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Mount Sinai Hospital • University Health Network • Women's College Hospital

# Managing Radiology Information System Downtimes

## *A Comprehensive Approach*

## Background

- With the implementation of a Radiology Information System (RIS) there is often a need to regularly update the RIS with new features
- In order for these new features to be implemented the system must undergo periods of downtime resulting in:
  - Inability to use the RIS system
  - Lack of connectivity/communication between the RIS and other hospital information systems i.e. order entry, dissemination of reports
- A need for a robust and comprehensive process to address these downtime was identified

## Downtime System Limitations

### Features Disabled During RIS Downtime

- Electronic requests for medical imaging studies
- Electronic scheduling and documentation of studies
- Online reporting of images in the RIS
- Automated transfer of reports to referring physician

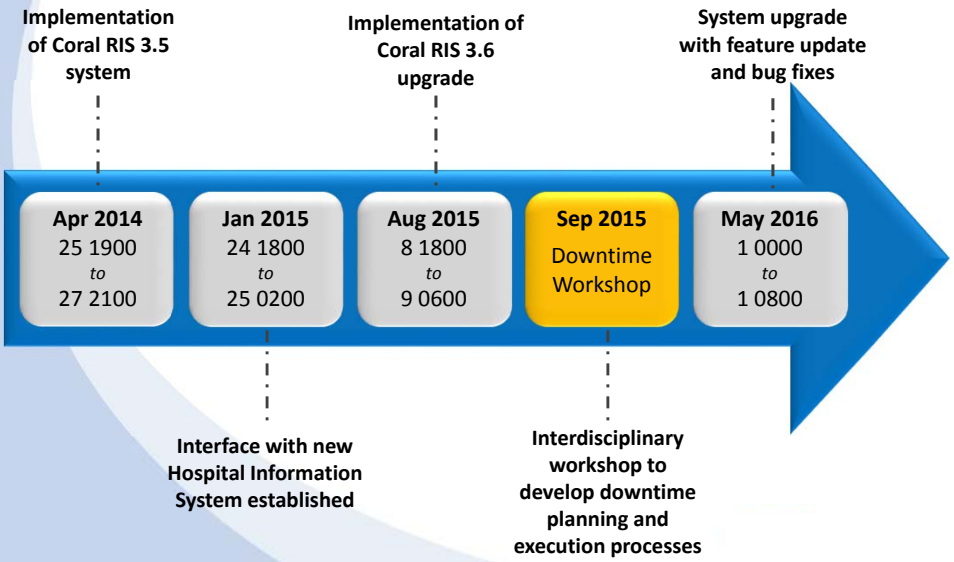
### Features Enabled During RIS Downtime

- Ability to send and store acquired images
- Electronic access for radiologists to view and manipulate acquired images
- Electronic access for referrers via online web based Coral Viewer software

## Downtime Challenges

| Downtime Planning *(Before)* | Downtime Execution *(During)* | Recovery *(After)* |
|---|---|---|
| • Fragmented planning and communication processes<br>• Focus on system implementation planning as opposed to delivery of care<br>• No key points of escalation or decision points | • Lack of clear workflows for delivery of care<br>• No defined clinical staff roles and responsibilities<br>• Delays to reporting of images following downtime<br>• Focus on needs of imaging as opposed to needs of referrer | • Poor documentation of study information back into RIS system resulting in incorrect or missing information |

