LIFESAVING POLICIES: OUTCOMES, SPILLOVER EFFECTS, AND HOW TO ADDRESS THEM

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To my mom, Nicholas Nesh. I wouldn't be who I am without you.

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I.   INTRODUCTION

Over the past several years, mass shootings have become an almost daily occurrence in the United States.[1] Their frequency has animated the long-standing, highly polarized debate about the optimal level of gun control legislation in the United States. Despite their increasing prominence, however, mass shootings are far from the greatest contributors to the social cost of gun violence. That distinction belongs to firearm suicide, followed by firearm homicide. On average, from 1990 to 2018, firearm-related suicides killed about 19,000 people per year, and firearm-related homicides killed an additional 14,500.[2] To put this in perspective, this death toll is the equivalent of over eleven September 11, 2001 attacks every year. From 2006 to 2018, firearm-related suicide rates increased by more than twenty-five percent. Reducing this common source of violent, firearm-related deaths is an important public policy goal and an important task for researchers. Suicide prevention is as pressing now as ever because physical distancing, the primary public health intervention to limit the spread of COVID-19, also has the potential to worsen social isolation, a known suicide risk factor. Evaluating the best ways to reduce firearm access among high-risk persons is therefore critical.

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[1] The Gun Violence Archive defines a mass shooting as a shooting in which four or more people, excluding the shooter, are shot or killed. By this measure, an average of 378 people died in 334 mass shootings per year from 2013 through 2019 (inclusive), or 1.0 people in 0.92 shootings per day.
[2] I computed these averages using data from the Centers for Disease Control and Prevention Underlying Cause of Death records.

Extreme Risk Protection Order laws are one potential tool to curb gun violence. Extreme

Risk Protection Order ("ERPO") laws,[3] also known as Gun Violence Restraining Orders,[4] Risk

Warrants,[5] and Proceedings for the Seizure and Retention of a Firearm,[6] are risk-based firearm

seizure laws that permit police or family members to petition a state court to order the temporary

removal of firearms from a person who may present a danger to themselves or others. Although

a large body of research examines the impact of gun control policies on gun-related violence,

ERPO laws have received much less attention from researchers, despite their potential to deter

gun-related violence at minimal cost to responsible gun owners. ERPO laws differ from

prohibited purchaser laws that prevent specific groups of individuals from owning, purchasing,

or possessing firearms, because they can be applied to any at-risk individual.[7] They also differ

from laws requiring removal of firearms from prohibited possessors, because a court can order

firearm removal from anyone if it determines that they are at high risk for violence, regardless of

whether they have committed a crime, been diagnosed with a mental illness, or have otherwise

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[3] Oregon, Washington, Maryland, Vermont, and Colorado. Or. Rev. Stat. Ann. § 166.525, et seq.; Wash. Rev. Code Ann. § 7.94.010, et seq.; Md. Code Ann., Pub. Safety § 5-601 et seq.; Vt. Stat. Ann. tit. 13, § 4051, et seq.; 2019 CO HB 1177. New Mexico calls the orders associated with its law Extreme Risk Firearm Protection Orders. 2020 NM SB 5. Florida calls them Risk Protection Orders. Fla. Stat. § 790.401, et seq.

[4] California. Cal. Penal Code § 18100 et seq.

[5] Connecticut. Conn. Gen. Stat. § 29-38c

[6] Indiana. Ind. Code Ann. § 35-47-14-1, et seq.

[7] 18 U.S.C. § 922(d)(4) (Under federal law, formal and involuntary commitment to a mental institution, being found not guilty by reason of insanity, or some other formal adjudicative proceeding regarding their mental illness is necessary to prevent a person suffering from mental illness from purchasing or possessing a firearm.); *See* 27 C.F.R. § 478.11 (defines "adjudicated as a mental defective" and "committed to a mental institution."). 18 U.S.C. § 922(d)(9) (A person who has committed a violent act towards others is only prohibited from possessing firearms under federal law if they are subject to a domestic violence restraining order, have been convicted of a felony, or have been convicted of a domestic violence misdemeanor). Most states have laws mirroring the federal prohibitions on gun possession by seriously mentally ill individuals, and every jurisdiction now has domestic violence laws. Michelle R. Waul, *Civil Protection Orders: An Opportunity for Intervention with Domestic Violence Victims*, 6 GEO. PUB. POL'Y REV. 51, 52, 59 (2000). However, these laws do not provide a process to disarm high-risk individuals who have not been adjudicated mentally ill, nor do domestic violence order protect individuals other than the victim, such as people outside the family, or suicidal individuals.

been disqualified from possessing a firearm. By providing a legal framework for identifying and disarming high-risk individuals, ERPO laws may decrease the overall rates of firearm-related fatalities, including homicides, suicides, and mass shootings.

Nineteen states and the District of Columbia currently have ERPO laws.[8] In light of their increasing popularity and to inform policymakers considering future laws and expansions of existing laws, it is important to empirically evaluate their effectiveness. I exploit variation in the existence and timing of enactment of ERPO laws across states to examine their effect on homicide and suicide rates. Because fatality data are available through 2018, I constrain my analysis to the ERPO laws of the five states which passed them before 2018: Connecticut, Indiana, California, Washington, and Oregon. The details of these states' statutes are summarized in Table A.1. With a difference-in-differences approach, I find that ERPO laws reduce firearm-related suicides by about 6.4%, with no statistically significant substitution to non-firearm suicides. ERPO laws have no statistically significant effect on overall or firearm-related homicides.

My data and approach offer advantages over previous work in this area. First, two previous studies in the psychology literature examined the effect of ERPO laws on suicides within single states. My difference-in-differences approach levies variation within states across time and is more resilient against threats to identification. Second, I build upon work by Kivisto

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[8] California, Colorado, Connecticut, Delaware, Florida, Hawaii, Illinois, Indiana, Maryland, Massachusetts, Nevada, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia. *See* CAL. PENAL CODE § 18150; COLO. REV. STAT. § 13-14.5-103; CONN. GEN. STAT. § 29-38c; DEL. CODE ANN. tit. 10, §§ 7701, 7704; FLA. STAT. § 790.401(3)(a); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35, 67/40; IND. CODE ANN. § 35-47-14-2; MD. CODE ANN., PUB. SAFETY § 5-601(E)(2); MASS. GEN. LAWS ch. 140 § 131R; 2019 NV A.B. 291; N.J. STAT. ANN. §§ 2C:58-21, 23; 2020 NM SB 5; N.Y. C.P.L.R. §§ 6340, 6341; OR. REV. STAT. ANN. § 166.527; R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4053; VA. CODE ANN. § 19.2-152.14; WASH. REV. CODE §§ 7.94.030(1), 7.94.020(2); D.C. CODE § 7-2510.04.

and Phalen (2018), who examined the impact of ERPO laws on suicide in Indiana and Connecticut using synthetic controls. My study includes more states and a broader time period made possible by the increased availability of mortality data, providing a more robust picture of ERPO laws nationwide. Additionally, to my knowledge I am the first to examine the impact of ERPO laws on homicides, which could inform the motivation for passing these laws. Finally, I am also the first to examine the differential impact of these laws on different race and gender groups. In terms of policy implications, ERPO laws represent a narrowly targeted but effective policy that balances the rights of gun owners and the externalities associated with widespread firearm availability.

II.   BACKGROUND

Nineteen states and the District of Columbia currently have ERPO laws.[9] The orders issued under these laws are variously called Extreme Risk Protection Orders,[10] Gun Violence Restraining Orders,[11] Risk Warrants,[12] and Proceedings for the Seizure and Retention of a Firearm.[13] Before 2018, only five states–Connecticut (1999), Indiana (2005), California (2014),

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[9] California, Colorado, Connecticut, Delaware, Florida, Hawaii, Illinois, Indiana, Maryland, Massachusetts, Nevada, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia. *See* CAL. PENAL CODE § 18150; COLO. REV. STAT. § 13-14.5-103; CONN. GEN. STAT. § 29-38c; DEL. CODE ANN. tit. 10, §§ 7701, 7704; FLA. STAT. § 790.401(3)(a); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35, 67/40; IND. CODE ANN. § 35-47-14-2; MD. CODE ANN., PUB. SAFETY § 5-601(E)(2); MASS. GEN. LAWS ch. 140 § 131R; 2019 NV A.B. 291; N.J. STAT. ANN. §§ 2C:58-21, 23; 2020 NM SB 5; N.Y. C.P.L.R. §§ 6340, 6341; OR. REV. STAT. ANN. § 166.527; R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4053; VA. CODE ANN. § 19.2-152.14; WASH. REV. CODE §§ 7.94.030(1), 7.94.020(2); D.C. CODE § 7-2510.04.
[10] Oregon, Washington, Maryland, Vermont, and Colorado. OR. REV. STAT. ANN. § 166.525, et seq.; WASH. REV. CODE Ann. § 7.94.010, et seq.; MD. CODE ANN., PUB. SAFETY § 5-601 et seq.; VT. STAT. ANN. tit. 13, § 4051, et seq.; 2019 CO HB 1177. New Mexico calls the orders associated with its law Extreme Risk Firearm Protection Orders. 2020 NM SB 5. Florida calls them Risk Protection Orders. FLA. STAT. § 790.401, et seq.
[11] California. CAL. PENAL CODE § 18100 et seq.
[12] Connecticut. CONN. GEN. STAT. § 29-38c
[13] Indiana. IND. CODE ANN. § 35-47-14-1, et seq.

Washington (2015), and Oregon (2017)–had passed these laws.[14] In each of the first three states,

the laws were passed in response to highly publicized homicides: the 1998 Connecticut Lottery

mass shooting, the 2004 murder of a police officer by a mentally ill man, and the 2014 killings of

students near the University of California, Santa Barbara.[15] In 2018, following the Stoneman

Douglas High School shooting in Parkland, Florida, the number of states with ERPO laws more

than doubled to include Florida, Vermont, Maryland, Rhode Island, New Jersey, Delaware,

Massachusetts, Illinois, and the District of Columbia.[16] In 2019 and 2020, New York, Colorado,

Nevada, Hawaii, New Mexico, and Virginia also passed these laws.[17] Eleven other states are

currently considering such legislation.[18]

The laws vary in their details, but the general scheme is that a person with reason to believe

that a gun owner presents a danger to themselves or others may petition a state court to order the

temporary removal of firearms.[19] The order also prevents the individual subject to it from

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[14] CONN. GEN. STAT. § 29-38c; IND. CODE ANN. § 35-47-14-1, et seq.; California. CAL. PENAL CODE § 18100 et seq.; WASH. REV. CODE Ann. § 7.94.010, et seq.; OR. REV. STAT. ANN. § 166.525, et seq.

[15] Timothy Williams, *What are 'Red Flag' Gun Laws, and How Do They Work?*, N.Y. TIMES, Aug. 7, 2019, at A14 (Connecticut ERPO law passed after state lottery worker killed four employees and self; California ERPO law passed after gunman killed six people near U.C. Santa Barbara); *Jake Laird Law: Indiana's "Red Flag" Statute*, IND. STATE POLICE LEGAL OFFICE (last updated May, 2019) https://www.in.gov/isp/files/Jake%20Laird%20Law%20(Final%20Revision)%20July%202020%20-%20Barbie.pdf (providing background on Indiana ERPO law passed after police officer Jake Laird was killed by a man who had recently been released from hospital and had his firearms returned).

[16] FLA. STAT. § 790.401, et seq.; VT. STAT. ANN. tit. 13, § 4051, et seq.; MD. CODE ANN., PUB. SAFETY § 5-601 et seq.; R.I. GEN. LAWS §§ 8-8.3-1, et seq.; N.J. STAT. ANN. § 2C:58-20, et seq.; DEL. CODE ANN. tit. 10, § 7701 et seq.; MASS. GEN. LAWS, ch. 140 § 131R(b); 430 ILL. COMP. STAT. Ann. 67/1, et seq.; D.C. CODE § 7-2510.04. ; 2019 DC B 286.

[17] COLO. REV. STAT. § 13-14.5-103; HAW. REV. STAT. ANN. § 134-C; 2019 NV A.B. 291; 2020 NM SB 5; N.Y. C.P.L.R. §§ 6340, 6341; VA. CODE ANN. § 19.2-152.14.

[18] As of April 13, 2020, there were active ERPO bills in eleven state legislatures: Arkansas, New Hampshire, Minnesota, Wisconsin, Michigan, Iowa, Pennsylvania, Nebraska, Kentucky, Tennessee, and North Carolina. Sean Campbell et al., *Red Flag Laws: Where the Bills Stand in Each State*, THE TRACE (last updated April 13, 2020) https://www.thetrace.org/2018/03/red-flag-laws-pending-bills-tracker-nra/.

[19] *See* Reena Kapoor et al., *Resource Document on Risk-Based Gun Removal Laws*, 37 DEV. IN MENTAL HEALTH L. 6, 9 (2018) (outlining the typical risk-based gun removal framework); GUN POL'Y IN AM., *supra* note 15 (providing another outline).

purchasing or possessing firearms.[20] A court decides whether to issue the order based on statements or actions by the gun owner in question. Evidence might include threats of violence by the respondent toward themselves or others, a violation of a domestic violence restraining order, or recent acquisition of a significant number of firearms.[21] If implemented, the order lasts about six to twelve months, but the person subject to the order is usually given the opportunity to request a hearing to terminate the order.[22] Refusal to comply with the order is punishable as a criminal offense. After a set time, the guns are returned to the person from whom they were seized unless another court hearing extends the period of confiscation.[23]

There is state variation along several dimensions. Seven states allow only law enforcement to petition for removal orders, but twelve states and the District of Columbia allow other individuals, including family and household members, to petition.[24] All states offer both ex parte orders, allowing eligible individuals to petition for orders in emergency cases without waiting to provide notice of a hearing to the respondent, and final orders after a notice and a

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[20] GUN POL'Y IN AM., *supra* note 15.

[21] *See, e.g.,* CAL. PENAL CODE § 18155(b)(1). Additionally, petitioners must also usually include information they have about firearms the respondent possesses. *See*, *e.g.,* CAL. PENAL CODE § 18107; DEL. CODE ANN. tit. 10, §§ 7703(a), 7704(a); 2017 DC B 1068, Act 629 (effective until April 30, 2019); D.C. CODE § 7-2510.04; FLA. STAT. § 790.401(2)(e); HAW. REV. STAT. ANN. § 134-63(b); 430 Ill. Comp. Stat 67/35(a), 430 Ill. Comp. Stat 67/40(a); MD. CODE ANN., PUB. SAFETY §§ 5-602(a), 5-603(A); MASS. GEN. LAWS, ch. 140, section 131R(b); N.J. STAT. ANN. § C.2C:58-23(b); 2020 NM SB 5, Section 5; R.I. GEN. LAWS § 8-8.3-3(f); VT. STAT. ANN. tit. 13, § 4053(c)(3)(B); WASH. REV. CODE § 7.94.030(3)(b).

[22] *See* Kapoor et al., *supra* note at 8 (outlining the basics of the gun removal process); RAND, *supra* note (providing resources regarding risk protection orders).

[23] *See* Reena Kapoor et al., *Resource Document on Risk-Based Gun Removal Laws*, 37 DEV. IN MENTAL HEALTH L. 6, 9 (2018) (outlining the typical risk-based gun removal framework); GUN POL'Y IN AM., *supra* note 15.

[24] California, Colorado, Delaware, Hawaii, Illinois, Maryland, Massachusetts, Nevada, New Jersey, New York, Oregon, Washington, and the District of Columbia. *See* CAL. PENAL CODE § 18150; COLO. REV. STAT. § 13-14.5-104; DEL. CODE ANN. tit. 10, § 7701, 7704 (family and household members can petition for non-emergency orders); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35, 67/40; MD. CODE ANN., PUB. SAFETY § 5-601(E)(2); MASS. GEN. LAWS ch. 140, §§ 121, 131R; 2019 NV A.B. 291; N.J. STAT. ANN. § 2C:58-21; N.Y. C.P.L.R. §§ 6340, 6341; OR. REV. STAT. ANN. §§ 166.527; WASH. REV. CODE § 7.94.030(1). Maryland has gone the farthest, allowing medical and mental health professionals, spouses and cohabitants, other family members, co-parents, current dating partners, and current or former legal guardians to file petitions. *See* MD. CODE ANN., PUB. SAFETY § 5-601(E)(2)).

hearing.[25] Most final orders last one year.[26] Ex parte orders last for shorter periods, and there is greater variability in their length, ranging from one to two days in Maryland to up to twenty-one days in California and Oregon.[27] There is also variation in the standards of proof required for ex parte[28] and final orders. To obtain an ex parte order, the alleged danger must be imminent in all states except for Massachusetts, New York, and the District of Columbia.[29] To renew a final

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[25] California, Colorado, Delaware, Florida, Hawaii, Illinois, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, Vermont, Washington, and the District of Columbia allow removal of firearms from people subject to ex parte removal orders. *See* CAL. PENAL CODE § 18150(b); COLO. REV. STAT. § 13-14.5-103; DEL. CODE ANN. tit. 10, § 7703; FLA. STAT. § 790.401(4)(a); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35; MD. CODE ANN., PUB. SAFETY, § 5-603; MASS. GEN. LAWS ch. 140, §§ 121, 131R, 131S, 131T; N.J. STAT. ANN. §§ 2C:58-21, 23; N.Y. C.P.L.R. §§ 6340-6342; OR. REV. STAT. ANN. §§ 166.525, 166.527; R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4054(a)(1); WASH. REV. CODE § 7.94.050; D.C. CODE § 7-2510.04. Some states allow ex parte removal only when the petitioner is law enforcement (Delaware, Florida, Rhode Island, and Vermont) while other allow ex parte petitions by a larger group of petitioners (Hawaii, Illinois, Maryland, Massachusetts, New Jersey, New York, Oregon, and Washington). *See* DEL. CODE ANN. tit. 10, § 7703; FLA. STAT. § 790.401(4)(a); R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4054(a)(1) (ex parte law enforcement only); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/5, 67/35; MD. CODE ANN., PUB. SAFETY §§ 5-601(E)(2), 5-602, 5-603; MASS. GEN. LAWS ch. 140, §§ 121, 131R, 131S, 131T; N.J. STAT. ANN. § 2C:58-21; N.Y. C.P.L.R. §§ 6340-6342; OR. REV. STAT. ANN. §§ 166.525, 166.527; WASH. REV. CODE § 7.94.050 (expanded ex parte).

[26] Exceptions are Illinois (six months), Vermont (six months), Virginia (six months) and New Jersey (indefinite, until respondent demonstrates by preponderance of the evidence that they are no longer a danger). *See* 430 ILL. COMP. STAT. 67/35; 13 VT. STAT. ANN. § 4053; Va. Code Ann. § 19.2-152.14, N.J. STAT. ANN. § 2C:58-25. Currently, California's finals orders last for one year, but effective September 1, 2020, courts in California will be able to issue final orders lasting between one and five years. 2019 CA AB 12, amending CAL. PENAL CODE § 18175(d).

[27] *See* MD. CODE ANN., PUB. SAFETY, § 5-603 (hearing must be on the first or second day on which a district court judge is sitting); OR. REV. STAT. ANN. § 166.527(9) (respondent has 30 days to request a hearing, and the hearing must occur within 21 days); CAL. PENAL CODE § 18155(c) (order lasts 21 days).

[28] Twelve states and the District of Columbia require probable, reasonable, of good cause in order to obtain an ex parte order. They are California, Florida, Hawaii, Illinois, Maryland, Massachusetts, New Jersey, New Mexico, New York, Rhode Island, Virginia, Washington, and the District of Columbia. See CAL. PENAL CODE § 18150 (law enforcement only); FLA. STAT. § 790.401(3)(a); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35, 67/40; MD. CODE ANN., PUB. SAFETY § 5-601(E)(2); MASS. GEN. LAWS ch. 140 § 131R; N.J. STAT. ANN. §§ 2C:58-21, 23; 2019 NV A.B. 291; N.Y. C.P.L.R. §§ 6340, 6341; D.C. CODE § 7-2510.04; R.I. GEN. LAWS § 8-8.3-4; VA. CODE ANN. § 19.2-152.14; WASH. REV. CODE §§ 7.94.030(1), 7.94.020(2); D.C. CODE § 7-2510.04. California requires a substantial likelihood of harm when the petitioner is family or law enforcement. *See* CAL. PENAL CODE § 18150(b). Four states, Colorado, Delaware, Nevada, and Vermont, require a preponderance of the evidence, *see* 2019 CO HB 1177; DEL. CODE ANN. tit. 10, § 7703(d); 2019 NV A.B. 291; VT. STAT. ANN. tit. 13, § 4054(b)(1), and Oregon requires clear and convincing evidence. However, Oregon's orders become final automatically if unchallenged by the respondent, and this higher standard of proof is commensurate with other states' requirements for final orders. OR. REV. STAT. ANN. § 166.527(9).

[29] *See* MASS. GEN. LAWS ch. 140 § 131T (2020) (allowing the courts to issue an ex parte order where reasonable cause exists to believe respondents pose a risk to themselves or others by possessing firearms); N.Y. C.P.L.R.

order, the petitioner generally must meet the same burden of proof using the same categories of

evidence they used to obtain the initial final order. Individuals subject to an order may usually

also request one hearing during the effective period of the order, at which they bear the burden of

proving, by the same standard used to obtain the order, that they no longer pose a risk of harm.

To date, no court has invalidated an ERPO law on Constitutional or other grounds.[30]

Despite variation in the details of ERPO laws, each state's law is designed to respond to

acute periods of elevated risk of violence by identifying and disarming high-risk individuals.

The next section will examine ERPO laws' potential to accomplish these goals, beginning with

background on suicide and homicide prevention and subsequently analyzing how ERPO laws

affect this interplay.

<div align="center">III.   SUICIDE AND HOMICIDE PREVENTION</div>

<div align="center">A. *Government Interest in Preserving Human Life*</div>

One can clearly understand the societal interest in preventing homicides, but the suicide case

is more nuanced. The government has a compelling interest in preserving human life. The Supreme

Court upheld this interest in *Washington v. Glucksberg* and its companion case, *Vacco v. Quill*.[31]

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§ 6342 (MCKINNEY 2021); D.C. CODE § 7-2510.04 (2020) (permitting issuance of ex parte orders where probable exists to believe respondents pose a significant danger of injuring themselves or others by possessing firearms).

[30] Courts in Connecticut, Indiana, and Florida that have heard challenges to ERPO laws have held that the laws do not violate the due process rights of respondents and/or are constitutional under the Second Amendment. *See Hope v. State*, 163 Conn. App. 36, 133 A.3d 519 (2016); *Redington v. Indiana*, 992 N.E.2d 823 (Ind. Ct. App. 2013), trans. denied (rejecting challenges based on the Second Amendment, the Indiana right to bear arms, the takings clause of the US Constitution, and vagueness). The Indiana Supreme Court subsequently refused to hear an appeal of the case. 997 N.E.2d 356 (Nov. 7, 2013); https://www.1dca.org/content/download/537544/6066635/file/183938_1284_09252019_09405740_i.pdf. *See* Section VII for additional discussion of court challenges to ERPO laws.

[31] *Washington v. Glucksberg*, 521 U.S. 702 (1997) (applying rational basis scrutiny to Washington law barring physician-assisted suicide for terminally ill patients, but allowing withholding or withdrawal of life-saving treatment at patient's request); *Vacco v. Quill*, 521 U.S. 793, (1997).

There are many different and contentious issues surrounding suicide prevention. In *Cruzan v. Director, Missouri Department of Health*, 497 U.S. 261 (1990), the Court held that a competent person has the right to refuse life-saving treatment, stemming from the common law tradition of battery.[32] In *Glucksberg*, respondents argued that terminally ill people who are on life support are treated differently than those who are not, in that the former may "hasten death" by ending treatment, but the latter may not "hasten death" through physician-assisted suicide.[33] The Court rejected this argument, holding that the distinction between assisting suicide and withdrawing life-sustaining treatment is rational.[34] The Court based its reasoning on the distinction's wide recognition in both medical and legal traditions, fundamental legal principles of causation and intent (when a patient refuses life-sustaining treatment, they die from the underlying fatal disease, but a patient who ingests lethal medication prescribed by their physician is killed by that medication), and an interest in preserving the integrity of the medical profession and preventing a slide toward euthanasia (so that a doctor's intent is never to hasten a patient's death, but only to ease pain).[35] The Court also reasoned that terminally ill people may go through temporary depression, and the state has an interest in preventing this type of rash decision making—a justification that is directly relevant to ERPO laws.[36] States have an undifferentiated interest in prohibiting intentional killing, preserving human life, and preventing the "serious public-health problem of suicide, especially among the young, the elderly, and those suffering from untreated pain or from depression or other mental disorders."[37] States passing ERPO laws with the goal of

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[32] *Cruzan v. Director, Missouri Department of Health,* 497 U.S. 261 (1990).
[33] *Glucksberg,* at 725.
[34] *Id.*
[35] *Vacco,* at 800-802.
[36] *Id.*
[37] *Glucksberg*, at 703-704.

preventing suicide are undoubtedly pursuing legitimate government interests.[38] And unlike in

Glucksberg, the subjects of ERPO orders are usually not terminally ill, so there is no countervailing

consideration of a right to "die with dignity."[39] However, in the case of ERPO laws, the

government interest in preserving human life must be weighed other potentially fundamental

individual rights. This will be further examined in Section VII below.

B. *The Relationship Between Guns and Violence*

Most people who attempt suicide do not die.[40] Figure 1.1 below illustrates the male and

female case fatality rates of several common methods of suicide attempt—most methods are less

than fifty percent successful. The major preventable exception is firearm-related suicide, whose

fatality rate is more than forty times that of drug poisoning, the most common method of suicide

attempt.[41] As a result, firearms are responsible for about fifty percent of suicides in the United

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[38] *Id.*

[39] *Glucksberg,* at 717.

[40] The case fatality rate considering every method of suicide is about 8.5% (14.7% for males vs. 3.3% for females). Andrew Conner et al., *Suicide Case-Fatality Rates in the United States, 2007 to 2014*, 171 ANNALS INTERNAL MED. 885, 889 (2019). About ninety percent of people who survive near-lethal suicide attempts eventually die from something other than suicide. *See* David Owens et al., *Fatal and Non-Fatal Repetition of Self-Harm*, 181 BRIT. J. PSYCHIATRY 193, 195–96 (2002) (systematically reviewing published observational and experimental studies following up on non-fatal suicide attempts); Bo Runeson et al., *Suicide Risk After Nonfatal Self-Harm: A National Cohort Study, 2000–2008*, 76 J. CLINICAL PSYCHIATRY 240, 243–45 (2015) (following Swedish individuals admitted to hospital after deliberate self-harm for three to nine years); Richard H. Seiden, *Where Are They Now? A Follow-Up Study of Suicide Attempters from the Golden Gate Bridge*, 8 SUICIDE & LIFE-THREATENING BEHAV., 203, 214 (1978) (providing evidence that an anti-suicide barrier on the Golden Gate Bridge would save lives, rather than simply diverting would-be bridge jumpers to some other method of suicide); Dag Tidemalm et al., *Risk of Suicide After Suicide Attempt According to Coexisting Psychiatric Disorder: Swedish Cohort Study with Long Term Follow-up*, 337 BRIT. MED. J. 1328, 1328 (2008) (finding that the absolute risk of completed suicide in suicide attempters followed for five to thirty-seven years was seven to thirteen percent). Additionally, approximately seventy-five percent of suicide attempters do not go on to make another attempt. *See* Owens et al., *supra* at 195–96 (measuring fatal and non-fatal repetition of self-harm); *see also* Seiden, *supra* at 214 (following up on suicide attempts from the Golden Gate Bridge).

41. Overall, drug poisoning accounts for 59.4% of suicidal acts, but only 13.5% of deaths. Conner et al., *supra* note, at 888–92 (qualifying suicide attempts and death by type). It has a case fatality rate of 1.9%. *Id.* Firearms account for only 4.8% of suicidal acts, but 50.6% of suicide deaths. *Id.* They have a case fatality rate of 89.6%. *Id.* Multi-state data from the 1990s shows very similar trends. Rebecca Spicer & Ted R. Miller, *Suicide Acts in 8 States: Incidence and Case Fatality Rates by Demographics and Method*, 90 AM. J. PUB. HEALTH 1885, 1888 (2000). During that period, drug poisoning had a case fatality rate of 1.5% and firearms had a case fatality rate of 82.5%. *Id.*

States. Because firearms are such an effective means of suicide, preventing firearm suicide attempts may be one of the most effective ways to prevent suicide deaths overall.

Figure 1.1. Case Fatality Rate (%) by Suicide Method.[42]
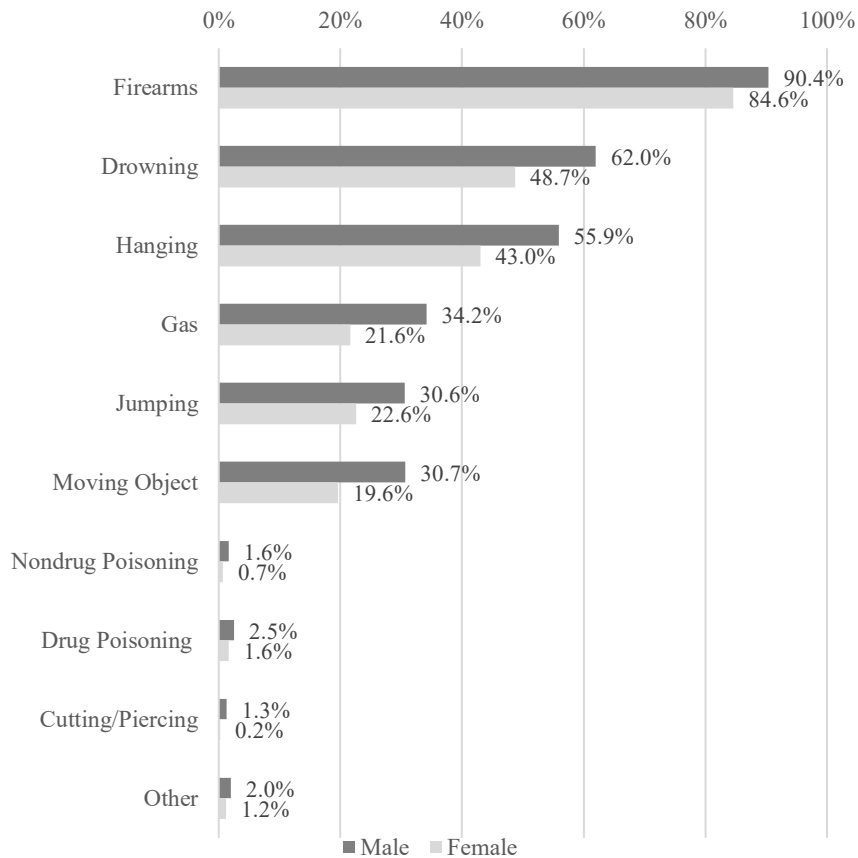
Restricting access to a chosen means of suicide can effectively discourage some would-be suicide attempts entirely without diverting them to other means of suicide.[43] The literature on

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42. Figure created using Table 4 in Conner et al., *supra* note, at 892 (categorizing suicide mortality rates by method, as well as by sex, age group, religion, urbanization, and year).

43. Brian W. Bauer & Daniel W. Capron, *How Behavioral Economics and Nudges Could Help Diminish Irrationality in Suicide-Related Decisions*, 15 PERSP. PSYCH. SCI. 44, 45 (2020) ("If the thesis were true that most people who want to kill themselves will . . ., it is more likely that we would see higher rates of means substitution and a decrease in survivor rates. Instead, these studies suggest that people retrospectively find greater utility in continuing to live their life after a suicidal crisis has ended compared with the prospect of ending their life.").

interventions at "suicide hotspots"—locations such as bridges, tall buildings, and railway tracks, where a disproportionate number of suicides occur—provides strong evidence that means restriction, such as the installation of physical barriers, is an effective way to avert suicide without substitution to other methods.[44] Restricting access to carbon monoxide and toxic substances has also effectively reduced suicides.[45]

There is also extensive literature focusing specifically on access to firearms and suicide. The overall findings indicate that reducing access to firearms is associated with lower firearm suicide rates, sometimes with substitution to other methods of suicide.[46] Lower gun ownership rates and

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44. Georgina R. Cox et al., *Interventions to Reduce Suicides at Suicide Hotspots: A Systematic Review*, 13 BMC PUB. HEALTH 1, 10 (2013) (providing evidence that rates of suicide decrease overall where intervention make impulsive suicide more difficult); *See* Annette L. Beautrais, *Effectiveness of Barriers at Suicide Jumping Sites: A Case Study*, 35 AUSTL. & N.Z. J. PSYCHIATRY 557, 559 (2001) (finding that removing a bridge safety barrier resulted in a substantial increase in both the number and rate of suicides by jumping from that bridge, while suicides by jumping at other sites in the city continued to decline). Although many papers find a positive correlation between suicide rates and access to a suicide method, the research relies primarily on cross-sectional data, limiting the strength of the conclusions. *E.g.*, *The Relationship Between Firearm Availability and Suicide*, GUN POL'Y IN AM., https://www.rand.org/research/gun-policy/analysis/essays/firearm-availability-suicide.html [https://perma.cc/V7GC-QZKC] (March 2, 2018).

45. *See* Norman Kreitman, *The Coal Gas Story: United Kingdom Suicide Rates, 1960-71*, 30 BRIT. J. PREVENTATIVE & SOC. MED. 86, 87–88 (1976) (concluding that replacing coal with oil-based and natural gas heating and thereby decreasing access to carbon monoxide in the general public led to a decrease in carbon monoxide suicide); Keith Hawton et al., *Effects of Legislation Restricting Pack Sizes of Paracetamol and Salicylate on Self Poisoning in the United Kingdom: Before and After Study*, 322 BRIT. MED. J. 1203, 1209 (2001) (finding that deaths from paracetamol and salicylate poisoning decreased significantly in the year following a change in legislation limiting the size of packs of the medications sold over-the-counter); Stephen Wilkinson et al., *Admissions to Hospital for Deliberate Self-Harm in England 1995–2000: An Analysis of Hospital Episode Statistics*, 24 J. PUB. HEALTH MED. 179, 183 (2002) (finding that paracetamol package size regulations and increased prescription of anti-depressants resulted in fewer intentional drug overdoses); s*ee also* Marc S. Daigle, *Suicide Prevention Through Means Restriction: Assessing the Risk of Substitution: A Critical Review and Synthesis*, 37 ACCIDENT ANALYSIS & PREVENTION 625, 629–30 (2005) (reviewing studies examining restricted access to domestic toxic gas, firearms, toxic substances, and bridges and concluding that means restriction can avert suicide without substitution to other methods).

46. *See, e.g.*, Matthew Lang, *Firearm Background Checks and Suicide*, 123 ECON. J. 1085, 1087 (2013) (using firearm background checks as a proxy for changes in firearm ownership rates to establish a positive causal relationship between suicides and firearm ownership); Michael D. Anestis & Joye C. Anestis, *Suicide Rates and State Laws Regulating Access and Exposure to Handguns*, 105 AM. J. PUB. HEALTH 2049, 2056 (2015) (finding that waiting periods, universal background checks, gun laws, and open carrying regulations were all associated with lower firearm suicide rates and that each policy except for waiting periods was associated with lower overall suicide rates); A. L. Beautrais et al., *Firearms Legislation and Reductions in Firearm-Related Suicide Deaths in New Zealand*, 40 AUS. & N.Z. J. PSYCHIATRY 253, 258–59 (2006) (finding that the effects of the 1992 New Zealand Amendment to the Arms Act, which restricted access to firearms, were consistent with a reduction in firearm-related suicide, particularly in impulsive suicide attempts by young men); *but see* Mark Duggan et al., *The Short-Term and Localized Effect of Gun Shows: Evidence from California and Texas*, 93 REV. ECON. & STAT. 786, 786 (2011) (finding no evidence that gun shows led to increases in either gun homicides or suicides in the short run in the geographic area surrounding the shows).

firearm purchase delays lead to lower suicide rates, despite some method substitution.[47] Military

policies requiring soldiers to leave their firearms on base when they take weekend leave and gun

buybacks may also reduce firearm-related and overall suicide.[48]

The evidence on the relationship between access to firearms and homicide is more mixed.

