Canadian Workplace Exposure Database (CWED)

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Presentation to Association of Workers' Compensation Boards of Canada

Overview

- Brief overview and history of CWED

- Occupational Exposure Databases and their role in meeting strategic priorities

- Workshop: "Advancing Workplace Exposure Surveillance in Canada"

- Future of CWED

What is CWED?

- Originated as part of CAREX Canada Project
  - Used of occupational estimates of prevalence & level
- Repository of occupational exposure observations
  - Air-monitoring data (>95%)
  - One observation per measurement
- Secondary administrative data
  - Original measurements made for variety of reasons
- Resides at University of British Columbia
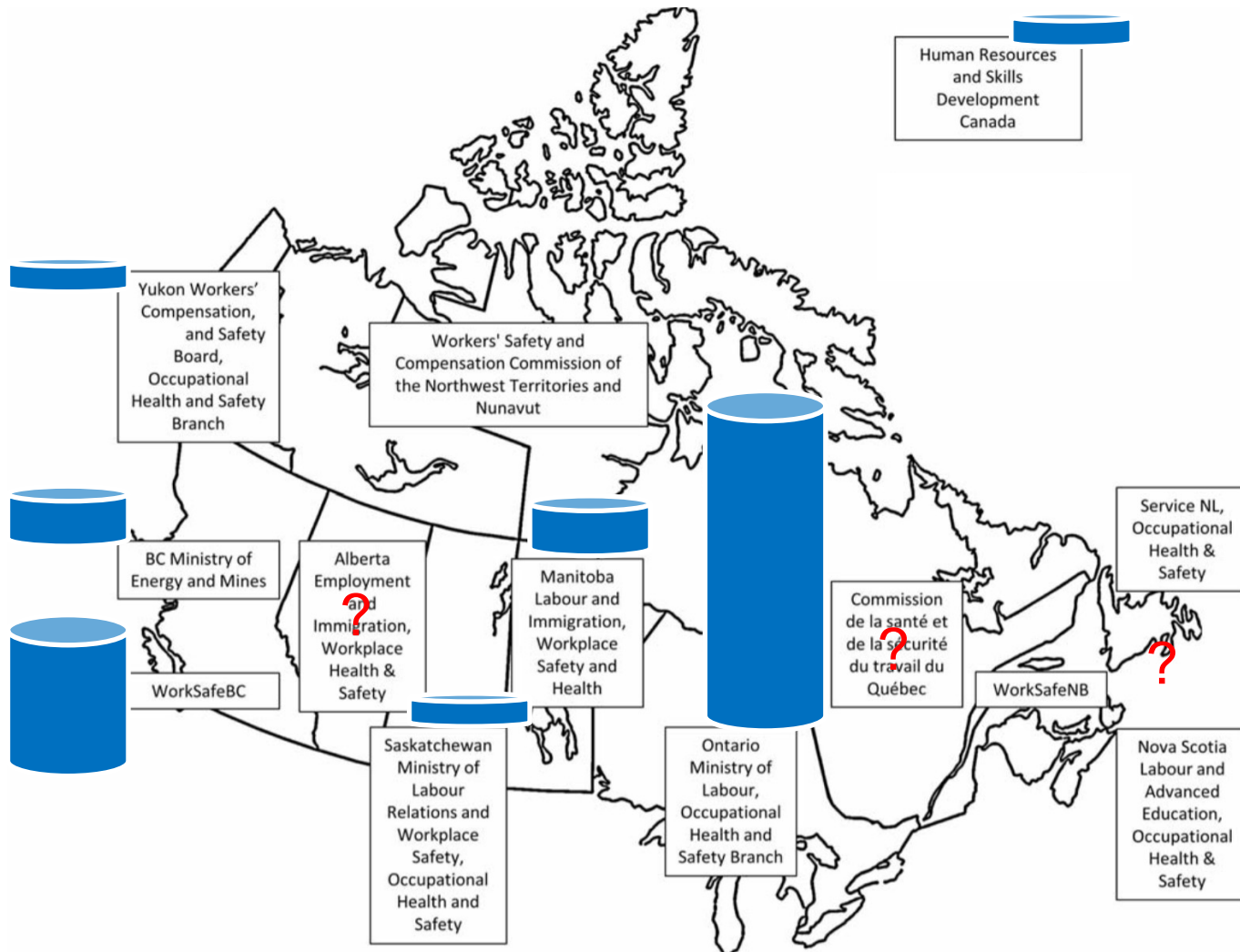 - Research status

Occupational Exposure Databases (OEDB's)

