Recent trends in heroin use and heroin injection in Europe: results from the Treatment Demand Indicator (TDI)

Ana Sarasa-Renedo and Gregorio Barrio
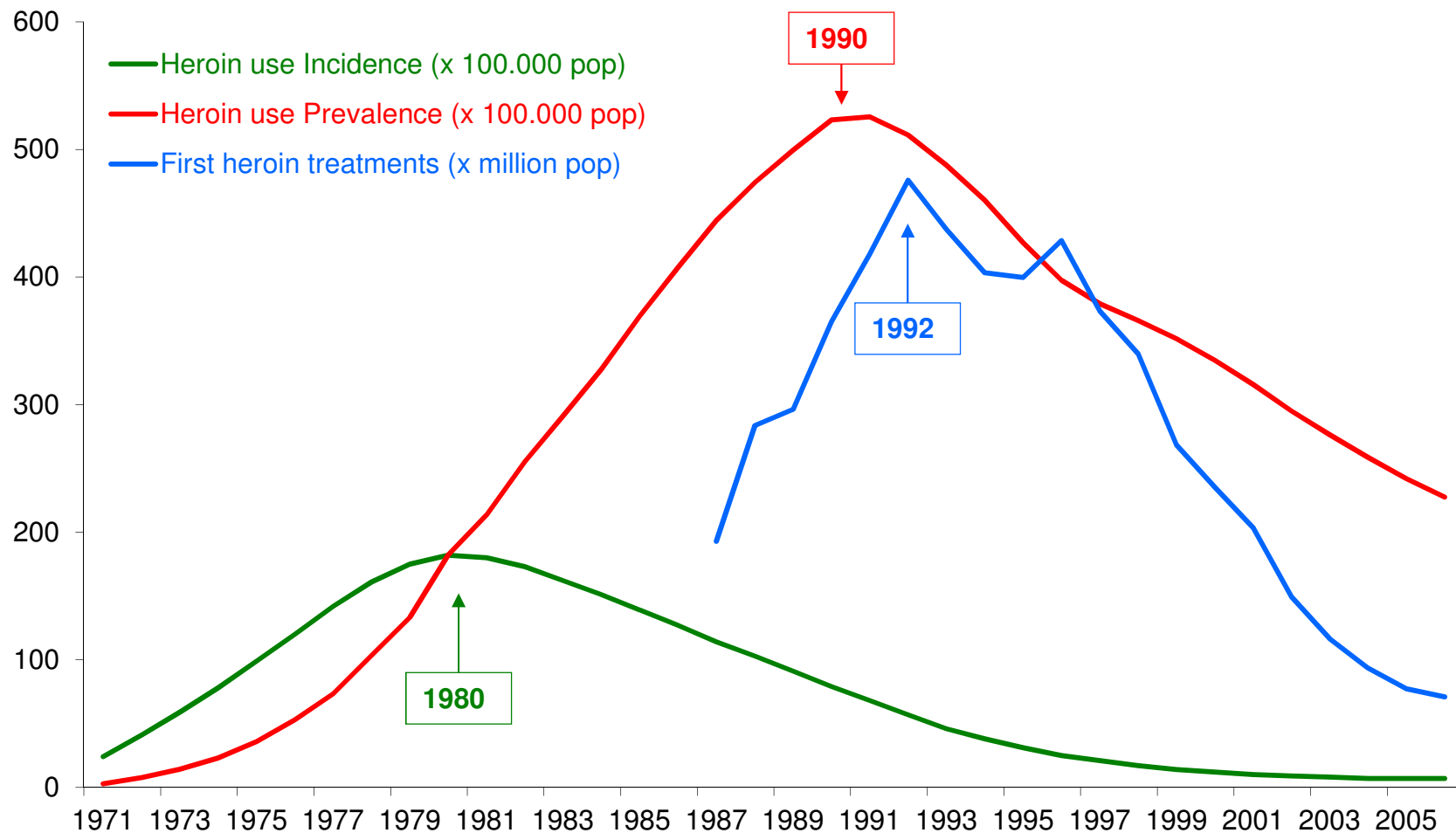**Carlos III Health Institute, Madrid**

Lisboa, September 21st

The Treatment Demand Indicator (TDI)
12th Annual Expert Meeting 2012
European Monitoring Centre for Drugs And Drug Addiction

First heroin treatment as indicator of trend in problem heroin use

• First heroin treatment has been previously used to estimate incidence of heroin use, taking into account the lag between first use and first treatment (Hickman *et al*, Am J Epidemiol 2001; Nordt & Stohler, Lancet 2006; Sánchez-Niubó *et al*, Addiction 2009)

• It has also been used, together with other indicators, to estimate trends in prevalence of heroin use (Pompidou Group, Multi-city study 1994). However, empirical evidence is lacking supporting this usage.

Trends in heroin-related indicators in Spain

Legend:
- Heroin use Incidence (x 100.000 pop) — green
- Heroin use Prevalence (x 100.000 pop) — red
- First heroin treatments (x million pop) — blue

Annotations: 1990, 1992, 1980

Objectives

- **The EMCDDA contracted the implementation of new heroin treatment demand analyses with the Spanish consortium IGENUS Foundation-Drug Epidemiology Group of Carlos III Institute on Health (*CT.10.EPI.070.1.0*).**

    - **To identify recent trends and characteristics of heroin treatment admissions in Europe**
    - **To identify trends in heroin use incidence and prevalence using first heroin treatment data**
    - **To identify recent trends of injecting drug use among heroin users in Europe**
    - **To describe the mentioned trends and characteristics by country, Western and Eastern Europe**
    - **To generate sound hypothesis for further research**

Methods

- Data on heroin treatment demand available at EMCDDA for **2000-2009** were analyzed. 12 countries reported in year 2000, 21 countries in 2004, 29 in 2009.

- 2009: available data from 29 countries (European Union *plus* Croatia and Turkey): *Europe-29*

- The **unit of observation was the *country***, because no individual data are reported. Countries report aggregated data using a standard form.

- Additional information was requested from some countries to resolve some doubts and inconsistencies.

Methods

- **Main indicators (aggregated data) reported per country for each calendar-year:**

    - Absolute number of first heroin treatment admissions (cases)
    - Number of reporting centres
    - Number of cases per centre
    - Mean age at treatment admission
    - Mean age at first heroin use
    - Proportion mainly using each administration route (injecting, smoking, sniffing)
    - Proportion who had ever injected drugs in their lifetime (Ever injectors)
    - Proportion who had injected drugs within 30 days before admission (Current injectors)

- **Analysis is based on percentage distribution as well as on estimation of trends using joinpoint regression (Joinpoint v.3.5.2, National Cancer Institute of the United States).**

Methods

**Time trends: Joinpoint regression**

- Use of joined linear segments on a logarithmic scale. Permutation test, linear regression for each segment

- A joinpoint implies there is a statistically significant change in time trend (up to down, down to up, or change in rate of change)

- Slope in each linear segment associated with a fixed annual percent change (APC)

- Recent trends: when there was a joinpoint in last 5 years, average annual percent change (AAPC) was estimated as a geometric weighted average of APCs of both adjacent segments

- If APC (or AAPC) are statistically significant ($p<0.05$), upward trend if APC>0, downward if APC<0. If not significant, we consider a relevant change if APC<-1 or APC>1

Methods

We specially focused on:

- *Differences between countries*
- *Temporal trends (2000-2009)*
  - *Eastern Europe (EE)*
  - *Western Europe (WE)*

When interpreting trends we should bear in mind that the nº of countries reporting to EMCDDA has not been consistent over time.
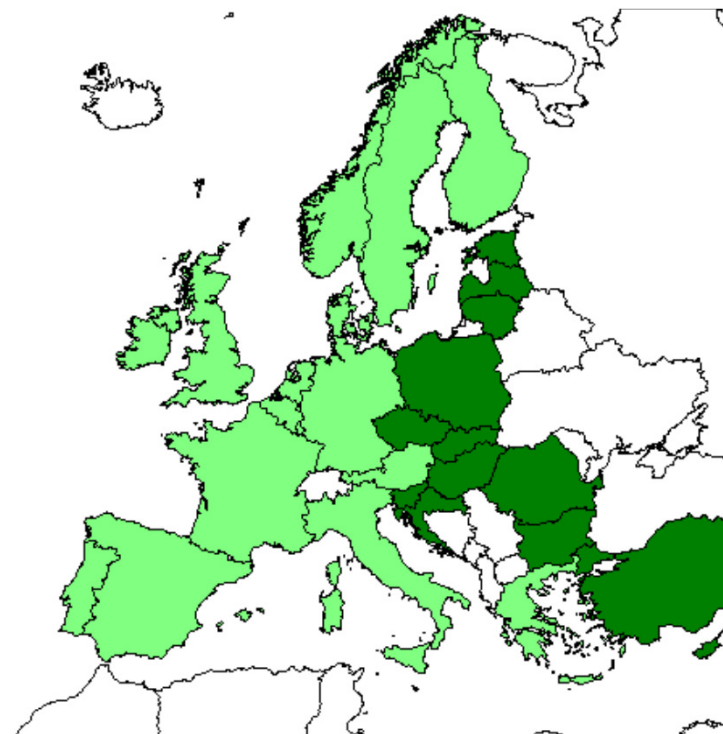
Eastern Europe (13 countries)

Western Europe (16 countries)

