

Final conclusions from the Baltic Alcohol Control Policy Project:

Evaluation of the impact of alcohol control policies on morbidity and mortality in Lithuania and other Baltic states

Mindaugas Štelemėkas

Health Research Institute, Faculty of Public Health, Lithuanian University of Health Sciences

Jürgen Rehm

Institute for Mental Health Policy Research & Campbell Family Mental Health Research Institute, Centre for Addiction and Mental Health (CAMH), Toronto, Canada;

PAHO/WHO Collaborating Centre, CAMH, Toronto, Canada;

Dalla Lana School of Public Health and Department of Psychiatry, University of Toronto (UofT), Canada;

WHO Collaborating Centre, Agència de Salut Pública de Catalunya, Barcelona, Spain;

Center for Interdisciplinary Addiction Research (ZIS), Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf(UKE), Hamburg, Germany

Presentation on behalf of the international project team



Outline

1. Background
2. The key effects of the alcohol control policies in a Natural Experiment setting in Lithuania (and the Baltics)
3. Conclusions

Background

- The project '**Evaluation of the impact of alcohol control policies on morbidity and mortality in Lithuania and other Baltic states**' was supported by the (U.S.) National Institute on Alcohol Abuse and Alcoholism (NIAAA) of the National Institutes of Health (NIH), grant number 1R01AA028224.
- Co PI's of the project **Jürgen Rehm** and **Mindaugas Štelemėkas**.
- The funder played no role in research design, studies or interpreting the results.
- Authors' had no conflict of interest to declare.
- Duration: 04-2020 – 03-2025 (no cost extension to 03-2026)

• **Aims of the project:**

- **Specific Aim I:** Measure the effectiveness of the alcohol control policy interventions implemented in Lithuania between 2016 and 2018.
- **Specific Aim II:** Measure the return on investment of the alcohol control policy interventions implemented in Lithuania between 2016 and 2018.
- **Specific Aim III:** Compare the trends in alcohol-attributable harm in Lithuania with surrounding countries for the years 2010-2020.
- **Plus a supplement on the effects of COVID-19 on alcohol consumption and attributable harm**

Background



- Lithuanian population: 2 885 891 (2024)
- Regained independence in early 1990s
- Joined the EU in 2004
- The life expectancy at birth in 2023 was 77.4 years (72.9 for men and 81.7 for women)

Natural experiment in alcohol control:

- Was one of the hardest drinking countries in the world (e.g. APC 16.3 liters in 2016 according to WHO)
- Implemented strong alcohol control policies in 2008-2009, and 2014-2018:
- **Most importantly:**
 - Doubling of excise tax since March 2017
 - Since 2018:
 - Near total ban on alcohol advertising;
 - MLDA increase from 18 to 20 years old;
 - Availability restrictions of take-away alcohol, especially on Sundays.



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Background



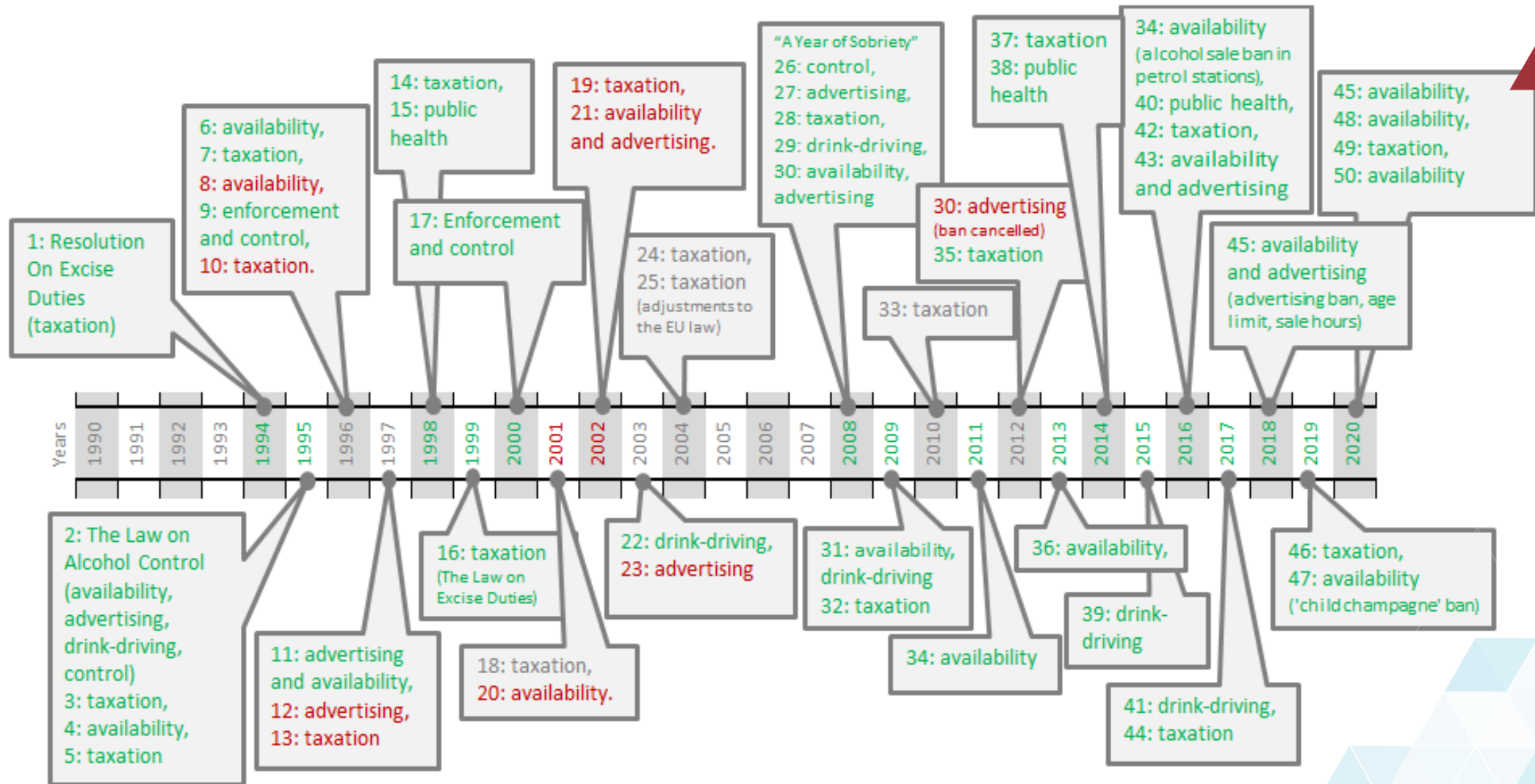
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Background



Alcohol control policies reduce all-cause mortality in Baltic Countries and Poland between 2001 and 2020

Study design

- Setting: Baltic countries and Poland
- Period: 2001-2020
- Target group: men and women aged 20+years of age in Estonia, Latvia, Lithuania, and Poland
- Data sources: data obtained from Statistics Estonia, Official Statistics of Latvia, from Statistics Lithuania and The State Register of Death Cases and Their Causes, and from the National Statistical Office (Poland)
- Design, methods: Interrupted time-series analyses were conducted by employing a generalized additive mixed model (GAMM)

Evaluated policies

	Estonia	Latvia	Lithuania	Poland
2002		Availability		
2008	Taxation Taxation Availability	Taxation	Taxation, Marketing	
2009			Availability	Taxation
2010	Taxation	Taxation		
2016	Taxation			
2017	Taxation		Taxation	
2018	Taxation		Availability, Marketing	
2019		Taxation		
2020				Taxation *

* Not included in data analysis

Main results

Between 2001 and 2020, alcohol control policies, **including excise taxation and availability restrictions**, significantly reduced **men age-standardized all-cause mortality rates by 2.31% per year** in the Baltic countries and Poland.

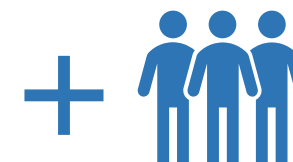
Among women rate reduced by 1.09%, but not significantly ($p=0.0554$)

Policies implemented in 2001-2020

A total of 18 policies, classified as “best buys” and expected to reduce affordability and availability were evaluated in the study period.

