

# Incidence and survival of patients with chronic lymphocytic leukaemia in Lower Saxony: A population-based study



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- Chronic lymphocytic leukaemia (CLL) is the most frequently diagnosed leukaemia
- Variable course, often indolent
  - Premalignant phase
  - Numerous variables including white blood cell count and specific biological affect prognosis.
- Emerging new drugs in the last decades to treat CLL have led to improved prognosis.

**We aimed to describe the incidence and the 5- and 10- years relative survival for patients with chronic lymphocytic leukaemia (CLL) in Lower Saxony and in the United States.**

## ➤ Data sources (ICD-10 C91.1, M9823/3, M9670/3)

- Lower Saxony Cancer Registry (LS)
- Surveillance, Epidemiology, and End Results (SEER) 18 database (28% of the US population)

## ➤ I: Incidence

- Incidence (death certificate only (DCO) cases; included)
- Age-standardized (Europe) rates by sex, age and overall
- Trends assessed using the joinpoint regression analysis (JP)

## ➤ II. Survival

- Period approach: relative survival (RS)
- Age-standardized 5- and 10-year RS by sex, age group and overall
- Exclusions: DCO cases, ages < 15 years
- Passive mortality follow-up. Expected survival (Ederer II Method)

# Results I: Incidence cases and rates

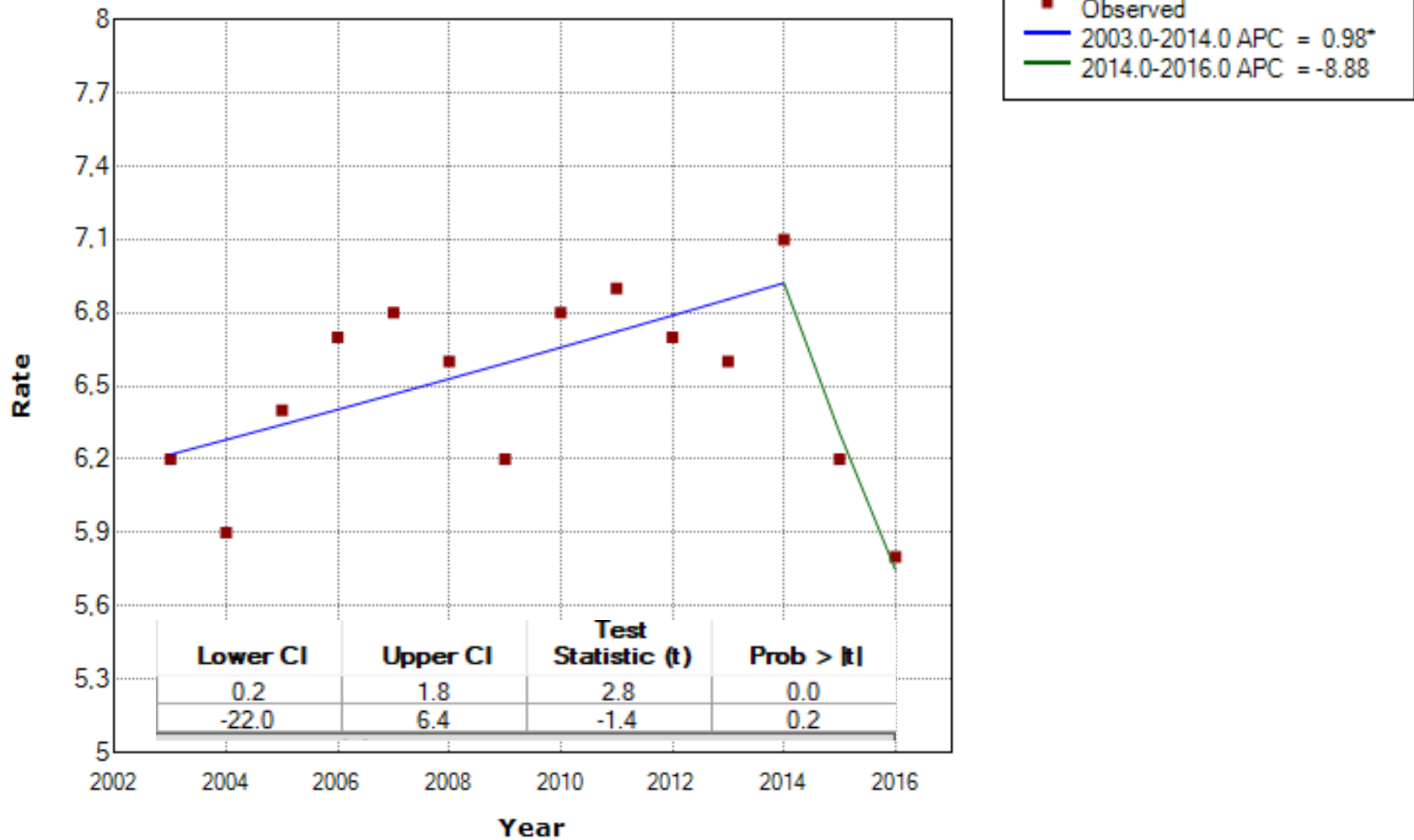
Table 1: CLL case numbers and age-standardized rates per 100.000 person-years in LS and in the US, period 2003-2016

