Chapter 12
Saskatchewan Health Authority—Maintaining Saskatoon and Surrounding Area Health Care Facilities

1.0 Main Points

There are over 50 health care facilities located in the City of Saskatoon and surrounding area (Saskatoon-area facilities). Patients, residents, visitors, and staff rely on well-maintained facilities in the delivery of health care services.

This chapter reports, for the 12-month period ending November 2018, the Saskatchewan Health Authority did not have effective processes to maintain health care facilities in the City of Saskatoon and surrounding area.

While the Authority has qualified staff and relies on their professionalism to conduct maintenance, it needs to make improvements in the following areas to effectively maintain its Saskatoon-area facilities over their entire lifespan.

The Authority needs complete and consistent information about each key Saskatoon-area facility and component subject to maintenance to provide a basis for maintenance planning decisions. It needs a comprehensive risk-based maintenance plan to guide maintenance decisions of those facilities and components over the long-term. This would include setting desired conditions of key facilities and components; and consistently setting the nature, extent, and expected frequency of regular maintenance.

The Authority needs documented guidance on prioritizing maintenance to support completing maintenance within scheduled timeframes. Timely maintenance reduces the likelihood of failure or breakdown, which reduces the risk of harm to residents, patients, visitors, and staff.

Senior management need to receive reports on results of Saskatoon-area maintenance activities. Having sufficient analysis and reporting of maintenance results would help the Authority assess if maintenance is occurring as expected, and whether maintenance funding is sufficient and efficiently used.

2.0 Introduction

The *Provincial Health Authority Act* makes the Authority responsible for planning, organizing, delivering, and evaluating health services in the province. It is also responsible for constructing, renovating, altering, and managing its health care facilities.

Costs of delivering health services to the residents of Saskatchewan continues to increase. In 2018-19, the Government planned to spend $5.765 billion on health.[1] In 2017-18, the Government spent $5.668 billion on health (2016-17: $5.663 billion; 2015-16: $5.575 billion).[2]

[1] Government of Saskatchewan, *Saskatchewan Provincial Budget 18-19 On Track*, p. 66.
[2] Government of Saskatchewan, *Public Accounts Volume 1, Summary Financial Statements*.

The Saskatchewan Health Authority provides the majority of Saskatchewan health care services. In 2017-18, the Authority reported total expenses of $4.027 billion (2016-17: $3.961 billion combined expenses of former regional health authorities).[3]

The Authority employs over 40,000 employees and physicians to facilitate the delivery of quality health care services.[4] It provides health services to residents of Saskatchewan through more than 270 facilities located throughout the province. These facilities include hospitals (acute care), long-term care facilities, health care centres, and other support centres. Facilities include buildings and significant components (e.g. boilers, air filters). At March 31, 2018, the net book value of its capital assets was $1.6 billion including buildings and improvements (i.e., 70% of total net book value).[5]

In 2017-18, the Authority spent $60.4 million on repairs and maintenance expenses (2016-17: $58.2 million); $131.0 million on additions to buildings and improvements; and in progress construction.[6] In 2018-19, the Authority budgeted to spend about $55.9 million for repairs and maintenance to its facilities and $200 million for capital additions.[7,8]

Over 50 health care facilities located in the City of Saskatoon and immediate surrounding areas serve over 360,000 Saskatchewan residents in more than 100 communities, which includes cities, towns, rural municipalities, and First Nations communities.[9] Facilities located in the City of Saskatoon and surrounding area include 9 hospitals; 28 long-term care facilities; and 19 health centres and other health care facilities.[10] See **Section 5.0** for a listing of facilities.

2.1 The Importance of Facility Maintenance

The Authority identified "aging infrastructure increasing operating costs" as a challenge in achieving a balanced budget.[11] As of May 2018, the Authority's health care facilities averaged 40 years of age and a facility condition index of 45% (critical condition).[12,13] Moreover, estimated deferred maintenance for health care facilities in Saskatchewan totalled $3.3 billion.[14]

The health care facilities located in the City of Saskatoon and surrounding areas account for about $1.5 billion of the estimated deferred maintenance, with an average facility condition index of 26% (poor condition).[15] A poor condition rating indicates:

- Facilities will look worn with apparent and increasing deterioration
- Frequent component and equipment failure may occur

[3] Saskatchewan Health Authority, *2017-18 Annual Report, p. 34.*
[4] Ibid., p. 3.
[5] Ibid., p. 30.
[6] Saskatchewan Health Authority, *2017-18 Annual Report*, Audited Financial Statements, pp. 45 and 82.
[7] Saskatchewan Health Authority, *Special Public Board Meeting Agenda & Package*, (2018).
[8] Saskatchewan Health Authority, *2017-18 Annual Report*, p. 28.
[9] Saskatoon Health Region, *Annual Report 2016-2017*, p. 11.
[10] www.saskatoonhealthregion.ca/locations_services/locations/Pages/Home.aspx (08 November 2018).
[11] Saskatchewan Health Authority, *Special Public Board Meeting Agenda & Package*, (2018).
[12] Ibid.
[13] Facilities condition index (FCI) is the total cost of existing deficiencies (maintenance needs) in a particular facility (FCI Cost or cost of deferred maintenance) divided by its replacement value. It is represented as a decimal point or as a percentage. The lower the FCI, the better the condition of the asset.
[14] Saskatchewan Health Authority, *Special Public Board Meeting Agenda & Package*, (2018).
[15] Information provided by Saskatchewan Health Authority on November 15, 2018.

