Drug-related deaths – the Swedish case

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C.A.N CENTRALFÖRBUNDET FÖR ALKOHOL- OCH NARKOTIKAUPPLYSNING

Disposition

- **Background**
- **Analyses of changes in methodology (recording practices) with focus on forensic tox analyses**
- **Results of new corrected (adjusted) time series of drug deaths (DD=presences of drugs in deaths) and DRD**
- **Why so confusing, lessons to learn, implications, future**

Background

- **The reported increase: used to in order to support and to criticise the current Swedish drug policy (‘everyone’ is fuelled by an increase!)**

- **But DRD – increase or not?**

Why CAN involvement in this?

- **CAN – commissioned to follow drug trends by different indicators; DRD is one important indicator**

- **CAN – not a Governent body but and umbrella organisation of different NGOs; and**

- **A centre of competence within the ANDT-field; epid., prevention, communication…**

Flow chart, from a death to a statistic in the GMR (Cause-of-death register)

Approximately 90,000 deaths per year in Sweden

Health care
- About 85,000 deaths
- Doctors determine cause of death on death certificate

Forensic investigation
- About 5,000 per year
- Requested by the Police
- Toxicological tests for the presence of many kinds of drugs (national forensic toxicological database at RMV) (basic forensic results in a centralised forensic medicine data base at RMV)
- Forensic pathologists determine cause of death on death certificate

Cause-of-death statistics
All 90,000 death certificates sent to National Board of Health and Welfare (NBHW):
- Coding of all deaths (underlying and contributory), and
- Updating the General Mortality Register (GMR)
- From the GMR: Drug-related deaths in Swedish-GMR and EMCDDA-GMR (Selection B)

Background

Different indicators (time series) of drug-related used in Sw during past 15-20 yrs

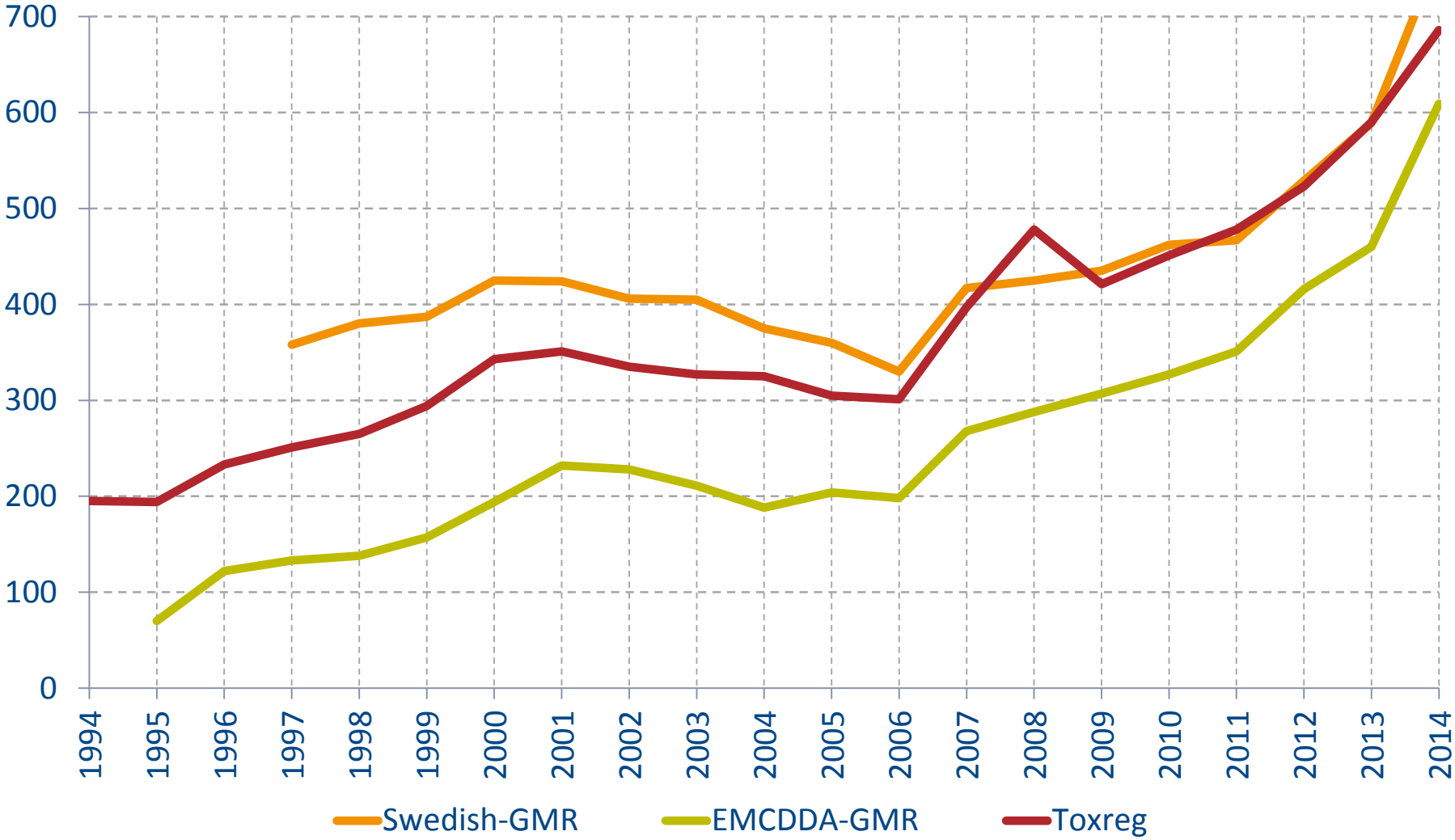
- Drug-related deaths underlying or contributory cause of deaths (from GMR): T40.0-T40.9, except DXP, F11-F16. More or less the Selection B but incl. contributory causes and few non-poisoning codes, e.g. O35.5 (maternal care for suspected damage to fetus by drugs), T40, F11-F16, from the GMR) **Swedish-GMR**

- Selection B, only underlying cause of deaths (reported to the EMCDDA): F11, F12, F14-F16, F19) or poisonings: X and Y-codes: (X41, X42, X61, X62, Y11, Y12) in combinations with T-codes (T40.0-T40.9, except DXP, and T43.6).
EMCDDA-GMR

- Deaths with a selection of substances found in national forensic toxicological database : <=60 yrs of age for opioid medicines and in hierarchical order and not incl. oxycodone, tramadol, DXP). Presence of some substances among forensically investigated deaths (called