## JDMI Major Downtime Timelines




## Pre Downtime Workshop

### What Worked Well

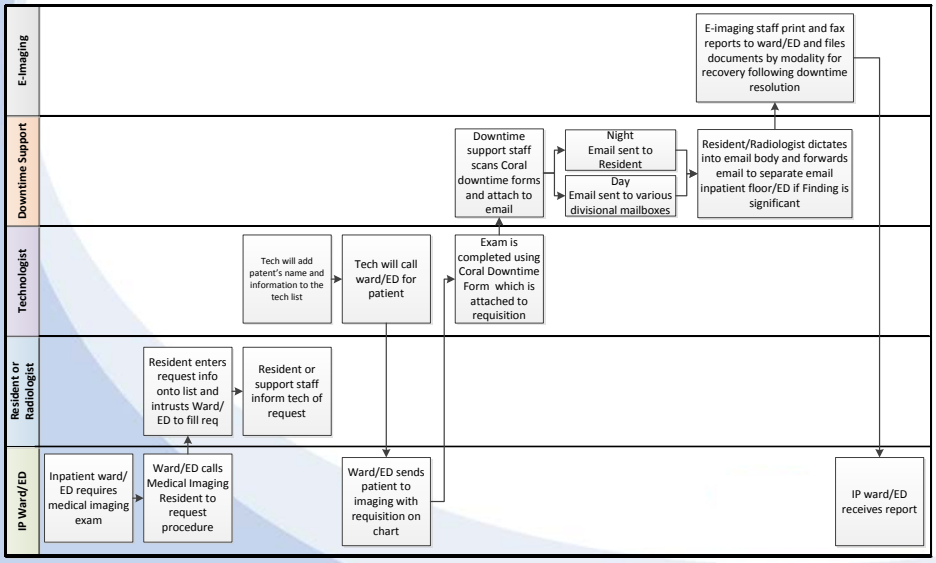
- Risks to the organization clearly identified, understood and communicated
- Workflows and roles/responsibilities for clinical staff during downtime identified

### What Didn't Work

- Fragmented planning process
- Short time frames for planning of downtime
- Lack of escalation points and decision making triggers
- Poorly understood communication channels
- Lack of role clarity with respect to downtime planning