Results: Overview
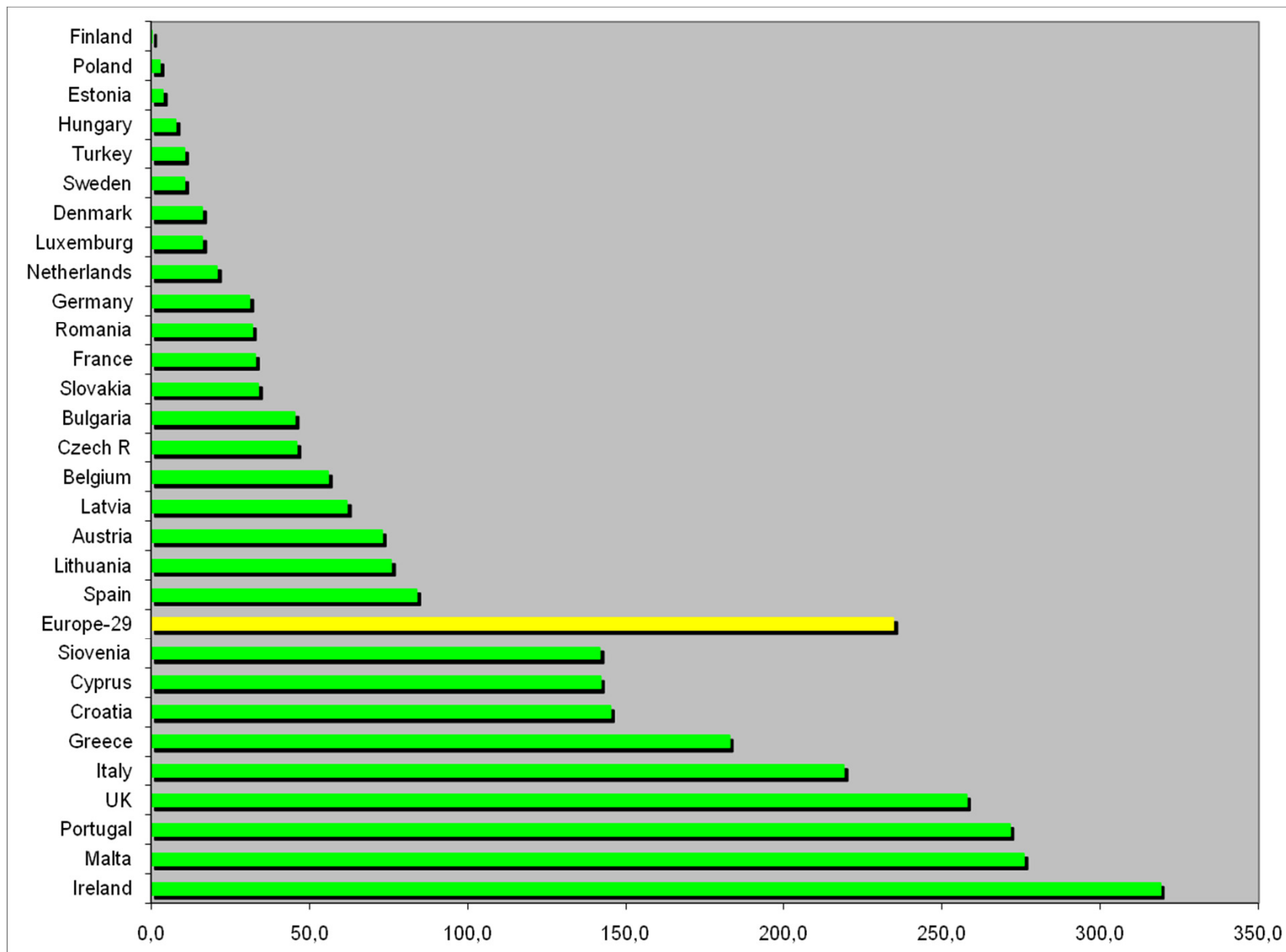
1. Number of admissions to first heroin treatment and number of treatments per center
2. Age at first heroin treatment and Age at first heroin use
3. Main route of heroin administration
4. Current drug injection

1. Number of admissions to first heroin treatment and number of treatments per center

# Volume of heroin treatment admissions reported by European countries

- 48,807 (44,743 in WE) first heroin treatment admissions were reported in Europe-29 in 2009.

- Countries with more reported first admissions were UK (15,858) and Italy (13,137), followed by Spain (3,841)

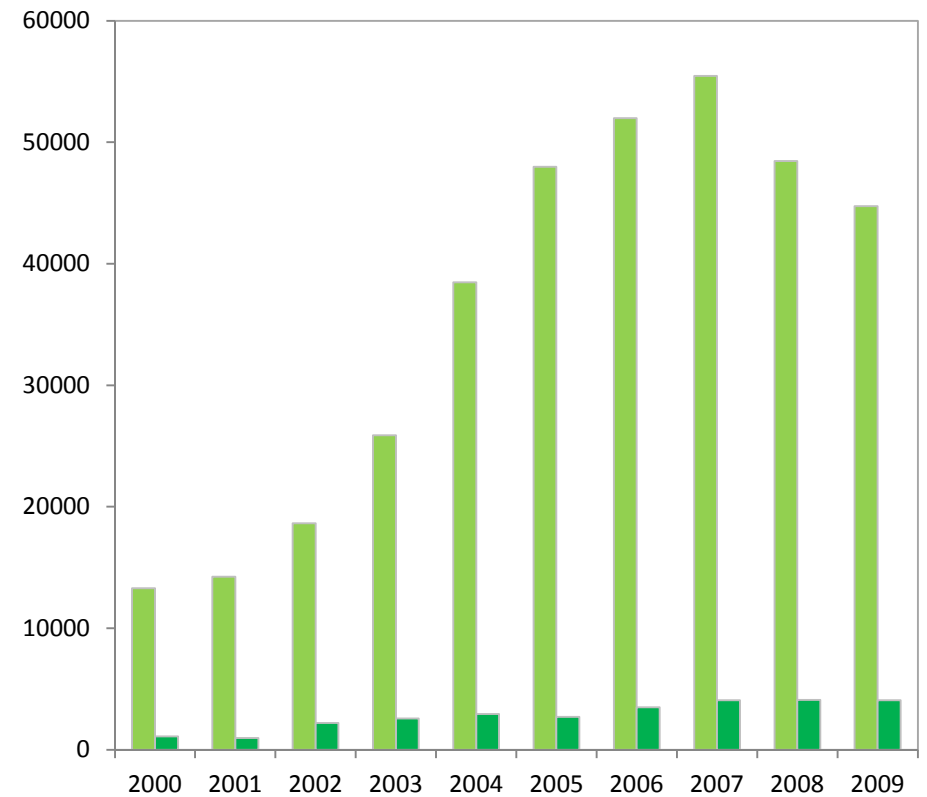# First heroin treatment admissions by country (nº per million population). Europe-29, 2009

Number of heroin treatment admissions reported to EMCDDA. Europe-29 (EU+HR+TR)

All treatments

Legend: Western Europe, Eastern Europe
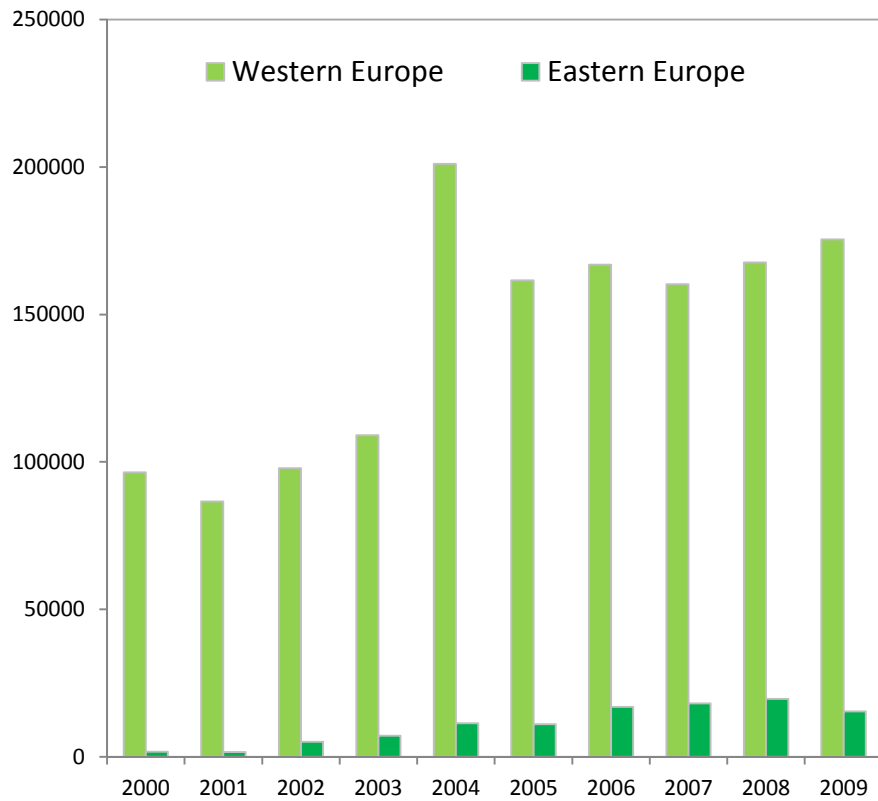
First treatments

Global nº of first heroin treatment admissions (T) (Thousands)

Year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	AAPC of T	AAPC of TC
Europe-29	14.4	15.2	20.9	28.5	41.4	50.7	55.5	59.5	52.5	48.8	0.7	-3.7

AAPC: Average annual percent change for last 5 years with available data; T: Nº of people admitted for first time ever to treatment for heroin abuse/dependence; TC: Nº of T per reporting centre; * Statistically significant at P<0.05

WESTERN EUROPE

Global nº of first heroin treatment admissions (T)
Year

Countries	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	AAPC of T	AAPC of TC
Western Europe	13,297	14,228	18,648	25,889	38,481	47,987	51,984	55,450	48,448	44,743	**0.2**	**-2.6**
Belgium[a]	96					208			272	601	**81.4***	**-1.5**
Denmark	344	251	265	380	185	162	113	141	117	89	**-13.4***	**-13.2***
Germany		2,250	9,991	3,370	3,190	2,966	2,655	4,035	2,437	2,549	**-3.5**	**-16.3***
Spain	8,151	7,461	5,051	4,000	3,826	3,604	3,318	3,675	3,841	3,841	**1.8**	**1.5**
Ireland	890	880	769	758	605	668	874	992	1,140	1,418	**17.2***	**-12.2***
Finland	227	79	26	6	6	3	1	3	2	0	**-28.5***	**-13.8**
France						782	1,901	1,976	1,822	2,113	**14.0**	**3.2**
Greece	916	1,680	1,469	1,567	1,820	1,874	1,981	1,808	1,768	2,055	**4.8***	**-5.2***
Italy					12,949	15,976	16,919	20,031	16,738	13,137	**-3.3**	**0.5**
Luxembourg[a]	17		20	8	3	7				8	**-11.1**	**-17.7**
Malta				172	120	196	229	229	229	114	**2.5**	**-24.4***
Netherlands	1039	1435	945	645	438	321	440	625	453	344	**-13.3***	**-13.2***
Austria[a]							624	621	503	609	**-2.6**	**-8.1**
Portugal						2,368	2,243	2,124	2,021	1,910	**-5.2***	**-5.2***
Sweden	59	192	114	106	115	356	339	106	95	97	**-0.4**	**-9.7**
United Kingdom				14,877	15,224	18,497	20,347	19,084	17,010	15,858	**-3.4**	**-2.5**

[a]: Annual percent change (APC) for last 3-5 years with available data.