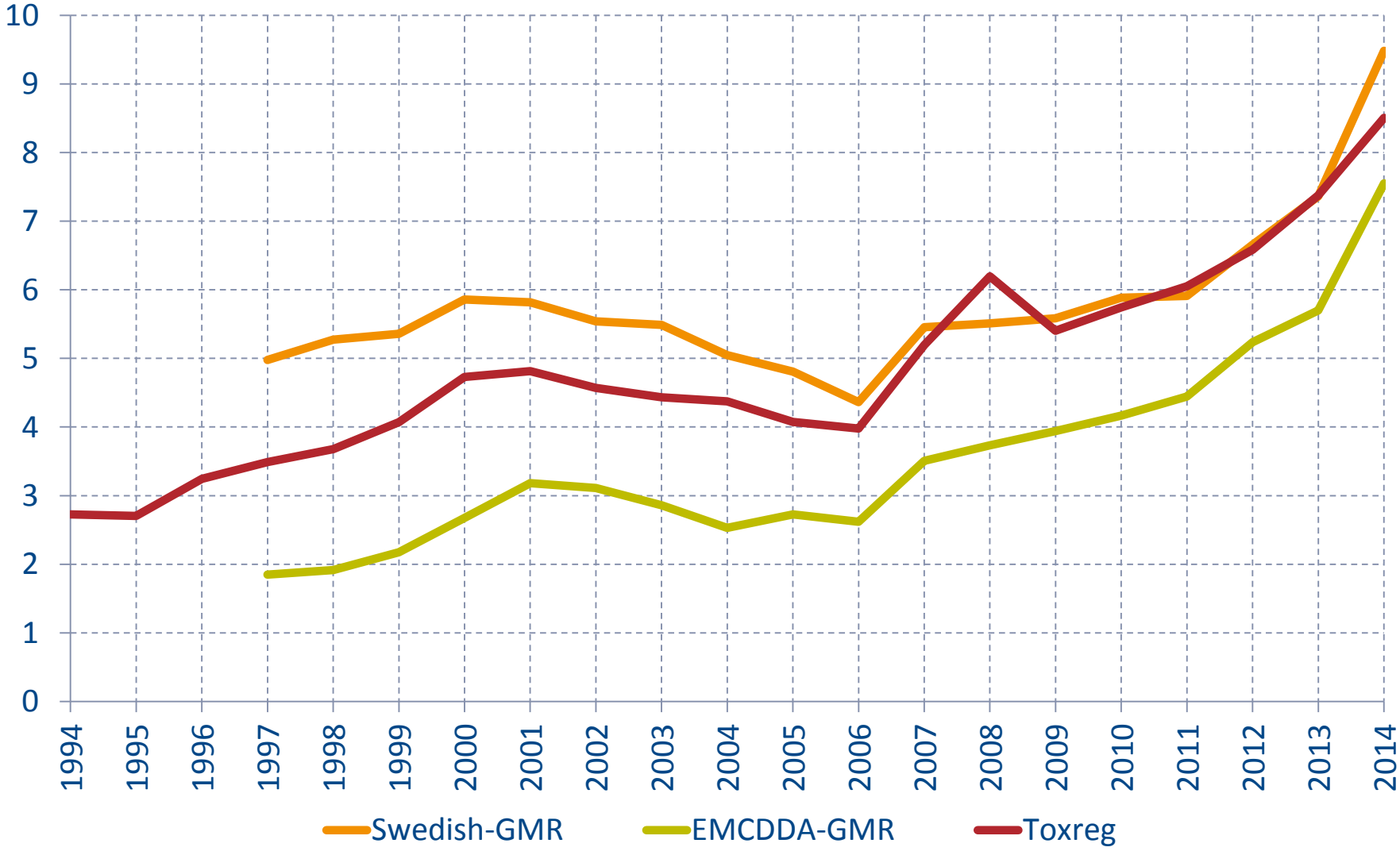
Background

Trends in number of drug-related deaths according to the three indicators



Background

Trends in number of drug-related deaths according to the three indicators, per 100 000 inh 15 +



Thus:

According to all three: dramatic increases

Increase (more than +100% since 2006), especially in opioids: methadone, buprenorfin, fentanyl, oxycodone (thus, opioid pharmaceuticals)

Recent years, no decrease in heroin

A (new) report from the National Board of Health and Welfare (NBHW)

- Commissioned by the Government to develop the drug-related statistics further
- Seen in the light of the increase and an uncertainty of how to interpret this increase, what does it stand for?:
  real increase and/or due to recording practices

The report:
Background, definitions, analyses of the 2014 drug-related data (cause of death register (GMR), **changes in recording practices (methodological changes) affecting the statistics**, discussion and conclusions

Changes in recording practices (methodological changes)

Two parts

1. Coding practices for all causes of deaths certificates (done at the National Board of Health and Welfare)

2. Changes in practices in toxicological tests (done by the National Board of Forensic Medicine)

(The CAN-report focus on the latter)

1. Coding practices for all causes of deaths certificates (done at the National Board of Health and Welfare)

- **T50.9:** (others, non specified drugs/medicines) *not included* in the DRD-series, but from 2006/07 more information on the causes of death certificates – deaths previously would be under the T50.9 will now have codes *included* in the DRD-series
- **Tramadol**: Until 2012 coded as T39.3, after that T40.8. T39.3 *not included*, T40.8 *included*
- **NPS:** Number increased, previously under T50.9 (*not included*) from 2014 under T43.6 (*included*)
- **Dextropropoxifen (DXP):** *not included* and removed from the market in March 2011. Other substances 'replacing' DXP *included*

Altogether: all these changes – drive the DRD-time series upward

2. Changes in the toxicological testing (done at the National Board of Forensic Medicine)

(also mentioned in the NBHW-report)

- Previously – most tests done after request from forensic doctor, but now…
- More routine screening and
- More substances routinely screened
- Lower cut-off (quantification /concentration) (e.g. halving of the methadone quantities)
- September 2011: new analysis apparatus (mass spectrograph (Time of Flight)

Altogether: all these changes – drive the DRD-time series upward – the more you search, the more you find.