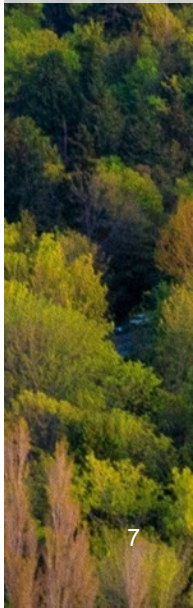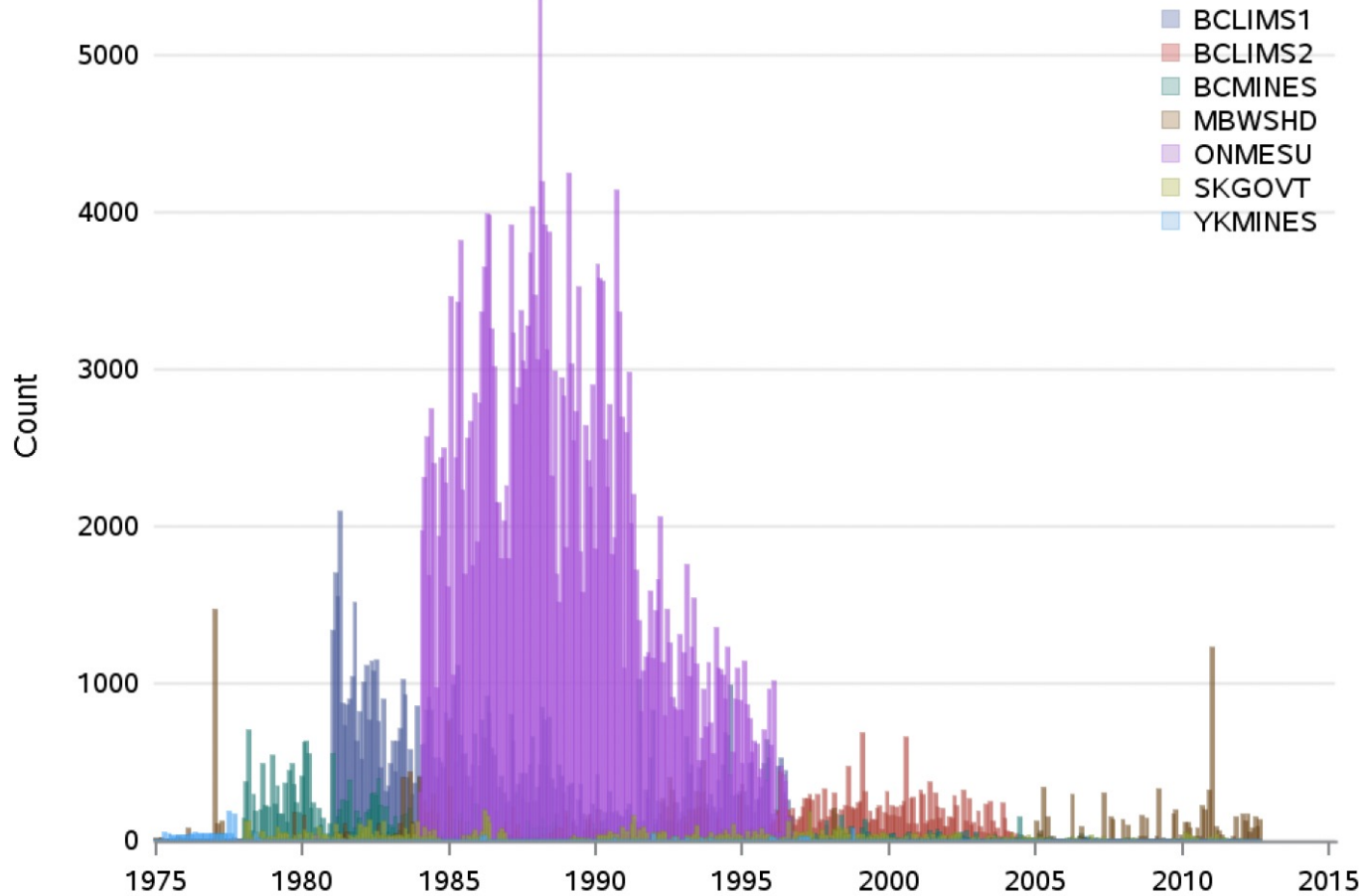| Country	Database	Measurements	Substances	Maintained By
Germany	MEGA	>1,600,000	1000	BIA
Korea	WEMD	~1,000,000	190	KOSHA
USA	IMIS / OIS	900,000	1050	OSHA
France	COLCHIC	800,000	670	INRS
Canada	**CWED**	**460,000**	**336**	**…**
UK	NEDB	200,000	>400	HSE
Italy	SIREP	100,000	550	ISPESL

What is CWED?

