

Fetal Alcohol Spectrum Disorder: Comorbidity, Health Care Utilization and Associated Cost in Canada

**Presented by
Svetlana (Lana) Popova, MD, PhD, MPH**

**Centre for Addiction and Mental Health,
University of Toronto,
PAHO/WHO Collaborating Centre
Toronto, Canada**

**7th National Biennial Conference on Adolescents and Adults
with FASD**

Vancouver, BC, Canada, April 6-9, 2016



Centre
for Addiction and
Mental Health
Centre de
toxicomanie et
de santé mentale

INTRODUCTION

Comorbidity of FASD

- **FASD is related to numerous comorbidities due to the permanent effects of prenatal alcohol exposure on the fetus**
- **However, the existing comorbid conditions and their prevalence among individuals with FASD remained to be established**

Popova, S., Lange, S., Shield, K., Mihic, A., Chudley, A. E., Mukherjee, R. A. S., Bekmuradov, D., & Rehm, J. (2016). Comorbidity of fetal alcohol spectrum disorder: a systematic review and meta-analysis. *The Lancet*, 387, 978-8. DOI: [http://dx.doi.org/10.1016/S0140-6736\(15\)01345-8](http://dx.doi.org/10.1016/S0140-6736(15)01345-8).

OBJECTIVES

- **The objectives of the current study were to:**
 - 1) Identify the comorbid conditions that occur among individuals with FASD, and**
 - 2) Estimate the pooled prevalence of comorbid conditions found to occur among individuals with FAS**
- **The latter objective was limited to FAS because FAS is the only expression of FASD in the *International Classification of Diseases (ICD)*:**
 - **ICD, version 9 – *Alcohol affecting foetus or newborn via placenta or breast milk* - 760.71**
 - **ICD, version 10 – *Fetal alcohol syndrome (dysmorphic)* - Q86.0**

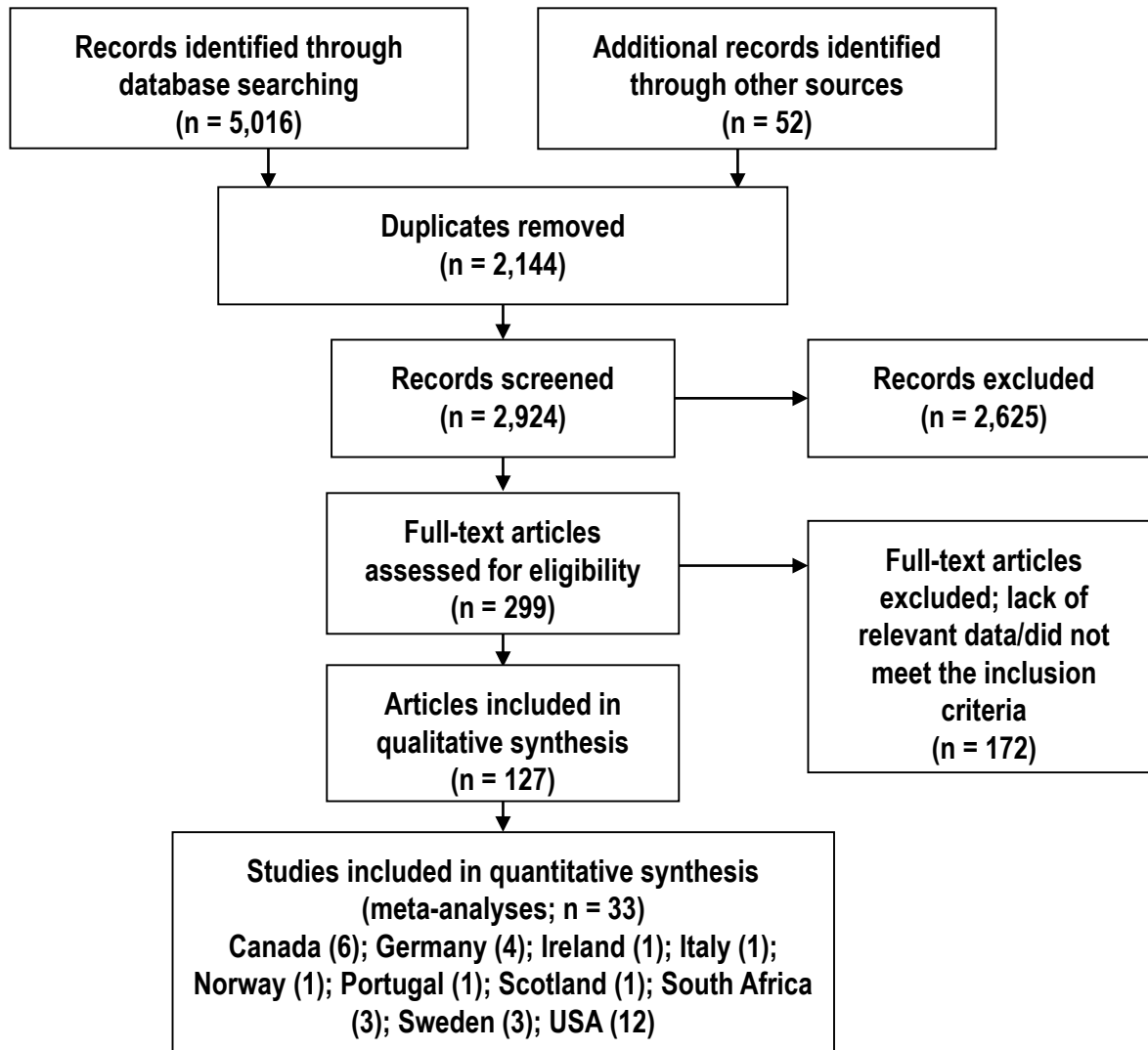
METHODS

Systematic Literature Review

- **A systematic literature search was performed in multiple electronic bibliographic databases in order to locate original published studies that reported on the comorbidity among individuals with diagnosed FASD**
- **The search was not limited geographically**
- **All comorbid conditions were coded according to the ICD-10**
- **Meta-analyses were performed, assuming a random-effects model**

