Contribution of chronic diseases to gender differences in disability in France

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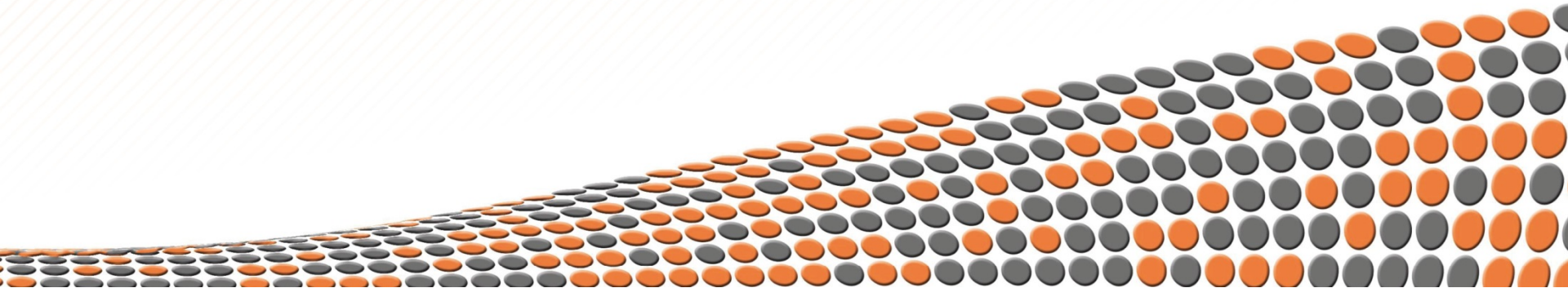
JA-EHLEIS research programme

Background

- **JA EHLEIS monitoring population health in the EU:**
  - Life Expectancy (LE) and Healthy Life Years (HLY)
- **Large gap between LE and HLY = unhealthy years (ULY)**
  - ➔ EU-27 at age 50: men 12 unhealthy years; women: 16 unhealthy years
- **Which chronic diseases contribute to the difference?**
  - Measuring the disabling impact of diseases
  - Measuring the contribution of diseases to disability prevalence
  - Decomposition of the gender difference in ULY



Contribution of diseases to disability

- **Contribution of diseases depends on:**
  - Prevalence of diseases in the population
  - Disabling impact of diseases
  - *Are the most disabling diseases the largest disability contributors?*
- **Disabling impact of diseases**
  - Based on regression model (additive rate model) to estimate the association of each disease with disability
  - People can have more diseases (control for comorbidity)
  - Independent competing risks
  - Persons with no self-reported diseases can have disability (“background”)
- **Tools used for the analyses**
  - Attribution tool to attribute disability to diseases
  - Decomposition tool to decompose differences in HLY

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Data: French survey “Handicap-Santé”

- **HSM (2008): population in private households (face-to-face)**

  N=39065 (RR 76.6%) -- 50+: n= 13672 (France metropolitan)

- **HIS (2009): population in institutions (face-to-face)**

  N=9104 (RR 91%) -- 50+: n= 4932 (France metropolitan)

- **Various disability measures = Activity limitation (GALI)**

  For at least the past 6 months, to what extent have you been limited because of a health problem in activities people usually do?

