Why did we do this study?

Last summer, the BC Liquor Distribution Branch and the BC Government and Service Employees Union asked UBC to help investigate workplace exposures linked to the use of glass breaking machinery in BC liquor stores and their possible impact on employee health. This study plan was endorsed by both management and the union and by the BC Workers’ Compensation Board.

What did we do?

We tested 36 stores (34 stores chosen at random by UBC and 1 each nominated by the LDB and the BCGEU). Only the UBC researchers knew which stores were selected until the day before the testing. We visited each store twice. Between the two testing visits, the glass breaking machines were shut down for one month in half the stores. In each store, we repeated the same testing on each of the two visits.

Dust measurements: We measured dust levels using a filter device clipped to each employee’s lapel and worn throughout the work shift. The filter captured glass dust as well as dust from any other sources in the store.

Bio-aerosol measurements: We measured endotoxin (from bacteria) and fungal (mould) spores in the air because other studies of recycling workers have found these to be linked to symptoms. Fungal spores and bacteria are commonly found wherever there is contaminated water or organic materials (such as beer and wine residues). Endotoxin was measured from the same dust filter worn by each employee all day. Fungi were measured with devices placed in several locations throughout the store. Each fungal sample only collected air for 5 minutes.

Employee interviews: We interviewed each employee on shift during our visits. We used a standard questionnaire to ask about ongoing symptoms and about important parts of each person’s health and medical history. We used a second questionnaire to ask about symptoms during the week before the test.

We also used a standard questionnaire to measure some psychosocial aspects of the work environment including job strain (which compares the psychological demands of work to the level of individual control over work tasks) and employee-employer communication.

Where can you get more information about the study?

A detailed technical report describing our results has been provided to LDB management, the BCGEU, and the Workers’ Compensation Board. It is also available for reading and downloading from our website at: www.soeh.ubc.ca.

(Please turn the page over for information about what we found.).
**What did we find?**

**Dust and symptoms:**

Dust levels were low (and below the current WCB exposure limit). Dust levels were highest among employees who spent more time in the back section of the stores. Dust levels were no different when glass machines were operating or not. The dust may be combination of outdoor dust being brought indoors, dust from shelf stocking operations and dust from the glass breaking operations.

Higher dust levels were linked to more nose and throat irritation in the past week. Dust levels did not appear to be linked to any of the other symptoms.

**Endotoxin and symptoms:**

Endotoxin levels were low. There is no North American exposure limit for endotoxin; there is a newly proposed limit in the Netherlands. The levels we found were below this. None of the symptoms was linked to endotoxin exposure.

**Fungi and symptoms:**

Fungal levels were higher than typical levels in an office or residential building. They were highest around broken bottles and near the empties return counter, next highest elsewhere in the warehouse, and lowest at the cashier station. This was true when the glass breaking equipment was operating as well as when it was not operating. The most important factor linked to higher fungal counts was if mouldy bottles were being broken in the store (either in the glass breaking machines or by throwing them into bins). Having uncovered glass bins in the warehouse also contributed to higher fungal levels.

More chest symptoms in the past week (chest tightness, wheezing, cough, and breathlessness) were reported in stores where mouldy bottles were being broken on the test day. However, none of the symptoms was linked directly to the fungal measurements.

**Other findings:**

In general, LDB employees reported about twice as much chronic tightness in the chest, more nasal irritation, and more eye irritation at work than a similar group of BC Ferry employees.

Employees reporting higher levels of job strain, more job dissatisfaction, and poorer workplace communication reported more eye and skin irritation and somatic symptoms.

**What did we conclude?**

As none of the exposures or symptoms appeared to be linked to the operation of glass breaking machines, we could not conclude that halting the glass breaking, while continuing recycling, would reduce exposures or symptoms.

Based on the links between fungal levels and the presence of recycled materials in the stores in general and on whether or not mouldy bottles were being broken in the stores, we suggested that removal or redesign of the recycling operations may reduce fungal levels and symptoms. We also suggested that improved dust control measures (for dust from all sources) and attention to improving the psychosocial dimensions of the work environment might have a positive effect on some symptoms.