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HEALTH - COMPUTER ENVIRONMENT CONTROL REVIEW - MARITIME MEDICAL CARE INC.

BACKGROUND

10.1   The Health Services and Insurance Act provides insured medical, physician, dentist, optometrist and pharmacist services to eligible Nova Scotians. These services are commonly known as the Medical Services Insurance (MSI) Program. The Minister of Health, through the Insured Programs Branch of the Department of Health, is responsible for the delivery of this program.

10.2   Day-to-day program administration has been carried out under contract, since 1967, by Maritime Medical Care Inc. (MMC). The latest MSI administration contract between the Province and MMC was signed on May 22, 1992. In addition to MSI administration, MMC processes medical and pharmacy claims for the Department of Community Services Pharmacare Plan and for the Workers' Compensation Board.

10.3   For the 1997-98 fiscal year, MMC processed 9.8 million MSI claims with a value of $386.5 million. MMC billed the Province $7.4 million for the administration of the MSI program or 1.9% of claims paid. Exhibit 10.1 provides a historical summary of MSI claims paid by MMC and the administration charges billed to the Department.

10.4   Computer systems for the processing of claims from providers (physicians, pharmacists and others) were originally developed approximately 30 years ago. Until 1996, these systems physically resided off-site at the Provincial Data Centre in Halifax which is a mainframe processing environment. The Provincial Data Centre was acquired by SHL Systemhouse in 1992.

10.5   By 1992, the Department of Health (DOH) was finding it increasingly difficult to manage the MSI Program using the systems operating at the Data Centre. The software was written in old computer languages that were difficult to support and data was stored using out of date technology that was difficult to manipulate and analyse. Systems changes necessitated by changing policies and procedures were difficult and costly to implement.

10.6   An information and systems management consulting firm was retained to develop options for modifying or replacing the MSI system. The firm submitted a re-engineering report in 1993 which recommended replacing the existing mainframe system with a client server system to be located at the head office of Maritime Medical Care Inc. in Dartmouth. In June 1994, Cabinet approved a contract with the firm to develop the new system.

10.7   In the fall of 1993, this Office conducted a summary review of the old mainframe system at the Data Centre. We also reviewed procurement practices for the development of the new MSI system. These matters were reported in Chapter 13 of our 1994 Annual Report.

10.8   Given the large dollar value of medical claims processed by MMC and the significant investment by the Province in developing the new MSI system, this year we reviewed computer environment controls in place at the new installation located at MMC. We also reviewed project management practices associated with the development of the new MSI system.

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10.9   This audit was conducted in accordance with Section 8 of the Auditor General Act and Section 39 of the May 22, 1992 Agreement between the Province and MMC.

RESULTS IN BRIEF

10.10   The following are the principal observations from the review.

■   Data processing for the new MSI system is carried out by the Information Services Section of Maritime Medical Care Inc. The control environment at MMC should be subject to periodic independent assessments.

■   We reviewed controls over various aspects of the MSI computer installation and found them to be satisfactory. We have made recommendations for improvement in a few areas.

■   The lack of a disaster recovery and contingency plan was reported during our 1994 audit. Some progress in developing a plan has been made. However, this facility is still without a complete and tested disaster recovery and contingency plan. We have recommended that the plan be completed and tested as soon as possible.

■   Planned systems development costs for the new MSI system, including hardware, software and project management were $3.4 million. Actual systems development costs, to September 1998, were $5.7 million. The additional cost of $2.3 million was due primarily to additional hardware, software and financing costs.

■   Significant tangible and intangible benefits were expected to accrue from the new MSI system as documented in the project planning documents. The Department has not conducted a formal post-implementation review to determine the extent to which benefits have been realized and how these results compare to original plans. We have recommended that the Department complete a post-implementation review as soon as feasible.