Region	Males		Females		Overall	
	N (%)	Rate	N (%)	Rate	N (%)	Rate
Lower Saxony	5,206 ( <b>58.4</b> )	6.5	3,713 ( <b>41.6</b> )	3.5	8,922 ( <b>100</b> )	<b>4.9</b>
US: SEER 18 regions	43,490 ( <b>59.9</b> )	7.4	29,064 ( <b>40.1</b> )	3.9	72,554 ( <b>100</b> )	<b>5.4</b>

- Incidence data - median ages in years; men 71, women 75 (LS); men 69, women 72 (US).

# Results I JP: Incidence in males (Lower Saxony)

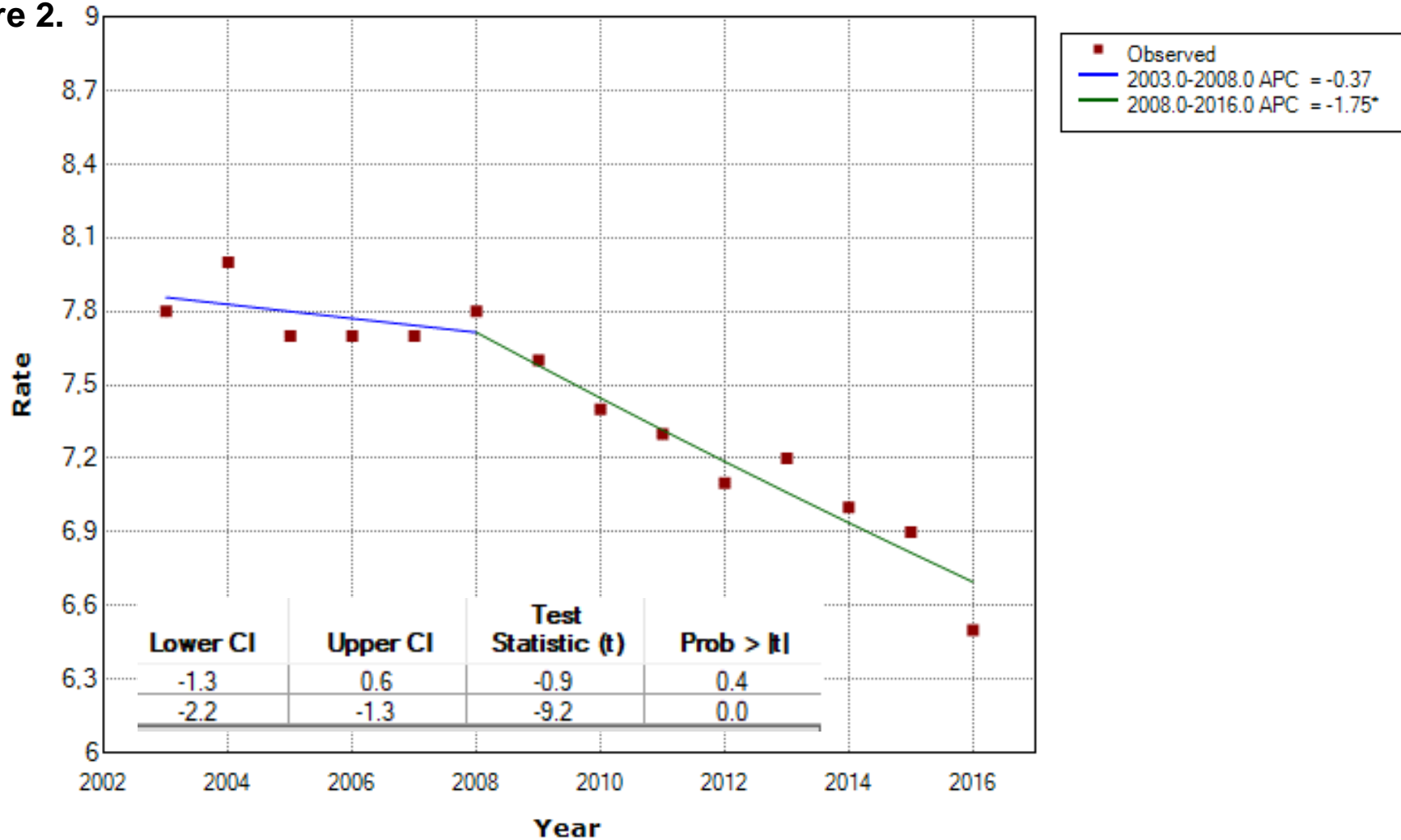
Figure 1.



\* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.  
Final Selected Model: 1 Joinpoint.

# Results I JP: Incidence in males (United States)

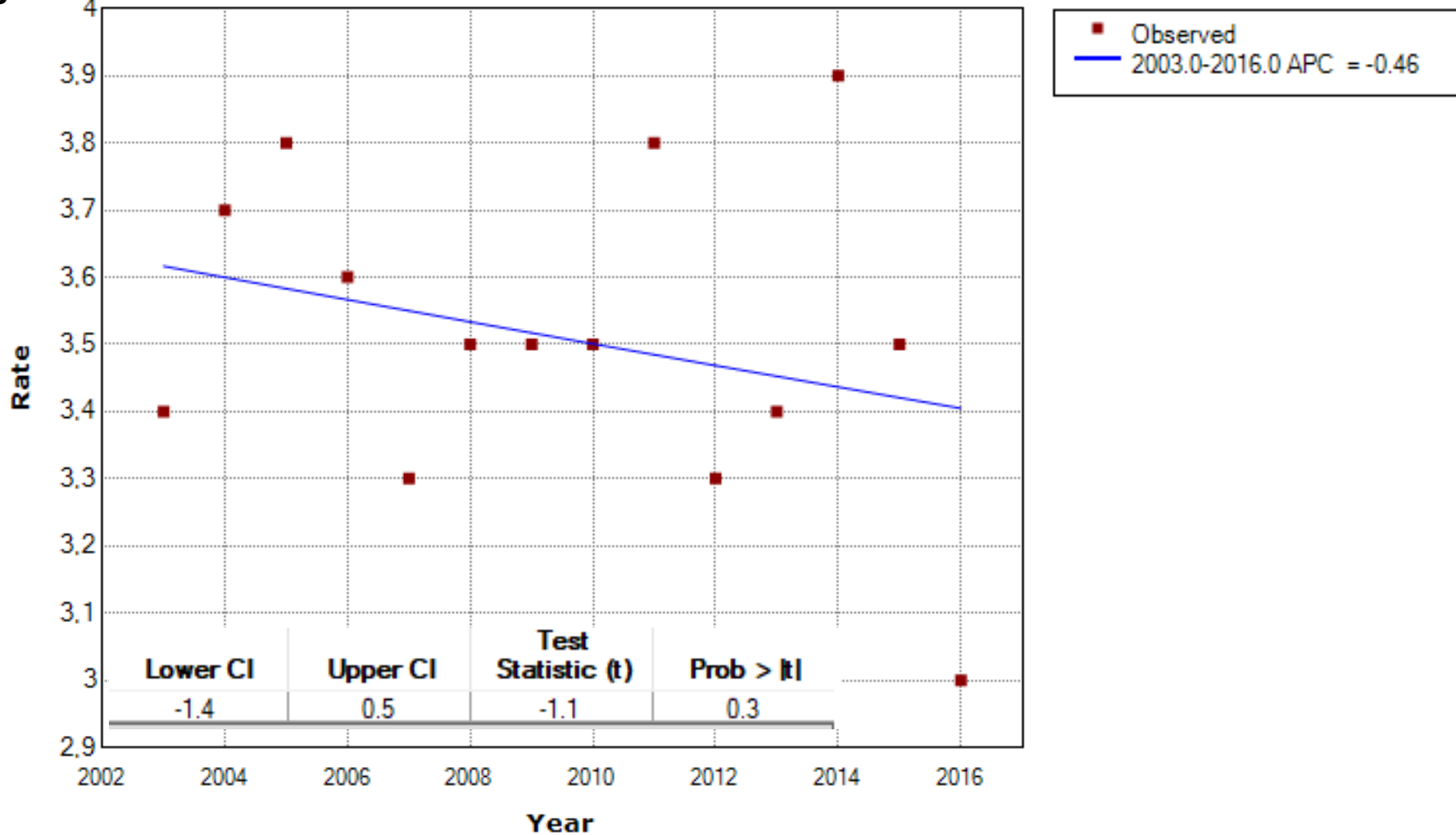
Figure 2.



\* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.  
Final Selected Model: 1 Joinpoint.

# Results I JP: Incidence in females (Lower Saxony)

Figure 3.

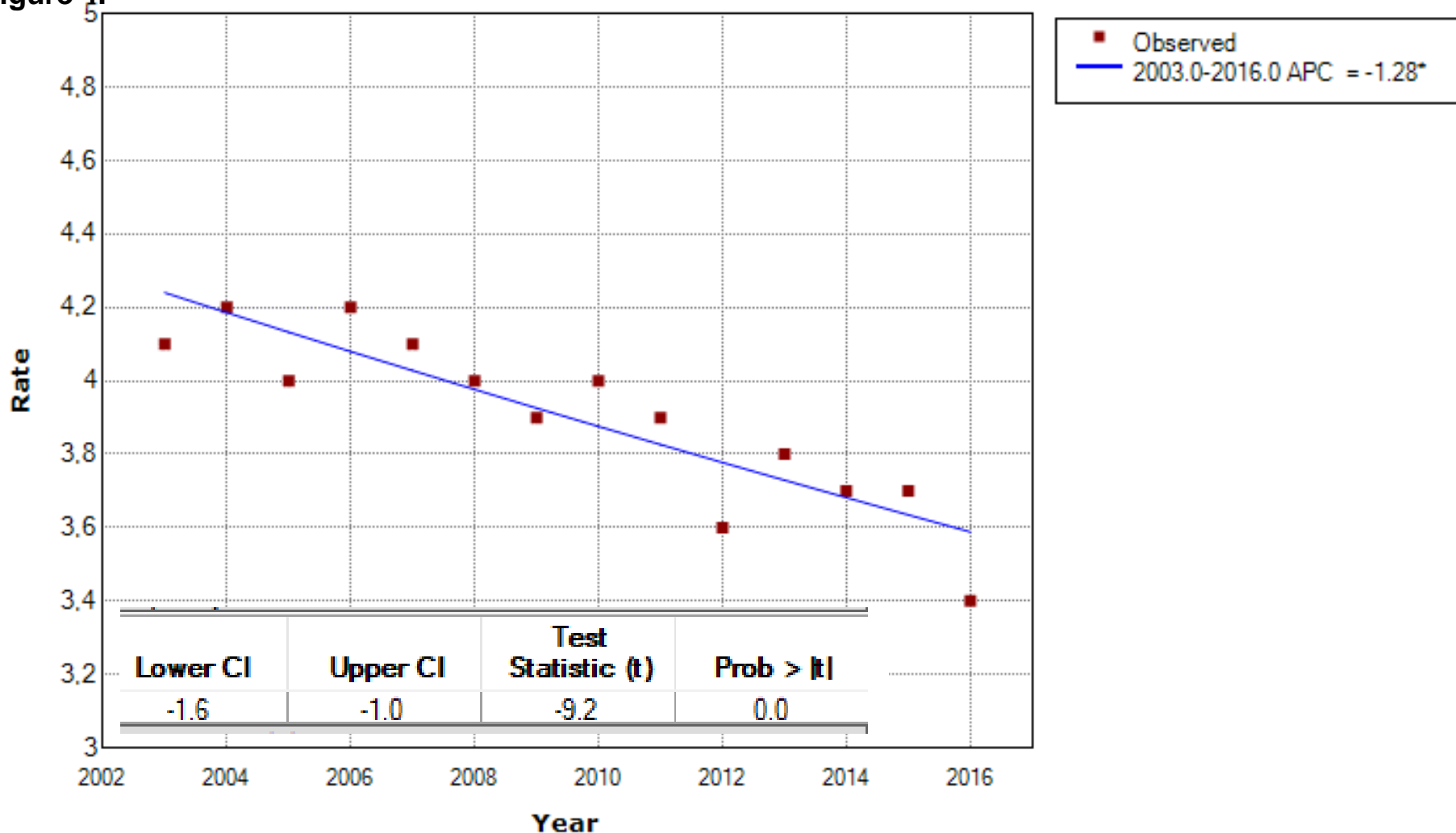


\* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.  
