

An
OAHPP/ICES
Report



Ontario Burden of **INFECTIOUS DISEASES**

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 **Ontario**
Agency for Health
Control and Promotion
Agence de protection et
de promotion de la santé

The Impact of Infection on Population Health: Results of the Ontario Burden of Infectious Diseases Study

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Objectives of ONBOIDS

- **To determine the relative contributions of various IDs to the overall burden of IDs in Ontario**
- **Inform priority setting, planning, and decision-making within IDs**
- **Establish baseline for future evaluations of public health interventions**
- **Identify strengths/weaknesses of existing data on IDs in Ontario and define areas requiring improvement**

Creating the Disease List

- **Adapted from latest GBD list**
- **Syndromes (pneumonia, septicemia) vs. Agents (*Streptococcus pneumoniae*, influenza)**
- **Criteria for inclusion:**
 - Severe (HIV) and/or common (cystitis)
 - Reportable (measles)
 - High profile (WNV)

Diseases and syndromes considered

- 10 disease groups
- 51 distinct infectious agents
- 16 syndromes

- Notable exclusions: *Helicobacter pylori*, non-tuberculous mycobacteria, norovirus, rotavirus, Epstein-Barr virus, Lyme disease, surgical site infections

Unit of Measurement: HALY

HALY: Health-Adjusted Life Year

- Used in the PHI study
- Conceptually similar to DALYs (GBD study) and QALYs (health economics)

HALY = YLL + YERF

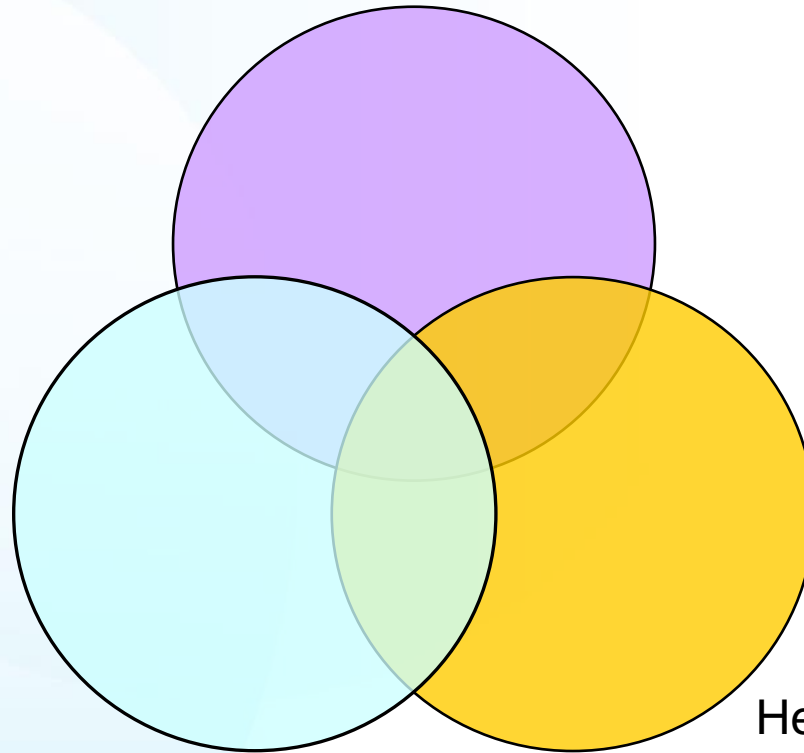
- YLL: Years of life lost due to premature mortality
- YERF: Year-equivalents of reduced functioning from living with disease (i.e., time spent in less than perfect health)

Data Sources for YLL

- **Ontario life expectancy table for 2001**
- **Deaths by cause, 2005-2007, disaggregated by age and sex**
 - Vital statistics data
 - Single underlying cause of death (ICD-10)