RESULTS

Systematic Literature Review



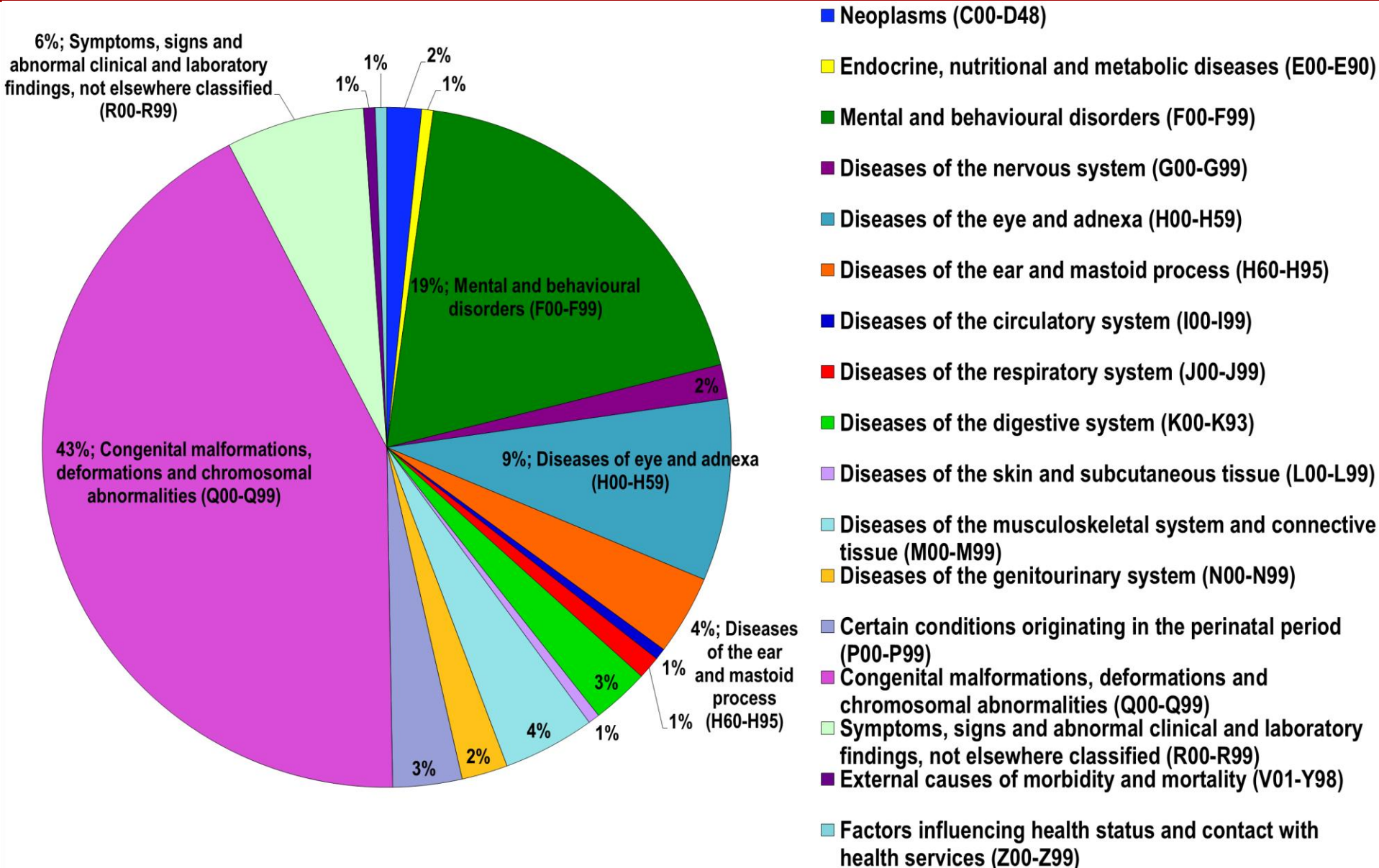
RESULTS (Con't)

Systematic Literature Review

- **428** comorbid conditions, spanning across **18 (out of 22)** chapters of the ICD-10
- **The most prevalent disease conditions were:**
 - ***Congenital malformations, deformities and chromosomal abnormalities (Q00-Q99; Chapter XVII), and***
 - ***Mental and behavioural disorders (F00-F99; Chapter V)***

RESULTS (Con't)

Percentage of conditions found to occur among individuals with FASD by ICD-10 chapter

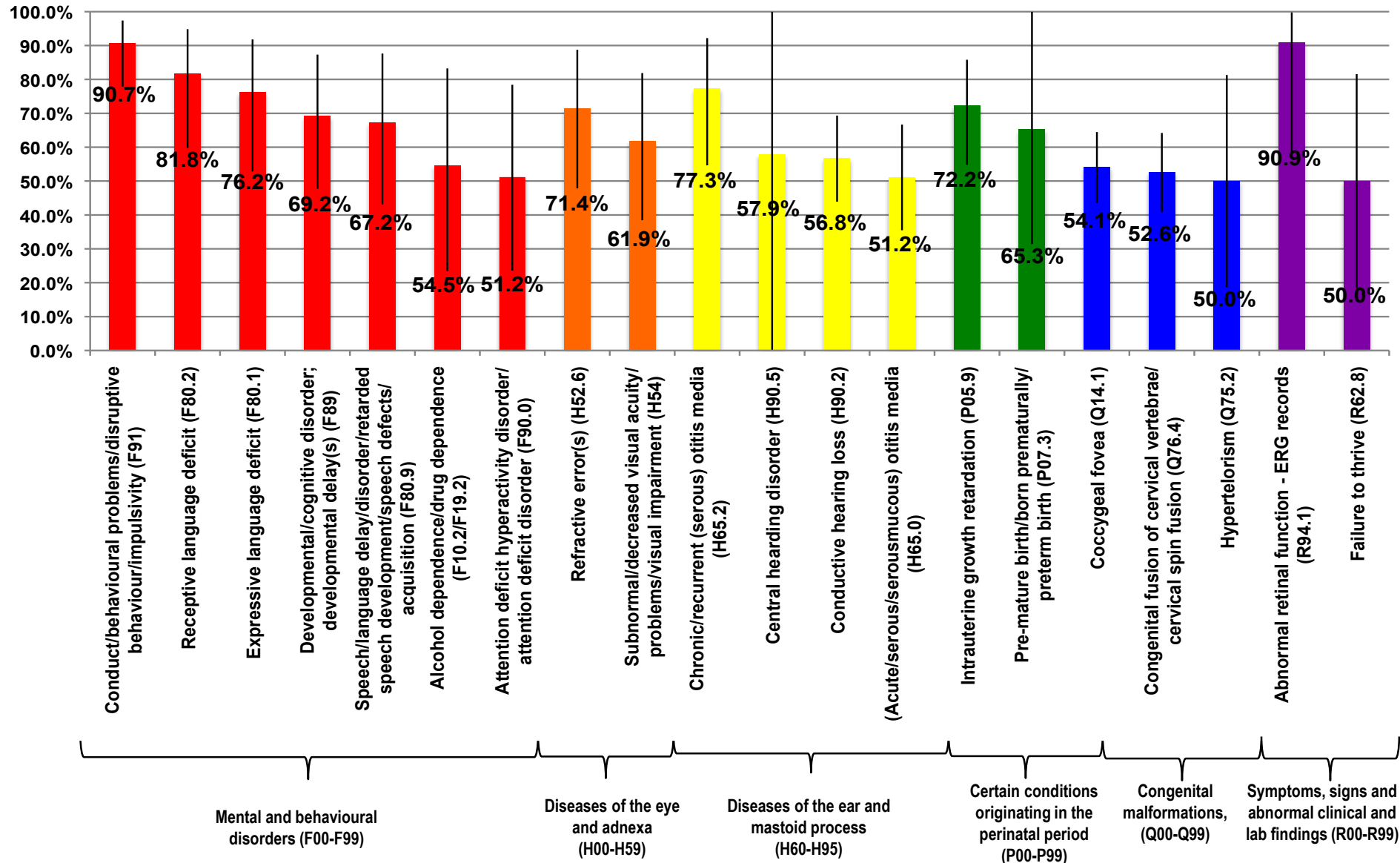


RESULTS (Con't)