 Final Selected Model: 0 Joinpoints.



# Results I JP: Incidence in females (United States)

Figure 4.

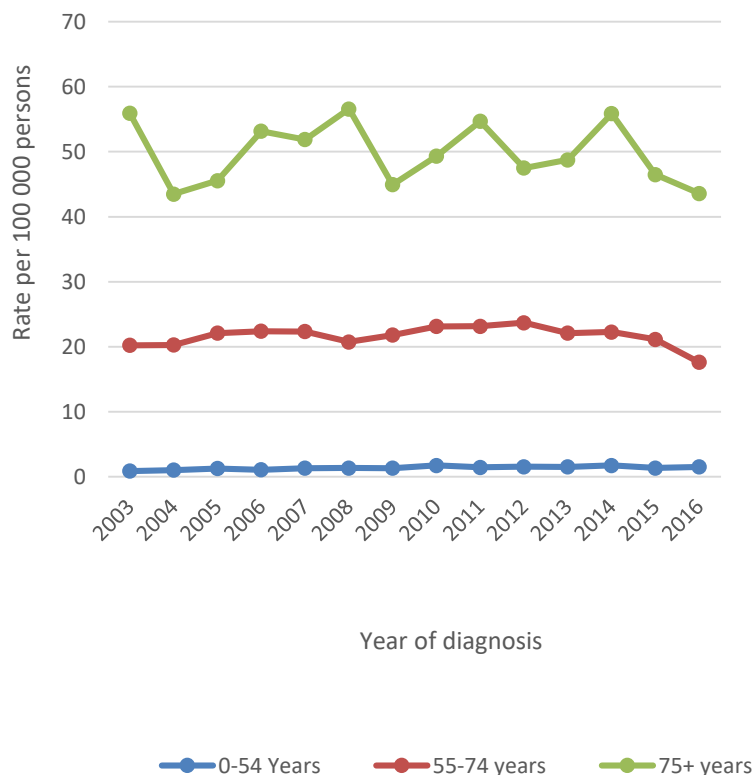


\* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.  
Final Selected Model: 0 Joinpoints.