There is economic theory consistent with either a positive or negative relationship; the existence

of gun-wielding law-abiding citizens might deter would-be criminals, or the greater availability of

firearms might increase the fatality rate of criminal activity.[49] There is empirical evidence for either

theory. Many studies have found that fewer firearms are associated with lower rates of firearm-

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47. *See* Justin T. Briggs & Alexander Tabarrok, *Firearms and Suicides in US States*, 37 INT'L REV. L. & ECON. 180, 187 (2014) (finding that if all states reduced gun ownership by ten percentage points, we would expect five to nine percent fewer suicides); *see also* Griffin Edwards et al., *Looking Down the Barrel of a Loaded Gun: The Effect of Mandatory Handgun Purchase Delays on Homicide and Suicide*, 128 ECON. J. 3117, 3118 (2017) (using a difference-in-differences approach to exploit within-state variation across time in both the existence and length of explicit wait periods and delays created by licensing requirements, and finding that any firearm purchase delay led to a two to five percent decrease in firearm-related suicides, with no effect on non-firearm-related suicides); *but see* Jens Ludwig & Philip J. Cook, *Homicide and Suicide Rates Associated with Implementation of the Brady Handgun Violence Prevention Act*, 284 J. AM. MED. ASS'N 585, 588 (2000) (finding that the Brady Handgun Violence Prevention Act was associated with lower firearm suicide rates in people older than fifty-five but not for any other group).

48. In the Israeli Defense Force, requiring soldiers to leave their firearms on base when they took weekend leave was associated with a forty percent suicide rate decrease mostly attributable to a reduction in weekend firearm suicides. Gad Lubin et al., *Decrease in Suicide Rates After a Change of Policy Reducing Access to Firearms in Adolescents: A Naturalistic Epidemiological Study*, 40 SUICIDE & LIFE-THREATENING BEHAV. 421, 422 (2010). Because the Israeli Defense Force is a mandatory population-based army drafting all eighteen-to-twenty-one-year-old youth, although this study had no control group, the study might be externally valid to other groups of youth. *Id.* at 423. For gun buyback, see, e.g., Andrew Leigh & Christine Neill, *Do Gun Buybacks Save Lives? Evidence from Panel Data*, 12 AM. L. & ECON. REV. 509, 511 (2010) (finding that the 1997 Australian gun buyback, which reduced Australia's firearm stock by about one-fifth, led to an almost eighty percent decrease in firearm suicide rates, with no substitution to non-firearm death rates). *See also* Beautrais et al., *supra* note 46, at 258–59 (finding that the effects of the 1992 New Zealand Amendment to the Arms Act, which restricted access to firearms, were consistent with a reduction in firearm-related suicide, particularly in impulsive suicide attempts by young men).

49. Mark Duggan, *More Guns, More Crime*, 109 J. POL. ECON. 1086, 1086–87, 1112 (2001) (discussing both theories and providing empirical support for the theory that increased gun ownership leads to substantial increases in the overall homicide rate); *see also* Ian Ayres & John J. Donohue, *Shooting Down the "More Guns, Less Crime" Hypothesis*, 55 STAN. L. REV. 1193, 1203 (2003) (discussing both theories).

related homicide.[50] Other studies have found that handgun ownership has no effect on crime,[51] and there is yet another large literature finding that right-to-carry laws, which increase firearm access, are associated with lower homicide rates.[52]

C. *ERPO Laws and Gun Violence*

Although the potential impact of ERPO laws depends on how the policies are used in practice, it is possible to predict the theoretical direction of the relationship.[53] If courts can correctly identify individuals who pose a high risk of violence by simply observing their behavior rather than relying on specific criminal or mental health histories, then ERPO laws could decrease

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50. *See, e.g.*, Duggan, *supra* note 49, at 1088 (showing that changes in homicide and gun ownership are positively causally related and refuting the potential explanation that individuals purchase guns in response to expected future increases in crime); Philip J. Cook & Jens Ludwig, *The Social Costs of Gun Ownership*, 90 J. PUB. ECON. 379, 380 (2006) (using the percentage of suicides committed with a gun as a proxy for gun prevalence to show that gun prevalence is possibly causally related with gun homicide rates); Ayres & Donohue, *supra* note 49, at 1202 (refuting the evidence in Lott & Mustard, *infra* note 52, and finding that right-to-carry laws are associated with more crime); Jens Ludwig, *Concealed-Gun-Carrying Laws and Violent Crime: Evidence from State Panel Data*, 18 INT'L REV. L. & ECON. 239, 239 (1998) (exploiting minimum age requirements for concealed-carry permits to show that right-to-carry laws have increased adult homicide rates).

51. *See, e.g.*, Carlisle E. Moody & Thomas B. Marvell, *Guns and Crime*, 71 S. ECON. J. 720, 720 (2005) (using the General Social Survey to proxy gun ownership and finding that handguns have a negligible effect on crime); Duggan et al., *supra* note 46, at 786 (finding no evidence that gun shows lead to increases in either gun homicides or suicides in the short run in the geographic area surrounding the shows).

52. *See, e.g.*, John Lott Jr. & David Mustard, *Crime, Deterrence, and Right-to-Carry Concealed Handguns*, 26 J. LEGAL STUD. 1, 48 (1997) (using cross-sectional time-series data to show that allowing concealed weapon carry deters violent crimes without increasing accidental deaths); Florenz Plassmann & John Whitley, *Confirming "More Guns, Less Crime,"* 55 STAN. L. REV. 1313, 1313 (2003) (analyzing county-level data and finding lower homicide rates each year a right-to-carry law was in effect from 1997 to 2000); William Bartley & Mark A. Cohen, *The Effect of Concealed Weapons Laws: An Extreme Bound Analysis*, 36 ECON. INQUIRY 258, 258 (1998) (examining the results from Lott & Mustard, *supra*, and finding that they too are robust to be dismissed as unfounded); Eric Helland & Alexander Tabarrok, *Using Placebo Tests to Test "More Guns, Less Crime"*, 4 ADVANCES ECON. ANALYSIS & POL'Y 1, 3–4 (2004) (finding that the effects of right-to-carry laws on crime are less well-estimated than Lott & Mustard, *supra*, and Lott, *infra*, suggest, but that their theory is supported); Charles Manski & John Pepper, *How Do Right-to-Carry Laws Affect Crime Rates? Coping with Ambiguity Using Bounded-Variation Assumptions*, 100 REV. ECON. & STAT. 232, 232 (2018) (finding that the effect of right-to-carry laws vary greatly depending on variables including location and type of crime); *see generally* JOHN LOTT, MORE GUNS, LESS CRIME: UNDERSTANDING CRIME AND GUN CONTROL LAWS (3d ed. 2000) (expanding on the argument in Lott & Mustard, *supra*).

53. There is no systematic information collected about the number of gun removal orders served nationwide, but there is some state data. In California in 2016, eighty-six orders were served, in Washington in 2018, forty-eight orders were served. Between 2006 and 2013 in Indiana, fifty-eight orders were served per year, and between 1999 and 2013 in Connecticut, fifty-one orders were served per year. RAND, *supra* note. George Parker, *Circumstances and Outcomes of a Firearm Seizure Law: Marion County, Indiana, 2006-2013*, 33 BEHAV. SCI. LAW 308, 313 (2015) [hereinafter Parker Indiana]; Swanson Connecticut, *supra* note, at 189. By contrast, in the first six months of Maryland's ERPO law that went into effect in October 2018, the state granted 258 orders. Alex Yablon, *Use of Red Flag Laws Varies Widely Among Local Police*, TRACE (Apr. 23, 2019), https://www.thetrace.org/2019/04/use-of-red-flag-laws-varies-widely-among-local-police/ [https://perma.cc/XC6M-RT2Y].

suicides and homicides in addition to those prevented by existing interventions.[54]

Although high-profile homicides precipitated the passage of ERPO laws in several states, available data suggest that petitions for removal orders most commonly cite concerns about self-harm or suicide as the reason for removal.[55] Therefore, the impact of ERPO laws might be concentrated in suicide rates rather than rates of mass shootings or homicides.

Up to eighty percent of people considering suicide give some sign of their intentions.[56] By allowing those most likely to notice signs of suicidal ideation to intervene using the legal system, ERPO laws could reduce suicide rates by directly interrupting suicidal plans.[57] As discussed above, restricting access to suicide means can permanently prevent suicide attempts and deaths.[58] Reducing access to firearms as a means of suicide, as ERPO laws do, may be particularly effective because of firearms' outsized case fatality rate.[59]

ERPO laws are usually enacted in response to high-profile mass shootings, not overall spikes in firearm homicides.[60] Nevertheless, by removing firearms from at-risk individuals, ERPO

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54. *See, e.g.*, Vernick et al., *supra* note at 100–01 (arguing that their targeted nature could make risk-based seizure laws effective); Swanson Indiana, *supra* note at 195 (finding that in both Connecticut and Indiana, the most common use of gun-removal laws was in cases where concerned family members noticed signs of suicide risk).

55. *See, e.g.*, George Parker, *Application of a Firearm Seizure Law Aimed at Dangerous Persons: Outcomes from the First Two Years*, 61 PSYCHIATRIC SERVS. 478, 478 (2010) [hereinafter Parker, *First Two Years*] ("Firearm seizure by police was rarely a result of psychosis; instead, risk of suicide was the leading reason."); Parker Indiana, *supra* note 53, at 308 (finding that in Indiana, removals were prompted by threatened or attempted suicide 68% of the time; violence 21%; and psychosis 16%); Swanson Connecticut, *supra* note, at 192 (finding that about 61% of gun removal requests in Connecticut cited concern about self-harm, 32% cited risk of harm to others, and 9% cited both categories); Garen Wintemute, *Extreme Risk Protection Orders Intended to Prevent Mass Shootings: A Case Series*, ANNALS INTERNAL MED. 655, 657(2019) (finding that only 13% of removals in California involved an individual deemed at risk of perpetrating a mass shooting).

56. *Extreme Risk Protection Orders*, *supra* note (citing *Suicide*, MENTAL HEALTH AM. (last visited Feb. 10, 2020), https://www.mhanational.org/conditions/suicide [https://perma.cc/GT6G-WQFB]).

57. *See* Parker Indiana, *supra* note 53, at 308 ("Overall, the Indiana law removed weapons from a small number of people, most of whom did not seek return of their weapons. The firearm seizure law thus functioned as a months-long cooling-off period for those who did seek the return of their guns."); *see also* Swanson Indiana, *supra* note, at 195 (finding that in both Connecticut and Indiana, the most common use of gun-removal laws was in cases where concerned family members noticed signs of suicide risk).

58. *See supra* Section II.A.

59. *See supra* Figure 1.

60. *See supra* INTRODUCTION. About 75% of homicides in the United States use firearms. *Assault or Homicide*,

laws have the potential to reduce firearm homicides in all settings, whether in the home or in

public. There are reasons to believe that ERPO laws might be less effective in reducing homicides

than suicides, however. As noted above, most removal petitions cite risk to self rather than risk to

others as the reason for removal.[61] Additionally, ERPO laws are modeled after domestic violence

firearm-removal laws, which exist at the federal level and in many states.[62] ERPO laws might be

redundant in the domestic violence context because there is already a route for people in these

situations to petition for firearm removal. The incremental effect of ERPO laws on domestic

homicides, a large contributor to total homicide deaths, might therefore be small.[63] Additionally,

a majority of criminals report obtaining firearms through nontraditional channels such as theft,

family members or friends, or private sales on the secondary market and may be more likely to

have alternate means of accessing weapons even were they subject to a ERPO protection order.[64]

CTRS. FOR DISEASE CONTROL & PREVENTION https://www.cdc.gov/nchs/fastats/homicide.htm [https://perma.cc/YRR2-ZNTS] (last visited Mar. 2, 2021) (providing that in 2018, 14,414 of the 19,141 homicides in the United States were firearm homicides). These overall statistics are at a level of aggregation that is unaffected by excluding deaths from mass shootings from this overall homicide risk. Only about 378 people per year are killed in mass shootings. *See supra* note (averaging the number of individuals killed in mass shootings from 2013 through 2019 based off figures from the Gun Violence Archive) (figures on file with author).

61. *See supra* note 55 (providing multiple sets of data that show ERPO laws are used predominately in response to suicide risk).

62. Waul, *supra* note 7, at 52, 59.

63. *See, e.g.*, Emiko Petrosky et al., *Racial and Ethnic Differences in Homicides of Adult Women and the Role of Intimate Partner Violence—United States, 2003–2014*, 66 MORBIDITY & MORTALITY WKLY. REP. 741, 741 (2017), https://www.cdc.gov/mmwr/volumes/66/wr/pdfs/mm6628a1.pdf [https://perma.cc/RJR9-5J5U] (almost half of female homicides are committed by the victim's current or former male partner); Parker Indiana, *supra* note 53, at 308 (ERPO firearm seizures in Indiana occurred as a result of domestic disputes in 28% of cases, possibly substituting for what would otherwise have been domestic violence-related firearm removal).

64. *See, e.g.*, Philip J. Cook et al., *Gun Control After* Heller: *Threats and Sideshows from a Social Welfare Perspective*, 56 UCLA L. REV. 1041, 1047 (2009) ("[T]he 30 to 40 percent of all gun transfers that do not involve licensed dealers . . . accounts for most guns used in crime . . . ."); JAMES D. WRIGHT & PETER H. ROSSI, ARMED AND CONSIDERED DANGEROUS: A SURVEY OF FELONS AND THEIR FIREARMS 16 (expanded ed. 1994) (explaining that forty percent of handguns are obtained from friends and forty-three percent are purchased for cash); Philip J. Cook & Anthony A. Braga, *Comprehensive Firearms Tracing: Strategic and Investigative Uses of New Data on Firearms Markets*, 43 ARIZ. L. REV. 277, 291 (2001) ("Over 500,000 guns are stolen each year from private homes and vehicles, a number which is apparently sufficient to satisfy the 'needs' of robbers and drug dealers."); Leila Nadya Sadat & Madaline M. George, *Gun Violence and Human Rights*, 60 WASH. U. J. L. & POL'Y 1, 24 (2019) ("The median age of school shooters is sixteen (too young to buy a firearm in any state) and the federal government has reported that in most school shootings, the gun used was taken from the shooter's home or that of a relative."). A 2000 Bureau of Alcohol, Tobacco, Firearms and Explosives inspection revealed that nearly half of all firearms dealers could not account for all of their guns, more than half were out of record-keeping compliance, and they had made nearly 700

It is possible that ERPO laws could still affect homicides indirectly by affecting the prevalence of guns in a state—either by changing the violent crime rate or changing the fatality rate of criminal activity. However, because of the targeted, risk-based nature of the laws, it seems unlikely that enough of the critical mass of firearms in a given population would change to affect homicide through these channels.[65]

ERPO laws' targeted nature gives them some advantages over other gun control policies such as purchase restrictions, delays, and other removal laws. Unlike purchaser restrictions that prevent specific groups of individuals—such as those with a criminal record, history of domestic abuse, or dishonorable military discharge—from owning, purchasing, and possessing firearms, ERPO laws affect at-risk individuals who already own firearms, not only those who would need to purchase a gun in order to carry out their plan.[66] ERPO laws also differ from prohibited possessors laws, because they can affect anyone at high risk for firearm violence, regardless of whether they have committed a crime, been diagnosed with a significant mental illness, or have otherwise been disqualified from possessing firearms.[67]

However, one disadvantage of ERPO laws is that they may not be uniformly applied across a state population. Two people may present the same warning signs but only one may have their firearms removed because of a more attentive bystander.[68] Purchase delays and restrictions, in

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sales to potential traffickers. James V. Grimaldi & Sari Horwitz, *Industry Pressure Hides Gun Traces, Protects Dealers from Public Scrutiny*, WASH. POST (Oct. 24, 2010, 6:00 AM), https://www.washingtonpost.com/wp-dyn/content/article/2010/10/23/AR2010102302996_2.html?sid=ST2010102304311 [https://perma.cc/4AUC-RZ5N].

65.   RAND, *supra* note ("[A]lthough removal of firearms could have spillover effects . . . these second-order effects are likely to be small.").

66.   *Id.*

67.   *Id.*

68.   Swanson Indiana, *supra* note, at 195 (finding that in both Connecticut and Indiana, the most common use of gun-removal laws was in cases where concerned family members noticed signs of suicide risk).

theory, impose a barrier on everyone attempting to purchase a gun. However, in practice, purchase restrictions and background checks are not conducted perfectly uniformly and may miss at-risk individuals, despite imposing costs on everyone who attempts to purchase a firearm.[69]

The huge number of existing firearms owned in the United States further limits the effectiveness of policies that rely solely on stopping potentially risky purchasers from buying new guns. Guns are durable goods that can work for many years with minimal maintenance and be passed down through generations.[70] By some estimates, there are more guns than people in the United States.[71] The magnitude of the existing gun stock makes policies which allow removal of firearms from high-risk individuals uniquely promising.

IV.   LITERATURE REVIEW

Three previous studies in the psychology literature have analyzed the effects of ERPO laws on suicide in Connecticut and Indiana. In two papers, Swanson et al. (2019) and Swanson et al. (2017) analyzed individual-level data on firearm removal cases matched to death records in Connecticut and Indiana and concluded that the gun removal laws prevented approximately 72 firearm suicides in Connecticut and 39 firearm suicides in Indiana. In these non-population level results, the authors also identified 15 non-firearm and seven non-firearm suicides in the death records of persons subjected to firearm removal in Connecticut and Indiana respectively.

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69. Edwards et al., *supra* note 47, at 3118 (explaining how many states have passed firearms legislation that impose waiting periods in addition to the federal Brady Act).

70. Cook & Braga, *supra* note 64, at 291 ("Since guns are highly durable commodities, used guns appear to be a close substitute for new ones.").

71. *See* Christopher Ingraham, *There Are Now More Guns Than People in the United States According to a New Study of Global Firearm Ownership,* WASH. POST. (June 19, 2018, 9:31 AM), https://www.washingtonpost.com/news/wonk/wp/2018/06/19/there-are-more-guns-than-people-in-the-united-states-according-to-a-new-study-of-global-firearm-ownership/ [https://perma.cc/U2R7-HAMZ] (combining data from the Small Arms Survey and U.S. estimates of population to estimate that there are 120.5 guns for every 100 residents).

In percentage terms, Swanson's Connecticut study found a 6% decrease in firearm-related suicide which translated to a 2% decrease in overall suicides, and the Indiana study found more moderate 0.57% and 0.27% decreases respectively. Although the detail of these studies is impressive, their focus on individual-level data precludes causal inference and external validity.

The study most similar to mine is Kivisto and Phalen's (2018) population-level analysis of the effect of ERPO laws on suicides in Connecticut and Indiana from 1981-2015. Using synthetic controls, a statistical method which involves the construction of a weighted combination of groups used as controls, to which the treatment group is compared, Kivisto and Phalen (2018) find that ERPO laws contributed to a 7.5% decrease in firearm-related suicides and a 3% decrease in overall suicides in Indiana. In Connecticut, Kivisto and Phalen found a 1.6% decrease in firearm-related suicide in the first years of enactment, which became a 13.7% decrease following increased enforcement efforts in the post-Virginia Tech (2007) period. However, Connecticut's reduction in firearm suicides was offset by increased non-firearm suicides, resulting in an overall slight increase in suicides.

My study offers advantages over previous empirical examinations of ERPO laws in the psychology literature. First, two previous studies in the psychology literature examine the effect of ERPO laws on suicides only within single states (Swanson et al. 2019; Swanson et al. 2017). My differences-in-differences approach uses variation within states across time and is more resilient against threats to identification. Second, I build upon work by Kivisto and Phalen (2018). My study includes more states and a broader time period due to the increased availability of mortality data, providing a more robust picture of ERPO laws nationwide. It uses standard differences-in-differences rather than synthetic controls as its main empirical method,

removing concerns about manipulability. Additionally, to my knowledge I am the first to examine the impact of ERPO laws on homicides, which could inform the motivation for passing these laws. Finally, I am also the first to examine the differential impact of these laws on race and gender groups.

V. DATA SOURCES AND EMPIRICAL METHODOLOGY

A. *Data*

The main dependent variables in my study are suicide and homicides rates, in log form, by state and year. I will also examine suicide and homicide rates separately for men, women, white, and non-white people. The mortality data come from the CDC WONDER database, a compilation of the National Center for Health Statistics' cause of death files. CDC Wonder provides death counts by state, year, cause, age, sex, and many other breakdowns. I use firearm and non-firearm homicides and suicides between 1980 and 2018.

Table 1.1 shows summary statistics of the variables included in my model. The independent variable of interest, ERPO laws, is a dummy variable coded 0 prior to the enactment of the law and 1 if the law went into effect at any point during the year. The second and third columns of Table 1.1 show the summary statistics of state-years separated according to whether there was an ERPO law in effect or not. The fourth column of Table 1.1 shows the outcome of a two-sided t-test on each ERPO/no ERPO pair, indicating whether there is a statistically significant difference between the means of the two groups. All rates are per 100,000 except for the unemployment rate, which is per 100.

Table 1.1. Summary Statistics.

	Full Sample	ERPO Law	No ERPO Law	ttest
Suicide rate	13.51	11.77	13.57	***
Female	5.38	5.09	5.39	
Male	21.88	18.68	21.97	***
White	14.68	12.94	14.73	***
Non-white	11.18	6.87	11.31	***
Firearm-related suicide rate	7.63	5.09	7.71	***
Female	1.94	1.15	1.97	***
Male	13.49	9.15	13.62	***
White	8.50	5.66	8.59	***
Non-white	4.83	2.48	4.90	***
Non-firearm-related suicide rate	5.88	6.68	5.86	***
Female	3.44	3.93	3.42	**
Male	8.40	9.52	8.37	***
White	6.26	7.28	6.23	***
Non-white	6.41	4.40	6.47	*
Homicide rate	6.73	4.31	6.81	**
Female	2.98	1.90	3.01	***
Male	10.75	6.80	10.88	**
White	3.79	2.73	3.82	***
Non-white	19.68	16.36	19.79	*
Firearm-related homicide rate	4.58	2.95	4.64	**
Female	1.53	0.91	1.55	***
Male	8.13	5.06	8.24	**
White	2.31	1.56	2.34	***
Non-white	14.16	13.38	14.18	
Non-firearm-related homicide rate	2.15	1.36	2.18	***
Female	1.50	0.99	1.52	***
Male	2.93	1.74	2.98	***
White	1.52	1.17	1.53	***
Non-white	5.51	2.98	5.59	***
ERPO law	0.03	1	0	***
Unintentional poisoning death rate	8.30	13.34	8.15	***
Unintentional firearm death rate	0.26	0.09	0.26	**
Fraction white	0.82	0.83	0.82	
Fraction black	0.11	0.09	0.11	
Percent other race	0.07	0.08	0.07	
Fraction male 45-64	0.11	0.13	0.11	***
Unemployment rate	5.54	5.73	5.54	

Real per capita income	44369.67	58602.43	43941.1	***
Urbanization fraction	0.71	0.88	0.70	***
Fraction married	0.42	0.41	0.42	
	N = 1471	N = 43	N = 1428	

Note: Rates are per 100,000, except for the unemployment rate which is per 100.
***p<0.01, **p<0.05, *p<0.1.

The overall suicide rate and the suicide rate for each group except for women is significantly lower in state-years with an ERPO law than when there is no ERPO law. On average the suicide rate is approximately 13% lower (13.6 verses 11.8 per 100,000) in state-years with a ERPO law in place. Similarly, the firearm-suicide rate is highly significantly lower for every group. The overall firearm-suicide rate is about 34% lower (7.7 versus 5.1 per 100,000) on average when an ERPO law is in effect. The non-firearm related suicide rate is actually 12% higher in state-years with ERPO laws for every group but non-white, but the magnitude of the difference is smaller (about 0.82 per 100,000). Homicide rates—total, firearm, and non-firearm—are all lower in state-years with ERPO laws. These differences are all statistically significant except for firearm-related non-white homicide. Almost twice as many people are killed by firearm-related suicide as by firearm-related homicide every year. While there are certainly more factors causing these differences than the ERPO laws alone, these raw numbers motivate further investigation and support the idea that ERPO laws may deter firearm suicide, possibly with some substitution to non-firearm suicide.

One methodological challenge in the study of the relationship between firearms and suicides and homicides is that it is difficult to accurately measure the stock and change in the stock

of firearms in the United States. There is no mandatory registry of new gun purchases,[72] and guns are a durable good that can work for many years with minimal maintenance.[73] Previous research on guns and crime, including homicide, has used the percentage of suicides committed with a firearm as a proxy for gun stock.[74] Because suicide is one of the outcome measures of interest here, this approach is not a viable option for this study.[75] Other studies have used the results of surveys, number of gun magazine subscriptions, number of background checks performed, and number of local gun shows in a time period to proxy for gun ownership.[76] My study will use the unintentional

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[72] The National Tracing Registry, which systematically tracks the movement of firearms recovered by law enforcement from their first sale by the manufacturer or importer through the distribution chain to the first retail purchaser, exists, but the Tiahrt Amendment prevents the National Tracing Center of the Bureau of Alcohol, Tobacco, Firearms, and Explosives from releasing information from the firearms trace database to anyone other than a law enforcement agency or prosecutor in connection with a criminal investigation. *National Tracing Center*, BUREAU OF ALCOHOL, TOBACCO, FIREARMS, & EXPLOSIVES (last reviewed June 15, 2020) https://www.atf.gov/firearms/national-tracing-center ("The Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) National Tracing Center (NTC) is the United States' only crime gun tracing facility.") This prevents gun trace data from being used in academic research of gun use in crime as well as use of any data released in civil lawsuits against gun sellers or manufacturers. *See* Consolidated Appropriations Act, 2010, Pub. L. No. 111-117, 123 Stat. 3034, 3128-29 (2009); Grimaldi & Horwitz, *supra* note 72.

[73] Cook & Braga, *supra* note 72, at 291 ("Since guns are highly durable commodities, used guns appear to be a close substitutes for new ones.").

[74] Cook & Ludwig, *supra* note 58, at 580 (using the percentage of suicides committed with a gun as a proxy for gun prevalence to show that gun prevalence is possibility causally related with gun homicide rates). *See also* Gary Kleck, *Measures of Gun Ownership Levels for Macro-Level Crime and Violence Research*, 41 J. OF RES. ON CRIME & DELINQUENCY 3, 13 (2004) (finding that the percentages of suicides committed with guns is the best measure of gun ownership for cross-sectional researched, but not for panel research); Deborah Azrael, Philip J. Cook & Matthew Miller, *State and Local Prevalence of Firearms Ownership Measurement, Structure, and Trends*, 20 J. OF QUANTITATIVE CRIMINOLOGY 43, 49 (2004) (finding that percentage of suicides committed with a gun is highly correlated with survey-based estimates of gun ownership).

[75] *See* Edwards et al., *supra* note 55, at 3120 ("[W]e are unable to use the firearm suicide ratio since suicides is an outcome of interest."); Lang, *supra* note 54, at 1087 (using firearm background checks as a proxy for changes in firearm ownership rates to establish a positive causal relationship between suicides and firearm ownership).

[76] *See, e.g.* Briggs & Tabarrok, *supra* note 55, at 182 (using a composite measure of percentage of suicides committed with a gun, background check rates, and rates of accidental death by gun, and showing that this correlates strongly with gun ownership estimates from the Behavioral Risk Fact Surveillance Survey (BRFSS)); Lang, *supra* note 54, at 1087 (using firearm background checks as a proxy for changes in firearm ownership rates); Duggan et al., *supra* note 54, at 787–88 (examining the effect of local gun shows on homicide and suicide); Duggan, *supra* note 57, at 1087 (arguing that subscriptions to a gun-related magazine are an accurate way to measure gun ownership in an area).

firearm death rate to proxy for firearm availability.[77] Other studies have found this measure to be correlated with background check and suicide measures,[78] and as an additional check, I am able to control for the firearm suicide ratio in my homicide regressions and find virtually no difference in estimates when controlling for unintentional firearm death rate and firearm-related suicide death rate. Unintentional firearm death measurement may be affected by local coroners' standards for what is an accidental death rather than a suicide or homicide.[79] However, as long as these judgment calls are not systematically related to ERPO law enactment, state and year fixed effects should resolve concerns with this issue.[80] As an extra check that unintentional firearm deaths are a valid proxy for firearm stock and are not themselves directly affected by ERPO laws, I ran regressions replacing homicides and suicides with unintentional firearm deaths as the outcome variable. I did not find any statistically significant results, which should lend confidence to the idea that this is a reasonable control variable. These results are available in Table A.2.

I also control for other factors that may affect suicides and homicides. These include state demographic and economic characteristics data from the Bureau of Economic Analysis and the Current Population Survey: per capita income, unemployment rate, and the percentages of the white, African American, other race, metropolitan, and married population. (Flood, 2020; Iowa State, 2020). I control for the percentage of the population that is male between the ages of 45

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[77] Unintentional firearm death rate by state by year is from CDC WONDER, *supra* note 3. This measure has become another popular proxy for firearm stock in the gun violence literature. *See* Edwards et al., *supra* note 55, at 3120.
[78] Edwards et al., *supra* note 55, at 3120 (using unintentional firearm death rates to proxy for firearm availability and finding that accidental firearm death rates are correlated with firearm background check data in a similar manner as firearm suicide rates).
[79] Cook et al., *supra* note 72, at 1048.
[80] Edwards et al., *supra* note 55, at 3126 (arguing that because the enactments of laws restricting and delaying gun purchases were independent of local coroners' standards, variation in the standards should not affect unintentional firearm death as a good proxy for gun stock).

and 64 because this is the group that accounts for the highest number of suicides. I also include the unintentional poisoning death rate by state and year as a proxy for alcoholism and prescription drug use or abuse.

B. *Empirical Model*

I use a quasi-natural experiment design and examine the difference-in-differences in homicide and suicide rates between states with and without ERPO laws across time. Social scientists have long used difference-in differences analysis to approximate conditions similar to a laboratory setting when running a traditional laboratory experiment is infeasible.[81]

Difference-in-differences first calculates the differences in suicide and homicide rates in a treatment group before and after a policy goes into effect, then compares that difference to a baseline difference in a control group. We first find the difference in suicide rate in each state with an ERPO law before and after an ERPO law was passed, and take the average. We then do the same for states in which no ERPO law was passed, subtracting before and after an ERPO law might have been passed. We then subtract, or difference, the differences in these two groups from each other. This gives us the difference-in-differences, which is a measure of the causal effect of ERPO laws on suicide (or homicide) rates. Essentially what difference-in-difference does is calculate:

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[81] *See* Michael Lechner, *The Estimation of Causal Effects by Difference-in-Difference Methods*, 4 ECONOMETRICS 165 (2010) (providing a review of the literature on the use of difference-in-difference in empirical studies); Elizabeth A. Stuart et al., *Using Propensity Scores in Difference-in-Differences Models to Estimate the Effects of a Policy Change*, 4 HEALTH SERVS. & OUTCOMES RSCH. METHODOLOGY 166 (2014) ("Difference-in-difference (DD) methods are a common strategy for evaluating the effects of policies or programs that are instituted at a particular point in time, such as the implementation of a new law.").

$$\beta = (Suicide_{post-rfl}^{states\ with\ rfl} - Suicide_{pre-rfl}^{states\ with\ rfl}) - \quad\quad (1)$$

$$(Suicide_{post-rfl}^{states\ without\ rfl} - Suicide_{pre-\text{rfl}}^{states\ without\ rfl})$$

ERPO laws were enacted in response to high-profile mass shootings, not to increases in firearm suicides or non-mass homicides, allowing me to treat the enactment of these laws as exogenous to my outcome variables, suicide and homicide rate. Exogeneity means that we can establish a one-way causal relationship between ERPO laws and suicide or homicide rates, without worrying that any statistical relationship we find might actually be the result of policymakers passing ERPO laws in response to increased suicide or homicide rate.[82] Instead, we can interpret the results of the difference-in-differences analysis below as solely the causal effect of ERPO laws on suicide or homicide rates.

I employ a multiple-regression technique common for studies that employ a difference-in-differences framework.[83] Not only do regressions allow me to estimate standard errors, but they also allow me to include other measurable factors that may be influencing suicide and homicide rates like income, unemployment, gender, and race, among others.[84] Formally, I estimate:

$$\ln(s_{it}) = \alpha + \beta R_{it} + \theta X_{it} + \gamma_t + \tau_i + \varepsilon_{it}, \quad\quad (2)$$

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[82] *See, e.g.,* Jeffrey Wooldridge, INTRODUCTORY ECONOMETRICS 561, 4th ed. 2009.
https://books.google.com/books?id=64vt5TDBNLwC&pg=PA49#v=onepage&q=exogenous&f=false.
[83] *See, e.g.,* David Card & Alan Krueger, *Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania*, 84 THE AM. ECON. REV. 772 (1994) (using difference-in-differences to measure the effect of the minimum wage on employment); Edwards et al., *supra* note 55, at 3120 (using a difference-in-differences approach to exploit within-state variation across time in both the existence and length of explicit firearm purchase wait periods and delays created by licensing requirements); Alberto Abadie, *Semiparametric Difference-in-Differences Estimators*, 72 REV. OF ECON. STUD. 1, 1 (2005) ("The difference-in-differences (DID) estimator is one of the most popular tools for applied research in economics to evaluate the effects of public interventions and other treatments of interest on some relevant outcome variables.").
[84] "A good way to do econometrics is to look for good natural experiments *and* use statistical methods that can tidy up the confounding factors that nature has not controlled for us." Abadie, *supra* note 108, at 1.

where $\ln(s_{it})$ is the natural log of the homicide or suicide rate in state i at time t, R_{it} is a dummy variable (coded as either 0 or 1) for the presence of an ERPO law, X_{it} is a vector of demographic and economic controls, γ_t are year fixed effects, τ_i are state fixed effects, and ε_{it} is the error term.[85] This model allows me to more accurately measure the relationship between ERPO laws and suicide or homicide while controlling for alternative explanatory variables.

VI.   RESULTS

My main results are reported below. Table 1.2 presents the results from the difference-in-differences modeling for suicide rates, and Table 1.3 presents the results for homicide rates. The first panel of each table shows the results for total suicides or homicides, the second panel shows the results for firearm homicides or suicides, and the third panel shows the results for non-firearm homicides or suicides. Each column in Tables 1.2 and 1.3 represents a unique regression, estimating first the outcomes for the entire population, then separately the outcomes for the male, female, white, and non-white population.[86] In this sort of model, a positive number indicates an increase in the rate of homicides or suicides and a negative number indicates a decrease in the rate of homicides or suicides. Three stars next to a number indicates that the result is statistically

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[85] I chose a log-linear model because I believe the impact of the policy will be proportional to the base rate of homicide or suicide in each state-year. That is, it is likely that the policy has a larger effect in an area or time when the rate of suicides or homicides is high, rather than a constant marginal effect in all areas and time periods, like using rate dependent variables would assume.

[86] The regression sample sizes differ because of suppression constraints on the data. The Centers for Disease Control and Prevention suppresses all state level data representing zero to nine deaths to protect privacy. Therefore, in state-years where, for example, six men and seven women committed suicide, the data are missing for both male and female suicides. However, the data are non-missing for the overall regression. There are more missing values for the homicide than for the suicide data. Suicide results run on the homicide sample are available in Appendix A. The results are qualitatively the same.

significant at the 1% level, two stars indicates that it is significant at the 5% level, and one star

indicates that it is significant at the 10% level.[87]

Table 1.2. Regression of Suicide Rates on ERPO Laws.