2. Changes in the toxicological testing (done at the National Board of Forensic Medicine)

The NBHW-report: not do any 'deeper' analyses of toxdata (needed more detailed data).
But stated that changes in coding and toxicological tests: explain *all increase* from approx. 2006-2011, and *some/most* (?) of the increase 2012-2014

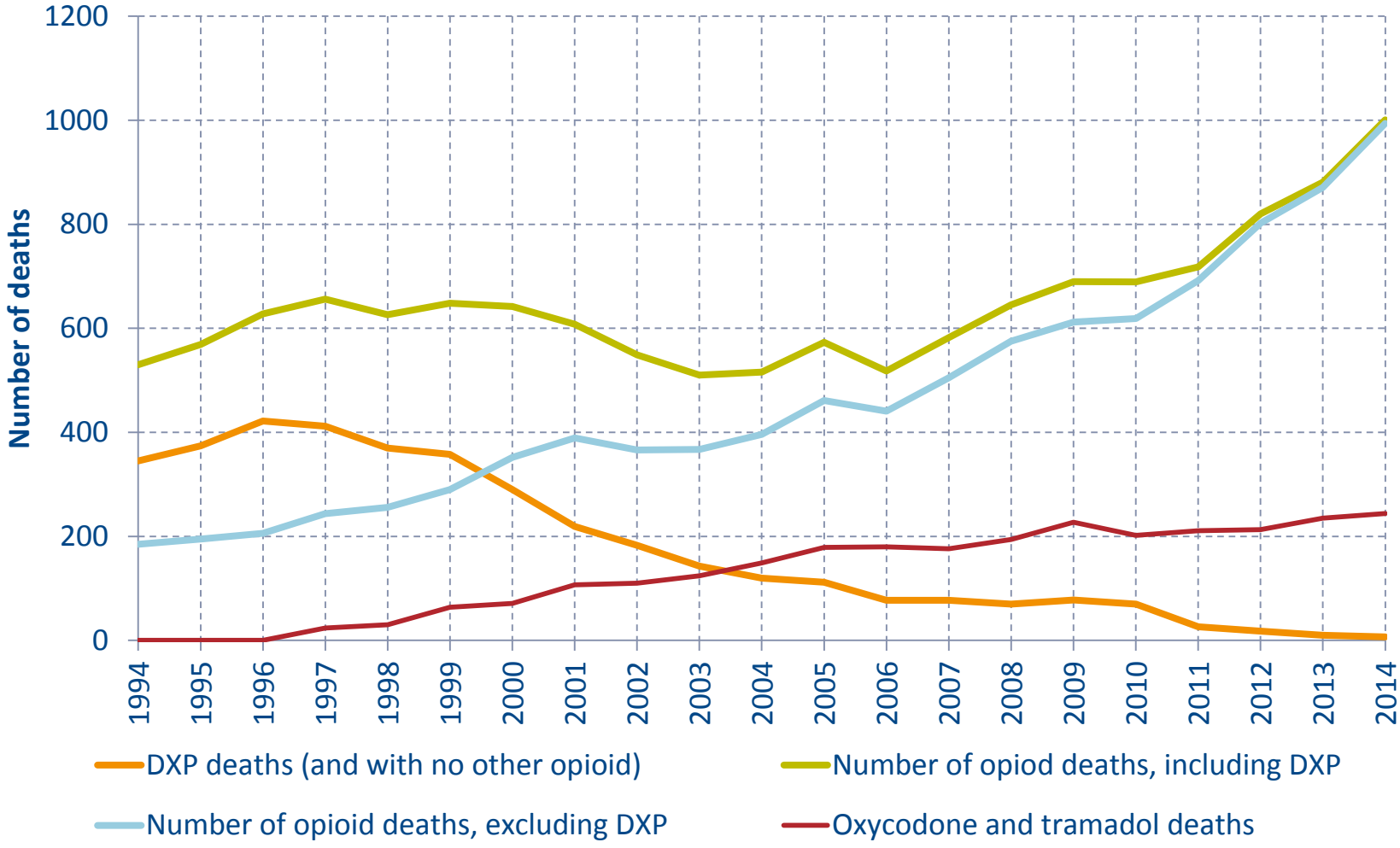
- More detailed analyses are needed before any "final answer".

- **CAN-study: focus on analyses of toxdata, with data on individual level, in-depth analyses, contribute to an increased understanding**

Analyses of toxdata

Toxicological ’raw’ data, number of opioid deaths with and without DXP (most likely some substitution)

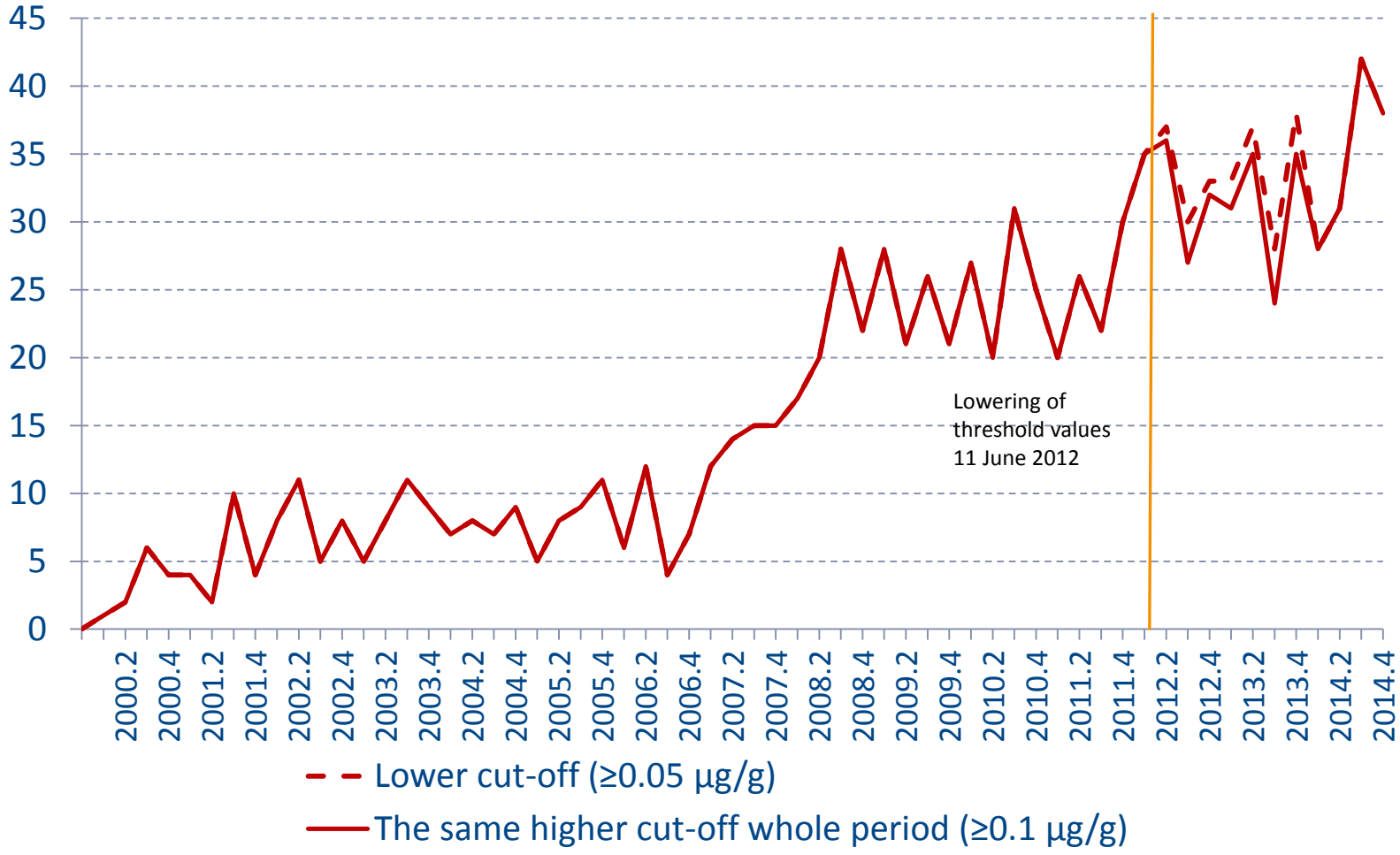
(Source: National forensic toxicological database)