EASTERN EUROPE

Global nº of first heroin treatment admissions (T)

|	Year										APPC of T	APPC of TC
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
Countries												
Eastern Europe	1,100	959	2,207	2,566	2,943	2,699	3,496	4,084	4,093	4,064	**13.7**	**-0.7**
Bulgaria				416	600	337	273	337	357	345	-6.8	-14.1*
Czech Republic			675	589	587	581	489	493	447	481	-5.2*	-0.4
Cyprus				69	112	88	77	156	94	113	5.9	-3.5
Estonia									13	5	_	_
Latvia	781	618	232	79	86	189	274	405	393	140	6.4	13.2
Lithuania					326	270	247	224	184	254	-6.7	-12.8*
Hungary[a]								86	88	78	-4.6	0.0
Poland									102	102	_	_
Romania			910	715	369	342	421	750	708	685	15.0	-18.0*
Slovenia	319	341	390	408	406	301	254	248	248	288	-2.7	-4.8*
Slovakia				290	281	253	194	181	228	183	-7.4*	11.9
Croatia[a]							856	773	754	643	-8.3*	-27.9
Turkey					175	332	408	430	452	677	22.3*	10.9

[a]: Annual percent change (APC) for last 3-5 years with available data.

2. Age at first heroin treatment and Age at first heroin use

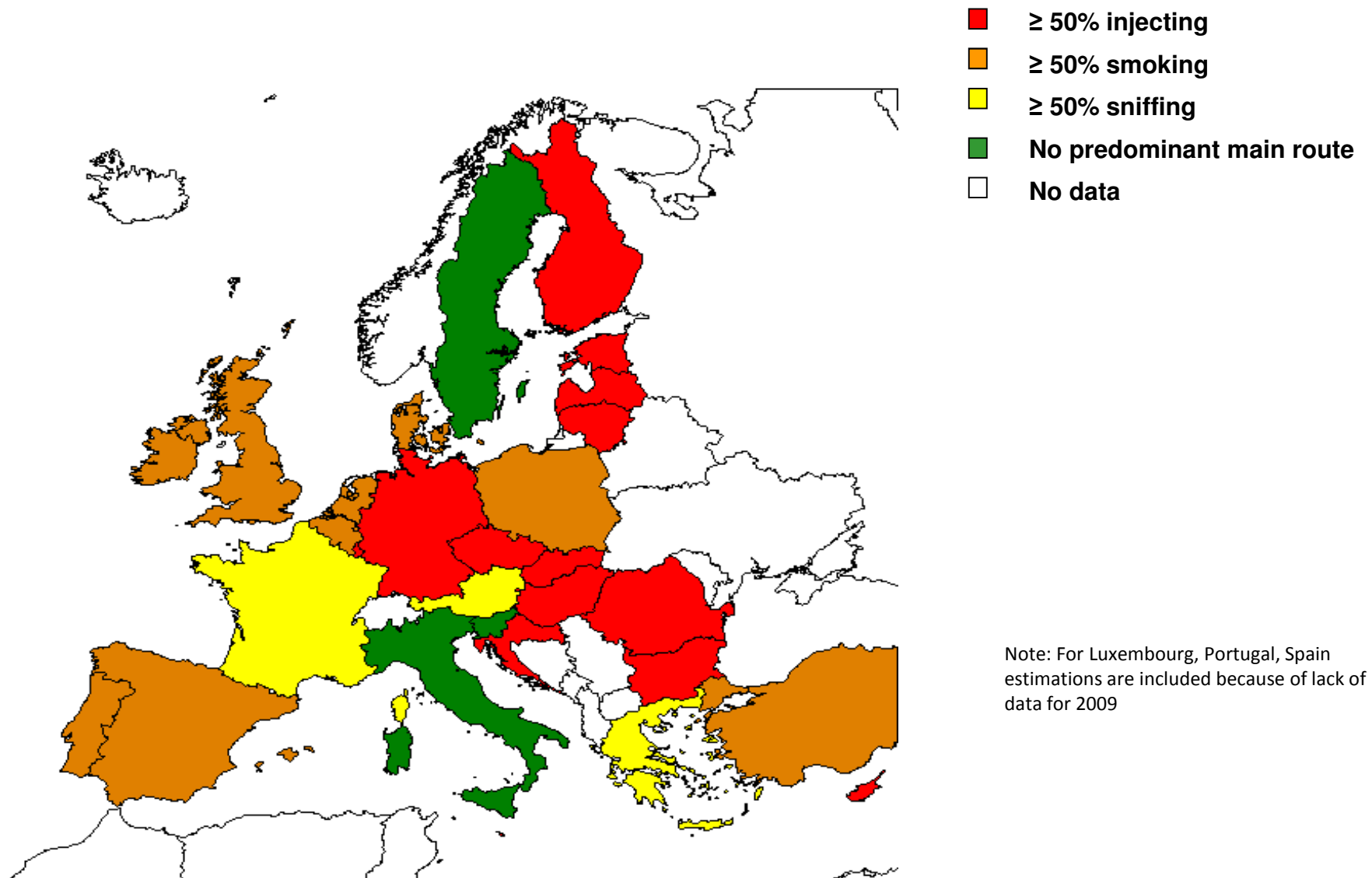# Mean age at first heroin treatment admission, 2009