■   MMC provided bridge financing for the MSI systems development project by paying development costs approved by the Department and periodically billing the outstanding balance, plus interest, to the Department. The Department failed to record the liability owing to MMC in its accounting records at year end resulting in misstatements of Provincial liabilities and Department expenditures in the Public Accounts of the Province.

■   A Year 2000 assessment of the MSI system was completed in July 1998. The report indicates that corrective action may cost between $2.5 and $3.1 million. A detailed project plan was being developed at the time of our audit but was not complete.

SCOPE OF REVIEW

10.11   The objectives of this assignment were to:

–   evaluate the adequacy of environmental controls for the computer installation at MMC including organizational controls; development and program change controls; operations controls; documentation controls; logical access controls; and disaster recovery and contingency planning.

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– review project management practices for the development of the new MSI system; and

– determine the steps taken by MMC and DOH to ensure Year 2000 readiness of MSI-related hardware and software.

10.12 The following general criteria were used in our review.

■ There should be adequate computer environmental controls in place at the Maritime Medical Care Inc. data processing facility.

■ Sound project management practices should have been utilized in the development of the new MSI system.

■ The Department and MMC should have a plan to ensure Year 2000 readiness of the hardware and software supporting the MSI system.

10.13 Our approach consisted of interviews with staff of the Department of Health and MMC. We examined documentation associated with the new MSI system. We did not examine, in detail, systems documentation for the new system or test the appropriateness of the access privileges granted to users of the system.

10.14 We also reviewed a report prepared by the Audit and Consulting Section of the Department of Health and presented to senior Department officials in February 1998. This report focussed primarily on the costs associated with the new system. The report also raised many of the same issues reported in paragraphs 10.44, 10.45 and 10.46 below concerning project financing and approval of additional project costs.

PRINCIPAL FINDINGS

Organizational Controls

10.15 *Background* - A review of organizational controls includes assessing the electronic data processing section's position within the organization, the existence of effective senior management control of the information technology environment and the existence of effective controls over the concentration of functions in the EDP (Electronic Data Processing) department.

10.16 MSI transactions are processed by the Information Services Section of Maritime Medical Care. Programmers are permitted to copy production programs and make programming changes to the copy in a test environment. After testing and user acceptance, programmers are permitted to copy revised programs back into production. We have recommended that programming staff not be permitted to copy revised programs into production. This function should be performed by an independent person without programming responsibilities.

10.17 Under the old MSI system, the SHL Systemhouse Data Centre was subject to a yearly systems audit. An audit firm was retained to express an independent opinion on the suitability of the controls at the Data Centre. The audit opinion provided assurance that MSI transactions were being processed in a controlled environment.

10.18 Under the new MSI system, data processing functions are carried out at MMC's facilities in Dartmouth. We note that the Department has made no provision for periodic independent

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assessments of the control environment at MMC. We have recommended that the Department conduct periodic, independent audits of the EDP control environment at MMC.

Development and Program Change Controls

10.19 *Background* - Development controls are procedures that ensure proposed applications are implemented only if they will produce greater benefits than alternative proposals. Program change controls are procedures that ensure systems changes are properly authorized and tested and that adequate segregation of functions is maintained for program changes.

10.20 *Systems development methodology* - The Province requires departments and agencies to follow a standard systems development methodology called Productivity Plus. The major systems development at MMC was the development of the new MSI system. Generally, we found that the requirements of Productivity Plus were adhered to for this project.

10.21 A notable exception was the absence of a formal cost benefit analysis for the Seniors' Pharmacare Premium Billing System component of the MSI system. This system was developed because of changes in the Seniors' Pharmacare Program announced in 1995. These changes introduced a requirement to charge premiums to seniors to help offset program costs thus necessitating a revenue collection system. We were informed that a formal cost benefit analysis of processing alternatives was not prepared due to time constraints in the introduction of the Seniors' Pharmacare Program in 1995.

