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### *Descriptive Finding*

## **Cumulative risks of paternal and maternal incarceration in Denmark and the United States**

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## **Cumulative risks of paternal and maternal incarceration in Denmark and the United States**

**Christopher Wildeman<sup>1</sup>**

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### **Abstract**

#### **BACKGROUND**

No research has estimated the cumulative risk of paternal or maternal incarceration in any country other than the U.S., so it remains unclear how much more likely U.S. children are to be exposed to parental incarceration than children living in other countries.

#### **OBJECTIVE**

To estimate the cumulative risks of paternal and maternal incarceration (including even very short jail stays of less than 24 hours) by age 14 for the 1990 Danish birth cohort. We then compare these estimates to equivalent estimates for the 1990 U.S. birth cohort.

#### **METHODS**

We use birth cohort life tables and Danish registry data, which provide administrative records on all incarcerations in Denmark, to estimate the cumulative risks of paternal and maternal incarceration. We follow the full 1990 Danish birth cohort ( $N = 62,982$ ) up to age 14 to see whether each child has ever experienced different lengths of paternal and maternal incarceration.

#### **RESULTS**

We estimate that 1.54% of Danish children experienced paternal imprisonment and that 8.78% of Danish children experienced any paternal incarceration (including jail stays less than 24 hours), indicating that U.S. children are almost as likely to have their fathers sent to prison (which usually results from a sentence of at least one year in the U.S.) as Danish children are to have their fathers spend less than one day in jail. Results for maternal imprisonment are similar.

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## **CONCLUSIONS**

U.S. children are far more likely to be exposed to parental incarceration than Danish children, suggesting that imprisonment contributes not only to inequality among children within the U.S., but also to inequality between children in the U.S. and children in other developed democracies.

## **1. Introduction**

Dramatic increases in U.S. imprisonment have rendered imprisonment common not only for U.S. adults (Bonczar 2003; Bonczar and Beck 1997; Pettit 2012; Pettit and Western 2004; Western and Wildeman 2009) but also for their children (Wildeman 2009). As parental imprisonment has become common for U.S. children, researchers have started to test the association between parental incarceration and the health and well-being of infants, children, and adolescents. Research in this area has shown not only that paternal incarceration is a risk factor for poor health and well-being among U.S. infants (Wildeman 2012), children (Geller et al. 2012; Haskins 2014; Turney 2014; Wakefield and Wildeman 2011, 2013; Wildeman 2010), and adolescents (Foster and Hagan 2007; Lee, Fang and Luo 2013; Roettger and Boardman 2012; Roettger and Swisher 2011; Roettger et al. 2011), but also that maternal incarceration is a risk factor for poor child health and well-being across the life-course (Lee, Fang, and Luo 2013; Cho 2009; Hagan and Foster 2012; Huebner and Gustafson 2007; Turney and Wildeman 2015; Wildeman and Turney 2014). Similar associations exist in a host of developed democracies, including England (e.g., Murray and Farrington 2005), Norway (e.g., Murray, Janson and Farrington 2007), the Netherlands (e.g., Besemer et al. 2011), and Denmark (e.g., Wildeman et al. 2014).

Unfortunately, because no research has estimated the cumulative risk of paternal or maternal incarceration in any country other than the U.S., it remains unclear how much more likely U.S. children are to be exposed to parental incarceration than children living in other countries. In this article we fill this research gap by estimating the cumulative risk of paternal and maternal incarceration for Danish children using the same methods (birth cohort life tables), birth cohort (1990), and age range (birth to age 14) as research that provides companion estimates for Black and White children in the U.S. (Wildeman 2009). We do this in order to be certain that any differences between Denmark and the U.S. in the cumulative risk of paternal and maternal incarceration that we find in this analysis are not driven by the method, birth cohort, or age range used. Unlike U.S.-based research, which can only provide estimates of paternal and maternal prison incarceration (Wildeman 2009), the Danish data provide estimates of the