Meta-analyses

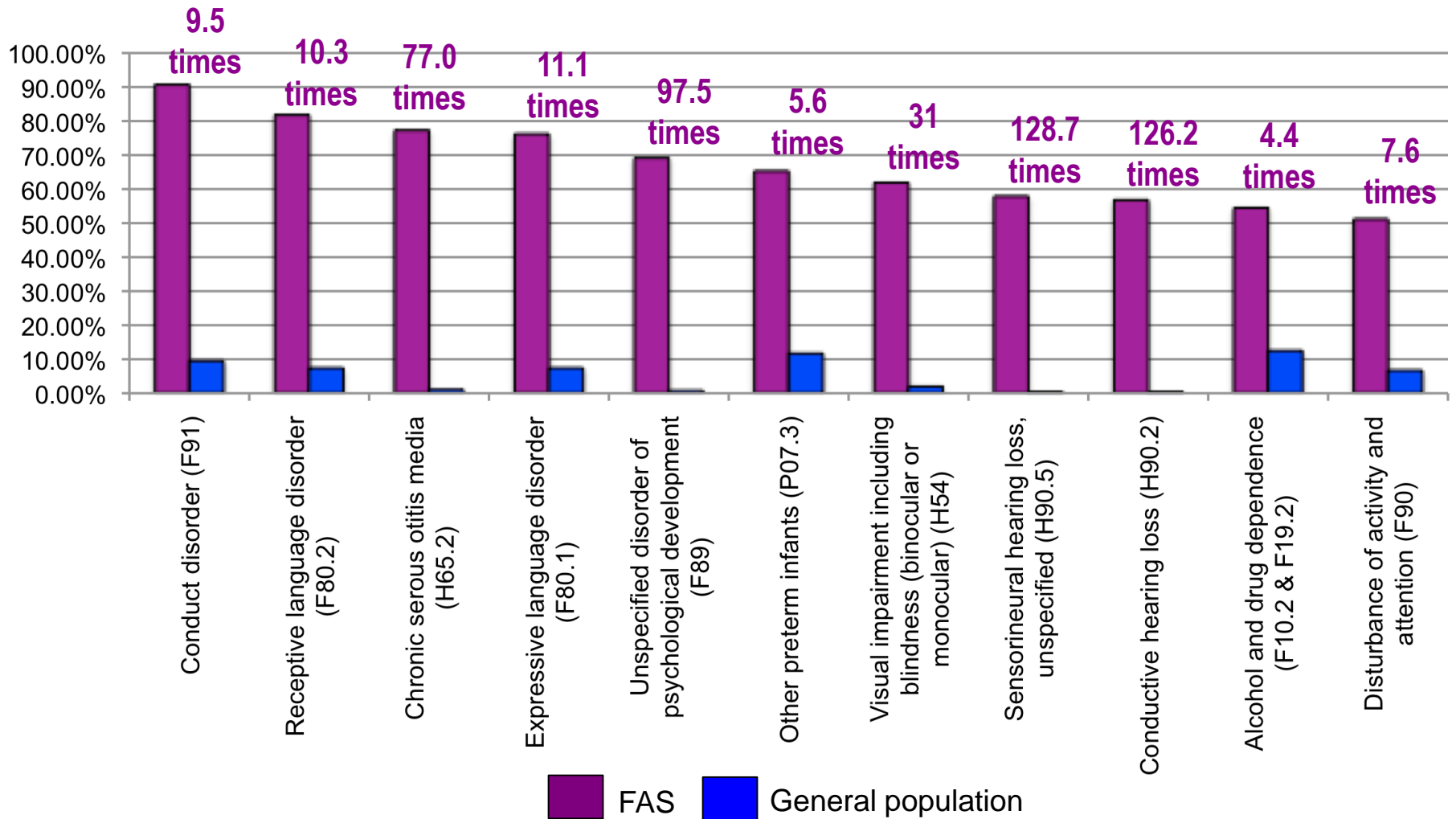
- **33 studies reported data on frequency of at least one disease condition and were eligible to be included in the meta-analyses**
- **Contained 1,728 subjects with diagnosed FAS**
- **Reported frequencies for 183 comorbid conditions coded in ICD-10**
- **In order to estimate pooled prevalence, 183 meta-analyses were performed; one for each comorbid condition found to occur among individuals with FAS**

Comorbid conditions with a pooled prevalence over 50% among individuals with FAS



RESULTS (Con't)

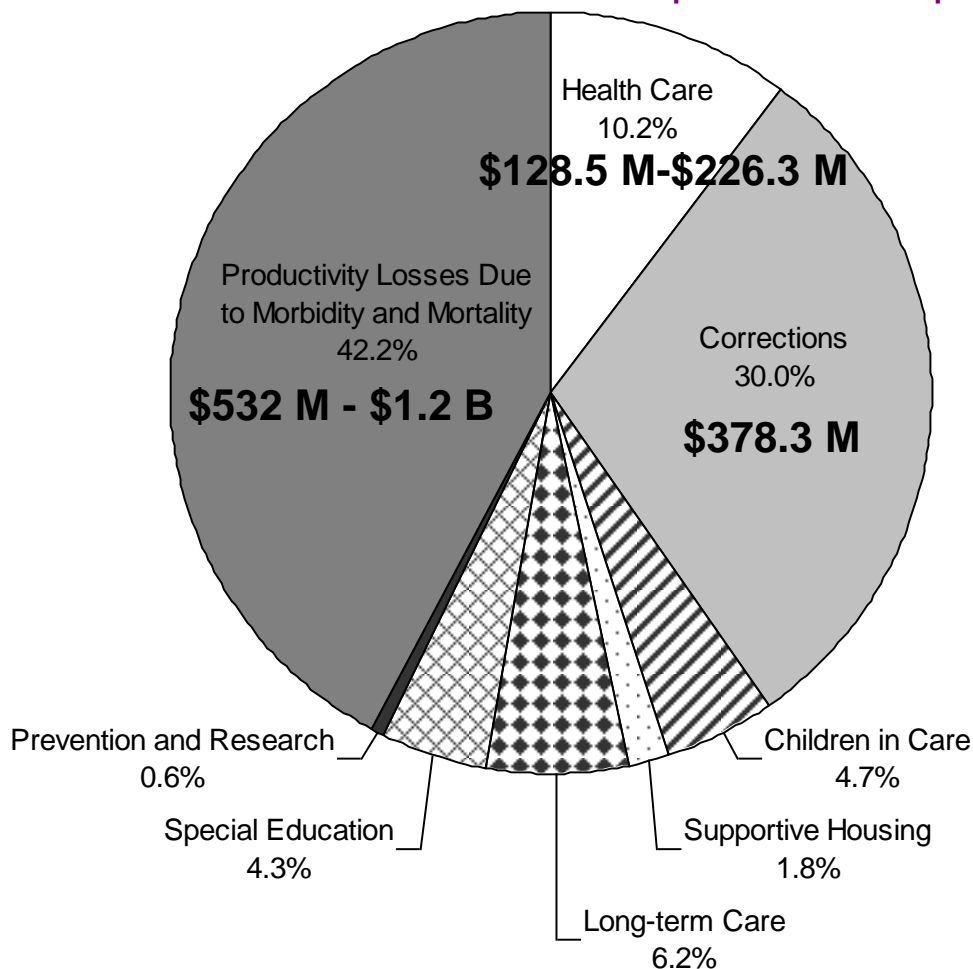
Pooled prevalence of comorbid conditions in individuals with FAS vs the general population of the USA