Analyses of toxdata

Methodological effects: lowered threshold value for methadone (weak effect)

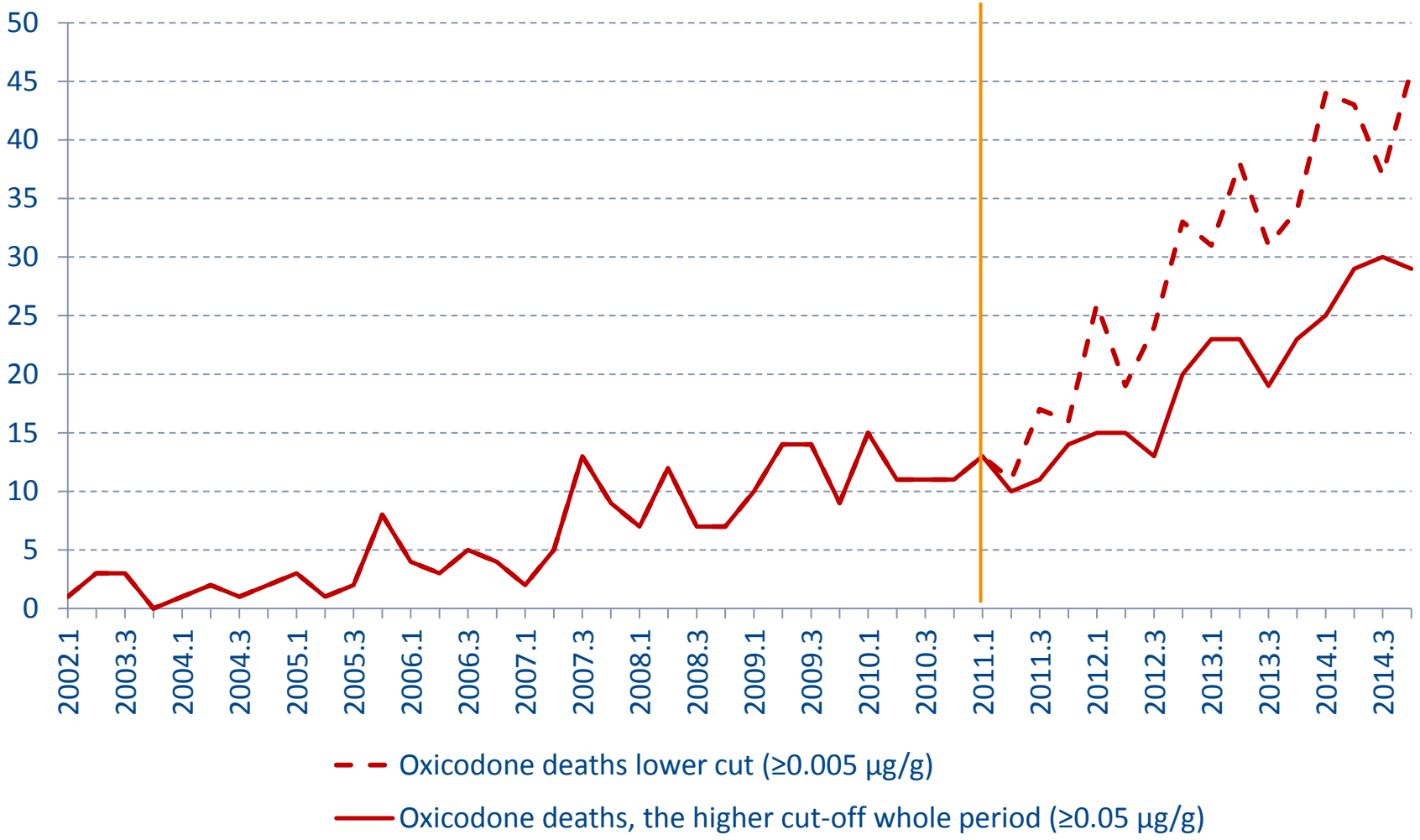
(Source: National forensic toxicological database)



Analyses of toxdata

Methodological effects: lowered threshold value for oxicodone (clear effect)

(Source: National forensic toxicological database)



However, except for oxycodone…

…more or less the same concentration of opioids in blood over time (table 4), despite increased screening