YERF: Data Sources for Incidence

Reportable disease data



Laboratory data

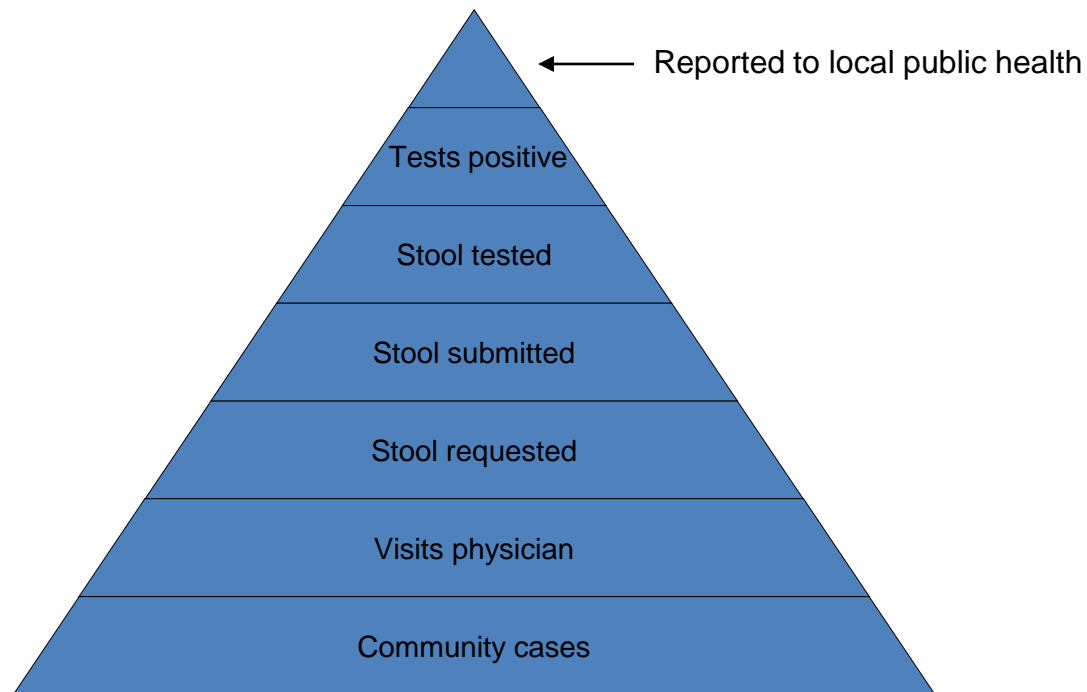
Health care utilization data

Data Sources for YERF

- **Disease incidence, 2005-2007, by age and sex**
 - Reportable disease data (iPHIS)
 - Health care utilization data
 - Visits to doctors' offices (OHIP)
 - Visits to emergency departments (NACRS)
 - Hospitalizations and same day surgery (CIHI-DAD and SDS)
 - Cancer registry data (OCR)
 - Mathematical models
 - Epidemiologic studies (i.e., literature)
- **Distribution of disease by health state (literature)**
- **Health state duration (literature and expert opinion)**
- **Severity weights (SW subcommittee)**

Underreporting

- **Significant issue for enteric illnesses**
- **Majowicz et al.: For each case of enteric illness reported in province of Ontario, estimated number of IGI cases in community range from 105 to 1,389**



Majowicz et al., 2005

Severity weights

- **Previous studies (GBD, Dutch) have developed disability weights (DWs) in various settings**
- **Incomplete alignment between diseases/health states included in current study and previous DWs**
- **Validity of combining DWs from different studies (and different settings) uncertain**
- **Chose to develop Ontario-specific set of severity weights using CLAMES methodology developed by Statistics Canada**

CLAMES

11 attributes (scale of 1 to 4/5)

- Pain/discomfort
- Physical functioning
- Emotional state
- Fatigue
- Memory and thinking
- Social relationships
- Anxiety
- Speech
- Hearing
- Vision
- Use of hands and fingers