10.22 The Premium Billing System was developed at a cost of approximately $600,000. The system processes approximately $22.0 million of premium revenues annually. In our view, a formal cost benefit analysis of processing alternatives should have been completed for this system addition.

10.23 *Control over system changes* - It is important to ensure that systems additions and changes take place in a controlled environment including proper authorization and testing prior to implementation.

10.24 In April 1998, the Department of Health developed the MSI - IS Management Plan. This plan created the MSI Change Management Committee and defined roles and responsibilities of those involved in the operation and management of the MSI system.

10.25 The MSI Change Management Committee is responsible for assessing proposed systems enhancements, deciding on change request priorities, ensuring the efficient and effective use of IT resources and ensuring proposed changes are consistent with the strategic direction of the MSI Program. In general, we found the system for the authorization and control of systems changes to be strong.

Operations Controls

10.26 Operations controls are those procedures designed to prevent or detect accidental or deliberate errors during processing, misuse of classified information and accidental destruction of records. We found operations controls to be satisfactory.

Documentation Controls

10.27 Documentation controls are designed to ensure that adequate, up-to-date standards and documentation exist for systems, programming and operations We found documentation controls to be satisfactory.

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Disaster Recovery and Contingency Planning

10.28 *Background* - Disaster recovery and contingency plans are important to ensure the timely and cost effective resumption of processing in the event of a service interruption.

10.29 The lack of a disaster recovery and contingency plan was reported in our 1994 Annual Report. An impact analysis, prepared by a consultant, was completed in the summer of 1998. A business resumption study was near completion at the time of our audit. We have recommended that the disaster recovery and contingency planning process be completed and tested as soon as possible.

Logical Access Controls

10.30 *Background* - Logical access controls include procedures that ensure only authorized individuals gain access to the system and that access privileges are commensurate with an individual's duties. The password system is the primary means by which logical access control is established.

10.31 *UNIX root authority access* - The MSI system resides on hardware which uses a Unix operating system. Unix requires the granting of supervisory (root authority) access to operators. Root authority access is very powerful which provides unlimited capability to add, delete and modify data files and directories. Therefore root authority access should only be granted to a limited number of persons and an independent review of the activities of those with root authority access should be undertaken on a regular basis.

10.32 MMC has granted root authority access to a limited number of persons (six). However there is no regular internal review of the activities of those with this access. We have recommended that an independent review process be established.

Project Management - MSI Systems Development

10.33 *Background* - In 1994, Priorities and Planning Committee approved the development of a new MSI system. The systems development was carried out under contract by a systems development firm. The firm was the lowest qualified bidder for development of the new system. In addition to systems development work, the contract included systems maintenance and operations support to March 31, 1999. The contract amount was $4.5 million. In addition, the plan provided an additional $1.6 million for systems conversion support for providers and for provincial sales taxes on equipment purchases.

10.34 The project was to be financed from the planned operating budgets of the Department and from savings to be generated by the new system. No new funding was authorized by the Priorities and Planning Committee.

10.35 The plan approved by the Priorities and Planning Committee projected that the new system would generate net savings of $947,000 annually. In January 1995, the systems development firm released a Systems Architecture Report which provided a detailed implementation plan for the new MSI system. This report contained a revised cost benefit analysis. Revised projections indicated net cost savings of approximately $1.7 million annually commencing in the 1996-97 fiscal year. This report targeted the delivery of full systems capabilities by April 1, 1996.

10.36 The new system involved significant differences in the way claims are processed. Claims are now submitted online, provider staff are now responsible for data entry rather than MMC staff and payments to providers are now made by electronic funds transfer. The MSI system requires

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providers to classify the type of service provided to patients. The number of service categories increased significantly under the new system in an effort to generate improved health management information.

10.37 *Project management practices* - We found project management practices to be satisfactory. A Steering Committee was established at the outset of the project which included senior officials from DOH, MMC and the systems development firm. The Committee met on a regular basis, kept minutes and discussed a comprehensive range of issues related to the project. Progress reports which included finances and deadlines were prepared for most meetings.