- ■ Low (< 28 years)
- ■ Medium (28-31 years)
- ■ High (32 or more years)
- □ No data
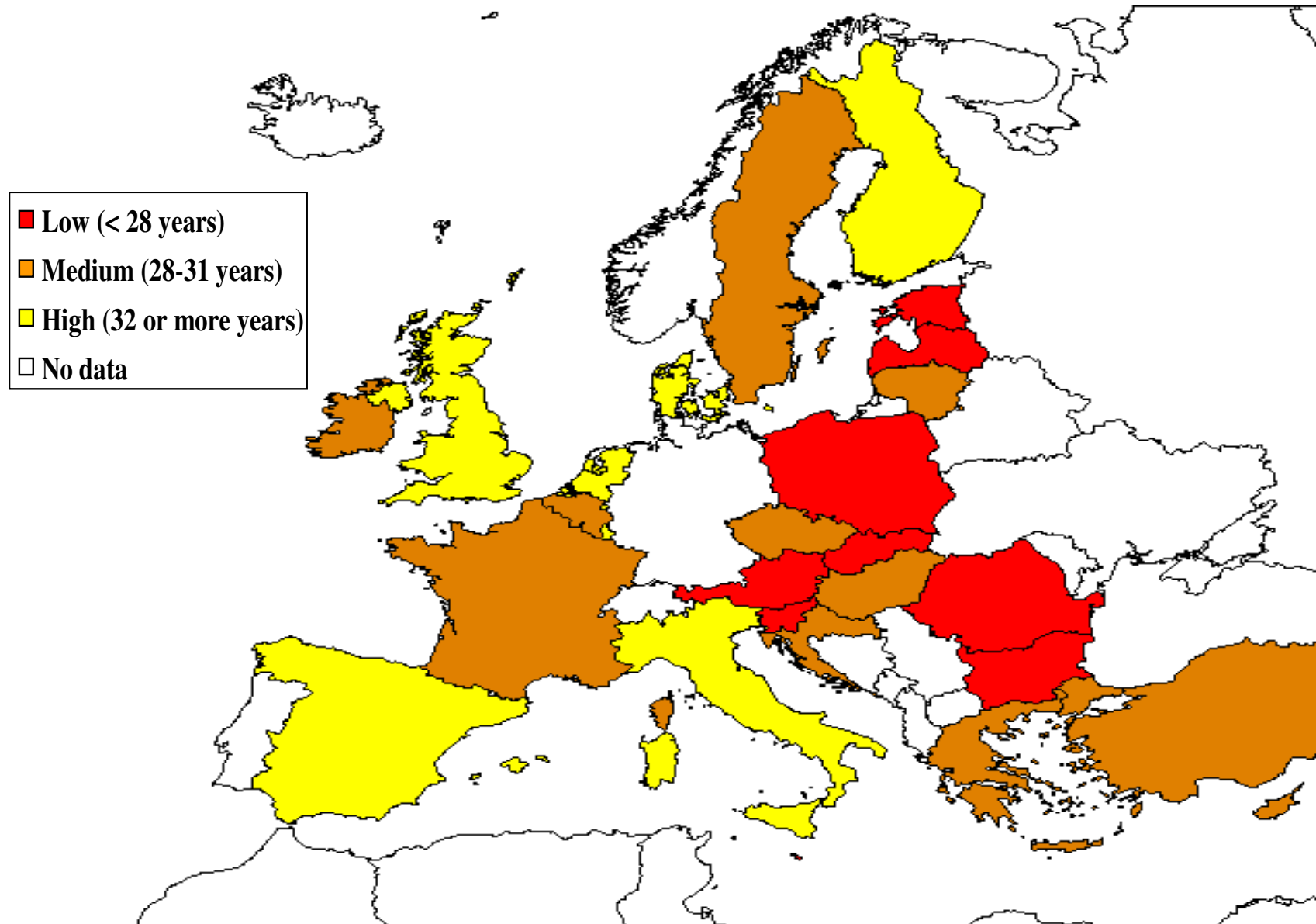
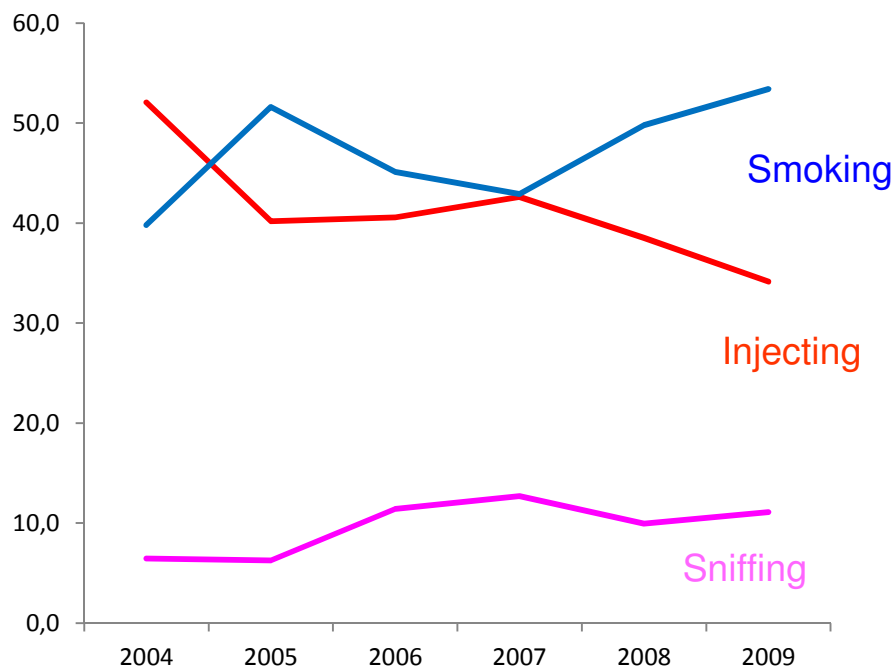**Trends in mean age at first heroin use and mean age at first heroin treatment admission**
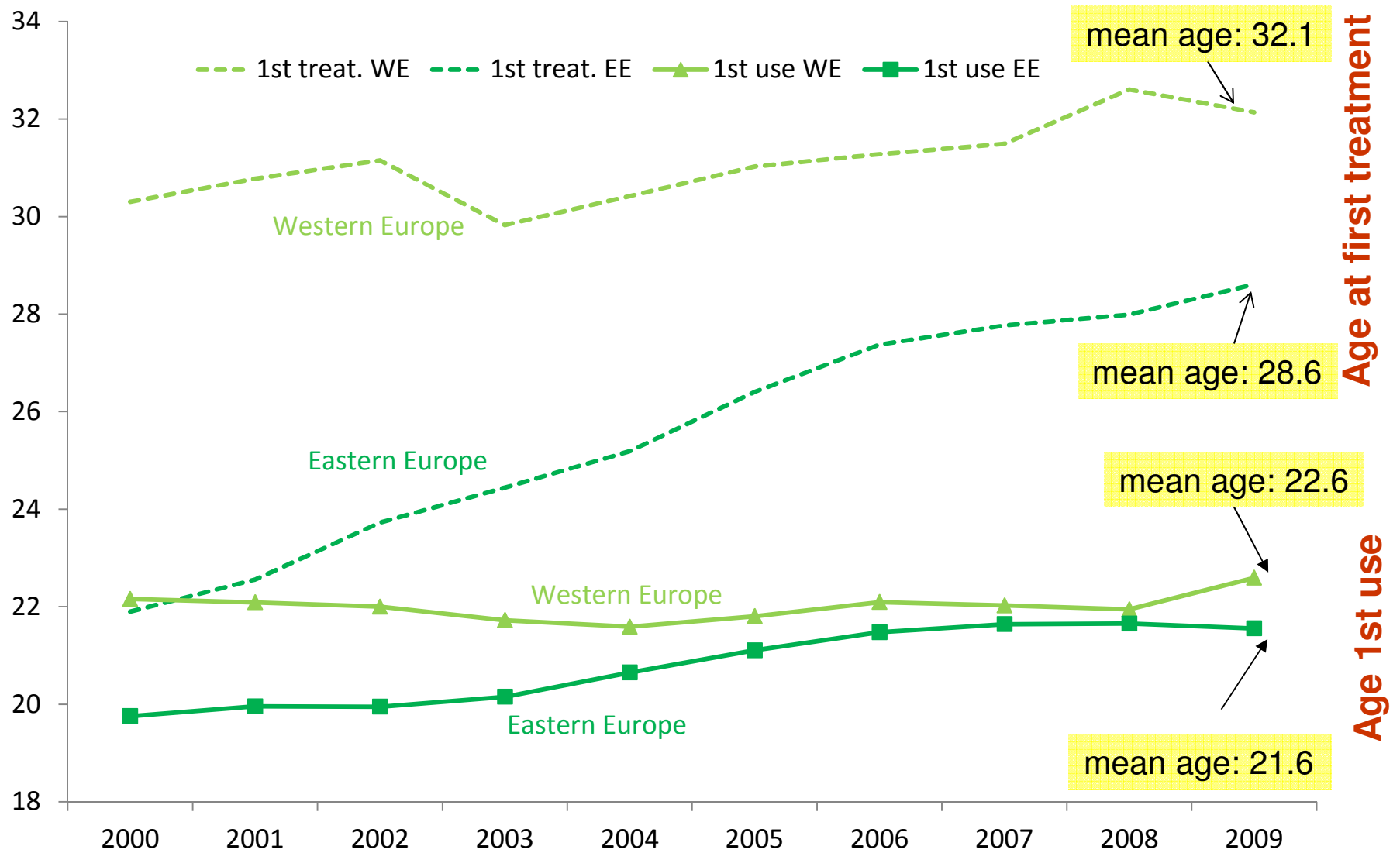
3. Main route of heroin administration

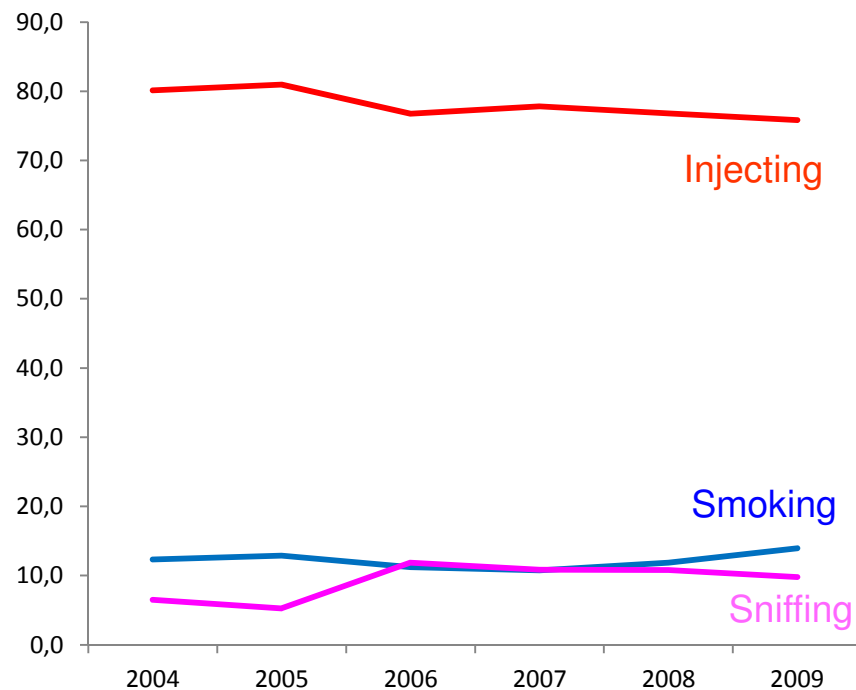# Predominant main route of heroin administration among patients admitted to first heroin treatment. 2009

- 🟥 ≥ 50% injecting
- 🟧 ≥ 50% smoking
- 🟨 ≥ 50% sniffing
- 🟩 No predominant main route
- ⬜ No data

Note: For Luxembourg, Portugal, Spain estimations are included because of lack of data for 2009

Main route of heroin administration among first heroin treatment admissions (%)