Cost of FASD in Canada

Percentage of main cost components attributable to FASD in Canada in 2013

Total annual cost: \$1.3 B - \$2.3 B



Health Care Burden and Cost

- **Acute Inpatient Care, Psychiatric Care, Emergency Department Visits, and Day Surgery Visits (FAS only)**
- **Screening and Diagnosis**
- **Specialized Addiction Treatment**
- **Prescription Drug Use**
- **Speech-Language Interventions**

METHODOLOGY

Health Care Burden and Cost

Popova, S., Lange, S., Burd, L., & Rehm, J. (2012). Health care burden and cost associated with Fetal Alcohol Syndrome in Canada: Based on official Canadian data. PLoS ONE, 7(8), e43024. Available from <http://www.plosone.org>

Data were extracted from CIHI for the following health care service:

- ***Acute inpatient care***
- ***Psychiatric care***
- ***Day surgery***
- ***Emergency department***

FAS is the only FASD-related diagnosis in the International Classification of Diseases:

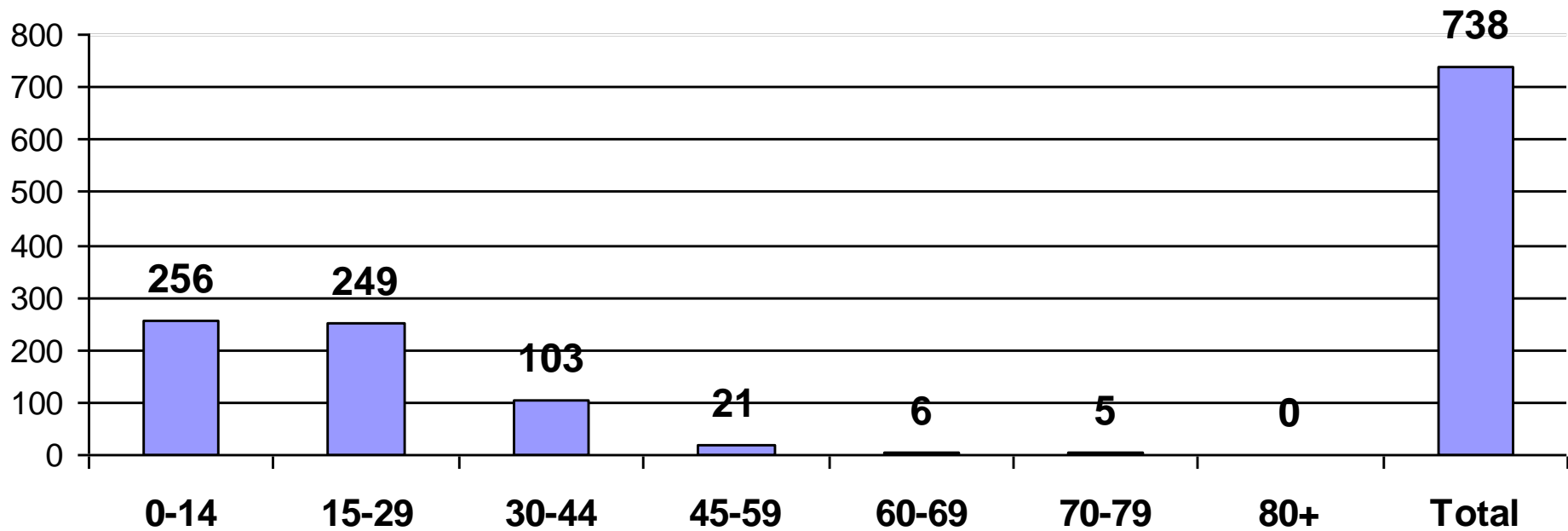
- ***ICD-10: Fetal alcohol syndrome (dysmorphic) Q86.0***
- ***ICD-9-CM Alcohol affecting foetus or newborn via placenta or breast milk 760.7***

RESULTS

Health Care Burden and Cost

Number of acute care hospitalizations among individuals diagnosed with FAS in Canada 2008-2009