	(1)	(2)	(3)	(4)	(5)
	All	Men	Women	White	Non-white
Total suicides					
ERPO law	-0.037***	-0.025**	-0.072***	-0.038***	-0.136**
	(0.012)	(0.010)	(0.025)	(0.013)	(0.055)
R-squared	0.951	0.948	0.874	0.945	0.435
Observations	1,471	1,471	1,471	1,468	1,468
Firearm suicides					
ERPO law	-0.064***	-0.050**	-0.175***	-0.070***	-0.087
	(0.021)	(0.019)	(0.050)	(0.020)	(0.082)
R-squared	0.973	0.970	0.834	0.972	0.441
Observations	1,471	1,469	1,469	1,450	1,450
Non-firearm suicides					
ERPO law	0.004	0.019	-0.028	0.005	-0.104
	(0.014)	(0.013)	(0.026)	(0.018)	(0.063)
R-squared	0.911	0.890	0.836	0.893	0.466
Observations	1,471	1,469	1,469	1,450	1,450

Notes. Each column represents a unique regression. Each observation is at the state-year level. The dependent variable is the natural log of the various suicide rates, and the standard errors are clustered at the state level. All specifications include state and year fixed effects. The controls included in the columns are percent white, percent black, percent male, unintentional poisoning death rate, unintentional firearm death rate, percent age 45-64, percent male age 45-64, urbanization percent, unemployment rate, real per capita income, and percent married. Robust standard errors are in parentheses.
***p<0.01, **p<0.05, *p<0.1.

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[87] A result is statistically significant if the observed result would be unlikely if the null hypothesis were true. A result being significant at, for example, the 1% significance level (aka at the 99% confidence level), means that if the null hypothesis (here, that there is no difference in suicide rates between state-years with an ERPO law and state-years without an ERPO law) were true, we would expect to see the observed result (for example, a 3.7% decrease in suicides) only 1% of the time. Statistical significance can never tell us for certain that there is no difference between two data sets, but it can tell us how likely we would be to see the result we see if the data sets were the same.

Table 1.3. Regression of Homicide Rates on ERPO Laws.[88]

	(1) All	(2) Men	(3) Women	(4) White	(5) Non-white
Total homicides					
ERPO law	-0.018	-0.022	-0.0004	0.043	-0.079
	(0.066)	(0.072)	(0.052)	(0.068)	(0.070)
R-squared	0.899	0.898	0.814	0.878	0.621
Observations	1,353	1,345	1,345	1,328	1,328
Firearm homicides					
ERPO law	-0.077	-0.069	-0.081	-0.002	-0.135
	(0.092)	(0.097)	(0.069)	(0.101)	(0.098)
R-squared	0.896	0.893	0.700	0.896	0.655
Observations	1,353	1,290	1,290	1,259	1,259
Non-firearm homicides					
ERPO law	0.083**	0.100**	0.058	0.109**	-0.006
	(0.039)	(0.049)	(0.048)	(0.043)	(0.069)
R-squared	0.788	0.806	0.631	0.728	0.500
Observations	1,353	1,290	1,290	1,259	1,259

Notes. Each column represents a unique regression. Each observation is at the state-year level. The dependent variable is the natural log of the various homicides rates, and the standard errors are clustered at the state level. All specifications include state and year fixed effects. The controls included in the columns are percent white, percent black, percent male, unintentional poisoning death rate, unintentional firearm death rate, percent age 45-64, percent male age 45-64, urbanization percent, unemployment rate, real per capita income, and percent married. Robust standard errors are in parentheses. ***$p<0.01$, **$p<0.05$, *$p<0.1$.

As is evident in Table 1.3, there appears to be no consistent statistically significant relationship between ERPO laws and total or firearm homicides. This is true both overall and for each demographic group. Based on the limited information available about the practical implementation and enforcement of ERPO laws, it seems that these laws are used most often to

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[88] The regression sample sizes differ because of suppression constraints on the data. The Centers for Disease Control and Prevention suppresses all state level data representing zero to nine deaths to protect privacy. Therefore, in state-years where, for example, six men and seven women committed suicide, the data are missing for both male and female suicides. However, the data are non-missing for the overall regression. There are more missing values for the homicide than for the suicide data. Suicide results run on the homicide sample are available in Appendix A. The results are qualitatively the same.

remove guns from individuals with apparent suicidal, rather than homicidal, tendencies (Swanson et al. 2019; Swanson et al. 2017). This result may be surprising to policy makers who enacted the laws in response to high profile mass shootings, but it is not surprising given the actual distribution of firearm deaths in the United States. Mass shootings are rare; according to the Gun Violence Archive,[89] about 388 people died in U.S. mass shootings per year between 2013 and 2019, or about 0.12 people per 100,000. Deaths from mass shootings comprise a tiny fraction of the approximately 4.6 per 100,000 people killed every year in firearm homicides. However, relatively speaking, firearm homicide deaths overall are also rare. As can be seen in the Table 1.1 summary statistics above, almost twice as many people are killed by firearm-related suicide as by firearm-related homicide every year. It therefore seems logical that ERPO law enforcement efforts would be more concentrated on and more successful at reducing firearm-related suicides than homicides. Additionally, while ERPO laws can be used to remove a person's guns and prevent them from buying new guns, most criminal offenders report obtaining firearms through secondary or illegal markets (Ross et al. 2012). This evidence suggests that even if ERPO laws are sometimes used to interrupt homicidal plans, they may not have as much bite in secondary or illegal markets, which may explain why there is no statistical difference in homicides or firearm homicides associated with the implementation of a ERPO law.

In contrast to the results in Table 1.2, Table 1.3 shows ERPO laws do have a consistently negative and statistically significant effect on firearm-related suicides. Specifically, I find that an ERPO law decreases firearm-related suicides by about 6.4% overall, with the biggest drop,

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[89] The Gun Violence Archive defines a mass shooting as a shooting in which four or more people, excluding the shooter, are shot or killed.

17.5%, for women. This gender difference could be because women have the lowest base rates of firearm suicide of any group analyzed, so preventing even one suicide leads to a correspondingly larger percentage change. One concern with policies which aim to prevent one method of suicide is substitution to other methods. That is, discouraging firearm suicides may actually just encourage suicides by other means. To explore this possibility, the bottom rows of Table 1.2 examine non-firearm-related suicides. I find no evidence of a statistically significant relationship between ERPO laws and non-firearm-related suicides. The effect on suicides overall is therefore a statistically significant 3.7% decrease for all groups, consistent with studies mentioned previously which find that the decision to attempt suicide can be, for many potential victims, discouraged by small interruptions including means restriction.

VII.   Effect Sizes and Robustness Checks

In this section, I establish that the effect sizes I find in this Chapter are of believable magnitude. I obtained data on the enforcement of ERPO laws from Everytown for Gun Safety.[90] I do not have comprehensive data for which purpose (protect others or protect individual) the laws were used, but in the table below, I report the number of times ERPOs were used annually in each of the five states whose passage of ERPOs I use in my analysis. I also report the average number of suicides per year in each state.

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[90] https://everytownresearch.org/report/extreme-risk-laws-save-lives/#due-process.

Table 1.4. Number of ERPO Petitions and Average Suicides by State and Year.

State (Month/Year ERPO law took effect)	Number of ERPO Petitions from 1999–2017	Number of ERPO Petitions in 2018	Number of ERPO Petitions in 2019	Total Petitions Filed (All Years)	Average Suicides per Year Since Year Enacted
California (1/2016)	175	331	815	1,321	4,383
Connecticut (10/1999)	1,560	268	250	2,078	334
Delaware (1/2019)			20	20	111
District of Columbia (1/2019)			3	3	44
Florida (3/2018)		1,192	2,075	3,267	3,516
Illinois (1/2019)			41	41	1,439
Indiana (7/2005)	Unavailable	Unavailable	Unavailable	Unavailable	811
Maryland (10/2018)		303	873	1,176	653
Massachusetts (8/2018)		10	19	29	647
New Jersey (1/2019)			211	211	762
New York (8/2019)			170	170	1,705
Oregon (1/2018)		74	116	190	875
Rhode Island (6/2018)		10	31	41	115
Vermont (4/2018)		8	19	27	118
Washington (12/2016)	32	140	140	312	1,271
Total	1,767	2,336	4,783	8,886	16,784

In California, there is an average of 4,383 suicides per year, and ERPO petitions were issued 175 times in 2016 and 2017 and 331 times in 2018. My differences-in-differences estimates indicate that the passage of ERPO laws corresponds to a 3.7% reduction in annual suicides. Applying my results to California, a 3.7% reduction in suicides would correspond to a reduction of 162 suicides per year due to the passage of California's ERPO law, which would mean that 19% percent of petitions filed each year prevented a suicide in California. This percent is 8%, 6%, 30% in Washington, Oregon, and Connecticut respectively. Data are not available for Indiana, but Swanson et al. (2019) found from an assembled cross-agency administrative record

database on all individuals with gun seizure cases (n = 395) that were processed in Marion

County, which subsumes the city of Indianapolis, from 2006 to 2013, that the study population's

annualized suicide rate was about 31 times higher than that of the general public in Indiana,

indicating that the laws are targeted on those at risk of self harm.[91]

The following graphs and tables include a comparison of means between treated states

and border states and a number of alternative specification tests. First, I expand my results to

include the 11 additional states and D.C. that passed ERPO laws in 2018, using an additional

year of mortality data. In my primary specification, I define my outcomes as natural logs of the

rate to approximate percentage changes, making them easier to interpret. Next, I run the models

using the levels rather than the natural logs of the variables, so the outcome variable is, for

example, suicide rate instead of ln(suicide rate). When I use levels, I get, for example, a -0.45

effect for suicides, or that the presence of an ERPO law leads to approximately 0.45 fewer

suicides per 100,000 people. This is -0.54 for men, -0.34 for women, -0.93 for nonwhite people,

and -0.51 for white people. All of these results are significant. I get an insignificant -0.07 per

100,000 for homicides overall as well as insignificant for each of the groups. Next, I conduct a

test to address the concern raised in Goodman-Bacon (2021) that difference-in-differences

designs which use treated states to identify time period fixed effects may provide estimates that

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[91] "Fourteen individuals (3.5%) died from suicide, seven (1.8%) using a firearm. The study population's annualized suicide rate was about 31 times higher than that of the general adult population in Indiana, demonstrating that the law is being applied to a population genuinely at high risk." Jeffrey Swanson et al., *Criminal Justice and Suicide Outcomes with Indiana's Risk-Based Gun Seizure Law*, 47 J. OF THE AM. ACAD. OF PSYCHIATRY & THE L. 188 (2019). For Connecticut, Swanson and co-authors also report that "specific information written by police on the risk-warrant petitions was available for review in 702 gun-removal cases. Suicidality or self-injury threat was listed as a concern in sixty-one percent of cases, and risk of harm to others was a concern in thirty-two percent of cases." Jeffrey Swanson et al., *Implementation and Effectiveness of Connecticut's Risk-Based Removal Law: Does It Prevent Suicides?*, 80 L. & CONTEMP. PROBS. 179 (2017).

give negative weight to certain pairs of treatment-control comparisons. I perform a stacked difference-in-differences estimate (Sun and Abraham 2020, Deshpande and Li 2019, Fadlon and Nielsen 2015), which attempts to transform this setting, in which average treatment effects vary across groups and periods, and the adoption of the treatment by different states is staggered over time, to a two-group, two-period design (in which difference in differences identifies the average effect of the treatment on the treated) by stacking separate datasets containing observations on treated and control units for each treatment group. Finally I restrict the sample to treated cities.

Table 1.5. Robustness Checks: Suicide.

| | (1) | (2) | (3) | (4) | (5) |
	All	Men	Women	White	Non-white
(1) Baseline specification					
Total suicides	-0.037***	-0.025**	-0.072***	-0.038***	-0.136**
Firearm suicides	-0.064***	-0.050**	-0.175***	-0.070***	-0.087
Non-firearm suicides	0.004	0.019	-0.028	0.005	-0.104
Observations	1471	1469	1469	1450	1450
(2) 11 additional states 2019 data					
Total suicides	-0.047***	-0.037***	-0.079***	-0.046***	-0.130***
Firearm suicides	-0.071***	-0.056***	-0.168***	-0.072***	-0.102
Non-firearm suicides	-0.016	-0.006	-0.038	-0.0137	-0.102*
Observations	1522	1520	1520	1500	1500
(3) Levels					
Total suicides	-0.450**	-0.540	-0.340**	-0.510**	-0.930**
Firearm suicides	-0.490**	-0.970**	-0.249***	-0.550***	-0.630***
Non-firearm suicides	0.041	0.180*	-0.092	0.042	-0.301
Observations	1471	1469	1469	1450	1450
(4) Stacked DD					
Total suicides	-0.052**	-0.038**	-0.091**	-0.057**	-0.092
Firearm suicides	-0.085**	-0.067**	-0.210***	-0.095**	-0.041
Non-firearm suicides	0.004	0.020	-0.031	0.0003	-0.061
Observations	8101	8089	8089	7975	7975
(5) Restrict to treated states					
Total suicides	-0.019	-0.006	-0.056**	-0.007	-0.290***
Firearm suicides	-0.035**	-0.026*	0.130*	-0.026*	-0.310**
Non-firearm suicides	-0.003	0.015	-0.038**	0.010	-0.220**
Observations	145	145	145	145	145

Table 1.6. Robustness Checks: Homicide.

	(1) All	(2) Men	(3) Women	(4) White	(5) Non-white
(1) Baseline specification					
Total homicides	-0.018	-0.022	-0.0004	0.043	-0.079
Firearm homicides	-0.077	-0.069	-0.081	-0.002	-0.135
Non-firearm homicides	0.083**	0.100**	0.058	0.109**	-0.006
Observations	1,353	1,290	1,290	1,259	1,259
(2) 11 additional states 2019 data					
Total homicides	-0.053	-0.053	-0.030	0.0002	-0.085
Firearm homicides	-0.084	-0.077	-0.076	-0.023	-0.162
Non-firearm homicides	0.023	0.031	-0.004	0.053	-0.054
Observations	1394	1327	1520	1303	1327
(3) Levels					
Total homicides	-0.074	-0.056	-0.500**	-0.016	-1.800*
Firearm homicides	-0.262	-0.322	-0.123**	-0.271	-1.900**
Non-firearm homicides	0.265**	0.400**	0.165***	0.180**	0.134
Observations	1353	1290	1290	1450	1450
(4) Stacked DD					
Total homicides	-0.336	-0.033	-0.005	0.050	-0.054
Firearm homicides	-0.930	-0.085	-0.088	0.019	-0.147
Non-firearm homicides	0.101**	0.126**	0.062	0.116**	0.072
Observations	7339	6961	6961	6829	6829
(5) Restrict to treated states					
Total homicides	-0.071	-0.080	-0.055	-0.067	-0.096
Firearm homicides	-0.087	-0.870	-0.079	-0.134	-0.046
Non-firearm homicides	-0.050	-0.077	-0.040	0.016	-0.270**
Observations	145	145	145	145	145

Figure 1.2. Treated States vs. Bordering Comparison States: Firearm Suicide Rates

California

Oregon

Washington

Indiana

Connecticut

37
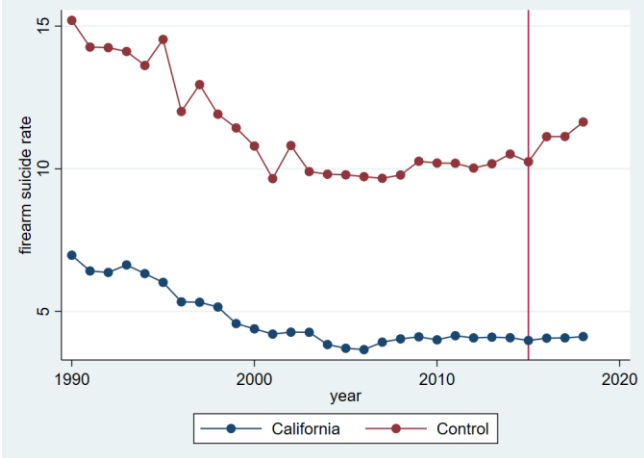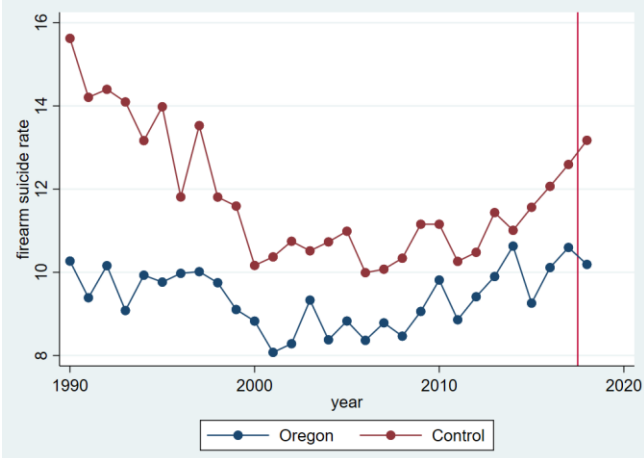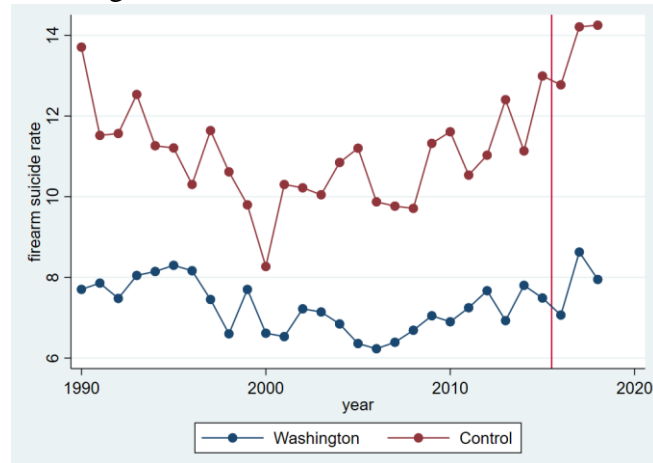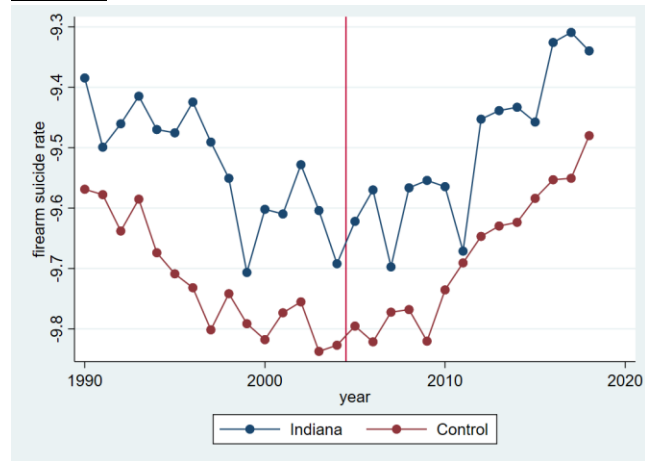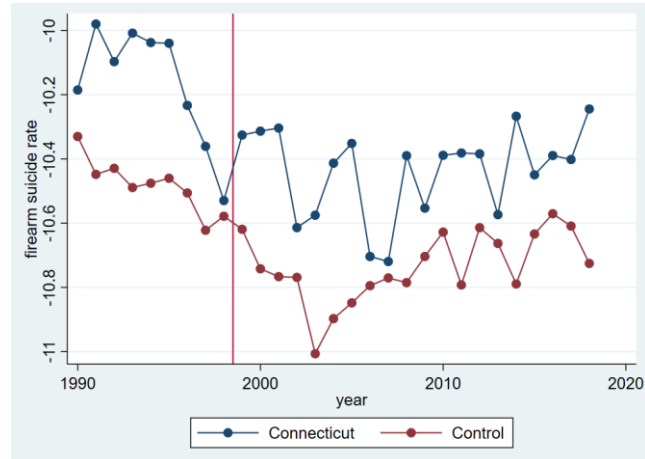
Figure 1.3. Treated States vs. Bordering Comparison States: Firearm Homicide Rates

California
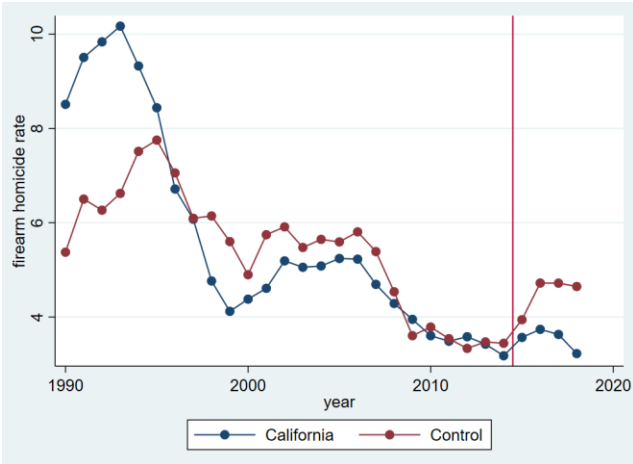
Oregon
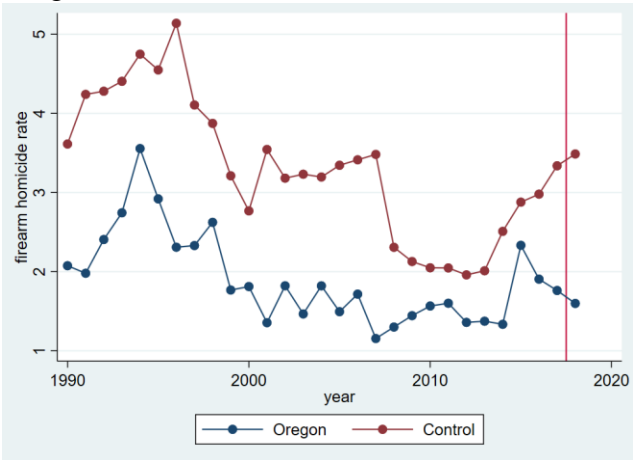
Washington
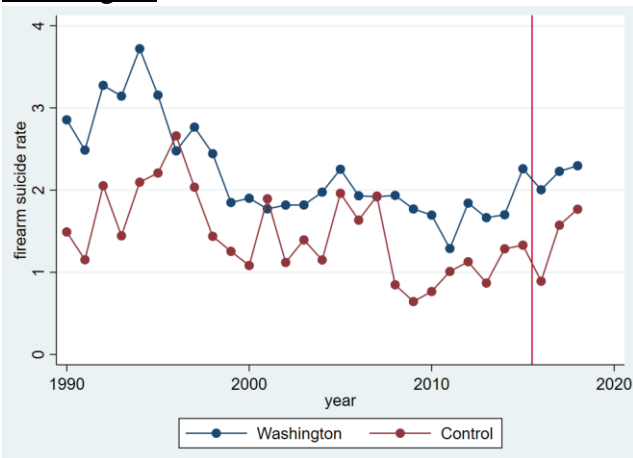
Indiana
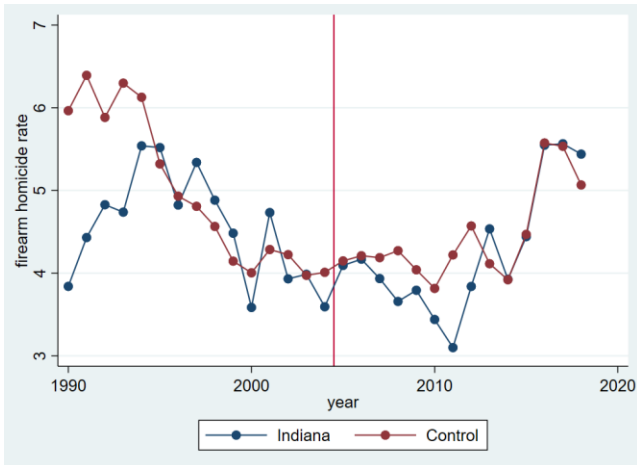
Connecticut
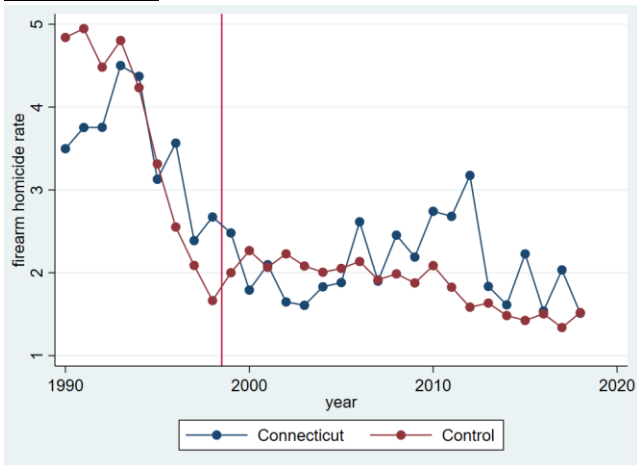
VIII.   IMPLICATIONS FOR FIREARM POLICY

In this Chapter, I use variation in the timing of ERPO laws and their plausible exogeneity to homicide and suicide rates to estimate the effects of ERPO laws on firearm-related homicides and suicides. I find little to no evidence of a relationship between ERPO laws and homicides. This result may be due to the avenues through which potential criminals obtain firearms as well as the fact that homicides, despite their higher media visibility, are actually much rarer than suicides. I do find, however, that ERPO laws reduce firearm-related suicides and suicides overall by about

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6.4% and 3.7% respectively, with the drop in firearm suicide rate by group ranging from 17.5% (women) to 5% (men). These results are both statistically and substantively significant. They suggest that if all 45 states without an ERPO law during this period were to adopt one, almost 1,300 lives per year could be saved.[92] About 38% of states currently have a ERPO law, and my results suggest that this increase in the adoption of ERPO laws is a life-saving trend. My results add to a growing literature examining the relationship between firearms and suicide and are congruent with the findings of previous seminal studies as well as with previous ERPO law studies.[93] My results are most similar to Kivisto and Phalen's results for Indiana and are higher than their Connecticut results and the results in both Swanson papers.[94] It is possible that the larger effects I find in my study may be partially due to the fact that I include Washington, Oregon, and California in my analysis; the ERPO laws in these three states are more expansive in who they allow to petition for a removal order than those laws in either Indiana or Connecticut, the two states studied by the previous authors. The states that have passed ERPO laws since 2018 also vary in the expansiveness of their laws.[95] It is possible, and would be consistent with economic theory,[96] that as states expand the group of people allowed to petition for an order, leveraging an expanded

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[92] This is based on a back-of-the-envelope calculation of 3.7% fewer suicides from the 1990 to 2018 average of 33,648 suicides per year, excluding states in the years they had ERPO laws.

[93] Swanson Connecticut, *supra* note 21; Swanson Indiana, *supra* note 22; Kivisto & Phalen, *supra* note 22.

[94] Swanson Connecticut, *supra* note 21, at 203 (finding that Connecticut ERPO laws decreased firearm-related suicide by 6% and overall suicide by 2%); Swanson Indiana, *supra* note 22, at 193 (finding that Indiana ERPO laws decreased firearm-related suicide by 0.57% and overall suicide by 0.27%); Kivisto & Phalen, *supra* note 22, at 861 (finding that ERPO laws contributed to a 7.5% decrease in firearm suicides and a 3% decrease in overall suicides in Indiana, while Connecticut laws resulted in a 1.6-13.7% decrease in firearm suicides which was completely offset by an increase in non-firearm suicides, resulting in an overall slight increase in suicides.)

[95] *See supra* Section II for discussion of state variation in ERPO laws.

[96] *See, e.g.,* Hal R. Varian, INTERMEDIATE MICROECONOMICS 718–19, 8th ed. 2010. http://fac.ksu.edu.sa/sites/default/files/microeco-_varian_0.pdf (explaining how asymmetric information between buyers and sellers can cause significant problems in a market).

information set, the accuracy and effectiveness of these laws increase.[97] In addition, laws that allow

for ex parte orders may be more effective in time-sensitive cases because the person subject to the

order is likely to be separated from their firearms more quickly.[98] ERPO laws may also decrease

overall suicidality if they increase the probability that the person subject to them receives mental

health treatment, and states should consider this connection to increase effectiveness as well.[99] As

states gain more experience with these laws and mortality data become available for years later

than 2018, this may be an important area of future research.

American politics faces historically high levels of polarization, affecting nearly every

institution of government.[100] A key element of depolarizing the normative debate about gun control

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[97] Twelve states, California, Colorado, Delaware, Hawaii, Illinois, Maryland, Massachusetts, Nevada, New Jersey, New York, Oregon, Washington, and the District of Columbia, allow people other than law enforcement to file a gun removal petition. *See* CAL. PENAL CODE § 18150; COLO. REV. STAT. § 13-14.5-104; DEL. CODE ANN. tit. 10, § 7701, 7704 (family and household members can petition for non-emergency orders); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35, 67/40; MD. CODE ANN., PUB. SAFETY § 5-601(E)(2); MASS. GEN. LAWS ch. 140, §§ 121, 131R; 2019 NV A.B. 291; N.J. STAT. ANN. § 2C:58-21; N.Y. C.P.L.R. §§ 6340, 6341; OR. REV. STAT. ANN. §§ 166.527; WASH. REV. CODE § 7.94.030(1). Maryland has gone the farthest, allowing medical and mental health professionals, spouses and cohabitants, other family members, co-parents, current dating partners, and current or former legal guardians to file petitions. *See* MD. CODE ANN., PUB. SAFETY § 5-601(E)(2)).

[98] Fourteen states, California, Colorado, Delaware, Florida, Hawaii, Illinois, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, Vermont, Washington, and the District of Columbia allow removal of firearms from people subject to ex parte removal orders. *See* Cal. Pen. Code § 18150(b); COLO. REV. STAT. § 13-14.5-103; DEL. CODE ANN. tit. 10, § 7703; FLA. STAT. § 790.401(4)(a); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35; MD. CODE ANN., PUB. SAFETY, § 5-603; MASS. GEN. LAWS ch. 140, §§ 121, 131R, 131S, 131T; N.J. STAT. ANN. §§ 2C:58-21, 23; N.Y. C.P.L.R. §§ 6340-6342; OR. REV. STAT. ANN. §§ 166.525, 166.527; R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4054(a)(1); WASH. REV. CODE § 7.94.050; D.C. CODE § 7-2510.04. Some states allow ex parte removal only when the petitioner is law enforcement (Delaware, Florida, Rhode Island, and Vermont) while other allow ex parte petitions by a larger group of petitioners (Hawaii, Illinois, Maryland, Massachusetts, New Jersey, New York, Oregon, and Washington). *See* DEL. CODE ANN. tit. 10, § 7703; FLA. STAT. § 790.401(4)(a); R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4054(a)(1) (ex parte law enforcement only); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/5, 67/35; MD. CODE ANN., PUB. SAFETY §§ 5-601(E)(2), 5-602, 5-603; MASS. GEN. LAWS ch. 140, §§ 121, 131R, 131S, 131T; N.J. STAT. ANN. § 2C:58-21; N.Y. C.P.L.R. §§ 6340-6342; OR. REV. STAT. ANN. §§ 166.525, 166.527; WASH. REV. CODE § 7.94.050 (expanded ex parte).

[99] Swanson Indiana, *supra* note 21, at 198 (finding that exposure to an ERPO order also increased the probability that a would-be suicide attempter received mental health treatment in the year after the law was enacted).

[100] The large literature on legislative polarization includes RED AND BLUE NATION? CHARACTERISTICS AND CAUSES OF AMERICAN'S POLARIZED POLITICS: VOLUME ONE (Pietro S. Nivola & David W. Brady eds., 2006); RED AND BLUE NATION? CONSEQUENCES AND CORRECTION OF AMERICA'S POLARIZED POLITICS: VOLUME TWO (Pietro S. Nivola & David W. Brady eds., 2008); SEAN M. THERIAULT, PARTY POLARIZATION IN CONGRESS (2008); Gary C. Jacobson, *Partisan Polarization in American Politics: A Background Paper*, 43 PRESIDENTIAL STUD. Q. 688 (2013);

and gun violence is establishing a foundation of facts about gun control policies and gun violence.

From an economic perspective, firearms impart utility to gun owners through recreational use and as a method of self-defense. However, the availability of firearms also creates a negative externality for society by increasing the probability that a firearm will be misused by an individual for violence.[101] Policies that aim to strike a balance between the costs associated with restricting gun ownership and the negative externalities associated with the improper use of firearms are likely welfare-enhancing and are the most likely gun laws to be legislatively successful.[102] I find that ERPO laws can help mitigate some of the negative externalities of gun ownership, specifically suicide. ERPO laws are targeted policies which use individualized information to remove guns from the most at-risk individuals.[103] Their targeted nature might minimize the costs of gun control policies on responsible gun owners, while discouraging firearm suicide without encouraging

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BARBARA SINCLAIR, PARTY WARS: POLARIZATION AND THE POLITICS OF NATIONAL POLICY MAKING (2014); POLITICAL POLARIZATION IN AMERICAN POLITICS (Daniel J. Hopkins & John Sides eds., 2015); SOLUTIONS TO POLITICAL POLARIZATION IN AMERICA (Nathaniel Persily ed., 2015); GOVERNING IN A POLARIZED AGE: ELECTIONS, PARTIES, AND POLITICAL REPRESENTATION IN AMERICA (Alan S. Gerber & Eric Schickler eds., 2016); SAM ROSENFELD, THE POLARIZERS: POSTWAR ARCHITECTS OF OUR PARTISAN ERA (2018). Polarization is highly asymmetric, however, with Republicans having moved considerably further to the right than Democrats have to the left. *See, e.g.*, Jacob S. Hacker & Paul Pierson, *Confronting Asymmetric Polarization*, *in* SOLUTIONS TO POLITICAL POLARIZATION IN AMERICA (Nathaniel Persily ed., 2015). *But see* Bree Lang & Matthew Lang, *Pandemics, Protests, and Firearms* 15–18 (U.C. Riverside, Dep't of Econ., Working Paper No. 202008), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3593956 (documenting that the large increase in firearm sales associated with the COVID-19 pandemic in Republican states is statistically indistinguishable from the increase in Democrat states, indicating that the divide between political parties may not be as wide as previously thought).

[101] *See supra* Section III.A for the connection between guns and violence. Although there is debate about the overall relationship between firearms and homicide, the externalities to which I am referring are not the net relationship between firearms and violence, but to the indisputably tragic cases of individual firearm homicide and suicide. Almost everyone will agree that the ideal scenario would be one in which we could keep the positive aspects of firearm ownership (home protection, recreational use) and eliminate the negative aspects (firearm homicide and suicide, mass shootings, accidental deaths).

[102] Kelly Roskam & Vicky Chaplin, *The Gun Violence Restraining Order: An Opportunity for Common Ground in the Gun Violence Debates*, 36 DEV. MENTAL HEALTH L. 1 (2017). https://www.westlaw.com/Document/I68585423927411e79bef99c0ee06c731/View/FullText.html?transitionType=Default&contextData=(sc.Default)&VR=3.0&RS=cblt1.0

[103] Vernick et al, *supra* note 47, at 100–101 (arguing that their targeted nature could make risk-based seizure laws effective).

suicide by other means. Taken together, my study and previous studies on this topic give strong support to the idea that ERPO laws are a successful means to prevent suicide and its attendant costs on family, friends, community, and society at large.[104]

A. *Constitutional Issues*

Further competing interests can inform the legal and policy analysis of ERPO laws. There is a Constitutional right to own a handgun in the home for self-protection.[105] However, there are many unresolved questions about which weapons, where, and who is protected. The Supreme Court recognizes that states may still use a variety of "presumptively lawful regulatory measures;" *Heller*, at 627 n. 26; to prevent the violence associated with firearms. *Id*., at 636. These include "longstanding prohibitions on the possession of firearms by felons and the mentally ill, or laws forbidding the carrying of firearms in sensitive places such as schools and government buildings, or laws imposing conditions and qualifications on the commercial sale of arms."[106]

The Supreme Court in *Heller* did not articulate the level of constitutional review to be employed in second amendment cases, but noted that rational basis review is inapplicable. *Heller*, 554 U.S. at 628–29. There is no direct loss of liberty involved in an ERPO firearm removal, but there is a deprivation of an interest that may have constitutional provenance through the Second Amendment, and a federal court might apply some form of intermediate scrutiny.