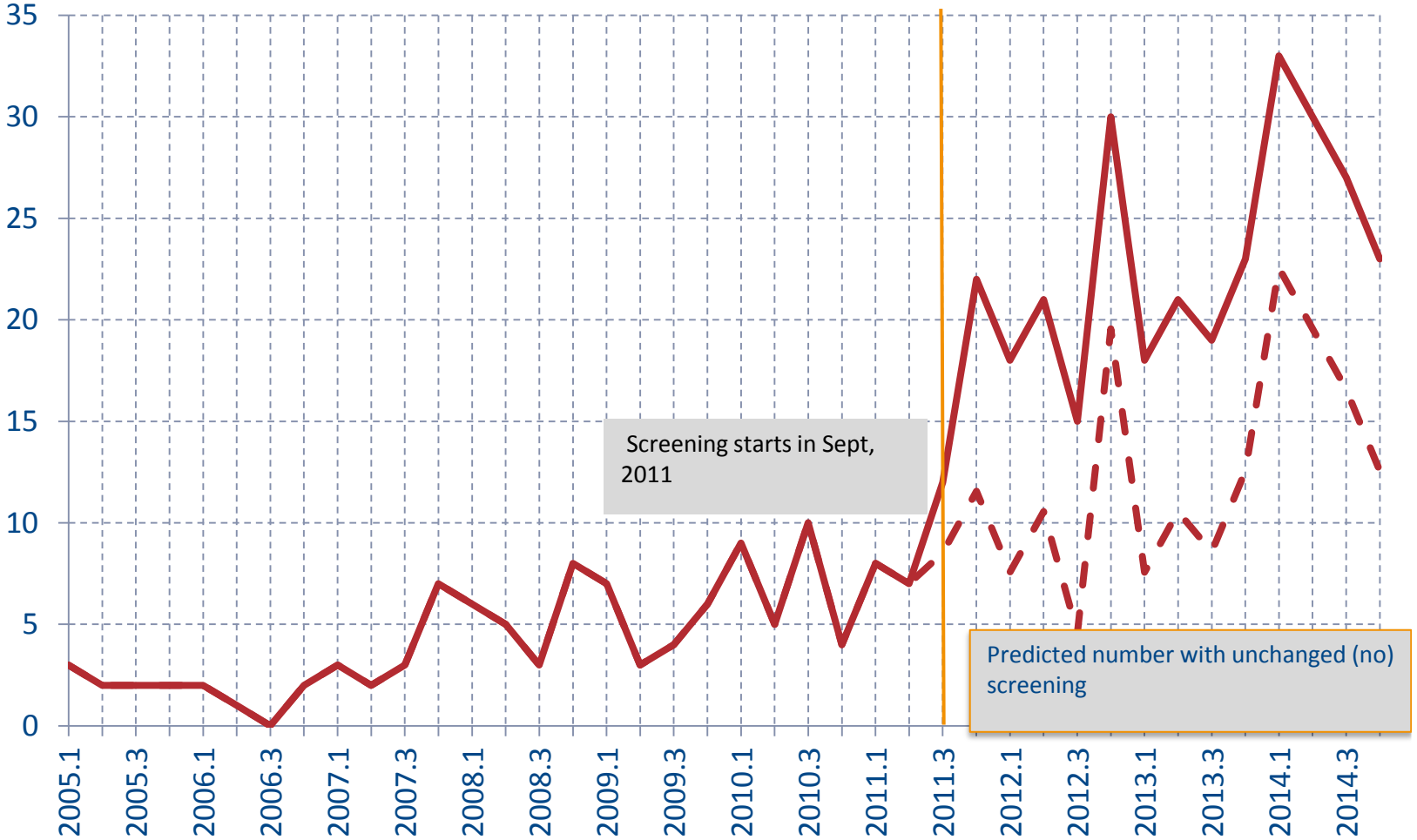
’New’ cases have not lower quantities of opioids

Effects of increased screening: number of screening tests, number of positive cases 2008-2014 (table 5)

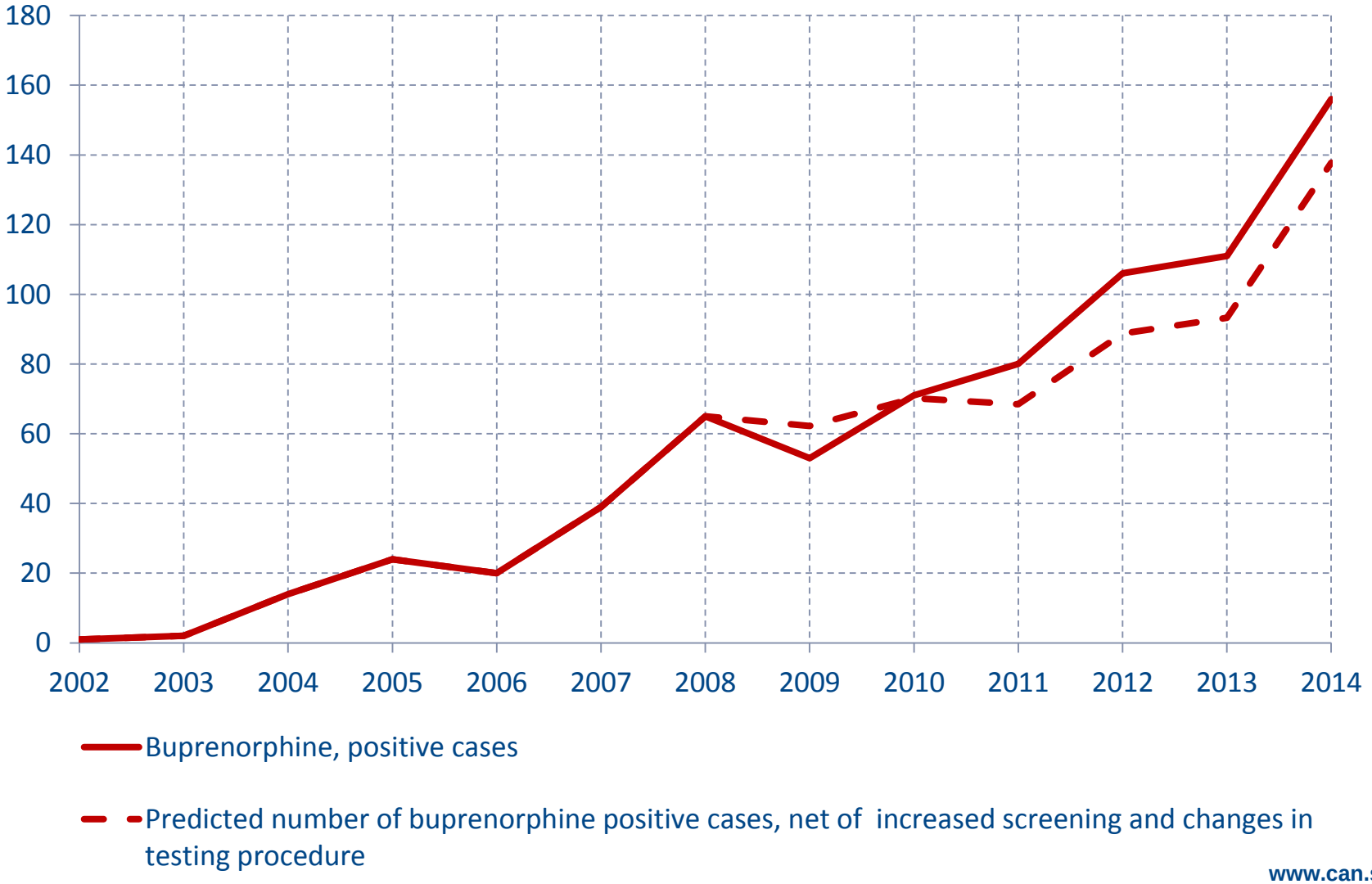
	Fentanyl		Methadone		Buprenorphine		Morphine		Codeine		Oxycodone		Tramadol	
Year	Number of screenings tests	Number positive cases	Number of screenings tests	Number positive cases	Number of screenings tests[2]	Number positive cases	Number of screenings tests	Number positive cases	Number of screenings tests	Number positive cases	Number of screenings tests	Number positive cases	Number of screenings tests	Number positive cases
2008	72[1]	22	5,111	87	460	65	2,369	114	2,369	97	5,111	33	5,111	191
2009	59	20	5,248	96	601	53	2,262	118	2,262	100	5,248	50	5,248	227
2010	52	26	5,223	103	1,169	72	1,988	112	1,988	106	5,223	50	5,223	197
2011	1,670	49	5,015	98	1,656	84	2,926	146	2,926	116	5,015	56	5,015	180
2012	4,992	84	4,992	135	1,783	106	4,992	189	4,992	124	4,992	102	4,992	192
2013	5,143	81	5,143	135	2,023	113	5,143	186	5,143	130	5,143	135	5,143	202
2014	5,363	113	5,363	139	2,294	160	5,363	219	5,363	147	5,363	170	5,363	176