Number of Acute Care Hospitalizations

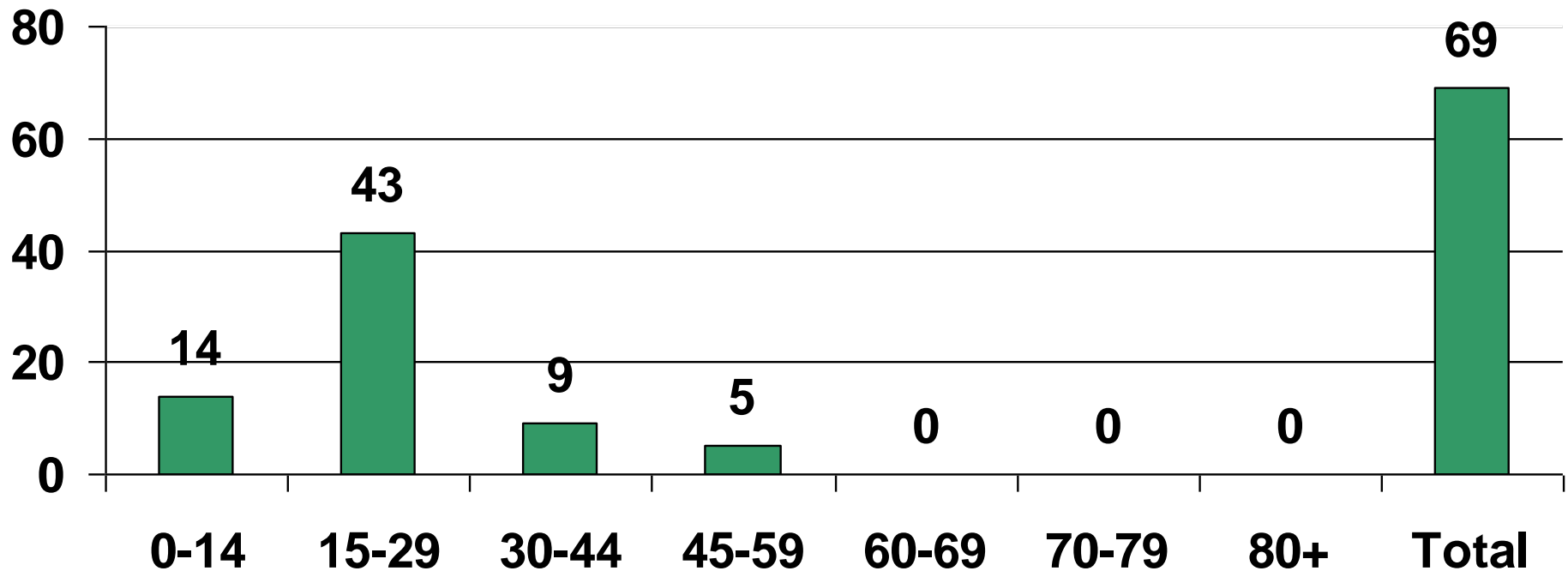


Results (Con't)

Health Care Burden and Cost

Number of psychiatric care hospitalizations among individuals diagnosed with FAS in Canada 2008-2009

Number of Psychiatric Care Hospitalizations

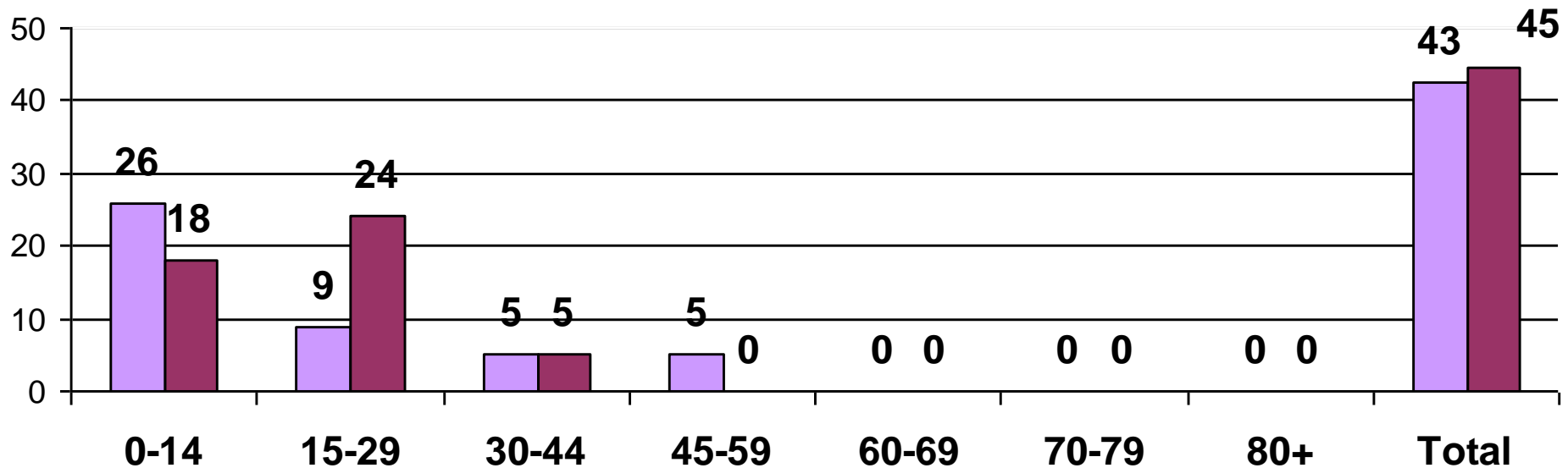


Results (Con't)

Health Care Burden and Cost

Number of day surgery and emergency room visits in Canada 2008-2009

Number of Day Surgery Hospitalizations and Emergency
Departments Visits

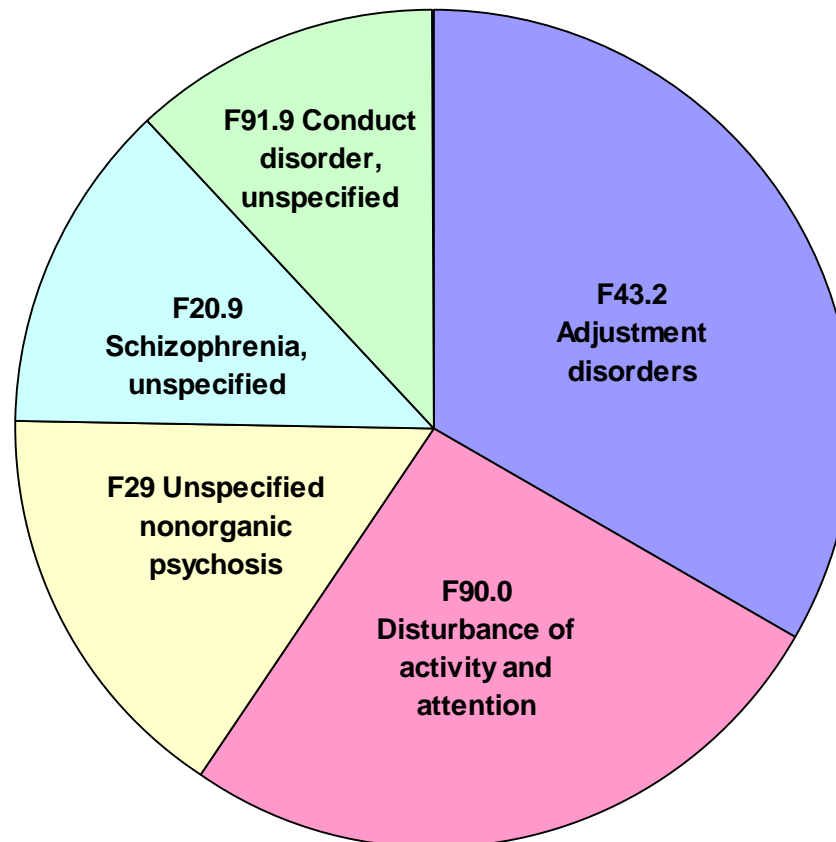


Results (Con't)