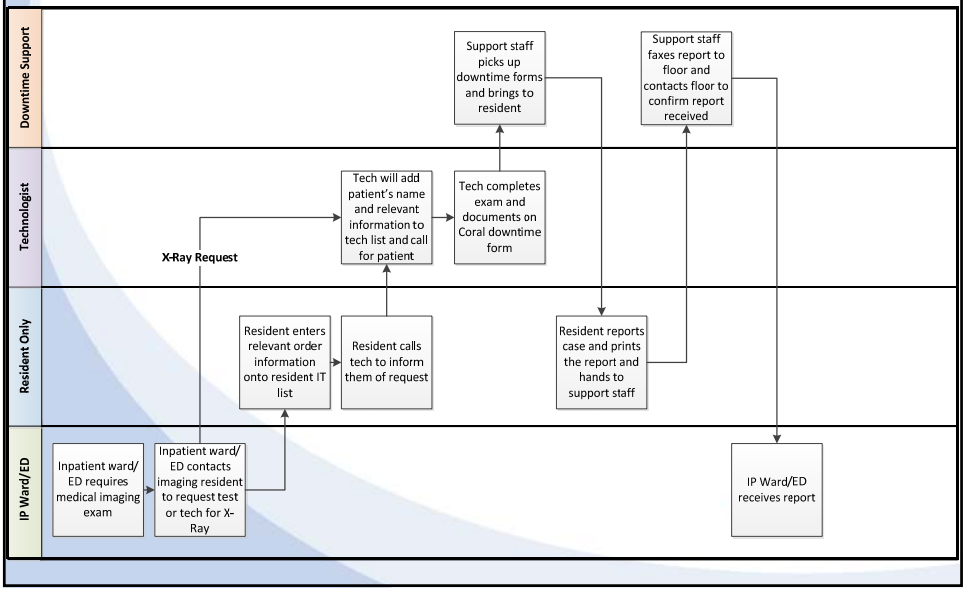
# Downtime Workflow

## *1st Iteration – Electronic Workflow*

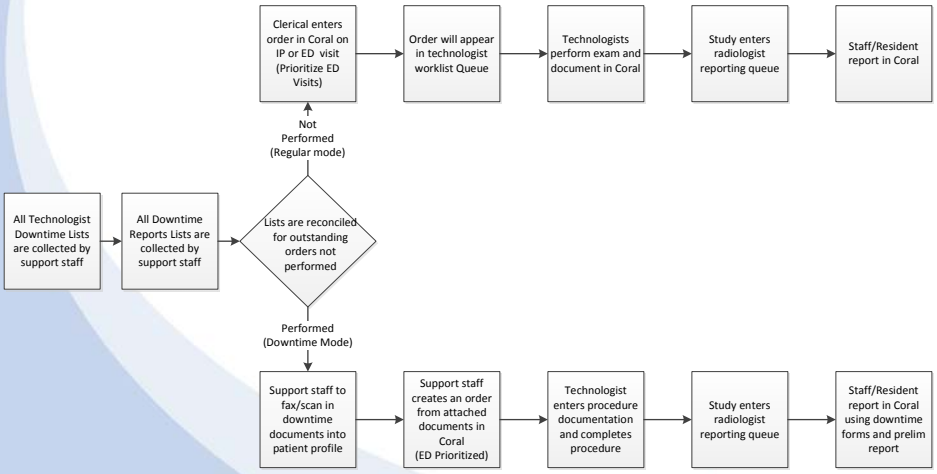



# Downtime Workflow

## *2nd Iteration - Paper Process*

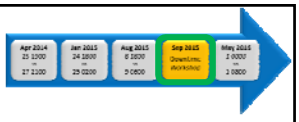


## Recovery Process




## Downtime Workshop

***Solutions***



***In an effort to address challenges identified in previous downtimes a process improvement workshop was held***

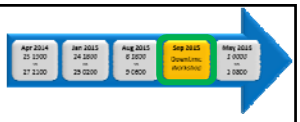
| Issues Identified | Implemented Solutions |
|---|---|
| 1. Fragmented planning process | ✓Downtime governance structure established to ensure appropriate individuals are engaged during decision making |
| 2. Lack of escalation points and decision making triggers | ✓Comprehensive and collaborative planning workflow developed outlining clear triggers , decision making points and owners |
| 3. Poorly understood communication channels | ✓Clinical service delivery prioritized during downtime planning process |
| | ✓Implemented standard communication methodologies and standard timelines |