- Facilities' staff time will likely be diverted from regular scheduled maintenance and forced to react

- Resident/patient complaints will be high with an increasing level of frequency[16]

Maintenance is one key aspect of asset management. Effective asset management takes a risk- and evidence-based approach to managing assets through their entire life cycle (from purchase to disposal). It requires a co-ordinated approach, and linkage between decisions about maintenance to capital planning to an organization's overall strategic direction.

Effective maintenance planning:

- Helps ensure facilities can perform at optimum levels over their expected service life, and reduces the risk of service disruption

- Identifies and reduces risks associated with aging facilities, and reduces environmental impact by controlling resource usage

- Increases confidence in budgeting the cost of facility maintenance, and includes understanding the business consequences of reducing or increasing either the capital or maintenance budgets today and in the years ahead

- Reviews the performance of the facility to ensure it meets the requirements for service delivery

- Provides a foundation for continuous process improvement and feedback to improve future applications of the maintenance process[17]

In addition, effective maintenance planning helps justify planned asset expenditures to internal and external stakeholders, and ensure employees have the right competencies and capabilities for managing facilities.

Maintaining facilities to acceptable conditions helps ensure they meet service delivery requirements. Deferring maintenance can reduce capacity to provide services, increase future repair costs, and potentially reduce overall service life of facilities (e.g., having to replace a building or components earlier than intended).

Proper operation and maintenance of a health care facility and its key components (e.g., nurse call systems, boilers) is essential not only to the safe and effective delivery of health services to patients and long-term care residents, but also for providing safe work environments for health care providers.[18]

[16] BC Housing, *Capital Asset Management – Asset Strategies, Facility Condition Index*, (2011), p. 3.
[17] New South Wales, *Total Asset Management Guideline – Asset Maintenance Strategic Planning*, (2006), p. 2.
[18] CSA Z8002-14, *Operation and maintenance of health care facilities*, February 2014, p.8.

3.0 AUDIT CONCLUSION

We concluded that for the 12-month period ending November 30, 2018 the Saskatchewan Health Authority did not have effective processes to maintain health care facilities located in the City of Saskatoon and surrounding areas. It needs to:

- **Keep complete and consistent information about each key facility and components subject to maintenance, and status of maintenance activities**
- **Better control the accuracy and reliability of key maintenance data**
- **Set measurable service objectives (e.g., desired facility condition index, asset condition) for facilities and its significant components to support short-, medium-, and long-term maintenance planning and budget decisions**
- **Have guidance on classifying and prioritizing maintenance activities (preventative, reactive, and capital maintenance projects) consistently across its facilities**
- **Consistently set the nature, extent, and frequency of preventative maintenance activities, and complete the work as planned**
- **Consistently classify and rank demand maintenance work, and complete the work within a reasonable timeframe**
- **Report the results of its maintenance activities to senior management**

Figure 1—Audit Objective, Criteria, and Approach

Audit Objective: to assess whether the Saskatchewan Health Authority had effective processes to maintain health care facilities located in the City of Saskatoon and surrounding areas for the 12-month period ending November 30, 2018.

Audit Criteria:

Processes to:

1. Keep reliable information on facilities
   - 1.1 Identify the facilities, including components to be maintained
   - 1.2 Maintain current, reliable information needed to manage maintenance (e.g., facility condition, remaining service potential, estimated maintenance costs, estimated replacement costs)
   - 1.3 Assess risk that facilities will not meet required service objectives
2. Develop a risk-informed maintenance plan
   - 2.1 Determine service objectives for long-term performance (e.g., expected service life, desired facility condition index)
   - 2.2 Establish specific maintenance strategies to achieve service objectives
   - 2.3 Set maintenance priorities (short-, medium-, and long-term) based on assessed risks
   - 2.4 Evaluate strategies against available resources
3. Carry out maintenance effectively
   - 3.1 Use recognized maintenance standards
   - 3.2 Implement maintenance procedures consistent with standards and assessed priorities
   - 3.3 Provide staff with guidance on maintenance procedures
   - 3.4 Track maintenance activities

4. Monitor performance of maintenance
   - 4.1 Analyze progress in carrying out maintenance
   - 4.2 Report on results of maintenance activities (e.g., progress against maintenance plan, total deferred maintenance, facility condition index) to internal and external stakeholders (i.e., Board, Ministry of Health, public)
   - 4.3 Adjust maintenance priorities as new information becomes available

Audit Approach:

To conduct this audit, we followed the standards for assurance engagements published in the *CPA Canada Handbook – Assurance* (CSAE 3001). To evaluate the Authority's processes, we used the above criteria based on our related work, reviews of literature including reports of other auditors, and consultations with management. The Authority's management agreed with the above criteria.

We examined documentation and the Authority's maintenance IT system detailing the actions involved in the maintenance of facilities and assets maintained by the Authority. We interviewed Authority staff responsible for planning, carrying out, and reporting on maintenance activities at a variety of health care facilities (e.g., rural, urban, acute care, long-term care). We also tested key aspects of the maintenance process including samples of maintenance records, maintenance staff qualifications and training records, and other documents.

4.0 Key Findings and Recommendations

In this section, we refer to the health care facilities (and their related components like heating, ventilation, and air conditioning systems, beds) located in the City of Saskatoon and surrounding areas as Saskatoon-area facilities. In addition, we refer to the staff assigned responsible for maintaining these facilities as Facilities Management.

4.1 Qualified Staff Responsible for Maintenance

The Authority clearly assigned responsibility for maintaining Saskatoon-area facilities to appropriately qualified staff.

Responsibilities for maintenance includes accountability for planning, performing, and overseeing maintenance (preventative and demand) along with projects to replace components or key equipment. It refers to these as capital maintenance projects.