[1] The numbers for 2008-2010, do not refer to screening tests but verification tests done by the request of responsible pathologist.
Source: national forensic toxicology database

Number of positive fentanyl cases before and after implementation of routine screening (from 0% to 100% screening)

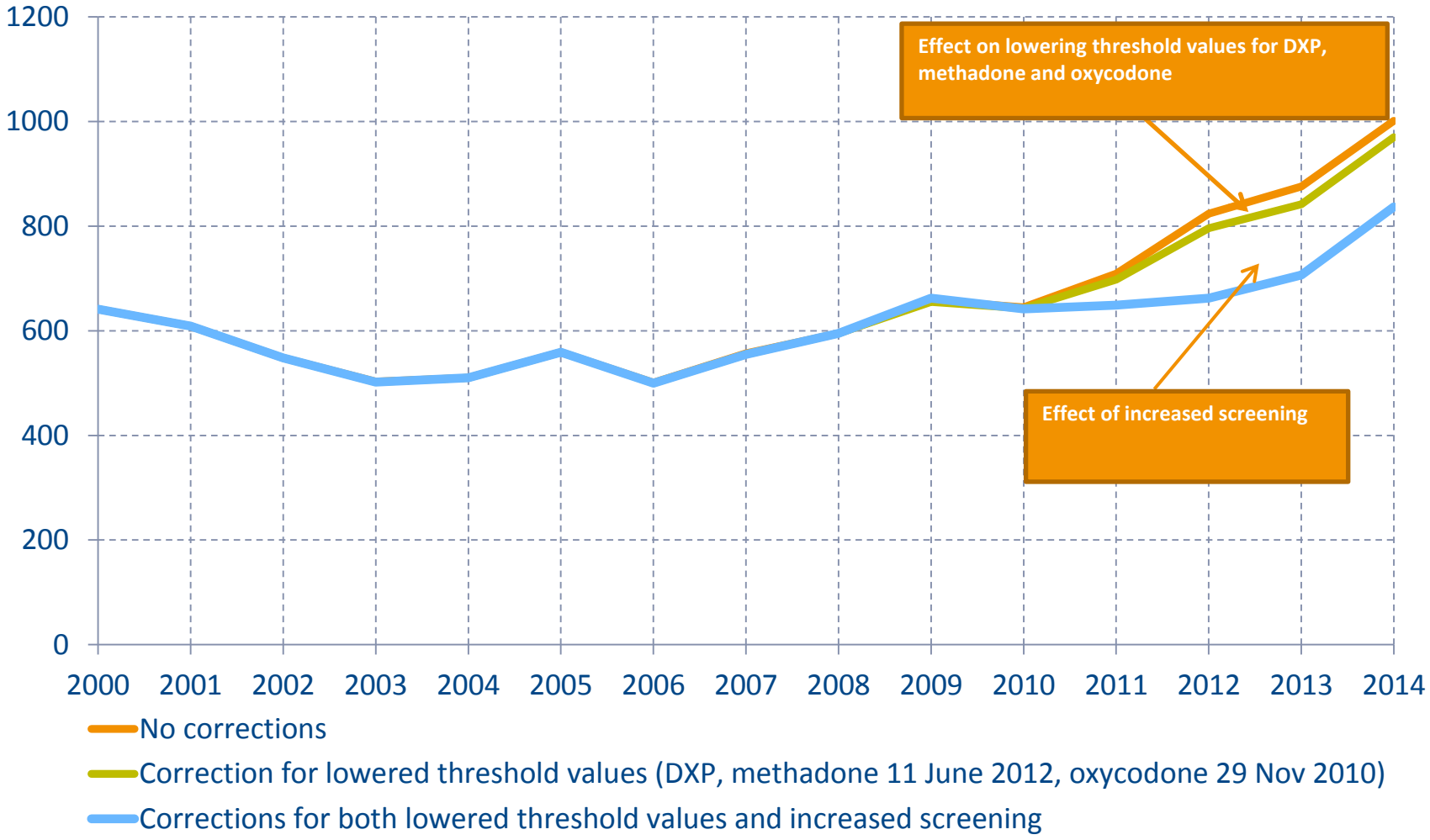


Number of positive buprenorphine cases before and after implementation of routine screening (from 0% to 100% screening)