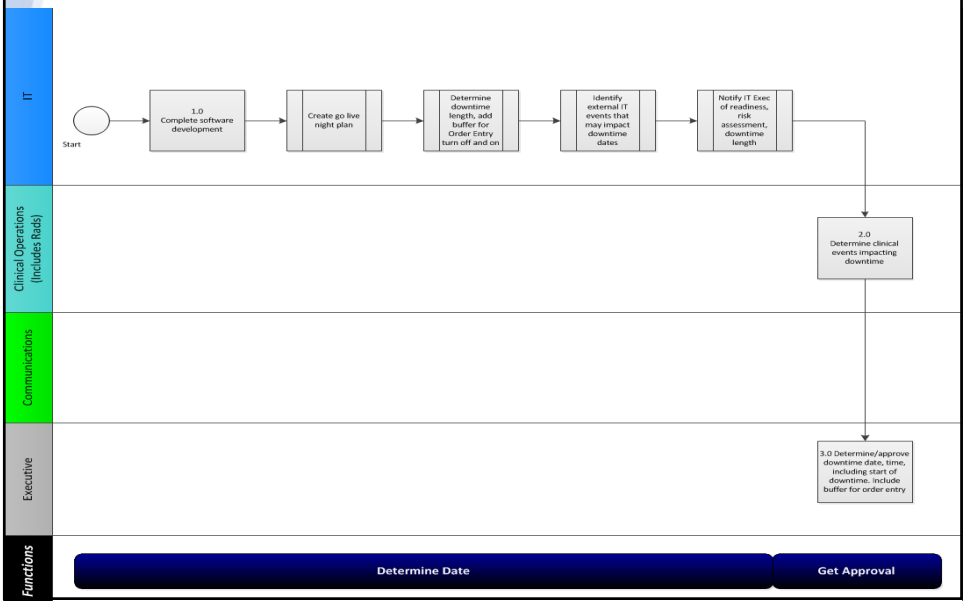
# Downtime Workshop

***Solutions Continued***

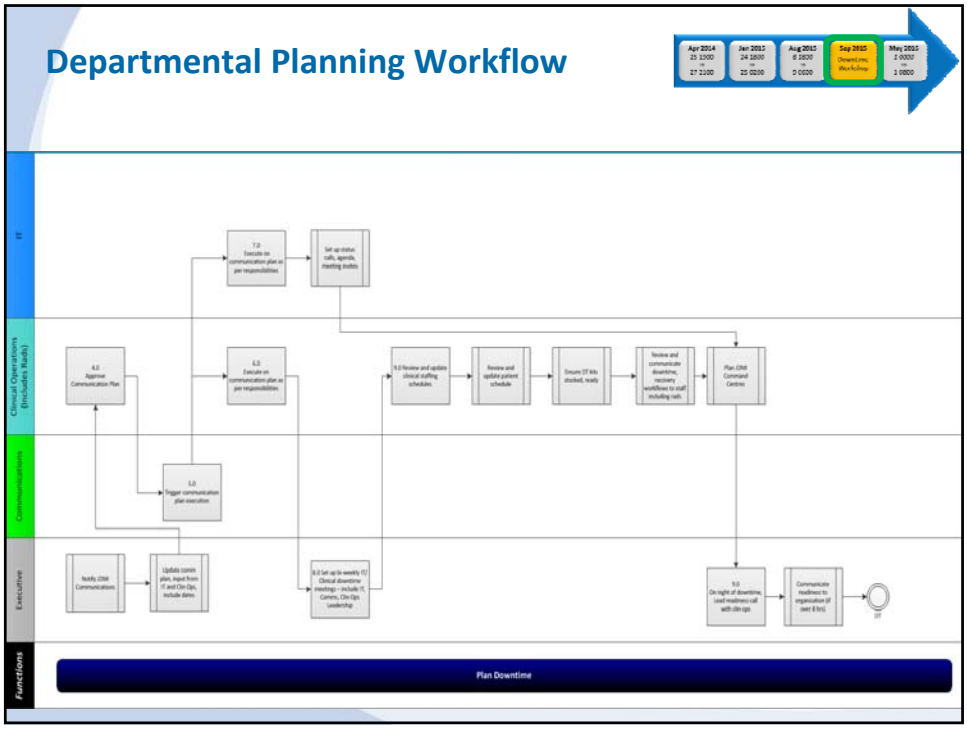
| Issues Identified | Implemented Solutions |
|---|---|
| Short timeframe for downtime notification | ✓Standard planning time of 3 months established in order to allow adequate time for recruitment and training of staff<br>✓Development of new features to be released post-downtime closed once date and length of downtime established |
| Lack of clear roles and responsibilities for staff members | ✓Process and action item owners identified<br>✓Job action sheets developed to ensure process and action item owners know what to do and when to do it when planning and executing downtimes<br>✓Downtime workflows revised and updated with feedback from IT and clinical stakeholders |

# Departmental Planning Workflow





## Departmental Planning Workflow




## Job Action Sheet

*Senior Clinical Director*

| Trigger | Task | Execution Time |
|---|---|---|
| **Before Downtime** | | |
| Communication Downtime Date to Management Team | • Communicate Downtime Date and Time<br>• Initiate planning<br>• Create leadership and frontline schedule<br>• Engage physician stakeholders | 3 Months Prior to Downtime |
| **During Downtime** | | |
| Downtime Start | • Conduct staff visits and support where necessary<br>• Participate in status calls | Immediately when downtime begins |
| **After Downtime** | | |
| Downtime End Status Calls | • Initiate communication to IP units<br>• Initiate Recovery Process | Immediately following end of downtime |