Men deaths avoided per year:

172 in Estonia,
317 in Latvia
478 in Lithuania
4340 in Poland

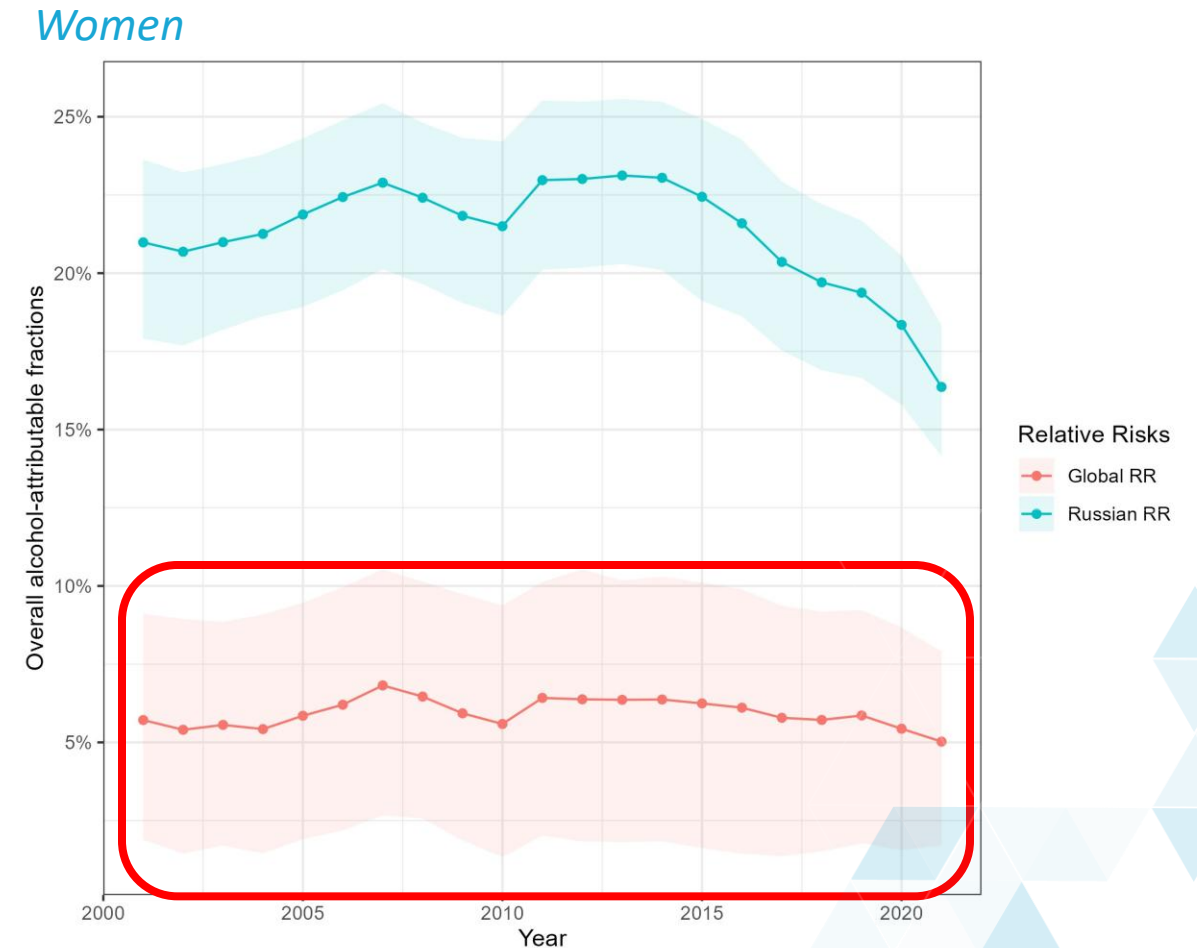
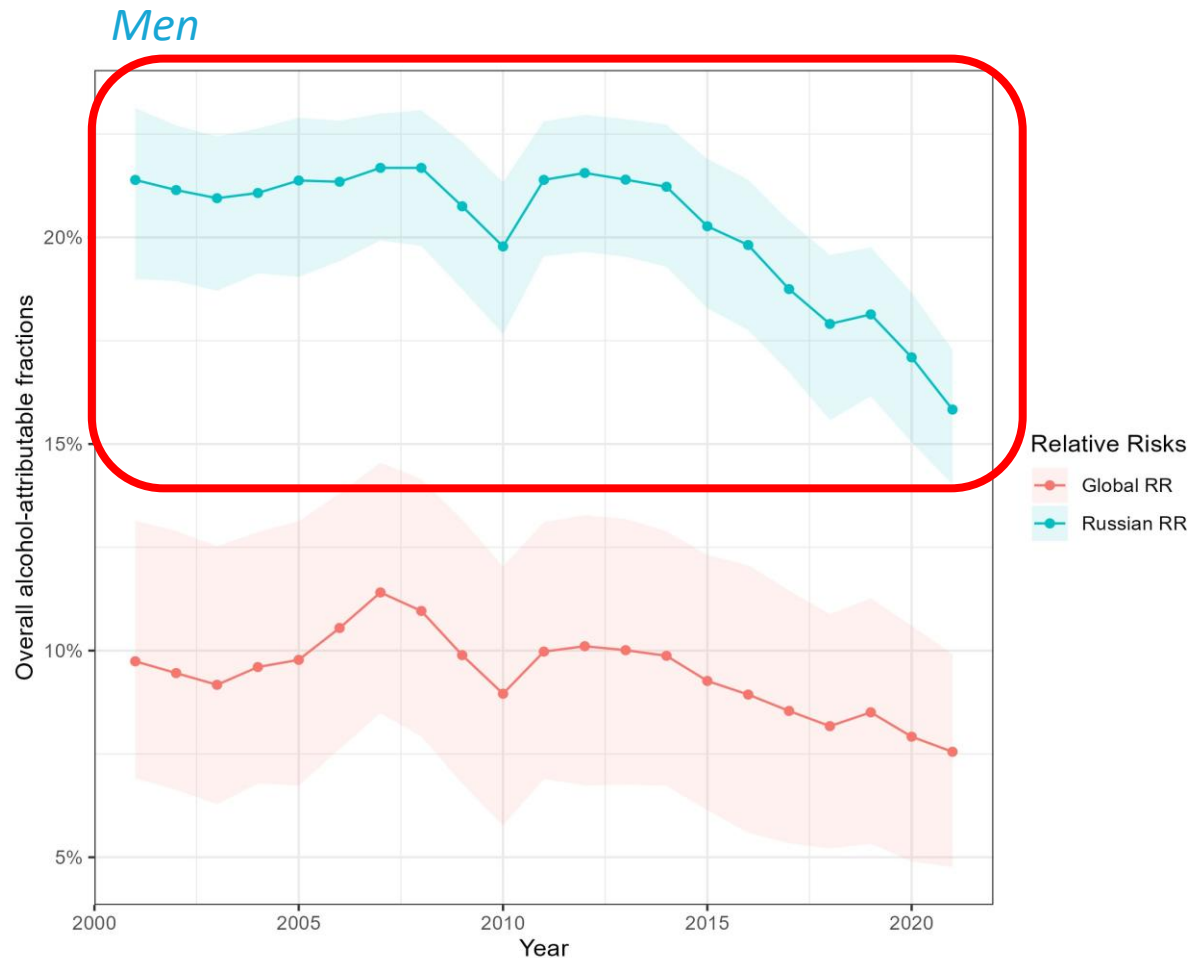


Women deaths avoided per year:

84 in Estonia,
159 in Latvia
218 in Lithuania
1892 in Poland



Overall alcohol-attributable fractions for Lithuania 2001-2021, based on different relative risks.



Impact of Lithuanian alcohol control policy on overall mortality in different age groups