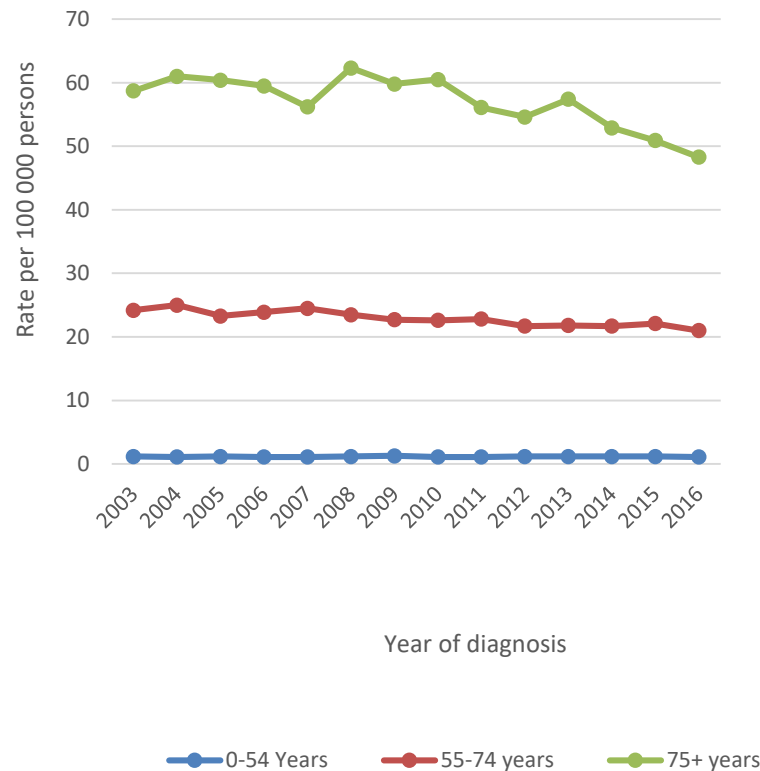
# Results I: Incidence trends by age group in males

**Figure 5.**

Age group specific incidence trends for CLL in males,  
**Lower Saxony, period 2003-2016**



Age group specific incidence trends for CLL in males,  
**the US, period 2003-2016**

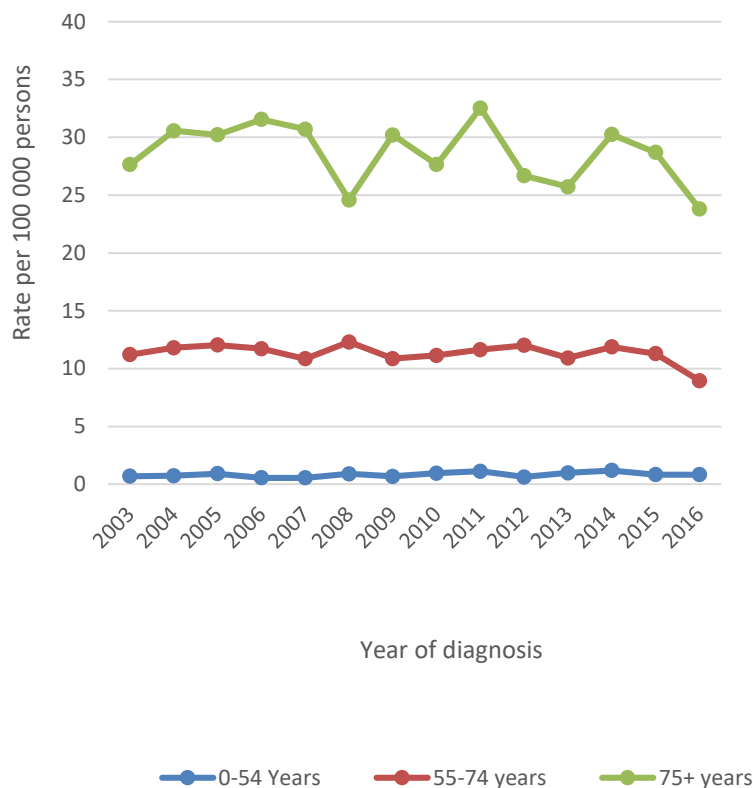


**Strong age gradient in incidence for the age groups observed; 0-54, 55-74, 75 + years (LS: 1.1, 16.4, 36.4, US: 0.9, 17,2, 40.8) for both gender combined**