- Preventative maintenance is regularly performed maintenance designed to lessen the likelihood of failure or breakdown of a component or piece of equipment. Maintenance is done when a component or equipment works. It contributes to performance and reliability of the component or equipment.

- Demand maintenance (also referred to as corrective or reactive) is maintenance to repair a component or equipment when it is not working properly or at all.

Facilities Management is responsible for maintaining all Saskatoon-area facilities. It operates largely on a decentralized basis. It has staff in about 138 full-time equivalent positions—with about 13 responsible for centrally planning and overseeing maintenance, and managing the related maintenance IT system. There are about 196 staff located in 16 facilities. Staff in facilities are responsible for prioritizing and carrying out maintenance for their assigned facilities.

Facilities Management staff include professionals in trades (e.g., electricians, plumbers, steamfitter/pipefitter).

We assessed the qualifications of 10 Facilities Management staff. We found each obtained and maintained the qualifications as set out in their related job descriptions. Where qualifications required renewal of certifications (e.g., electrician license, power engineering certificate), we found it was appropriately renewed and up-to-date.

Having clearly assigned responsibilities, and properly qualified maintenance staff, increases the likelihood of facilities and related components being properly maintained.

4.2 Service Objectives for Guiding Maintenance Not Set

The Authority has not set measurable service objectives (e.g., a minimum acceptable facility condition index rating needed to meet future operations) for types of facilities or key components for its Saskatoon-area facilities.[19] Service objectives could include use of minimum acceptable facility condition indices, and setting minimum condition standards for critical equipment.[20]

Facilities Management has not set a minimum acceptable facilities condition index for categories of its facilities (e.g., acute care), or for individual facilities in the Saskatoon-area. As of November 2018, the Authority had not set provincial indices either.

In addition, Facilities Management does not use Ministry-maintained, facility-condition data (as described in **Figure 2**) for the Saskatoon-area facilities when making maintenance planning decisions.

Figure 2—Ministry-Maintained Facility Condition Information

In 2014, the Ministry of Health, using a third-party consultant, determined the actual facility condition index rating for each of Saskatchewan's health care facilities, and average for each health region. Its report included, for each facility, the age, use, size, replacement cost, and cost of addressing all identified deficiencies, in addition to the facility condition cost, and index.

It published the related report, and shared the results with the boards and management of the former health regions.

Each year since 2014, the Ministry updated this information by surveying maintenance staff of each facility. It shares the results with the management of these facilities.

Source:http://publications.gov.sk.ca/documents/13/105276-Saskatoon%20Health%20Region%20Asset%20List%20Report.pdf (25 March 2019).

The Ministry-maintained data shows overall average facility condition index for Saskatoon-area facilities declined since 2014 from 40% to 26% in 2018; a lower percentage is better. In 2014, the Saskatoon-area facilities percentages ranged between a low of 0% to a high of 88% – both for long-term care facilities located in Saskatoon.[21] In 2018, the percentages ranged between a low of 6% to a high of 72%.

[19] Facilities or key components of a similar nature (e.g., same class of health care facility, similar component in different health care facilities).
[20] Facilities condition index (FCI) is the total cost of existing deficiencies (maintenance needs) in a particular facility (FCI Cost or cost of deferred maintenance) divided by its replacement value. It is represented as a decimal point or as a percentage. The lower the FCI, the better the condition of the asset.
[21] publications.gov.sk.ca/documents/13/105276-Saskatoon%20Health%20Region%20Asset%20List%20Report.pdf (25 March 2019).

Facilities Management had not set a minimum condition standard and/or asset availability for categories of assets essential to the delivery of health care in the Saskatoon-area.[22] As of November 2018, the Authority had also not set service objectives for categories of critical assets.

As of November 2018, Facilities Management had not identified categories of critical assets for the Saskatoon-area. For example, categories of critical assets could include boilers; nurse call systems; and heating, ventilation, and air conditioning systems.

Having minimum condition standards enables taking a risk-informed approach to maintenance planning. It facilitates comparisons of assets' current conditions to those standards to identify particular facilities or components at risk. This supports determining the extent of resources needed for maintenance, and deciding where best to focus maintenance efforts over the short-, medium-, or long-term.

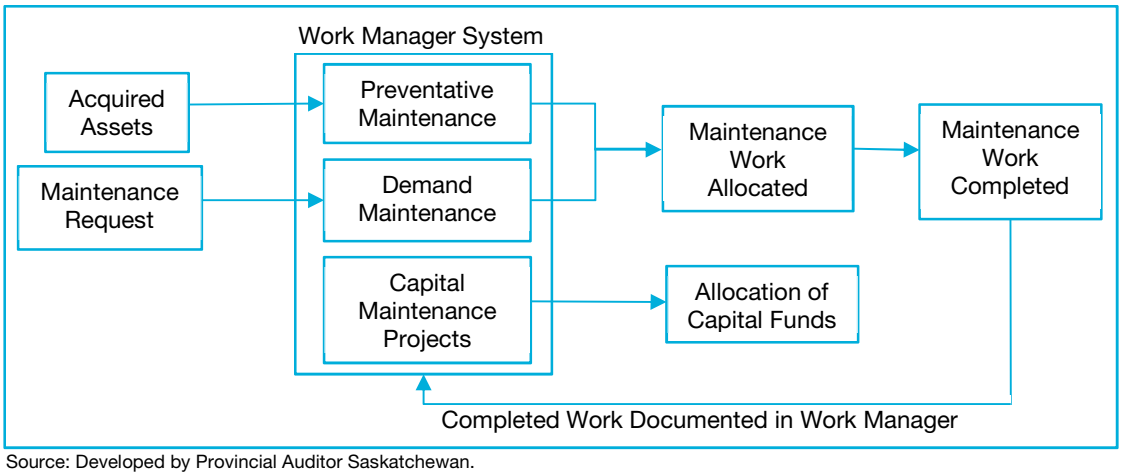
1. **We recommend the Saskatchewan Health Authority establish measurable service objectives for its key health care facilities and critical components located in the City of Saskatoon and surrounding areas.**

4.3 Controls over the Accuracy and Reliability of Information in Maintenance IT System Needed

The Authority has taken insufficient steps to keep information in its maintenance IT system accurate and reliable.