Age group 20+

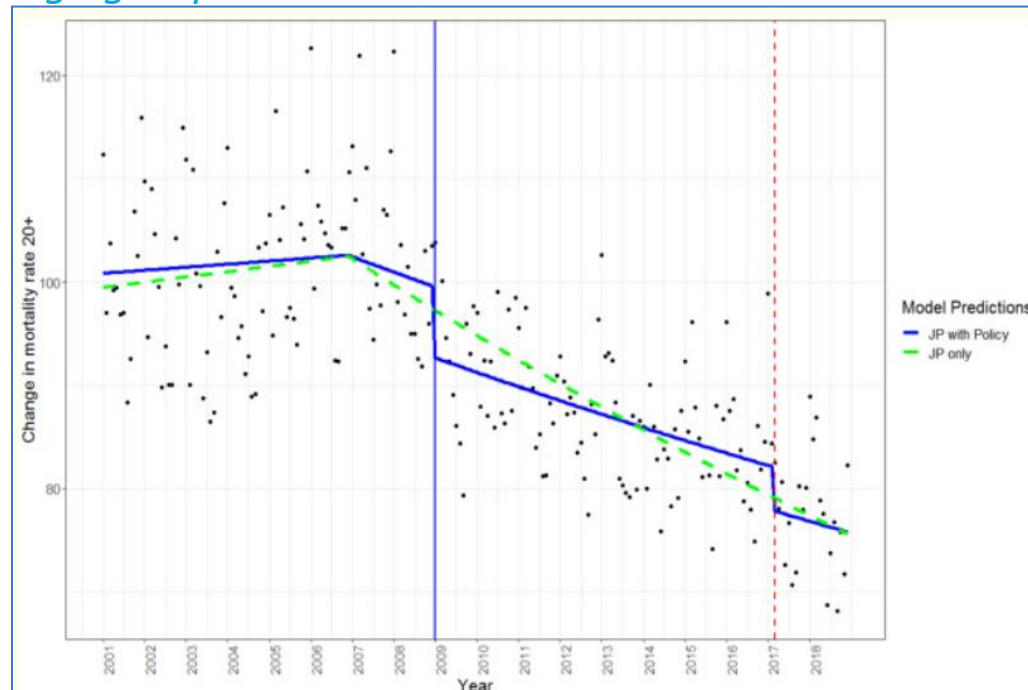


Figure 1

Scatterplot trend of mortality rate (deaths per 100,000 people) for all ages 20+. Joinpoint (JP) modeled with and without policy effects. Alcohol control policy implemented in 2009 (increased taxation and reduced availability) and 2017 (increased taxation) shown by the solid blue line and dashed red line, respectively.

Age group 20-29

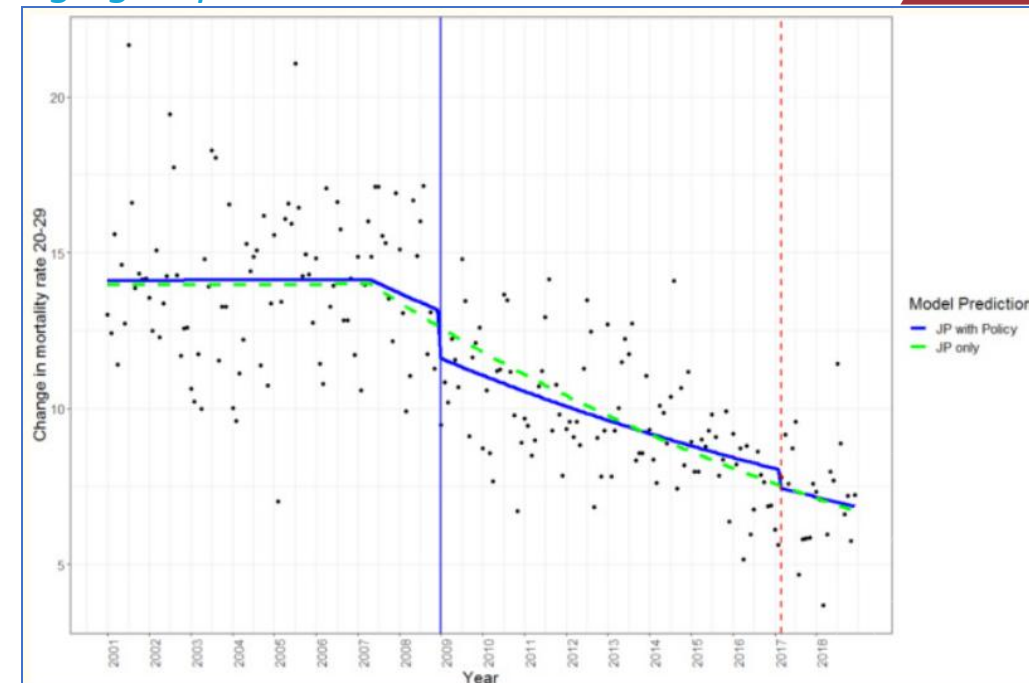


Figure 2

Scatterplot trend of mortality rate (deaths per 100,000 people) for ages 20–29. Joinpoint (JP) modeled with and without policy effects. Alcohol control policy implemented in 2009 (increased taxation and reduced availability) and 2017 (increased taxation) shown by the solid blue line and dashed red line, respectively.

The impact of the Lithuanian alcohol control policy on cardiovascular mortality.

In the ICD-10 cardiovascular disease categories studied, the mortality trends for alcoholic cardiomyopathy were most closely aligned with the selected dates of entry into force of the alcohol control policy (1 January 2008, 1 January 2009, 1 April 2014, and 1 March 2014). , 2017 m.)

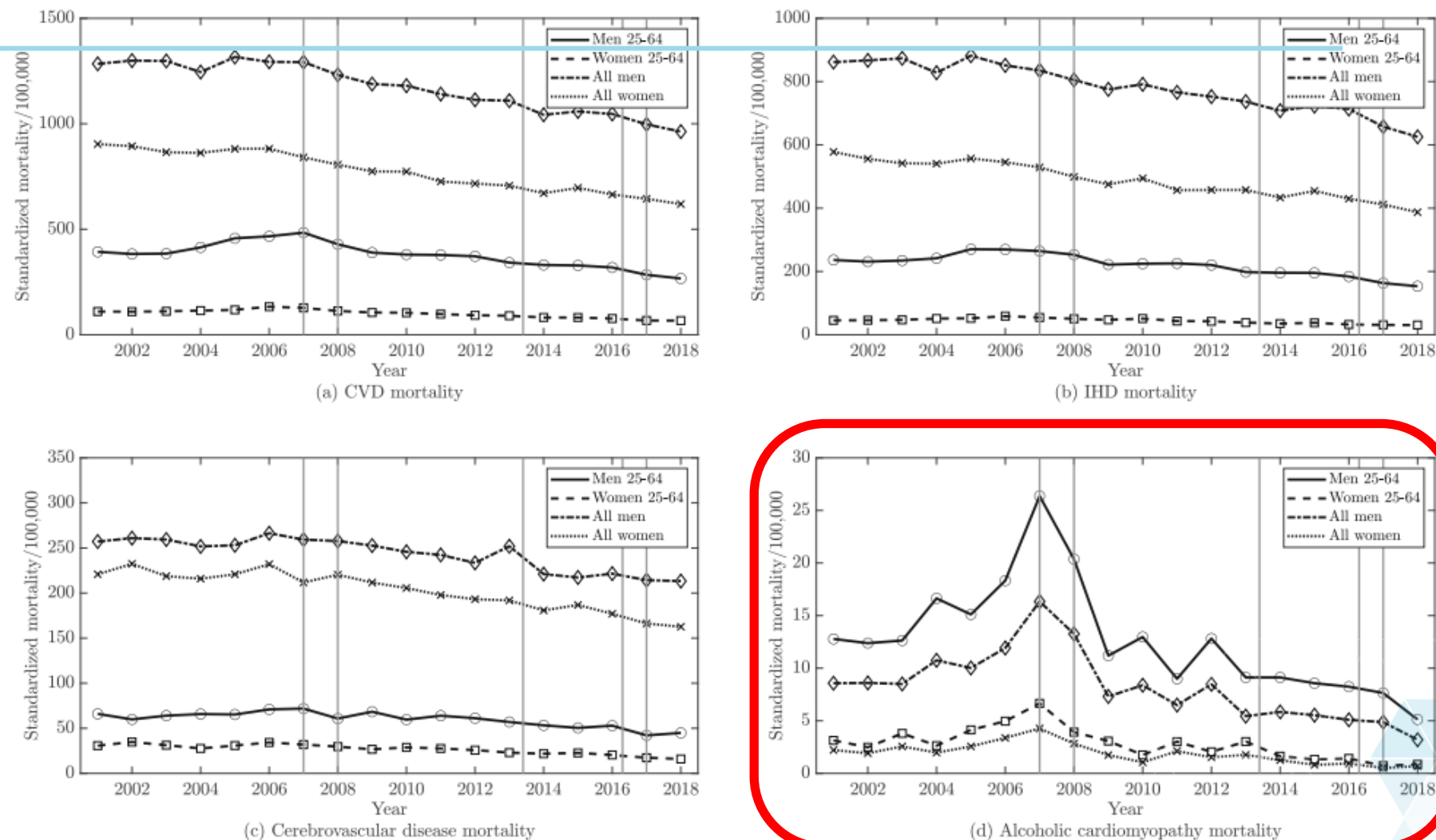
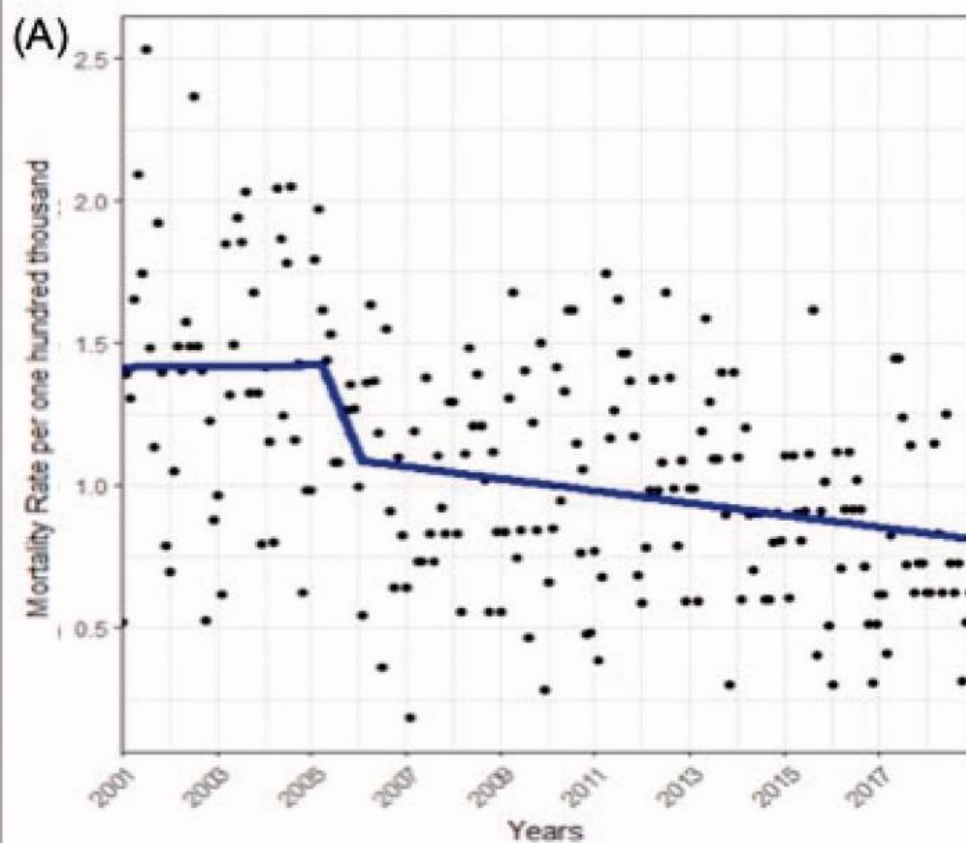