  ➔**Severely limited + Limited but not severely *vs*** Not limited at all

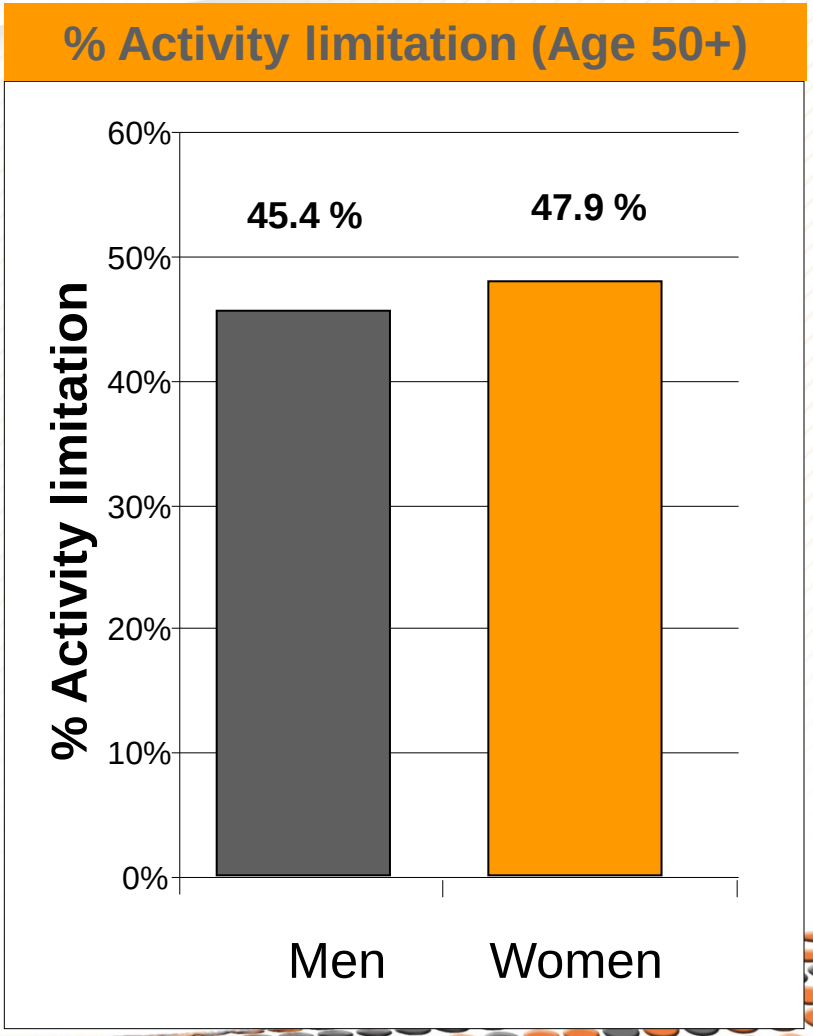
- **Diseases = Self-reported based on disease list (card)**

  ➔ 12 disease group were selected

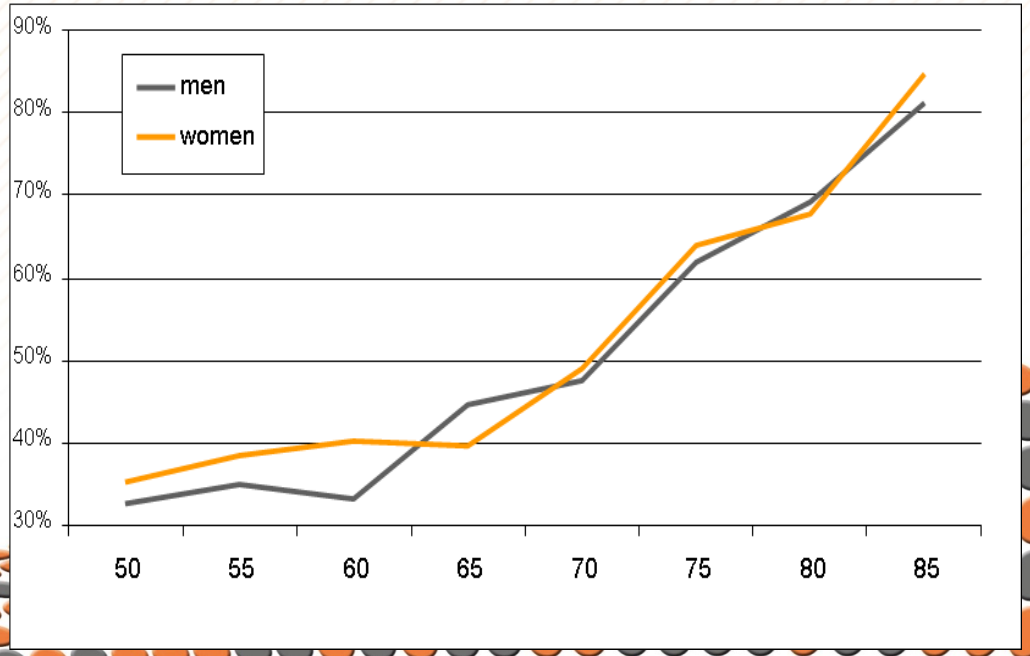
Data: French survey “Handicap-Santé”

