Bridging the Knowledge Gap
An Innovative Surveillance System to Monitor the Health of British Columbia’s Healthcare Workforce

Tony Gilligan1
Hasanat Alamgir, PhD2

ABSTRACT

Objective: Healthcare workers are exposed to a variety of work-related hazards including biological, chemical, physical, ergonomic, psychological hazards; and workplace violence. The Occupational Health and Safety Agency for Healthcare in British Columbia (OHSASH), in conjunction with British Columbia (BC) health regions, developed and implemented a comprehensive surveillance system that tracks occupational exposures and stressors as well as injuries and illnesses among a defined population of healthcare workers.

Intervention: Workplace Health Indicator Tracking and Evaluation (WHITE™) is a secure operational database, used for data entry and transaction reporting. It has five modules: Incident Investigation, Case Management, Employee Health, Health and Safety, and Early Intervention/Return to Work.

Outcomes: Since the WHITE™ database was first introduced into BC in 2004, it has tracked the health of 84,318 healthcare workers (120,244 jobs), representing 35,927 recorded incidents, resulting in 18,322 workers’ compensation claims. Currently, four of BC’s six healthcare regions are tracking and analyzing incidents and the health of healthcare workers using WHITE™, providing OHSASH and healthcare stakeholders with comparative performance indicators on workplace health and safety. A number of scientific manuscripts have also been published in peer-reviewed journals.

Conclusion: The WHITE™ database has been very useful for descriptive epidemiological studies, monitoring health risk factors, benchmarking, and evaluating interventions.

Key words: Healthcare; surveillance; occupational health; evidence; evaluation; health and safety

La traduction du résumé se trouve à la fin de l’article.

2. Director, Statistics and Evaluation, OHSASH

Correspondence and reprint requests: Hasanat Alamgir, Director, Statistics and Evaluation, Occupational Health and Safety Agency for Healthcare (OHSASH), 301-1195 West Broadway, Vancouver, BC V6H 3X5, Tel: 778-328-8013, Fax: 778-328-8002, E-mail: hasanat@ohsash.bc.ca

Acknowledgements: We thank British Columbia’s healthcare employers (Fraser Health, Interior Health, Northern Health, Vancouver Island Health Authority, HEABC) and unions (BCGEU, BCNU, HEU, HSA), the OHSASH Board, and the Ministry of Health Services for their active participation in development and maintenance of this database. The database and related projects were funded in part by grants to Dr. Annalee Yassi from the Canadian Institutes of Health Research, the Canada Research Chairs Program and the Canadian Foundation for Innovation. We sincerely thank Dr. Yassi for her leadership for this project and for her work as the founding executive director of OHSASH. In addition, we thank the following individuals for their work: Joe Tremblay, Vincent Arao, Slavica Gordon; Quan Lee, Jie Jiang, Ling Yang, Kate Chelsky, Yuri Cvitkovich (deceased) and Scott Robinson. We also thank the other OHSASH employees, the union and health authority personnel, as well as UBC staff, Community Medicine residents, and students who contributed to this database.
METHODS

Need for the development and implementation of a healthcare surveillance system

In 2002, the Occupational Health and Safety Agency for Healthcare in BC (OHSÅH) launched a data collection process to evaluate the effectiveness of overhead ceiling lifts to transfer patients. Due to the multiple geographical locations and nature in which data were stored, the process required considerable investment of time and resources. The analysis was further complicated by the lack of denominator data linkages (full time equivalent/ productive hours) with payroll data systems.

That project further highlighted that each health authority maintained different injury coding schemes and forms (i.e., incident and investigation form). Though consensus was reached for the standardization of incident and investigation forms, this was not possible for occupation and department codes as health authorities relied on different legacy systems for human resources, payroll and finance. Coding schemes within a particular dataset changed between years, and a limited number of code numbers for occupational titles were recycled and reused for multiple jobs.

Following an extensive review of BC’s healthcare authority systems and processes, it was evident that the development of a surveillance system required broad scope, including incident tracking, case management (disability prevention, workers’ compensation claims), employee health records, and health and safety concerns.

In 2002, OHSÅH began the development of a surveillance system for BC named Workplace Health Indicator Tracking and Evaluation-WHITE™. Funding for some equipment and staff time was provided by grants held by Dr. Annalee Yassi at the University of British Columbia. Development was finalized in 2004 with five modules: Incident Investigation; Case Management; Employee Health; Health and Safety; and Early Intervention/Return to Work.

WHITE™ can report at multiple levels: health authority, health service delivery area, workplace facility, department, occu-
Table II
Number of Incidents, Claims and Healthcare Workers by Health Authority (ending March 31st, 2007)

<table>
<thead>
<tr>
<th>Health Authority</th>
<th># of Facilities</th>
<th># of b/fwd* Incidents</th>
<th># of Incidents</th>
<th># of b/fwd Claims</th>
<th># of Claims</th>
<th>Date Started Collecting</th>
<th># of HCWs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraser Health</td>
<td>95</td>
<td>91</td>
<td>10,303</td>
<td>83</td>
<td>5930</td>
<td>2004-07-27</td>
<td>27,185</td>
</tr>
<tr>
<td>Interior Health</td>
<td>257</td>
<td>2906</td>
<td>11,862</td>
<td>1671</td>
<td>5343</td>
<td>2004-07-17</td>
<td>25,844</td>
</tr>
<tr>
<td>Northern Health</td>
<td>110</td>
<td>149</td>
<td>3,345</td>
<td>121</td>
<td>1795</td>
<td>2004-11-24</td>
<td>11,038</td>
</tr>
<tr>
<td>Vancouver Island Health Authority</td>
<td>105</td>
<td>658</td>
<td>10,417</td>
<td>507</td>
<td>5254</td>
<td>2004-07-26</td>
<td>20,251</td>
</tr>
</tbody>
</table>