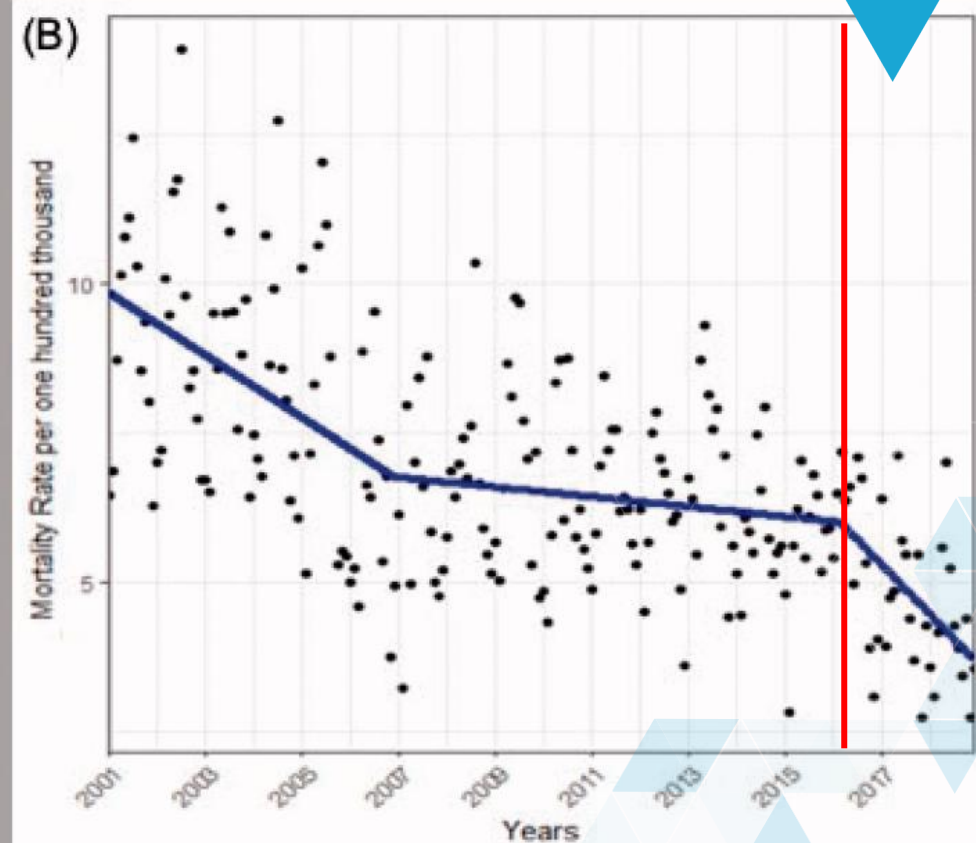
Fig. 1 The trends in age-standardized mortality rates from cardiovascular diseases, ischemic heart diseases, cerebrovascular diseases and alcoholic cardiomyopathy per 100,000 people among Lithuanian men and women in all ages and in 25–64 years' during 2001–2018. Note: Vertical lines illustrate time points of the five alcohol policies investigated in this analysis. As the mortality trends describes the end of the year state, each of the timeline policy points was visualized by setting it 1 year earlier with an aim to indicate an end of the year line before the initiation of a specific policy

Association between alcohol control policies and suicide

Women



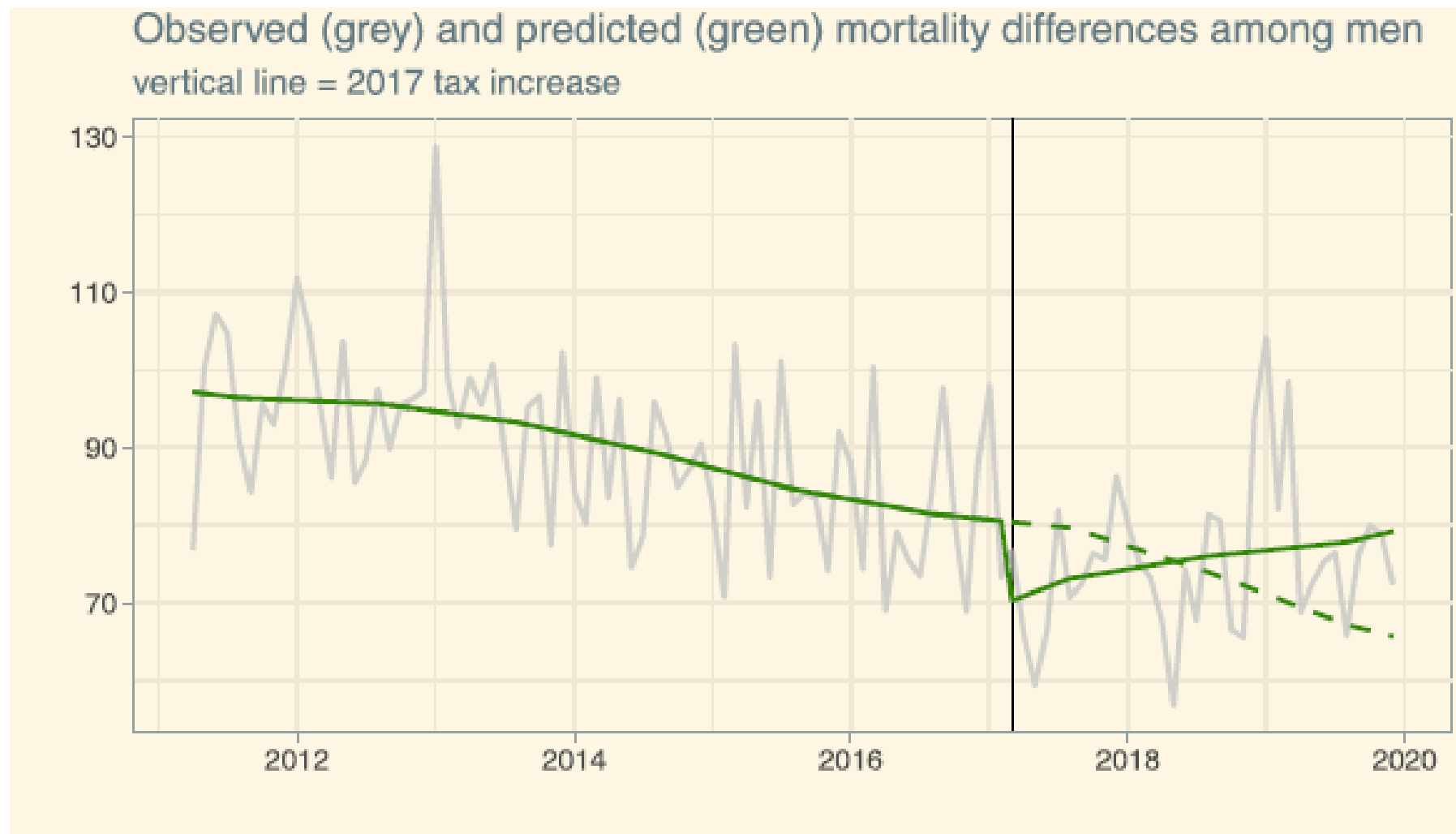
Men



The impact of alcohol control policy in the year following the 2017 excise duty increase resulted in around 57 (95% CI: 9-107) suicide deaths prevented among men aged 25-74.