Self-reported disease groups in HSM-HSI	
Heart diseases	HEART
Stroke	CVA
Peripheral vascular disease	PVD
Musculoskeletal	MuscSkel
Cancer	CAN
Alzheimer-Parkinson	ALZ-PAR
Other neurological	OTH-NEUR
Chronic nonspecific lung disease	CNSLD
Anxiety-depression	ANX-DEP-MENT
Other mental	OTH-MENT
Diabetes Mellitus	DIAB
Injuries-accidents	ACCI

Results : Activity limitation in France 2008



- Women have a (only) slightly higher prevalence of activity limitation
- No strong difference across ages…



Gender differences in HLY in France in 2008

Healthy, unhealthy and total life expectancy

At age 50	HLY	ULY	LE
Men	16.0	14.1	30.2
Women	17.1	18.7	35.9
Gender difference	**+1.1**	**+4.6**	**+5.7**

- Women can expect to live 5.7 years longer than men
- Most of these extra years being lived with activity limitation

Source: Own calculations based on French life tables (INSEE) and HSM-HIS survey

Contribution to LE with activity limitation

Healthy, unhealthy and total life expectancy

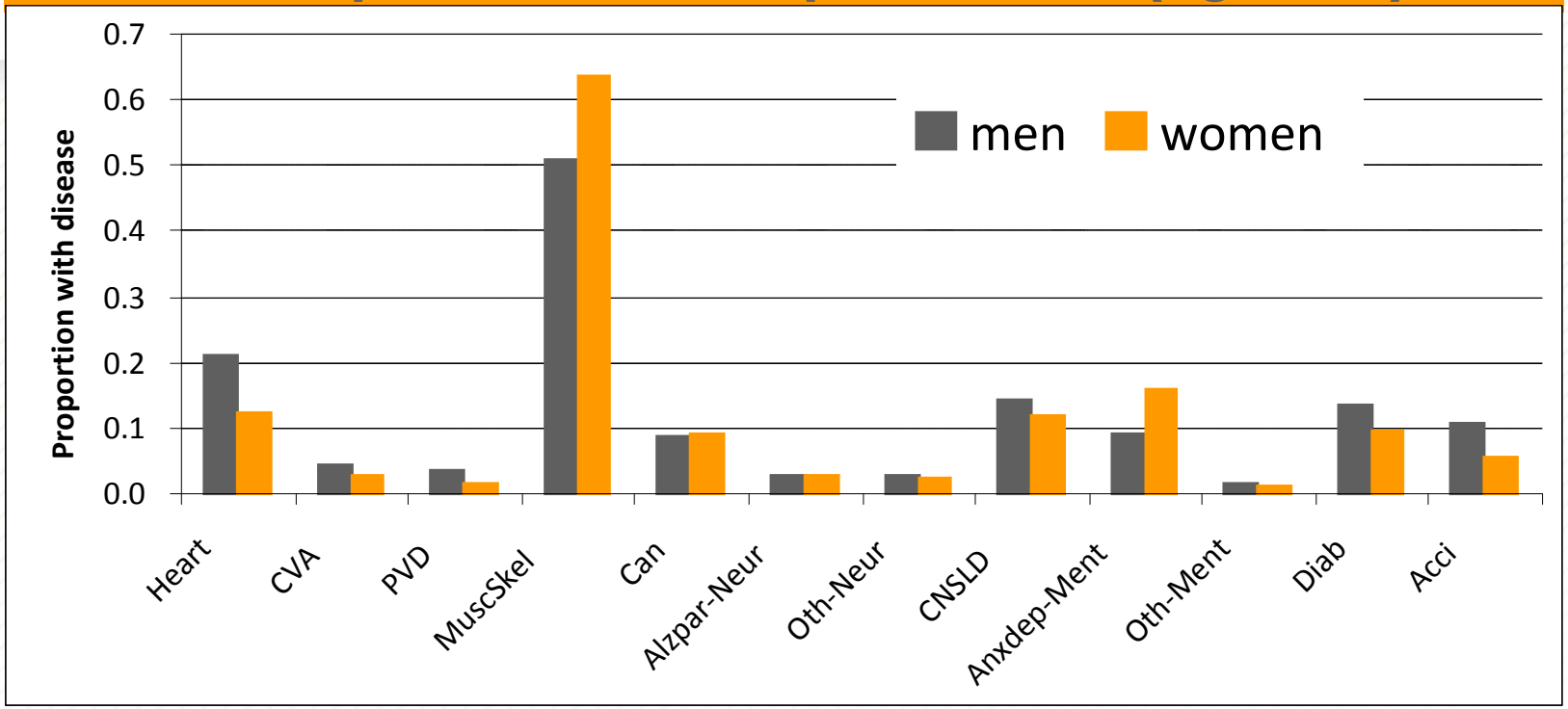
At age 50	HLY	ULY	LE
Men	16.0	14.1	30.2
Women	17.1	18.7	35.9
Gender difference	**+1.1**	**+4.6**	**+5.7**
Total	1.1	4.6	5.7
Mortality differences	1.8	3.9	5.7
Disability differences	-0.7	0.7	0.0