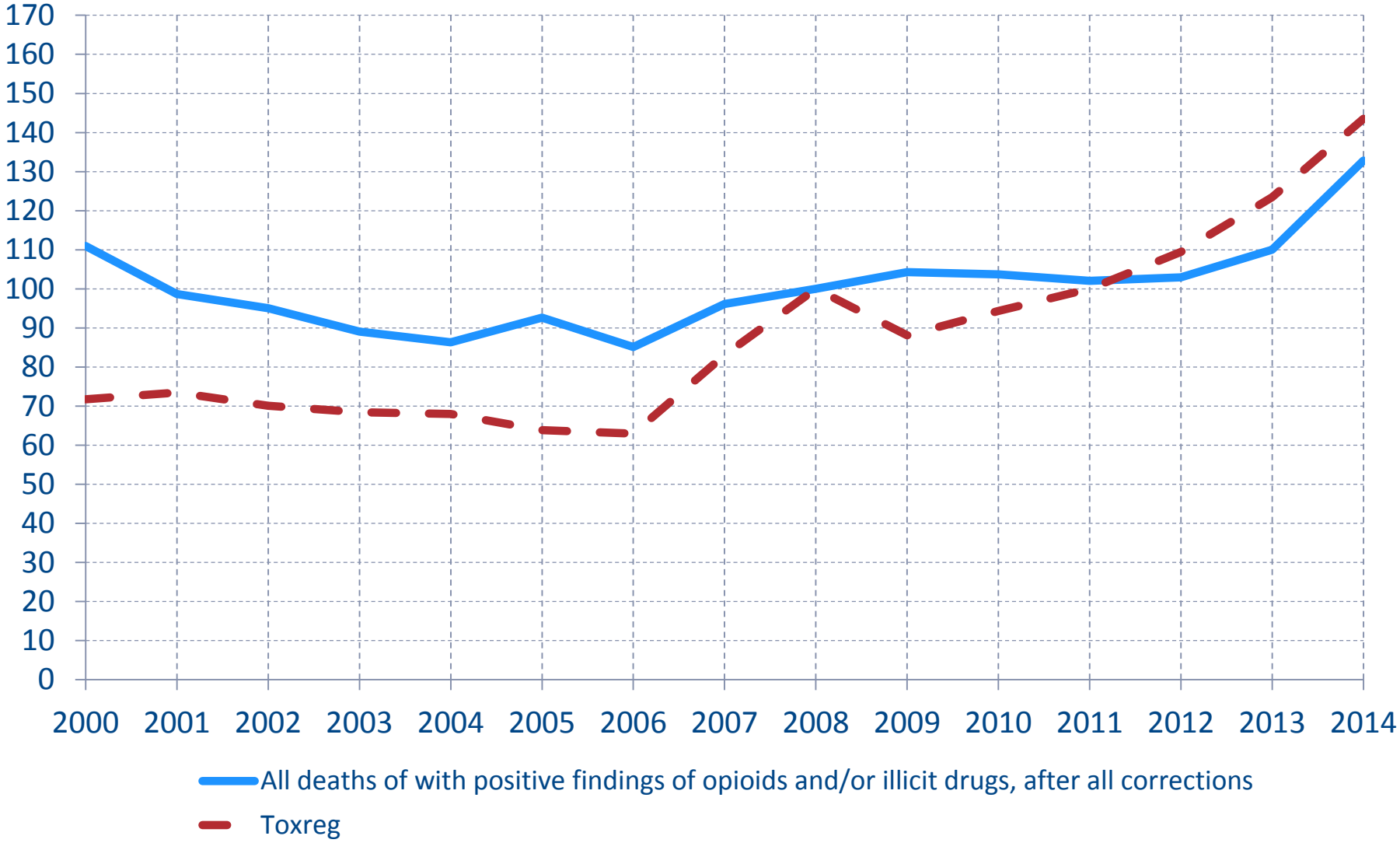
Number of forensically examined deaths with positive finding of opioids before and after corrections for increased screening and lowering of threshold values (methadone, oxycodone, DXP) (blue line = corrected time series)

Source: national forensic toxicology database.

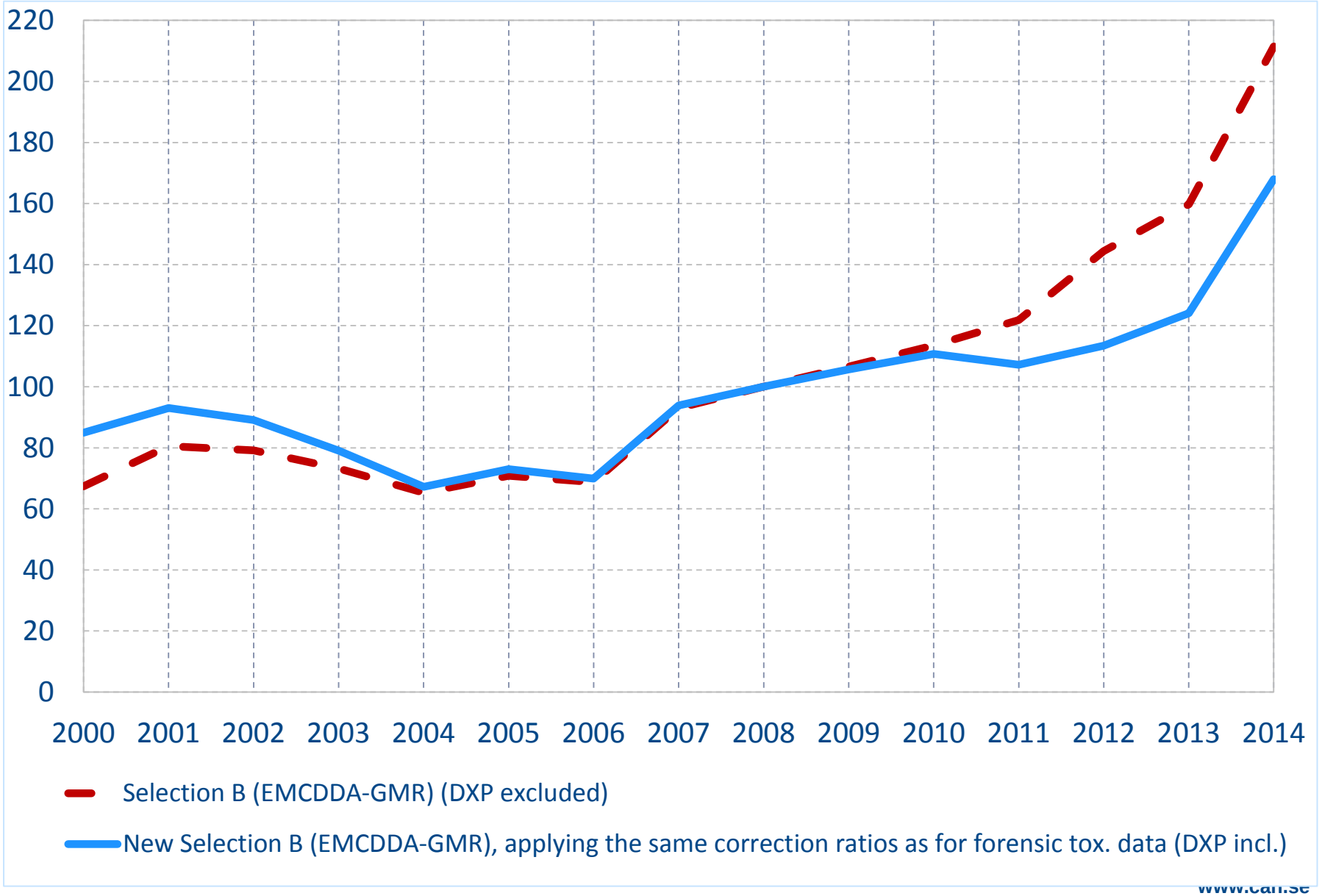


Number of drug deaths (opioids, illicit drugs) in forensically examined deaths, with all corrections and Toxreg, both anchored on 2008.

Source: national forensic toxicology database.



Selection B, with and without estimated corrections, both anchored on 2008.