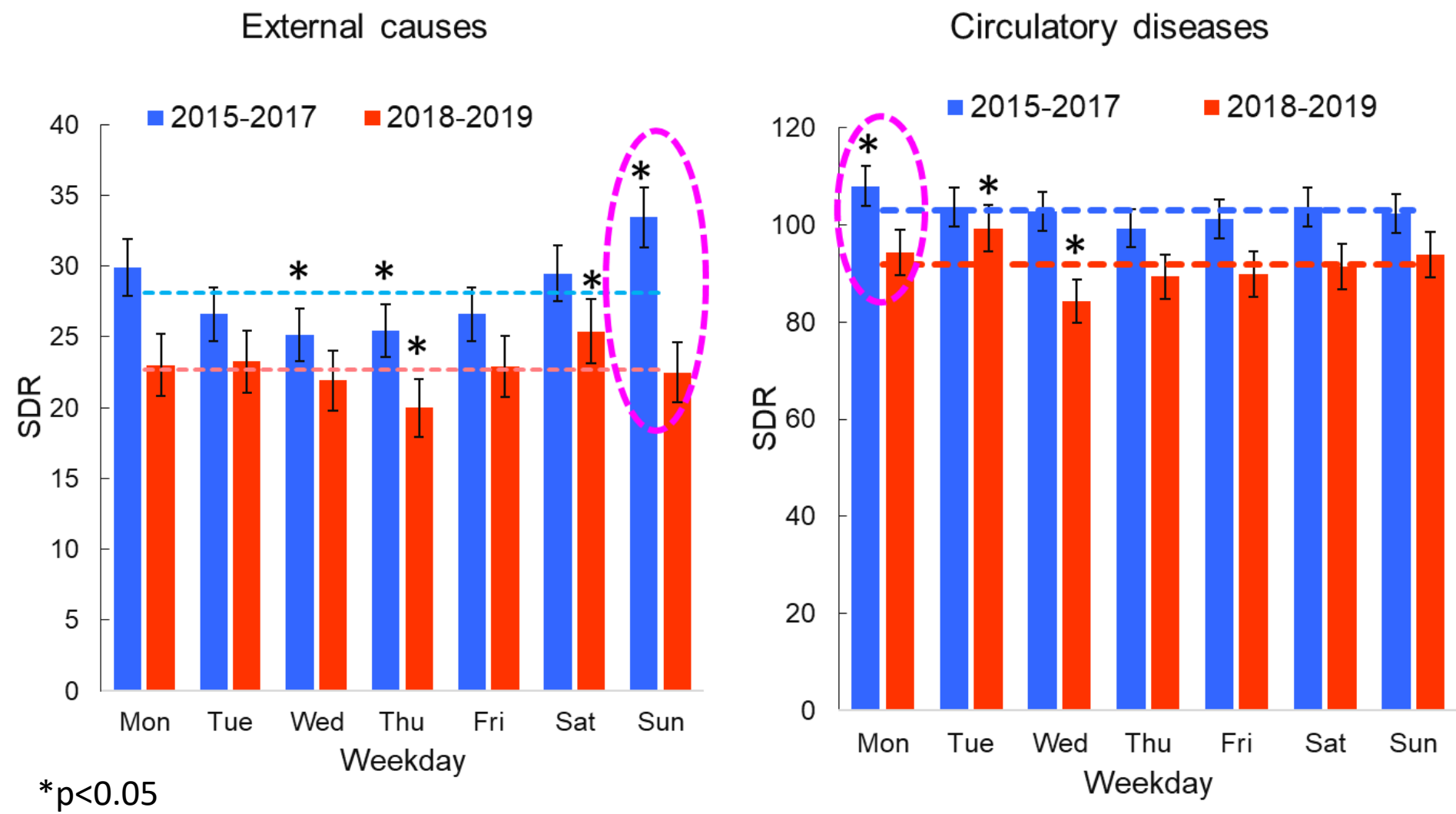
The impact of alcohol taxes (excise duty) on reducing mortality inequalities

Manthey et al. (2023) demonstrated that following the alcohol taxation increase, a **pronounced yet temporary reduction of mortality inequalities among Lithuanian men was found (– 13%)**. The reduction in mortality inequalities between lower and higher educated men was mainly driven by narrowing mortality differences in injuries and infectious diseases.

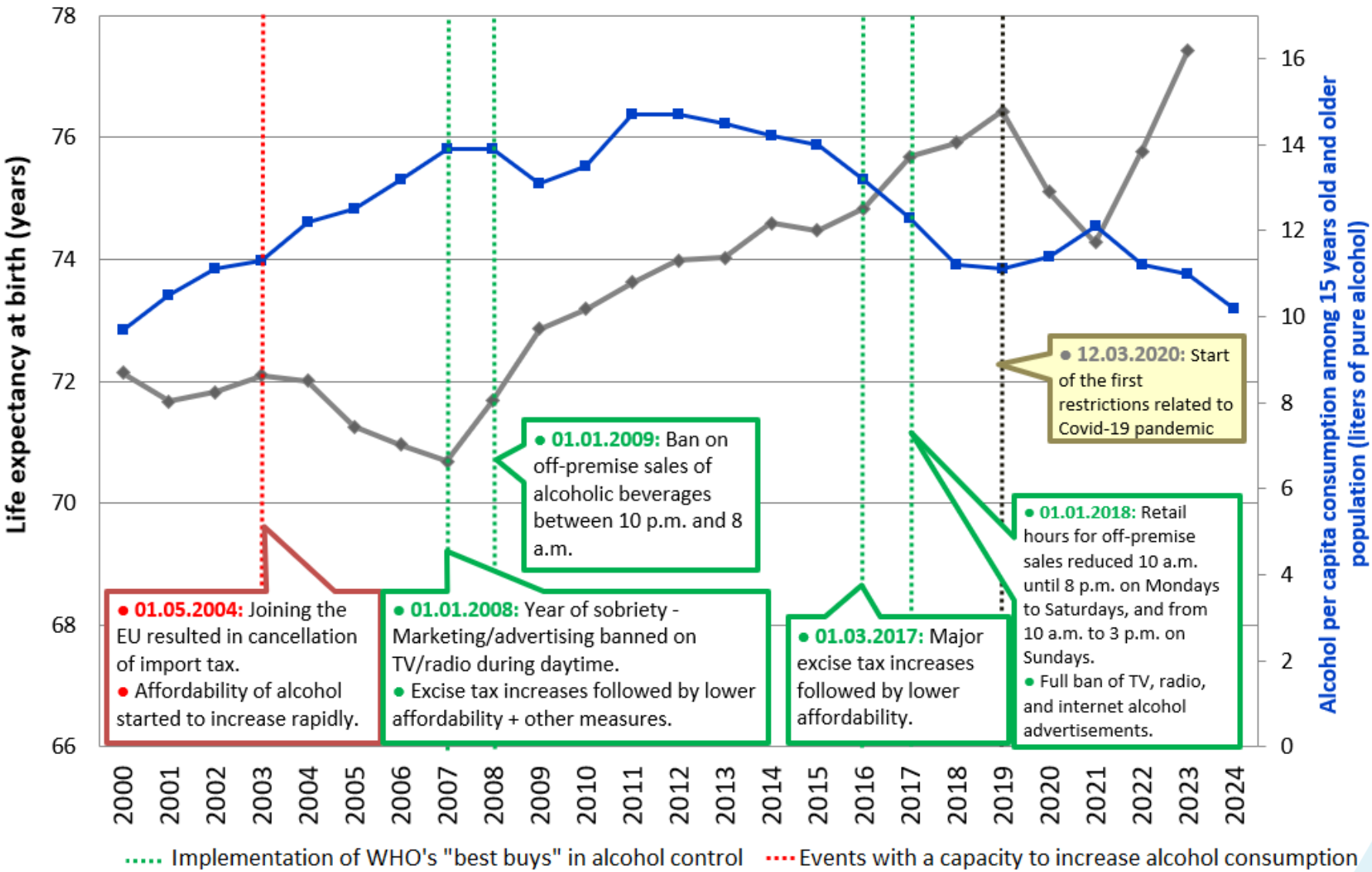


Weekly pattern of alcohol-attributable male mortality before and after imposing limits on hours of alcohol sale in Lithuania in 2018

Stumbrys *et al.* (2024) demonstrated that during 2018-2019, earlier observed peak in age-standardised death rates for **external causes of death for males on Sunday** have declined, and this day no longer differed from the weekly average. **On Mondays excess mortality due to circulatory diseases** have declined in males.