What is CWED?

- 42 data variables

- Core data elements:
    - Exposure concentration, units
    - Substance
    - Sampling method, duration, volume, LOD, area/personal
    - Company ID, province, date
    - Industry code (NAICS)
    - Occupation code (NOCS)
- Harmonized coding: substance, industry, occupation, etc..
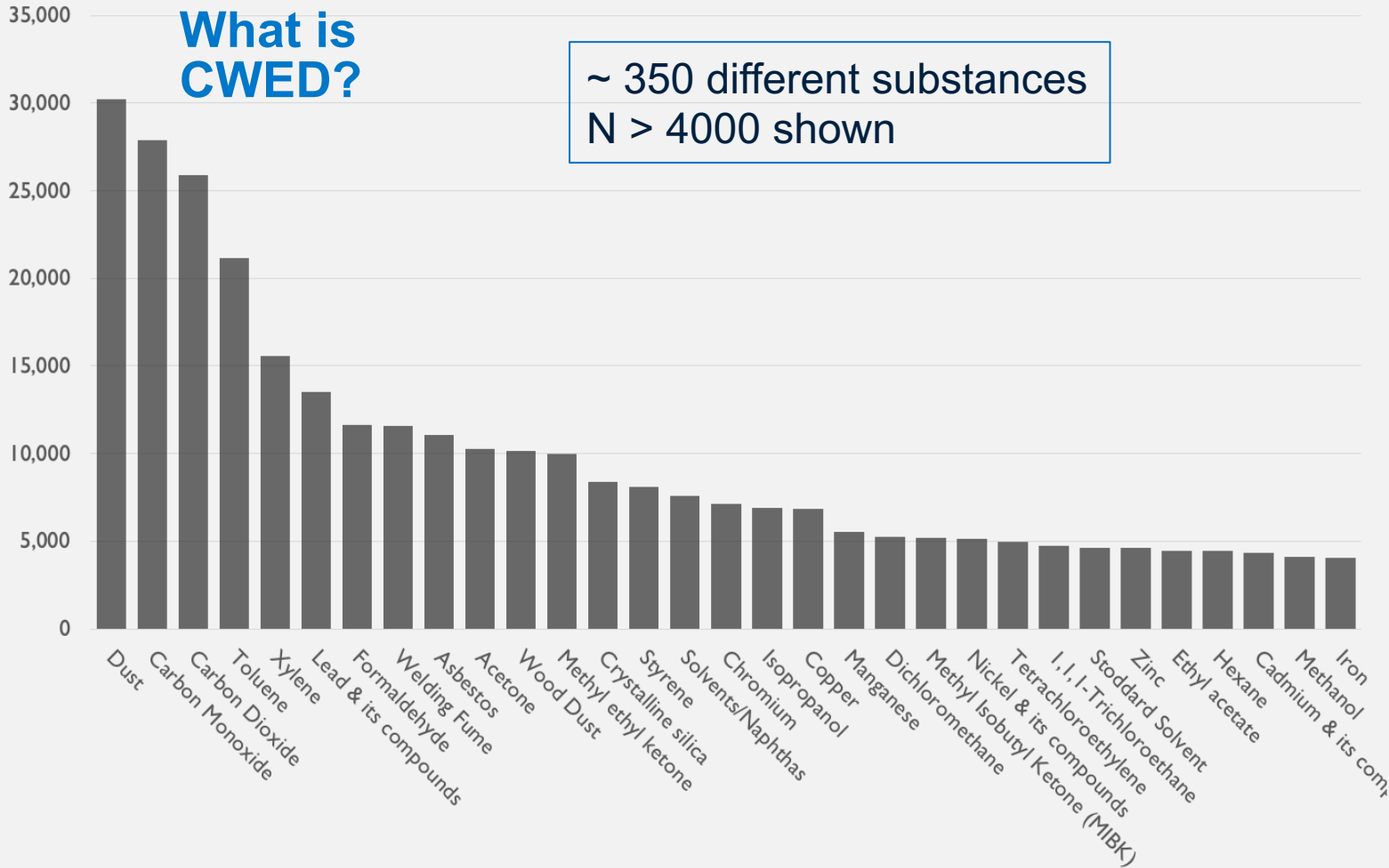- *No Unique Personal Identifiers*

What is CWED?

Section 1: Provincial Jurisdiction
Distribution of Sampling Date by Provincial Jurisdiction

What is CWED?

