



Leveraging ArcGIS to Enable Public Health Surveillance of Work-Related Injuries

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Conflict of Interest Disclosure

Christopher M. Bell, MSHI, CAPM, CHTS-IM

Has no real or apparent conflicts of interest to report.

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UNIVERSITY OF ILLINOIS
Hospital & Health Sciences System
— Changing medicine. For good. —



University of Illinois Hospital & Health Sciences Background

University Health Services Overview



Workers' Compensation Overview



Study Overview

- Capture the work-related incidents and visualize them using ArcGIS
- Identify vulnerable locations and occupations (hot spots) on campus
- Structure intervention programs
- Allocate prevention resources in a cost effective matter

Datasets Used

- First Report of Injury Forms
- OSHA Reports
- EHR Extracted Data
- UIC AutoCAD Building Files

UNIVERSITY OF ILLINOIS
FIRST REPORT OF INJURY/ILLNESS

Submit via campus mail or electronically to WorkComp@uillinois.edu
(To be completed within 24 hours of incident by employee)

EMPLOYEE INFORMATION (* Federal Government/University Required Information)

Name _____ UIN # _____

Street _____ Phone # _____

City _____ State _____ ZIP _____

Birth date _____ Sex: **M / F** Marital Status: **S / M / Sep / W / D** # Children under the age of 18 _____

*Applied for or been denied Social Security Disability Insurance (SSDI)? Yes No If **yes**, when _____

*Applied for or been denied SURS benefits? Yes No If **yes**, when _____ *Currently on Medicare? Yes No

Job Classification: Academic Professional Faculty Staff Student Extra Help

Date of hire _____ Job Title _____ Department _____

Years in current job _____ Previous job title _____ # Years in previous job _____

Work days scheduled per week: **M T W R F S S** Work hours: _____ am pm to _____ am pm Hours per week _____
(Circle all that apply)

EMPLOYEE'S REPORT OF INJURY/ILLNESS (Attach additional sheets as needed)

Date of Injury/Illness _____ Time _____ am _____ pm Day of week _____

Date Reported _____ To _____

Exact location where accident occurred _____

If on U of I property, include name of building / address / room # _____

Amount of training on the job prior to incident _____

Working overtime when accident happened? Yes No

Do you have a second job? Yes No If **yes**, where _____

Body part Injured _____ Type of Injury /Illness _____

Describe in detail what happened: _____

Programs Used

- ESRI ArcGIS Framework
- IBM SPSS Modeler Professional
(for Text Analytics)
- Microsoft Access/Excel