Reflection of WHO's "best buys" alcohol control policy measures on life expectancy at birth and alcohol consumption in Lithuania (2000–2024)



Source : Statistics Lithuania, alcohol policy selection based on Rehm et al. (2022) doi: 10.1111/add.16102

The economic costs of alcohol consumption in Lithuania, 2015–2020

The total economic cost of alcohol consumption in Lithuania between 2015 and 2020 was estimated at an annual average of **€542.958 million** (in 2020 Euros) or about **1.18% of the Lithuanian GDP**.

Costs, adjusted to 2020 € (95% CI)	2015	2016	2017	2018	2019	2020
Direct costs						
Healthcare (€)	55 518 528 (52 396 112–62 543 011)	55 962 530 (51 409 535–62 541 857)	51 497 412 (46 955 509–57 219 122)	55 984 446 (52 071 417–62 978 069)	62 422 151 (56 938 837–69 660 356)	60 798 351 (56 076 349–67 748 886)
Group I	5 813 638 (5 813 638–5 813 638)	5 979 608 (5 979 608–5 979 608)	5 202 618 (5 202 618–5 202 618)	5 582 438 (5 582 438–5 582 438)	6 091 709 (6 091 709–6 091 709)	5 351 640 (5 351 640–5 351 640)
Group II	28 011 670 (25 571 976–33 779 723)	27 958 346 (24 523 115–32 873 608)	24 818 604 (21 176 721–29 275 200)	26 453 799 (23 514 444–32 078 656)	31 600 297 (26 860 369–36 846 248)	31 406 617 (28 088 945–37 060 446)
Group III	21 693 219 (19 537 030–24 650 743)	22 024 576 (19 866 810–24 904 899)	21 476 190 (19 301 393–24 292 690)	23 948 208 (20 989 828–26 804 468)	24 730 144 (22 350 856–28 120 160)	24 040 096 (21 268 099–26 954 326)
Childcare (€)	59 607 040	54 961 355	60 650 967	57 106 191	58 686 543	58 877 716
Child guardianship	53 137 560	48 544 824	57 392 582	49 735 118	47 857 900	45 119 514
Social benefits	3 365 029	3 110 871	3 258 385	3 632 236	4 217 248	4 723 450
Workforce	3 104 451	3 305 661	2 682 207	3 738 837	6 611 395	9 034 752
Law enforcement (€)	54 643 968 (49 212 651–62 093 800)	70 330 431 (63 440 101–79 528 082)	75 726 925 (68 058 399–85 658 149)	70 337 433 (61 648 481–78 726 452)	83 912 140 (75 838 949–95 414 842)	85 521 702 (75 660 431–95 888 963)
Traffic accidents	18 189 374 (16 381 448–20 669 205)	21 700 091 (19 574 115–24 537 978)	16 990 072 (15 269 564–19 218 238)	20 617 166 (18 070 278–23 076 139)	21 468 588 (19 403 094–24 411 509)	27 050 991 (23 931 816–30 330 213)
Imprisonment	7 889 260 (7 105 109–8 964 834)	11 453 429 (10 331 327–12 951 282)	11 868 492 (10 666 623–13 424 988)	12 469 219 (10 928 866–13 956 400)	14 211 096 (12 843 846–16 159 157)	12 828 297 (11 349 102–14 383 392)
Pre-trial Investigations	10 521 625 (9 475 832–11 956 080)	8 319 744 (7 504 652–9 407 781)	10 617 559 (9 542 366–12 010 001)	11 967 523 (10 489 146–13 394 869)	16 486 983 (14 900 769–18 747 024)	15 484 624 (13 699 134–17 361 728)
Financial loss due to criminal offences	8 211 421 (7 395 250–9 330 917)	19 643 911 (17 719 381–22 212 896)	25 056 094 (22 518 776–28 342 082)	10 977 338 (9 621 281–12 286 585)	14 499 822 (13 104 793–16 487 462)	9 697 321 (8 579 149–10 872 866)
Court system	9 832 288 (8 855 011–11 172 763)	9 213 256 (8 310 626–10 418 144)	11 194 708 (10 061 070–12 662 840)	14 306 186 (12 538 909–16 012 460)	17 245 651 (15 586 446–19 609 691)	20 460 469 (18 101 229–22 940 763)
Indirect costs						
Productivity loss (€)	366 535 636 (344 021 890–392 561 216)	359 117 137 (333 772 957–379 460 639)	328 950 079 (302 954 634–347 895 986)	333 187 702 (312 740 240–356 799 429)	351 844 266 (321 314 119–369 015 447)	385 567 773 (362 882 201–411 725 516)
Male	308 239 995 (286 859 654–332 379 063)	306 364 161 (281 553 117–325 882 889)	280 139 914 (255 478 051–297 968 243)	283 405 653 (262 521 552–305 790 191)	298 833 683 (269 424 404–313 897 627)	325 997 452 (305 098 648–350 249 679)
Female	58 295 641 (50 470 151–66 496 069)	52 752 976 (45 034 171–60 929 980)	48 810 165 (41 187 467–56 320 841)	49 782 049 (42 702 499–57 605 360)	53 010 583 (45 692 510–60 311 207)	59 570 320 (50 904 368–68 756 963)
Total alcohol-attributable costs (€)	536 305 171 (512 434 726–568 408 233)	540 371 454 (511 563 694–568 227 235)	516 825 382 (487 247 350–542 275 206)	516 615 771 (490 644 249–548 863 578)	556 865 100 (522 595 473–582 048 198)	590 765 543 (562 753 299–623 752 984)
Alcohol-attributable % of GDP (%)	1.29%	1.26%	1.15%	1.10%	1.12%	1.18%

Group I: fully alcohol-attributable causes; Group II: partially alcohol-attributable causes; Group III: external causes.

An Example of the Return on Investment for Increased Alcohol Excise Taxation: Rehm *et al.* (2025)

The WHO and others rely on investment cases to increase NCD prevention and control:

- An NCD investment case supports governments to identify and understand, scale-up, and prioritize increased investments in NCD prevention and control.
- There are two major components of the investment case: an economic and a political economy component. These are quantitative (economic) and qualitative (policy analysis) exercises.
- A return on investment (ROI) analysis is the result of the economic component. It quantitatively evaluates costs of inaction (baseline or 'business as usual' scenario) and the potential returns from implementing a set of country-specific priority interventions.

Alcohol control policies are important components of such investments for NCD.

Source: Rehm et al. (2025). A return on investment analysis for the 2017 increase in alcohol excise taxation in Lithuania. *Addiction*. 2025 Oct;120(10):2094-2104. doi: 10.1111/add.70083. Epub 2025 May 6. PMID: 40329451; PMCID: PMC12426354.

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RESEARCH REPORT

ADDICTION

SSA

A return on investment analysis for the 2017 increase in alcohol excise taxation in Lithuania

Jürgen Rehm^{1,2,3,4,5,6,7,8} | Pol Rovira⁸ | Ahmed S. Hassan^{1,4} |
Claire de Oliveira^{1,2,4} | Shannon Lange^{1,2,5,6} | Mark J. Thompson^{9,10} |
Ilona Tamutienė⁹ | Vaida Liutkutė-Gumarov⁹ | Lukas Galkus⁹ |
Mindaugas Štelemėkas^{9,11}

¹Institute for Mental Health Policy Research, Centre for Addiction and Mental Health, Toronto, Canada

²Campbell Family Mental Health Research Institute, Centre for Addiction and Mental Health, Toronto, Canada

³PAHO/WHO Collaborating Centre for Centre for Addiction and Mental Health, Toronto, Canada

⁴Dalla Lana School of Public Health, University of Toronto, Toronto, Canada

⁵Department of Psychiatry Faculty of Medicine, University of Toronto, Toronto, Canada

⁶Faculty of Medicine Institute of Medical Science, University of Toronto, Toronto, Canada

⁷Center for Interdisciplinary Addiction Research (ZIS), Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany

⁸Program on Substance Abuse and WHO European Region Collaboration Centre, Public Health Agency of Catalonia, Barcelona, Spain

⁹Health Research Institute Faculty of Public Health, Lithuanian University of Health Sciences, Kaunas, Lithuania

¹⁰Institute for Wealth and Asset Management, Zurich University of Applied Sciences, Winterthur, Switzerland

¹¹Department of Preventive Medicine Faculty of Public Health, Lithuanian University of Health Sciences, Kaunas, Lithuania

Correspondence

Jürgen Rehm, Institute for Mental Health Policy Research, Centre for Addiction and Mental Health, 250 College Street, Toronto, Ontario, M5T 1R8, Canada.
Email: jtrehm@gmail.com

Abstract

Aims: To conduct a return on investment analysis of Lithuania's 2017 increase in alcohol excise taxation of 112% for beer, 111% for wine, and 23% for ethyl alcohol (spirits), resulting in a marked decrease in alcohol affordability.

