Menu Case Study 2: Infection Prevention and Control

**Applicant Organization:** Ontario Shores Centre for Mental Health Sciences

**Organization's Address:** 700 Gordon Street, Whitby, Ontario, Canada, L1N5S9

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**Submitter's Title:** President and Chief Executive Officer

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**Menu Item:** Infection Prevention and Control

### Executive Summary

Ontario Shores Centre for Mental Health Sciences (Ontario Shores) is a public teaching hospital specializing in comprehensive mental health and addiction services for those with complex, serious and persistent mental illness. The facility, located in Whitby, Ontario, Canada has 15 specialized inpatient units and extensive outpatient and community services, serving a total regional population of approximately 2.8 million. The organization is staffed by approximately 1,300 employees with 326 inpatients beds (servicing over 115,000 patient days annually), and approximately 60,000 annual outpatient visits.

Infection Prevention and Control (IP&C) requires special attention at this and any mental health care facility, where patients are encouraged to leave the unit and interact with patients from other units to enhance recovery. However, this increases the risk of infection transmission and outbreak. The goals of this project were to:

- Improve the symptom surveillance system within the Electronic Medical Record (EMR) to optimize the tracking process
- Change policies and protocols for precaution initiation to enhance patient safety

An IP&C status board was implemented to enable the IP&C Practitioners to quickly identify patients with symptoms that may require follow up and potential initiation of precautions. An improved symptom surveillance workflow enabled nurses to efficiently initiate precautions in the absence of a physician order. New policies and procedures reduced outbreak days from 47 in the year prior to implementation to 7 in the year following implementation, effectively enhancing patient and staff safety.

### Background

IP&C is a key practice at all hospitals and continual efforts are made to reduce or prevent transmission and enhance patient safety. Mental health care facilities face unique challenges. Patients spend more time in communal spaces (day area, shared toileting facilities, dining area) where social engagement is a key to recovery and reducing stigma. Regular interaction occurs between patients from different units, increasing the risk of transmission compared to acute care hospitals, where patients spend the majority of time in their own rooms and units.
Local Problem

It was noted that the number of outbreaks at Ontario Shores was steadily increasing (Figure 1). Therefore, an initiative was undertaken to improve IP&C by reducing transmission, with the goal of reducing the number of outbreaks from 6 in 2013/2014 to 0 in 2014/2015. The process for documenting, tracking and communicating symptoms was inefficient. Prior to 2009, a paper copy of the syndrome surveillance assessment and communication tool, known to Ontario Shores as the FRI (Febrile Respiratory Illness assessment: Modified to include respiratory and enteric symptoms) was completed and faxed to IP&C. When the Electronic Medical Record (EMR) was launched, the FRI was completed electronically with results printing in IP&C. A page containing confidential patient information printed for each presenting symptom for each patient. The IP&C Practitioners would sort the papers and keep track of symptoms manually on both paper and Excel spreadsheet. Symptoms and precautions were documented in SOAPE (Subjective, Objective, Assessment, Plan, Evaluation) narrative notes and therefore, were challenging to track within patient, units or throughout the hospital. The only field for precaution initiation in the EMR was a physician’s order, leading to the misperception that this was the only means to initiate precautions. Therefore, nurses were hesitant to initiate precautions, often waiting for a physician’s order, which was not always accomplished in a timely manner.

Design and implementation

In response to identified issues, Professional Practice initiated a process for improving precaution initiation and IP&C surveillance with the goal of preventing infection transmission. Through discussions with Clinical Informatics and IP&C Practitioners, a solution utilizing the existing EMR infrastructure was developed. Iterations were tested with end-users to ensure usability. Procedure changes associated with the new surveillance system were communicated through the EMR/Clinical Informatics bulletin, a communication tool utilized to provide clinicians with updates related to EMR changes and system user tips. IP&C Practitioners were provided with intensive training sessions to understand the functionality of the new status board and monitoring procedures. The new processes were implemented in Q2 of 2014 and a Clinical Analyst was available for immediate support to IP&C Practitioners as needed. All IP&C policies were updated to align with new practices.