~ 350 different substances
N > 4000 shown

Bar chart of substances (y-axis: 0 to 35,000):

Substance	Approximate value
Dust	30,000
Carbon Monoxide	28,000
Carbon Dioxide	26,000
Toluene	21,000
Xylene	15,500
Lead & its compounds	13,500
Formaldehyde	11,500
Welding Fume	11,500
Asbestos	11,000
Acetone	10,500
Wood Dust	10,000
Methyl ethyl ketone	10,000
Crystalline silica	8,500
Styrene	8,000
Solvents/Naphthas	7,500
Chromium	7,000
Isopropanol	7,000
Copper	7,000
Manganese	5,500
Dichloromethane	5,000
Methyl Isobutyl Ketone (MIBK)	5,000
Nickel & its compounds	5,000
Tetrachloroethylene	5,000
1,1,1-Trichloroethane	4,500
Stoddard Solvent	4,500
Zinc	4,500
Ethyl acetate	4,500
Hexane	4,000
Cadmium & its compounds	4,000
Methanol	4,000
Iron	4,000

8

How is CWED Used?

- CWED is primarily a research tool:

2004 - 2017 Data Acquisition, CAREX (Peters, *et al.*, 2014)

OCRC – Burden of Occupational Cancer (Labrèche, *et al.*, 2019)

UdeM collaboration: MultEXPO project

Currently available to researchers engaged in CAREX-related research

Historic Exposures of Isocyanates (Hon, *et al.*, 2014)

Wood Dust JEM development (Sauvé, *et al.*, 2019)

UBC Ototoxicity Project

- AD-hoc analyses for Data Custodians

How is CWED Funded ?

- 2008 – 2012: Canadian Partnership against Cancer (Part of CAREX Canada; $4M)

- 2010 – 2013: WorkSafeBC "Focus on Tomorrow" ($205,000)

- 2010 – 2013: WCB of Manitoba "Research Work in Progress" ($88,000)

- 2018 – 2020: WorkSafeBC "Innovation at Work" ($50,000)

- Plus In-kind (data coding, data donations)

Advancing Workplace Exposure Surveillance in Canada; Toronto, March 2023

Advancing Workplace Exposure Surveillance in Canada

- *Exposure surveillance is the on-going, systematic collection, analysis, and interpretation of exposure data or other data that provides an indication that potentially hazardous exposures have occurred. This data is used to identify patterns and trends, groups in need of intervention, or assess the effectiveness of previous interventions.*

Role of OEDB's

- *Inform* prioritization and targeting of interventions

- *Evaluate* interventions and policies

- *Characterize* exposure histories, assist in claims adjudication

- *Benchmarking and Assessing* trends in exposures over time

- *Highlight* data gaps that may be important for future policy

- *Compare* what data across agencies / Provinces / countries

- *Complement* other agency data collection methods

- *Educate* and raise general awareness of occupational hazards

- *Answer* research questions on exposure and disease

Challenges

- Lack of current, high-quality exposure data
- Lack of data on emerging hazards, non-chemical
- Access and collection of data, understanding context of data

- Lack of coordination and data sharing across jurisdictions
- Data collection and storage is not standardized; difficult to share across organizations/jurisdictions
- Ensuring data quality & ability to pool data

- Lack of training on occupational exposure data, surveillance
- Need to create tools that allow the "mobilize" the data
- Need resources & funding to maintain & update data over time

CWED as a way forward

CWED Now	CWED Future
Passive archive of national OH measurement data	National OH measurement database; active surveillance
Research remit only	Research remit plus Surveillance reporting to both data custodians and public (custom and routine)
Ad-hoc data requests for data from Data custodians	National coordination center for occupational exposure surveillance data
Air only	Air, Surface, biomonitoring
	Inventory/catalogue Canadian Exposure Databases
	New standards for data collection, coding, management
	Develop relevant linkages and crosswalks
	Advise knowledge users on data QA/QC and data use
	Scientific/Academic partnership in multi-party projects
	Software data analysis Tool development

CWED Mobilization Project (2018-2020)

- Secure the existing CWED database
- Improve stakeholder knowledge of the database
- Explore database potential
- Improved data management
- Make data more widely available to researchers and knowledge users
- Explore sustaining funding models

Agent name: STYRENE (PHENYLETHENE)

NAICS 2002 : 3261 : Plastic Product Manufacturing

NOC 2006S: J225 : Plastic Products Assemblers, Finishers and Inspectors

Source: BCLIMS1 - BCLIMS2 - BCMINES - MBWSHD - ONMESU - YKMINES

Time window : [1980 - 2000]

Duration (min) : [60 - 350]