Western Europe

Eastern Europe
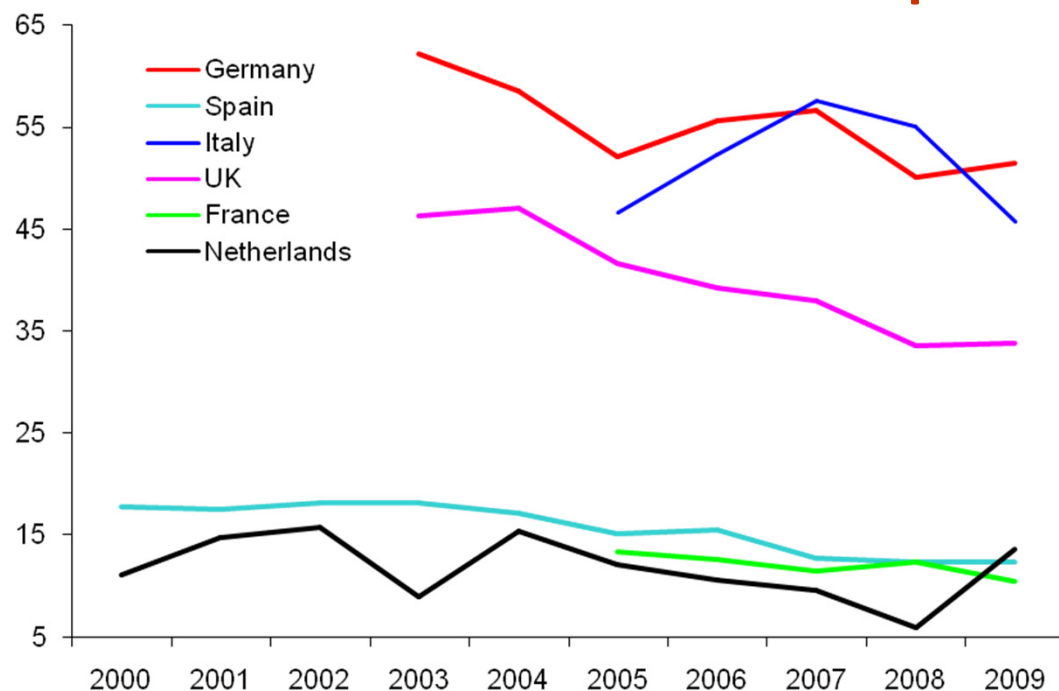
Trends of injection behaviour among people admitted to first heroin treatment in Europe-29 (%)
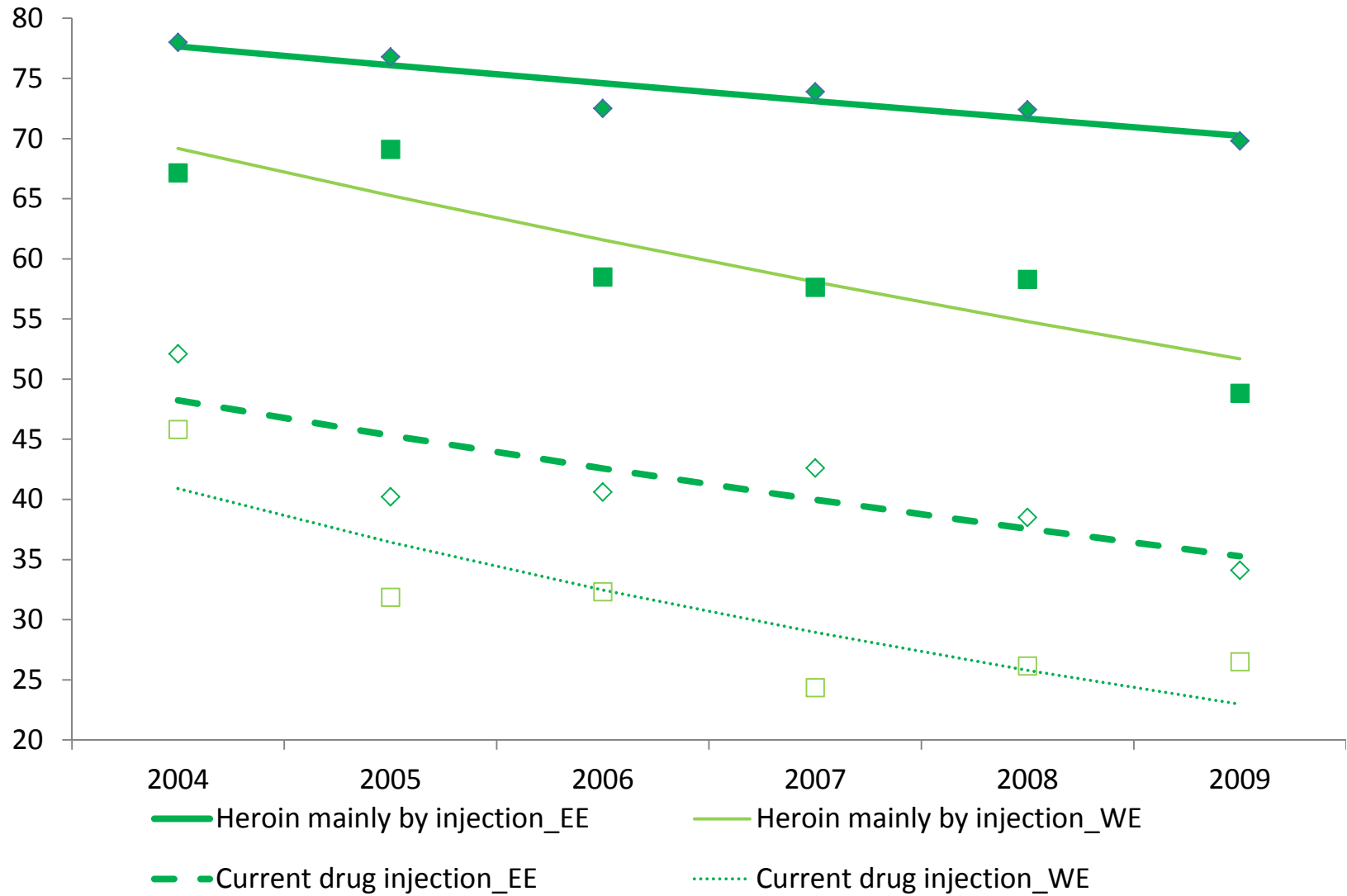
Heroin mainly by injection_EE — Heroin mainly by injection_WE

- - - Current drug injection_EE · · · · · · Current drug injection_WE

Main route of heroin administration among first heroin treatment admissions in Europe-29: INJECTION

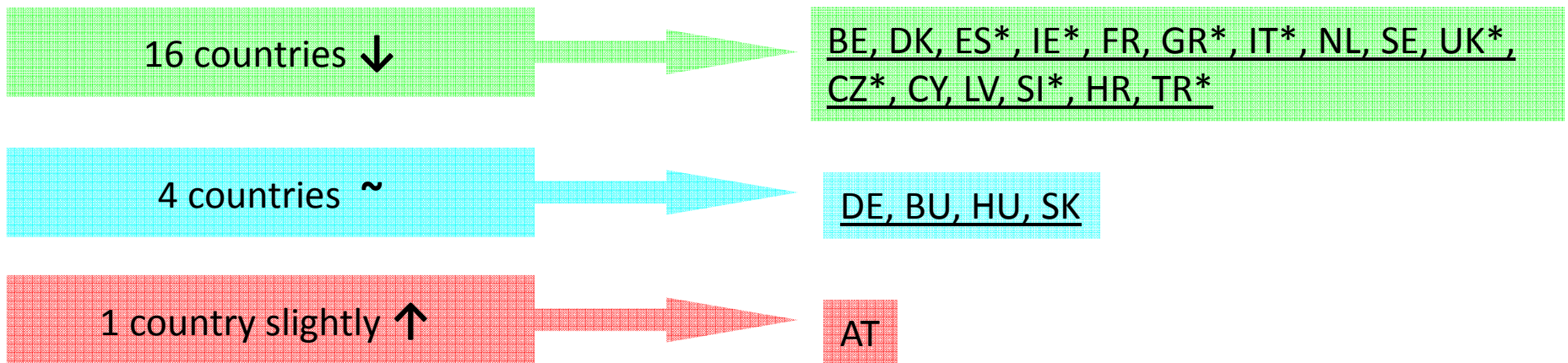**Trends in some big Western European countries (%)**

Legend: Germany, Spain, Italy, UK, France, Netherlands

17 countries ↓ → BE, DK*, DE*, ES*, IE*, FR, GR*, IT, MT, NL, PT, SE, UK*, CZ*, CY, SI*, TR

6 countries ~ → AT, LV, LT, HU, RO, HR

2 countries, slightly ↑ → BU*, SK*
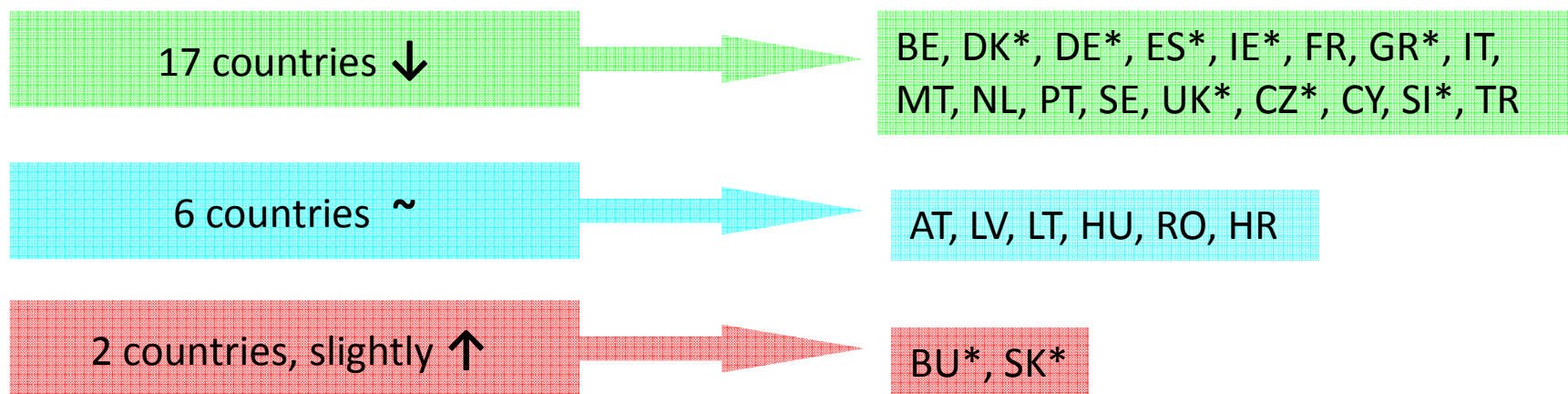
4 countries with no clear trends due to lack of data or inconsistences: FI, LU, EE, PL.