In 2007, the staff of the former Saskatoon Health Region developed a maintenance IT system to plan for, track, and manage maintenance activities on Saskatoon-area facilities.[23] It refers to this IT system as 'Work Manager.' As shown in **Figure 3**, Work Manager consists of three main modules—preventative maintenance, demand maintenance, and capital maintenance projects.

Figure 3—Schematic of Saskatoon's Work Manager Maintenance IT System



Source: Developed by Provincial Auditor Saskatchewan.

[22] Equipment availability is the number of hours (time measure) that equipment operates at full capacity in a reporting period divided by total hours in the reporting period (e.g., month, quarter, year).
[23] The former Saskatoon Regional Health Authority developed Work Manager in-house.

As shown in **Figure 4**, Work Manager is designed to require staff to complete six mandatory fields when manually entering an asset into the system, and gives them the option of tracking additional information like asset condition.

Figure 4—Brief Description of Modules in Work Manager, and Data it Can Track

Preventative Maintenance – tracks the scheduled, routine maintenance of component assets to reduce the likelihood of failure. Each asset has an individual preventative maintenance plan. A staff member of Facilities Management determines the timing of work (e.g., monthly, semi- annually, annually) for each asset when they add it to the system. When preventative maintenance is due, the system creates a requisition for work to be completed.

Demand Maintenance – tracks repairs conducted in the form of demand maintenance requests and completed as issues arise (on component assets that have broken down or failed). Staff submit demand maintenance requests to a central switchboard (by phone or via an electric form). Demand maintenance focuses on restoring the equipment to its normal operating condition. Examples can range from fixing a light bulb in a patient room to repairing a malfunctioning elevator in a health care facility.

Capital Maintenance Projects – tracks the larger or more complex maintenance activities (facility roof repairs, replacing boilers). The Authority uses its maintenance IT system to evaluate and prioritize its capital maintenance projects (i.e., those projects that staff have identified the facility or components to be close to or at the end of their service life).

Work Manager is designed to track the following information (mandatory field in blue font):

- Asset description
- Asset owner department (e.g., Facilities Management)
- Who services the asset (e.g., contractor, Facilities Management)
- Asset category (e.g., transport – beds, stretchers, and ceiling lifts)
- Equipment type (e.g., stretcher)
- Site (e.g., Royal University Hospital)
- Asset details (e.g., model number, serial number, manufacturer name, warranty expiry date)
- Asset location (e.g., building, floor, room)
- General asset information (e.g., date installed, asset condition rating, last condition rating)
- Asset costing information (e.g., original purchase order number, original unit cost, useful life, replacement cost, lifecycle cost)
- Maintenance activity (e.g., roof inspection, fire alarm panel certification, code blue nurse call system)
- Preventative maintenance category (e.g., life safety, base building)
- Type of preventative maintenance (e.g., emergency power, plumbing, heating, area inspection)
- Reason for preventative maintenance (e.g., code requirement, manufacturer requirement, Authority initiative)
- Frequency of preventative maintenance (e.g., weekly, every six months, annually)

Source: Adapted from information from the Saskatchewan Health Authority for Saskatoon-area facilities.

Consistent with its decentralized approach to maintenance, all 196 Saskatoon-area maintenance staff have access to Work Manager. Facilities Management managers handle changes to user access to Work Manager centrally.

Saskatoon-area maintenance staffs' access to data in Work Manager is not restricted to facilities they are assigned to maintain. As a result, they could change or delete any existing data in real time.

The Authority did not have a way to identify inappropriate or erroneous changes to data in Work Manager. We found Work Manager can identify if someone made a change, but not what change was made.

Furthermore, the Authority does not periodically review whether user access to Work Manager is appropriate – that is, whether it removed access for individuals who are no longer employed in Saskatoon-area maintenance.

In addition, the Authority does not have controls around program changes made to Work Manager. The Authority did not properly test a programming change (i.e., an additional field in the Capital Maintenance Projects module) before putting it into effect. We identified that this change inadvertently deleted existing data (i.e., removed calculated priority ranking scores for capital maintenance projects in the Capital Maintenance Projects module). Management was unaware of this error.

Insufficient controls over user access in Work Manager, and insufficient program change controls may result in data in Work Manager being inaccurate or incomplete. Inaccurate and incomplete maintenance data may result in inappropriate maintenance decisions, or using additional time unnecessarily.

2. **We recommend the Saskatchewan Health Authority control the accuracy and reliability of maintenance data in its IT system for key health care facilities and components located in the City of Saskatoon and surrounding areas.**

4.4 Complete Listing of Facilities to Maintain Needed

The Authority does not keep a complete listing of key Saskatoon-area facilities that it needs to maintain. It is aware that Work Manager is incomplete.

The Authority does not systematically identify key Saskatoon-area facilities it is responsible to maintain for inclusion in Work Manager, its maintenance IT system. Rather Facilities Management staff manually add assets to Work Manager based on:

- Purchase orders received from the Finance Department showing assets to be acquired
- Maintenance requests (if asset was not already in the system)
- Information provided by maintenance staff

As of November 2018, Work Manager included over 19,000 individual assets.