Still and increase…

1. Substantially lower than what has previously been reported

2. Increase is due to an increase in opioids (methadone, fentanyl, buprenorphine, oxycodone)

3. 70-75% of all drug deaths (and DRD) due to pharmaceutical opioids

4. An increase in most age groups, men and women

5. Strong correlations between drug deaths (presence of drugs) and drug-related deaths

What about polydrug use?:

Polydrug use

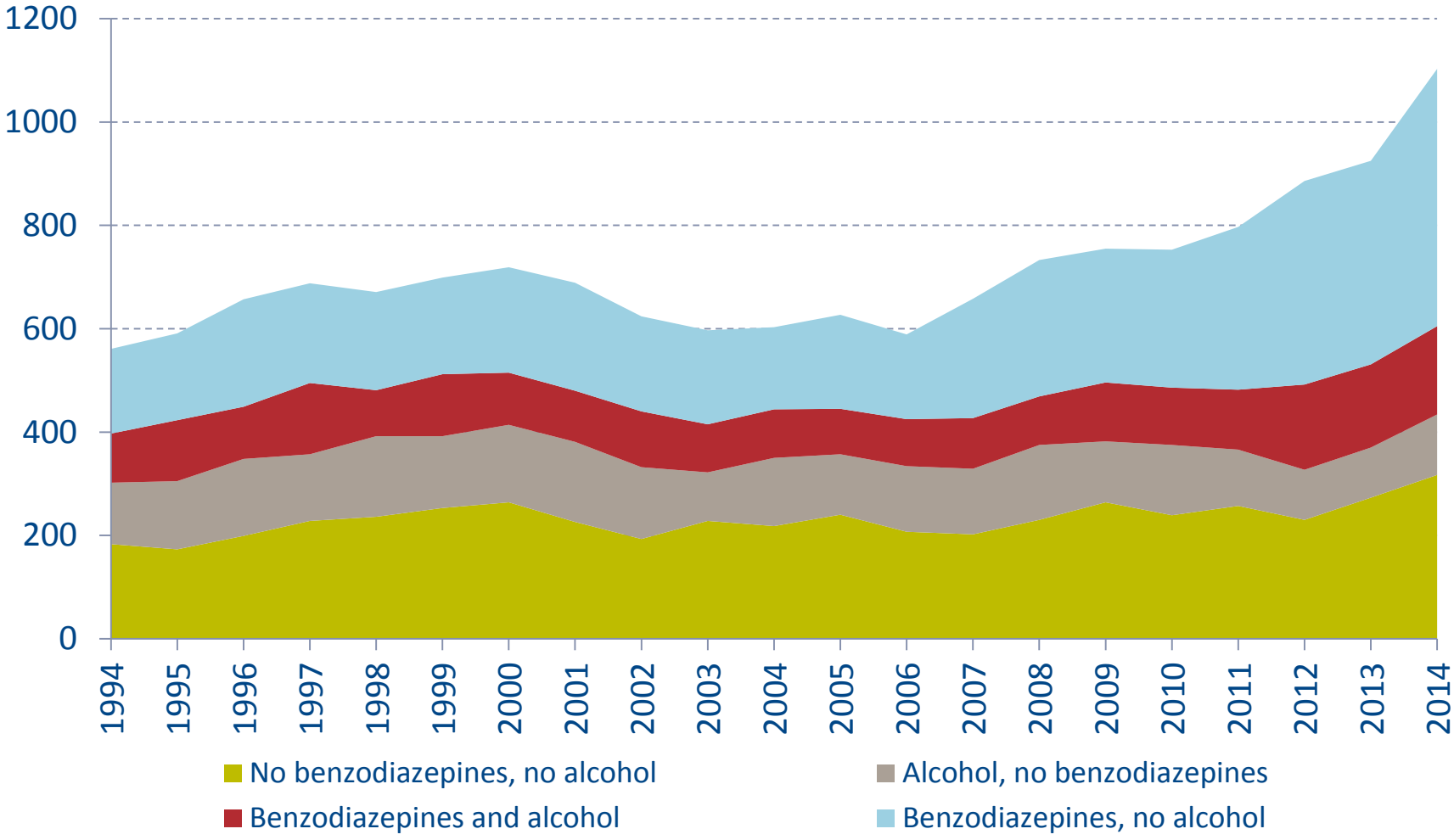
Studying alcohol and/or benzodiazepine involvement in opioid deaths

- Decrease in relative terms (%) for alcohol

- Stable or increase for benzodiazepines

- Alcohol cannot explain the increase in opioid deaths
- Benzodiazepines could be an important contributory factor

Polydrug use: different combinations of alc and /or benz findings in all forensically investigated opioid deaths (increase only in blue: opiods and benz, no alc)



Why this confusing situation, and how to improve

- Sweden has all the necessary data, but no one has the whole picture
  - Linking toxdata with cause-of-death data on individual level would be an improvement
- Poor coordination between the relevant Nat. Boards (auth)
- The drug issue, and the statistics has not been prioritised, time series (indicators) produced mechanically
  - More in-depth control of syntax, data etc are needed every year
- Toxreg – only a time series, not a register – has been disseminated broadly (even to EMCDDA) . Often incorrectly presented as DRD (instead of DD) and a selection criteria with no consensus among experts

Future

National Board of health and Welfare:

Develop(ed) a new series of DRD-death indicator

- Still including both underlying and contributory cause of death,
- Only including poisoning, not F-codes
- And include more substances:

Poisoning – pharmaceuticals and other synthetic narcotic substances: T36-T39, T40.2-T40.4, T40.6, T41-T43.5, T43.8-T50.8

Illegal drugs: T40.0-T40.1, T40.5. T40.7-T40.9, T43.6

Other and non specified drugs, pharmaceuticals and biological substances: T50.9

Future plans, RMV and CAN, using forensic data

1. **Select the number of detected substances classified as narcotics according to the Swedish Medical Products Agency in forensically examined deaths**. Both total number of deaths and number of deaths per substance or group of substances, e.g., opioids, benzodiazepines and amphetamines. **Monitored over time and give a good picture of drug involvement in groups at high risk of premature death.**

2. **Select the number of poisoning deaths in step 1, regardless of substance, in all forensically examined deaths.** Here too, the total number of deaths and number of deaths per substance or group of substances can be monitored over time.

3. **Select the number of poisoning deaths where opioids are considered to be the immediate cause of death**. Here, all opioid deaths will have to be assessed at RMV. Will give us a good sense of the development of opioid-related deaths.

Comparability, conclusions

1. The Swedish trend data (without corrections) is not really comparable over time

2. The Swedish level of DRD, but also trends, are not fully comparable with other EU-countries

3. It is not plausible that the Swedish rate of 93 deaths per million compared do the EU-average of 19 per million mirrors true differences

4. Most likely, also other countries have done methodological changes, along already existing differences