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[104] Swanson Connecticut, *supra* note 21; Swanson Indiana, *supra* note 21; Kivisto & Phalen, *supra* note 22.
[105] *District of Columbia v. Heller*, 554 U.S. 570 (2008); *McDonald v. City of Chicago* 561 U.S. 742 (2010) (incorporating the Second Amendment against the states).
[106] *Id*., at 626–27.

Courts in Connecticut, Indiana, and Florida have heard challenges to ERPO laws and have held that the laws do not violate the due process rights of respondents and/or are constitutional under the Second Amendment. In *Redington v. Indiana*, 992 N.E.2d 823 (Ind. Ct. App. 2013), the Indiana Court of Appeals rejected challenges based on the Second Amendment, the Indiana right to bear arms, the takings clause of the US Constitution, and vagueness. The court reasoned that the ERPO statute was rationally calculated to advance the legitimate governmental purpose of preventing the mentally ill from possessing firearms, and that there was not a substantial impairment of the subject's right to bear arms because of the required finding of dangerousness.[107] The Indiana Supreme Court subsequently refused to hear an appeal of the case.[108] Similarly, the Appellate Court of Connecticut held in *Hope v. State*, 163 Conn. App. 36, 43 (2016) that Connecticut's ERPO law does not violate the Second Amendment because it is is an example of a " 'presumptively lawful regulatory measure' " that does not restrict the right of law-abiding, responsible citizens to use firearms in home defense.[109] Florida joined Connecticut and Indiana in *Davis v. Gilchrist County Sheriff's Office*, 280 So. 3d 524, 532 (Fla. Dist. Ct. App. 2019) when it rejected a facial challenge to Florida's law on due process and vagueness grounds.

My findings do not support ERPO laws in the name of homicide prevention, so that rationale would not likely survive intermediate scrutiny. However, suicide prevention could satisfy heightened scrutiny with some type of tailoring to fit the means and ends. The government has a legitimate interest in suicide prevention, which the Supreme Court upheld in

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[107] *Id.* at 833.
[108] 997 N.E.2d 356 (Nov. 7, 2013).
[109] *Id.*

Washington v. Glucksberg and its companion case, *Vacco v. Quill*.[110] A federal court would

therefore balance the government's interest in the preservation of human life with the right to

own firearms for self-protection in the home. ERPO laws, with their requirements of at least

clear and convincing evidence and opportunities for hearings before a final order is issued, are

arguably narrowly tailored to the task of removing firearms from those who are at risk of suicide.

ERPO laws are modeled on Domestic Violence Protection Orders ("DVPOs"), which exist in all

50 states and the District of Columbia.[111] Ex parte ERPOs incorporate the same due process

protections as ex parte DVPOs, which states have been implementing for decades. The person

barred from possessing firearms is entitled to a full court hearing to plead their case before a

final ERPO is initiated.[112] Additionally, most states include penalties for filing false ERPO

petitions, addressing the risk that the orders could be weaponized to harass.[113] If a federal court

disagreed with the Connecticut, Indiana, and Florida courts that have so far heard challenges to

ERPO laws, it might require even more narrow tailoring in the nature of the showing to satisfy

an ERPO law and the basis for that law. For example, risk factors for suicide might be necessary,

rather than homicide on its own, based on my and other studies.

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[110] *Washington v. Glucksberg*, 521 U.S. 702 (1997) (applying rational basis scrutiny to Washington law barring physician-assisted suicide for terminally ill patients, but allowing withholding or withdrawal of life-saving treatment at patient's request);
(applying rational basis scrutiny to Washington law barring physician-assisted suicide for terminally ill patients, but allowing withholding or withdrawal of life-saving treatment at patient's request).
[111] *See generally Disarm Domestic Violence* (May 21, 2020), https://www.disarmdv.org/ (last visited Jan. 14, 2021) to learn about the domestic violence laws, including DVPOs, of all fifty states and the District of Columbia
[112] The plaintiff in *Davis v. Gilchrist Cty. Sheriff's Off.*, 280 So. 3d 524, 532 (Fla. Dist. Ct. App. 2019) argued that unlike domestic violence statute, ERPO laws are vague because they are "untethered to any central idea, subject, or danger." The court rejected this argument because of the legislatures own explanation for the law, the "need to comprehensively address the crisis of gun violence." *Id.*
[113] Matt Vasilogambros, Red Flag Laws Spur Debate over Due Process, PEW: STATELINE (Sept. 24, 2019), https://www.pewtrusts.org/en/research-and-analysis/blogs/ stateline/2019/09/04/red-flag-laws-spur-debate-over-due-process.

XI.   CONCLUSION

This Chapter exploits state-level variation across time in the existence of ERPO laws—gun control laws that permit police or family members to petition a state court to order the temporary removal of firearms from a person who may present a danger to others or themselves—to examine their effect on homicides and suicides. The existence of an ERPO law reduces firearm-related suicides by 6.4% and overall suicides by 3.7%, with no substitution to non-firearm suicides. ERPO laws are not associated with statistically significant changes in homicides rates, as a result of the rarity of their use for this purpose. Policymakers should consider ERPO laws an effective method to prevent firearm-related suicide, one of the most deadly and prevalent potential causes of death in the United States. In light of this evidence, ERPO laws should be more politically palatable than other forms of gun legislation because of their targeted nature and potential to balance the interests of gun owners against the negative externalities of gun violence.

CHAPTER TWO: SPILLOVER EFFECTS OF EXTREME RISK PROTECTION ORDER LAWS ON ORGAN DONATION

I.   INTRODUCTION

In 2019, 39,719 Americans received lifesaving heart, liver, lung, or kidney transplants from organ donors.[114] The vast majority, 32,322, of these organs came from deceased donors.[115] Unfortunately, demand for transplants has far outstripped supply for as long as organ transplantation has been medically possible.[116] As of September 28, 2021, there are 106,712 people on the national organ waiting list.[117] Every year, between 6,000 and 8,000 of these people die waiting.[118]

There are many institutional reasons for the organ donor shortage. Some of these, such as illegalization of incentives for organ donors and inefficiencies in the organ transplantation network, have received substantial academic, professional, and popular attention.[119] Although they have received less attention, lifesaving policies can also exacerbate the organ shortfall. Advances in medical care for accident victims, safety measures such as mandatory motorcycle and seatbelt laws, greater access to mental healthcare, and state gun control laws which reduce suicide and homicide are all lifesaving measures which have improved life expectancy over the past forty years. However, a potential unintended consequence of each of these measures is that

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[114] *Transplant Trends,* UNITED NETWORK FOR ORGAN SHARING (last updated Apr. 1, 2020), https://unos.org/data/transplant-trends/ (of the 39,719 total transplants in the United States in 2019, 7,397 were from living donors).

[115] *Id.*

[116] *Reforming Organ Donation in America*, ORGAN PROCUREMENT AND TRANSPLANTATION NETWORK, U.S. DEP'T HEALTH & HUM. SERVS. 2 (last updated January 2019), https://www.bridgespan.org/bridgespan/Images/articles/reforming-organ-donation-in-america/reforming-organ-donation-in-america-01-2019.pdf.

[117] *Transplant Trends, supra* note 1.

[118] *Reforming Organ Donation in America*, *supra* note 3.

[119] *See infra* Part VI.

by reducing the pool of individuals exposed to severe head trauma and brain death, they reduce the number of potential deceased organ donors and exacerbate the organ shortfall.[120] Safety laws present something of a "public health paradox"—they save some lives but might indirectly end others.[121]

This Chapter will empirically examine whether Extreme Risk Protection Order ("ERPO") laws—risk-based firearm seizure laws that permit police or family members to petition a state court to order the temporary removal of firearms from a person who may present a danger to themselves or others—are another lifesaving policy that reduces a beneficial externality by decreasing the supply of viable organ donors. ERPO laws reduce suicide (Chapter One; Dalafave 2021; Swanson et al. 2019; Kivisto and Phalen 2018; Swanson et al. 2017), but the reduction in suicides may also reduce the number of organs donated. Suicide deaths tend to provide fewer damaged organs than other causes of death (Figueiredo et al., 2007) and account for approximately 5-10% of all organ donations.[122] If fluctuations in the suicide rate impact the supply of organ donors in a significant way, enacting ERPO laws may reduce the supply of

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[120] *See infra* Part V. *See also* Jose Fernandez & Matthew Lang, *Suicide and Organ Donors: Spillover Effects of Mental Health Insurance Mandates*, 24 HEALTH ECON. 491, 493, 497 (2015) (mental health parity laws, which reduce suicide rates by about 2.5%, also reduce the female organ donor supply by 17.8%); Firat Bilgel, *State Gun Control Laws, Gun Ownership and the Supply of Homicide Organ Donors*, 63 INT'L REV. L. & ECON. 1, 10 (2020) (stricter gun control laws reduce homicide organ donor recovery by about 0.5-1.5%, depending on the gun control measure); Stacey Dickert-Conlin, Todd Elder, & Brian Moore, *Donorcycles: Motorcycle Helmet Laws and the Supply of Organ Donors*, 54 J. L. & ECON. 907, 930 (finding that if every helmet law were repealed, 3.1–4.6 percent of those who died while awaiting an organ would receive a transplant.); Ben Brewer, *Click it or Give it: Increased Seat Belt Law Enforcement and Organ Donation*, 29 HEALTH ECON. 1400, 1413 (2020) (finding that mandatory seatbelt laws reduce organ donations by 19 percent).
[121] George Annas, *The Paradoxes of Organ Transplantation*, 78 AM. J. PUB. HEALTH 621, 621 (1988) ("Organ transplantation presents a public health paradox: as motor cycle helmet, seat belt, gun control, drunk-driving, and other safety laws succeed in reducing the number of fatalities among young, healthy individuals, they decrease the number of potential organ donors, and exacerbate the 'organ shortage.' This, in turn, often leads to the death of others that could have been prevented by organ transplantation.").
[122] *See Organ Procurement and Transplantation Network Data Reports*, U.S. DEP'T HEALTH & HUM. SERVS. (last visited November 18, 2020), https://optn.transplant.hrsa.gov/data/view-data-reports/build-advanced/.

organ donations. This Chapter explores whether suicide-reducing ERPO laws decrease the supply of organ donors and assesses the net effect of ERPO laws on mortality.

If ERPO laws alone reduce suicide by 3.7-4.5 percent during this period, the result is 66 fewer organ donors per year. Because one donor can save up to 8 lives, the result is an additional shortage of up to 585 transplants. If this is true, it is critical to find other ways to compensate for the organ donation spillover effects of lifesaving policies to maintain the supply of organs.

II.   BACKGROUND ON ORGAN DONATION

Organ transplantation has been medically possible since 1954, when the first kidney was successfully transplanted.[123] Until the early 1980s, the potential for organ rejection limited the number of transplants performed, but since that time, medical advancements in matching and immunosuppression have radically increased the potential for successful transplantation.[124] Despite these advancements, thousands of Americans still die from medically remediable organ failure every year because there are not enough organs available.[125] An obvious path to reducing the organ shortage is to increase supply. While live donation is an option for paired organs such as kidneys, deceased donors provide about 81 percent of transplantable organs.[126] Only about two percent of Americans die in circumstances that allow for donation.[127] The main criteria are

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[123] *History of Transplantation*, UNITED NETWORK FOR ORGAN SHARING (last visited Dec. 3, 2020), https://unos.org/transplant/history/#:~:text=In%201954%2C%20the%20kidney%20was,were%20begun%20in%20the%201980s. Liver, heart, and pancreas transplants followed in the late 1960s, while lung and intestinal transplants began in the 1980s. *Id.*
[124] *Id.*
[125] *Reforming Organ Donation in America*, *supra* note 3 (Between 6,000 and 8,000 people die on waiting lists every year.)
[126] *Transplant Trends, supra* note 1 (of the 39,719 total transplants in the United States in 2019, 32,322 were from deceased donors).
[127] Lauran Neergaard & Nicky Forster, *Where You Die Can Affect Your Chance of Being an Organ Donor*, THE MORNING CALL (Oct. 20, 2019), https://www.mcall.com/health/mc-nws-organ-donors-20191019-qhdjlldyqnczxkxlyhjmypgl6q-story.html.

that brain happen before heart death and that the body be in reasonably good physical

condition.[128] Potential disqualifiers include death before reaching the hospital, cancer, infection,

and intense traumatic injury.[129] Age is another factor, although older donors can still provide life-

saving organs to older recipients.[130] If every person who died under circumstances where organs

could be donated were an organ donor, current demand might be satisfied.[131] However, the

biggest disqualifier from organ donation is not being an organ donor. This condition is

contingent not only on the often unexpressed wishes of the potential donor, but also on the

wishes of their family, to which health professionals sometimes defer even when they are at odds

with a donor's explicit expressed intent to donate.[132] In 2019, of the 2.8 million Americans who

died, only 11,900 were deceased organ donors, leading to 32,322 transplants.[133] Each recipient

needs on average 1.1 organs, so 32,322 transplants translates to almost as many lives saved.[134]

The gap between demand and supply for organs translates to huge costs for individual

patients and society as a whole. Patients suffer lower quality of life, inability to work, and often

exorbitant financial costs.[135] The overall healthcare system is heavily taxed as well. A vast

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[128] *Reforming Organ Donation in America*, *supra* note 3

[129] *Id*. The cutoff is usually age 75. *See The Kidney Project*, UNIV. CALIF. SAN FRANCISCO (last updated Sept. 19, 2019), https://pharm.ucsf.edu/kidney/need/statistics#:~:text=The%20almost%20750%2C000%20people%20who,at%20%2435%20billion%20in%202016..

[130] Neergaard & Forster, *supra* note 13.

[131] Phyllis Coleman, *"Brother, Can You Spare a Liver?" Five Ways to Increase Organ Donation*, 31 VAL. U. L. REV. 1, 2-3 (1996).

[132] Kevin Callison & Adelin Levin, *Donor Registries, First-Person Consent Legislation, and the Supply of Deceased Organ Donors*, 49 J. OF HEALTH ECON. 70, 73–74 (2016).

[133] *Transplant Trends, supra* note 1 (Of the 39,719 total transplants in the United States in 2019, 7,397 were from living donors. There were 15,158 organ donors, of whom 3,258 were living).

[134] *Reforming Organ Donation in America*, *supra* note 3.

[135] *Id.*

majority of the people on organ waiting lists are waiting for a kidney.[136] Since 1972, patients

with kidney failure have been eligible for Medicare coverage through the End Stage Renal

Disease Program.[137] For these patients, the only alternative to kidney transplantation is dialysis, a

time-consuming, exhausting treatment with high morbidity and mortality.[138] Dialysis costs for

patients awaiting a kidney transplant total $34 billion per year.[139] By contrast, spending for

transplant patient care is $3.4 billion, with much better long-term health outcomes.[140] Preempting

dialysis with a kidney transplant creates lifetime savings per patient and to the system.[141] Organ

transplantation presents an almost unique case in which the medically optimal outcome is also

the most cost-effective.[142]

III.   SECONDARY EFFECT OF LIFESAVING POLICIES

Advances in science and medicine have led to large increases in life expectancy, which

correspondingly lead to both increases in the need for organ donors and decreases in the supply.

Lifesaving policies can have the same unintended latter effect. Examples include safety measures

such as mandatory motorcycle helmet and seatbelt laws and laws which increase access to health

services, such as mental health parity laws.[143] State-level motorcycle fatalities increase by about

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[136] *Organ Donation and Transplantation Statistics,* NAT'L KIDNEY FOUNDATION (last updated Jan. 1, 2016),
https://www.kidney.org/news/newsroom/factsheets/Organ-Donation-and-Transplantation-Stats (about 96,000 people
are waiting for a kidney, and 3,000 new patients are added to the kidney waiting list each month).
[137] *See, e.g.* Medicare and Medicaid Programs; Conditions for Coverage for End-Stage Renal Disease Facilities, 42
C.F.R. § 405 (2008). People with kidney failure make up one percent of the Medicare population but cost seven
percent of the Medicare budget. *The Kidney Project, supra* note 15.
[138] *The Kidney Project*, *supra* note 15 (Hemodialysis involves being tethered a machine for three- to four-hour
session three time per week. Just 35% of hemodialysis patients remain alive after five years of treatment).
[139] David Goldberg et al., *Changing Metrics of Organ Procurement Organization Performance in Order to Increase
Organ Donation Rates in the United States*, 17 AM. J. OF TRANSPLANTATION 3183, 3183 (2017).
[140] *The Kidney Project*, *supra* note 15.
[141] *Reforming Organ Donation in America*, *supra* note 3.
[142] *Id.*
[143] *See* Richard Pérez-Peña, *Downside of Fewer Violent Deaths: Transplant Organ Shortage Grows*, N.Y. TIMES
(Aug. 19, 2003), https://www.nytimes.com/2003/08/19/nyregion/downside-to-fewer-violent-deaths-transplant-

30 percent when mandatory helmet laws are repealed.[144] Helmet mandates imposes costs on

riders who may prefer to ride helmetless, which might be justified by reduced negative

externalities of death and injury.[145] However, helmet laws also decrease positive externalities of

helmetless riding by reducing the supply of organ donors.[146] If every helmet law were repealed,

3.1–4.6 percent of those who died while awaiting an organ would instead receive a transplant.[147]

Similarly, by reducing motor vehicle fatalities, mandatory seatbelt laws reduce organ donations

by 3.8 percent.[148] In addition to better care for accident victims, lifesaving access to mental

healthcare and state gun control laws which reduce suicide and homicide also have the

unintended consequences of decreasing the availability of deceased organ donors, reducing their

mortality reduction benefits.[149]

Extreme Risk Protection Order ("ERPO") laws—risk-based firearm seizure laws that

permit police or family members to petition a state court to order the temporary removal of

firearms from a person who may present a danger to themselves or others—are another

lifesaving policy with the potential to reduce a beneficial externality by decreasing the supply of

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organ-shortage-grows.html ("In my field, we make morbid jokes about repealing the seat belt laws and air bag laws and gun-control laws") (quoting Dr. Jonathan Bromberg, director and chief surgeon of the organ transplant program at Mount Sinai Medical Center in Manhattan); Annas, *supra* note 8 ("Organ transplantation presents a public health paradox: as motor cycle helmet, seat belt, gun control, drunk-driving, and other safety laws succeed in reducing the number of fatalities among young, healthy individuals, they decrease the number of potential organ donors, and exacerbate the 'organ shortage.' This, in turn, often leads to the death of others that could have been prevented by organ transplantation.").

[144] Dickert-Conlin et al., *supra* note 7, at 929.

[145] *Id.*

[146] *Id.* at 929–30 (Motorcycle deaths are concentrated among healthy men ages 18–34, ideal organ donation candidates.).

[147] *Id*. at 930.

[148] Brewer, *supra* note 7, at 1413.

[149] Fernandez & Lang, *supra* note 7, at 493, 497 (mental health parity laws, which reduce suicide rates by about 2.5%, also reduce the female organ supply by 17.8%); Bilgel, *supra* note 7, at 10 (stricter gun control laws reduce homicide organ donor recovery by about 0.5-1.5%, depending on the gun control measure).

viable organ donors. ERPO laws reduce firearm suicide, and as a result also might reduce the

pool of individuals exposed to severe head trauma and brain death, a prerequisite for most cases

for deceased donor organ recovery. The following sections will empirically examine this

possibility and its implications for organ donation policy.

IV. EXTREME RISK PROTECTION ORDER LAWS

A. *Overview of State Laws*

Nineteen states and the District of Columbia currently have ERPO laws.[150] The orders

issued under these laws are variously called Extreme Risk Protection Orders,[151] Gun Violence

Restraining Orders,[152] Risk Warrants,[153] and Proceedings for the Seizure and Retention of a

Firearm.[154] Before 2018, only five states–Connecticut (1999), Indiana (2005), California (2014),

Washington (2015), and Oregon (2017)–had passed these laws.[155] In each of the first three states,

the laws were passed in response to highly publicized homicides: the 1998 Connecticut Lottery

mass shooting, the 2004 murder of an Indiana police officer by a mentally ill man, and the 2014

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[150] California, Colorado, Connecticut, Delaware, Florida, Hawaii, Illinois, Indiana, Maryland, Massachusetts, Nevada, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia. *See* CAL. PENAL CODE § 18150; COLO. REV. STAT. § 13-14.5-103; CONN. GEN. STAT. § 29-38c; DEL. CODE ANN. tit. 10, §§ 7701, 7704; FLA. STAT. § 790.401(3)(a); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35, 67/40; IND. CODE ANN. § 35-47-14-2; MD. CODE ANN., PUB. SAFETY § 5-601(E)(2); MASS. GEN. LAWS ch. 140 § 131R; 2019 NV A.B. 291; N.J. STAT. ANN. §§ 2C:58-21, 23; 2020 NM SB 5; N.Y. C.P.L.R. §§ 6340, 6341; OR. REV. STAT. ANN. § 166.527; R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4053; VA. CODE ANN. § 19.2-152.14; WASH. REV. CODE §§ 7.94.030(1), 7.94.020(2); D.C. CODE § 7-2510.04.
[151] Oregon, Washington, Maryland, Vermont, and Colorado. OR. REV. STAT. ANN. § 166.525, et seq.; WASH. REV. CODE Ann. § 7.94.010, et seq.; MD. CODE ANN., PUB. SAFETY § 5-601 et seq.; VT. STAT. ANN. tit. 13, § 4051, et seq.; 2019 CO HB 1177. New Mexico calls the orders associated with its law Extreme Risk Firearm Protection Orders. 2020 NM SB 5. Florida calls them Risk Protection Orders. FLA. STAT. § 790.401, et seq.
[152] California. CAL. PENAL CODE § 18100 et seq.
[153] Connecticut. CONN. GEN. STAT. § 29-38c
[154] Indiana. IND. CODE ANN. § 35-47-14-1, et seq.
[155] CONN. GEN. STAT. § 29-38c; IND. CODE ANN. § 35-47-14-1, et seq.; California. CAL. PENAL CODE § 18100 et seq.; WASH. REV. CODE Ann. § 7.94.010, et seq.; OR. REV. STAT. ANN. § 166.525, et seq.

killings of students near the University of California, Santa Barbara.[156] In 2018, following the

Stoneman Douglas High School shooting in Parkland, Florida, the number of states with ERPO

laws more than doubled to include Florida, Vermont, Maryland, Rhode Island, New Jersey,

Delaware, Massachusetts, Illinois, and the District of Columbia.[157] In 2019 and 2020, New York,

Colorado, Nevada, Hawaii, New Mexico, and Virginia also passed these laws.[158] Eleven other

states are currently considering such legislation.[159]

The laws vary in their details, but the general scheme is that a person with reason to

believe that a gun owner presents a danger to themselves or others may petition a state court to

order the temporary removal of firearms.[160] The order also prevents the individual subject to it

from purchasing or possessing firearms.[161] A court decides whether to issue the order based on

statements or actions by the gun owner in question. Evidence might include threats of violence

by the respondent toward themselves or others, a violation of a domestic violence restraining

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[156] Timothy Williams, *What are 'Red Flag' Gun Laws, and How Do They Work?*, N.Y. TIMES, Aug. 7, 2019, at A14 (Connecticut ERPO law passed after state lottery worker killed four employees and self; California ERPO law passed after gunman killed six people near U.C. Santa Barbara); *Jake Laird Law: Indiana's "Red Flag" Statute*, IND. STATE POLICE L. OFFICE (last updated May, 2019) https://www.in.gov/isp/files/Jake%20Laird%20Law%20(Final%20Revision)%20July%202020%20-%20Barbie.pdf (providing background on Indiana ERPO law passed after police officer Jake Laird was killed by a man who had recently been released from hospital and had his firearms returned).

[157] FLA. STAT. § 790.401, et seq.; VT. STAT. ANN. tit. 13, § 4051, et seq.; MD. CODE ANN., PUB. SAFETY § 5-601 et seq.; R.I. GEN. LAWS §§ 8-8.3-1, et seq.; N.J. STAT. ANN. § 2C:58-20, et seq.; DEL. CODE ANN. tit. 10, § 7701 et seq.; MASS. GEN. LAWS, ch. 140 § 131R(b); 430 ILL. COMP. STAT. Ann. 67/1, et seq.; D.C. CODE § 7-2510.04. ; 2019 DC B 286.

[158] COLO. REV. STAT. § 13-14.5-103; HAW. REV. STAT. ANN. § 134-C; 2019 NV A.B. 291; 2020 NM SB 5; N.Y. C.P.L.R. §§ 6340, 6341; VA. CODE ANN. § 19.2-152.14.

[159] As of April 13, 2020, there were active ERPO bills in eleven state legislatures: Arkansas, New Hampshire, Minnesota, Wisconsin, Michigan, Iowa, Pennsylvania, Nebraska, Kentucky, Tennessee, and North Carolina. Sean Campbell et al., *Red Flag Laws: Where the Bills Stand in Each State*, THE TRACE (last updated April 13, 2020) https://www.thetrace.org/2018/03/red-flag-laws-pending-bills-tracker-nra/.

[160] *See* Reena Kapoor et al., *Resource Document on Risk-Based Gun Removal Laws*, 37 DEV. IN MENTAL HEALTH L. 6, 9 (2018) (outlining the typical risk-based gun removal framework); *The Effects of Extreme Risk Protection Orders*, GUN POL'Y IN AM. (last updated April 22, 2020), https://www.rand.org/research/gun-policy/analysis/extreme-risk-protection-orders.html (providing another outline).

[161] *The Effects of Extreme Risk Protection Orders*, *supra* note 52.

order, or recent acquisition of a significant number of firearms.[162] If implemented, the order lasts about six to twelve months, but the person subject to the order is usually given the opportunity to request a hearing to terminate the order.[163] Refusal to comply with the order is punishable as a criminal offense. After a set time, the guns are returned to the person from whom they were seized unless another court hearing extends the period of confiscation.[164]

There is state variation along several dimensions. Seven states allow only law enforcement to petition for removal orders, but twelve states and the District of Columbia allow other individuals, including family and household members, to petition.[165] All states offer both ex parte orders, which allow eligible individuals to petition for orders in emergency cases without waiting to provide notice of a hearing to the respondent, and final orders after a notice

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[162] *See, e.g.,* CAL. PENAL CODE § 18155(b)(1). Additionally, petitioners must also usually include information they have about firearms the respondent possesses. *See, e.g.,* CAL. PENAL CODE § 18107; DEL. CODE ANN. tit. 10, §§ 7703(a), 7704(a); 2017 DC B 1068, Act 629 (effective until April 30, 2019); D.C. CODE § 7-2510.04; FLA. STAT. § 790.401(2)(e); HAW. REV. STAT. ANN. § 134-63(b); 430 Ill. Comp. Stat 67/35(a), 430 Ill. Comp. Stat 67/40(a); MD. CODE ANN., PUB. SAFETY §§ 5-602(a), 5-603(A); MASS. GEN. LAWS, ch. 140, section 131R(b); N.J. STAT. ANN. § C.2C:58-23(b); 2020 NM SB 5, Section 5; R.I. GEN. LAWS § 8-8.3-3(f); VT. STAT. ANN. tit. 13, § 4053(c)(3)(B); WASH. REV. CODE § 7.94.030(3)(b).

[163] *See* Kapoor et al., *supra* note 30, at 8 (outlining the basics of the gun removal process); RAND, *supra* note 12 (providing resources regarding risk protection orders).

[164] *See* Kapoor et al., *supra* note 48, at 9 (outlining the typical risk-based gun removal framework); GUN POL'Y IN AM., *supra* note 48.

[165] California, Colorado, Delaware, Hawaii, Illinois, Maryland, Massachusetts, Nevada, New Jersey, New York, Oregon, Washington, and the District of Columbia. *See* CAL. PENAL CODE § 18150; COLO. REV. STAT. § 13-14.5-104; DEL. CODE ANN. tit. 10, § 7701, 7704 (family and household members can petition for non-emergency orders); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35, 67/40; MD. CODE ANN., PUB. SAFETY § 5-601(E)(2); MASS. GEN. LAWS ch. 140, §§ 121, 131R; 2019 NV A.B. 291; N.J. STAT. ANN. § 2C:58-21; N.Y. C.P.L.R. §§ 6340, 6341; OR. REV. STAT. ANN. §§ 166.527; WASH. REV. CODE § 7.94.030(1). Maryland has gone the farthest, allowing medical and mental health professionals, spouses and cohabitants, other family members, co-parents, current dating partners, and current or former legal guardians to file petitions. *See* MD. CODE ANN., PUB. SAFETY § 5-601(E)(2)).

and a hearing.[166] Most final orders last one year.[167] Ex parte orders last for shorter periods, and

there is greater variability in their length, ranging from one to two days in Maryland to up to

twenty-one days in California and Oregon.[168] To date, no court has invalidated an ERPO law on

Constitutional or other grounds.[169]

Despite variation in the details of ERPO laws, each state's law is designed to respond to

acute periods of elevated risk of violence by identifying and disarming high-risk individuals.[170]

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[166] California, Colorado, Delaware, Florida, Hawaii, Illinois, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, Vermont, Washington, and the District of Columbia allow removal of firearms from people subject to ex parte removal orders. *See* CAL. PENAL CODE § 18150(b); COLO. REV. STAT. § 13-14.5-103; DEL. CODE ANN. tit. 10, § 7703; FLA. STAT. § 790.401(4)(a); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/35; MD. CODE ANN., PUB. SAFETY, § 5-603; MASS. GEN. LAWS ch. 140, §§ 121, 131R, 131S, 131T; N.J. STAT. ANN. §§ 2C:58-21, 23; N.Y. C.P.L.R. §§ 6340-6342; OR. REV. STAT. ANN. §§ 166.525, 166.527; R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4054(a)(1); WASH. REV. CODE § 7.94.050; D.C. CODE § 7-2510.04. Some states allow ex parte removal only when the petitioner is law enforcement (Delaware, Florida, Rhode Island, and Vermont) while other allow ex parte petitions by a larger group of petitioners (Hawaii, Illinois, Maryland, Massachusetts, New Jersey, New York, Oregon, and Washington). *See* DEL. CODE ANN. tit. 10, § 7703; FLA. STAT. § 790.401(4)(a); R.I. GEN. LAWS § 8-8.3-4; VT. STAT. ANN. tit. 13, § 4054(a)(1) (ex parte law enforcement only); HAW. REV. STAT. ANN. § 134-C; 430 ILL. COMP. STAT. 67/5, 67/35; MD. CODE ANN., PUB. SAFETY §§ 5-601(E)(2), 5-602, 5-603; MASS. GEN. LAWS ch. 140, §§ 121, 131R, 131S, 131T; N.J. STAT. ANN. § 2C:58-21; N.Y. C.P.L.R. §§ 6340-6342; OR. REV. STAT. ANN. §§ 166.525, 166.527; WASH. REV. CODE § 7.94.050 (expanded ex parte).
[167] Exceptions are Illinois (six months), Vermont (six months), Virginia (six months) and New Jersey (indefinite, until respondent demonstrates by preponderance of the evidence that they are no longer a danger). *See* 430 ILL. COMP. STAT. 67/35; 13 VT. STAT. ANN. § 4053; Va. Code Ann. § 19.2-152.14, N.J. STAT. ANN. § 2C:58-25. Currently, California's finals orders last for one year, but effective September 1, 2020, courts in California will be able to issue final orders lasting between one and five years. 2019 CA AB 12, amending CAL. PENAL CODE § 18175(d).
[168] *See* MD. CODE ANN., PUB. SAFETY, § 5-603 (hearing must be on the first or second day on which a district court judge is sitting); OR. REV. STAT. ANN. § 166.527(9) (respondent has 30 days to request a hearing, and the hearing must occur within 21 days); CAL. PENAL CODE § 18155(c) (order lasts 21 days).
[169] Courts in Connecticut, Indiana, and Florida that have heard challenges to ERPO laws have held that the laws do not violate the due process rights of respondents and/or are constitutional under the Second Amendment. *See Hope v. State*, 163 Conn. App. 36, 133 A.3d 519 (2016); *Redington v. Indiana,* 992 N.E.2d 823 (Ind. Ct. App. 2013), trans. denied (rejecting challenges based on the Second Amendment, the Indiana right to bear arms, the takings clause of the US Constitution, and vagueness). The Indiana Supreme Court subsequently refused to hear an appeal of the case. 997 N.E.2d 356 (Nov. 7, 2013); https://www.1dca.org/content/download/537544/6066635/file/183938_1284_09252019_09405740_i.pdf.
[170] Jon Vernick et al., *Background Checks for all Gun Buyers and Gun Violence Restraining Orders: State Efforts to Keep Guns from High-Risk Persons*, 45 J. OF L., MED., & ETHICS 98, 100–101 (2017) (arguing that their targeted nature could make risk-based seizure laws effective).

The next subsection will examine evidence of ERPO laws' effectiveness in accomplishing these goals with respect to firearm suicide.

B. *Effect of Extreme Risk Protection Order Laws on Suicides*

There is strong evidence that ERPO laws reduce suicide by reducing the incidence of firearm suicide, without replacement to non-firearm suicide. Three studies have analyzed the effects of ERPO laws on suicide in Connecticut and Indiana. In two papers, Jeffrey Swanson and coauthors analyzed individual-level data on firearm removal cases matched to death records in Connecticut and Indiana.[171] Swanson's Connecticut study found a 6% decrease in firearm-related suicide which translated to a 2% decrease in overall suicide, and the Indiana study found more moderate 0.57% and 0.27% decreases respectively.[172] Kivisto and Phalen conducted a population-level analysis of the effect of ERPO laws on suicides in Connecticut and Indiana.[173] Using synthetic controls, Kivisto and Phalen find that ERPO laws contributed to a 7.5% decrease in firearm-related suicides and a 3% decrease in overall suicides in Indiana.[174] In Connecticut,

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[171] Jeffrey Swanson et al., *Implementation and Effectiveness of Connecticut's Risk Based Removal Law: Does It Prevent Suicides?*, 80 L. & CONTEMP. PROBS. 179, 202–204 (2017) [hereinafter Swanson Connecticut] (estimating that in Connecticut, approximately twenty gun seizures were need for every averted suicide); Jeffrey Swanson et al., *Criminal Justice and Suicide Outcomes with Indiana's Risk-Based Gun Seizure Law*, 47 J. OF THE AM. ACAD. OF PSYCHIATRY & THE L. 188, 193 (2019) [hereinafter Swanson Indiana]. (estimating that in Indiana, approximately 10 gun removal cases were needed to avert each prevented suicide).

[172] These percentages are calculated using the estimates in the Swanson papers and the average expected suicides in Connecticut and Indiana respectively, using data from the CDC. *See* Swanson Connecticut, *supra* note 58, at 203 (estimating that Connecticut's red flag law prevented seventy-two suicides over the study period); Swanson Indiana, *supra* note 58, at 193 (estimating that Indiana's red flag law prevented thirty-nine suicides over the study period); *Compressed Mortality File 1979-1998 on CDC WONDER Online Database*, NAT'L CTR. FOR HEALTH STAT., CTRS. FOR DISEASE CONTROL & PREVENTION (last visited March 15, 2020), https://wonder.cdc.gov/controller/datarequest/D16; *Underlying Cause of Death 1999-2018 on CDC WONDER Online Database*, NAT'L CTR. FOR HEALTH STAT., CTRS. FOR DISEASE CONTROL & PREVENTION (last visited March 15, 2020), https://wonder.cdc.gov/controller/datarequest/D76 [hereinafter CDC WONDER].

[173] Aaron Kivisto & Peter Lee Phalen, *Effects of Risk-Based Firearm Seizure Laws in Connecticut and Indiana on Suicide Rates, 1981–2015*, 69 PSYCHIATRIC SERVS. 855 (2018).