Study Details

- 2012 Total WC Incidents = 355
- 2013 Total WC Incidents = 374

Most prevalent injury types =

- Needlesticks
- Sprains/Strains
- Contusions

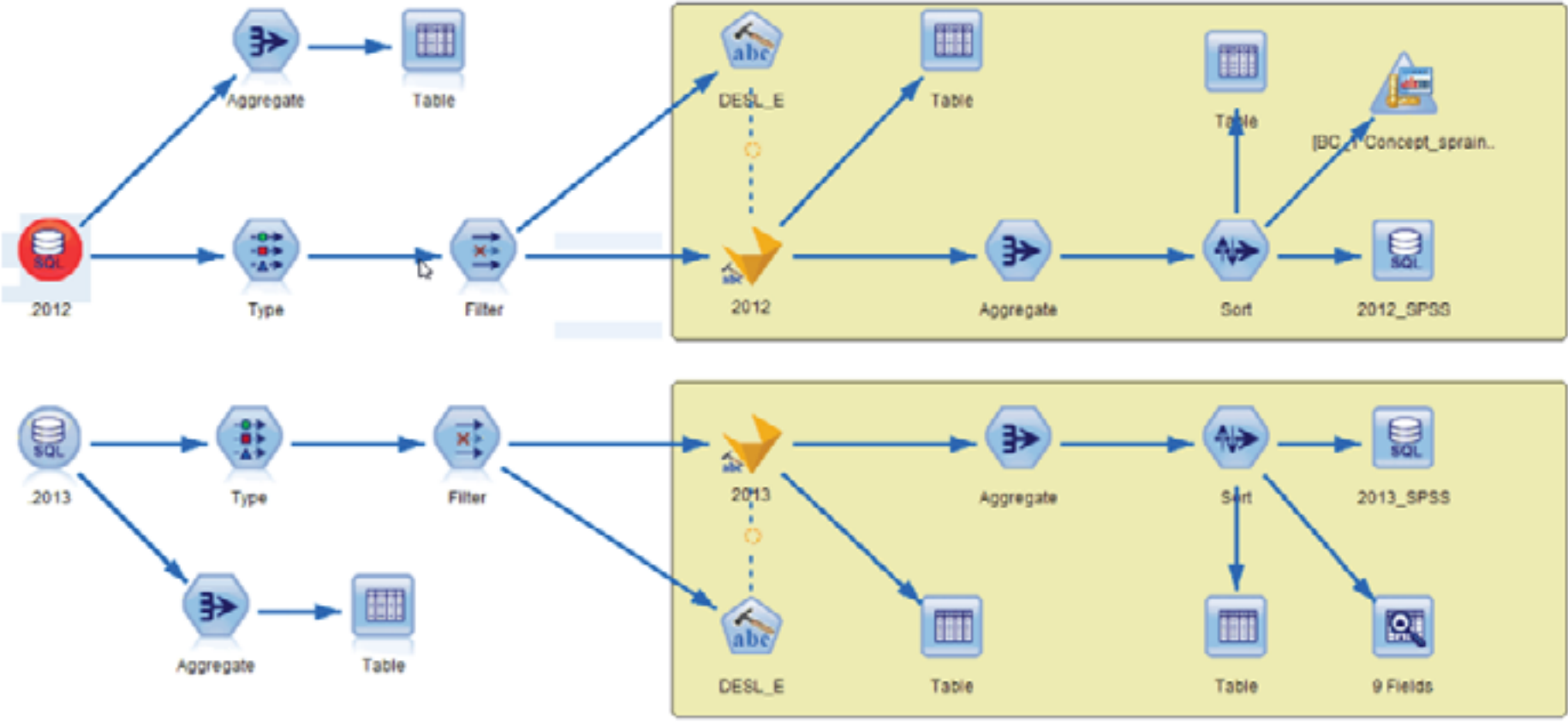
Study Details

Reporting Period =

March 2012 through October 2013

- Total Number of UIC Buildings = 172
- Total Number of Buildings with Reported Incidents in 2012 = 41
- Total Number of Buildings with Reported Incidents in 2013 = 55

IBM SPSS Modeler Text Analytics Workflow Design



Model Settings Fields Summary Annotations

Sort by: Global

Concept	Global	%	N	Docs	%	N
strain		23.762	96		27.042	96
needle stick		19.307	78		21.972	78
sprain		19.307	78		21.972	78
contusion		15.594	63		17.746	63
splash		3.218	13		3.662	13
exposure		2.723	11		3.099	11
laceration		2.228	9		2.535	9

Model Settings Fields Summary Annotations

Sort by: Global

Concept	Global	%	N	Docs	%	N
needle stick		16.418	88		23.592	88
strain		16.045	86		22.252	83
contusion		11.007	59		15.818	59
sprain		10.448	56		15.013	56
exposure		8.022	43		11.528	43
pain		3.918	21		5.63	21
open wound		3.731	20		5.362	20

- Layers
- C:\OSHA\UIC_OSHA.mdb
 - UIC_Buildings_2013
 - Sprain
 - 0
 - 1
 - 2
 - 3
 - 4 - 34
 - UIC_Buildings_2012
 - Sprain
 - 0
 - 1
 - 2
 - 3 - 5
 - 6 - 45
 - UIC_Buildings
 - UIC_CampusArea
 - UIC_Lawn
 - T2012_SPSS
 - T2013_SPSS
 - World_Topo_Map





Future Research

- Conduct 3D GIS, including room numbers and building floors information
- Follow incidents longitudinally
- Real-time mobile reporting
- Advance geostatistical analysis

Thank You!

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