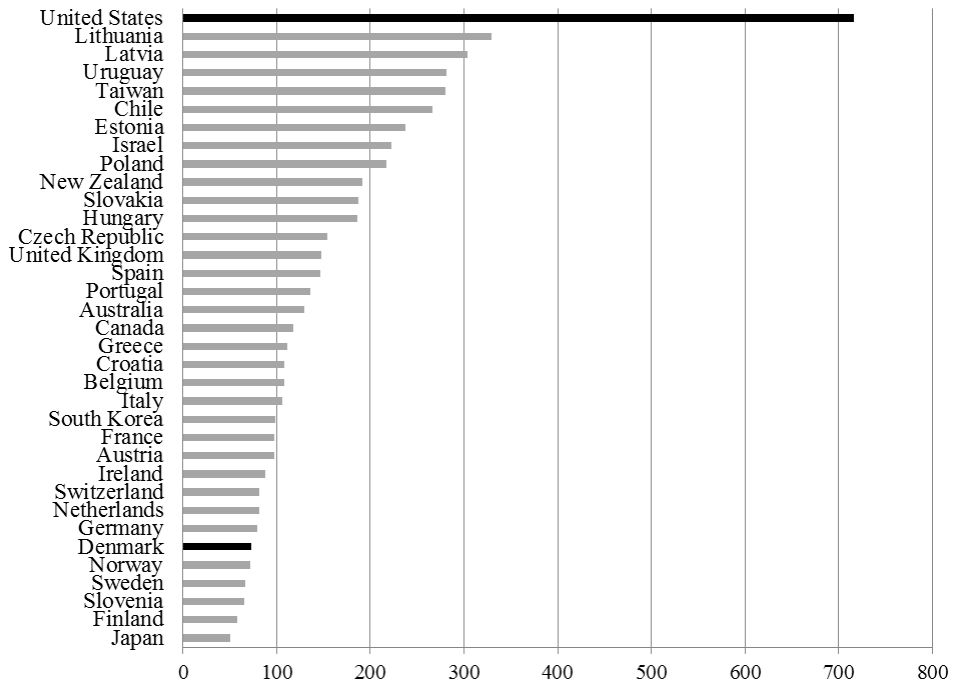
following six lengths of paternal and maternal incarceration: those lasting 1) more than six months, 2) more than three months, 3) more than one month, 4) more than two weeks, and 5) more than 24 hours, as well as 6) any jail entry (including those lasting less than 24 hours)<sup>3</sup>. We also show U.S.-based estimates from Wildeman (2009) in order to facilitate comparisons.

A U.S.–Danish comparison is especially appropriate, not only because the excellent Danish registry data facilitate such a comparison but also because the U.S. incarceration rate and Danish incarceration rate are both extreme relative to those of other developed democracies. As Figure 1 shows, the U.S. incarceration rate exceeds 700 per 100,000, far surpassing the incarceration rates of all other developed democracies. But the Danish incarceration rate is at the other extreme at 73 per 100,000, and only a few countries have lower incarceration rates than Denmark. The U.S.–Danish comparison in cumulative risks of parental incarceration is thus appropriate because it demonstrates how common parental incarceration is in the country with the highest incarceration rate in the world and in a country with one of the lowest incarceration rates among developed democracies.

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<sup>3</sup> We differentiate between prison incarceration and jail incarceration in a way consistent with the U.S. criminal justice system, which does not align perfectly with the criminal justice systems in other countries. Specifically, within the U.S. context, prison incarceration generally occurs as a result of a sentence of at least one year, while jail incarceration occurs as a result of a shorter sentence, being held during trial or while awaiting trial, or being arrested for a relatively minor arrest mandating a short jail stay.

**Figure 1: Incarceration rate (per 100,000) in 35 developed democracies, 2011–2013**



Note: \* Developed democracies are countries with at least 1,000,000 citizens that are considered free by Freedom House and high income or developed by the World Bank in 2013 (list from <http://richleebruce.com/economics/1st-world.html>). Incarceration rates are taken from the World Prison Population List 10th edition (Walmsley 2013).

## **2. Data and method**

### **2.1 Data**

All analyses rely on administrative records from Statistics Denmark, include the entire population of the country, and have basically no attrition. We use data from Denmark for two reasons. First, as mentioned above, the data are extremely high quality and facilitate generating precise estimates. Second, as mentioned above, because Denmark has one of the lowest rates of incarceration in the developed world (Walmsley 2013), having estimates of the cumulative risk of parental incarceration from Denmark and the U.S. means that researchers will have a sense of how large the range in the cumulative risks of parental incarceration is across developed democracies.