4. Current drug injection

Prevalence of current drug injection among patients admitted to first heroin treatment. 2009
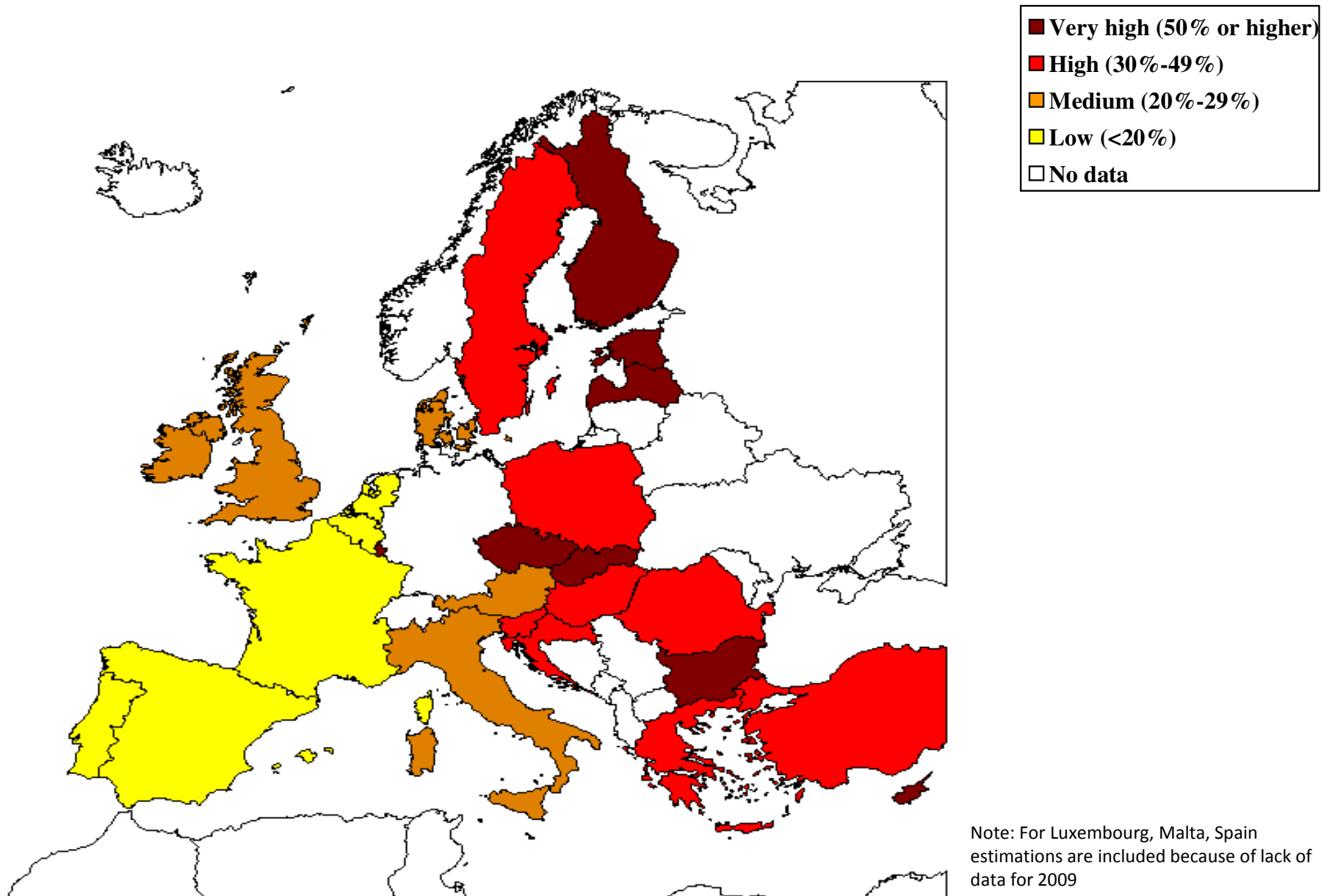
Very high (50% or higher)
High (30%-49%)
Medium (20%-29%)
Low (<20%)
No data

Note: For Luxembourg, Malta, Spain estimations are included because of lack of data for 2009

Current drug injection among first heroin treatment admissions in Europe-29 (%)

16 countries ↓ ➡ BE, DK, ES*, IE*, FR, GR*, IT*, NL, SE, UK*, CZ*, CY, LV, SI*, HR, TR*

4 countries ~ ➡ DE, BU, HU, SK

1 country slightly ↑ ➡ AT

8 countries with no clear trends due to lack of data or inconsistences: , FI, LU, MT, PT, EE, LT, PL, RO
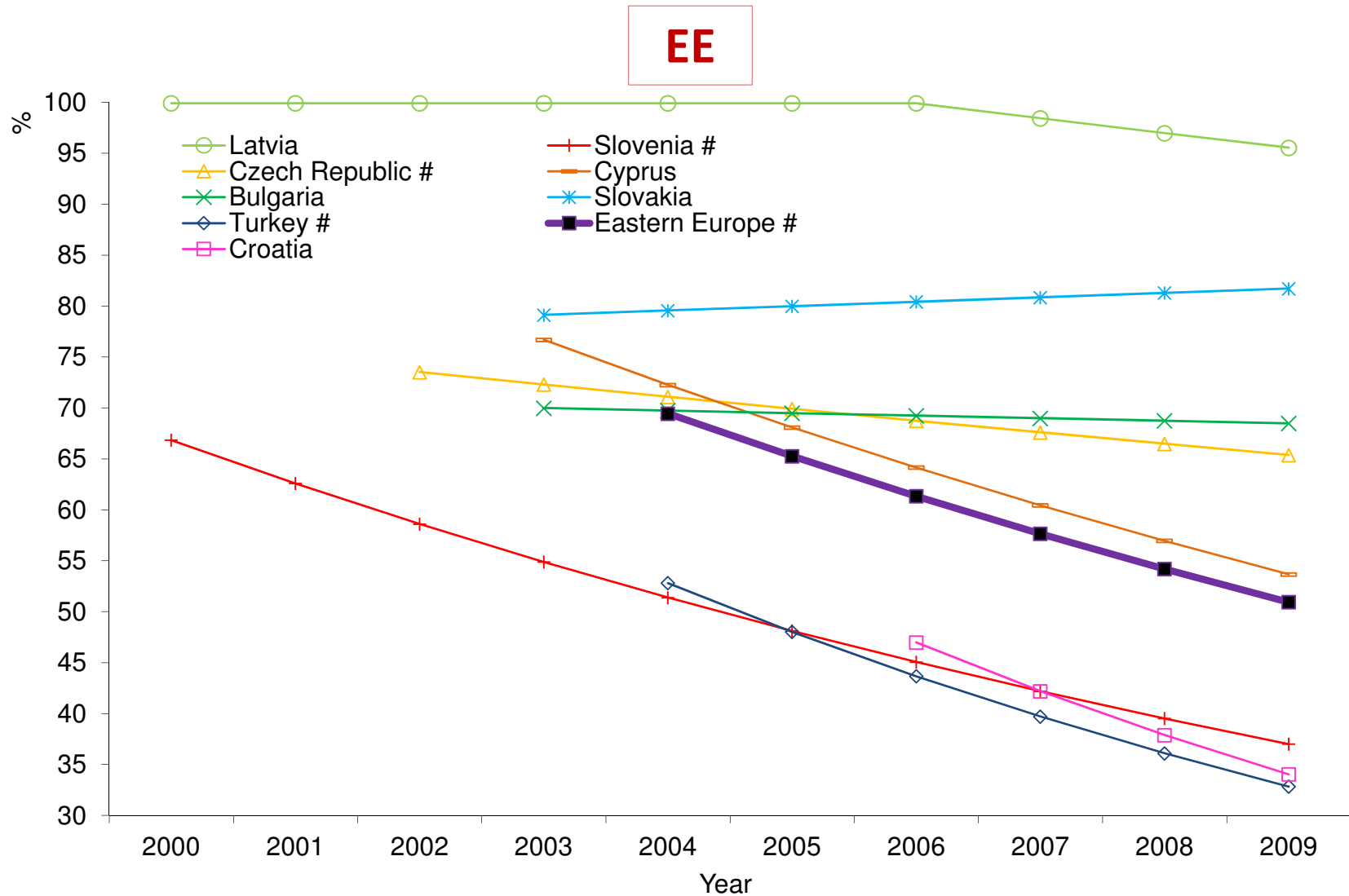
Current drug injectors among first heroin treatment admissions in selected countries (%). Modeled values from joinpoint regression analysis.
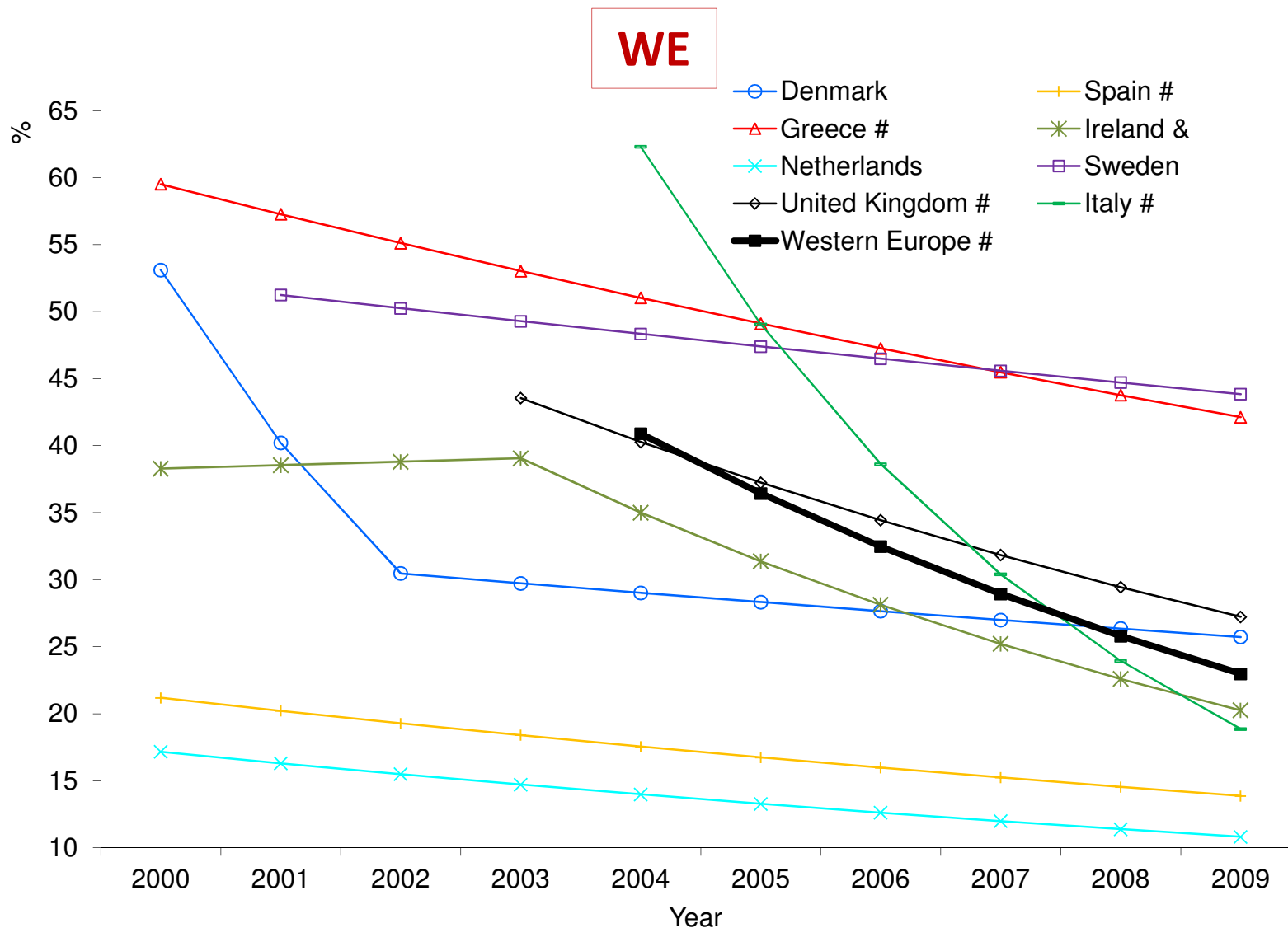
#: The annual percent change (APC) was statistically significant (p<0.05) for the whole represented period.

