# Table of Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>1</td>
</tr>
<tr>
<td>Program Background</td>
<td>2</td>
</tr>
<tr>
<td>Medical office organization</td>
<td>2</td>
</tr>
<tr>
<td>Visual Table of Contents</td>
<td>2 - 3</td>
</tr>
<tr>
<td>Functional flow for insurance</td>
<td>4</td>
</tr>
<tr>
<td>Theory of Operation</td>
<td>7</td>
</tr>
<tr>
<td>Insurance process diagram</td>
<td>7</td>
</tr>
<tr>
<td>System flowchart</td>
<td>8</td>
</tr>
<tr>
<td>Input/Process/Output chart (IPO)</td>
<td>11</td>
</tr>
<tr>
<td>System Design Criteria</td>
<td>12</td>
</tr>
<tr>
<td>Hardware requirements</td>
<td>12</td>
</tr>
<tr>
<td>Data file record descriptions</td>
<td>13 - 17</td>
</tr>
<tr>
<td>Program Execution</td>
<td>18</td>
</tr>
<tr>
<td>Sample session</td>
<td>18 - 40</td>
</tr>
<tr>
<td>Summary and Program Limitations</td>
<td>41</td>
</tr>
<tr>
<td>References</td>
<td>42</td>
</tr>
</tbody>
</table>

## Appendices

- Program flowcharts
  - Medical Office Management: A1 - A8
  - Insurance Claim Processor: A9 - A45
- Sample database file contents
  - Patients: B1
  - Insurance companies: B2
  - Doctors: B3
  - Diagnosis: B4 - B5
  - Procedure: B6
- Program modules, source code listings
  - Medical Office Management: C1 - C11
  - Insurance Claim Processor: C12 - C73
Medical Insurance Claim Processor

Abstract

Completion of medical insurance claim forms has become a major segment of the daily business office routine in the modern medical practice. Economic and practice management factors indicate that an automated system of accomplishing this task would be beneficial.

The process of manual claim completion involves extracting information from various file sources for inclusion on the insurance claim form. This manual file-extraction process is analogous to the technique of data extraction from computer database files. Thus, the automation of this office function will require creation of the necessary data files, and an algorithm for extraction of the data from these files. The end result is an interactive program for data entry by the operator followed by computer-controlled completion of the insurance form.

For optimum execution speed, a compiled programming language is desirable. Because of the heavy file manipulation requirements of this program, COBOL (COmmon Business Oriented Language) was chosen.

The Microsoft COBOL compiler offers three file organizations: sequential, indexed, and relative. Indexing the data files provides a fast, sure method of random retrieval of the desired data record(s) by means of the unique record key fields. At the same time, indexed organization permits some program flexibility in that sequential access as well as random access can be used, if needed, during some processing phase. For these reasons, indexed file organization is used for all data files.

The program is designed to be modular. That is, the file structures used for the insurance claim processing function are designed so that future additions to the system can be made. These future functions, such as accounting and practice management tools, will share the same data files and file structures.

The IBM-PC microcomputer was chosen as the hardware environment for this application. This equipment has become the 'standard' for the small business system. The Microsoft MS-DOS operating system, version 2.0 was similarly chosen for its widespread use on microcomputers using the Intel 8088/8086 central processing unit (CPU).
Program Background

While there are differences in the organization of individual medical offices, the overall schema can be generalized for the purposes of viewing the business aspects of a practice. Indeed, the same structure can be used to visualize any allied health profession in which insurance claims are submitted to receive payment for services rendered.

Also, there may be differences in operational organization between solo practices, having a single physician, and group, or clinic, practices. However, even in these situations, the underlying organization fits the general pattern. The following chart depicts the general organization for a typical medical practice. The chart has been modified to represent a Visual Table of Contents (VTOC) as well.

