending now the necessary strategic planning effort to understand and define the most logical structuring of data processing to support the health-care delivery system, data-processing system planners can gain the necessary insights, and lead times to design the most logical and responsive overall system.

D. N. Reps
### TABLE I

**Organization for Health-Care Data Processing**

<table>
<thead>
<tr>
<th>Required System Function</th>
<th>Organizational Entities Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Health Care programming and facility planning.</td>
<td>Health Systems Agencies (HSA's); State Coordinating Agency; HEW</td>
</tr>
<tr>
<td>II. Hospital budgeting and reimbursement rate setting.</td>
<td>Blue Cross, Medicaid, Medicare Insurance Companies</td>
</tr>
<tr>
<td>III. Utilization review and quality of care measurement.</td>
<td>PSRO's, Medicare, Medicaid, Blue Cross</td>
</tr>
<tr>
<td>IV. Hospital information systems for patient care</td>
<td>Hospitals, physicians</td>
</tr>
<tr>
<td>V. Hospital systems for administration and accounting.</td>
<td>Hospitals</td>
</tr>
<tr>
<td>VI. Reimbursement claims processing and health insurance accounting</td>
<td>Blue Cross, Medicaid, Medicare, Insurance Companies.</td>
</tr>
<tr>
<td>VII. Medical Records</td>
<td>Doctors, Hospitals, HSA's</td>
</tr>
</tbody>
</table>

### TABLE II

**Health-Care Data Processing System Design Specifications**

<table>
<thead>
<tr>
<th>Required Data</th>
<th>Required System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelf Life</td>
<td>Response Time</td>
</tr>
<tr>
<td>(days)</td>
<td>(days)</td>
</tr>
<tr>
<td>-----------------</td>
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</tr>
<tr>
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<td>50</td>
<td>10.</td>
</tr>
<tr>
<td>10,000</td>
<td>1.</td>
</tr>
</tbody>
</table>

(1) 100 days is the time frame of a typical study. Data processing would be required on a random, inter-active basis by the planners.

(2) One-second response to inquiry or message.