Health Care Burden and Cost

The top five most responsible diagnoses (MRDs) among individuals with FAS who used health care services in Canada in 2008-2009

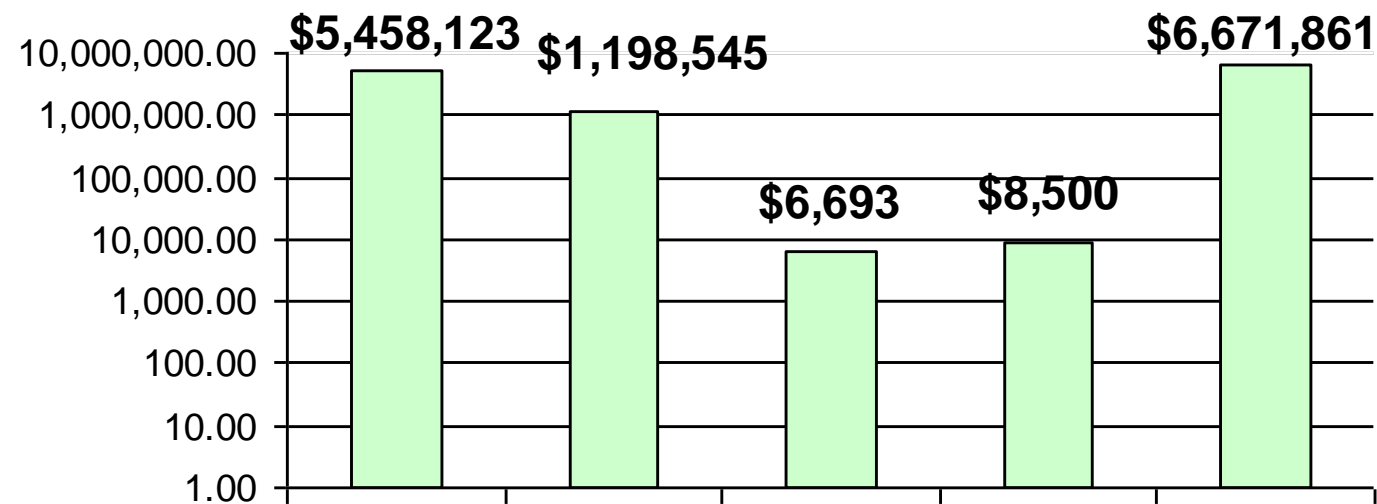
About 75% of MRDs among patients with FAS were in the category of *Mental and Behavioural Disorders*



Results (Con't)

Health Care Burden and Cost

Cost of Recorded Hospitalizations and Visits associated with a Diagnosis of FAS in Canada for 2008-2009



Acute care hospital days
Psychiatric care hospital days
Day surgery hospitalizations
Emergency departments visits
TOTAL

DISCUSSION

Health Care Burden and Cost

- **The official data on the utilization of health care services by individuals diagnosed with FAS are likely to be underreported**
- **The reported cost figures are most likely underestimated**

Discussion (Con't)

Health Care Burden and Cost

The error rate in capturing the cost of health care

The total rate of health care utilization was:

2.3% (FAS) vs 8.3% (gen pop of Canada)



The rate of health care utilization among individuals with FAS was **at least 3.6 times lower** than that of the general population of Canada

Cost of FASD Diagnosis

Popova, S., Lange, S., Burd, L., Chudley, A., Clarren, S., & Rehm, J. (2013). Cost of Fetal Alcohol Spectrum Disorder diagnosis in Canada. PLoS ONE 8(4): e60434. DOI:10.1371/journal.pone.0060434. ISSN: 1925-7066. Available from <http://www.plosone.org>

Consultants: Mary Cox-Millar, Gideon Koren, Sally Longstaffe, Kelly Nash, and Shelley Proven)

- In Canada, FASD diagnosis is currently achieved through a multidisciplinary team approach**
- The per person cost of diagnosis was calculated based on the number of hours required by each member of the diagnostic team**
- The number of FASD cases diagnosed per year in Canada was estimated based on the existing clinical capacity of all FASD multidisciplinary clinics in Canada (Clarren et al., 2011)**

RESULTS

Cost of FASD Diagnosis

Per Person Cost of FASD Diagnosis

- It was estimated that an FASD diagnostic evaluation requires from *32 to 47 hours* for one individual to be screened, referred, admitted, and diagnosed with an FASD
- The total per person cost of diagnosis was estimated to be *\$3,110 to \$4,570 per person*

RESULTS (Con' t)

Cost of FASD Diagnosis

Total Cost Per Year for FASD Diagnosis

- It was estimated, based on the existing clinical capacity in Canada, that **2,288 cases of FASD** were diagnosed in 2011
- The total cost of FASD diagnostic services in Canada ranges from:
 - \$3.6 to \$5.2 million* (lower estimate), *up to \$5.0 to \$7.3 million* (upper estimate) *per year*