- **Even with strictly equal disability prevalence, women would live more years with activity limitations because they live longer**
- **Which diseases do they have and how they contribute to the ULY?**

Source: Own calculations based on French life tables (INSEE) and HSM-HIS survey

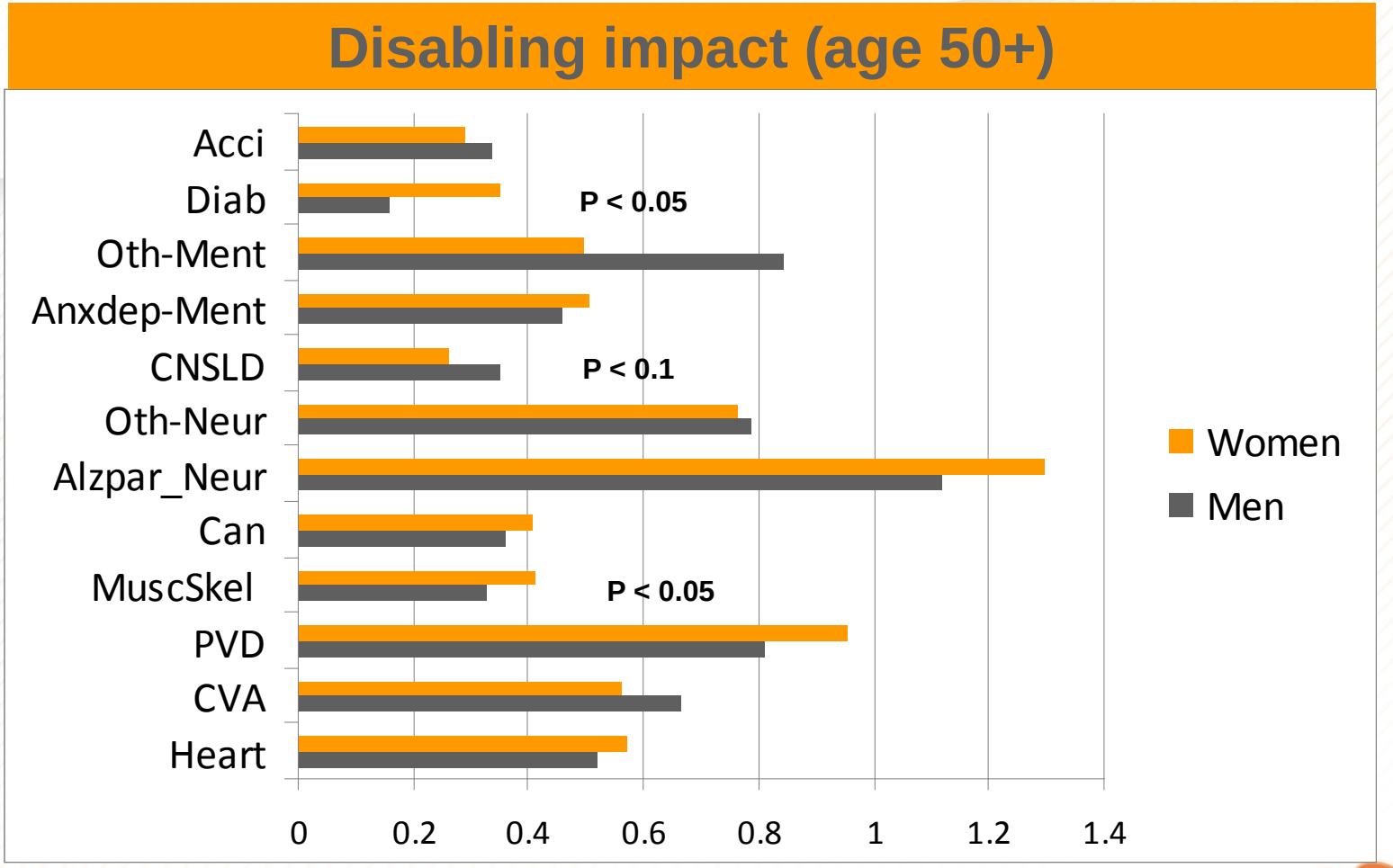
Disease prevalence in France 2008

Self-reported disease prevalence (age 50+)