10.38 Two project managers were assigned to oversee the day-to-day operation of the project. One project manager was an employee of DOH and the other was employed by the systems development firm. All invoices from the systems development firm were approved by the DOH project manager prior to payment.

10.39 *Deadlines* - The Pharmacare component of the system was implemented on schedule on January 1, 1996. The planned implementation date of the Medicare component was April 1, 1996. Implementation was tested at eleven selected sites in July 1996. The remaining providers were implemented by January 1997. Providers initially experienced significant delays in gaining electronic access to the new system. Electronic access difficulties were not resolved until more powerful equipment was acquired in the summer of 1997.

10.40 *Systems development costs* - Planned systems development costs including hardware, software and project management were $3.4 million. The contract also included a provision for systems maintenance and operations support to March 31, 1999, and provincial sales taxes on equipment purchases, for a total contract amount of $4.5 million. Actual systems development costs, to September 1998, were $5.7 million. The additional cost of $2.3 million was due primarily to the development of the Seniors' Pharmacare Premium Billing System, additional hardware acquired to achieve more timely electronic access for providers, financing interest and greater than expected development costs for the Medicare application software. The additional costs were authorized by change orders to the original development contract and by obtaining additional funding from the Managed Care Initiatives Fund administered by the Department of Finance.

10.41 *Post-implementation review* - Net tangible benefits expected from the new system consisted of reduced computer processing and data entry costs minus additional operating costs associated with administering the new system. Department and MMC staff provided us with an analysis demonstrating that the new system achieved substantial cost reductions in the areas expected. However, Exhibit 10.1 on page 120 demonstrates that the cost of administering the MSI program has increased significantly since 1994-95. We were unable to determine how much of this increase is due to unexpected additional costs associated with administering the new system. We were therefore unable to conclude whether the net tangible benefits expected from the new system have been realized.

10.42 Intangible benefits were identified in the project planning documents. Benchmarks were quantified at the outset of the project based on old system performance. Intangible benefits include faster turnaround time for claims and registering residents and providers, decreased claim rejection rates and errors, improved response time for queries and requests for information, and decreases in the average cost of processing a claim. These intangible benefits were intended to provide improved service levels for providers and residents.

10.43 The Department has not conducted a formal post-implementation review to determine whether the tangible and intangible benefits of the new system were realized and how these results

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compare to original plans. We have recommended that the Department undertake a post-implementation review as soon as feasible.

10.44 *Project financing* - The 1994 memorandum to the Priorities and Planning Committee did not disclose the expected interest costs for financing the project. MMC provided bridge financing for the project by paying development costs approved by the Department and billing the outstanding balance to the Department periodically. MMC charged the Department interest on the monthly outstanding balance at the chartered bank's prime lending rate plus 1%. Total interest charged to DOH from September 1994 to September 1998 was $388,000. In our opinion, Priorities and Planning should have been more fully informed of the financing arrangements and the interest costs to be incurred.

10.45 In addition, the Department failed to record the liability owing to MMC in its accounting records at year end. As a result, the Province's liabilities were understated and Department expenditures as reported in the Public Accounts of the Province were misstated as follows:

Fiscal Year	Liability Understatement	Expense Understatement (Overstatement)
Year ended March 31, 1995	$ 1,116,398	$ 1,116,398
Year ended March 31, 1996	$ 1,592,928	$ 476,530
Year ended March 31, 1997	$ 2,644,234	$ 1,051,306
Year ended March 31, 1998	$ 1,107,871	$ (1,536,363)

10.46 *Approval of other significant changes to project plans* - There were other significant changes to the project, approved by the Steering Committee and DOH that, in our opinion, the Priorities and Planning Committee should have been informed of. These include:

– The development of the Pharmacare Premium Billing system at a cost of $600,000.