![Figure 1: Number of Outbreaks Pre-Implementation](image-url)
Figure 2: Implementation Strategy

1. **Start**
   - Change identified by user

2. **Feasible in system?**
   - YES
     - Bring to Clinical Informatics and Professional Practice team meeting to discuss concerns.
   - NO

3. **Change Request Form complete/Requestor notified.**

4. **Clinical Informatics Analyst communicates back to requestor and/or proposes alternate solutions**

5. **End**

6. **Go live support**
   - Go live Q2 2014
   - Goal – prevent all transmission
   - Provide electronic solution to manage workload

7. **Build and go live**
   - IP&C trained on status board surveillance
   - New procedure communicated through bulletin

8. **Education and Communication and learning materials for users**

9. **Are there Committee Recommendations?**
   - YES
     - Committee Approval
     - Approved by committees
     - Endorsed by various stakeholders and Senior Management
   - NO

10. **Cross System Impact Determined**
    - Process mapping identified key weaknesses in surveillance leading to adoption and cultural change in practice.

11. **Clinical Analyst makes recommendations due to system limitations or functionality. Returns to requestor/working group for discussion and demo.**

12. **Build In EMR test**
How Health IT was Utilized

Figure 3: Infection Prevention and Control workflow through EMR

- Everyday at 11am, nursing is prompted to document on the FRI.
- Nurse selects precaution.
- Nurse answers FRI questions (not displayed).
- If response is ‘YES’ to any symptom, “ALERT” will display in ‘Infection Control Concerns’ field within the FRI.

When IP&C loads the surveillance status board (by unit or by all units), all patients that have ‘ALERT’ last documented, will sort to the top of the list of patients.

All other columns allow for further investigation. Including Precaution type, FRI questions, temperature, medications, labs, etc.

- Alerts from the FRI will sort to the top.
- Clicking on the ellipsis will expand and display the last documented answer for each question with the date and time stamp.
- Highlighting the patient will display related information.

- IP&C reviews patient data documented by Nursing staff
- If precautions are required, IP&C reviews chart, calls unit or, goes on site
- Additional precautions initiated FRI by the nurse or IP&C practitioner (orders by Providers remains available)
- IP&C follows up and updates patient care plan if applicable
The EMR was the primary medium through which new procedures were implemented. To support practice and policy that nursing staff could initiate precautions without consulting providers, a new field was added to the FRI for precaution initiation. If precautions were added, removed or changed, an automatic decision support message prompted the nurse to update the plan of care. The FRI was modified so that a response of “yes” to any of the symptoms displayed an “Infection Control Concerns” field within the FRI and triggered an alert on the status board.

IP&C Practitioners were able to monitor the status board from any EMR-enabled workstation in the hospital. They could now efficiently monitor symptoms for the whole hospital, a particular unit, or a specific patient. Any patient with an ‘Alert’ was automatically sorted to the top of the list for immediate identification. New processes allowed IP&C Practitioners to recognize the need to follow-up with units to provide education and support as necessary, initiate additional precautions when needed, and proactively prevent transmission.

Separate documentation items for nurses and the IP&C team that siloed documentation and prevented timely detection of isolation procedures were removed to streamline the process allowing for consistent messaging and normalizing documentation of additional precautions. During investigation, it was identified that the temperature on the FRI was coded separate from the generic vital signs document, as a result the temperature field on the FRI was merged with the temperature field in vital signs so that symptoms could be clearly graphed and tracked throughout the patient’s chart, having one source of truth.

The pre-implementation, “precautions” statistic was difficult to track due to the lack of normalization in the data entry points in the EMR. Post implementation, with only two entry points for the initiation of isolation precautions, clinicians were able to track and update the infection precaution on a daily basis embedded in standard documentation. This forced cultural change and improved data quality.

**Value Derived**

Implementation of the new IP&C procedures, enabling timely initiation of precautions and efficient symptom surveillance, resulted in reduced transmission and increased patient safety. This was evidenced by only one outbreak in the twelve month period following implementation. Figure 4 indicates that while the number of patients on precautions remained fairly stable, the trendline for outbreak days was negative, showing how implementation of the new workflow reduced transmission. This is due to a combination of factors including timely initiation of precautions, improved surveillance and proactive education and follow up by IP&C Practitioners who could spend less time sorting and organizing symptom printouts and more time with hands-on assistance to units. Transfer of responsibilities between the IP&C team was simplified through the use of the surveillance status board instead of the use of manual transfer of responsibilities. The efficiency gained lends itself to improved follow up processes within the IP&C team and between IP&C and each unit.
Since implementation of the status board, Ontario Shores has experienced only one enteric outbreak, which lasted only 7 days, in comparison to the year prior to implementation, which had 47 outbreak days (respiratory and enteric, combined). The post-implementation outbreak occurred on a newly opened unit, which inherently increases the risk of transmission. Notably, following implementation of new procedures, Ontario Shores did not experience any respiratory outbreaks during the influenza season in which Durham Region had a record number of cases (Figure 5) and the vaccine was not a match for the most prevalent strains. In addition to this, Ontario Shores became the Code Orange site for 15 nursing home residents displaced as a result of a fire at their home facility from October 2014 into June of 2015.