[174] *Id.* at 861 (finding that Indiana gun seizures prevented 383 firearm suicides but contributed to 44 non-firearm suicides, resulting in an overall suicide decrease over the study period).

Kivisto and Phalen found a 1.6% decrease in firearm-related suicide in the first years of enactment, which became a 13.7% decrease following increased enforcement efforts in the post-Virginia Tech (2007) period.[175] However, Connecticut's reduction in firearm suicides was offset by increased non-firearm suicides, resulting in an overall slight increase in suicides.[176] The most recent study to examine the effect of ERPO laws on suicides using difference-in-differences included laws in Connecticut, Indiana, California, Washington, and Oregon, and found that the laws contributed to a 6.4% decrease in firearm suicides, which translated to a 3.7% decrease in overall suicides.[177] There was no evidence of substitution to other methods of suicide as a result of decreased ability to commit firearm suicide. This is consistent with evidence that restricting access to a chosen means of suicide can effectively discourage some would-be suicide attempts entirely.[178]

V.   EXTREME RISK PROTECTION ORDER LAWS

Because ERPO laws reduce suicide, and suicide donors make up about 5-10% of all organ donors, it is reasonable to suppose that, in addition to saving lives, ERPO laws might have

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[175] *Id.* The authors argue that the Virginia Tech mass shooting affected Connecticut's but not Indiana's ERPO enforcement because of the "eight-year lag after the enactment of Connecticut's firearm seizure legislation during which time very few guns were seized, but seizure rates increased fivefold following the mass shooting at Virginia Tech on April 16, 2007. By contrast, Indiana's enactment in 2005 corresponded almost immediately with meaningful levels of enforcement." *Id.* at 855.

[176] *Id.* The authors estimate that the Connecticut enforcement bump prevented 128 firearm-related suicides but contributed to 140 non-firearm suicides from 2007-2015, resulting in an overall 0.4% *increase* in overall suicides. *Id.*

[177] Rachel E. Dalafave, *An Empirical Assessment of the Effect of Red Flag Laws on Homicide and Suicide*, 52 LOY. U. CHI. L.J. 867 (2021) (using a difference-in-differences methodology).

[178] Brian Bauer & Daniel Capron, *How Behavioral Economics and Nudges Could Help Diminish Irrationality in Suicide-Related Decisions*, 15 PERSP. ON PSYCHOL. SCI. 44, 47 (2019) ("If the thesis were true that most people who want to kill themselves will…it is more likely that we would see higher rates of means substitution and a decrease in survivor rates. Instead, these studies suggest that people retrospectively find greater utility in continuing to live their life after a suicidal crisis has ended compared with the prospect of ending their life.").

the unintended secondary consequence of reducing the supply of transplantable organs. The following section will empirically explore this possibility.

A. *Trends in Raw Data*

I use a number of data sources to isolate the relationship between ERPO laws, suicide rates, and organ donations. Suicide data are from CDC WONDER and are merged with state-level demographic variables from Bureau of Economic Analysis and the Current Population Survey. (Flood, 2020; Iowa State, 2020). The Organ Procurement Transportation Network ("OPTN") reports the count of cadaveric donors originating from suicide by sex and state for 1994-2018. Created by the National Organ Transplant Act of 1984, the OPTN is a network of separate organ procurement organizations ("OPOs") that hold a local monopoly on the receipt and transplantation of all organs in their designated service area.[179] As part of its mandate, the OPTN collects data on the universe of all organ donations in the United States.[180] Starting in 1994, the OPTN began cataloging the circumstances of death for each deceased organ donor including whether the death was due to circumstances such as homicide, suicide, motor vehicle accident, or other accidents like death due to a fall.

The OPTN can be aggregated to the state-level in several different ways. I follow Brewer (2020) and assign deceased organ donors to the state of residence, allowing me to link state-specific ERPO laws with state-level organ donation for all 50 states and D.C. I prefer the state of residence because that is where the individual was most likely living and was therefore subject to that state's ERPO law. Another option would be to follow Howard (2011), Dickert-Conlin et al.

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[179] *Reforming Organ Donation in America*, *supra* note 3.
[180] The OPTN data is publicly available and can be found at https://optn.transplant.hrsa.gov/data/.

(2011), Fernandez et al. (2013), and Fernandez and Lang (2015) in assigning the donation data

from an OPO to the state where it is located. However, because there are 57 OPOs located across

38 states, not all states will be represented and there are some cases where the OPO's jurisdiction

spills over into a neighboring state(s).[181] Given that the identification is based on the state-

specific changes in ERPO laws, the jurisdiction of an OPO could be an issue if deceased organ

donors from one state are assigned to a neighboring state with a different legal scheme.

The main dependent variable in this study is suicide organ donation rate per 100,000 by

state and year. I will also examine this measure of organ donation rates separately for men,

women, white, and non-white people. Additionally, I will look at donations resulting from all

gunshot deaths, regardless of whether they are homicides, suicides, or accidental. I am able to

break this measure down by gender and race. Finally, OPTN also provides a measure of all

gunshot injuries broken down by homicide, suicide, or unintentional circumstance of death for

all donors, but it is not possible to break this measure down by gender or race.

Table 2.1 shows summary statistics of the variables included in the main model. The

independent variable of interest, ERPO laws, is a dummy coded 0 prior to the enactment of the

law and 1 if the law went into effect at any point during the previous year. The second and third

columns of Table 2.1 show the summary statistics of state-years separated according to whether

there was an ERPO law in effect or not. The fourth column of Table 1 shows the outcome of a

two-sided t-test on each ERPO/no ERPO law pair, indicating whether there is a statistically

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[181] States that do not have OPOs within them are: Alaska, Delaware, Idaho, Maine, Montana, New Hampshire, North Dakota, Rhode Island, South Dakota, Vermont, West Virginia and Wyoming. Individuals in these states are covered under the jurisdiction of an OPO in a neighboring state(s).

significant difference between the means of the two groups. All control variable rates are per

100,000, except for the unemployment rate which is per 100.

Table 2.1. Summary Statistics

	Full Sample	ERPO	No ERPO	ttest
Suicide rate per 100,000	13.60	11.56	13.66	***
Female	5.47	5.09	5.48	
Male	21.93	18.37	22.04	***
Suicide organ donors per 100,000	0.24	0.19	0.24	***
Female	0.10	0.10	0.11	
Male	0.38	0.29	0.38	***
Ratio of suicide donors to suicides	0.017	0.016	0.018	
Female	0.019	0.019	0.019	
Male	0.017	0.015	0.017	*
ERPO law	0.030	1	0	***
Fraction white	0.81	0.83	0.81	
Fraction black	0.11	0.09	0.11	
Fraction other race	0.07	0.07	0.07	
Fraction male age 45-64	0.12	0.13	0.12	***
Unemployment rate	5.43	5.82	5.41	
Real per capita income ($)	45518.68	59273.17	45093.40	***
Urbanization fraction	0.72	0.88	0.71	***
Fraction married	0.41	0.41	0.41	
	N = 1267	N = 38	N = 1229	

Note: Rates are per 100,000, except for the unemployment rate which is per 100.
***p<0.01, **p<0.05, *p<0.1.

The average U.S. suicide rate is 13.6 suicides per 100,000 people. Men account for

approximately 80% of all U.S. suicides and about 78% of suicide donors. On average, about 2%

of suicide victims become organ donors. This number is consistent across gender.

The overall suicide rate and the suicide rate for men is significantly lower in state-years

with an ERPO law than when there is no ERPO law. On average the suicide rate is

approximately 15% lower in state-years with an ERPO law in place.[182] Similarly, the suicide organ donor rate is significantly lower overall and for men with an ERPO law in place. While there are certainly more factors causing these differences than ERPO laws alone, these raw numbers motivate further investigation and support the idea that ERPO laws may have unintended spillover effects on organ donor supply.

I also control for other factors that may affect suicide organ donation. These include state demographic and economic data from the Bureau of Economic Analysis and the Current Population Survey: per capita income, unemployment rate, and the percentages of the white, African American, other race, metropolitan, and married population. I control for the percentage of the population that is male between the ages of 45 and 64 because this is the group that accounts for the highest number of suicides.[183]

B. *Empirical Model*

I use a quasi-natural experiment design and examine the difference-in-differences in suicide organ donation rates between states with and without ERPO laws across time. Difference-in-differences first calculates the differences in suicide organ donation rates in a treatment group before and after a policy goes into effect, then compares that difference to a baseline difference in a control group. We first find the difference in suicide organ donation rates in each state with an ERPO law before and after the ERPO law was passed and take the average. We then do the same for states in which no ERPO law was passed, subtracting before and after

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[182] 13.66 per 100,000 verses 11.56 per 100,000.
[183] *See Suicide by Age, United States 2009-2018*, SUICIDE PREVENTION RESOURCE CENT. (last visited July 20, 2020) https://www.sprc.org/scope/age.

an ERPO law might have been passed. We then subtract, or difference, the differences in these two groups from each other. This gives us the difference-in-differences, which is a measure of the causal effect of ERPO laws on suicide organ donation rates. Essentially what difference-in-differences does is calculate:

$$\beta = (Suicide\ Organ\ Donation_{post-rfl}^{states\ with\ rfl} - \tag{1}$$

$$Suicide\ Organ\ Donation_{pre-rfl}^{states\ with\ rfl}) -$$

$$(Suicide\ Organ\ Donation_{post-rfl}^{states\ without\ rfl} -$$

$$Suicide\ Organ\ Donation_{pre-rfl}^{states\ without\ rfl})$$

ERPO laws were enacted in response to high-profile mass shootings, not to increases in suicides or organ donation, allowing me to treat the enactment of these laws as exogenous to my outcome variables. Exogeneity means that we can establish a one-way causal relationship between ERPO laws and suicide organ donation rates, without worrying that any statistical relationship we find might actually be the result of policymakers passing ERPO laws in response to increased suicide organ donation rates.[184] Instead, we can interpret the results of the difference-in-differences analysis below as solely the causal effect of ERPO laws on suicide organ donation rates.

The main model which I estimate to determine whether ERPO laws influence homicides and suicides is:

$$\ln(s_{it}) = \alpha + \beta R_{it} + \theta X_{it} + \gamma_t + \tau_i + \varepsilon_{it},$$

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[184] *See, e.g.,* Jeffrey Wooldridge, INTRODUCTORY ECONOMETRICS 561, 4th ed. 2009.
https://books.google.com/books?id=64vt5TDBNLwC&pg=PA49#v=onepage&q=exogenous&f=false.

where $\ln(s_{it})$ is the natural log of the suicide organ donation rate in state i at time t, R_{it} is a 0-1 dummy variable for the presence of an ERPO law, X_{it} stands for a vector of demographic and economic controls, γ_t are year fixed effects, and τ_i are state fixed effects.

VI.   THE EFFECT OF ERPO LAWS ON ORGAN DONATIONS

The main results are reported below in Table 2.2. The first panel of the table shows the results for the natural log of suicides per 100,000 and the second panel shows the results for the natural log of suicide organ donation rates per 100,000. Each column in Table 2.2 represents a unique regression, estimating first the outcomes for the entire population, then separately the outcomes for the men and women. In this sort of model, a positive coefficient indicates an increase in the rate of homicides or suicides and a negative number indicates a decrease in the rate of homicides or suicides. Three stars next to a number indicates that the result is significant at the 1% level, two stars indicates that it is significant at the 5% level, and one star indicates that it is significant at the 10% level, two-tailed tests.[185]

According to Table 2.2, overall, male, and female suicide rates decrease significantly after an ERPO law is enacted. Because the regressions are performed using the natural log of the dependent variables (suicide rates or suicide donor rates), the resulting regression coefficients multiplied by 100 can be interpreted as the approximate percent change effect of a one unit increase in the independent variable (presence of an ERPO law) on the dependent variable. So,

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[185] A result is statistically significant if the observed result would be unlikely if the null hypothesis were true. A result being significant at, for example, the 1% significance level (aka at the 99% confidence level), means that if the null hypothesis (here, that there is no difference in organ donation rates between state-years with an ERPO law and state-years without an ERPO law) were true, we would expect to see the observed result (for example, a 3.7% decrease in donations) only 1% of the time. Statistical significance can never tell us for certain that there is no difference between two data sets, but it can tell us how likely we would be to see the result we see if the data sets were the same.

for example, if a regression coefficient, is 0.5, this means that a move from 0 to 1 of the independent dummy variable is associated with a 0.5*100 = 50% increase in the dependent variable. Suicide rates decreased by about 4.4% overall, about 3.4% for men, and about 7.5% for women during this time period. The suicide donor rate decreased by about 14% as a result. Estimates for men and women separately significant at the 10% level, and if taken at face value, indicate decreases of 6.9% and 15.9% respectively. For race, the results show a significant decrease in both suicide and suicide donor rates for white donors, but not for nonwhite suicide donor rates. These results are less precise due to CDC suppression limits.[186]

Table 2.2. Regression of Suicide and Organ Donation Rates on ERPO Laws.

	(1)	(2)	(3)	(4)	(5)
	All	Men	Women	White	Non-white
Suicide rate					
ERPO law	-0.044**	-0.034**	-0.075***	-0.039***	-0.128***
	(0.012)	(0.011)	(0.021)	(0.012)	(0.038)
R-squared	0.96	0.96	0.89	0.95	0.42
Suicide donor rate					
ERPO law	-0.139**	-0.069*	-0.159*	-0.225***	-0.054
	(0.042)	(0.038)	(0.082)	(0.081)	(0.085)
R-squared	0.71	0.64	0.59	0.71	0.69
Observations	1,260	1,237	979	1,233	868

Notes. Each column represents a unique regression. Each observation is at the state-year level. The dependent variable is the natural log of the suicide rate and the suicide donor rate, and the standard errors are clustered at the state level. All specifications include state and year fixed effects. The controls included in the columns are percent white, percent black, percent male, unintentional poisoning death rate, unintentional firearm death rate, percent age 45-64, percent male age 45-64, urbanization percent, unemployment rate, real per capita income, and percent married. Robust standard errors are in parentheses.***$p<0.01$, **$p<0.05$, *$p<0.1$.

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[186] The Centers for Disease Control and Prevention suppresses all state level data representing zero to nine deaths to protect privacy. Therefore, in state-years where, for example, six men and seven women committed suicide (homicide), the data are missing for both male and female suicides (homicides). However, the data are non-missing for the overall regression.

The following graphs and tables include a comparison of means between treated states and border states and a number of alternative specification tests. In my primary specification, I define my outcomes as natural logs of the rate to approximate percentage changes, making them easier to interpret. Next, I run the models using the levels rather than the natural logs of the variables, so the outcome variable is, for example, suicide organ donor rate instead of ln(organ donor suicide rate). Then, I conduct a test to address the concern raised in Goodman-Bacon (2021) that difference-in-differences designs which use treated states to identify time period fixed effects may provide estimates that give negative weight to certain pairs of treatment-control comparisons. I perform a stacked difference-in-differences estimate (Sun and Abraham 2020, Deshpande and Li 2019, Fadlon and Nielsen 2015), which attempts to transform this setting, in which average treatment effects vary across groups and periods, and the adoption of the treatment by different states is staggered over time, to a two-group, two-period design (in which difference in differences identifies the average effect of the treatment on the treated) by stacking separate datasets containing observations on treated and control units for each treatment group. (Gardner, 2021). Finally I restrict the sample to treated cities.

Table 2.3. Robustness Checks: Suicide Organ Donors.

	(1) All	(2) Men	(3) Women	(4) White	(5) Non-white
(1) Baseline specification					
Suicide organ donors	-0.139**	-0.069*	-0.159*	-0.225***	-0.054
Observations	1,260	1,237	979	1,233	868
(2) Levels					
Suicide organ donors	-0.039**	-0.041**	-0.034**	-0.047***	-0.031
Observations	1,326	1,326	1,326	1,326	1,326
(3) Stacked DD					
Suicide organ donors	-0.141**	-0.036	-0.163	-0.221***	-0.180
Observations	5,980	5,859	4,577	5,838	4,088
(4) Restrict to treated states					
Suicide organ donors	-0.133	-0.079	-0.038	-0.245	-0.004
Observations	304	293	238	292	223

Figure 2.1. Treated States vs. Bordering Comparison States: Suicide Organ Donor Rates

California
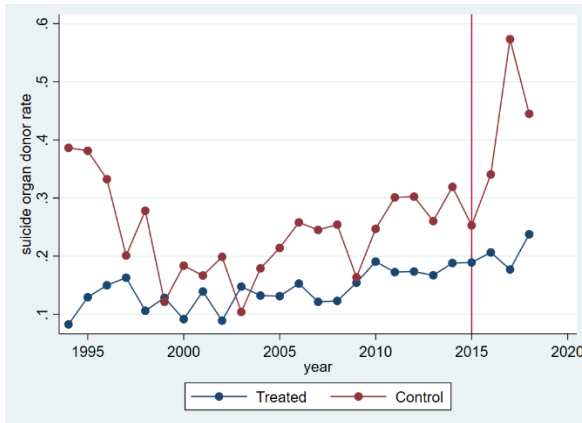
Oregon
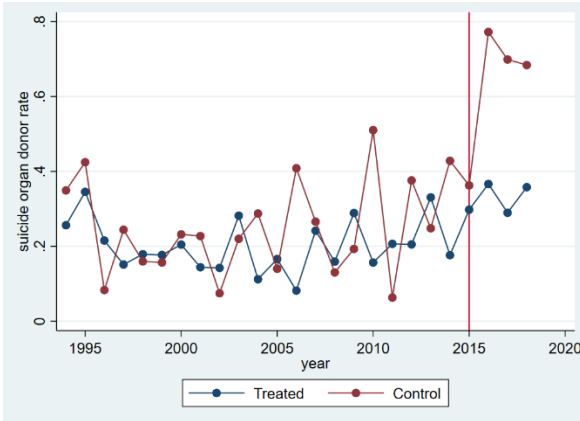
Washington
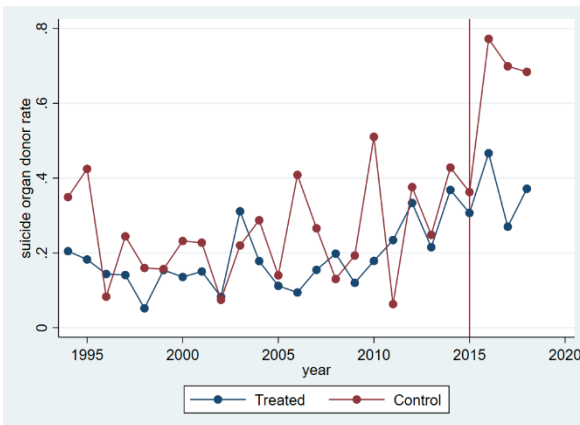
Indiana
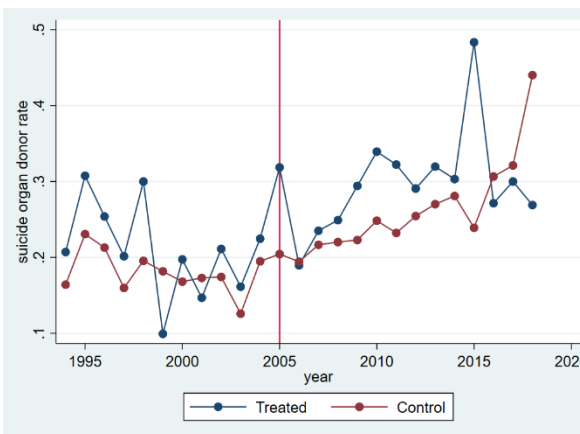
Connecticut
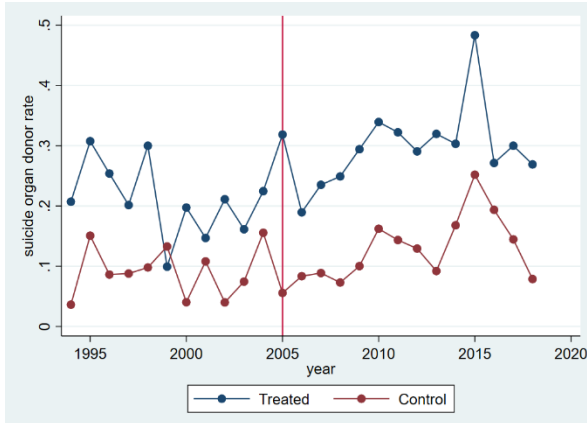
VII.   MORTALITY BENEFITS OF ERPO LAWS

From the estimates above, I can estimate the number of organ donors that would be lost annually if every state adopted an ERPO law. There is an average of 645 suicide donors per year in the country. Fourteen percent (0.139—the effect of ERPO laws on suicide donor rates from Table 2.2, column 1, row 2) of 645 means that ERPO laws lead to a loss of about 90 donors.

We can compare this estimate to the predicted loss from the decrease in suicides using the suicide estimation results. There was an average of 36,414 suicides per year during this time period, and ERPO laws were associated with a 4.4% decrease, or about 1,602 fewer suicides per year if every state adopted the laws. Using the average suicide to suicide donor conversion rate of about 2%, the predicted loss in suicide donors would be about 32 per year using this method. This is of the same order of magnitude as the former method, but identical results are not expected. There are also several possible explanations for any discrepancy. The second method assumes that the marginal person prevented from committing suicide has the same likelihood of becoming a donor as the average person who commits suicide. This assumption could be incorrect for several reasons. The kind of person prevented by ERPO laws could be more likely

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to be a registered organ donor, more likely to have family who would consent to their being a donor, or more likely to have family in general. The latter possibility seems likely, since use of an ERPO law requires someone to notice problematic behavior and petition the court. There is not much literature analyzing donation rate and family authorization after suicide, but one study in Brazil analyzing all potential brain death donors from 1988-2004 found that family is more likely to consent to donation when brain death is caused by suicide than in deaths caused by head injury from a car accident or brain-vascular disease. (Figueiredo et al., 2007). The explanation for this lower refusal rate is unclear. However, it provides a potential explanation for ERPO laws' higher than predicted drop in organ donation. If a person is not a registered donor and no next of kin can be located to consent, they will not become an organ donor. If individuals who are more likely to have visible support networks are disproportionately affected by these laws, there will be a disproportionately larger drop in suicide organ donation rates, because of the high family consent rate in suicide situations.

It is possible to calculate the net effect of ERPO laws on mortality and therefore their net lifesaving benefits. In 2019, there were 11,900 deceased organ donors, leading to 32,322 transplants. Therefore, on average, each donor gives about 2.7 organs:

32,322 transplants/11,900 deceased donors = 2.7 organs/donor.

Ninety fewer donors per year due to the effect of the ERPO laws (see beginning of this section) in decreasing suicides results in about 243 fewer organs:

90 fewer donors x 2.7 organs/donor = 243 fewer organs.

Each recipient needs on average 1.1 organs, so 243 organs will provide organ transplants for 221 recipients:

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243 fewer organs/1.1 organs per recipient = 221 fewer recipients.

Different organs have different one-year survival rates. For example, 95% of patients who receive a donated kidney survive for at least one year, while only 81% of pancreas recipients survive that long. (Michas, 2020). Heart and liver recipients have 90% and 89% one-year survival rates respectively. Using a 90% survival rate, about 199 of the 221 recipients would survive at least one year:

221 recipients x 90% one year survival rate = 199.

Subtracting this number from the estimated number of suicides that would be prevented by ERPO laws, 1,601-199, gives a net effect of 1,403 lives saved:

1,601 fewer suicides – 199 fewer organ recipients = 1,403 lives saved.

Using an $11 million value of a statistical life ("VSL") (2020$) estimate, this brings the net mortality benefits if every state adopted an ERPO law to over $15 billion. (Viscusi, 2018):

1,403 lives saved x $11 million per life = $15,433,000,000.

The VSL is a local tradeoff between fatality risk and money, and plays a fundamental role in policy analysis as a measure of the benefit individuals receive from enhancement to their health and safety. For the past 20 years, the VSL used by U.S. agencies has been in the $9 million to $11 million range, which brackets the recommended labor market estimate of $10 million in Viscusi (2018) based on labor market estimates using the Census of Fatal Occupational Injury data for fatality risks. (Viscusi & Dalafave, 2020). The Environmental Protection Agency and the Department of Transportation both currently use VSLs of approximately $11.6 million in their benefit-cost analyses. (U.S. Department of Transportation, 2021, Viscusi & Dalafave, 2020). The VSL does not put a dollar value on individual lives, but

rather aggregates estimates of how much people are willing to pay for small reductions in their risks of dying.

Any lifesaving policy has the potential to also decrease the supply of organ donors. Fernandez and Lang (2015) find that mental health mandates reduces the supply by 0.52%, Dickert-Conlin et al. (2011) find that motorcycle helmet laws decrease the supply by 0.98%, and Brewer (2020) finds that primary seat belt enforcement laws decrease supply by about 3.8%. This effect is not often considered by government benefit-cost analyses, and perhaps it should be any time a policy has the potential to have this adverse effect. This is not to advocate for public policy that shuts down lifesaving interventions just because by saving lives they also decrease organ donations. Instead, it highlights the critical need to increase organ donor rates to compensate for both the current shortage and for public health improvements.

VIII.   CONCLUSION

In the past few years, several states have enacted ERPO laws, gun control laws that permit police or family members to petition a state court to order the temporary removal of firearms from a person who may present a danger to themselves or others. ERPO laws have been shown to effectively reduce suicide, especially firearm-related suicide. Because a significant fraction of organ donations come from suicide deaths, ERPO laws can potentially affect the supply of organ donors. I explore the relationship between ERPO laws and organ donors and find that ERPO laws are associated with modest decreases in suicide donors. These point estimates suggest that ERPO laws decrease the organ supply by approximately 0.62%. Fernandez and Lang (2015) find that mental health mandates reduces the supply by 0.52%,Dickert-Conlin et al. (2011) find that motorcycle helmet laws decrease the supply by 0.98%, and Brewer (2020) finds

that primary seat belt enforcement laws decrease supply by about 3.8%. Like other lifesaving laws, ERPO laws have a small, but significant, impact on the overall organ supply. As policy makers and advocates continue to push for policies aimed specifically at firearm violence prevention, the supply of organ donors will have to increase through other sources in order to keep the inefficiency in the organ market from growing.

CHAPTER THREE: COMPENSATING FAMILIES OF DECEASED ORGAN DONORS? MORAL CONCERNS AND ALTERNATIVES

I. INTRODUCTION

As of January 5, 2022, there are 106,786 men, women, and children on the national transplant waiting list. A record 38,151 transplants were performed in 2021, but around 58,400 patients were added to the transplant waiting list.[187] The majority, about 91,000 patients, are waiting for a kidney (HRSA 2021).[188] The average wait is around 5 years while receiving dialysis, and between 6,000 and 8,000 people die each year because they cannot find a donor.[189]

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[187] https://www.organdonor.gov/learn/organ-donation-statistics/detailed-description#fig1 detailed description of waiting.
https://www.organdonor.gov/learn/organ-donation-statistics organ donation stats
[188] https://www.organdonor.gov/learn/organ-donation-statistics/detailed-description#fig1
[189] https://www.kidneyfund.org/kidney-disease/kidney-failure/treatment-of-kidney-failure/kidney-transplant/transplant-waitlist/; *Reforming Organ Donation in America*, ORGAN PROCUREMENT AND TRANSPLANTATION NETWORK, U.S. DEP'T HEALTH & HUM. SERVS. 2 (last updated January 2019),

The gap between demand and supply for kidneys translates to huge costs of individual patients

and the system as a whole. Patients and their families suffer lower quality of life, inability to

work, and eventual death if a kidney is not supplied in time. For these patients, the only

alternative to kidney transplantation is dialysis, a time-consuming, exhausting treatment with

high morbidity and mortality.[190] The overall healthcare system is heavily taxed as well. Since

1972, patients with kidney failure have been eligible for Medicare covered through the End

Stage Renal Disease Program.[191] Transplantation is not only the medically best treatment for end

stage renal disease patients, but also the most cost-effective. Dialysis costs for patients awaiting a

kidney transplant total $34 billion per year.[192] By contrast, spending for transplant patient care is

$3.4 billion, despite the fact that there are only about three times as many patients on dialysis as

those who are transplanted.[193] Using an $11 million Value of a Statistical Life ("VSL") (Viscusi,

2018), a successful transplant to every patient on the waiting list who would otherwise die would

have a value of over $70 billion annually.

There are many discussions in policy and academic circles about how to increase organ

donations and transplants. In particular, there have been debates in the past few years about

legalizing kidney donor compensation, which is currently illegal virtually everywhere (Becker

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https://www.bridgespan.org/bridgespan/Images/articles/reforming-organ-donation-in-america/reforming-organ-donation-in-america-01-2019.pdf.

[190] *The Kidney Project*, UNIV. CALIF. SAN FRANCISCO (last updated Sept. 19, 2019) (Hemodialysis involves being tethered a machine for three- to four-hour session three time per week. Just 35% of hemodialysis patients remain alive after five years of treatment).

[191] *See, e.g.* Medicare and Medicaid Programs; Conditions for Coverage for End-Stage Renal Disease Facilities, 42 C.F.R. § 405 (2008). People with kidney failure make up one percent of the Medicare population but cost seven percent of the Medicare budget. *The Kidney Project, supra* note 15.

[192] David Goldberg et al., *Changing Metrics of Organ Procurement Organization Performance in Order to Increase Organ Donation Rates in the United States*, 17 AM. J. OF TRANSPLANTATION 3183, 3183 (2017).

[193] *The Kidney Project*, *supra* note 15.

and Elías 2007, Held et al. 2016, Satel 2006).[194] Although incentives for living kidney donors

have received the most attention, the vast majority of donated organs come from deceased

donors.[195] If every person who died under circumstances where organs could be donated were an

organ donor, current demand for organs might be met.[196] However, this is far from the current

reality.

Ethical concerns regarding exploitation of participants, coercion, undue influence, and

unfair allocation of organs are often the main concerns of opponents to incentivizing donors.[197]

A further worry is that compensation would violate human dignity and other sacred values.[198]

These concerns characterize organ donor payments as "repugnant transactions," i.e., exchanges

in which the parties want to engage but which third parties think should be prohibited.[199] There

have been few studies into the nature of preferences of US residents toward paying organ donors

(Elias et al., 2019), and, to my knowledge, none into the nature of preferences toward

compensating families of deceased organ donors. Although living organ donation generally has

better outcomes for recipients, it involves a major sacrifice on the part of living donors, with

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[194] Remuneration is illegal in all countries except in the Islamic Republic of Iran. In the United States, the 1984 National Organ Transplant Act (NOTA) prohibited the transfer of human organs for "valuable consideration," punishing violators with fines and prison time. Certain countries have introduced or are considering some types of incentives and mechanisms to enhance donations, such as allocation priority, kidney exchanges, and symbolic awards (Kessler and Roth 2012; Leider and Roth 2010; Niederle and Roth 2014; Roth, Sönmez, and Ünver 2004; Stoler et al. 2017).

[195] *Transplant Trends,* UNITED NETWORK FOR ORGAN SHARING (last updated Apr. 1, 2020), https://unos.org/data/transplant-trends/ (of the 39,719 total transplants in the United States in 2019, 32,322 were from deceased donors).

[196] Phyllis Coleman, *"Brother, Can You Spare a Liver?" Five Ways to Increase Organ Donation*, 31 VAL. U. L. REV. 1, 2-3 (1996).

[197] See Basu (2007), Halpern et al. (2010), Kerstein (2009), Radin (1996), Rippon (2012), Satz (2010). Ambuehl (2017) and Ambuehl, Niederle, and Roth (2015) provide experimental evidence of whether remuneration leads to undue influence.

[198] See Council of Europe (2015), Spital et al. (2002), Grant (2011), Sandel (2012), WHO (2004).

[199] Roth, Alvin E. 2007. "Repugnance as a Constraint on Markets." *Journal of Economic Perspectives* 21 (3): 37–58.

potential health consequences for the rest of their lives.[200] Concerns of exploitation, coercion, and undue influence might be greater when the donor is living than when they are deceased, because in the latter case there are no future health consequences to consider. Because of the potential to save lives and improve health outcomes for living donors with no health cost to donors, compensated deceased donation might be a less ethically fraught path than compensated living donation.

Another alternative to the current system is an opt-out, or presumed consent, system. The United States currently employs an opt-in system of donor consent. No one is presumed an organ donor, but must affirmatively opt in by registering. In an opt-out system, everyone is presumed a donor unless they affirmatively opt out. Opt-out systems have the potential to increase donation rates because of status quo bias, the human tendency to stick with default choices more often than rational decision-making would predict, even when it is very easy to switch.[201] Other alternatives include a priority allocation system (priority on organ waiting lists for registered donors, living donors, and consenting family members of deceased donors), and a registration incentive system (annual health insurance premium discount or other incentive for registered donors).

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[200] "In general, kidney donation has minimal long-term risks, especially when compared with the health risks in the general population. However, kidney donation may very slightly increase your risk of eventually developing kidney failure yourself, particularly if you're a middle-aged black man. The increased risk is minimal and translates into less than a 1 percent chance of future kidney failure." https://www.mayoclinic.org/tests-procedures/nephrectomy/expert-answers/kidney-donation/faq-20057997 Mayo Clinic. Professor Henry Hansmann has argued that the risk of living with one kidney is moderate, equivalent to driving back and forth to work sixteen miles a day. *The Economics and Ethics of Markets for Human Organs, in* ORGAN TRANSPLANTATION POLICY: ISSUES AND PROSPECTS 57 (James F. Blumstein & Frank A. Sloan eds., 1989).

[201] Colin Camerer et al., *Regulation for Conservatives: Behavioral Economics and the Case for Asymmetric Paternalism,* 151 U. PA. L. REV. 1211, 1224 (2003). Status quo bias could indicate a preference for the way things currently are or a lack of preferences over a given choice, which is also inconsistent with standard assumptions of rational choice theory. *Id.*

To examine public attitudes toward different policy options, I designed a randomized survey to provide, to my knowledge, the first investigation into the nature of preferences of Americans toward paying families of deceased organ donors. I also examine attitudes toward an opt-out system, and provide preliminary insight into preferences between a greater variety of alternative systems. First, I explore the nature of these preferences and document their heterogeneity. In particular, I ask whether attitudes toward paying donor families and presumed consent are influenced by the increase in transplants that such a system may generate, or whether they instead reflect deontological views or sacred values that are unaffected by considerations about kidney supply gains. Second, I assess how preferences depend on different institutional features according to which paid-donor family systems may be organized. Third, I examine other alternative systems, including opt-out deceased donor systems, how attitudes affect support for them, and how support for these systems compares to support for paid-donor family systems.

My sample consisted of 1,006 adult US residents recruited online through Amazon Mechanical Turk. The design included two main sources of experimental variation. First, I randomly assigned each respondent to one, and then later four more, hypothetical paid-donor family kidney procurement systems, and asked them to consider it as an alternative to the current system. There were twelve possible systems, and each respondent provided their opinion on a randomly selected five of the twelve systems. The features that characterized each system were the nature of compensation (cash or noncash), the number of kidneys procured (20,000, 30,000, or 40,000) and the amount of the payment ($10,000 or $30,000). Families of donors receive compensation from the government in every scenario, rather than recipients themselves. I chose this design because there is already strong evidence that there is strong opposition to organ

recipients paying. (Elias et al., 2019). Additionally, as explained above, kidney patients are already covered by one of the only universal healthcare programs in the United States: The End Stage Renal Disease Program under Medicare.[202] It seems reasonable that going forward, the government would continue to subsidize end stage renal disease care, especially because even with compensating donors or families, transplantation would represent a significant cost savings over the current system. Each individual made multiple choices to indicate whether they would support the proposed system, if they would prefer to keep the current one, or if both options were equal. This combination of between- and within-subject variation allowed me to characterize respondents' preferences toward transplant effects (number of kidneys procured) on the one hand, and institutional features of paid-donor procurement systems on the other hand. I also randomly assigned respondents to one of three potential opt-out systems, in which citizens are presumed to be organ donors, unless they explicitly opt-out. These systems were characterized by the number of kidneys procured (20,000, 30,000, or 40,000). Finally, respondents answered a multiple- choice question in which they could choose between the current system and five alternative systems: paid living donor, paid deceased donor family, opt-out, priority allocation for organ donors and their families, and insurance premium discount for living donors and those who agree to be deceased donors. Respondents were told to assume that each of the alternative multiple-choice systems would provide 30,000 kidneys (compared to 20,000 in the current system). Respondents answered a series of five questions regarding their attitudes to the current

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[202] *See, e.g.* Medicare and Medicaid Programs; Conditions for Coverage for End-Stage Renal Disease Facilities, 42 C.F.R. § 405 (2008).

system, the first paid-donor family system, the opt-out system, and their chosen multiple-choice system. The attitude questions followed each of their respective choice questions.