– Systems maintenance and operations support were supposed to be included in the original contract with the developer to March 31, 1999. However this funding was expended by 1997. The Department entered into separate contracts with the developer for system maintenance for the 1997-98 and 1998-99 years at a cost of approximately $300,000 per year.

– Additional funding from the Managed Care Initiatives Fund of $1.2 million was secured for the purchase of additional hardware and for provider support.

10.47 *Ownership of software* - The MSI program is administered under a May 1992 agreement between the Province and MMC. Section 16.2 of the Agreement states that "*computer programs totally or partially designed and or developed by the Corp for the Plan are owned jointly and severally by the Province and the Corp.*" Thus the new MSI system software appears to be jointly owned by the Department and MMC even though MMC's contribution to the project has been limited to providing personal computers for systems access. Department of Health staff informed us that they believe the Province has sole ownership and use of the MSI program software. We have recommended that ownership of the system be clarified by legal counsel.

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Year 2000 Readiness

10.48 *Background* - Concern about the Year 2000 Issue arises because older computerized systems use two digits rather than four to identify a year. These systems may recognize the year 2000 as some other date, resulting in errors when information using year 2000 dates is processed. The effects of the Year 2000 issue may range from minor errors to significant systems failures. It is important that steps be taken to identify and correct significant Year 2000 problems on a timely basis.

10.49 Certain actions have been taken regarding the Year 2000 issue for government applications at MMC. A Public Year 2000 Steering Committee was established in May 1998. Committee members include senior officials from MMC and the Department. The Executive Director of the Insured Programs Branch of the Department chairs the Committee.

10.50 A consulting firm was retained to conduct a Year 2000 assessment and the report was released in July 1998. From the assessment report, the Committee has an understanding of the Year 2000 corrective action required. The report indicates that corrective action may cost between $2.5 and $3.1 million. A detailed project plan was being developed at the time of our audit but was not complete.

10.51 Prompt decisions regarding funding and courses of action will be required, primarily by the Department, in order to ensure Year 2000 activities will be completed, tested and implemented prior to January 1, 2000. We urge that the necessary decisions and actions be made on a timely basis.

CONCLUDING REMARKS

10.52 This was our first examination of computer environment controls for the new MSI system. Although we found weaknesses and recommended corrective action in the areas of disaster recovery and contingency planning, logical access controls and programmer access to production programs, in general, we found control over the EDP environment to be satisfactory. It is important that the Department of Health establish periodic, independent audits of the EDP control environment at MMC to ensure that the integrity of environmental controls is maintained.

10.53 The development of a Province-wide MSI claims processing and information system was a significant, complex undertaking. The system has been operating successfully for over a year and has many advantages over the old system it replaced. The decision to develop this system was based upon estimated costs and benefits, both tangible and intangible, asserted in the original planning documents. It is important that the Department conduct a post-implementation review to ensure that taxpayers have received all of the tangible and intangible benefits expected from the new system and to ensure that costs in addition to those planned are justified.

10.54 The MSI system is an integral part of the Province's health system. It is important that this system handle Year 2000 dates properly. We urge that the Department take the necessary steps to ensure Year 2000 activities are completed, tested and implemented on a timely basis.

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Exhibit 10.1

MSI CLAIMS PROCESSED BY MMC FOR THE DEPARTMENT OF HEALTH

Fiscal Year	Total Claims Paid By MMC ($ Millions)	Administration Fees Charged By MMC ($ Millions)	Percentage of Administration Fees To Claims Paid %
1994-95	$341.6	$6.0	1.8%
1995-96	$355.8	$7.0[1]	2.0%
1996-97	$356.3	$7.2	2.0%
1997-98	$386.5	$7.4	1.9%
1998-99 (Estimate)	$401.3	$7.8	2.0%

[1]The new Seniors' Pharmacare Program was introduced on April 1, 1995 resulting in increased administrative fees.

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