Utilization and Costs of Specialized Addiction Treatment

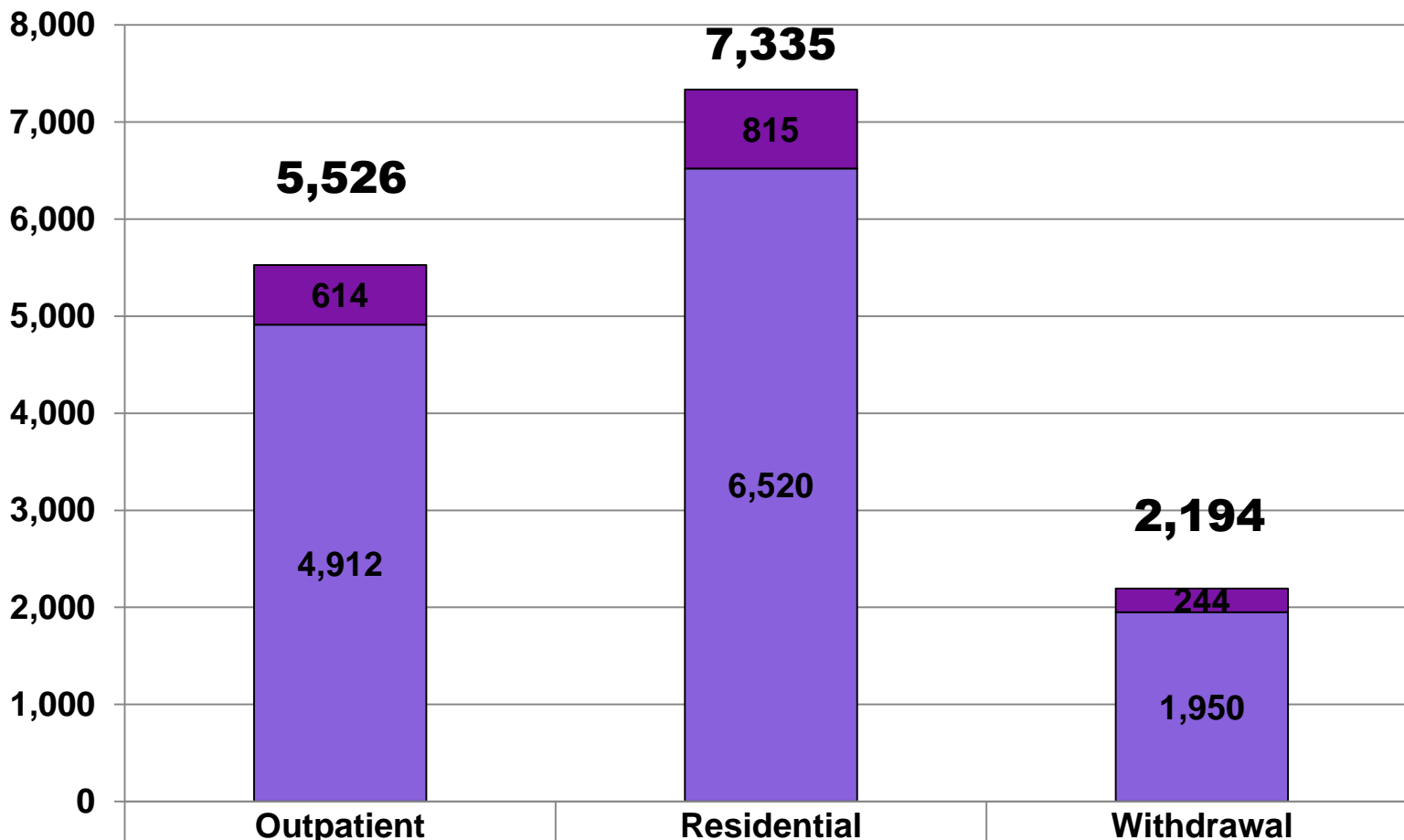
Popova, S., Lange, S., Burd, L., Urbanoski, K., & Rehm, J. (2013). Cost of specialized addiction treatment of clients with Fetal Alcohol Spectrum Disorder in Canada. *BioMed Central Public Health, 13*, 570. Available from: <http://www.biomedcentral.com/1471-2458/13/570>

- **Objective:** to estimate the utilization rate of specialized addiction treatment services and the associated cost among clients with FASD
- **Individuals with FASD constitute a special population that may be at particularly high risk for substance use**
 - **Weighted pooled prevalence: 50% (95% CI: 41.9%-58.5%)**
- **Data source: Drug and Alcohol Treatment Information System DATIS**

RESULTS

Cost of Specialized Addiction Treatment

Estimated number of visits/inpatient days among clients with FASD in Canada 2010/11



■ Clients with FAS
■ Clients with FASD

614

815

244

4,912

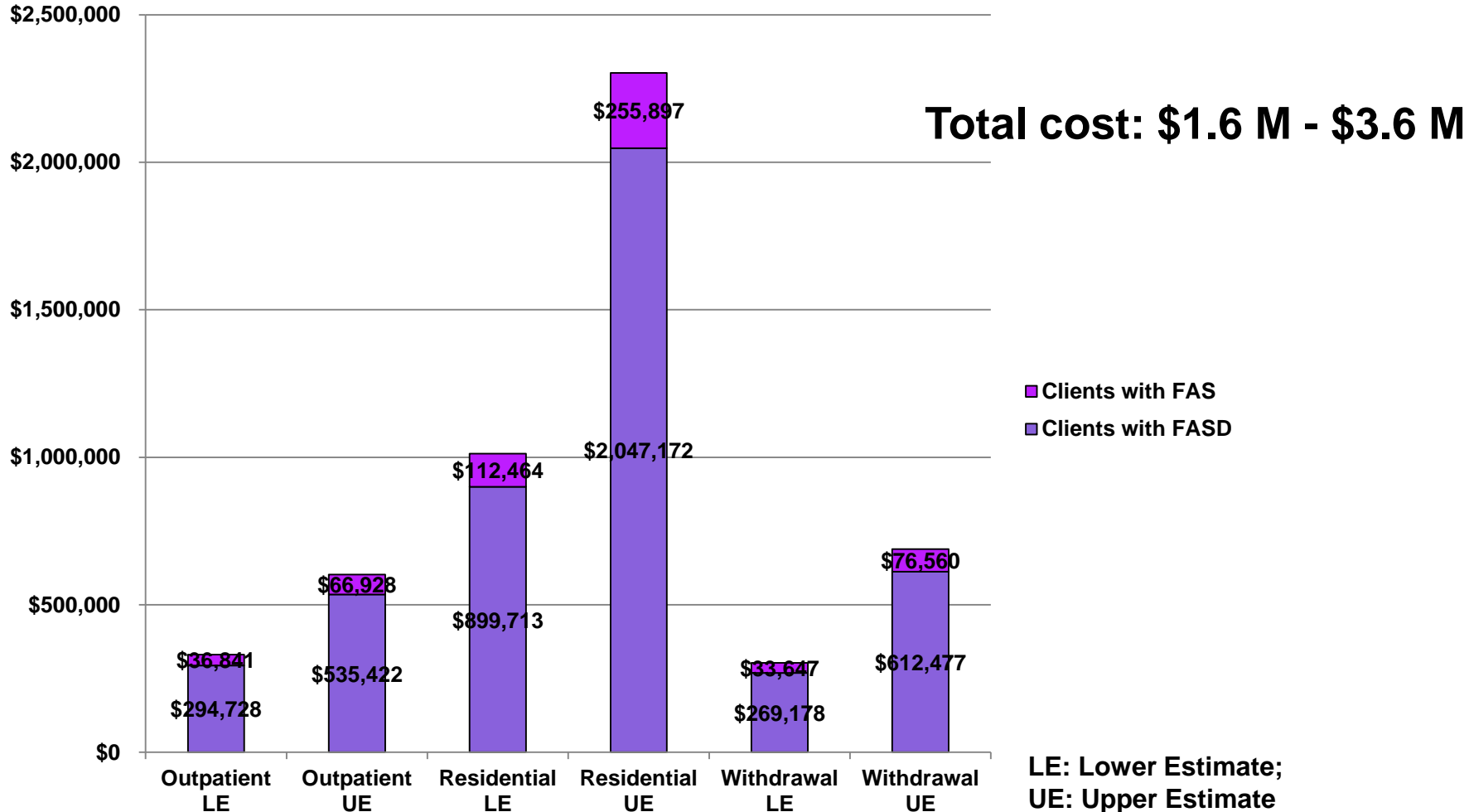
6,520

1,950

RESULTS (Con' t)