The second source of variation came from the respondents answering one paid-donor family question before being prompted to think about morality issues. They then answered four more questions after answering questions regarding ethical principles. The broad similarity of preferences before and after being prompted to express their moral views, and between subjects who answered the same question either before or after being prompted indicates that concern about potential violation of moral and ethical principles was salient in respondents' minds, regardless of the salience that the survey gave to them.

Figure 3.1 summarizes every policy option I consider in the survey.

Figure 3.1. Policy Options Considered in Survey.

	Current System	Deceased Financial Incentive System	Living Financial Incentive System	Opt-out System	Priority System	Registration Incentive System
Compensation (paid by governments)	none	$10,000 or $30,000	$10,000 paid by government	none	none	$500 paid by government
Incentive type	none	Funeral expenses, tax credits, contributions to a tax-free retirement account, tuition vouchers, or loan repayment paid to <u>deceased</u> donor's family	Health insurance, tax credits, contributions to a tax-free retirement account, tuition vouchers, or loan repayment paid to <u>living donor</u>	Opt-out system replaces opt-in	Priority on organ donation waiting list for registered donors, previous living donors, and consenting family members of deceased donors	Health insurance premium discount paid by government for registered donors

		OR cash				
Number of kidney transplants (annual)	20,000	20,000, 30,000, or 40,000	30,000	20,000, 30,000, or 40,000	30,000	30,000
% of demand for transplants satisfied	50%	50%, 75%, or 100%	75%	50%, 75%, or 100%	75%	75%

I find that on average across all conditions, 53 percent of respondents would support a compensated donor system in case of no transplant gains, and about 71 percent would favor compensation when the system is assumed to satisfy 100 percent of demand. This is very similar to results for living donor compensation found by Elias et al. (2019) (57 percent with no transplant gains, 70 percent for 100 percent of demand). Most respondents were trade-off sensitive. Their choices depended on how many additional transplants an alternative system would enable. The effect of additional kidneys was very stable across different specifications, and across incentive and opt-out system questions. Expanded kidney supply increased individuals' support for legalizing alternative organ donor systems and reduced their ethical concerns.

Type of compensation mattered to respondents. Payment in cash had a significant negative effect on support for the deceased financial incentive system. This supports the judgment of the Ethics Committee of the American Society of Transplant Surgeons that there is an ethical distinction between direct payment and charitable contributions or funeral expenses paid for the deceased donor (Shaikh & Bruce, 2016). Similarly, it supports the view of the Committee on Increasing Rates of Organ Donation that: "Ultimately, only if and when financial incentives for organ donation are widely accepted as different from purchasing organs, can this

alternative be proposed as preferable to the current system of altruistic organ donation."

(Childress and Liverman, 2006). However, my results indicate that a positive effect on the

supply of donated kidneys might be able to compensate for aversion to payment in cash.

Moral considerations strongly influence views for both the incentive and opt-out system.

Respondents who believe that a given system i) benefits rather than exploits donors (and their

families), (ii) respects rather than limits individual autonomy, (iii) allows individuals to make

fully informed choices and does not exert undue influence, (iv) is fair to patients who need a

transplant, and (v) promotes rather than violates human dignity, are more likely to support it.

Including moral judgments in my regression specifications explains a large amount of the

variation in support for both incentive and opt-out systems.

My study contributes to several literatures. Numerous papers examine how fairness

concerns, identity, religious and political beliefs, dignity, and social status influence decisions.[203]

Many argue that ethical beliefs should be considered in economic decision making (Bartling and

Özdemir, 2017; Bartling, Weber, and Falk and Szech, 2013, 2017; Yao, 2015; Sen, 1999;

Marshall 1890; Smith 1822). However, there is less evidence on whether individuals considering

repugnant transactions trade off moral beliefs and supply considerations.

Other studies consider whether financial gain affects decisions to behave in morally

unacceptable ways, such as lying or cheating on tests.[204] These activities are (plausibly)

universally wrong, are illegal everywhere, and legalization is not considered a policy option. My

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[203] *See, e.g.,* Akerlof and Kranton (2000); Bénabou and Tirole (2009, 2011); Bénabou, Ticchi, and Vindigni (2015); Bénabou, Falk, and Tirole (2018); Benjamin et al. (2012); Benjamin, Choi, and Fisher (2016); Bursztyn et al. (2015); Kuziemko et al. (2015).

[204] *See, e.g.*, Gibson, Tanner, and Wagner (2013) and Gneezy (2005). Jacob and Levitt (2003) and Martinelli et al. (2018) show that teachers and students to cheat with monetary incentives.

interest is in transactions that are morally contentious but that can be (and often are) contemplated as actual policies. Many other morally controversial transactions have features similar to payments for organ donors or their families; examples include gestational surrogacy, prostitution, abortion, eating meat from certain types of animals (or at all), and so on. Some of these activities are legal in certain countries but not in others, and opinions about their morality vary widely (Healy and Krawiec 2017, Satz 2010). Moreover, I focus on individuals' attitudes towards activities that others (not necessarily they themselves) undertake. This is a different decision process from choosing between an illegal or universally unethical act and a private economic or social gain.

Section I provides background on organ donation and allocation in the United States, potential alternatives to the current system, and the debate around financial incentives. Section II outlines the framework that guides my empirical investigation. Section III describes the research design and the subject pool. I report my findings in Section IV and discuss their implications for scholarship and policy in Section V.

II.   CURRENT ORGAN DONATION POLICY LANDSCAPE

In the United States, national organ donation policy is organized under The National Organ Transplant Act of 1984 ("NOTA"). NOTA banned "trade in organs" and created the national Organ Procurement and Transplantation Network ("OPTN"), which includes all transplant centers and 58 subnational organ procurement organizations ("OPOs")—geographic organ procurement monopolies (U.S. Dept. of Health and Human Services, 2019). The OPTN is managed under contract by the United Network for Organ Sharing ("UNOS"). OPOs are responsible for soliciting organ donations, matching patients with eligible donors, forming and

maintaining relationships with donor hospitals, obtaining next-of-kin authorization for all deceased donors, and managing the logistics of transferring organs between donor hospitals and transplant centers.

A. *National vs. Regional Allocation*

The role of geography in organ allocation has fueled an extremely contentious debate over organ allocation policy. Historically, OPTN's policies allocated organs to candidates based on 58 local Donor Service Areas ("DSAs") and 11 OPTN regions. There are inherent, organ specific limits to how far organs can travel before they are no longer viable for transplant. However, patients and transplant centers primarily on the West Coast and in the Northeast have recently successfully argued that geography should not otherwise be part of the allocation scheme for livers.[205] Existing law favors a national allocation policy, and advocates argue that ethics does as well. [206] The current allocation scheme prioritizes treating the sickest patients first, and broader national sharing seems to further this goal.[207] There are data showing that patients located in urban areas in the Northeast and West Coast are sicker and more likely to die on waiting lists than patients elsewhere.[208] Advocates argue that "[t]he burden of end stage organ failure across the country is not evenly distributed (demand) and neither is donor potential (supply)."[209] Therefore, they argue that organ allocation policy should require those areas of the

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[205] *Callahan v. United States Dep't of Health.* https://www.msn.com/en-us/feed*h & Human Servs.* through Alex Azar II, 939 F.3d 1251, 1255 (11th Cir. 2019).
[206] NOTA.
[207] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022).
[208] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022).
[209] Alexandra K. Glazier, *The Lung Lawsuit: A Case Study in Organ Allocation Policy and Administrative Law*, 15 J. HEALTH & BIOMEDICAL L. 139, 143 (2018).

country with greater access to organs to export them to areas with less access or a greater need for organs.[210]

Opponents of broader sharing, who tend to be from the South and Midwest, counter each of these arguments.[211] They argue that there is evidence of systemic inflation in the sickness of patients listed at the transplant centers arguing for a broader allocation scheme.[212] If this is true, not only will sicker patients not be the first to receive livers, but broader sharing could exacerbate existing socioeconomic inequalities by shipping organs from poor, rural areas to rich, urban areas.[213]

Additionally, nationalized allocation could lead to perverse incentives.[214] First, national organ sharing will reduce the incentive to improve OPOs that are performing worse than others. As discussed in Section II.A. above, OPOs have many responsibilities in addition to their previous use as administrative boundaries for allocating organs. These include promoting organ donation in their service area.[215] The size and quality (in terms of number of organs recovered) of OPOs varies significantly across the country.[216] There is similar large variation in percent of the population registered as organ donors by area. Unsurprisingly, "regions with better-performing OPOs tend to resent sending organs to regions with OPOs that perform poorly, as it is difficult to accept policies that allocate a scarce resource without taking into consideration

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[210] *Id.*

[211] *Callahan v. United States Dep't of Health & Human Servs.* through Alex Azar II, 939 F.3d 1251, 1251 (11th Cir. 2019).

[212] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022).

[213] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022).

[214] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022).

[215] "Changes in Allocation Policies for Donated Livers and Lungs." U.S. GOV'T ACCOUNTABILITY OFF. Oct. 2020. https://www.gao.gov/assets/gao-21-70.pdf.

[216] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022); Lara C. Pullen, *Lawsuits Drive Transplant Community Debate Over Liver Allocation*, 19 AM. J. OF TRANSPLANTATION 1251, 1255 (2019); Seth J. Karp et al., *Fixing Organ Donation: What Gets Measured, Gets Fixed*, 155 JAMA SURGERY 687, 987 (2020).

variations in OPO performance."[217] Nationalized allocation policies blunt incentives for the local

transplant community to improve OPOs and increase the number of recovered organs. Instead of

encouraging people in their areas to register as donors or increasing supply in other ways, such

as improving use of "marginal" organs,[218] they can get more organs from the national pool.

While this might help their patients in the short run, it will not increase the overall supply of

available organs, harming every patient on the waitlist.

Nationalized allocation might also blunt incentives for potential donors. "Sickest first"

regardless of geography is often assumed to be an absolute worthy goal, but it might not

correspond with actual potential donor preferences or efficient allocation. A 2019 survey of

potential donors that inquired into views about the relative importance of various factors when

allocating livers found that geographic proximity was just as important as recipient sickness.[219]

Public trust in the organ donation system is critical for potential donors to buy into that

system.[220] It is important to not simply rely on ethical maxims such as sickest first without

justification, but to determine the actual views of the public, because the public is ultimately the

source of all donated organs.[221]

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[217] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022) (quoting Lara C. Pullen, *Lawsuits Drive Transplant Community Debate Over Liver Allocation*, 19 AM. J. OF TRANSPLANTATION 1251, 1255 (2019)).
[218] For example, less-than-ideal organs such as those from older donors or donors with multi-organ system failure, sepsis, or cancer, whose cause of death is nevertheless consistent with organ donation and who might be a good match for some patients.
[219] Heather W. O'Dell et al., *Public Attitudes Toward Contemporary Issues in Liver Allocation*, 19 AM. J. TRANSPLANTATION 1212, 1213 (2019) ("Current organ allocation almost exclusively prioritizes risk of waiting list death without clear ethical justification.").
[220] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022) (citing *Organ Donation Depends on Trust*, 387 THE LANCET P2575 (2016), https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)30886-8/fulltext.)
[221] Benjamin McMichael, *Stealing Organs?*, INDIANA L. J. (forthcoming 2022).

B. *UAGA Legal Regime vs. UNOS Rationale*

Organs from deceased individuals become available for donation by express consent. The Uniform Anatomical Gift Act ("UAGA") of 1968 authorized express donation by individuals and, in the absence of the decedent's prior choice, by their family (a list of specific relatives in order of preference).

The UAGA is a model law that was drafted by Congress after the first successful heart transplant in 1967. Its purpose was to increase organ donation and protect patients. The UAGA does not mention payment for organs. According to the chair of the UAGA drafting committee, the drafters did not intend to encourage or discourage payment for organs, but to leave the choice up to the states or individual conscience (Childress and Liverman, 2006; Stason, 1968). Sales were illegal in some states prior to 1968, but most repealed their statutes when they adopted the UAGA. (Hansmann, 1989).

Every state adopted the UAGA in the late 1960s and early 1970s. Subsequently, states have enacted three additional versions. The 1987 revision provided a uniform way of obtaining consent from individuals, characterized a body part or organ as property because living people could gift parts of their body to another person, and prioritized an individual's explicit wish to donate (or not donate) over that of their family. Hospitals were authorized to retrieve organs if an individual had documented consent to donate. These revisions were adopted by 26 states. In 2006 the UAGA was revised again with the goals of motivating more people to become organ donors, again prioritizing the individual's wish to donate, and maintaining the current organ donation and transplantation system. The 2006 UAGA allowed individuals to consent to organ donation when obtaining a driver's license, verbally, through a will or other advance directive,

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through an online donor registry, or in another manner. As a result, the 2006 UAGA preserved the "opt-in" system, meaning that unless explicitly stated, a person is presumed not to be a donor. At the same time, the 2006 UAGA also strengthened language regarding the individual's right to make their own decision regarding organ donation, making it harder for family to nullify that decision after death. Many states have drafted and enacted their own versions of the UAGA based on the 2006 revisions.

Arguably, the current UNOS conception of organs as public goods is at odds with the legal regime set up by the UAGA (Blumstein, 1993).[222] Organs are distributed through a centralized system and treated as a national resource, eliminating control by the donor or family over their distribution. The donor and family cannot assign an organ because it is not "theirs" to assign (Blumstein, 1993).[223] However, the UAGA gives the donor and family the right to assign organs to a designated beneficiary, creating a legally enforceable right if one is designated. The legal structure set up by the UAGA is quite different from the currently prevailing legal ethics in the medical field (Blumstein, 1993).[224] Additionally, the United State Court of Appeals of the Sixth Circuit has found that a wife has a "constitutionally protected property interest in her husband's corneas," suggesting that courts are not uncomfortable with the use of traditional commercial paradigms in considering organ transplantation issues.[225]

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[222] James F. Blumstein, *The Use of Financial Incentives in Medical Care: The Case of Commerce in Transplantable Organs*, 3 Health Matrix: The J. of L. Med. 1, 15 (1993) ("The approach of the DHHS Task Force and the prevailing view of the Organ Procurement and Transplantation Network are in direct tension with the patient/family control provisions of the UAGA.")

[223] James F. Blumstein, *The Use of Financial Incentives in Medical Care: The Case of Commerce in Transplantable Organs*, 3 Health Matrix: The J. of L. Med. 1, 15 (1993).

[224] James F. Blumstein, *The Use of Financial Incentives in Medical Care: The Case of Commerce in Transplantable Organs*, 3 Health Matrix: The J. of L. Med. 1, 15 (1993).

[225] *Brotherton v. Cleveland*, 923 F.2d 477 (6th Cir. 1991) (holding that the wife of a deceased man had a property right in the decedent's corneas). The California Supreme Court, on the other hand, has held that cells from a

The United States continues to have an organ shortage despite the passage and revisions

of the UAGA. In traditional neoclassical economics, shortages occur when there is too much

demand and too little supply, indicating that the "price" for a commodity is too low (in this case,

zero). As Professor Blumstein explains, there is a lack of empirical evidence to indicate that

organs are different from other health care services, for which is it well accepted that financial

incentives make a difference.[226] Despite the legal bans in most countries on experimentation with

incentives, there is some direct evidence they work. In Iran, the only country with legalized

payments for live kidney donors, the waiting list have been eradicated. The system in Iran is not

perfect, but there is evidence that overall donors are satisfied and capable of making informed

decisions to donate.[227] Additionally, the thriving black market in kidneys, for which there is no

shortage of sellers, if further evidence that incentives can work.[228] The black market involves

healthy, willing sellers giving the gift of life, and in return receiving sometimes life-changing

compensation for themselves and their families. Unfortunately, in large part because it operates

outside formal legal protections, there have been documented abuses in the black market,

including donors not being paid the full amount promised, and both recipients and donors being

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removed spleen, used to form a commercially valuable cell line to produce lymphokines, are not a form of "property" protected under the state tort doctrine of conversion. *Moore v. Regents of the University of Cal.*, 793 P.2d 479 (1990).

[226] James F. Blumstein, *The Use of Financial Incentives in Medical Care: The Case of Commerce in Transplantable Organs*, 3 Health Matrix: The J. of L. Med. 1, 15 (1993).

[227] Hammond, Samuel. September 12, 2018. "How Iran Solved Its Kidney Shortage, And We Can Too." *Niskanen Center*. https://www.niskanencenter.org/how-iran-solved-its-kidney-shortage-and-we-can-too/#:~:text=An%20unlikely%20innovator%20in%20organ,within%2011%20years%20of%20implementation.

[227] Finkel, Michael. May 27, 2001. "Complications." *The New York Times Magazine*. https://www.nytimes.com/2001/05/27/magazine/complications.html.

[228] Finkel, Michael. May 27, 2001. "Complications." *The New York Times Magazine*. https://www.nytimes.com/2001/05/27/magazine/complications.html.

released too quickly after surgery.[229] Additionally, the black market is only available to patients of at least some means, leading to issues of distributive justice on both the donor and recipient sides. A regulated, government-paid incentive system would alleviate distributional unfairness on the side of recipients, resulting in at least as equitable organ allocation as the current, non-incentivized system. Concerns of distributional fairness on the donor side, even in a regulated system, are still warranted. It is possible that, as in the current market for human eggs, younger people under financial constraints would be the most likely to accept the offer to donate a kidney. However, we allow both rich and poor people to participate in dangerous sports for enjoyment or money (e.g., skiing, football, car racing)[230] or in dangerous jobs for high pay.[231] People who take the lesser risk of donating a kidney should not be thought presumptively incapable of making that decision.

Regardless, the distributional issues inherent in legal, incentivized live kidney and liver donation rightly give many pause, and make this method of incentivization unlikely to be adopted in the United States in the near term. The related proposal of incentivized deceased

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[229] Finkel, Michael. May 27, 2001. "Complications." *The New York Times Magazine*. https://www.nytimes.com/2001/05/27/magazine/complications.html.

[230] The IndyCar race and NASCAR have fatality rates per race of 7% and 1% respectively. https://flowracers.com/blog/f1-indycar-nascar-most-dangerous/. In contrast, being a living kidney donor has a 0.006% chance of death directly attributable to donation. "Risks and Benefits of Living Kidney Donation." Last visited Jan. 22, 2022. *Weil Cornell Medicine.* https://weillcornell.org/services/kidney-and-pancreas-transplantation/living-donor-kidney-center/about-the-program/risks-and-benefits-of-living-donation.

[231] For example, the most dangerous jobs in the United States, Alaskan crab fishing and logging, have fatal injury rates of 0.12% and 0.11% respectively. "Top 25 most dangerous jobs in the United States." November 5, 2020. *Industrial Safety & Hygiene News*. https://www.ishn.com/articles/112748-top-25-most-dangerous-jobs-in-the-united-states; Lauren Cox. April 29, 2006. "Is 'Deadliest Catch' a Model of Safety?" *ABC News*. https://abcnews.go.com/Health/story?id=4720481&page=1#:~:text=The%20fishermen%20who%20venture%20out,four%20deaths%20per%20100%2C000%20workers. In contrast, being a living kidney donor has a 0.006% chance of death directly attributable to donation. "Risks and Benefits of Living Kidney Donation." Last visited Jan. 22, 2022. *Weil Cornell Medicine.* https://weillcornell.org/services/kidney-and-pancreas-transplantation/living-donor-kidney-center/about-the-program/risks-and-benefits-of-living-donation.

donation side-steps many of these issues because a living donor's health is no longer at stake. Concerns of exploitation, coercion, and undue influence might be greater when the donor is living than when they are deceased, because in the latter case there are no future health consequences to consider. Additionally, while kidney and liver patients have the option of receiving either living or deceased donor organs, patients waiting for a lung, heart, or pancreas currently have no choice but to rely exclusively on altruism from deceased donors and their families. A system that increases deceased donation has the potential to help a much wider range of recipients.

Opponents of incentives for deceased donation might argue that it is inappropriate to give families an incentive to "pull the plug" on their family members. To show why this argument is unwarranted, it is necessary to understand how a person becomes eligible to become a deceased donor. To be a candidate for deceased donation, a person must already be legally dead. There are two ways this can happen: brain death and cardiac death. Brain death (also known as brain stem death) occurs when a person on an artificial life support machine no longer has any brain function. Brain death can be caused by cardiac arrest, heart attack, stroke, blood clot, severe head injury, and other trauma. Because the brain stem is responsible for most of the body's automatic functions that are essential for life (breathing, heartbeat, etc.), this means the person will never regain consciousness or be able to breathe without support. They have no chance of recovery because their body is unable to survive without artificial life support. Brain death is not the same as being in a vegetative state. Someone in a vegetative state still has a functioning brain stem, which means that they may have some level of consciousness, can usually breath without support, and have a slim chance of recovery because the brain stem's core functions might be

undamaged. While it is possible to recover from a vegetative state, brain death is permanent.

Debates about whether to "pull the plug" or discontinue support on someone who is in a coma or a persistent vegetative have nothing to do with organ donation; such people still have brain function and are not dead. Once a person is brain dead, families are not asked to "pull the plug" or take someone off of "life support" because such actions would be impossible: the person they love has already died. Doctors carry out a series of checks to rule out other causes, and then conduct tests for brain death twice. A person must fail every test, twice, in order to be declared dead. Both the legal and medical communities in the United States and most other countries have accepted brain death as a legal definition of death since at least the 1980s.[232]

Most deceased donors are brain dead. In a minority of cases (about 14 percent) donation after cardiac death occurs when the decision is made to discontinue mechanical ventilation in a vegetative patient who is expected to die quickly after cessation of life-support. Donation does not occur until after the heart stops beating and a physician declares death.

Another counterargument to the idea that it is unethical for families to benefit in any way from the death of a loved one comes from the existence of life insurance, social security death benefits (from the government), and other social and private insurance programs. Killing someone for the life insurance commonly occur in movies, and much less commonly in real life. But this is an accepted risk of providing a safety net for bereaved families. The risk that someone would be killed by their family for their potential as an organ donor is even slimmer than for insurance reasons, because, as explained above, they would have to killed in a very specific way such that brain death or potential cardiac death after a vegetative state results. There are many

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[232] (Uniform Determination of Death Act; Finland = first European country (1971), Kansas = first state (earlier)).

factors that determine manner of death; simply dying before reaching the hospital is enough to disqualify someone. This is illustrated by the fact that only about 2 percent of the deaths in the United States occur in a way that allows for the possibility of organ donation.[233] Families or donors who selflessly decide to donate organs may experience a "silver lining" from their loved one's death through saving another's life. This does not mean that it is inherently improper to show gratitude to them in other ways as well.

Some opponents of financial incentives also argue that because organ donation is a sphere in which nonpecuniary ideals have traditionally motivated behavior, the introduction of payments might crowd out other motivations (Shaikh & Bruce, 2016; Childress & Liverman, 2006; Frey & Jegen, 2001). The concern is that if organ donation were to become "commercialized" because of the introduction of payments, some families who are willing to donate under an altruistic system may refuse to provide consent for organ donation because the payment seems insufficient compensation for violating the bodily integrity of a family member (Childress & Liverman, 2006). Similarly, payment might be perceived in undesirable ways: as insultingly low; as intended to purchase organs; as a conflicting interest in the decision making of a family; or as a motivation that shifts attention from intrinsic motivators (e.g., the "gift of life"). Alternatively, some people who would previously have been willing to donate for free might demand payment.[234]

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[233] Donors can be disqualified if their body is not in good physical condition (from, for example, a full-body traumatic injury), if brain death occurs before heart death, if they die before reaching the hospital, because of certain types of cancer or infection, or because of advanced age.
[234] This argument is less valid when one considers that even paying every single organ donor $100,000+ would represent a cost savings over the current system.

Opponents argue that it is impossible to know the impact that incentives would have on rates of organ donation (because they are currently illegal), but that any experimentation would be unwise. Even a pilot study might "gradually change perceptions and come to be viewed as a routine part of donation," leading to a decline in consent rates for families with primarily altruistic motives, and making it difficult to retreat to the original position of prohibition of the financial incentives for organ donation (Childress & Liverman, 2006). Additionally, disgust in the medical community at the idea of paying donors might lead to a boycott by doctors against even asking families to donate. Furthermore, if a payment does not increase the organ supply in the pilot study, it could be argued that the circumstances of the pilot study were at fault, that payment should have been a little higher, and so on. At the same time, opponents of financial incentives argue that the current altruistic system has not failed as much as it has not been fully promoted (Childress & Liverman, 2006). However, some opponents, including the Ethics Committee of the American Society of Transplant Surgeons', believe that there is an ethical distinction between direct payment and charitable contributions or funeral expenses paid for the deceased donor (Shaikh & Bruce, 2016).

Most of the arguments opposing financial incentives in deceased organ donation hinge on public opinion and the attitudes of the medical community. The Committee on Increasing Rates of Organ Donation concludes: "Until supportive data become available through polls that are universally accepted as accurate and representative, the feasibility and effect of financial incentives for organ donation remain questionable. Ultimately, only if and when financial incentives for organ donation are widely accepted as different from purchasing organs, can this alternative be proposed as preferable to the current system of altruistic organ donation."

(Childress and Liverman, 2006). Answering the question of what the public's attitudes are is therefore critical and is what I aim to do in this survey. I illuminate these issues by examining how kidney supply gains, type and amount of payment, and ethical concerns such as undue influence, human dignity, fairness, exploitation, and autonomy influence support or opposition to paid-donor family systems.

C. *Literature on Attitudes Toward Alternative Organ Donation Policies*

i. Presumed and First-Person Consent

The United States currently employs an opt-in system of donor consent. No one is presumed an organ donor, but must affirmatively opt in by registering. And even if a person chooses to sign up as an organ donor before death, there is a widespread practice among health professionals of deferring to a "family veto"—allowing family members to override the deceased loved one's wish to be an organ donor. Two popular proposals for increasing the deceased donor supply are switching to an opt-out, or presumed consent, system, in which everyone is presumed a donor unless they affirmatively opt-out, and forbidding practitioners from honoring family vetoes at odds with decedent wishes (Blumstein, 1989). [235] Opt-out systems have the potential to increase donation rates because of status quo bias, the human tendency to stick with default and existing policies and choices more often than rational decision-making would predict, even when it is very easy to switch (Camerer et al., 2003).[236] Many countries already employ opt-out

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[235] James F. Blumstein, *Federal Organ Transplantation Policy: A Time for Reassessment?*, 22 U.C. DAVIS L. REV. 451, 484 (1989).

[236] Colin Camerer et al., *Regulation for Conservatives: Behavioral Economics and the Case for Asymmetric Paternalism,* 151 U. PA. L. REV. 1211, 1224 (2003). Status quo bias could indicate a preference for the way things currently are or a lack of preferences over a given choice, which is also inconsistent with standard assumptions of rational choice theory. *Id.*

systems and have had some success (Ahman et al., 2019). For example, one study of the

European Union found that opt-out systems are causally responsible for organ donation rates that

are 28-32% higher in countries with opt-out than in countries with opt-in systems (Burcu Ugur,

2015). As an even more dramatic example, Germany, which uses an opt-in system, has an organ

donation consent rate of 12%, while Austria, a country with a very similar culture and economic

development, but which uses an opt-out system, has a consent rate of 99.98 percent (Johnson &

Goldstein, 2003).[237] However, Singapore has seen only moderate increases in deceased donor

organs after implementing an opt-out system.[238] Opt-out systems generate fewer organs when

family vetoes are still allowed. However, incentives for doctors favor honoring family wishes,

because the family is the most obvious party who could bring a lawsuit if their wishes are not

respected—there is no specific donor who can sue to enforce their rights. A related idea is

creating a national organ donor registry, whose potential success is supported by the fact that

state-level donor registries are associated with an 8 percent increase in donation rates (Callison &

Levin, 2016). Almost every United States state has experimented with first-person consent

legislation, which explicitly allows for deceased organ donation to proceed when intent to donate

can be confirmed (via donor card, driver's license designation, or state donor registration)

without requiring medical professionals to obtain permission from the family. This effort has

been met with less success (Callison & Levin, 2016). There are several potential reasons for this.

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[237] Eric J. Johnson and Daniel Goldstein, *Do Defaults Save Lives?*, 302 SCIENCE 1338, 1338–39 (2003). *But see* How-Cheng Low et al., *Impact of New Legislation on Presumed Consent on Organ Donation on Liver Transplant in Singapore: A Preliminary Analysis*, 82 TRANSPLANTATION 1234 (2006) (finding only moderate increase in deceased donor organs after Singaporean implementation of presumed consent law).
[238] How-Cheng Low et al., *Impact of New Legislation on Presumed Consent on Organ Donation on Liver Transplant in Singapore: A Preliminary Analysis*, 82 TRANSPLANTATION 1234 (2006) (finding only moderate increase in deceased donor organs after Singaporean implementation of presumed consent law).

Although healthcare providers may be reluctant to override family refusals, more than 90 percent

of families consent when the decedent has documented a desire to donate, so this barrier exists in

only a small fraction of cases (Callison & Levin, 2016). [239] More significantly, most individuals

express no clear preference about organ donation during life. Families often interpret an

unsigned driver's license or lack of registration as an indication that their loved one has declined

to be a donor rather than assuming they were undecided. These results imply that, in order to be

successful, methods to increase organ donation must result in more individuals either clearly

communicating their donation preferences or being presumed in favor.

ii. Non-monetary Incentives

Another broad group of proposals is those involving incentives. One proposal is giving

registered organ donors, living donors, and people who give permission for deceased next-of-kin

donation priority on organ waiting lists. This proposal has been implemented in Israel,

Singapore, and Chile, where in combination with opt-out systems, priority systems have resulted

in record numbers of signed donor cards and lower but still significant increases in the actual

numbers of transplants.[240] Another potential non-monetary incentive is providing posthumous

awards to deceased donors. Since 2013, families of deceased solid organ donors have been

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[239] *Id.* at 73–74. About half of families are uncertain about their decedent's wishes, and these families are very likely to refuse donation. However, more than 90% of families consent when the decedent has documented a desire to donate and has discussed this with their family. *Id.*

[240] *See* Antonia J. Cronin, *Points Mean Prizes: Priority Points, Preferential Status and Directed Organ Donation in Israel*, 8 ISRAEL J. OF HEALTH POL'Y RES. 1, 1 (2014); Judd B. Kessler & Alvin E. Roth, *Getting More Organs for Transplantation*, 104 AM. ECON. REV.: PAPERS & PROCEEDINGS 425, 425 (2014); Alejandra Zúñiga-Fajuri, *Increasing Organ Donation by Presumed Consent and Allocation Priority: Chile*, 93 BULLETIN OF THE WORLD HEALTH ORG. 199, 200–202 (2014).

awarded The Order of St. John Award for Organ Donation, leading to a 25% increase in the

number of deceased donations.[241]

iii. Monetary Incentives

A third category of proposals involve money and money-adjacent incentives. These

include payment for organ donors, monetary-related incentives to fill out organ donor cards,

payment for donation-related expenses, and tax incentives. Private payment for organs is illegal

in every country except Iran.[242] By compensating donors $1,200 plus additional payment from

the recipient or a non-profit, Iran has eliminated its kidney transplant waiting list.[243] In Australia

and Singapore, the government respectively pays live donors nine weeks leave at minimum wage

and compensates them for their time.[244] As explained above, the United States has recently

implemented a similar policy. [245]

A study in Germany found that money, but not a promise to donate money to charity on

the subject's behalf, was an effective incentive to fill out an organ donor card.[246] In the United

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[241] Mascia Bedendo & Linus Siming, *Incentivizing Organ Donation Through a Nonmonetary Posthumous Award*, 28 HEALTH ECON. 1320, 1320, 1322–23 (2019) (the causal effect of the award was calculated by comparing rates of solid organ donors, who are eligible for the award, with those of cornea-only donors, who are not).

[242] Samuel Hammond, *How Iran Solved Its Kidney Shortage, And We Can Too*, NISKANEN CTR. (September 12, 2018), https://www.niskanencenter.org/how-iran-solved-its-kidney-shortage-and-we-can-too/#:~:text=An%20unlikely%20innovator%20in%20organ,within%2011%20years%20of%20implementation.

[243] *Id.*; *see also* Tahereh Malakoutian et al., *Socioeconomic Status of Iranian Living Unrelated Kidney Donors: A Multicenter Study*, 39 TRANSPLANTATION PROC. 824, 825 (2007) (91% of Iranian donors were satisfied with their donation, and 53% would suggest donation to others.).

[244] *See Supporting Living Organ Donors Program*, AUSTL. GOV'T DEP'T OF HEALTH (last updated May 27, 2020), https://www.health.gov.au/initiatives-and-programs/supporting-living-organ-donors-program; *Singapore legalizes compensation to kidney donors*, BRIT. MED. J. (Nov. 7, 2008), https://www.bmj.com/content/337/bmj.a2456. Australian Government Department of Health, 2020; Bland, 2008.

[245] 42 C.F.R. 121.

[246] Markus Eyting, Arne Hosemann, & Magnus Johanesson, *Can Monetary Incentives Increase Organ Donations?*, 142 ECON. LETTERS 56, 57 (2016).

States, at least eighteen states allow tax credits for live organ donors.[247] These credits vary in their generosity, however. In Maryland, for example, the credit only provides partial reimbursement for "qualified expenses," which include travel costs, lodging expenditures, and lost wages.[248] Although New York's more generous tax credit and paid leave of absence allowance led to a 52% increase in unrelated kidney donation rates,[249] more broadly, another study found no significant change in living organ donation rates after tax credit policies.[250]

There have been several surveys generally gauging public opinion regarding financial incentives for organ donation, but relatively few with an experimental design, and even fewer regarding deceased rather than living donation. The 2012 National Survey of Organ Donation found that 25.8 percent of respondents would be more likely to donate a family member's organs if they were offered payment, up from 18.3 percent in 2005. 9.5 percent would be less likely to grant consent, and 63.6 percent would be neither more nor less likely to grant consent. In a survey of Pennsylvania households, 17 percent of respondents stated that direct payments would make them more likely to grant consent and 8 percent responded that monetary incentives would make them less likely to grant consent. Most respondents stated that payments would have no effect on their decision to donate (Bryce et al., 2005). A survey of 561 adults who had recently been asked to grant consent for organ donation found that an equal number (about 11 percent)

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[247] Julia Angkeow, *Tax Credits Aren't Enough to Relieve Burden of Organ Donation*, THE BALTIMORE SUN (Dec. 15, 2018), https://www.baltimoresun.com/opinion/op-ed/bs-ed-op-1217-organ-donors-20181214-story.html.
[248] *Id.*
[249] Firat Bilgel & Brian Galle, *Financial Incentives for Kidney Donation: A Comparative Case Study Using Synthetic Controls*, 43 J. OF HEALTH ECON. 103, 111 (2015).
[250] Atheendar Venkataramani, *The Impact of Tax Policies on Living Organ Donations in the United States*, 12 AM. J. TRANSPLANTATION 2133, 2135 (2012) (studying results in fifteen states).

stated that incentives would make them more likely or less likely to donate and 78 percent stated that incentives would have no effect (Rodrigue et al., in press).