OFFICE ORGANIZATIONAL CHART
(major functions)

```
  DOCTOR 1.0
    ↓
  PATIENT SERVICES 1.1
  ↓
  ACCT.REC. 1.3.1
  ↓
  CASH 1.3.1.1
  ↓

  STAFF 1.2
  ↓
  ACCT.PAY 1.3.2
  ↓
  INSURANCE 1.3.1.2

  BUSINESS SERVICES 1.3
    ↓
  INVENTORY 1.3.3
  ↓
  PAYROLL 1.3.4
  ↓
  GOVT/LICENSES 1.3.5
```
In outline format, the VTDC is as follows.

1.0 Doctor's office system
   1.1 Patient services
   1.2 Staff
   1.3 Business services
      1.3.1 Accounts receivable
         1.3.1.1 Cash
         1.3.1.2 Insurance
      1.3.2 Accounts payable
      1.3.3 Inventory
      1.3.4 Payroll
      1.3.5 Government & licenses

Paragraph 1.3.1.2 dealing with the insurance function of the accounts receivables segment is the one of interest for this project. This paragraph is further detailed in a functional flowchart on page 4.

There are several types of medical insurance claim forms which are encountered in the office. They include Medicare, Medicaid (public assistance), Blue Cross/Blue Shield, several government employee plans (including CHAMPUS), and a multitude of private insurance plans. Fortunately, the majority of these insurance companies will accept claims which are submitted on a form approved by the American Medical Association (AMA). Approximately 75% of claims processed can be submitted on the AMA form. Only the private insurers will often require submission of claims on their specific claim forms.

The project, then, will be directed at the standard claim form processing. At this time, the other formats are not supported. Furthermore, physical limitations of the layout of the AMA form permit a maximum of four diagnoses and eight procedures/services per claim form.

Broadly, claims may be for medical or surgical services. In many offices, payments for medical services, and minor office surgical procedures, are requested at the time such services are rendered. That is, the patient pays the balance due for such services at the time they are rendered. When the patient has medical insurance coverage, most offices have the policy to complete and submit claims for reimbursement to these patients.

For hospital surgery and certain classes of government assistance claims, the physician generally cannot, or does not, require payment from the patient at the time of service. In these cases submission to the third-party (insurance company) is made by the office. After payment has been received from the insurer, if legal to do so, the office will bill the patient for the remaining balance due.
A functional flow diagram demonstrates the sequential steps in processing a medical insurance claim form.

FUNCTIONAL FLOW DIAGRAM
(insurance claim form processing, 1.3.1.2)

A. Professional service

B. Fee for service determined

C. Account flagged for insurance processing

D. Claim info/data processed

E. Claim checked and logged

F. Claim submitted to insurer

G. Insurer requests more info/or corrections

H. Benefits paid to doctor

I. Under/overpayment differences resolved

J. Account credited

A. Doctor performs medical/surgical service for patient.

B. Doctor computes fee and charge slip is completed/sent to front desk.

C. Fee recorded on ledger and payment made and/or clerk prepares claim form.

D. Clerk enters required insurance data:
   Patient data
   Diagnosis
   Procedures
   Charges

E. Doctor validates data and clerk logs claim in insurance-pending log.

F. Claim leaves office.

G. Clerical staff checks patient records to validate info. Additions/corrections made and resubmitted.

H. Insurance company processes claim and pays benefits.

I. Discrepancies in balance due arbitrated between doctor & insurer.

J. Clerk applies payment to patient's account, insurance log entry made.
Processing medical health insurance claims can be a time-consuming task in the modern physician's office. The number of persons covered by some form of medical insurance continues to increase. Approximately 80% of the patients seen today will have some type of medical health insurance coverage. Those patients having medical insurance coverage expect the physician's office to complete the appropriate claim forms. From the accounts receivable standpoint, timely completion of claims is also essential so that payment to the physician can be made. When the patient has prepaid the balance due, timely processing of the claim will permit reimbursement to the patient to occur with a minimum of delay.