The data include complete information on all criminal justice contacts resulting in even a brief incarceration (including those lasting less than 24 hours) for all Danes since 1990. Thus, although the data used to estimate the cumulative risk of parental imprisonment for U.S. children only make it possible to measure prison incarcerations (Wildeman 2009), the Danish data make it possible for us to consider all incarcerations regardless of duration. Because sentences tend to be much shorter in Denmark than in the U.S. – seven months on average in Denmark, with early release available after half the sentence is served for sentences longer than three months, and only 39%, 16%, and 7% of sentences exceeding three months, one year, and two years, respectively (Danish Prison and Probation Service 2014) – we consider first parental incarcerations that last more than 1) six months, 2) three months, 3) one month, 4) two weeks, and 5) 24 hours, as well as 6) any jail entry (including less than 24 hours). We label six months incarcerated – the least amount of time a U.S. adult sentenced to prison could expect to serve with early release for good behavior – as prison incarceration for the Danish results. Results using sentence length instead would yield similar conclusions, although they would exaggerate Danish–U.S. disparities.

Although Statistics Denmark does not allow us to release the individual-level data we use for replication, we have provided collapsed data of counts of first-time paternal and maternal incarcerations in Denmark (by time served), as well as information on the number of children in the 1990 Danish cohort living at each age. This information is provided in Table 1 and Table 2, which we discuss shortly, as well as in a Stata do-file available online through the journal.

## 2.2 Analytic strategy

We use birth cohort life tables to estimate the cumulative risks by age 14 of paternal and maternal imprisonment and incarcerations of shorter duration for the 1990 Danish birth cohort, using methods used in prior U.S.-based research (Wildeman 2009), and Danish registry data.

Tables 1 and 2 show the number of children in the 1990 Danish birth cohort who survived to and had not emigrated by each age, as well as the number of children who experienced different lengths of paternal (Table 1) and maternal (Table 2) incarceration for the first time at each age.

**Table 1: 1990 Danish cohort at risk of paternal criminal justice contact by age and length of contact**

Age	Population	Prison	> 3 months	> 1 month	> 14 days	> 24 hours	All Entries
1	62982	78	86	105	138	249	443
2	62666	99	109	156	192	380	796
3	62424	95	106	157	225	412	716
4	62194	91	99	149	206	328	578
5	61959	88	103	140	194	274	413
6	61781	70	79	119	167	263	426
7	61619	64	72	86	122	193	331
8	61500	71	79	107	129	181	306
9	61350	59	68	81	111	159	250
10	61222	59	59	76	99	126	235
11	61112	40	46	64	76	118	242
12	61020	51	63	62	55	87	209
13	60935	29	38	47	56	79	188
14	60853	42	46	59	63	76	208



**Table 2: 1990 Danish cohort at risk of maternal criminal justice contact by age and length of contact**

Age	Population	Prison	> 3 months	> 1 month	> 14 days	> 24 hours	All Entries
1	62982	6	7	8	12	24	85
2	62666	15	15	16	20	47	170
3	62424	15	15	16	20	40	154
4	62194	17	19	22	24	46	138
5	61959	8	10	12	15	36	124
6	61781	20	19	23	24	40	118
7	61619	12	13	15	16	33	93
8	61500	11	10	15	19	25	86
9	61350	6	7	7	15	28	55
10	61222	7	7	10	13	23	55
11	61112	16	16	17	18	34	82
12	61020	6	7	7	11	20	54
13	60935	11	11	13	15	27	54
14	60853	12	12	13	14	21	76

Before moving on to the results, it is worth noting that the U.S.-based research we use as our point of comparison estimated the cumulative risk of parental imprisonment for Blacks (Hispanic and non-Hispanic) and Whites (Hispanic and non-Hispanic) but not the population (Wildeman 2009). Our U.S. estimates of the cumulative risks of parental imprisonment are therefore based on applying the race-specific cumulative risks presented in previous research to the proportion of U.S. children in those groups in the 1990 birth cohort (Wildeman 2009).

All code used to generate these estimates is available online through the journal.

### 3. Results

#### 3.1 The cumulative risk of paternal incarceration for Danish children

Table 3 presents estimates of the cumulative risk of paternal and maternal incarceration for Danish and U.S. children. For U.S. children, results are presented only for prison incarceration. For Danish children, estimates are presented for the cumulative risk of ever experiencing parental incarceration lasting more than 1) six months, 2) three months, 3) one month, 4) two weeks, and 5) 24 hours, as well as 6) any jail entry (including less than a day).