* b/fwd (Brought Forward) incidents and claims that were active yet occurred before the launch of WHITE™ in 2004 were transferred into WHITE™

Module overview
OHSAM conducted reviews on the injury management needs of each health authority and identified five main modules needed to translate injury reports and payroll data into preventive efforts. The goal was to capture detailed injury trends which could be utilized by interventionists to identify information for return to work and disability management programs, evaluate effectiveness of preventive programs, and conduct health and safety assessments. Table I summarizes these five chosen modules. The Incident Investigation Module identifies the causes and details of each incident that can later be linked to its compensatory outcome contained in the Case Management Module. The Employee Health Module is important for tracking the health of each HCW to better develop disability management programs. The primary and secondary Prevention Modules are used specifically for MSI incidents, which constitute the greatest proportion of injuries for HCWs and result in high compensation costs. The Health and Safety Modules are used for risk assessments with respect to specific tasks. The future plans of OHSAM are to include the development of specific workplace assessments using this module.

Demographic and payroll fields
To facilitate the analysis and production of provincial reports, OHSAM created a database to consolidate data from each health authority. This is commonly known as a data warehouse or Online Analytical Processing (OLAP) and is used as a repository to store all historical data. The data warehouse allows for multidimensional analysis and includes data from WHITE™, payroll and workers’ compensation (i.e., claims costs). The addition of payroll data (e.g., productive hours) allows for more accurate reporting, such as injury and incident rates. Payroll/human resources information includes employment status (casual, full time, part time, etc.), job start date, union, pay type (hourly, salaried, etc.), hourly rate, pay period start and end date, sick hours, workers’ compensation paid hours, long-term disability hours, vacation, union leave, overtime hours, etc.

To facilitate the consolidation of data at OHSAM (for provincial analysis), a programmatic mapping table was created to systematically group health authority departments. Figure 2 reflects the data mapping process used to map occupations and departments.

Security/Privacy
The design of WHITE™ required careful consideration regarding the security of confidential data including personal identifiers (name, date of birth, social insurance number, and employee ID), incident and workers’ compensation details, and health records (e.g., immunizations, exposures). From a software perspective, WHITE™ uses encryption and multiple security lev...
RESULTS

Since WHITE™ was introduced to BC healthcare in 2004, it has tracked the health of 84,318 (up to March 2007) healthcare workers, representing 35,927 healthcare workers, resulting in 18,322 incidents, demographics of the injured and outcomes, some of which have not – or have only to a limited extent – been considered for HCWs specifically. WHITE™ data include descriptions of incidents, demographics of the injured worker, contributory factors related to the location, circumstances, nature and cause of the injury. Incidents of occupational injury resulting in lost time, medical care, or first aid treatment only can be extracted from WHITE™. With person-years obtained from payroll data, detailed analyses on various occupational injury indicators (injury rates, days lost, costs) in the BC healthcare sector can be conducted. Before WHITE™, identifying occupational injury risk factors and their result-


Received: July 24, 2008
Accepted: June 20, 2008

RéSUMÉ

Objectif : Les travailleurs de la santé sont exposés à toutes sortes de dangers (biologiques, chimiques, physiques, ergonomiques, psychologiques) liés à leur emploi, ainsi qu’à la violence au travail. Conjointement avec l’Université de la Colombie-Britannique (UBC) et les régions sanitaires de la province, l’OHSAH (l’agence de la sécurité et de la santé au travail de la Colombie-Britannique pour le milieu des soins de santé) a mis au point et instauré un système de surveillance intégré des cas d’exposition professionnelle, des agents stressants, des blessures et des maladies dans une population de travailleurs de la santé bien définie.

Intervention : Une base de données opérationnelles sécurisée, Workplace Health Indicator Tracking and Evaluation (WHITE®), sert à entrer des données et à produire des rapports d’opérations. Elle comprend cinq modules (enquête sur les incidents, gestion de cas, santé des employés, santé et sécurité, et intervention précoce/retour au travail).

Résultats : Depuis son lancement en Colombie-Britannique en 2004, la base WHITE® a suivi l’état de santé de 84 318 travailleurs de la santé (120 244 emplois), lesquels ont déclaré 35 927 incidents qui ont donné lieu à 18 322 demandes d’indemnisation. À l’heure actuelle, quatre des six régions sanitaires de la province suivent et analysent les incidents et l’état de santé des travailleurs de la santé à l’aide de WHITE®, ce qui offre à l’OHSAH et aux intervenants de la santé des indicateurs de rendement comparatifs sur la santé et la sécurité au travail. Des manuscrits scientifiques ont aussi été publiés dans des revues évaluées par des pairs.

Conclusion : La base de données WHITE® s’avère très utile pour les études épidémiologiques descriptives, la surveillance des facteurs de risque pour la santé, l’étalement, ainsi que l’évaluation des mesures d’intervention.

Mots clés : soins de santé; surveillance; santé au travail; preuves; évaluation; santé et sécurité