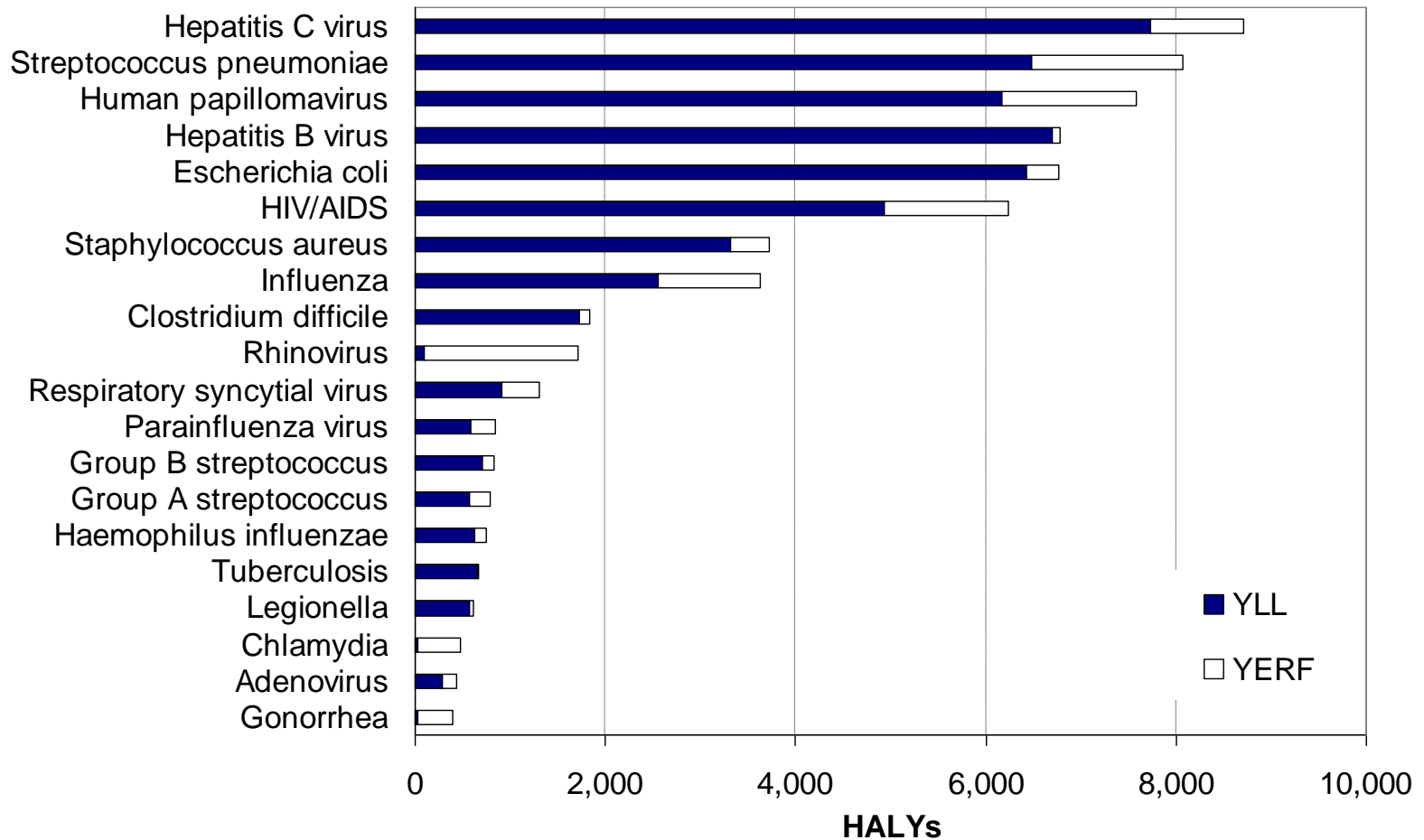
CLAMES

- **Combination of health professionals and lay panels assessed a set of hypothetical health states**
- **Algorithm produces severity weight**
- **Focus on functional limitations**