When we tried to determine the completeness of Work Manager, we identified that it is time consuming to compare assets listed in Work Manager to those listed in other IT systems (e.g., accounting sub-ledger system), and in the Ministry-maintained facility condition information system.[24] We found the assets are broken-down differently, and the descriptions of them differ. Also, the Authority does not use a common identifier (e.g., a tag number affixed to the asset) in its IT system to enable matching of data. Use of common identifiers can provide an efficient way to electronically transfer relevant data, and help determine consistency and completeness of related data in each system.

[24] For example, the fixed asset module of the financial system lists assets purchased and disposed of during the year along with details of those assets (e.g., purchase date). The Ministry-maintained facilities conditions database contains details about facilities (see **Figure 2**).

In addition, our review of the assets in Work Manager found it missed some equipment critical to patient care, and included others that did not seem critical to health care delivery or facility safety. For example, we identified Work Manager did not include two nurse call systems located and operating in two rural health facilities. A nurse call system provides the ability for patients to obtain nurse assistance when needed. Work Manager includes nurse call systems for other locations. In addition, it listed non-critical assets like toasters, warming ovens, and ice machines.

Having a complete listing of key facilities and components provides the basis to decide on which types of assets to do preventative maintenance, and on which to do only reactive (demand) maintenance.

In addition, not identifying all of its key facilities and components increases the risk that the Authority may not effectively prioritize maintenance activities, or make inconsistent decisions about approaches to maintenance. This could lead to increased future repair costs or replacing facilities or components earlier than intended.

3. **We recommend the Saskatchewan Health Authority maintain complete information on each of its key health care facilities and components located in the City of Saskatoon and surrounding areas to enable the preparation of a comprehensive maintenance plan.**

4.5 Preventative Maintenance Activities Not Consistently Determined

The Authority does not make consistent preventative maintenance decisions for the same categories of assets or equipment types. It makes inconsistent decisions about how often, or which, Saskatoon-area facilities it plans to carry out preventative maintenance, and the extent of preventative maintenance expected.

The Authority uses Work Manager to document its preventative maintenance planning decisions. Facilities Management typically decides on which assets it expects to do preventative maintenance when adding an individual asset to Work Manager. For each asset, Facilities Management, in Work Manager, sets the frequency (e.g., monthly, semi-annually, annually), and outlines the expected preventative maintenance tasks.

Facilities Management staff indicate it bases the frequency and preventative maintenance tasks on manufacturer information or code requirements.[25] Alternatively, where manufacturer or code requirements do not exist, Facilities Management staff use their knowledge and experience. Preventative maintenance can include routine inspections of key components (e.g., roofs, boilers). As shown in **Figure 4**, staff can track in Work Manager the reason for preventative maintenance (e.g., electrical code, manufacturer requirements) to document the basis of the preventative maintenance decision, and to advise maintenance staff why the maintenance is required.

Work Manager automatically generates preventative maintenance requisitions before preventative maintenance is due. These requisitions notify Saskatoon-area maintenance

[25] Codes are a set of standards for specific trades to follow; examples include building codes, electrical codes or plumbing codes.

staff of required upcoming preventative maintenance tasks, and by when to complete them.

For five of six preventative maintenance requisitions we tested where Work Manager identified a reason for the preventative maintenance (e.g., manufacturer manual, code, or similar detail), relevant Saskatoon-area maintenance staff was unable to provide us with the related manual, or code (e.g., electrical code in place). As a result, they could not show us the basis of its preventative maintenance decisions.

In our testing of 30 preventative maintenance requisitions, we found the Authority did not make consistent preventative maintenance decisions on the same equipment types. In addition, some decisions did not align with requirements of applicable codes. For example,

- Facilities Management decided to maintain nurse call systems located in Saskatoon on a monthly basis, whereas for two systems located in rural facilities, it decided to maintain them only when they failed. Management was unable to explain why these decisions differed. A nurse call system provides the ability for patients to obtain nurse assistance when needed – it is critical in the delivery of safe health care.

- The preventative maintenance requisition of one nurse call system we tested included detailed procedures (e.g., identified the specific tool to be used – impedance meter, and detailed inspection steps such as test power supply, check grounding, check battery, test call level from all systems). Whereas another requisition for a nurse call system we tested did not include the detailed procedures or detailed inspection steps. It only indicated staff should test call level from all systems (but did not list the systems).

- We observed differences in the frequency and extent of preventative maintenance of boilers subject to the same code requirements. The maintenance staff was unable to provide us with the related code to show support for their decisions on preventative maintenance of boilers (frequency and extent). Boilers are vital to key hospital processes such as delivering building heat and providing hot water.

    - They did preventative maintenance including checking flame conditions, testing low water cut-offs, and testing relief valves each month on boilers located in two rural facilities. However, it did not annually inspect them in a detailed manner. Work Manager indicated the reason for monthly maintenance was a code requirement.

    - They did similar preventative maintenance every four weeks, and, in addition, a detailed annual inspection on boilers in facilities located in the City of Saskatoon. Work Manager indicated the reason for the four-week and annual maintenance was a code requirement.

Not making consistent decisions and aligning the frequency and maintenance activities with standards (e.g., manufacturer and code requirements) increases the risk that key facilities and component assets are not maintained appropriately or, conversely, resources are used inefficiently. Inadequately maintained assets may put patients, residents, visitors, and staff at risk of injury if an asset fails.