- Significant gender differences (exc. Can, Oth Neur, Alzpar-Neur)
  - > M : ++ Cardiovascular, Diab, CNSLD, Acci
  - > W : ++ MuscSkel, ++ AnxDep

Disabling impact of disease, France 2008

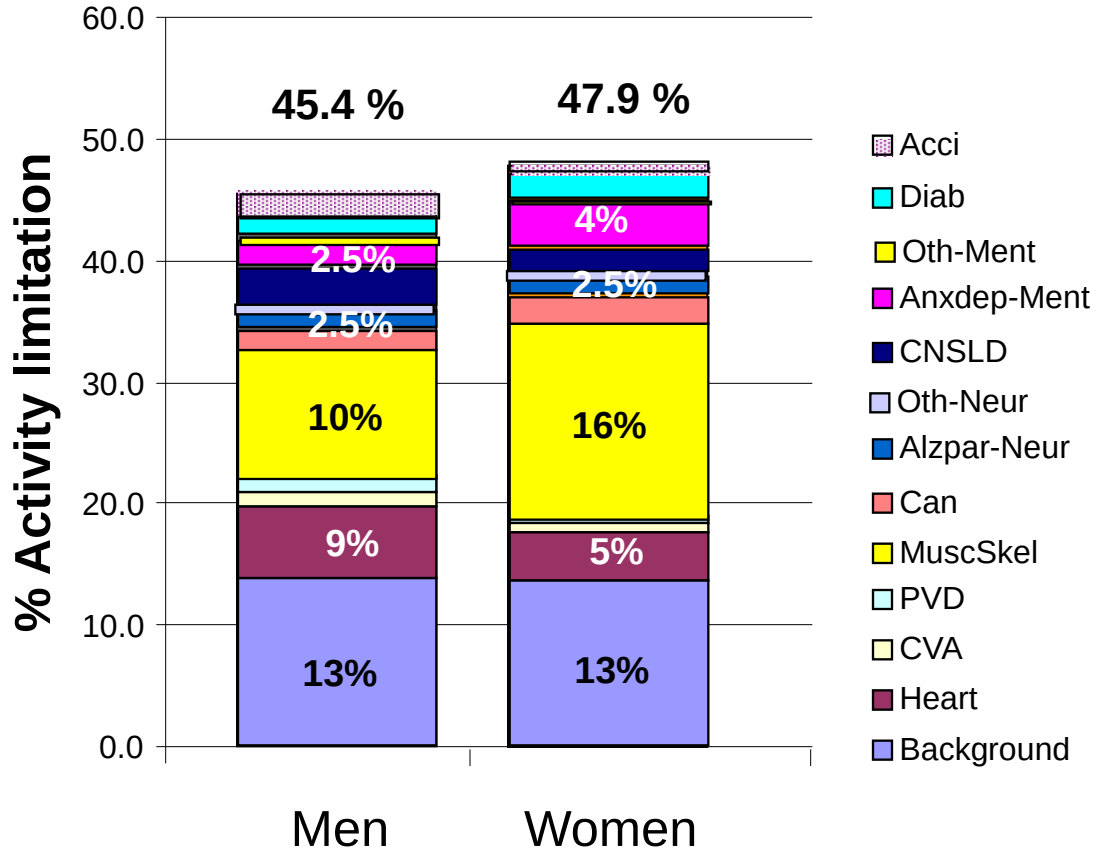


- Significant difference only for
  - > W : Diab, MuscSkel
  - > M : CNSLD

