

# Mémovie

**A prospective evaluation of  
Mild Cognitive Impairment  
and associated subclinical  
health problems**

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- **With longer life expectancy, dementia becomes a major public health question.**
- **Alzheimer's disease (AD) is the most common form of dementia: 2/3 of cases** (Ramaroson *et al.*, 2003, *Rev Neurol*).
- **In subjects aged over 65, crude prevalence rates for dementia vary in E.U. from 5.9% to 9.4%** (Berr *et al.*, 2005, *Eur Neuropsychopharmacol*).
- **Lack of data in Luxembourg**
- **Lack of recent epidemiological data in Europe:**
  - Eurodem Prevalence Research Group (1991)
  - A comparative analysis of dementia expert group of OECD (2004)

# Dementia in Europe: Extrapolation for Luxembourg

Age	Population in Luxembourg*	Eurodem prevalence (Europe) %		Extrapolation of the number of demented people in Luxembourg		
		M	F	M	F	Total
65 - 69	19,294	2.2	1.1	198	112	310
70 - 74	16,708	4.6	3.9	352	350	702
75 - 79	15,135	5.0	6.7	326	578	904
80 - 84	9,944	12.1	13.5	414	881	1,295
85 - 89	4,700	18.5	22.8	234	781	1,015
90 - 94	1,655	32.1	32.3	106	427	533
≥ 95	257	31.6	36.0	3	90	92
<b>Total</b>	<b>67,693</b>			<b>1,633</b>	<b>3,219</b>	<b>4,852</b>

# Mild Cognitive Impairment (MCI)

- **Transitional state between the cognitive changes of normal ageing and the very earliest clinical symptoms of AD**
- **A clinically useful entity**
- **Considerable attention in the literature over the past 10 years: progression 10-15% per year** (Small *et al.*, 1999a, *Neurology* ; Petersen *et al.*, 1999, *Arch Neurol*)
- **Difficulties to adopt uniform criteria for MCI**
  - **Heterogeneous state**
  - **Lack of consensus → defining a very confused disease entity**