**Table 3: Cumulative risks of parental criminal justice contact in the U.S. and Denmark, 1990 cohort**

	U.S. <sup>a</sup>	Denmark <sup>b</sup>					
Age	Prison	Prison	> 3 months	> 1 month	> 2 weeks	> 24 hours	All Entries
Paternal							
1	0.95	0.12	0.14	0.17	0.22	0.40	0.70
2	1.80	0.28	0.31	0.42	0.53	1.00	1.98
3	2.57	0.44	0.48	0.67	0.89	1.67	3.13
4	3.27	0.58	0.64	0.91	1.22	2.20	4.07
5	3.90	0.73	0.81	1.14	1.54	2.65	4.75
6	4.46	0.84	0.94	1.34	1.82	3.09	5.46
7	4.95	0.95	1.06	1.48	2.02	3.41	6.01
8	5.43	1.07	1.19	1.66	2.23	3.71	6.52
9	5.88	1.17	1.31	1.79	2.42	3.98	6.94
10	6.33	1.26	1.40	1.92	2.59	4.19	7.34
11	6.77	1.33	1.48	2.03	2.71	4.39	7.75
12	7.18	1.42	1.59	2.13	2.81	4.54	8.10
13	7.58	1.47	1.65	2.21	2.90	4.68	8.42
14	7.96	1.54	1.73	2.31	3.01	4.81	8.78
Maternal							
1	0.03	0.01	0.01	0.01	0.02	0.04	0.13
2	0.06	0.03	0.04	0.04	0.05	0.11	0.41
3	0.09	0.06	0.06	0.06	0.08	0.18	0.66
4	0.13	0.09	0.09	0.10	0.12	0.25	0.88
5	0.16	0.10	0.11	0.12	0.15	0.31	1.08
6	0.20	0.13	0.14	0.16	0.19	0.38	1.28
7	0.24	0.15	0.16	0.18	0.21	0.43	1.43
8	0.28	0.17	0.18	0.21	0.24	0.47	1.57
9	0.32	0.18	0.19	0.22	0.27	0.52	1.67
10	0.37	0.19	0.20	0.24	0.29	0.56	1.76
11	0.42	0.22	0.23	0.26	0.32	0.62	1.90
12	0.47	0.23	0.24	0.28	0.34	0.65	1.99
13	0.52	0.25	0.26	0.30	0.36	0.69	2.08
14	0.58	0.27	0.28	0.32	0.39	0.73	2.21

Notes: <sup>a</sup>U.S. estimates based on Wildeman (2009) and incorporating the racial distribution of the 1990 birth cohort.

<sup>b</sup>Danish numbers are our calculations using data from Statistics Denmark

The estimates indicate that 7.96% of U.S. children born in 1990 could expect to ever have their father imprisoned by their 14<sup>th</sup> birthday. As our estimates show, the cumulative risk of paternal imprisonment is far smaller for Danish children, at 1.54%.

Indeed, according to our estimates, Danish children are 81% less likely to experience paternal imprisonment than are U.S. children. They are also far less likely to have ever had their father incarcerated for more than three months (1.73%), more than one month (2.31%), more than two weeks (3.01%), and even more than 24 hours (4.81%). Interestingly, Danish children are only slightly more likely to have had their father incarcerated for less than 24 hours (at 8.78%) than are U.S. children to have ever had their father imprisoned – usually indicating a sentence of at least a year (at 7.96%).

The cross-national disparities in the cumulative risk of paternal incarceration between Denmark and the U.S. are thus stark, with Danish children only being 10% more likely to have had their father incarcerated, even for less than 24 hours, than U.S. children are to have had their father sentenced to prison for at least a year. To conceptualize just how large this gap is, consider that Danish children are only slightly more likely to have had their father incarcerated, even for 24 hours, by age 14 (4.81%) than U.S. children are to have ever had their father imprisoned by age 6 (4.46%).

### **3.2 The cumulative risk of maternal incarceration for Danish children**

Differences in the cumulative risk of maternal incarceration are also pronounced, although very few children experience maternal incarceration in the U.S. or Denmark. The estimates suggest that only 0.58% of U.S. children born in 1990 could expect to have their mother imprisoned at any point between their birth and their 14<sup>th</sup> birthday. For Danish children from the same birth cohort the parallel risk is 0.27%, which is 53% lower than the risk for U.S. children. Danish children born in 1990 were also less likely to have had their mother incarcerated for more than three months (0.28%), more than one month (0.32%), and more than two weeks (0.39%) than U.S. children were to have their mother sent to prison (0.58%). Yet Danish children were slightly more likely to have ever had their mother experience more than 24 hours in jail (0.73%) or a jail stay of less than one day (2.21%) than U.S. children were to have had their mother sentenced to prison for at least a year.