Figure 5: Respiratory outbreaks and precautions at Ontario Shores compared to influenza cases in Durham Region (https://www.durham.ca/departments/health/sri/surveillance/WeeklyFluReport.pdf)
The data is inconsistent and has a number of peaks, which is expected as there is natural seasonal variation in illnesses. Remarkably, zero outbreaks occurred in Q4 of 2014/2015, which typically has high influenza rates (compare with 2013/2014 Q4 pre-implementation), and the one outbreak in Q1 2015/2016 lasted only 7 days.

The near-elimination of outbreaks increases the quality of life for patients. Reduced transmission not only prevents patients from becoming ill, but those on a unit with an outbreak experience reduced quality of care and quality of life as they are unable to leave the hospital on pass, leave the unit during the day or be transferred to another unit for a changing level of care, as per Public Health guidelines. Furthermore, Public Health mandates that new patients cannot be admitted to a unit experiencing an outbreak, impairing the ability to receive proper care and negatively impacting wait times.

Improved IP&C processes reduced the number of papers printed containing confidential patient information (by eliminating hard copies of patient FRI “Yes” responses) thereby reducing the probability of a Personal Health Information breach.

Importantly, the new surveillance system allows the potential to identify novel microorganisms of epidemiologic significance, allowing Ontario Shores to collaborate with other facilities to track emerging infectious illnesses.

**Lessons Learned**

Including point of care staff in the development and testing phases is integral to increase end user engagement and promote “buy-in” to the new processes. Implementation of the new process was relatively easy, since end-users had been involved in development and testing and had already undergone substantial training on the new procedure. A Clinical Informatics Analyst was available via direct line for support for two months after implementation to help manage the status board and interpret data. It became apparent that giving nursing staff the ability to initiate precautions without an order promoted ownership, with many nurses taking the initiative to report symptoms and change precaution status in the absence of physician orders (though this function was still available). Changing the display and availability of the documentation process positively impacted nursing culture for initiating precautions by creating further autonomy for nurses within their scope of practice.

The one outbreak that occurred post-implementation provided many lessons for improvement. The outbreak occurred on a new unit, which contained staff who were not present at the time of implementation and therefore did not undergo the same intensive training. Thus, the FRI was not regularly completed at 11am or even during IP&C working hours. Hence, an alert would not be flagged and followed up with until the next working day. Additionally, despite initiation of precautions by nursing staff, not all staff on the unit were aware that the patient was on precautions and the patient attended group sessions and used shared computer spaces without proper precautions. This particular unit has a different staff-mix compared to the other units, with a higher proportion of allied staff and fewer nurses. From this experience, IP&C more strictly follows up on daily missing FRI data, and it was ensured that IP&C procedures were communicated effectively to all staff through education and reminders.
## Financial Considerations

<table>
<thead>
<tr>
<th>Human Resources</th>
<th>4,868</th>
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<tbody>
<tr>
<td><strong>Software License and Implementation Fee</strong></td>
<td>215,000</td>
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<tr>
<td><em>this cost was part of the overall implementation of EMR</em></td>
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<tr>
<td><strong>Total Infection Prevention and Control Cost</strong></td>
<td>219,868</td>
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**Cost Avoidance:** The economic impact could not be calculated with information available. A literature search returned information of cost-effectiveness at acute and long-term care facilities, neither of which is applicable to the expenses or savings at our facility. However, areas with the potential for cost avoidances were identified and cost savings were realized from the discontinuation of printing results from the FRI (1 page per symptom per patient – cost of paper, ink, printer service, confidential shredding service). Savings were also incurred from reduced number of outbreaks, which result in increased costs of antibiotics and antivirals, antiviral prophylaxis for patients and staff, more frequent housekeeping, staff sick days. Additional costs due to delayed patient transfer and discharge during outbreaks (as per Public Health mandate) and increased wait times have also been avoided with improved surveillance and precaution policies.