4. **We recommend the Saskatchewan Health Authority consistently set the nature, extent, and frequency of preventative maintenance activities for similar categories of key health care facilities and components located in the City of Saskatoon and surrounding areas.**

Furthermore, the Authority does not consistently keep its preventative maintenance plans for individual Saskatoon-area component assets up-to-date. We also found the Authority did not adjust the due dates of its preventative maintenance when it did demand maintenance on a component asset.

As noted in **Figures 3** and **4**, Work Manager tracks preventative and demand maintenance in separate modules, and on a different basis. It tracks preventative maintenance based on individual component assets, and demand maintenance by location of asset repairs (e.g., unit within an acute care facility).

Failing to take into account any demand maintenance work completed on a component asset, could lead to work duplication, such as scheduling or completing preventative maintenance work after requested demand maintenance. Moreover, this unnecessarily causes staff to expend resources on monitoring overdue maintenance.

In addition, Facilities Management expects maintenance staff responsible for preventative maintenance to keep preventative maintenance plans of those assets up-to-date through staff feedback in Work Manager. They expect staff will adjust preventative maintenance tasks, note the specialized tools needed to perform the tasks, and estimate the time to do preventative maintenance tasks, as necessary. Furthermore, they expect staff to record the condition of component assets based on preventative maintenance done.

For only 3 of 30 Work Manager preventative maintenance requisitions we tested, maintenance staff provided feedback (e.g., roof repairs required) in Work Manager.

Staff did not record in Work Manager the actual condition of the asset for any of the 30 Work Manager preventative maintenance requisitions we tested.

Not basing planned preventative maintenance decisions on current and complete information increases the risk of maintenance inefficiencies. See **Recommendation 3** about maintaining complete information on key Saskatoon-area facilities and components.

4.6 Complete Risk-Informed Maintenance Plan Needed

The Authority does not have a complete risk-informed plan to maintain its Saskatoon-area facilities over their related useful lifespan.

The Authority uses Work Manager as its maintenance planner. As noted in **Section 4.4**, it does not have a complete listing of key facilities and components it is to maintain. As noted in **Section 4.5**, it has neither made consistent decisions about which assets to maintain on a preventative basis, nor kept its preventative maintenance plans up-to-date.

In addition, Work Manager does not include estimates for the costs of planned maintenance for the upcoming year or future years.

We found Facilities Management bases its budget for maintaining Saskatoon-area facilities on historical costs as opposed to planned maintenance activities.

As shown in **Figure 5**, failing to link the maintenance budget to its maintenance plan in each upcoming year contributes to differences between actual and planned maintenance costs. For example, the year-over-year actual to budget comparisons for the three hospitals in the City of Saskatoon show significant differences from 2015 to 2018 (underspent on maintenance in 2017).

Figure 5—Comparison of Actual to Budget Maintenance Costs from 2015 to 2018[A]

	2015	2016	2017	2018
Actual	$6,149,321	$6,014,258	$4,759,807	$4,197,320
Budget	$4,076,480	$4,107,806	$5,243,410	$3,818,426
Over/(under) budget	$2,072,841	$1,906,452	$(483,603)	$378,894

Source: Saskatchewan Health Authority financial records for three hospitals in Saskatoon.
[A] Maintenance costs do not include labour costs.

In addition, because the Authority has not set measurable service objectives, it has not estimated the cost to maintain its Saskatoon-area assets to a desired condition or asset availability over its useful lifespan. As a result, the Authority does not know whether it is doing maintenance at appropriate times, or, if not, what the impact of deferring maintenance is on the delivery of health care, safety, and costs.

5. **We recommend the Saskatchewan Health Authority use its planned maintenance activities as an input to setting its Saskatoon-area maintenance budget.**

4.7 Preventative Maintenance Activities Not Conducted Within Expected Timeframes

The Authority does not always conduct maintenance activities on Saskatoon-area facilities within expected timeframes.

Work Manager preventative maintenance plans set out the expected timing of maintenance of facilities and component assets.

For 30 preventative maintenance requisitions we tested, 14 (47%) were not completed within the timeframe set out in the Work Manager preventative maintenance plan. Staff completed expected maintenance tasks between 11 and 251 days after the scheduled maintenance date. One nurse code blue system (a critical asset) received maintenance 178 days later than expected—despite the Authority expecting staff to maintain the system once a month.[26]

For four of six roof inspections included in our sample of 30 preventative maintenance requisitions, staff completed the inspections between 14 and 251 days after the scheduled inspection date. For one roof inspection requisition we tested, staff inspected

[26] A nurse code blue system is used to alert staff of a medical emergency such as a cardiac arrest.

the roof once in a 12-month period instead of every six months as expected (see **Figure 6** for further details).

Figure 6 – Example of Inconsistent and Untimely Roof Inspections

For this roof, the Work Manager preventative maintenance plan required a roof inspection every six months. Instead of every six months, maintenance staff inspected the roof once in a 12-month period.

- Work Manager issued a preventative maintenance requisition on October 1, 2017. Maintenance staff closed this requisition on July 9, 2018 (251 days later than expected).
- Work Manager issued a preventative maintenance requisition on April 1, 2018 (for its next six-month inspection). Maintenance staff closed this requisition on June 21, 2018 (51 days later than expected).

Maintenance staff completed a six-month inspection two times within 19 days.

Maintenance staff closed requisitions only after they completed the required maintenance tasks.

Source: Information compiled by Provincial Auditor Saskatchewan.

The Authority does not require its Saskatoon-area staff to document reasons for delays in completing preventative maintenance.