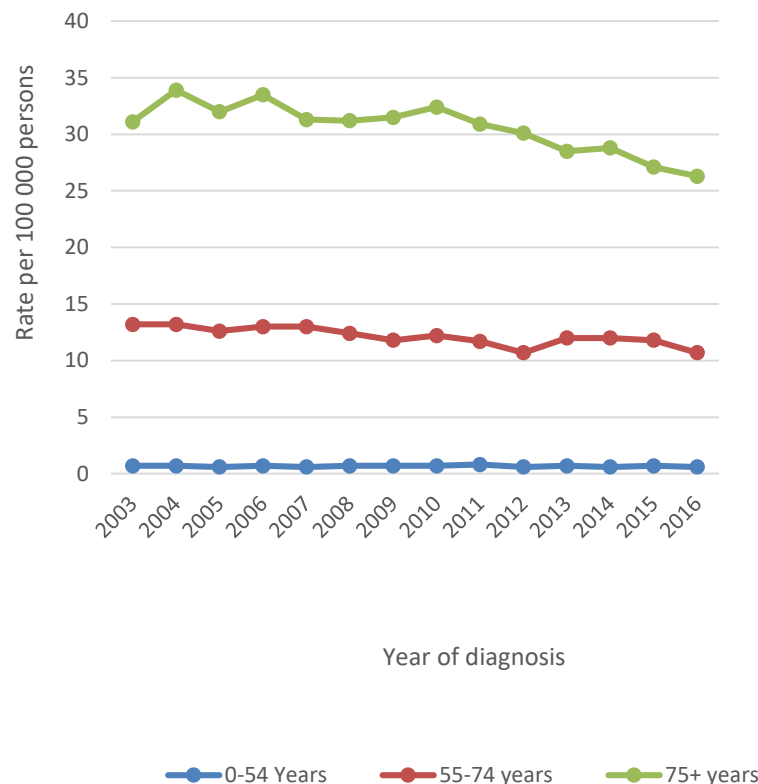
# Results I: Incidence trends by age group in females

**Figure 6.**

Age group specific incidence trends for CLL in females,  
**Lower Saxony, period 2003-2016**



Age group specific incidence trends for CLL in females,  
**the US, period 2003-2016**



**Strong age gradient in incidence for the age groups observed; 0-54, 55-74, 75 + years (LS: 1.1, 16.4, 36.4, US: 0.9, 17.2, 40.8) for both gender combined**

- Total case numbers for CLL diagnosed in 2005 - 2015
  - LS: 6,317
  
  - US: 56,572
  
- DCO rates for 2015
  - LS: 10.2 %
  - US: 1.1%
  
- Median age at diagnosis
  - LS: males (70 years), females (73 years)
  
  - US: males (69 years), females (72 years)

Table 2: Five- and 10- years relative survival for patients with chronic lymphocytic leukaemia, period 2015 in Lower Saxony and the United States

Variable	LS 5-year RS (SE)	US 5-year RS (SE)	Diff-	LS 10-year RS (SE)	US 10-year RS (SE)	Diff-
<b>Overall<sup>a</sup></b>	81.1 (2.1)	84.9 (0.6)	3.8	67.9 (3.2)	69.4 (0.9)	1.5
<b>Males<sup>a</sup></b>	80.1 (2.6)	83.6 (0.8)	3.5	64.8 (4.3)	66.0 (1.2)	1.2
<b>Females<sup>a</sup></b>	82.2 (3.1)	86.5 (0.9)	4.3	70.3 (4.7)	74.0 (1.3)	3.7
<b>Age group in years</b>						
Age 15-54	88.6 (4.1)	93.0 (1.0)	4.4	74.1 (6.2)*	82.7 (1.6)	8.6
Age 55-74	85.6 (2.6)	88.9 (0.6)	3.3	72.0 (3.7)	74.2 (1.1)	2.2
<b>Age 75+</b>	<b>66.4 (4.7)</b>	<b>72.4 (1.5)</b>	<b>6.0</b>	54.4 (7.9)*	52.3 (2.1)	-2.1

RS= relative survival, SE=Standard error, Diff- = Differences in 5 –year RS and in 10-year RS between the US and LS <sup>a</sup>Age-standardized using five age group (15-44, 45-54, 55-64, 65-74, 75+ years).

\*Because of high standard error values, interpretation of RS should be with caution.