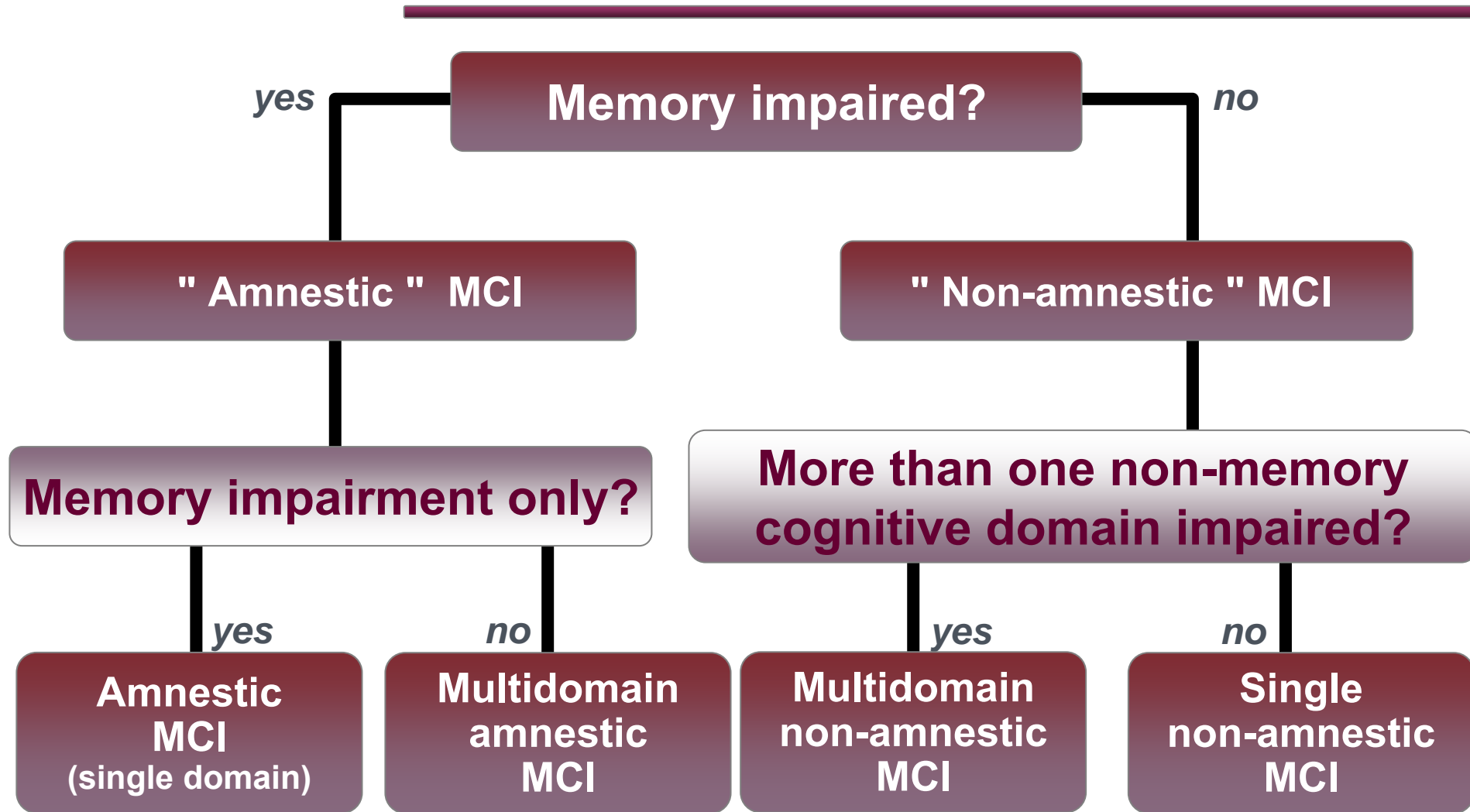
**Cognitive complaint**

**Not normal for age**  
**Not demented**  
**Cognitive decline**  
**Essentially normal functional activities**

**MCI**

**(Petersen, 2004)**

# Subtypes of MCI & decision process



# Objectives of the MemoVie study

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- **Prevalence of persons suffering from MCI and from Alzheimer's type dementia in Luxembourg**  
→ **Comprehensive view of the elderly population in the country**
- **Prospective evaluation of life conditions and risk factors associated with occurrence and evolution of MCI to AD**

# Investigated parameters

## “Environmental” features

Demographic parameters,  
education and socio-cultural  
information, habitat network,  
social behavior, leisure and  
physical activities, etc.

## Exploration of autonomy

Mobility,  
walking and balance  
limits of stability  
history of falls  
and accidents

## Health status and medical history

Risk Factors,  
cardiovascular events,  
metabolic dysfunction,  
long-term medications  
major comorbidities

## Family History

## Multilingualism

Language skills  
and  
multilingual abilities

## Biologic analyses

### Standard biological measurements

Total cholesterol, LDL, HDL,  
homocysteine,  
B6, B9, B12 vitamins  
and TSH

### APOE polymorphism

Fatty acid profiles of lipids  
in red blood cells

Inflammatory markers  
in circulating  
monocytes

# Study design

→ a recently started population-based cohort study with nested case-control designs

$t_{=0}$

Start:  
Composition  
of a random sample

**Prospective cohort study**  
yearly follow-up

$t_{=1}, t_{=2}, t_{= \infty}$ ?