Niederle and Roth (2014) analyzed approval ratings of various policies that rewarded nondirected living kidney donors in an experimental design, considering the effect of rewards such as recognition as a hero accompanied by a prize of $50,000, with policy variants such as whether the reward is from the government or a private foundation and whether all or only a small group of living donors are recognized and rewarded. There was overall high approval of all the policies, the policy where all donors are paid $50,000 by the government receiving less approval than any of the private foundation policies. The study most similar to mine is Elias, Lacetera, and Macis (2019), which performed a randomized survey and choice experiment regarding preferences for legalizing payment to living kidney donors. Respondents answered questions with variations on payment method (cash or noncash), payment amount ($30,000 or $100,000), payer identity (recipient or government) and kidney amount (19,000, 24,000, 29,000, 34,000, or 39,000 kidneys). They found strong polarization, with many participants supporting or opposing payments regardless of potential transplant gains. However, about 18 percent of respondents would switch to favoring payments for sufficiently large increases in transplants. Respondents especially dislike direct payments by patients as opposed to payments by the government. Moral attitudes were a strong influence on preferences. My study differs from Elias et al. because it examines incentives for deceased rather than live donations and in addition to examining preferences and attitudes toward paid-donor family systems also examines preferences into the current system, the opt-out system, and finally five alternative systems:

deceased financial incentive, living financial incentive, opt-out, priority incentive, and registration incentive.

III. MOTIVATING FRAMEWORK

This section will describe a simple framework on which I base the design of the survey.

Individual *i* is considering an alternative way for society to organize the procurement of kidneys for transplantation. To decide whether to support the alternative system, they must compare their utility from the alternative system to the utility they receive from the current system. The individual's utility depends on both the number of transplants that the alternative system would generate and on the institutional details that characterize the system (paid vs. opt-out; cash payments vs. noncash; amount of payment; moral and other attitudes toward the system). We can set utility from the current system to zero and assume that the utility that individual *i* derives from an alternative procurement system *s* has a linear form. We can then write respondent *i*'s utility from an alternative system as

$$U_{is} = \Gamma_{is} + \zeta_{is}Z_s, \tag{1}$$

where the term Γ_{is} represents the utility that respondent *i* gets from the characteristics of a particular system that differ from those of the current one, Z_s represents the change in the number of transplants with respect to the current system, and coefficient ζ_{is} indicates how utility responds to increases in kidney supply for system s. Both Γ_{is} and ζ_{is} are possibly individual- and system-specific, and each term could be either positive or negative. In words:

individual *i*'s utility from an alternative system = (2)

100

their utility from the characteristics of that system (independent of the

number of transplants)

+

their utility from the number of transplants (coupled with the preferences

regarding the characteristics of the system).

Individual i will support an alternative system s with an expected kidney supply change Z_s and system features Γ_s if $U_{is} > 0$.[251]

If the individual's reaction to transplant increases is positive ($\Gamma_{is} > 0$) and the individual's reaction to the alternative system's characteristics is positive ($\zeta_{is} > 0$), the individual will choose the alternative system regardless of the size of the system's kidney supply effects.

If instead the individual reacts positively to transplant increases ($\zeta_{is} > 0$), but negatively to the system's features ($\Gamma_{is} < 0$), then they will oppose the alternative system regardless of the transplant gains if the absolute value of Γ_s is large enough (indicating strong opposition to the institutional features of the alternative system s).

If an individual is moderately averse to the institutional features of the alternative system (lower absolute values of Γ_{is}), there will be a level L_1 of Z_s within the range of feasible kidney supply increases that will make the individual support the alternative system for $Z_s > L_1$.

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[251] The individual will overall prefer the alternative system that has the highest U_{is}—the U_{is} that is higher than all the other U_{is} values—not just $U_{is} > 0$.

An individual who reacts negatively to both transplant increases and to the alternative system's characteristics ($\Gamma_{is} < 0$ and $\zeta_{is} < 0$) would always oppose the alternative system. An individual might have a negative reaction to transplant increases if, for example, they get more and more disutility if what they consider to be an undesirable transaction happens more and more times.

Yet other individuals might have negative reactions to transplant gains ($\zeta_{is} < 0$) but might like the system features of the alternative system ($\Gamma_{is} > 0$), in which case they may support the system up to a supply increase of L_2 but oppose it for any $Z_s > L_2$. Figure 3.2 below summarizes the preceding possible outcomes.

Figure 3.2. Summary of Motivating Framework.

	$\Gamma_{is} > 0$ like alternative system features	$\Gamma_{is} < 0$ dislike alternative system features
$\zeta_{is} > 0$ like transplant gains	Always support	Support if kidney supply change is greater than some level L_1: $Z_s > L_1$
$\zeta_{is} < 0$ dislike transplant gains	Support if kidney supply change is less than some level L_2: $Z_s < L_2$	Never support

The next section provides the details of my randomized survey. I designed it to investigate the impact of system features Γ_s and organ supply effects Z_s, and I explore whether respondents' different reactions to the systems' features and transplant outcomes have roots in moral values.

IV.   RESEARCH DESIGN AND SUBJECT POOL

I designed this survey to provide insight into the attitudes of US residents toward alternative systems of organ donation. The main policy options I examine are cash and noncash compensation to families of deceased organ donors and opt-out rather than opt-in consent, and I also provide preliminary examination of living donor incentives, priority systems, and registration incentive systems. I examine how kidney supply gains, type and amount of payment, and ethical concerns such as undue influence, human dignity, fairness, exploitation, and autonomy influence support or opposition to alternative systems. Understanding how the public views the current donation system and alternatives to that system and the moral and ethical determinants of those views is a critical and currently lacking piece of the discussion around ending the organ shortage.

A. *Experiment Design*

I designed a randomized survey and administered it online through Amazon Mechanical Turk to a sample of 1,006 adult US respondents. The survey ran from June 3 to 11, 2021.[252]

After informing participants that I would collect their (anonymous) opinions regarding alternative kidney procurement systems, I provided a description of several aspects related to the procurement and allocation of kidneys in the United States. The description outlines the nature of

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[252] The text of the survey is provided in the Appendix.

kidney failure, various types of kidney donations (i.e., deceased and living), and the features of the current procurement and distribution system, including the size of the kidney shortage and the prohibition of compensation of donors. I wanted to ensure that all participants had the same initial information about the topic. Giving details about the context of interest is frequent and encouraged in contingent valuation studies, for example in the valuation of natural resources, to enhance the reliability of respondents' expression of willingness to pay in the absence of market information (Carson 2012).

After receiving information about the current system, participations answered five questions about their opinions regarding the current system. Participants were asked to report their assessment of whether the current system: (i) benefits or exploits donors (and their families), (ii) respects or limits individual autonomy (i.e., self-determination), (iii) allows individuals to make fully informed choices or exerts undue influence, (iv) is fair or unfair to patients who need a transplant, and (v) promotes or violates human dignity. Respondents could choose 5 verbal expressions to describe their moral assessments, for example: "very unfair to patients," "somewhat unfair to patients," "neutral," "somewhat fair to patients," "very fair to patients." This is a similar morality module to that used in Elias et al, 2019's examination of attitudes toward paying living donors and follows philosophy and bioethics literatures.[253] I apply it to examine moral views toward deceased donation, the current system, and an opt-out system.

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[253] See Council of Europe (2015), Nuffield Council on Bioethics (1995), Radin (1996), Satz (2010), United States Task Force on Organ Transplantation (1986), WHO (2004).

i. Assignment to Different Alternative Kidney Procurement Systems

I then randomly assigned participants to one of twelve alternative procurement systems.

Table 3.1 summarize the features of each system. Each system included compensation to donors

and was a combination of the following attributes:

1. Nature of the payment: cash or noncash. In the cash systems, families of donors would receive a deposit to their bank account, whereas in the noncash systems, donors could choose between "funeral expenses, tax credits, contributions to a tax-free retirement account, tuition vouchers, or loan repayment."

2. Size of the payment: $30,000 or $10,000.

3. Number of kidneys procured: 20,000, 30,000, or 40,000.

In all systems, the government is the payer. This is in line with the current system, where all

people with end stage kidney disease receive coverage under Medicare for both dialysis and

transplants.[254] Payments might be more ethically acceptable if they are not in the form of direct

cash. Noncash forms of compensation could lessen the concern that vulnerable individuals might

be induced to donate their family member's kidney because they are in urgent need of cash

(Satel, 2006).[255] However, in its strong form, opposition to payments appeals to deeper reasons

(e.g., violation of human dignity) that make any form of payments unacceptable, irrespective of

regulation, public intervention, and type of payment (Sandel 2012; Spital et al. 2002). My design

also allows me to discern whether attitudes towards payments depend on the amount of

compensation. Concerns such as exploitation of participants might be less relevant if donors

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[254] Centers for Medicare and Medicaid Services. "ESRD General Information." Last updated Jan. 5, 2022. https://www.cms.gov/Medicare/End-Stage-Renal-Disease/ESRDGeneralInformation.
[255] For example, the Ethics Committee of the American Society of Transplant Surgeons', believe that there is an ethical distinction between direct payment and charitable contributions or funeral expenses paid for the deceased donor (Shaikh & Bruce, 2016).

receive a relatively large sum. Conversely, substantial sums might increase worries about undue

influence (Ambuehl, Niederle, and Roth 2015). I chose the amount of $30,000 because it is in the

middle of various proposals about payments. Becker and Elías (2007) determine that payments

between $15,000 and $30,000 ($19,000 to $39,000 in 2021 dollars) would eliminate the wait list

within a few years and, more recently, Held et al. (2016) consider a payment of $45,000. The

smaller amount, $10,000, is in line with average funeral expenses.[256]

Table 3.1. Characteristics of the Incentive Kidney Procurement Systems Randomly Assigned to
Study Participants.

Nature of compensation	Amount	Number of kidneys	% Incentive System	% Equal	% Current System	Number of respondents
Cash	$10K	20,000	50.8	21.5	27.6	456
Cash	$10K	30,000	70.3	13.0	16.7	414
Cash	$10K	40,000	68.2	14.1	17.7	418
Cash	$30K	20,000	52.0	23.8	24.2	425
Cash	$30K	30,000	70.6	11.4	18.0	405
Cash	$30K	40,000	70.5	11.4	18.1	430
Noncash	$10K	20,000	54.4	23.3	22.3	421
Noncash	$10K	30,000	72.1	10.6	17.3	451
Noncash	$10K	40,000	70.8	12.1	17.1	380
Noncash	$30K	20,000	55.6	18.8	25.6	399
Noncash	$30K	30,000	70.0	10.7	19.4	413
Noncash	$30K	40,000	73.2	12.4	14.4	418
Average across conditions			64.9	15.2	19.9	Total: 1,006

Note: % Incentive System indicates the percentage of respondents who voted for the Paid-Family Donor System in each question, % Equal indicates the percentage who voted "both are equally good," and % Current System indicates the percentage who voted for the Current System.

Table 3.2 shows the breakdown for assignment to opt-out systems, which varied on kidney

supply levels.

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[256] The average funeral costs between $7,000 and $12,000 including the viewing, burial, service, fees, transport, casket, embalming, and other preparation. Lincoln Heritage Funeral Advantage.

Table 3.2. Characteristics of the Opt-Out Systems Randomly Assigned to Study Participants.

Number of kidneys	% Opt-Out System	% Equal	% Current System	Number of respondents
20,000	39.4	30.7	29.9	358
30,000	58.1	13.2	28.7	334
40,000	61.3	12.6	26.1	318
Average across conditions	52.9	18.8	28.2	Total: 1,006

Note: % Opt-Out System indicates the percentage of respondents who voted for the Opt-Out System in each question, % Equal indicates the percentage who voted "both are equally good," and % Current System indicates the percentage who voted for the Current System.

Each question could have one of three different kidney supply levels: 20,000 (roughly the number of kidney transplants currently performed in the United States, or about 50 percent of the annual demand)[257], 30,000, or 40,000 (corresponding to roughly 100 percent of the annual demand).[258] I asked respondents to consider each question separately, that is, to take each level as the best available estimate of the number of kidney transplants performed annually. Choices were thus binary "referenda" between the alternative and current system (Vossler, Doyon, and Rondeau, 2012), with the addition of a choice for no preference.

ii.   Moral Views about Alternative Paid-Donor Family Systems and Opt-Out System

After the first question, I asked participants the same morality value questions they were asked after being told about the current system. Participants were asked to assess whether the paid-donor family system (i) benefits or exploits donors (and their families), (ii) respects or limits individual autonomy, (iii) allows individuals to make fully informed choices or exerts undue influence, (iv) is fair or unfair to patients who need a transplant, and (v) promotes or violates human dignity. Respondents could again choose 5 verbal expressions to describe their

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[257] According to UNOS, 17,878 kidney transplants were performed in 2015; 19,060 in 2016; and 19,851 in 2017. See https://unos.org/data/transplant-trends/.
[258] https://www.pennmedicine.org/news/news-releases/2020/december/too-many-donor-kidneys-are-discarded-in-us-before-transplantation.

moral assessments, for example: "very unfair to patients," "somewhat unfair to patients,"

"neutral," "somewhat fair to patients," "very fair to patients."

Table 3.3 compares moral attitude ratings for the current system, the paid donor family system, and the opt-out system. Panel A compares ratings from participants who saw a 20,000-kidney choice for the first paid donor family system or the opt-out system with attitude ratings from all participants for the current system (which always provides 20,000 kidneys). Panel B does the same for 30,000 kidney choices, and Panel C for 40,000. The highest rating in each row is bolded for emphasis. The last column in each table reports the results of Chi-squared tests which test whether the responses came from the same distribution or were significantly different from each other. Three stars (***) indicates that the difference is statistically significant at the one-percent level, two star (**) indicates significance at the five-percent level, and one star (*) indicates at the ten-percent level.

Table 3.3. Comparison of Attitude Ratings by System and Kidney Supply.

A. Attitudes at 20,000 kidney level

	Current System	Paid Donor Family System	Opt-Out System	Chi-squared test
Benefit to donor (family)	3.13	**3.70**	3.06	***
Donor autonomy	3.40	**3.61**	3.20	***
Informed choices	**3.62**	3.48	3.24	***
Fairness to recipients	3.33	**3.71**	3.60	***
Dignity	**3.60**	3.51	3.30	***

B. Attitudes at 30,000 kidney level

	Paid Donor Family System	Opt-Out System	Chi-squared test

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Benefit to donor (family)	**3.61**	3.14	***
Donor autonomy	**3.66**	3.19	***
Informed choices	**3.46**	3.10	***
Fairness to recipients	3.70	**3.78**	
Dignity	**3.40**	3.31	

C. Attitudes at 40,000 kidney level

	Paid Donor Family System	Opt-Out System	Chi-squared test
Benefit to donor (family)	**3.69**	3.14	***
Donor autonomy	**3.65**	3.24	***
Informed choices	**3.52**	3.30	*
Fairness to recipients	**3.94**	3.83	**
Dignity	**3.54**	3.42	

Notes. The highest rating for each moral criteria is bolded for emphasis in each row.
***p<0.01, **p<0.05, *p<0.1.

Respondents who received systems with no transplant gains (20,000 kidneys) rated opt-out systems lower than both the current system and the paid-donor family system on all criteria. The current system is rated lower than the paid donor family systems in all but two aspects: informed choices and dignity. At the 30,000 level, the opt-out system is rated lower than the paid-donor family system on every aspect except for fairness to recipients, and at the 40,000 level on every aspect. Comparing Panels A, B, and C, we can see that the current system continues to be rated higher than the paid-donor family system on informed choices and dignity regardless of kidney supply level. Kidney level does not appear to affect moral attitudes within a system.

Next, Table 3.4 compares ratings for paid-donor family systems based on whether a paid-donor family system offered cash or noncash compensation. Once again, the higher rating in

each row is bolded. This table provides a preliminary investigation into my findings that participants disliked cash compensation and were more likely to support an alternative system if it offered noncash compensation. Participants rated noncash systems higher than cash on all aspects except for fairness to recipients, on which cash was slightly higher (3.77 vs. 3.79). The difference is significant only for donor autonomy, however, indicated by the Chi-squared test in the third column.

Table 3.4. Comparison of Attitude Ratings for Paid-Donor Family Systems by Compensation Type: Noncash and Cash.

	Noncash	Cash	Chi-squared test
Benefit to donor (family)	**3.67**	3.67	
Donor autonomy	**3.66**	3.63	**
Informed choices	**3.52**	3.47	
Fairness to recipients	3.77	**3.79**	
Dignity	**3.53**	3.45	

Notes. The highest rating for each moral criteria is bolded for emphasis in each row.
***p<0.01, **p<0.05, *p<0.1.

Table 3.5 breaks paid-donor family system ratings by which system participants supported. Participants who voted for the paid-donor family system rated it highest on every criterion. This is encouraging, and motivates further exploration of how moral attitudes affect support or opposition for alternative systems. The fourth column reports the results of Chi-squared tests s which test whether the responses came from the same distribution or were significantly different from each other.

Table 3.5. Comparison of Paid-Donor Family System Attitude Ratings by Preference.

Paid-Donor Family System Attitudes	Voted for current system	Voted equal	Voted for paid-donor family system	Chi-squared test

Benefit to donor (family)	2.98	3.71	**3.84**	***
Donor autonomy	3.01	3.71	**3.79**	***
Informed choices	2.79	3.60	**3.65**	***
Fairness to recipients	3.36	3.80	**3.89**	***
Dignity	2.86	3.56	**3.64**	***

Notes. The highest rating for each moral criteria is bolded for emphasis in each row.
***p<0.01, **p<0.05, *p<0.1.

Table 3.6 breaks down *current* system ratings by which system participants supported. This evidence is more mixed, as those who voted for the current system did not rate it highest. This indicates that what matters is the difference between ratings for the alternative and current system, rather than raw rankings for either. This preliminary exploration demonstrates the utility of asking participants about their moral judgments regarding both the current and alternative systems they are being asked to evaluate, rather than just the alternative system. Once again the fourth column shows results of Chi-squared tests.

Table 3.6. Comparison of Current System Attitude Ratings by Preference—Paid Donor Family Systems.

Current System Attitudes	Voted for current system	Voted equal	Voted for paid-donor family system	Chi-squared test
Benefit to donor (family)	2.86	3.35	**3.16**	***
Donor autonomy	3.39	**3.65**	3.35	***
Informed choices	2.45	**3.83**	3.61	***
Fairness to recipients	3.48	**3.53**	3.25	*
Dignity	3.46	**3.77**	3.60	*

Notes. The highest rating for each moral criteria is bolded for emphasis in each row.
***p<0.01, **p<0.05, *p<0.1.

Table 3.7 breaks opt-out system ratings by which system participants supported. Participants who voted for the opt-out system rated it highest on two, and those who voted that the systems are equal for the remaining three. Once again, this is an indication that what matters is the difference between ratings for the alternative and current system, rather than raw ratings for either. The fourth column shows results of Chi-squared tests.

Table 3.7. Comparison of Opt-Out System Attitude Ratings by Preference.

Opt-Out System Attitudes	Voted for current system	Voted equal	Voted for opt-out system	Chi-squared test
Benefit to donor (family)	2.40	**3.44**	3.38	***
Donor autonomy	2.50	**3.61**	3.44	***
Informed choices	2.51	**3.61**	3.45	***
Fairness to recipients	3.42	3.66	**3.93**	*****
Dignity	2.67	3.56	**3.63**	***

Notes. The highest rating for each moral criteria is bolded for emphasis in each row.
***p<0.01, **p<0.05, *p<0.1.

Table 3.8 breaks down *current* system ratings by which system participants supported. This evidence is still mixed, as those who voted for the current system only voted it highest on one criteria—human dignity. Once again, the difference between ratings for the alternative and current system is what matters, rather than absolute ratings. This preliminary exploration demonstrates the utility of asking participants about their moral judgments regarding both the current and alternative systems they are being asked to evaluate, rather than just the alternative system.

Table 3.8. Comparison of Current System Attitude Ratings by Preference—Opt-Out.

Current System Attitudes	Voted for current system	Voted equal	Voted for opt-out system	Chi-squared test
Benefit to donor (family)	2.92	**3.24**	3.21	***
Donor autonomy	3.34	**3.53**	3.37	
Informed choices	3.52	**3.64**	3.64	
Fairness to recipients	3.39	**3.44**	3.26	
Dignity	**3.66**	3.59	3.57	

Notes. The highest rating for each moral criteria is bolded for emphasis in each row.
***p<0.01, **p<0.05, *p<0.1.

Finally, respondents were given information on and asked to answer a broader question in which they chose between six alternatives: the current system, a deceased financial incentive system, a living financial incentive system, an opt-out system, a priority allocation system (priority on organ waiting lists for registered donors, living donors, and consenting family members of deceased donors), and a registration incentive system (annual health insurance premium discount for registered donors). Respondents were told to assume that the current system would provide 20,000 kidneys and that each of the alternative systems would provide 30,000. Participants were asked to evaluate the alternative system they chose on the same five criteria as before: whether the system (i) benefits or exploits donors (and their families), (ii) respects or limits individual autonomy, (iii) allows individuals to make fully informed choices or exerts undue influence, (iv) is fair or unfair to patients who need a transplant, and (v) promotes or violates human dignity.

The final part of the survey included sociodemographic questions (gender, age, income, education, religious beliefs, political orientation on social and economic matters, relationship status, and if the respondents had children) as well as questions about whether the respondents

made donations or volunteered in the recent past, had received an organ transplant, were on the

waiting list for a transplant, or knew anyone in those conditions. Respondents were also asked

"Did you have any problems understanding any of the questions in the survey?"

B. *Subject Pool*

Column 1 of Table 3.9 shows characteristics of the 1,006 survey participants. The statistics in

column 2 show that features of respondents (including gender, age, education, ethnicity, marital

status, employment, and income) are fairly similar to those of the US population. The sample is

younger, more male,[259] more Hispanic, more nonwhite, and better educated than the US

population.

Table 3.9. Characteristics of Respondents and Comparison with American Community Survey Data (Percent).

	Respondents (1)	US population (2)
Women	33.6	51.5
Age 18-34	41.9	23.2
Age 35-54	48.3	25.1
Age 55+	9.7	29.3
White (non-Hispanic)	58.0	67.0
Black	21.1	12.9
Hispanic	28.2	13.1
Asian	4.5	4.5
Other race/ethnicity	1.5	1.9
High school or less	6.5	37.5
Some college or Associate degree	13.0	31.5
Bachelor's degree	62.3	19.6
Graduate degree	18.1	11.4
Married	57.8	51.7
Employed	86.7	78.3
Income < $50,000	36.3	65.6
$50,000 ≤ Income < $100,000	51.5	33.4
Income ≥ 100,000	11.0	16.5

Notes: The table shows summary statistics from the MTurk sample in column 1 and the corresponding US population statistics from various sources in column 2. The statistics are from the American Community Survey (ACS) for 2019 (https://www.census.gov/acs/www/data/data-tables-and-tools/subject-tables/). The 2019 American Community Survey was used because as the Census Bureau notes on the website: "Notice: Due to the impact of the

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[259] The low number of women is odd, but a multivariate analysis could be used to project out to the US population.

COVID-19 pandemic, the Census Bureau is changing the 2020 American Community Survey (ACS) release. Instead of providing the standard 1-year data products, the Census Bureau will release a series of experimental estimates from the 1-year data. Therefore, we will not have 2020 Subject Tables and will continue to link to the 2019 Subject Tables." Marital status is for population 20 years and over, income is for population 16 and over; employment population ratio is 20-64, and the remaining ACS statistics are for population 18 years and over.
***p<0.01, **p<0.05, *p<0.1.

C. *Empirical Strategy*

For any given policy choice, respondents consider a choice between the current system, where 20,000 kidneys are procured, and alternative system where an equal or larger number is procured. The most basic regression I will estimate is:

$$p_{ni} = \alpha + \beta_1 Kidneys_{ni} + \beta_2 Cash_{ni} + \beta_3 Amount_{ni} + \theta X_n + \varepsilon_{it}, \quad (3)$$

where p_{ni} is the probability that respondent n chooses policy option i (the alternative system) in the pairwise policy comparison, $Kidneys_{ni}$ is the increase in kidneys procured from the current system, $Cash_{ni}$ is whether the form of payment was cash or noncash, and $Amount_{ni}$ is $30,000 or $10,000 payment. The model also includes demographic variables X_n to account for the possibility of variation in preferences due to personal characteristics:

$$p_{ni} = \alpha + \beta_1 Kidneys_{ni} + \beta_2 Cash_{ni} + \beta_3 Thirtyk_{ni} + \theta X_n + \varepsilon_{it}. \quad (4)$$

For the opt-out system, the regression will be:

$$p_{ni} = \alpha + \beta_1 Kidneys_{ni} + \theta X_n + \varepsilon_{it}, \quad (5)$$

where the terms are defined in the same way as above.

Next, I include respondents' answers to five corresponding attitude questions for both the alternative system (incentive or opt-out) and the current system:

$$p_{ni} = \alpha + \beta_1 Kidneys_{ni} + \beta_2 Cash_{ni} + \beta_3 Thirtyk_{ni} \tag{6}$$
$$+ \beta_4 BenefitDonorCS_i + \beta_5 DonorAutonomyCS_i$$
$$+ \beta_6 InformedChoicesCS_i + \beta_7 FairRecipientsCS_i$$
$$+ \beta_8 DignityCS_i + \beta_4 BenefitDonorIS_i$$
$$+ \beta_5 DonorAutonomyIS_i + \beta_6 InformedChoicesIS_i$$
$$+ \beta_7 FairRecipientsIS_i + \beta_8 DignityIS_i + \theta X_n + \varepsilon_{it}.$$

Equation (6) includes responses to the first Incentive System question only, because this is the question that the attitude questions corresponded to. The attitude questions are coded as 1 if participants rated the moral concern 4 or 5 (the system respect the moral concern), and 0 otherwise (the system does not respect or violates the moral concern).

The equivalent of equation (6) for the opt-out question only is:

$$p_{ni} = \alpha + \beta_1 Kidneys_{ni} + \beta_4 BenefitDonorCS_i \tag{7}$$
$$+ \beta_5 DonorAutonomyCS_i + \beta_6 InformedChoicesCS_i$$
$$+ \beta_7 FairRecipientsCS_i + \beta_8 DignityCS_i$$
$$+ \beta_4 BenefitDonorOO_i + \beta_5 DonorAutonomyOO_i$$
$$+ \beta_6 InformedChoicesOO_i + \beta_7 FairRecipientsOO_i$$
$$+ \beta_8 DignityOO_i + \theta X_n + \varepsilon_{it}.$$

I also pool the incentive and opt-out questions and include an indicator for opt-out system:

$$p_{ni} = \alpha + \beta_1 Kidneys_{ni} + \beta_2 Optout_i + \theta X_n + \varepsilon_{it}. \tag{8}$$

Finally, as a consistency check, I include participants' choices to the multiple-choice question.

$$p_{ni} = \alpha + \beta_1 Kidneys_{ni} + \beta_2 Cash_{ni} + \beta_3 Thirtyk_{ni} + \beta_4 DeceasedMC_i \tag{9}$$
$$+ \beta_5 LivingMC_i + \beta_6 OptOutMC_i + \beta_7 PriorityMCS_i$$
$$+ \beta_8 RegistrationMC_i + \mu A_{in} + \theta X_n + \varepsilon_{it},$$

where the additional variables are indicators for choosing a given system in the multiple-choice question (deceased financial incentive, living financial incentive, opt-out, priority, or registration incentive), and μA_{in} are the attitude questions.

Table 3.10 reports estimates from linear regression models. The outcome variable is an indicator variable equal to 100 if a respondent selected their assigned alternative system at a given transplant gain, 50 if they selected that both systems are equal, and 0 if they selected the alternative system. The right-hand-side variables are transplant gains, expressed in percent increase over the current number of transplants per year, and indicators for each system in some specifications, or binary indicators for the two key features of each system: the level of payment (1 for $30,000, 0 for $10,000) and the type of payment (1 for cash, 0 for noncash). I also added interactions between these indicators and the measure of supply increases, and, in some specifications, control variables for sociodemographic characteristics of respondents.[260]

Table 3.10. The Effect of Transplant Increases and Procedural Features on Support for Paid-Donor Family Systems.

Outcome variable:	Favor for alternative system (=100 if in favor, 50 if equal, 0 if opposed)		
Regressors:	(1)	(2)	(3)
Transplant increase (percentage points)	0.137*** (0.012)	0.137*** (0.015)	0.133*** (0.017)
$30K		-0.047 (0.964)	-0.125 (1.140)
Cash		-2.536*** (0.974)	-2.486*** (1.149)

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[260] The addition of control variables to the regressions does not meaningfully affect any of the coefficients of main interest. The results are also robust to functional form and regression specification. Appendix B shows results from a multinomial logistic regressions (which do not assume that the outcome variable, preference for the alternative system, is on any particular scale). I use the Stata margins command to calculate the average marginal effects from this specification.

Control variables			X
Individual fixed effects	X	X	
Adj. R-squared	0.362	0.362	0.064
Observations	5,030	5,030	4,330

Notes. The table reports the coefficient estimates from linear regressions of the support for a system on the hypothesized supply increase and binary indicators for the two features of each system: the level of payment (1 for $30,000, 0 for $10,000) and the type of payment (1 for cash, 0 for noncash). Control variables (column (3)) include age, rage, state, education, marital status, parental status, religion, employment status, income, volunteering, whether they or someone they know need/needed a transplant, and whether they or someone they know works/worked in the medical field. The regressions include all 1,006 respondents (140 people chose not to report information on income or race and were thus excluded from column (3)). Standard errors, clustered at the respondent level, are in parentheses.
***p<0.01, **p<0.05, *p<0.1.

The estimates confirm that both system features and transplant effects have an impact on support for paid-donor family systems. On average, a 10 percentage point increase in transplants leads to a 1.4 percentage point increase in support for a paid-donor system (columns (1) and (2)). This effect is very stable across specifications and does not change with the addition of system features or control variables. Systems with cash payments receive a support that is about 2.5 percentage points lower than systems with noncash payments. Thus, the effect of type of payment on the support for a system corresponds to the effect of about a $2.5/0.14 \approx 17.9$ percentage point increase in transplants. This is equivalent to about 7,160 additional transplants over the current system to compensate for cash payment (the current system meets about 50 percent of demand, so a 17.9 percent improvement would meet about 67.9 percent of demand. 40,000*0.679 = 27,160). This supports the idea that a that there is an ethical distinction between direct payment and charitable contributions or funeral expenses paid for the deceased donor (Shaikh & Bruce, 2016), which will be explored more below. The amount of payment, in contrast, has small and statistically insignificant effect on support, and does not support the idea that higher payments are offensive.

A. *The Association of Moral Concerns with Support for Paid-Donor Systems and Opt-Out System*

I now analyze the extent to which morality judgments account for support for paid-donor and opt-out systems. Because moral concerns are subjective, we should interpret this evidence as correlational. However, it is reassuring that the estimates are not affected by the inclusion of control variables in the regressions I present. Table 3.11 reports estimates limited to the first question respondents answered, because this is the one to which the incentive system morality attitude assessment referred. Regressors include the relative moral concerns for each of the five principles for the Incentive System and the Current System (columns (2) and (3)). These as coded as 1 if the respondent rated the moral assessment as a 4 or 5, and 0 otherwise. In column (1) I report, for reference, estimates from the same specification as in column (2) in Table 10, limited to the first Incentive System question.

Table 3.11. Transplant Increases, Moral Considerations, and Support for Paid-Donor Family Systems.

Outcome variable: Regressors: (IS = Incentive System) (CS = Current System)	Favor for alternative system (=100 if in favor, 50 if equal, 0 if opposed)		
	(1)	(2)	(3)
Transplant increase (percentage points)	0.117*** (0.029)	0.112*** (0.028)	0.106*** (0.032)
$30K	-3.224 (2.477)	-1.738 (2.314)	-3.082 (2.627)
Cash	-7.770*** (2.422)	-6.996*** (2.288)	-7.337*** (2.517)
Exploitation—benefit to donors IS		15.348*** (3.133)	18.843*** (3.633)
Autonomy IS		8.115*** (2.902)	8.443** (3.309)
Undue influence— informed choices		8.324*** (2.705)	11.328*** (3.191)

IS

Fairness to recipients IS		8.279*** (2.803)	7.686** (1.483)
Human dignity IS		3.712 (2.777)	-0.157 (3.120)
Exploitation—benefit to donors CS		2.677 (2.509)	2.998 (3.076)
Autonomy CS		-7.023*** (2.563)	-9.087*** (2.947)
Undue influence—informed choices CS		-2.087 (2.721)	-1.547 (3.277)
Fairness to recipients CS		-12.856*** (2.463)	-13.444*** (2.694)
Human dignity CS		-3.881 (2.633)	-3.857 (2.962)
Control variables			X
Adj. R-squared	0.023	0.147	0.180
Observations	1,006	1,006	866

Notes. The table reports the coefficient estimates from linear regressions of the support for a system on the assumed transplant increase, binary indicators for the features of each system, and measures of the relative moral attitudes for the assigned paid-donor family system (coded as 1 if ranked 4 or 5 (high morality rating), 0 otherwise). The estimates in column 1 are from the same specification as in column 2 of Table 3.10, but for only the first question. Control variables (columns (3)) include age, rage, state, education, marital status, parental status, religion, employment status, income, volunteering, whether they or someone they know need/needed a transplant, and whether they or someone they know works/worked in the medical field. The regressions include all 1,006 participants (140 people chose not to report information on income or race and were thus excluded from column (3)). Standard errors, clustered at the respondent level, are in parentheses.
***p<0.01, **p<0.05, *p<0.1.

Including moral judgments in the regression substantially raises the share of the variance in the outcome for which the regressions account. The R^2 in column (2), for example, is 6 times as large as the R^2 in column (1). The coefficient on transplant gains continues to be significant and positive, and remains consistent across specifications and with the inclusion of attitude and control variables. Respondents respond to supply gains in their decision to support the Incentive System. Once again, systems with cash payments receive support that is lower than support for

systems with noncash payments. This effect is stable with the addition of moral attitudes and control variables—about 7 percentage points. This supports the idea that there is an ethical distinction between direct payment and charitable contributions or funeral expenses paid for the deceased donor—a view held by the Ethics Committee of the American Society of Transplant Surgeons (Shaikh & Bruce, 2016). Similarly, it supports view of The Committee on Increasing Rates of Organ Donation that: "Ultimately, only if and when financial incentives for organ donation are widely accepted as different from purchasing organs, can this alternative be proposed as preferable to the current system of altruistic organ donation." Respondents might perceive payments in cash as a "purchase" of organs, but noncash compensation as simply a show of gratitude to the family of the deceased donor. Amount of compensation continues to have an insignificant effect on support for the Incentive System.

Each moral attitude has the expected sign (positive effect on support for higher Incentive System rankings and negative effect on support for higher Current System rankings) except for Current System exploitation/benefit to donors and their families, which though positive is insignificant. This indicates that those who believe that the incentive system respects moral concerns are more likely to support it, and those who believe it does not, or that the current system respects them more, are more likely to oppose it. The most important factor for the Incentive System attitudes was the extent to which respondents believed that the Incentive System benefitted donors and their families (and did not exploit them). The most important factor for attitudes toward the Current System was the extent to which respondents believed it was fair or unfair to recipients. The importance of fairness to organ recipients is consistent with the importance of kidney supply effects in respondent choices. Respondents are tradeoff

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sensitive to the number of kidneys an alternative system will procure and may be willing to support it if it provides enough donor organs, despite moral aversion.

While Table 3.11 allows us to see the individual effect of each incentive system and current system moral factor, it is really the difference between the two ratings for each system that drives overall moral views. A respondent might, for example, think that both systems respect human dignity, but that the current system does so more than the incentive system. In this situation, the respondent would prefer the current system, despite a human dignity rating for the incentive system that is high in absolute terms. Table 3.12 reports the effect of relative moral attitudes on support for a paid-donor family system. Each moral attitude is coded as 1 if the difference between the ranking for the incentive system and the current system is greater than or equal to 0, and 0 otherwise. For example, if current system human dignity was ranked 4 and incentive system human dignity was ranked 3, 3-4 = -1, Human dignity IS-CS>=0 would be coded as 0.