Not completing timely preventative maintenance increases the risk that an asset may fail and cause harm to residents, patients, visitors, or staff. This could also lead to increased future repair costs or the Authority maintaining assets earlier than intended.

6. **We recommend the Saskatchewan Health Authority complete preventative maintenance on its key health care facilities and components located in the City of Saskatoon and surrounding areas within expected timeframes.**

4.8 Timing of Demand Maintenance Not Aligned with Priority Ratings

The Authority does not always conduct demand maintenance in its Saskatoon-area facilities consistent with its Work Manager priority rating.

When a component fails or is not working properly (e.g., elevator does not work), staff working in Saskatoon-area facilities report the problem to a facility call centre, which operates 24-7 (by phone or via an electric form). The Authority refers to these as demand maintenance requisitions. At November 2018, the Authority had three full-time equivalent, Saskatoon-based facility call-centre staff responsible for processing demand maintenance requests. Each year, they process about 21,000 requests.

Using the Work Manager Demand Requisition module, facility call-centre staff prioritize requests, and automatically communicate them to maintenance staff at the appropriate facility. Facility call-centre staff record the location in a facility (e.g., patient room, administrative area) of the maintenance problem. The Work Manager Demand Requisition module does not track the particular component or asset in need of repair (or replacement); however, facility call-centre staff record their priority assessment of the demand request (e.g., rating of 1 is urgent; 12 not urgent) based on various factors (e.g., safety, operational, aesthetic).

For each of the 10 demand requisitions we tested, Work Manager indicated a priority rating.

However, in practice, individual Saskatoon-area maintenance staff and their supervisors do not necessarily use the priority rating to determine the actual priority for demand maintenance requests.

For 7 of the 10 demand requisitions we tested, staff did not complete the demand maintenance work within a timeframe consistent with the priority rating. For example, one demand requisition with a priority ranking of '3' we tested, requested the installation of security at a lab exit for safety reasons; this was then completed 184 days after the initial request. For other demand requisitions tested, staff completed maintenance between four to 190 days after the request.

In addition, 3 of 10 demand requisitions we tested were not repairs of components or equipment that did not work. Rather, they were projects to replace or renovate components (i.e., capital maintenance projects). One requisition was for a room renovation (a 100-hour project). Management could not explain why this was a demand requisition. Completing capital projects as a demand requisition allows staff to skip the prioritization process for capital projects (see **Section 4.9** for further information on the evaluation and prioritization of capital maintenance projects).

The Authority does not have written guidance to help Saskatoon-area facility call-centre staff and maintenance staff properly classify and consistently prioritize the urgency of requests for demand maintenance. Not having written guidance increases the risk of inconsistent prioritization of maintenance across Saskatoon-area facilities. It also increases the risk that maintenance of assets critical for the delivery of health care services and the safety of patients, residents, and/or staff is not done first.

7. **We recommend the Saskatchewan Health Authority have written guidance for classifying and prioritizing requests for demand maintenance on key health care facilities and components located in the City of Saskatoon and surrounding areas.**

Not completing timely demand maintenance increases the risk that an asset may fail and cause harm to residents, patients, visitors, or staff.

8. **We recommend the Saskatchewan Health Authority complete demand maintenance in line with priority rankings for key health care facilities and components located in the City of Saskatoon and surrounding areas.**

4.9 Consistent Ranking of Capital Maintenance Projects Needed

The Authority does not consistently select Saskatoon-area capital maintenance projects based on documented priority needs.

Capital maintenance projects are larger or more complex maintenance activities (e.g., facility roof repairs, replacing boilers).

For the 12-month period ending November 2018, the Authority approved about 31 capital maintenance projects totalling approximately $20.6 million for the Saskatoon-area.

Each year, Facilities Management recommends projects based on its ranking of the priority of each potential Saskatoon-area capital maintenance project. It scores each project using an evaluation tool in the Work Manager Capital Maintenance Project module. This tool applies numerical scores for factors such as risk levels, likelihood, and impact coupled with additional factors, such as service delivery impact, organizational reputation effects, and regulatory compliance. It does not have written guidance for scoring these factors. Good practice for the health sector suggests prioritization that emphasizes patient care, clinical effectiveness, and safety.

However, Facilities Management recommends capital maintenance projects for senior management's review and approval based on the results of its evaluation of priority needs. In addition, senior management (e.g., Vice Presidents) can initiate any capital maintenance project at their discretion. The Authority does not evaluate these projects in the Work Manager Capital Maintenance Project module.

Five of the seven projects we tested were not ranked in Work Manager. For each of them, the Authority did not have documentation to show who requested the project or why its priority was higher priority than other projects. One project scheduled an update to a boardroom in a long-term care facility.

Furthermore, our review of the capital-maintenance project listing identified a duplicate project for a specific boiler with different scorings. For one score, the boiler project was assessed as having an extreme likelihood of failure; whereas for the other score, it was assessed as having a high likelihood of failure. Management was unaware of the duplicate project, and unable to explain the difference in scoring.

Failing to score projects consistently or documenting rationale for selecting projects can lead to an increased risk the Authority is not prioritizing and completing capital projects that best address its needs. In addition, it increases the risk of not using resources (e.g., staff, budget) effectively.

9. We recommend the Saskatchewan Health Authority consistently document the priority of capital maintenance projects undertaken in the City of Saskatoon and surrounding areas.

4.10 Maintenance Costs Monitored

To monitor maintenance costs and workflow, Facilities Management managers review, each day, the total number of overtime hours for the previous day of maintenance staff for each Saskatoon-area facility. They follow up identified issues, if any.