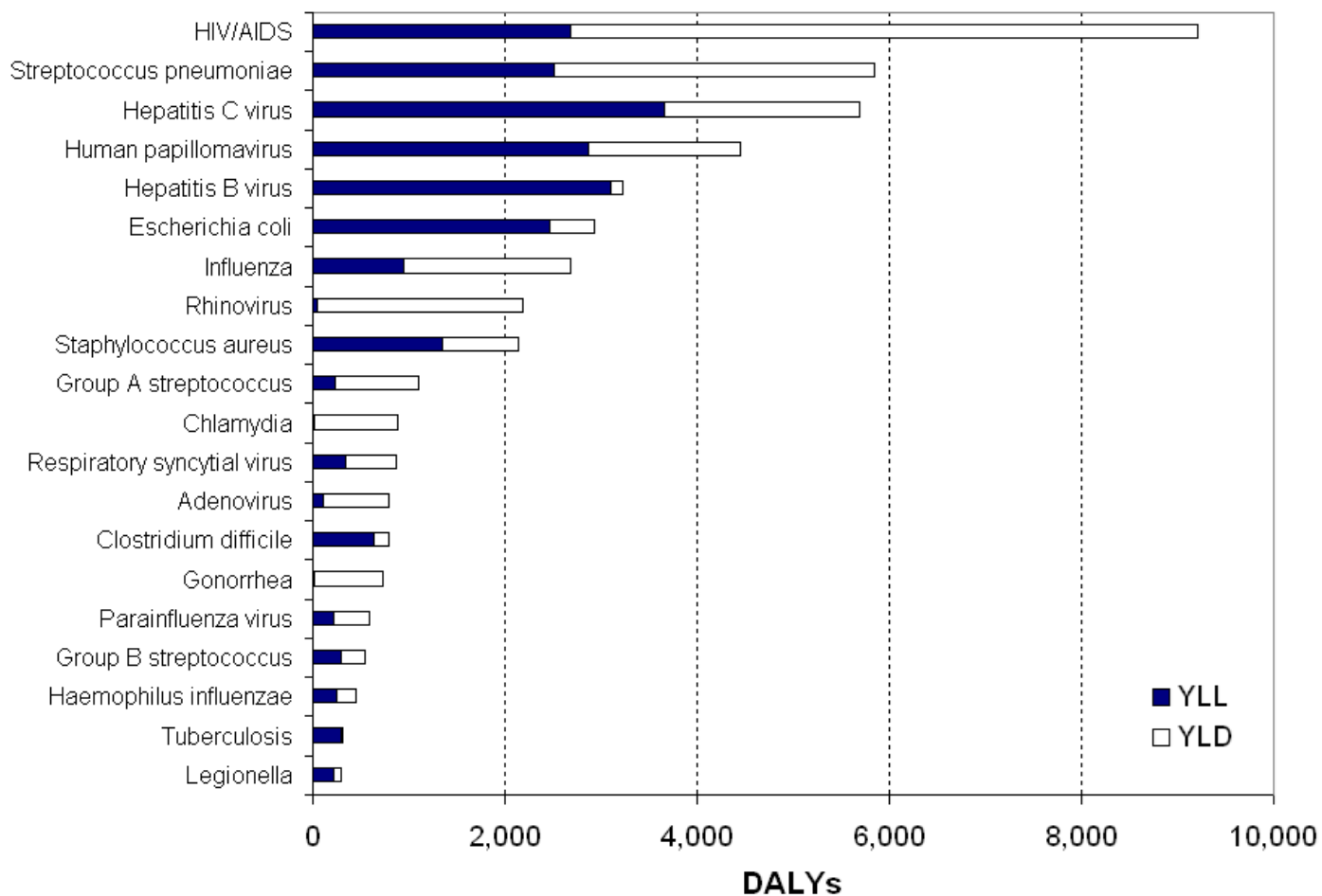
ONBOIDS (HALYs) vs. GBD (DALYs)

	ONBOIDS HALY	GBD DALY
Life expectancy table	Ontario F: 82.0 yrs M: 77.4 yrs	GBD standard F: 82.5 yrs M: 80.0 yrs
Age-weighting	Uniform age weights (i.e., no age-weighting)	Differential age weights (more weight for working age adults)
Discounting	No discounting	Discount rate of 3%
Health state valuation	Severity weights (CLAMES)	Disability weights (previous studies)