Table 3: Trends in 5-year relative survival (RS) for patients with chronic lymphocytic leukaemia, periods 2010 and 2015 in Lower Saxony and the United States

Variable	LS 2010 RS (SE)	2015 RS (SE)	Diff	US 2010 RS (SE)	2015 RS (SE)	Diff
<b>Overall<sup>a</sup></b>	<b>78.9 (2.2)</b>	<b>81.1 (2.1)</b>	<b>2.2</b>	<b>80.6 (0.6)</b>	<b>84.9 (0.6)</b>	<b>4.3</b>
<b>Males<sup>a</sup></b>	<b>75.4 (2.9)</b>	<b>80.1 (2.6)</b>	<b>4.7</b>	<b>78.8 (0.7)</b>	<b>83.6 (0.8)</b>	<b>4.8</b>
Age 15-54	83.5 (6.5)	88.1 (5.4)	4.6	90.8 (1.4)	93.5 (1.2)	2.7
Age 55-74	85.8 (3.5)	86.6 (3.3)	0.8	81.9 (1.0)	87.9 (0.9)	6.0
<b>Age 75+</b>	<b>48.4 (7.0)*</b>	<b>60.9 (6.5)*</b>	<b>12.5</b>	66.2 (2.1)	69.6 (2.1)	3.4
<b>Females<sup>a</sup></b>	<b>83.7 (3.1)</b>	<b>82.2 (3.1)</b>	<b>-1.6</b>	<b>83.6 (0.9)</b>	<b>86.5 (0.8)</b>	<b>2.9</b>
Age 15-54	---	89.3 (6.4)	---	93.5 (1.6)	91.6 (1.8)	-1.9
Age 55-74	81.1 (4.4)	83.7(4.2)	2.6	89.3 (1.1)	90.5 (1.0)	1.2
Age 75+	76.3 (7.5)	73.2 (6.8)	-3.1	<b>66.6 (2.1)</b>	<b>75.8 (2.1)</b>	<b>9.2</b>

RS= relative survival, SE=Standard error, Diff= Difference in 5-year RS for the two periods i.e.

2015 minus 2010, <sup>a</sup>Age-standardized using five age group (15-44, 45-54, 55-64, 65-74, 75+ years).

-- Because of small case number, reliable estimates could not be computed.

Table 4: Trends in 5-year relative survival for patients with chronic lymphocytic leukaemia, periods 2008- 2010, 2011-2013 and 2014- 2016 in Lower Saxony

Variable	LS 2008-2010 RS (SE)	LS 2011-2013 RS (SE)	LS 2014-2016 RS (SE)	Diff-
<b>Overall<sup>a</sup></b>	79.9 (1.3)	81.3 (1.2)	84.8 (1.1)	4.9
<b>Males<sup>a</sup></b>	77.7 (1.8)	79.3 (1.7)	84.9 (1.6)	7.2
<b>Age groups in years</b>				
<b>Age 15-54</b>	90.5 (3.3)	93.1 (2.8)	95.6 (2.3)	5.1
<b>Age 55-74</b>	82.6 (2.2)	84.0 (2.0)	87.5 (1.9)	4.9
<b>Age 75+</b>	<b>58.8 (4.5)</b>	<b>59.6 (4.4)</b>	<b>71.6 (4.1)</b>	<b>12.8</b>
<b>Females<sup>a</sup></b>	82.6 (1.9)	84.2 (1.7)	84.4 (1.7)	1.8
<b>Age groups in years</b>				
<b>Age 15-54</b>	97.4 (2.8)	96.4 (2.7)	95.7 (2.7)	-1.7
<b>Age 55-74</b>	84.0 (2.5)	89.7 (2.2)	87.5 (2.3)	3.5
<b>Age 75+</b>	69.5 (4.4)	65.0 (4.1)	70.8 (3.9)	1.3

RS= relative survival, SE=Standard error, Diff-= Difference in 5-year RS for the first and last periods i.e. 2014-2016 minus 2008-2010, <sup>a</sup>Age-standardized using five age groups (15-44, 45-54, 55-64, 65-74, 75+ years).

# Strengths and limitations

## ➤ Strengths

- Large sample size
- Precision for a relatively rare cancer type.
- Period approach for up-to-date estimates

## ➤ Limitations

- Higher DCO proportion in LS
- No valid data on treatment in the LS



## Summary/Conclusions

- Observed results are consistent with reported data.
- Overall, 5-year RS was good in LS and in the US, and the prognosis continues to improve.
- Newer treatments for CLL more tolerable and potentially expanding ability of older patients to receive treatment.
- Further research is warranted to elucidate ways to narrow the survival gaps for older patients with CLL and to assess the lower survival in LS compared to the US.

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**IHRE**

**AUFMERKSAMKEIT**