&: The APC was statistically significant for 2003-2009.

Current drug injectors among first heroin treatment admissions in selected countries (%). Modeled values from joinpoint regression analysis.

EE

Legend:
- Latvia
- Czech Republic #
- Bulgaria
- Turkey #
- Croatia
- Slovenia #
- Cyprus
- Slovakia
- Eastern Europe #

#: The annual percent change (APC) was statistically significant (p<0.05) for the whole represented period.

Summary of results

- **Recent trends in problem heroin use seem to be stable or decreasing in Europe**

  In favour of this statement we found:

  - **In most countries with sufficient data (17 out of 27), the number of first heroin treatment admission was stable or decreasing.**

  - **A significant increase in age at first heroin use and age at first treatment admission was observed both in WE and EE.**

  - **There is a clear predominance of those countries with decreasing trends in the number of notified cases per treatment center in WE and EE.**

Summary of results

- **Injecting drug use among heroin users is declining in Europe**

  Findings supporting this:

  - **Significant decline in prevalence of injection as main route of administration of heroin among first treatment admissions both in WE and EE (2005-2009)**

  - **Decline in prevalence of current drug injection among first treatment admission in 16 out of 21 countries, both in WE and in EE (2005-2009)**

Summary of results

- **These findings would support the well known phenomenon of a delayed epidemic of heroin use and heroin injection in the EE vs WE**

- In EE the mean age of first heroin use and mean age at first heroin treatment are lower than in WE (28.6 vs 31.8), and are increasing faster

- In EE the prevalence of the injecting indicators are higher than in WE

Summary of results

- **Caution is needed about these conclusions, because they are only based on the analysis of the TDI data**

- **TDI data could spuriously be influenced by differences within and between countries by many factors such as:**

  - **Coverage, availability, policy and use of treatment services**

  - **Policy of law enforcement on illegal drug use**

  - **Selection criteria of treatment admission episodes, definition of variables, or systems to avoid double counting.**

Cross validation with other indicators

- Trends in other indicators of problem heroin use are unclear.

- **Drug-induced deaths with opioid use evidence:**
    - Declined in the European Union until 2003, but subsequently rebounded.
    - The most recent data indicate that such deaths are clearly declining in some countries (Italy, Spain and Greece), but not in others (UK, France and Germany).
    - However, the value of this indicator in deducing trends in the prevalence of problem heroin use may be limited because:
        - Opioid users are increasingly old and have a higher risk of death from this cause.
        - Drug-induced deaths are attributed with increasing frequency to drugs other than opioids or a combination of opioids with other potentially dangerous drugs (polydrug use).

- **Price-purity of heroin:**
    - Data are not consistent across countries, although it seems that in 2004-09 there was a downward trend in the retail price of brown heroin.
    - Also, indications of a heroin drought in the market were reported by several European countries in 2009.

Trends in heroin use prevalence and fatal opioid overdose in Spain
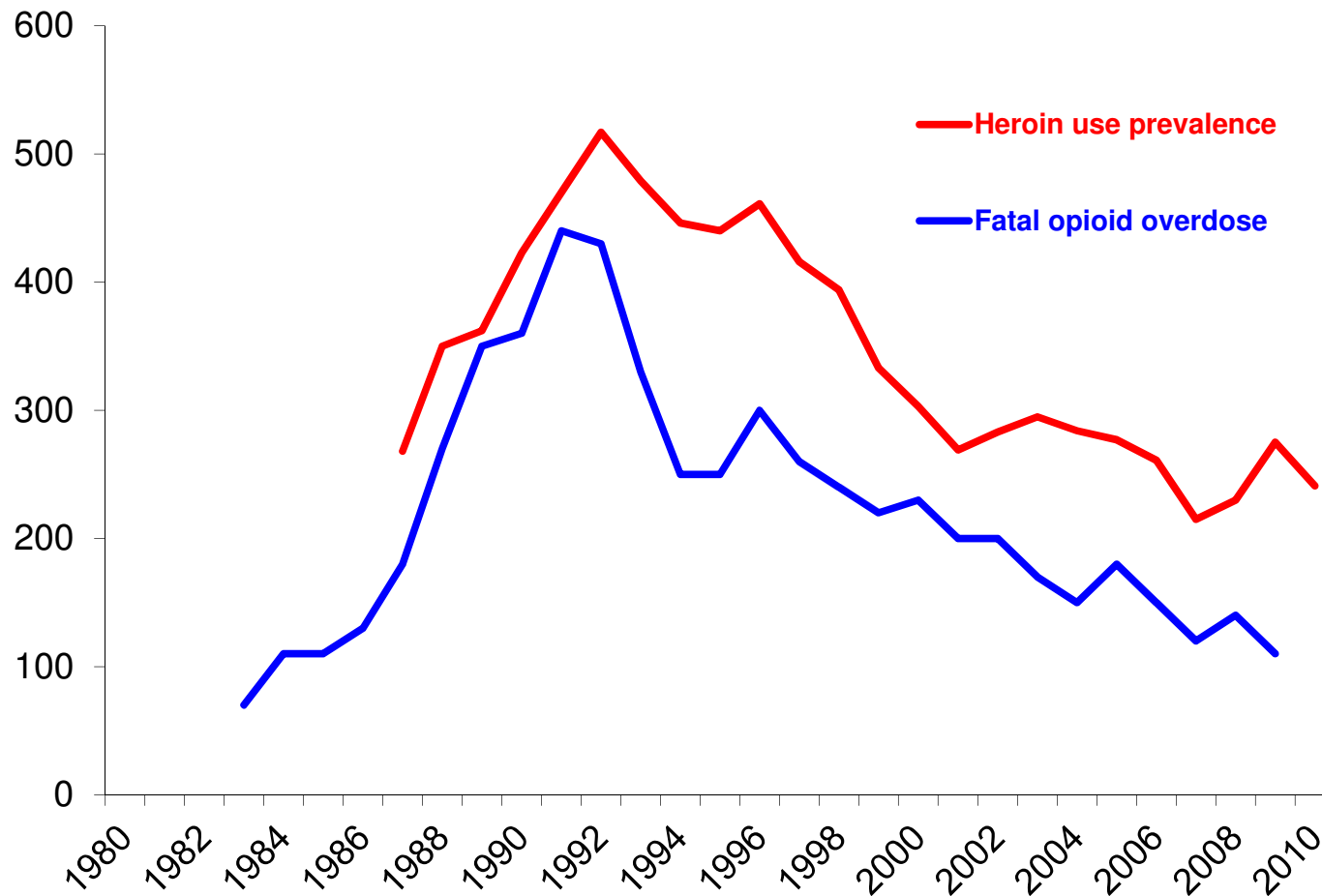
Heroin use prevalence is expressed per 100,000 pop.
Fatal opioid overdoses are expressed per 10 million pop.

# Trends in heroin injection from other indicators

- **The likely decline of heroin injection in Europe has previously been suggested.**

- **Estimations of prevalence of drug injection:**
  - **Data from countries with recent time series of prevalence, like Spain or Switzerland suggest a decline in prevalence. In Spain prevalence fell in 2001-2007 and then stabilized.**

- **Proportion of new or young drug users within samples of drug injectors**
  - **Low figures in samples recruited for infectious disease surveillance, which suggests a low rate of recent initiation into injecting, except perhaps in some EE countries.**

- **Nº of new HIV diagnoses related to drug injection in the general population:**
  - **It was decreasing in Europe during 2000-2010**
  - **A recent outbreak has been reported in Greece**
  - **In some EE-countries the trend may be stable or increasing.**

Thank you for your attention

...