Contribution of diseases to disability prevalence

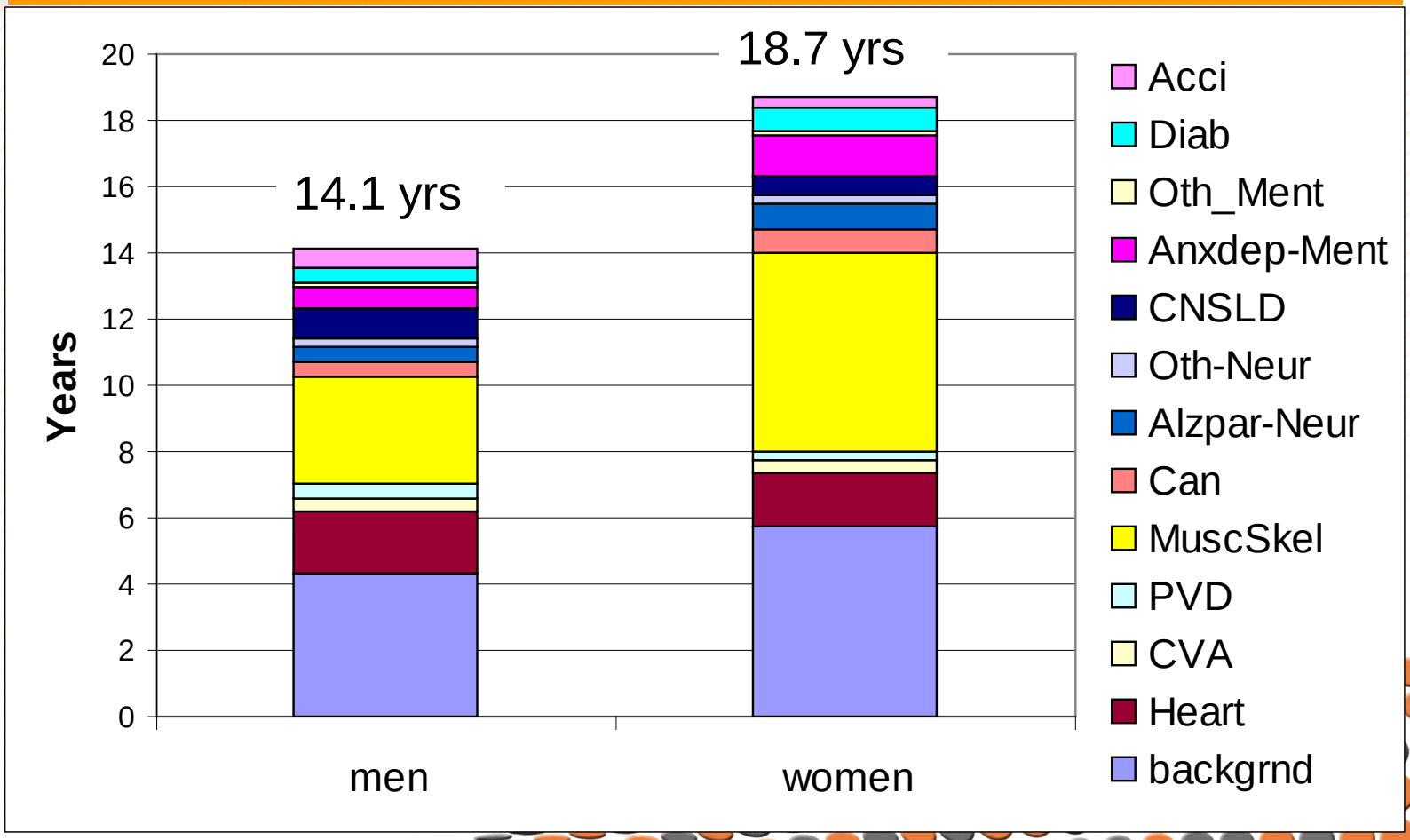
- More frequent
  - > W : ++ MuscSkel, ++ AnxDep
  - > M : ++ Cardiovascular, Diab, CNSLD, Acci
- More disabling
  - > W : Diab, MuscSkel
  - > M : CNSLD

Contributing diseases (age 50+)



Contribution of diseases to ULY

Contributing diseases (age 50+)