## **4. Discussion**

Although scholars of child well-being have been considering the association between parental incarceration and child well-being for well over 10 years, no research has compared the cumulative risk of parental incarceration for U.S. children to that of other children living in a country with a much lower incarceration rate. The goal of this article was to fill that research gap by estimating the cumulative risk of paternal and

maternal incarceration for Danish and U.S. children by age 14. By providing these estimates we show how extreme the U.S. risks of parental imprisonment are in comparative perspective and, in so doing, greatly expand research in this area by showing how mass imprisonment may have exacerbated not only racial disparities in child well-being in the U.S. (Wakefield and Wildeman 2011, 2013), but also disparities between the U.S. and other developed democracies in child well-being, with implications for the standing of the U.S. relative to the rest of the world in terms of the well-being of its population of children.

Results for the cumulative risk of paternal and maternal incarceration for Danish and U.S. children further reinforce just how common an experience parental incarceration is for U.S. children relative to children living in other developed democracies. As the cumulative risks of maternal incarceration are low in both Denmark and the U.S., implying that elevated cumulative risks of maternal incarceration in the U.S. are unlikely to play a substantial role in contributing to differences across countries in child health and well-being, we focus our discussion primarily on the paternal incarceration results. Roughly 1 in 12 U.S. children can expect to have their father experience imprisonment at some point between their birth and their 14<sup>th</sup> birthday; roughly 1 in 65 Danish children experience this event over the same period. In fact, Danish children are only slightly more likely to have their father locked up for any period of time – including for less than 24 hours – than U.S. children are to have ever had their father sentenced to prison for at least a year (1 in 11 to 1 in 12), showing just how pervasive an experience the incarceration of a father is for U.S. children.

Although these results provide a unique demonstration of how the comparatively novel U.S. experiment in mass imprisonment affects U.S. children, they are not without their limitations. First, and maybe most importantly, the results presented here consider only one country other than the U.S., making the comparison somewhat incomplete. Future research should thus seek to provide estimates of the cumulative risk of incarceration for men and women in other countries and paternal and maternal incarceration for the children that are left behind, paying special attention to developed democracies with somewhat higher incarceration rates (albeit still much lower than the U.S.), such as the United Kingdom, Australia, and Spain, to name three such countries. Second, and in a similar vein, the analyses herein do not show how much of the difference in the cumulative risk of paternal and maternal incarceration is due to differences in the incarceration rate and how much of it is due to differences in the age patterning of fertility in the U.S. and Denmark. Future research must also formally decompose these differences into components strictly due to differences in the criminal justice system and components due to differences in the timing of fertility. Third, our analyses of the Danish data provided only population-level estimates for the entire birth

cohort, rather than considering variations within the birth cohort in the cumulative risk of parental incarceration. Although considering just the total cumulative risk of parental incarceration was necessary for this article because of the relatively small size of Danish birth cohorts and low cumulative risks of parental incarceration for them, future research might consider pooling numerous Danish birth cohorts in order to provide relevant information on disparities in the cumulative risk of parental incarceration in the Danish context. Finally, and maybe most importantly, the analysis included in this article provides no insight into how parental incarceration affects children. Although this is an area that has already been heavily researched in the last 10 years, the unique Danish registry data could be used to consider how the timing, duration, frequency, and conditions of confinement shape the effects of parental incarceration on children, and future research should consider these types of effects.

In conclusion, by showing how common parental incarceration is in the U.S. relative to Denmark, a country with a far lower incarceration rate, the results show how high rates of incarceration in the U.S. could contribute to a divergence between the U.S. and other developed democracies in child well-being, both because parental incarceration is much more common in the U.S. and because it is so damaging to child well-being. Future analyses of the connections between parental incarceration and child well-being should be alert to the fact that high rates of incarceration in the U.S. may contribute not only to growth in racial disparities in child health and well-being in the U.S., but also to growing inequality between the U.S. and other developed democracies.

## **5. Acknowledgements**

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