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## Communication Plan

| | Audience | Key Message |
|---|---|---|
| Before Downtime | • IT Departments<br>• Leadership<br>• Frontline Staff | • Downtime date, time, length, impacts and risks<br>• Outline of services unavailable during downtime<br>• Processes to follow and contingency plans for all departments |
| During Downtime | • IT Departments<br>• Imaging Leadership<br>• All on site staff | • Overhead announcements to countdown and start downtime<br>• Status calls to report progress and potential issues<br>• Regular walkthroughs /check-ins of key departments |
| After Downtime | • IT Departments<br>• Imaging Leadership<br>• All on site staff | • Overhead announcements of downtime end<br>• Phone calls to open units to announce end of downtime and trigger electronic referrals<br>• Messaging to executive and IT teams indicating successful implementation |

## Post Downtime Workshop

| What Worked Well | What Didn't Work |
|---|---|
| • Clarity in roles and responsibilities for clinical and administrative staff with respect to planning and execution<br>• Reliable processes established and understood by all staff<br>• Clear and transparent communication process and channel<br>• Key points of escalation and decision making established | • Timeframe of downtime resulted in challenges for product delivery team in both implementation of product and post downtime monitoring of system |

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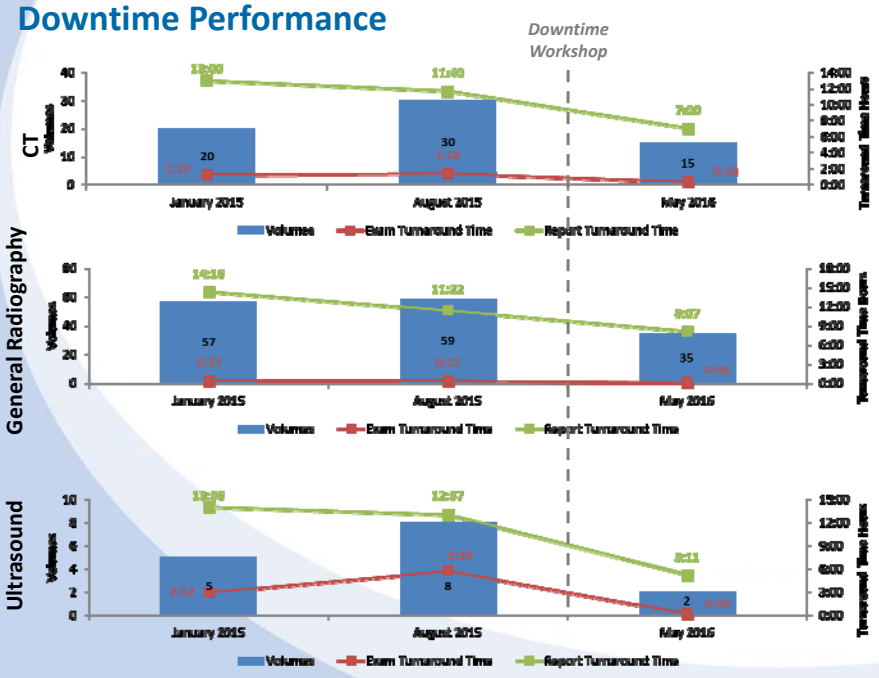
## Downtime Performance




## Lessons Learned

- Consolidated departmental workflow with key points of escalation, communication and decision points allowed for safe and effective management of clinical operations
- Paper processes with appropriate supporting workflows proved to be more reliable and less susceptible to error
- Alignment of downtime timeframes with low periods of clinical activity resulted in fewer requests and better performance

## Conclusion

- Key components of a good plan are communication and coordination
- Individual workflows and plans with little transparency between teams results in inefficient and error prone planning and execution of events
- In situations where regular downtimes are needed, having the appropriate planning and focus can ensure that patient care is not compromised

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## Next Steps

- Develop process workflows for unplanned downtimes
- Improve data capture processes to better measure performance during downtime events
- Consider consistent dates and times for downtimes in order to minimize impact to patients and external departments while balancing pressure on product delivery team

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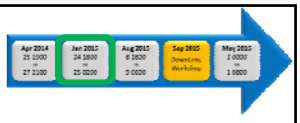
## Additional Information