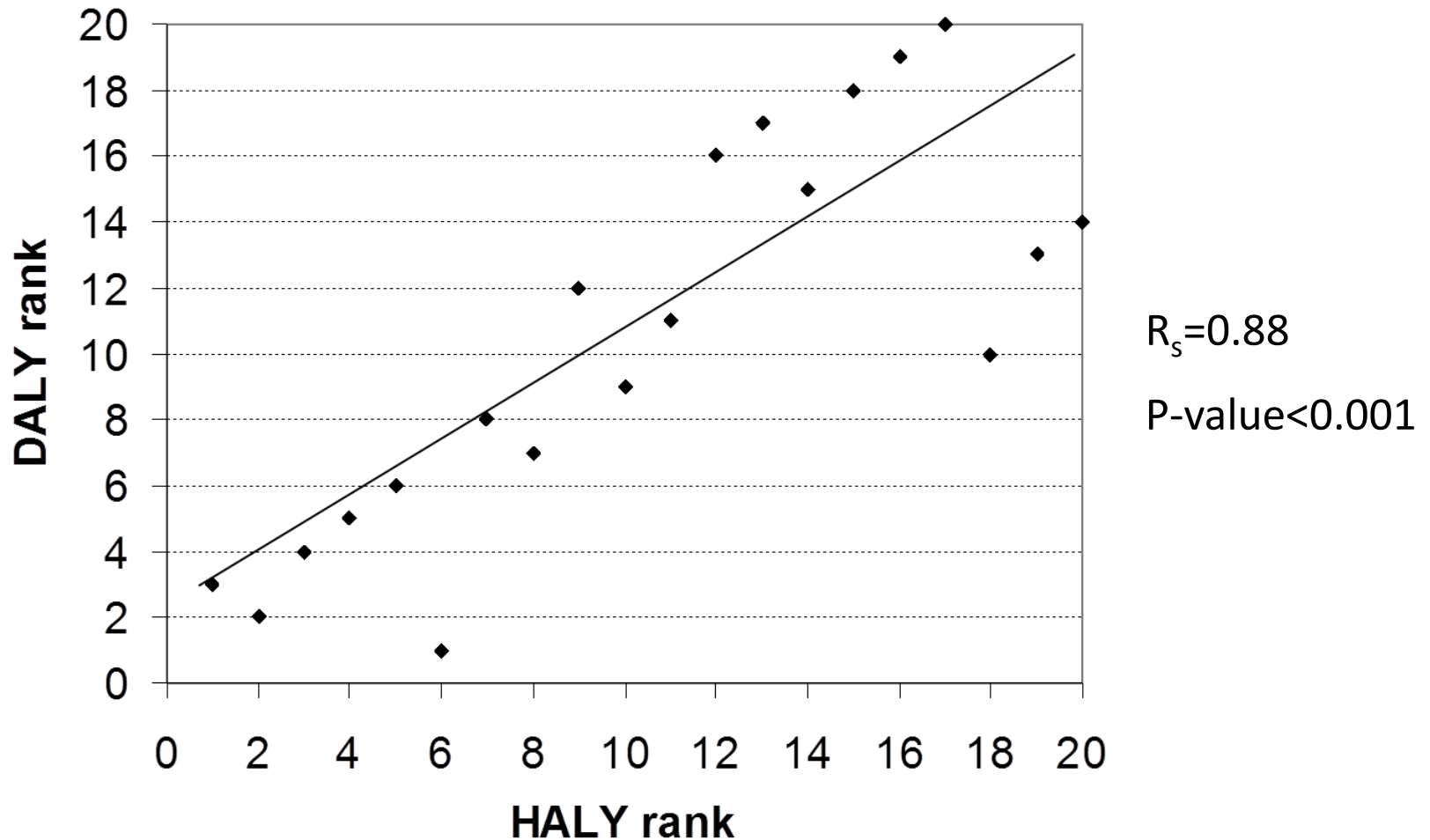
HALYs for Top 20 pathogens



DALYs for Top 20 pathogens



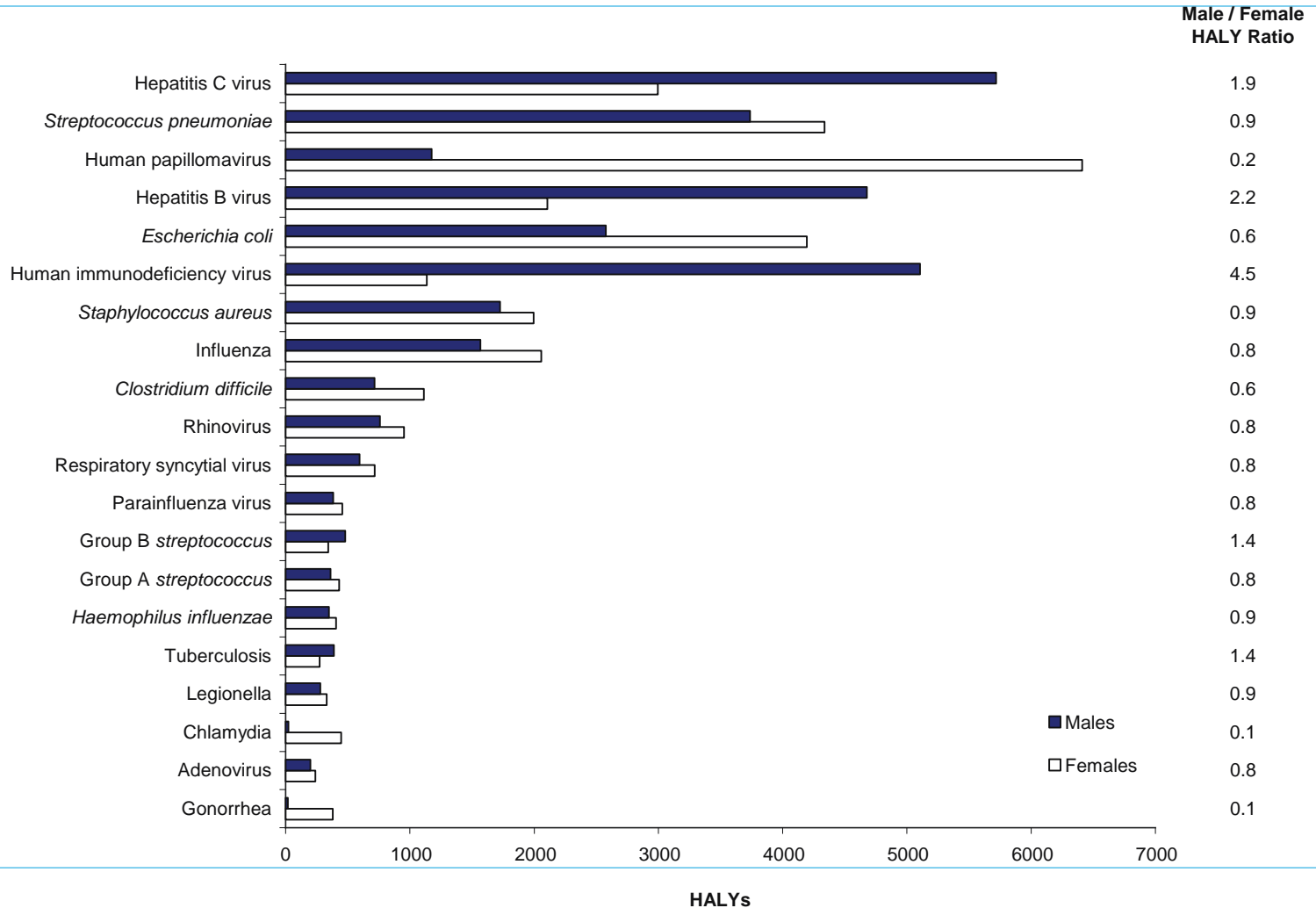
Ranking using HALYs vs. DALYs



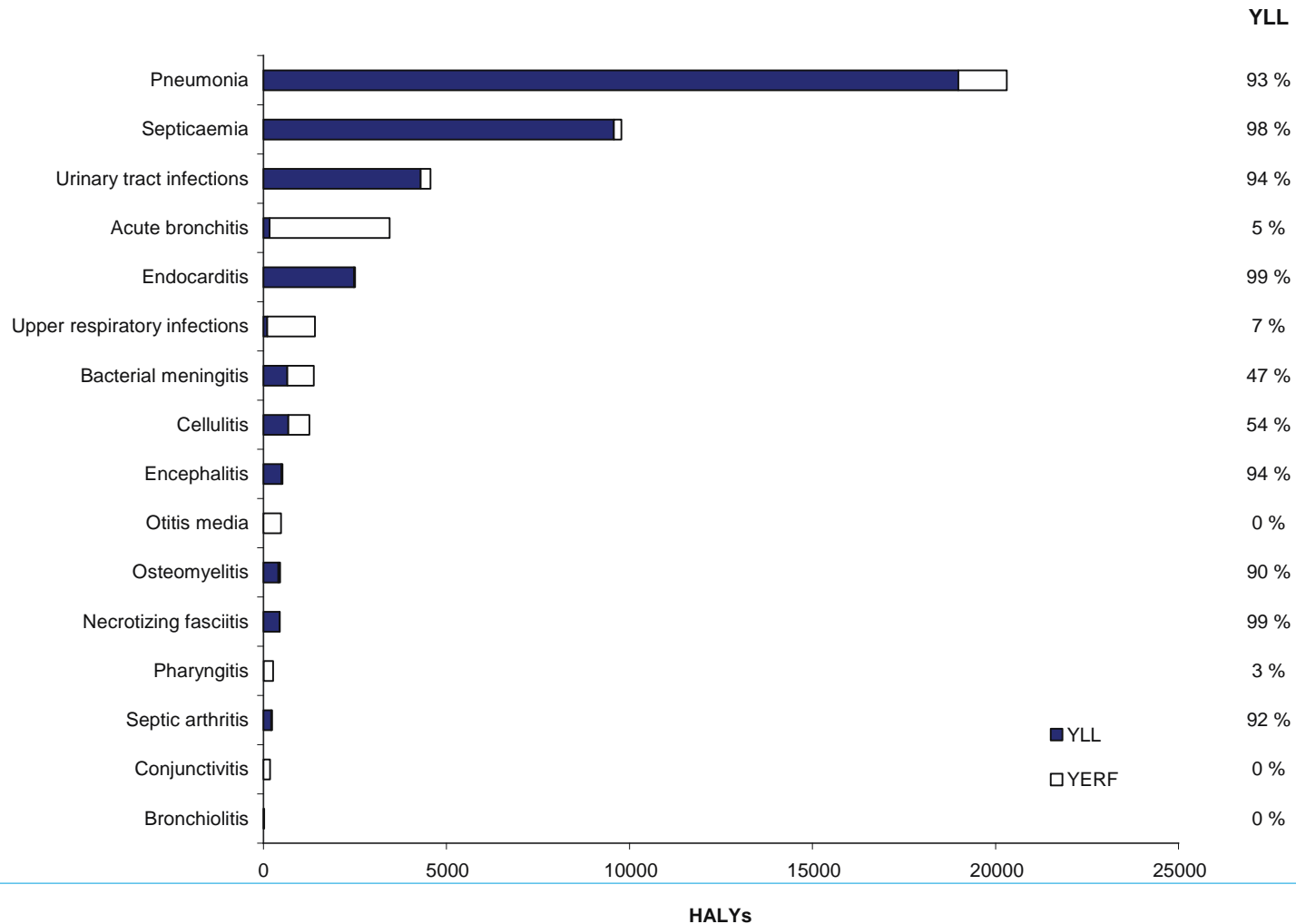
ONBOIDS (HALYs) vs. GBD (DALYs)

- **Proportion attributable to premature mortality differs (82% using HALYs vs. 48% using DALYs)**
 - YLL reduced for DALYs due to age-weighting and discounting
 - YLD increased for DALYs due to higher values for disability weights (compared to severity weights)
 - **Overall ranking of pathogens mostly consistent**
 - **No established gold standard since differences are value judgments**
-

HALYs for Top 20 by sex



HALYs for selected syndromes



Top 10 by different measures

#	HALYs	Number of Deaths	Number of Cases
1	Hepatitis C	<i>E. coli</i>	Rhinovirus
2	<i>S. pneumoniae</i>	<i>S. pneumoniae</i>	Influenza
3	<i>E. coli</i>	Hepatitis C	<i>S. pneumoniae</i>
4	HPV	Hepatitis B	Coronavirus
5	Hepatitis B	<i>C. difficile</i>	<i>E. coli</i>
6	HIV	<i>S. aureus</i>	RSV
7	<i>S. aureus</i>	HPV	Parainfluenza
8	Influenza	Influenza	Adenovirus
9	<i>C. difficile</i>	HIV	<i>S. aureus</i>
10	Rhinovirus	RSV	Group A strep

Questions?



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