Cost of Specialized Addiction Treatment

The estimated costs associated with specialized addiction treatment among clients with FASD in Canada 2010/11



TOTAL COST	\$332K	\$602K	\$1.0M	\$2.3M	\$303K	\$689K
-------------------	---------------	---------------	---------------	---------------	---------------	---------------

Prescription Drug Use

- **The percentage of individuals with FASD using prescription drugs (66.4%; Brownell et al., 2013) was applied to the total number of individuals with FASD in Canada in 2012**
- **The average annual per person cost of prescription medication (\$232; Fuchs et al., 2009) was applied to the total estimated number of individuals with FASD who use prescription drugs**
- **It was estimated that 177 316 individuals, 0–64 years of age, with FASD used prescriptions drugs in Canada in 2012**
- **Totaling \$41.1 million**

Cost of Speech-Language Interventions for Children & Youth

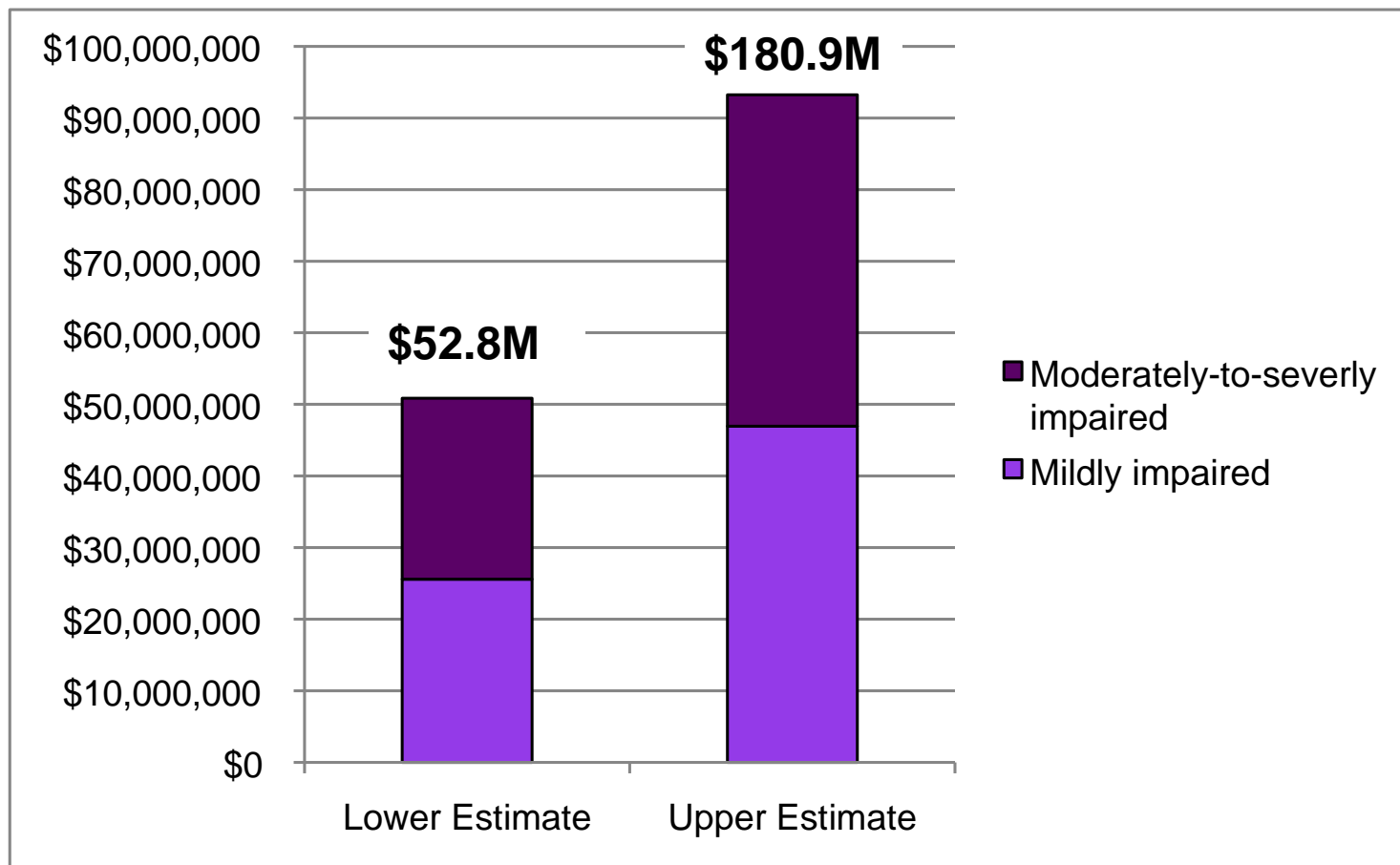
Popova, S., Lange, S., Burd, L., Shield, K., & Rehm, J. (2014). Cost of speech-language interventions for children and youth with Fetal Alcohol Spectrum Disorder in Canada. *International Journal of Speech-Language Pathology*, 16(6), 571-81. DOI: 10.3109/17549507.2013.862858. Available from <http://informahealthcare.com/eprint/mpCN6F7CVIIwzZ6a4fVf/full>

- **Speech and language disorders appear to occur at a disproportionate rate among individuals with FASD**
 - **Weighted pooled prevalence: 52% (95% CI: 47%-57%)**
 - **The distribution of the level of severity (Coggins and colleagues 2007).**
 - **The number of hours needed to treat (Law et al. 2003)**
 - **Data Source: Canadian Association of Speech and Language Pathologists and Audiologists CASLPA**

RESULTS (Con' t)

Cost of Speech-Language Interventions for Children & Youth

Costs associated with one-on-one speech and language interventions among children and youth (age 2-19) with FASD in Canada in 2011



If Not Now, When?

- **The presented data will raise awareness of harmful effects of PAE and draw attention to the need for screening and early diagnosing**
- **Improving screening and diagnosis would promote access to interventions and resources that may subsequently reduce burden and cost**
- **The harmful effects of alcohol on a fetus, representing many cases of preventable disability, should be recognized globally as a large public health problem. The presented results clearly demonstrate the need for such recognition**

ACKNOWLEDGEMENTS

**This work was supported by the
Public Health Agency of Canada**

**Many people worked on these
projects!**

CONTACT INFORMATION

Svetlana (Lana) Popova

Senior Scientist, Associate Professor

Social & Epidemiological Research

Department

Centre for Addiction & Mental Health,

University of Toronto, WHO Collaborating

Centre

33 Russell Street, room T507

Toronto, Ontario, Canada M5S 2S1

Tel. (416) 535-8501 ext. 34558

e-mail: lane.popova@camh.ca



Centre
for Addiction and
Mental Health
Centre de
toxicomanie et
de santé mentale