**For additional information please contact Paul Cornacchione at paul.cornacchione@uhn.ca**

# Appendix

## Second Downtime



| Volumes (Number of Studies Performed) | | | Average Exam Turnaround Time (Study Requested to Study Performed Hrs) | | | Average Report Turnaround Time (Study Requested to Study Reported Hrs) | | |
|---|---|---|---|---|---|---|---|---|
| *Avg Regular Overnight* | *Downtime Overnight* | *Variance* | *Regular Overnight* | *Downtime Overnight* | *Variance* | *Regular Overnight* | *Downtime Overnight* | *Variance* |
| **CT** | | | | | | | | |
| 20.1 | 20 | 0% | 2:07 | 1:10 | -44.9% | 6:49 | 13:00 | 90.7% |
| **General Radiography** | | | | | | | | |
| 45 | 57 | 26.7% | 1:10 | 0:23 | -67.1% | 7:11 | 14:18 | 99.1% |
| **Ultrasound** | | | | | | | | |
| 2 | 5 | 150% | 3:30 | 2:52 | -18.1% | 5:57 | 13:58 | 134.7% |

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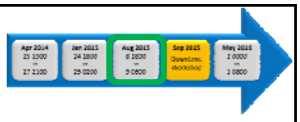
**Variance of +/- 5% of regular data, or better than regular operations considered acceptable*

## Third Downtime



| Volumes (Number of Studies Performed) | | | Average Exam Turnaround Time (Study Requested to Study Performed Hrs) | | | Average Report Turnaround Time (Study Requested to Study Reported Hrs) | | |
|---|---|---|---|---|---|---|---|---|
| *Avg Regular Overnight* | *Downtime Overnight* | *Variance* | *Regular Overnight* | *Downtime Overnight* | *Variance* | *Regular Overnight* | *Downtime Overnight* | *Variance* |
| **CT** | | | | | | | | |
| 20.1 | 30 | 49.3% | 2:07 | 1:18 | -38.6% | 6:49 | 11:40 | 71.1% |
| **General Radiography** | | | | | | | | |
| 45 | 59 | 31.1% | 1:10 | 0:22 | -68.6% | 7:11 | 11:22 | 58.2% |
| **Ultrasound** | | | | | | | | |
| 2 | 8 | 300% | 3:30 | 5:39 | 61.4% | 5:57 | 12:57 | 117.6% |

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**Variance of +/- 5% of regular data, or better than regular operations considered acceptable*

## First Post Workshop Downtime

| Volumes (Number of Studies Performed) | | | Average Exam Turnaround Time (Study Requested to Study Performed Hrs) | | | Average Report Turnaround Time (Study Requested to Study Reported Hrs) | | |
|---|---|---|---|---|---|---|---|---|
| *Avg Regular Overnight* | *Downtime Overnight* | *Variance* | *Regular Overnight* | *Downtime Overnight* | *Variance* | *Regular Overnight* | *Downtime Overnight* | *Variance* |
| **CT** | | | | | | | | |
| 20.1 | 15 | -25.4% | 2:07 | 0:18 | -85.8% | 6:49 | 7:00 | 2.7% |
| **General Radiography** | | | | | | | | |
| 45 | 35 | -22.2% | 1:10 | 0:06 | -91.4% | 7:11 | 8:07 | 13% |
| **Ultrasound** | | | | | | | | |
| 2 | 2 | 0% | 3:30 | 0:06 | -97.1% | 5:57 | 5:11 | -12.9% |

**Time Required to Recover:**
2 hours and 44 minutes

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***Variance of +/- 5% of regular data, or better than regular operations considered acceptable***

## Relevant Files

| File | Description | Attachments |
|---|---|---|
| **Communication Plan** | *Detailed plan outlining which stakeholders to engage and when* | Downtime Communication Plan |
| **Senior Clinical Director Job Action Sheet** | *Detailed instructions for required actions pre, during and post downtime* | Job Action Sheet |
| **Planning Workflow** | *Comprehensive workflow for departmental planning of downtime* | Downtime Planning Process |