No cognitive disorders

No cognitive disorders

*Prevalence*

MCI

MCI

MCI *Incidence, Conversion, Progression rates*

AT-dementia

AT-dementia

Other dementia

Other dementia

Case-control  
study

Nested case-control studies

- **After the validation process:** Acceptance of the Ethical Committee & Authorization from the national commission on the data protection
- **1377 women & men living in Luxembourg:**
  - From the IGSS register (including institutionalised people)
  - Stratified random sample with proportional allocation
    - Allocation performed within strata defined by age group and gender
- **Representative of the global population  $\geq 65$  y.**
- **Exclusion criteria:  $\emptyset$**



**Postal mailings**

**Phone calls**

**Invitation to participate - Explanation of the study**

**Appointments (“neutral” place or home )**

**Neuropsychological testing (informed consent) + Standardised interview of a close relative of the participant + Interview regarding “environmental features” and medical anamnesis (+ physiological and anthropological parameter measurements)**



**No suspicion of cognitive impairment**

**Suspicion of cognitive impairment**

**Selected control group**

**Clinical confirmation: Standardised neurogeriatric exam + Classification committee external experts**

**Monitoring of health parameters (vision, hearing, smelling) + Collection of blood samples**

**No suspicion of cognitive impairment**

**Probable MCI**

**Probable AT-dementia**

**Probable other dementia**

**Follow up**

# Neuropsychological investigation

## Aims Tools

**Dementia screening tests**

- . **MMSE**
- . **CERAD NP**
- . **Clock drawing test**

**Additional cognitive tests:  
to assess MCI**

- . **Episodic verbal memory test (RL-RI 16)**
- . **Frontal assessment battery**
- . **Trail making test (TMT A-B)**
- . **Selective attention test (D2)**

**Psychological evaluation:  
to measure states interfering  
with cognitive performance**

- . **Geriatric depression Scale (GDS)**
- . **Beck anxiety inventory (BAI)**

**Evaluation of cognitive complains  
and decline**

- . **Auto-evaluation (QPC, CDS)**
- . **Hetero-evaluation (IQ-code)**

**Evaluation of the repercussions  
of cognitive deficits on daily activities**

- . **Instrumental activities of daily living scale (IADL)**

# A feasibility study on a “population test”

- **Choose and implement the main necessary tools**
- **Develop procedures for the anonymity of participants**
- **Test and optimise the circuit offered to participants as well as the coordination tasks between the different actors**
- **Identify the reasons for refusal**
- **Approach the rate of refusal to participate**
- **Finalise the experimental protocols of:**
  - **sampling the target population to be transmitted to the IGSS**
  - **assessing the multilingualism in Luxembourg**
  - **preparing blood samples (*Neurobiology Laboratory*)**
- **Promote the creation of the multidisciplinary research group requested for achieving the project**

# Current state of the project

- **Inclusion of 173 participants**
- **450 interviews and exams performed**

<b>Age</b>	<b>total</b>	<b>M</b>	<b>F</b>
<b>65-69</b>	<b>52</b>	<b>25</b>	<b>27</b>
<b>70-74</b>	<b>50</b>	<b>24</b>	<b>26</b>
<b>75-79</b>	<b>43</b>	<b>17</b>	<b>26</b>
<b>80-84</b>	<b>21</b>	<b>13</b>	<b>8</b>
<b>≥ 85</b>	<b>7</b>	<b>3</b>	<b>4</b>
<b>Total</b>	<b>173</b>	<b>82</b>	<b>91</b>

- **Pr. J.F. Dartigues (ISPED, INSERM U593, Bordeaux, F):  
epidemiology of ageing**
- **Dr T. Pillot (Lipidomix, INPL, Nancy-Université, F):  
molecular and cellular mechanisms of neuronal  
degeneration**
- **Pr. E. Bialystok (York University, Toronto, Canada):  
bilingualism and cognitive processes**

# A multidisciplinary project, with several contributors

**University of Luxembourg  
Neurobiology laboratory  
Life Sciences Unit,  
(Pr. P HEUSCHLING)**

**Hospital Center of Luxembourg, CHL**

- . Clinical investigator, Neurology service (Dr N DIEDERICH)
- . Biochemistry laboratory (G GILSON)

**CRP-Santé  
CES  
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Biochemistry & Molecular Biology laboratories  
(Pr. JL OLIVIER)**

**General Inspectorate of Social Security (IGSS)**

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(Biotechnology and Health & Extension Medical  
Aspects of Ageing)