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EXPOSTATS
BAYESIAN CALCULATOR

| DATA SELECTION | DESCRIPTIVE ANALYSIS | LOGNORMAL ANALYSIS |

Descriptive statistics

parameter	value
n	430
PropCensored	0
min	0.256
Q25	42
Q50	91.1
Q75	179
maximum	764
propOverOEL	51 %
am	129
asd	120
cv	93.6 %
gm	73.5

Descripitive boxplot

Quantile-quantile plot

Silica exposure predictive tool

Risk estimate | advanced settings
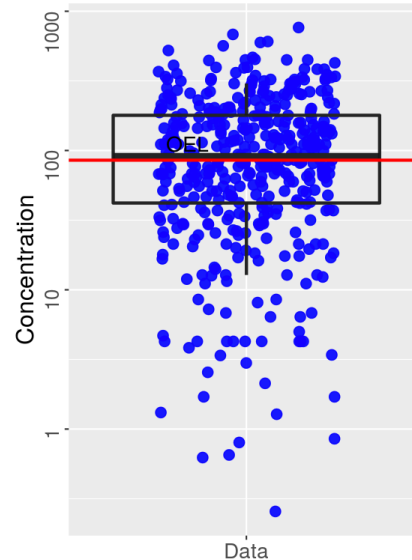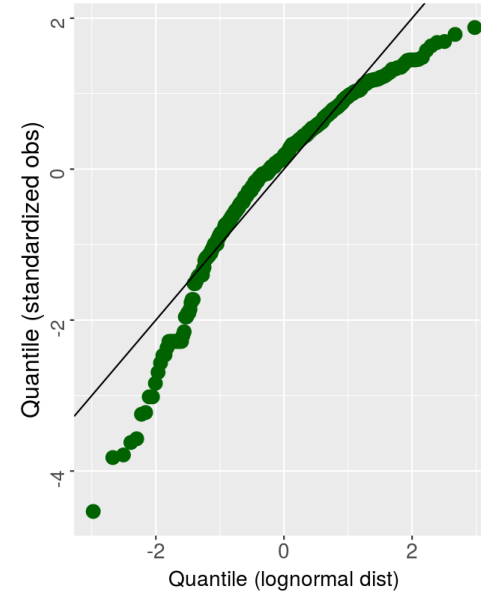
1. Historical data | 2. Observational data | 3. Combined data | 4. Summary

Risk estimation based on historical exposure data

Prediction model parameters

Activity area
Industrial, institutional and commercial

Project type
new building

Inside / Outside
Indoors

Sampling time
0.32 - 103

Region
British-Columbia

Stain
Drilling Concrete with Hammer Drill

Control measures
Uncontrolled

Occupational exposure limit

Exposure limit value (mg/m3)
0.1

Risk Analysis — *WorkSafe BC* Interpretive Framework

The GM of the exposure distribution is **0.07 mg/m^3** .

The upper limit of credibility (95 %) is **0.11 /m^3** .

The histogram on the right represents the distribution of uncertainty about the geometric mean, ie what we know about it.

According to this histogram, the probability that the true geometric mean exceeds the ELV is **11.43%** .

Risk Analysis — *AIHA* Interpretation Framework

The estimated 95th percentile of the exposure distribution is **0.33 mg/m^3** .

The upper limit of credibility (95 %) is **1.28 /m^3** .

The figure to the right represents the probability that the true 95th percentile of the exposure distribution is in each of the risk categories proposed by the AIHA .

According to this figure, the probability that the true 95th percentile exceeds the ELV is **99.68%** .

CWED 2.0 – Data Mobilization

Data In

- **Harvesting**
  - Regulators
  - Unions
  - Researchers
  - Industry
- **Surveillance Projects (examples)**
  - Silica control tool
  - NEPSI – EU
- **Data aggregators**
  - Consultants
  - Web of things (Apple "studies" app)

Information Out

- **Raw Data**
  - Researchers
    - Case-by-case Data Access Requisition
- **Moderate Aggregation**
  - Institutional systems
    - Programmed interfaces
    - Ad hoc reports
- **Highly Aggregated**
  - Public access
  - Pre-designed reports

Current Status: From Final Report to WorkSafeBC, 2020

- Completing revised Data Sharing Agreements

- Will strike steering and technical governance committees

- Establish New Data Platform and Host Criteria

- Continue technical work around protocols for data acquisition, data

  management, and data coding

- Implement Data Access Rules

- **Identify Stable Future Funding**

Conclusion

- CWED has played important role in national surveillance and research projects
- The database and associated knowledge and expertise form the foundation of a national exposure surveillance resource
- CWED seeking partners in sustainable funding model to build the next generation of Canadian OEDB

Acknowledgements

Questions?