4.11 Further Analysis and Reporting on Maintenance Activities Needed

Senior management (e.g., Executive Director, Vice President) receive no reports about the status of maintenance of Saskatoon-area facilities, and the impact of that maintenance on the condition of the Saskatoon-area facilities and components critical to the delivery of health services.

For capital maintenance projects, Facilities Management managers review, on a bi-weekly basis, the following two reports:

- The completed deferred maintenance capital projects report that lists, for each project, the approved budget, funding source, actual costs, planned start date, and actual end date
- The on-going deferred maintenance capital projects report that lists, for each project, the approved budget, funding source, planned start date, and project status.

We found the on-going deferred maintenance capital projects report does not include key information to effectively monitor the status of these projects; it does not include forecasted completion costs or estimated actual end date(s).

In 2018-19, prior to authorizing use of capital funds, senior management requests a listing of capital projects (including those for Saskatoon-area facilities) on an ad hoc basis. Management indicated that reporting on capital projects is progressing. For example, in mid 2018-19, senior management began receiving monthly reporting on the state of some capital projects.

Senior management does not receive any reports about Saskatoon-area preventative and demand maintenance planned, or actual, activities. Rather Saskatoon-area maintenance staff periodically receive statistics about maintenance work (demand and preventative) underway. Some examples of common reports used are as follows.

For demand maintenance, they receive:

- A daily listing of demand service requests rated as the highest priority in Work Manager
- Every four weeks, a listing of incomplete demand service requests older than six months—it describes, in detail, each request, and to which maintenance staff it is assigned

For preventative maintenance requisitions, they receive

- Every four weeks, a listing of incomplete preventative maintenance requisitions for all rural sites—it describes, in detail, each requisition and to which maintenance staff it is assigned
- Each month, a listing of incomplete preventative maintenance requisitions for the same maintenance (duplicate)—it lists each request, and the total number of requests for the same maintenance that are currently incomplete

We found that the Saskatoon-area maintenance staff use two measures to monitor the timeliness of maintenance activities. Each day, Saskatoon-area maintenance managers and supervisors jointly discuss (in-person or by phone) the average days of outstanding requisitions, and average time required to complete outstanding requisitions, as determined from information in Work Manager. This daily discussion gives staff an opportunity to identify and discuss immediate priority areas.

We found Facilities Management use of the overall average days of outstanding requisitions to evaluate the timeliness of its maintenance has limitations. The number of recent requisitions affects a simple average (number of days outstanding/ number of requisitions), which gives a potentially inaccurate view of the timeliness of maintenance.

In addition, use of overall average days outstanding does not take into account the criticality of outstanding maintenance activities (safety, critical component), types of outstanding maintenance (electrical), or location (facility). Looking at outstanding requisitions in different ways may provide the Authority more insight into reasons for delays (e.g., greater need for particular trades), or the condition of certain facilities.

In addition, we found the Authority did limited analysis of information included in the various reports, and did not document reasons for delays in the completion of scheduled maintenance or actions required to address those delays.

Without sufficient analysis and reporting of maintenance results, the Authority cannot assess if effective maintenance of its key facilities and components is occurring, or if maintenance funding is sufficient and efficiently used.

10. We recommend the Saskatchewan Health Authority report to senior management the results of maintenance activities for its key health care facilities and components located in the City of Saskatoon and surrounding areas.

5.0 Saskatoon and Surrounding Area Facilities

Hospitals (Acute Care)	
Saskatoon:	Surrounding Area:
Royal University Hospital Saskatoon City Hospital St. Paul's Hospital	Humboldt District Health Complex – Humboldt Lanigan Hospital – Lanigan Rosthern Hospital – Rosthern Wadena Hospital – Wadena Watrous District Health Complex – Watrous Wynyard Hospital – Wynyard

Health Centres and Other Facilities	
Saskatoon:	Surrounding Area:
Cameco Renal Health Centre Idylwyld Health Centre Kinsmen Children's Centre Larson House Brief Detox Royal University Hospital – Saskatchewan Cancer Agency	Borden Primary Health Centre – Borden Delisle Community Health & Social Centre – Delisle Lanigan Community Services Building – Lanigan LeRoy Community Health & Social Centre – LeRoy Nokomis Health Centre – Nokomis

Health Centres and Other Facilities (Continued)	
Royal University Hospital – Saskatchewan Cancer Agency Patient Lodge Youth Resource Centre	Quill Lake Community Health & Social Centre – Quill Lake Rosthern Community Services Building – Rosthern Spalding Community Health Centre – Spalding Wakaw Primary Health Centre - Wakaw Watrous Primary Centre – Watrous Watson Community Health Centre – Watson

Long-Term Care Homes	
Saskatoon: Central Haven Special Care Home Circle Drive Special Care Home Extendicare Special Care Home Luther Special Care Home Oliver Lodge Parkridge Centre Porteous Lodge Saskatoon Convalescent Home Sherbrooke Community Centre St. Ann's Home St. Joseph's Home Stensrud Lodge Sunnyside Adventist Care Centre	Surrounding Area: Bethany Pioneer Village – Middle Lake Central Parkland Lodge – Lanigan Cudworth Nursing Home/Health Centre – Cudworth Dalmeny Spruce Manor Special Care Home – Dalmeny Golden Acres – Wynyard Goodwill Manor – Duck Lake Lakeview Pioneer Lodge – Wakaw Langham Senior Citizen's Home – Langham Last Mountain Pioneer Home – Strasbourg Manitou Lodge – Watrous Mennonite Nursing Home – Rosthern Pleasant View Care Home – Wadena Quill Plains Centennial Lodge – Watson St. Mary's Villa – Humboldt Warman Mennonite Special Care Home – Warman

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