Methods: Economic analyses based on costs of the increased taxation and economic benefits derived from a societal perspective. Costs were measured according to World Health Organization standards, based on Lithuanian public data. Benefits were derived from the difference of direct (healthcare, childcare, legal) and indirect costs between 12 months pre- and post-enactment of the policy. All costs and benefits were expressed in 2023 Euros (€).

Results: Overall, there were net benefits from reductions in productivity losses and increases in tax revenue. Tax revenue increased by 20%, or more than €100 million, in the first-year post enactment, and productivity losses decreased over the same time period by about €35.3 million (95% confidence interval [CI]: -51.9 to -17.1; proportionally -7%; 95% CI: -11.0% to -4.0%), the latter based on marked reductions in premature mortality in all alcohol-attributable causes of death. In addition, healthcare costs decreased by about €3.8 million (95% CI: -8.4 to +0.1; proportionally -5%; 95% CI: -11.0% to +0.1%). On the other hand, childcare and legal costs increased compared with the year before, by €5.3 million (no 95% CI possible; proportionally: +7%) and €4.6 million (95% CI: +0.2 to +8.0; proportionally +5%; 95% CI: +0.3 to +8.7%), respectively. The final return on investment was 420 to 1, i.e. for each Euro invested, the return was €420. In the sensitivity analyses, the return on investment varied between 292 to 1 and 530 to 1, meaning that all assumptions resulted in a very positive return.

Conclusions: The increase in excise taxation for alcohol on March 1, 2017 in Lithuania created a large return on investment and reduced alcohol-attributable mortality and hospitalizations.

The usual model (overview)

Exposure **before** the interventions

⇒ Resulting economic **burden** (t_0) of exposure before the intervention

- Healthcare
- Legal system
- Productivity losses
- Damage

(all costs are estimated based on exposure via attributable fraction methodology)

**Inter-
vention
costs**

Exposure **after** the interventions

⇒ Resulting economic **burden** (t_1) of exposure after the intervention

- Healthcare
- Legal system
- Productivity losses
- Damage

(all costs are estimated based on exposure via attributable fraction methodology)

Return on investment (ROI):

$$\frac{\text{Net savings (burden (t}_0) - \text{burden (t}_1) + \text{Revenue after the intervention}}{\text{Cost of the intervention}}$$

- Where costs (t₀) denote costs during the 12 months before the alcohol excise taxation increase (=intervention), and consist of the following direct costs: healthcare, social, law enforcement and justice system, plus productivity losses as indirect costs.
- Costs (t₁) denote costs during the 12 months following the intervention, and consist of the following direct costs: healthcare, social, law enforcement, plus productivity losses as indirect costs.
- Changes in revenue denote the average change in revenue after the intervention.

The intervention and its cost

Increase in excise taxation of alcohol, March 2017 in Lithuania

- The enactment of this policy increased the excise taxation by 112% for beer, 111% for wine and 23% for ethyl alcohol (spirits), leading to **price increases of 25.9%, 7.4% and 5.7%, respectively**. Because of the variety of products in the intermediate products category, the excise taxation increase of 92% to 94% on these products did not lead to average price increase recorded in official statistics.
- The respective increase in alcohol excise taxation was estimated to have resulted in a **6.7% decrease in alcohol affordability**, defined as the amount of alcohol, which can be bought taken in consideration the increased price and increases in disposable household income.

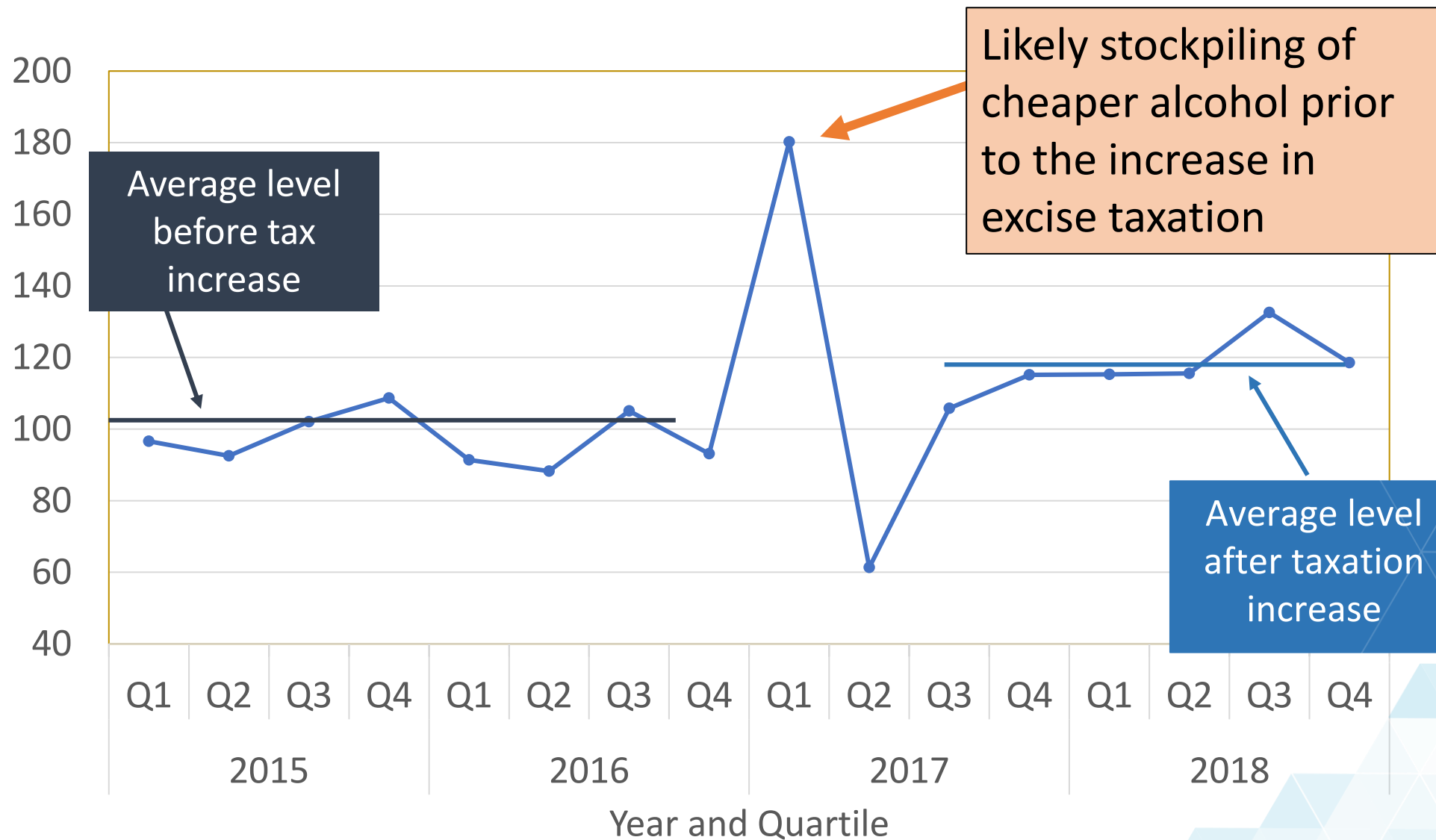
The **cost was estimate to be around €324 000** (personnel, additional meetings, supervision).