In looking at the manual processing of insurance claims versus an automated, computer-based claim processor, the two processing schemes should be analyzed from a systems analysis and systems development viewpoint. In so doing, the following problems become apparent with respect to manual claim processing.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Manual system</th>
<th>Desired feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Problem of throughput</td>
<td>Claims completed &quot;as time permits&quot;</td>
<td>Claims completed at the time of service (&quot;real-time&quot;)</td>
</tr>
<tr>
<td>2. Problem of accuracy and reliability</td>
<td>Clerical errors, typographical errors, data omission</td>
<td>Minimize operator input, consistent data extraction</td>
</tr>
<tr>
<td>3. Problem of efficiency</td>
<td>Staff time shared between clerical/professional duties</td>
<td>Minimize time to input data, let the computer do the work</td>
</tr>
<tr>
<td>4. Problem of information</td>
<td>Tracking of claims cumbersome with delays in response to inquiries</td>
<td>Provide daily and periodic summaries of all insurance activities</td>
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</table>

Therefore, the goals of any automation of the insurance claim processing system should be to reduce the time consumed in performing the task, to reduce the number of data errors, and to provide the finished product in a timely manner.

The system should be easy to use and require a minimum of knowledge about computers. The program should not require the operator to know details about the internals of either the hardware or the software. With this in mind, a consistent command structure is utilized in order to minimize operator confusion or errors. Such consistency also aids in making the program more
transparent to the operator. Design criteria emphasize user-friendliness and are structured to minimize the time required for training office clerical staff to use the system.

In order to accomplish these goals, the program is interactive and menu-driven. Simple CRT (cathode ray tube) screen prompts are used for all data entry and system prompts. The use of the standard keyboard for input makes the transition to the computer less abrupt for clerical staff not familiar with computers. By patterning the computer program after the already familiar manual claim processing system, there should be minimal disruption and negligible negative impact on the current office operations.
Theory of Operation

Initially, the system will consist of the single insurance-processing module and the necessary data file management utilities. The system is modular by design so that as computerization of other office functions is desired these functions can be added. The system flowchart appearing on page 8 depicts the complete modular system as now envisioned. The following diagram is an Input Process Output (IPO) chart of the manner in which any one of the system modules can be selected from a 'menu' of valid choices.

Description: Master Program Selection Process
Input/Process/Output (IPO) diagram

Input

MASTER PROGRAM

Process

1. Load 'main' program module.

2. Select desired subprogram module.

3. Load selected module.

Output

'MASTER SELECTOR' screen

'INSURANCE PROCESSING SELECTOR' screen

Display selected function screen
From the system flowchart, the Insurance Claim Processor module can be further diagrammed as follows to give a process overview:

![Insurance Claim Processing Flowchart]

The completion of insurance claim forms is a task which requires repetitive entry of similar information for each patient. The information required to complete the claim form includes personal data from the patient's file, data regarding the diagnosis (or diagnoses) and the procedure (or procedures) for that date of service, and data about the doctor who provided the services (identification number, address, etc.). These input requirements can be easily maintained as data files within a larger medical office database.

During claim processing, appropriate information is extracted from these files. The extracted information is moved to the proper place on a claim form template which is maintained by the program in the computer memory. When all data has been collected and moved to the template, the claim form is printed. The IPO diagram on page 11 gives a pictorial representation of the claim processing.
Any business activity, whether performed by hand or by computer, should have archival records maintained. In the case of computer-based business functions, such archives are essential. They serve the purpose of providing an audit trail and backup of information about the activity. Should the operator require it, these archives can be used to generate summaries and other reports about the activity. Such hardcopy documents are necessary to permit restoring the database in the event of computer hardware or software failure.

The program automatically creates a log file record as each patient's claim is successfully processed. This record of each transaction is written to a summary log file on diskette. The total fees submitted for reimbursement, the balance due after payments, the patient identification, and the insurance companies involved are maintained in the insurance log file.

A printed summary of transactions can be obtained for any day. This document is useful not only for backup but also for tracking the status of claims which have been submitted. Those claims which remain unpaid for any length of time can be detected. The appropriate action can be taken to find out why reimbursement has not been made. The audit trail provided by the summary is another business management tool.