Prevalence of drug injection **among first heroin treatment admissions. Europe-29 (%)**
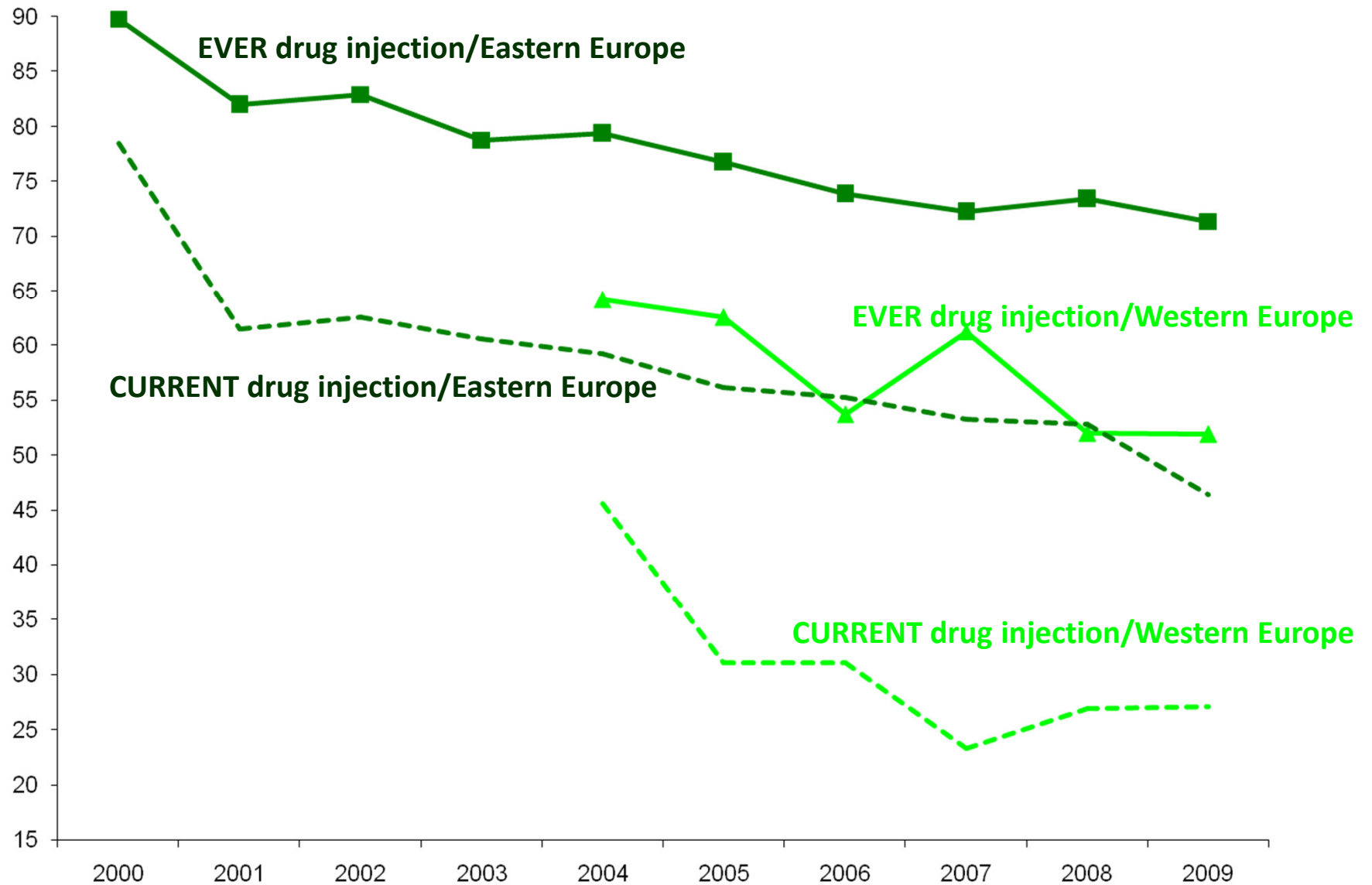
Methods

- Data were aggregated for Western Europe (WE), Eastern Europe (EE) and Europe-29.

Western Europe (16 countries)	Eastern Europe (13 countries)
Belgium	Bulgaria
Denmark	Czech Republic
Germany	Cyprus
Spain	Estonia
Ireland	Latvia
Finland	Lithuania
France	Hungary
Greece	Poland
Italy	Romania
Luxembourg	Slovenia
Malta	Slovakia
Netherlands	Croatia
Austria	Turkey
Portugal	
Sweden	
United Kingdom	

Trends in European estimations of prevalence of problem heroin use

- Estimations from Spain suggest that the prevalence of problem heroin use remained relatively stable or slightly decreased in 2001-2010.

- Estimations from Switzerland also suggest a decline in heroin use prevalence.

- In England, the incidence of heroin use peaked in 1996 and then dropped. Given that the time elapsed between peak incidence and peak prevalence was 8 years in Switzerland and 10-12 in Spain, one might expect a decline in prevalence in England in 2004-2008, which is what the initial trends in first treatment seem to reflect.

Trends in prevalence of heroin use and number of first heroin treatments; Spain
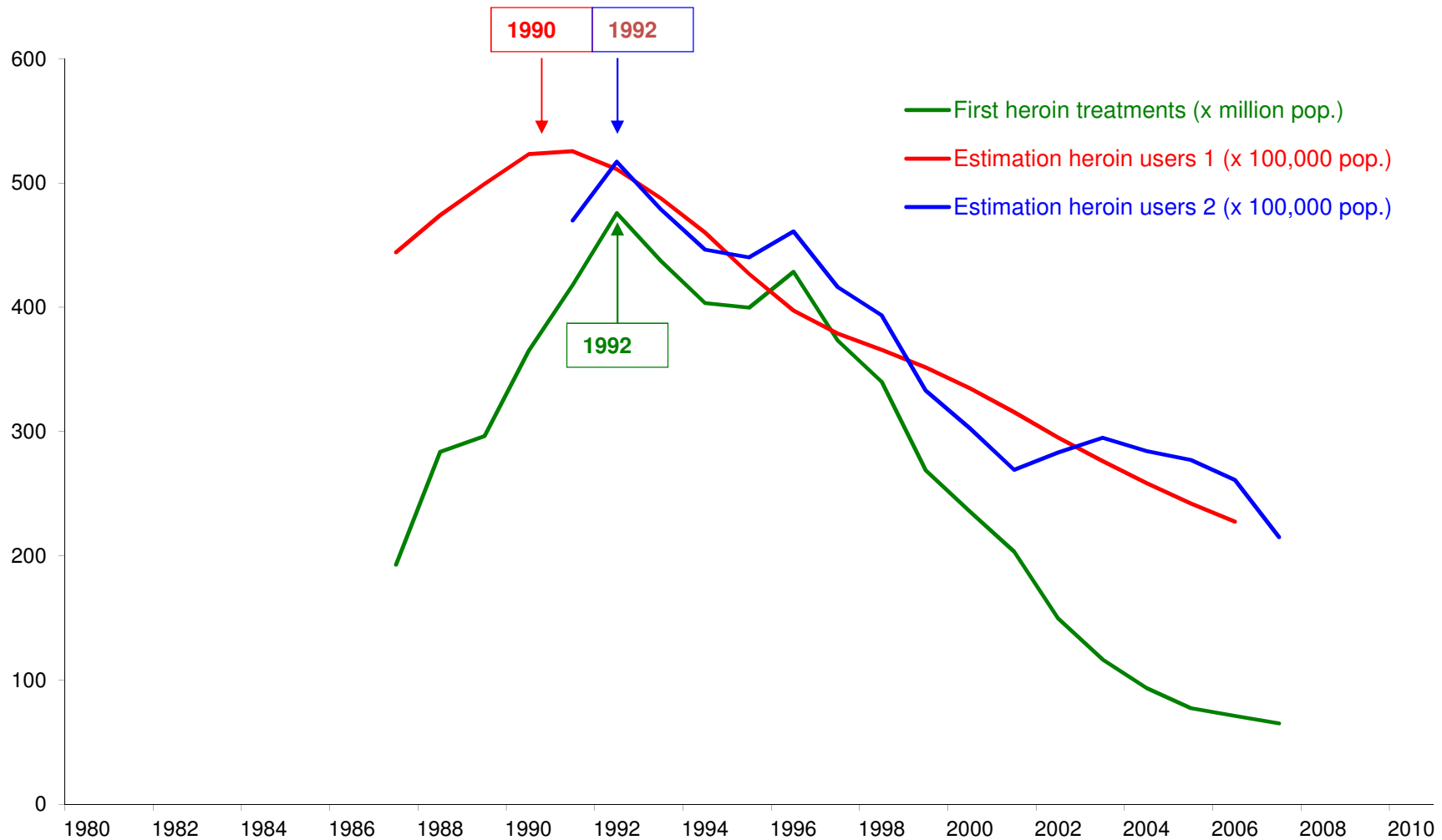
Sources: **First heroin treatments**: DGPNSD. Ministry of Health.
Estimation heroin users 1: Domingo-Salvany A. Personal communication. It was obtained by applying mortality and heroin cessation rates to heroin incidence data.
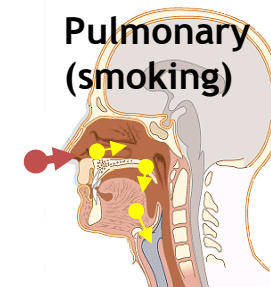**Estimation heroin users 2**: Barrio G et al. Addiction 2012;107(6):1111-22. It was obtained by multiplier methods.

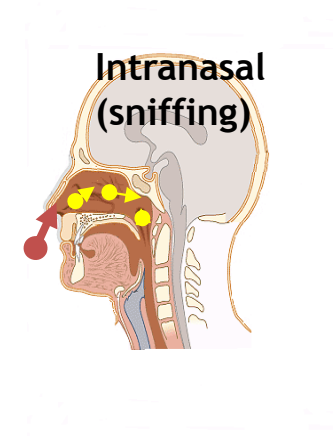# Is the route of heroin administration being correctly reported?

- Injecting, intravenous, etc.

- Pulmonary: smoking, chasing, chinesing, etc.

Pulmonary (smoking)

- Intranasal: sniffing, snorting, etc

Intranasal (sniffing)

12. Usual route of administration of primary drug
1. inject
2. smoke/inhale
3. eat/drink
4. sniff
5. others
99. not known