Economic burden before and after the intervention



Total costs of alcohol adjusted to 2023 euros	Difference (post-prior)	Proportional change %
Direct costs		
Healthcare costs	-3 813 618 (-8 371 821; 85 815)	-5.4% (-11.2%; 0.1%)
Social costs: childcare-related costs	5 323 951	7.4%
Law enforcement costs	4 616 256 (230 773; 8 006 082)	5.1% (0.3%; 8.7%)
Total direct costs	6 126 589 (-2 447 283; 12 907 074)	2.6% (-1.0%; -5.6%)
Indirect costs		
Loss of productivity	-35 261 364 (-51 908 896; -17 063 845)	-7.3% (-10.8%; -3.6%)
Total alcohol-attributable costs	-29 134 775 (-52 638 199; 6 896 285)	-4.1% (-7.2%; -0.9%)

Excise revenues in 2023 million Euros



Return on investment

Main scenario (based on costs of intervention with meetings included):

420 Euros returned

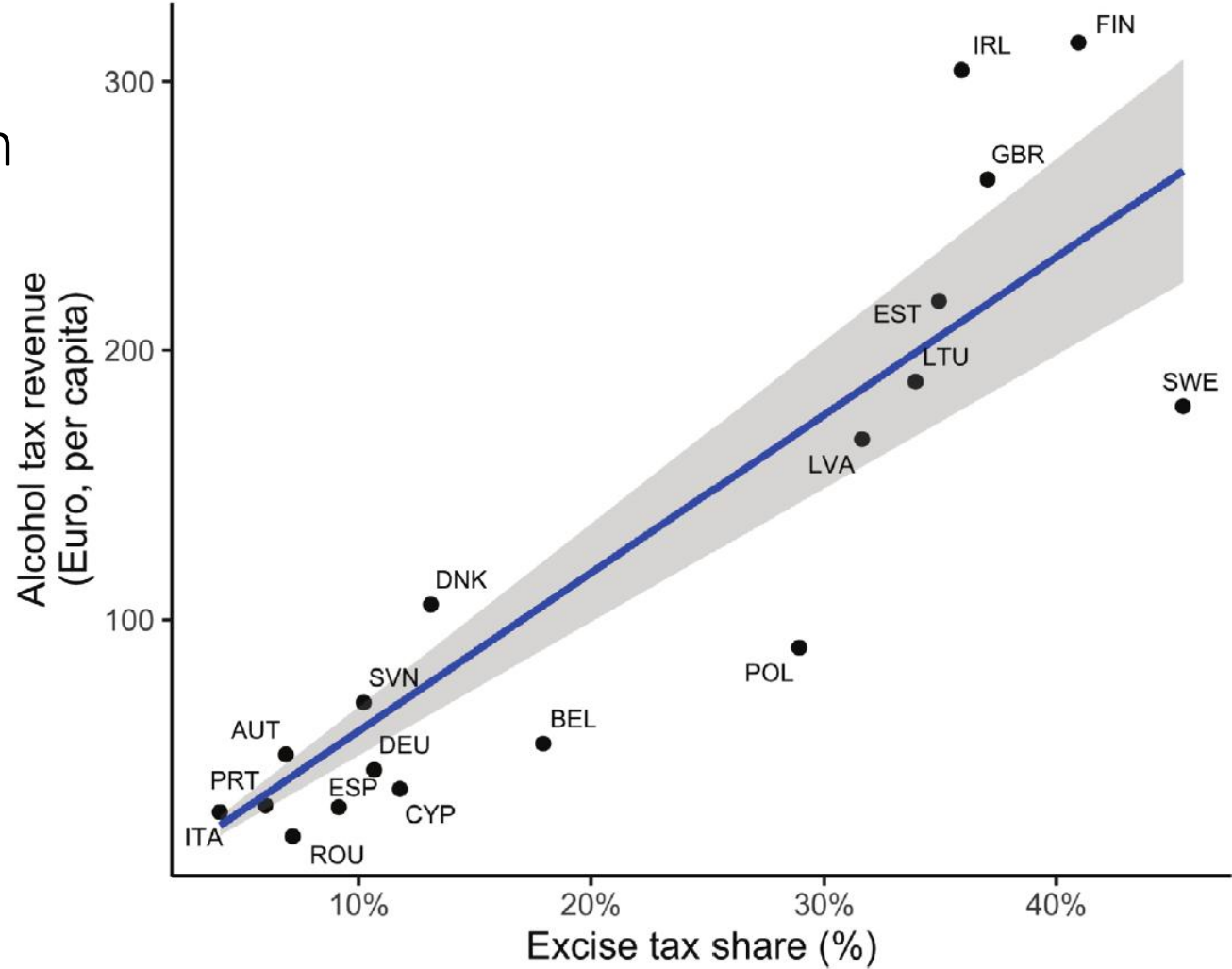
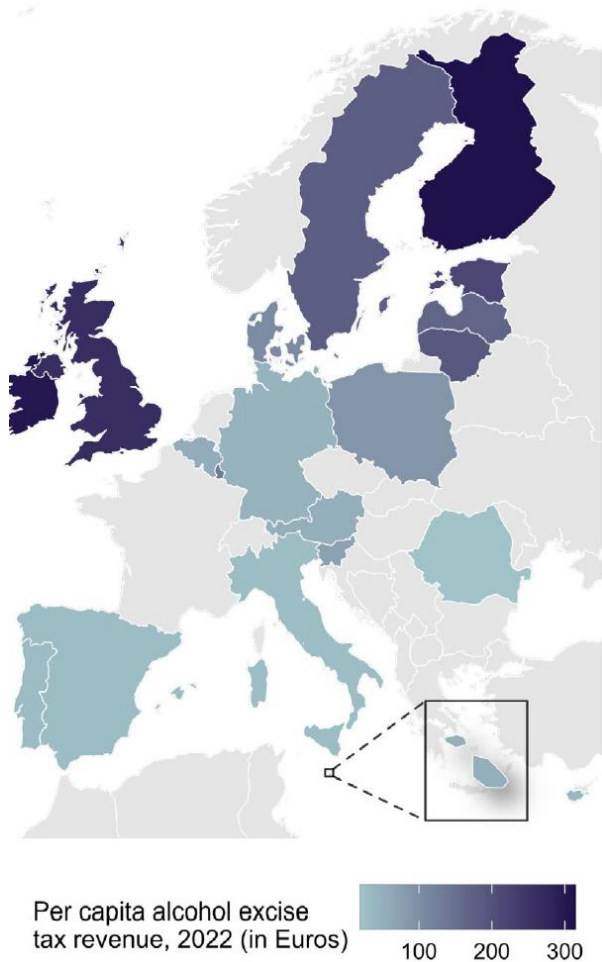
for every Euro invested into the taxation increase in Lithuania; sensitivity analyses show ROI between 292 and 530 Euros .

- Plus massive public health gains on top of the economic impact: almost 1000 deaths postponed, many in younger ages; YLLs avoided; YLDs avoided; and reductions of social harm.

Conclusion: The increase in excise taxation for alcohol on March 1, 2017 in Lithuania created a large return on investment and reduced alcohol-attributable mortality and hospitalizations.

Alcohol Excise Taxation, Tax Share and Revenue in the European Union and the United Kingdom in 2022

Alcohol per capita alcohol tax revenue in the European Union and the United Kingdom in 2022



Association between per capita revenue from alcohol excise taxation and overall tax share. AUT, Austria; BEL, Belgium; CYP, Cyprus; DEU, Germany; DNK, Denmark; ESP, Spain; EST, Estonia; FIN, Finland; GBR, United Kingdom; IRL, Ireland; ITA, Italy; LVA, Latvia; LTU, Lithuania; POL, Poland; PRT, Portugal; ROU, Romania; SVN, Slovenia; SWE, Sweden.

Source: Rehm J, Correia D, Hassan AS, Manthey J, Rovira P, Shield KD, Ferreira-Borges C, Neufeld M, Štelemėkas M. Alcohol Excise Taxation, Tax Share and Revenue in the European Union and the United Kingdom in 2022: An Overview and Modelling Analysis. Drug Alcohol Rev. 2025 Nov;44(7):2003-2012. doi: 10.1111/dar.70028. Epub 2025 Aug 28. PMID: 40874936; PMCID: PMC12581925.

Conclusions

1. Excise taxation is one of the WHO “best buys” interventions and is a powerful fiscal policy tool for a WIN-WIN scenario from a governmental perspective: **improve public health** and **to generate budget revenue**.
2. During the last two decades **Lithuania** was facing a major drinking problem and has successfully **implemented comprehensive alcohol control policies which were shown to be effective**.
3. Lithuania together with other Baltic States and Poland may serve as an example of a **Natural Experiment** to assess the effects of taxation and other alcohol control policies.
4. **Challenges remain** not only to implement new alcohol policies, but also to maintain the ones that are implemented. International and national evidence plays a crucial role in the process.