Disabling impact of disease and their contribution to activity limitation

- **Diseases with highest disabling impacts are not the main contributors**

Ranking disabling impacts			Ranking contributors to disability		
	Male	Female		Male	Female
1	Alzpar	Alzpar	1	MuscSkel	MuscSkel
2	Other-Ment	PVD	2	Heart	Heart
3	PVD	OtherNeur	3	CNSLD	AnxDep
4	Other-Neur	Heart	4	AnxDep	Cancer
5	CVA	CVA	5	Acci	Diab

Conclusions - general

- **The highest disabling diseases are not largest contributors to activity limitation**
  - Largest disabling impacts: Alzheimer-Parkinson, other neurological disease, other mental diseases, PVD
- **Largest contributors are diseases with moderate disabling impact and high prevalence**
  - Musculoskeletal diseases
  - Heart diseases, anxiety-depression (W), CNSLD (M)

Conclusions – gender

- **Weak difference in AL in French men and women (ADL?)**
- **Gender specific disease contributions to activity limitation prevalence largely nullify each other (ADL?)**
  - –Musculoskeletal + Anxiety-depression expose more women
  - –Heart disease and CNSLD expose more men
  - –Diabetes is more frequent in men but more disabling in women
- **Still, differences in disease contribution to ULE are *not* nullified because of the female longer life**
- **... to prolong with the causes of death**

Thank you for your attention

- **Tools used for the analyses presented today:**
  - Attribution tool to attribute disability to diseases
  - Decomposition tool to decompose differences in healthy life expectancies

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Further work

- **Comparison GALI vs. ADL disability**
  - Prelim analyses:

    Diseases with the highest disabling impact are largest contributors to years with ADL disability
- **Confidence intervals for contributions**
  - Is possible with bootstrapping, but extreme long runs
- **Adding causes of death**

1 survey year, 1 age group, 2 groups

- Two groups: 1. No disease: disability prevalence 30%
  2. Heart disease: disability prevalence 60%

- Assumption: initially: no disability

Group 1: total disability rate in -ln(1-0.3) = 0.36 = background rate

Group 2: total disability rate -ln(1-0.6) = 0.92

-> this group has been exposed to background rate and heart disease rate

-> Heart disease rate is total rate - background rate = 0.92-0.36= 0.56

- Using proportions of both rate in total rate:
  - 0.56/0.92 = 61% is attributed to heart disease
  - 0.36/0.92 = 39% is attributed to background

    -> disability prevalence attributed to heart disease 0.366 (0.61*0.60)

- < 30% disabled by background if disease is present because some already disabled by heart disease before they would have become disabled by background

Estimation of disability by cause: example

Y= 1-exp [-(rate (bg)+rate (A).X_A+ rate (B).X_B +…+rate (G).X_G)]

Disease-specific disability rate (disabling impact) men 40-44:

40-44	cancer	heart/CVA	CNSLD	diabetes	back compl.	arthritis	other
low	0.37	0.66	0.39	0.00	0.46	0.23	0.22

Rate background (40-44):

low 0.14

Men with heart disease/stroke and asthma/COPD:

Low **tot rate: 0.14 + 0.66 + 0.39 = 1.18 tot prob. 1-exp(-1.18) = 0.69**

Low	**prob. disability by background:**	**0.14/1.18 * 0.69 = 0.08**
	prob. disability by heart/stroke:	**0.66/1.18 * 0.69 = 0.38**
	prob. disability asthma/COPD:	**0.39/1.18 * 0.69 = 0.23**
		0.69

Additional slides – 1

- For other disability measures, such as restrictions in Activity of Daily Living (ADL) disease imprints are different

Ranking contributors					
GALI			ADL		
	Male	Female		Male	Female
1	MuscSkel	MuscSkel	1	Alzpar	Alzpar
2	Heart	Heart	2	CVA	MuscSkel
3	CNSLD	AnxDep	3	OtherNeur	CVA
4	AnxDep	Cancer	4	CNSLD	Diab
5	Acci	Diab	5	AnxDep	OtherNeur

Additional slides - 2

- **For restrictions in ADL diseases with largest disabling impact are among the main contributors**

Ranking disabling impacts			Ranking contributors		
	Male	Female		Male	Female
1	Alzpar	Alzpar	1	Alzpar	Alzpar
2	OtherMent	OtherMent	2	CVA	MuscSkel
3	OtherNeur	CVA	3	OtherNeur	CVA
4	CVA	OtherNeur	4	CNSLD	Diab
5	PVD	PVD	5	AnxDep	OtherNeur