Table 3.12. Transplant Increases, Relative Moral Considerations, and Support for Paid-Donor Family Systems.

Outcome variable: Regressors: (IS = Incentive System)	Favor for alternative system (=100 if in favor, 50 if equal, 0 if opposed)	
(CS = Current System)	(1)	(2)
Transplant increase (percentage points)	0.118***	0.119***
	(0.034)	(0.032)
$30K	-4.456	-3.438
	(2.836)	(2.732)
Cash	-8.329***	-8.109***
	(2.678)	(2.563)
Exploitation—benefit to donors IS≥CS		12.429*** (3.896)

Autonomy IS≥CS		11.127*** (3.396)
Undue influence—informed choices IS≥CS		9.876*** (3.089)
Fairness to recipients IS≥CS		11.355*** (3.298)
Human dignity IS≥CS		6.394** (2.737)
Control variables	X	X
Adj. R-squared	0.035	0.126
Observations	866	866

Notes. The table reports the coefficient estimates from linear regressions of the support for a system on the assumed transplant increase, binary indicators for the features of each system, and measures of the relative moral attitudes for the assigned paid-donor family system (coded as 1 if the difference between the ranking for the incentive system and the current system is greater than or equal to 0, and 0 otherwise. For example, if current system benefit to donor was ranked 3 and incentive system benefit to donor was ranked 4, 4-3=1, Exploitation—benefit to donors IS-CS>=0 would be coded as 1). The estimates in column 1 are from the same specification as in column 2 of Table 3.10, but for only the first question. Control variables (columns (3)) include age, rage, state, education, marital status, parental status, religion, employment status, income, volunteering, whether they or someone they know need/needed a transplant, and whether they or someone they know works/worked in the medical field. 140 people chose not to report information on income or race and were thus excluded from this table. Standard errors, clustered at the respondent level, are in parentheses.
***p<0.01, **p<0.05, *p<0.1.

We can see from column 2 of Table 3.12 that each relative moral attitude is significant and positive. An incentive system ranking that is greater than or equal to the corresponding current system ranking makes respondents significantly more likely to favor the incentive system, as expected. The most important factor is again exploitation/benefit to donors and their families. Respondents who believed the incentive system benefitted donors and their families *more* than the current system does were more likely to support it. The same is true for respecting autonomy, allowing for informed choices rather than exerting undue influence, being fair to recipients, and respecting human dignity.

Table 3.13. Comparison of Incentive and Opt-Out Systems.

Outcome variable: Regressors:	Favor for alternative system (=100 if in favor, 50 if equal, 0 if opposed)		
	(1)	(2)	(3)
Transplant increase (percentage points)	0.129*** (0.015)	0.129*** (0.016)	0.135*** (0.016)
Opt-out	-10.051*** (1.430)	-9.980*** (2.224)	-9.832*** (1.556)
Control variables			X
Individual fixed effects	X	X	
Adj. R-squared	0.025	0.025	0.063
Observations	6,035	6,035	5,195

Notes. The table combines all Incentive System and the Opt-Out questions. It reports the coefficient estimates from linear regressions of the support for a system on the assumed transplant increase and a binary indicator for whether the system is Incentive or Opt-Out. The regressions include all 1,006 participants (140 people chose not to report information on income or race and were thus excluded from column (3)). Standard errors, clustered at the respondent level, are in parentheses.
***$p<0.01$, **$p<0.05$, *$p<0.1$.

Table 3.13 combines responses to all five Incentive System questions and the Opt-Out question. Table 3.13 indicates that being an opt-out system has a significant negative impact on support for an alternative system, decreasing probability of support by about 10 percentage points. Transplant increase has a similar effect (between about 0.13 and 0.11) for the opt-out system as for the incentive systems, which again is a good indication that the coefficient ζ in Section II framework is not system-specific, making the simplified model with separate terms a plausible approximation.

Next, I perform the same morality attitude analysis for the opt-out system question to examine potential causes for this lack of support. The coefficient on transplant gains continues to be significant and positive, and remains consistent across specifications and with the inclusion of attitude and control variables. The magnitude of the effect—about 0.11-0.14—is the same as it was in the paid-donor family systems, indicating that transplant supply increases have the same

effect on respondents' tradeoff choices between systems regardless of system characteristics. As with the incentive systems, an increase in each of the opt-out attitudes has the expected, positive impact on support for the system. However, this effect is insignificant for autonomy beliefs. Beliefs regarding the current system are insignificant for three of the five, and two (benefit to donors and undue influence) are the wrong sign.

Table 3.14. Transplant Increases, Moral Consideration, and Support for Opt-Out Systems.

Outcome variable: Regressors:	Favor for opt-out system (=100 if in favor, 50 if equal, 0 if opposed)			
(OO = Opt-Out) (CS = Current System)	(1)	(2)	(3)	(4)
Transplant increase (percentage points)	0.127*** (0.033)	0.142*** (0.036)	0.110*** (0.030)	0.119*** (0.034)
Exploitation—benefit to donors OO			4.869 (3.241)	5.702*** (1.700)
Autonomy OO			3.798 (3.172)	1.707 (1.543)
Undue influence— informed choices OO			9.948*** (0.002)	3.140** (1.560)
Fairness to recipients OO			13.212*** (2.980)	3.715*** (1.219)
Human dignity OO			14.033*** (3.169)	6.318*** (1.654)
Exploitation—benefit to donors CS			-1.609 (2.941)	1.182 (1.604)
Autonomy CS			-3.132 (2.988)	-1.535 (1.423)
Undue influence—informed choices CS			1.798 (2.988)	0.375 (1.613)
Fairness to recipients CS			-11.226*** (2.781)	-5.019*** (1.323)
Human dignity CS			-9.605*** (2.898)	-4.247*** (1.535)

Control variables		X		X
Adj. R-squared	0.014	0.041	0.128	0.362
Observations	1,006	866	1,006	866

The most important factor for opt-out system attitudes was the extent to which respondents believed that the opt-out system respected human dignity. The most important factor for attitudes toward the current system was the extent to which respondents believed it was fair or unfair to recipients. As with the incentive system/current system comparison questions, the importance of fairness to organ recipients is consistent with the importance of kidney supply effects in respondent choices. Respondents are tradeoff sensitive to the number of kidneys an alternative system will procure and may be willing to support it if it provides enough donor organs, despite moral aversion.

As in Table 3.12 for the paid-donor family system, Table 3.15 reports the effect of relative moral attitudes on support for the opt-out system. Each moral attitude is coded as 1 if the difference between the ranking for the opt-out system and the current system is greater than or equal to 0, and 0 otherwise. For example, if current system human dignity was ranked 4 and opt-out system human dignity was ranked 3, 3-4 = -1, Human dignity OO-CS>=0 would be coded as 0.

We can see from column 2 of Table 3.15 that, as with the corresponding measures for the paid-donor family system, each relative moral attitude is significant and positive. An opt-out

system ranking that is greater than or equal to the corresponding current system ranking makes

respondents significantly more likely to favor the opt-out system, as expected. The most

important factor is again human dignity. Respondents who believed the opt-out system would

respect human dignity *more* than the current system does were more likely to support it. The

same is true for benefiting donors and their families, respecting autonomy, allowing for informed

choices rather than exerting undue influence, and being fair to recipients.

Table 3.15. Transplant Increases, Relative Moral Consideration, and Support for Opt-Out Systems.

Outcome variable: Regressors: (OO = Opt-Out) (CS = Current System)	Favor for opt-out system (=100 if in favor, 50 if equal, 0 if opposed)	
	(1)	(2)
Transplant increase (percentage points)	0.142***	0.123***
	(0.036)	(0.035)
Exploitation—benefit to donors OO≥CS		13.835*** (3.518)
Autonomy OO≥CS		7.094** (3.134)
Undue influence— informed choices OO≥CS		7.561** (3.356)
Fairness to recipients OO≥CS		11.338*** (3.622)
Human dignity OO≥CS		14.843*** (3.364)
Control variables	X	X
Adj. R-squared	0.041	0.154
Observations	866	866

Notes. The table reports the coefficient estimates from linear regressions of the support for an opt-out system on the assumed transplant increase and measures of the relative moral attitudes for the assigned opt-out system (coded as 1 if the difference between the ranking for the current system and the opt-out system is greater than or equal to 0, and 0 otherwise. For example, if current system benefit to donor was ranked 3 and opt-out system benefit to donor was ranked 4, 4-3=1, Exploitation—benefit to donors OO-CS>=0 would be coded as 1). The estimates in column 1 are the same as in column 2 of Table 3.12. The regressions include all 1,006 participants ((140 people chose not to report information on income or race and were thus excluded from columns (2) and (3)). Standard errors, clustered at the respondent level, are in parentheses.

B. *Consistency of Choice in Multiple-System Questions with Binary System Choices*

Finally, I analyze the results of the multiple-choice question, where respondents were given six possible systems to choose from. In addition to exploring predictors of support for cash and non-cash payments to families of deceased organ donors and opt-out system, the survey includes a broader question with five potential alternate systems: a deceased financial incentive system, a living financial incentive system, an opt-out system, a priority allocation system (priority on organ waiting lists for registered donors, living donors, and consenting family members of deceased donors), and a registration incentive system (annual health insurance premium discount for registers donors). Participants were asked to evaluate the alternative system they chose on the same five criteria as before: whether the system (i) benefits or exploits donors (and their families), (ii) respects or limits individual autonomy, (iii) allows individuals to make fully informed choices or exerts undue influence, (iv) is fair or unfair to patients who need a transplant, and (v) whether it promotes or violates human dignity.

The priority system was the most popular overall and was chosen by 30 percent of respondents. The least popular choice was the current system (4.1 percent). Priority systems could overcome the unfairness of widespread public support for donation and willingness to receive donated organs contrasted with the reality that relatively few people sign up to be donors. In the general population, the likelihood of requiring a life-saving organ transplant is five times greater than the chance of being a deceased donor.[261] However, respondents were told to assume that all alternative systems in the question would supply 30,000 kidneys, a 50 percent increase

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[261] https://ijhpr.biomedcentral.com/articles/10.1186/s13584-018-0232-1

over the current system. This assumption may not be realistic. Versions of the priority system

have been implemented in Israel, Singapore, and Chile (in combination with opt-out systems)

and have not achieved this level of success (Cronin, 2014; Kessler & Roth, 2014; Stoler et al.,

2017; Zúñiga-Fajuri, 2014).[262] However, given that it was the most popular of any alternative,

this system should be considered a promising option, as it still has the potential to improve on the

current system.

Table 3.16 presents regressions of preference for the alternative incentive system on multiple

choice question selection.

Table 3.16. Transplant Increases, Multiple Choice Selection, Moral Attitudes, and Support for
Paid-Donor Family Systems.

Outcome variable: Regressors: (IS = Incentive System) (CS = Current System) (MC = Multiple Choice)	Favor for alternative system (=100 if in favor, 50 if equal, 0 if opposed)	
	(1)	(2)
Transplant increase (percentage points)	0.137*** (0.015)	0.130*** (0.017)
$30K	-0.047 (0.964)	-0.279 (1.067)
Cash	-2.536*** (0.974)	-2.605** (1.102)
MC: Current		-27.033*** (5.155)
MC: Deceased Financial Incentive		24.117*** (3.215)
MC: Living Financial Incentive		18.424*** (2.935)
MC: Opt-Out		-7.246** (4.626)
MC: Priority System		-3.255

		(2.978)
Control variables	X	X
Adj. R-squared	0.362	0.159
Observations	4,330	4,330

Notes. The table reports the coefficient estimates from linear regressions of the support for a system on the hypothesized supply increase and binary indicators for each of the four systems or binary indicators for the two features of each system: the level of payment (1 for $30,000, 0 for $10,000) and the type of payment (1 for cash, 0 for noncash). Column (2) includes the selection made in the multiple choice question: deceased financial incentive system, a living financial incentive system, an opt-out system, a priority allocation system (priority on organ waiting lists for registered donors, living donors, and consenting family members of deceased donors), and a registration incentive system (annual health insurance premium discount for registered donors). Control variables include age, rage, state, education, marital status, parental status, religion, employment status, income, volunteering, whether they or someone they know need/needed a transplant, and whether they or someone they know works/worked in the medical field. 140 people chose not to report information on income or race and were thus excluded from this table. Standard errors, clustered at the respondent level, are in parentheses.
***p<0.01, **p<0.05, *p<0.1.

In column 1 I report, for reference, estimates from the same specification as in column 3 of Table 3.10. Choosing the current system in the multiple-choice question has a significantly negative effect on choosing the incentive system in the earlier questions (coefficient on MC: Current is negative and significant), while, as expected, choosing the deceased or living financial incentive systems has a significantly positive effect, with deceased having a larger magnitude (coefficients on MC: Deceased Financial Incentive and MC: Living Financial Incentive are positive and significant). This provides a consistency check on responses—on average, respondents' preferences were stable between the earlier binary choice question and the later multiple-choice question. Those who liked the incentive system before still like it, and those who liked the current system before still like it. Choosing the priority system in the multiple-choice question had a small positive but insignificant effect on choosing the financial incentive system in the earlier multiple-choice system. This indicates that those who chose the priority system in the multiple-choice question on average did not strongly support or oppose the deceased financial system. Another way to say this is that those who supported and those who opposed the

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financial incentive system in the earlier binary questions were about equally likely to pick the priority system in the multiple-choice question. This could be an indication that the priority system is a good compromise between respondents with opposing viewpoints. The estimates do not change significantly with the addition of control and moral attitude variables for the current and incentive systems in column (3), which is reassuring.

In Table 3.17, I present regressions for the opt-out question with multiple choice selection as a regressor.

Table 3.17. Transplant Increases, Multiple Choice Selection, Moral Attitudes, and Support for Opt-Out Systems.

Outcome variable: Regressors: (OO = Opt-Out) (CS = Current System) (MC = Multiple Choice)	Favor for opt-out system (=100 if in favor, 50 if equal, 0 if opposed)	
	(1)	(2)
Transplant increase (percentage points)	0.142*** (0.036)	0.135*** (0.036)
MC: Current		-26.547** (7.809)
MC: Deceased Financial Incentive		-1.040 (5.387)
MC: Living Financial Incentive		2.663 (4.864)
MC: Opt-Out		16.820*** (5.176)
MC: Priority System		-3.039 (4.772)
Control variables	X	X
Adj. R-squared	0.041	0.075
Observations	866	866

Notes. The table reports the coefficient estimates from linear regressions of the support for the opt-out system on the hypothesized supply increase. Column (2) include the selection made in the multiple-choice question: deceased financial incentive system, a living financial incentive system, an opt-out system, a priority allocation system (priority on organ waiting lists for registered donors, living donors, and consenting family members of deceased donors), and a registration incentive system (annual health insurance premium discount for registers donors).

Control variables include age, rage, state, education, marital status, parental status, religion, employment status, income, volunteering, whether they or someone they know need/needed a transplant, and whether they or someone they know works/worked in the medical field. 140 people chose not to report information on income or race and were thus excluded from the table. Standard errors, clustered at the respondent level, are in parentheses. ***p<0.01, **p<0.05, *p<0.1.

In column 1 I report, for reference, estimates from the same specification as in column 2 of Table 3.14. Table 3.17, column 2 demonstrates that those who chose the opt-out system in the multiple choice were significantly more likely to choose to support the opt-out system in the earlier questions (coefficient on MC: Opt-Out is positive and significant), and those who chose the current system in the multiple-choice question were significantly less likely to choose to support the opt-out system in the earlier question (coefficient on MC: Current is negative and significant). This again demonstrates that respondents' preferences were consistent across questions—those who liked the opt-out system before still like it, and those who liked the current system before still like it. As with the incentive system, choosing the priority system in the multiple-choice question has an insignificant effect on choosing the opt-out system in the binary choice question. Those who supported and those who opposed the opt-out system in the earlier binary questions were about equally likely to pick the priority system in the multiple-choice question, which is another indication that the priority system might bring together those with opposing views.

VI.   DISCUSSION

This chapter studied the nature of preferences of US residents toward compensating families of deceased organ donors, presumed consent, and other alternative systems. My analysis offers four main insights.

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First, most respondents were trade-off sensitive. Their choices depended on how many additional transplants an alternative system would enable. The effect of additional kidneys was very stable across different specifications, and across incentive and opt-out system questions. Expanded kidney supply increased individuals' support for legalizing alternative organ donor systems and reduced their ethical concerns. Thus, although my study shows that moral concerns pose a constraint to introducing a price mechanism in this context, at the population level, the positive supply effects of compensating families of organ donors may significantly change societal support for legalizing these payments, or other alternative systems. A policy implication of this finding is that pilot studies of compensation to organ donors and families would be useful to gather evidence of the potential effects on the number of transplants. Without this evidence, a large share of Americans would lack a crucial element to guide their preferences. My findings suggest that pilots should also evaluate whether paying organ donors violates ethical principles.

Second, type of compensation mattered to respondents. Payment in cash had a significant negative effect on support for the deceased financial incentive system. This supports the judgment of the Ethics Committee of the American Society of Transplant Surgeons that there is an ethical distinction between direct payment and charitable contributions or funeral expenses paid for the deceased donor (Shaikh & Bruce, 2016). Similarly, it supports view of the Committee on Increasing Rates of Organ Donation that: "Ultimately, only if and when financial incentives for organ donation are widely accepted as different from purchasing organs, can this alternative be proposed as preferable to the current system of altruistic organ donation." (Childress and Liverman, 2006). Respondents might perceive payments in cash as a "purchase" of organs, but noncash compensation as simply a show of gratitude for the decision of the family

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of the deceased donor. However, a positive effect on the supply of donated kidneys might be able to compensate for aversion to payment in cash. Systems with cash payments receive support that is about 2.5 percentage points lower than systems with noncash payments. Thus, the effect of type of payment on the support for a system corresponds to the effect of about a $2.5/0.14 \approx 17.9$ percentage point increase in transplants. This is equivalent to about 7,160 additional transplants to compensate for cash payment (the current system meets about 50 percent of demand, so a 17.9 percent improvement would meet about 67.9 percent of demand. $40,000*0.679 = 27,160$).

Third, moral considerations strongly influence views for both the incentive and opt-out system. Respondents who believe that a given system i) benefits rather than exploits donors (and their families), (ii) respects rather than limits individual autonomy, (iii) allows individuals to make fully informed choices and does not exert undue influence, (iv) is fair to patients who need a transplant, and (v) promotes rather than violates human dignity, are more likely to support it. Ethical and moral principles are a crucial element of support for different systems, and any successful alternative to the current system must make respecting them a priority.

A fourth insight is that, conditional on constant kidney supply that improves on the current system, respondents prefer a non-monetary incentive system above others: the priority incentive system. Those who chose the priority incentive system were not more or less likely to support the other alternative systems offered (paid donor family and opt-out), indicating that this may be a less polarizing option that is worth further study. When given more than a binary option, the current, altruism-only system was still the least popular. This is a strong indication that even if a deceased financial incentive system is not the most popular option, pilot studies of alternative systems would be useful and likely welcome to the general public. The priority

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incentive system has a strong fairness argument behind it—those who are willing to give should

be the first to receive, and the preliminary results from my survey indicate that while it might not

completely eliminate the organ shortage, it would be a good place to start.

APPENDIX

I.   Appendix A: Chapter One

Table A.1. Summary of Pre-2018 Extreme Risk Protection Order Laws

Connecticut, CONN. GEN. STAT. § 29-38c (enacted 1999)
Who can petition? One state's attorney or any two police officers
Maximum duration of order?
   Ex parte: 14 days
   Final: Up to one year
Requisite standard of proof?

Ex parte: Probable cause that (1) respondent poses an imminent risk, (2) respondent owns firearms, and (3) firearms are in a specified location

Final: Clear and convincing evidence that respondent poses a risk

Relinquishment process? Law enforcement searches areas named in the warrant for firearms and ammunition and seizes them.

Early termination of order? No

Renewal? No

Indiana, IND. CODE ANN. § 35-47-14-1, et seq. (enacted 2005)

Who can petition? Law enforcement

Maximum duration of order?

Emergency firearm removal: 14 days from submission of statement

Ex parte: 14 days

Final: Lasts until terminated by petition and a hearing, no earlier than 180 days after hearing for final order

Requisite standard of proof?

Emergency/Ex parte: Probable cause that respondent is dangerous

Final: Clear and convincing evidence that respondent is dangerous

Relinquishment process? Law enforcement searches areas named in the warrant for firearms and ammunition and seizes them.

Early termination of order? Respondent may petition once every 180 days. If it has been less than one year since the order was originally issued, respondent bears the burden of proving by preponderance of the evidence that he/she is not dangerous. If it has been longer than one year since the original order, the burden of proof falls to the state, which must prove by clear and convincing evidence that the respondent is still dangerous.

Renewal? No

California, CAL. PENAL CODE § 18100, et seq. (enacted 2014)

Who can petition? Family, household members, employers, certain coworkers and school staff, and law enforcement

Maximum duration of order?

Temporary: Up to 21 days

Ex parte: Up to 21 days

Final: One to five years

Requisite standard of proof?

Temporary: Reasonable cause to believe respondent poses immediate and present danger.

Ex Parte: Substantial likelihood that respondent poses significant danger in near future

Final: Clear and convincing evidence that respondent poses significant danger

Relinquishment process? Firearms, ammunition, and magazines must either be relinquished (1) immediately upon request of a law enforcement officer, or (2) to law enforcement or transferred to a federally licensed dealer within 24 hours. Respondent must file proof of relinquishment with the court within 48 hours of being served.

Early termination of order? Respondent may petition once per year for early termination. If no longer

clear and convincing evidence to believe that respondent meets the standard of dangerousness, court shall terminate the order.

Renewal? Final order can be renewed at any time within three months before termination of initial order. Same standard as final order.

Washington, WASH. REV. CODE ANN. § 7.94.010, et seq. (enacted 2016)
Who can petition? Family, household members, and law enforcement
Maximum duration of order?
Ex parte: Up to 14 days
Final: Up to one year
Requisite standard of proof?
Ex Parte: Reasonable cause to believe respondent poses significant
danger of injury in near future
Final: Preponderance of the evidence that respondent poses significant
danger
Relinquishment process? Immediate surrender of firearms and concealed pistol license to law enforcement. If order is not served by law enforcement, surrender to law enforcement within 48 hours.
Early termination of order? Respondent may petition once during order's duration for early termination. Respondent bears burden of proving by preponderance of the evidence that they no longer pose significant risk of danger.
Renewal? Final order can be renewed before termination of initial order. Must be requested within 105 days before expiration, same burden of proof as yearlong order.

Oregon, OR. REV. STAT. ANN. § 166.525, et seq. (enacted 2017)
Who can petition? Family, household members, and law enforcement
Maximum duration of order?
Ex parte: If respondent requests hearing, must be held within 21 days.
Final: Up to one year
Requisite standard of proof?
Ex Parte: Clear and convincing evidence that respondent presents risk
in the near future
Final: Automatic if respondent does not request hearing after ex parte.
Same standard as ex parte
Relinquishment process? Surrender all "deadly weapons" to law enforcement, gun dealer, or third party legally allowed to possess firearms.
Early termination of order? Respondent may petition once during order's duration for early termination. Respondent bears burden of proving by clear and convincing evidence that they no longer present risk.
Renewal? Final order can be renewed before termination of initial order. Same standard and duration as final order.

Table A.2. Regression of Unintentional Firearm Death Rates on ERPO Laws.

(1)
All

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Unintentional firearm deaths	
ERPO law	-0.021
	(0.040)
R-squared	0.705
Observations	1,471

Table A.3. Regression of Suicide Rates on Using Homicide Sample from Table 1.2.

	(1)	(2)	(3)	(4)	(5)
	All	Men	Women	White	Non-white
Total suicides					
ERPO law	-0.032***	-0.020**	-0.065**	-0.033**	-0.116**
	(0.012)	(0.009)	(0.025)	(0.013)	(0.046)
R-squared	0.953	0.952	0.881	0.949	0.496
Observations	1,353	1,353	1,353	1,350	1,350
Firearm suicides					
ERPO law	-0.057***	-0.043**	-0.156***	-0.061***	-0.078
	(0.019)	(0.017)	(0.043)	(0.017)	(0.083)
R-squared	0.975	0.972	0.859	0.974	0.487
Observations	1,344	1,342	1,342	1,324	1,324
Non-firearm suicides					
ERPO law	0.008	0.022*	-0.021	0.009	-0.071
	(0.015)	(0.013)	(0.027)	(0.019)	(0.052)
R-squared	0.914	0.895	0.842	0.896	0.507
Observations	1,344	1,342	1,342	1,324	1,324

Notes. Each column represents a unique regression. Each observation is at the state-year level. The dependent variable is the is the natural log of the various suicide rates and the standard errors are clustered at the state level. All specifications include state and year fixed effects. The controls included in the columns are percent white, percent black, percent male, unintentional poisoning death rate, unintentional firearm death rate, percent age 45-64, percent male age 45-64, urbanization fraction, unemployment rate, real per capita income, and percent married. Robust standard errors in parentheses.
***p<0.01, **p<0.05, *p<0.1.

II.   Appendix B: Chapter Three

Table B.1. The Effect of Transplant Increases and Procedural Features on Support for Paid-Donor Family Systems: Multinomial Logistic Regression Results with Average Marginal Effects.

Outcome variable:	Favor for alternative system		
Regressors:	(1)	(2)	(3)
50% transplant increase			
Oppose	-0.072***	-0.071***	-0.084***
	(0.016)	(0.016)	(0.016)
Equal	-0.105***	-0.104***	-0.103***
	(0.014)	(0.014)	(0.015)
Favor	0.176***	0.175***	0.187***
	(0.019)	(0.019)	(0.020)
100% transplant increase			
Oppose	-0.082***	-0.082***	-0.085***
	(0.016)	(0.016)	(0.017)
Equal	-0.094***	-0.093***	-0.096***
	(0.014)	(0.014)	(0.015)
Favor	0.175***	0.175***	-0.180***
	(0.019)	(0.019)	(0.020)
$30K			
Oppose		0.001	0.005
		(0.011)	(0.012)
Equal		-0.010	-0.009
		(0.010)	(0.010)
Favor		0.009	0.004
		(0.0127)	(0.014)
Cash			
Oppose		0.011**	0.017
		(0.011)	(0.012)
Equal		0.012	0.014
		(0.010)	(0.010)
Favor		-0.023*	-0.031**
		(0.013)	(0.013)
Control variables			X
Observations	5,030	5,030	4,330

Notes. The table reports the coefficient estimates from multinomial logistic regressions of the support for a system on the hypothesized supply increase and binary indicators for the two features of each system: the level of payment (1 for $30,000, 0 for $10,000) and the type of payment (1 for cash, 0 for noncash). Control variables (column (3)) include age, rage, state, education, marital status, parental status, religion, employment status, income, volunteering, whether they or someone they know need/needed a transplant, and whether they or someone they know works/worked in the medical field. The regressions include all 1,006 respondents (140 people chose not to report information on income or race and were thus excluded from column (3)). Standard errors, clustered at the respondent level, are in parentheses.

***p<0.01, **p<0.05, *p<0.1.

Survey Text

"Welcome to our survey on issues related to organ donation. This survey was put together by Vanderbilt University researchers studying support for health systems. We want to explore your attitudes towards different kinds of donation systems. We hope that you find the survey interesting. The survey should take you under 15 minutes. Thank you very much for your responses.

[page break]

There are over 100,000 people in the United States on the waiting list for an organ transplant, and there are only about 35,000 transplants a year. Not only is the wait long, but the waiting list grows longer each year, and thousands of people die annually while waiting for an organ.

Kidney transplants are the most common type of organ transplant. Transplantation is the best treatment for end-stage kidney disease: it saves the life of the patient, and also saves Medicare about half a million dollars per patient compared to alternative and less effective treatments such as dialysis. Some people get a new kidney from a living donor such as a family member or friend. However, the vast majority of kidney transplants, about 70%, come from deceased donors.

In what follows we will focus on deceased donations.

[page break]

People can sign up to be organ donors via their driver's license and can also sign up on their state's registry. Although 90% of U.S. adults support organ donation, only 50% are currently registered as organ donors. When someone who is not registered as an organ donor dies in a way that allows them to be an organ donor, their family decides whether to donate their organs. Even if someone is registered as an organ donor, their family can and sometimes does veto their choice to be a donor.

[page break]

People who wish to donate their organs upon their death can indicate their preference on their driver's licenses or on their state's registry. Although 90% of U.S. adults support organ donation, only 50% are currently registered as organ donors. When someone who is not registered as an organ donor dies in a way that

allows them to be a donor, their family decides whether to donate their organs. Even if someone is registered as an organ donor, their family can and sometimes does veto their choice to be a donor.

[page break]

The current organ donor system depends primarily on altruism. Organ allocation is decided by priority rules based on medical urgency, blood and tissue match with the donor, time on the waiting list, age, and distance to the donor. However, the shortage of organs causes most patients to wait for a transplant.

Each year in the United States approximately 40,000 new patients require a kidney transplant, but only about 20,000 obtain one."

1. In your opinion, does the current system benefit or exploit donors (and their families)?
   a. Greatly exploits donors
   b. Somewhat exploits donors
   c. Neutral
   d. Somewhat benefits donors
   e. Greatly benefits donors

[page break]

2. In your opinion, does the current system respect or limit individual autonomy (i.e., self-determination)?
   a. Severely limits autonomy
   b. Somewhat limits autonomy
   c. Neutral
   d. Somewhat respects autonomy
   e. Fully respects autonomy

[page break]

3. Overall, does the current system let individuals make fully informed choices or does it exert undue influence?
   a. Severe undue influence
   b. Somewhat undue influence
   c. Neutral
   d. Somewhat informed choices
   e. Fully informed choices

[page break]

4. In your opinion, is the current system fair or unfair to patients who need a transplant?

      a. Very unfair to patients
      b. Somewhat unfair to patients
      c. Neutral
      d. Somewhat fair patients
      e. Very unfair to patients

[page break]

5. In your opinion, does the current system <u>promote or violate human dignity</u>?
      a. Greatly violates human dignity
      b. Somewhat violates human dignity
      c. Neutral
      d. Somewhat promotes human dignity
      e. Greatly promotes human dignity

[page break]

Scholars and policymakers are debating alternative systems of organ procurement that might increase the supply of organs and reduce the shortage.

Some of the alternatives that are being debated include some form of compensation. Currently, the National Organ Transplant Act of 1984 prohibits compensation to organ donors or their families. Some advocates argue that altruism is the only appropriate motivation for organ donation, while others argue that compensation could also be appropriate and effective. We would like to know what you think.

In the next section of the survey we will ask you to express your opinions about an alternative organ procurement system, as compared to the current system.

[page break]

Please consider the following Alternative Organ Procurement Incentive System:

·   Families of donors receive compensation from the government

·   A public agency, coordinated by the U.S. Department of Health and Human Services, would regulate and oversee the process

·   Families and donors may still choose to make uncompensated donations, if they wish.

[page break]

(Participants see 1 variant of the following question:)

	Current System	Alternative System
Donor family compensation	none	$10,000 paid by government [$30,000 paid by government]
Compensation type	none	Funeral expenses, tax credits, contributions to a tax-free

		retirement account, tuition vouchers, or loan repayment [Cash]
Number of kidney transplants (annual)	20,000	20,000 [30,000; 40,000]
% of demand for transplants satisfied	50%	50% [75%; 100%]

Assuming that these are the best available estimates of the outcomes under the alternative system, please indicate which system you would prefer:

Current system	Alternative system	Both are equally good

[page break]

1. In your opinion, does the incentive system <u>benefit or exploit donors (and their families)</u>?
    a. Greatly exploits donors
    b. Somewhat exploits donors
    c. Neutral
    d. Somewhat benefits donors
    e. Greatly benefits donors

[page break]

2. In your opinion, does the incentive system <u>respect or limit individual autonomy (i.e., self-determination)</u>?
    a. Severely limits autonomy
    b. Somewhat limits autonomy
    c. Neutral
    d. Somewhat respects autonomy
    e. Fully respects autonomy

[page break]

3. Overall, does the incentive system let individuals make <u>fully informed choices or does it exert undue influence</u>?
    a. Severe undue influence
    b. Somewhat undue influence
    c. Neutral
    d. Somewhat informed choices
    e. Fully informed choices

[page break]

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4. In your opinion, is the incentive system <u>fair or unfair to patients who need a transplant</u>?
   a. Very unfair to patients
   b. Somewhat unfair to patients
   c. Neutral
   d. Somewhat fair patients
   e. Very unfair to patients

[page break]

5. In your opinion, does the incentive system <u>promote or violate human dignity</u>?
   a. Greatly violates human dignity
   b. Somewhat violates human dignity
   c. Neutral
   d. Somewhat promotes human dignity
   e. Greatly promotes human dignity

[page break]

(Participants see 4 variants of the following question:)

	Current System	Alternative System
Donor family compensation	none	$10,000 paid by government [$30,000 paid by government]
Compensation type	none	Funeral expenses, tax credits, contributions to a tax-free retirement account, tuition vouchers, or loan repayment [Cash]
Number of kidney transplants (annual)	20,000	20,000 [30,000; 40,000]
% of demand for transplants satisfied	50%	50% [75%; 100%]

Assuming that these are the best available estimates of the outcomes under the alternative system, please indicate which system you would prefer:

Current system	Alternative system	Both are equally good

[page break]

Please consider the following Alternative Organ Procurement System:

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· Every adult in the United States is automatically "opted-in" to organ donation. This means that if someone does not wish to be an organ donor, they must "opt-out."

· It is as easy to "opt-out" of organ donation as it currently is to "opt-in." People can indicate that they do not wish to be organ donors via their driver's license and or on their state's registry.

· If a potential organ donor did not "opt-out," they will automatically be an organ donor. Their family will not be asked. Similarly, if a potential donor did "opt-out," they will automatically not be an organ donor.

[page break]

(Participants see 1 variant of the following question:)

	Current System	Opt-out System
Donor family compensation	none	none
Compensation type	none	Opt-out system replaces opt-in
Number of kidney transplants (annual)	20,000	20,000 [30,000; 40,000]
% of demand for transplants satisfied	50%	50% [75%; 100%]

Assuming that these are the best available estimates of the outcomes under the alternative system, please indicate which system you would prefer:

Current system	Opt-out system	Both are equally good

[page break]

1. In your opinion, does the opt-out system benefit or exploit donors (and their families)?
    a. Greatly exploits donors
    b. Somewhat exploits donors
    c. Neutral
    d. Somewhat benefits donors
    e. Greatly benefits donors

[page break]

2. In your opinion, does the opt-out system respect or limit individual autonomy (i.e., self-determination)?
    a. Severely limits autonomy

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b. Somewhat limits autonomy
c. Neutral
d. Somewhat respects autonomy
e. Fully respects autonomy

[page break]

3. Overall, does the opt-out system let individuals make <u>fully informed choices or does it exert undue influence</u>?
   a. Severe undue influence
   b. Somewhat undue influence
   c. Neutral
   d. Somewhat informed choices
   e. Fully informed choices

[page break]

4. In your opinion, is the opt-out system <u>fair or unfair to patients who need a transplant</u>?
   a. Very unfair to patients
   b. Somewhat unfair to patients
   c. Neutral
   d. Somewhat fair patients
   e. Very unfair to patients

[page break]

5. In your opinion, does the opt-out system <u>promote or violate human dignity</u>?
   a. Greatly violates human dignity
   b. Somewhat violates human dignity
   c. Neutral
   d. Somewhat promotes human dignity
   e. Greatly promotes human dignity

[page break]

Consider the following policy options the government could choose.

1. Deceased Financial Incentive System:
· Families of donors receive $10,000 non-cash compensation from the government
· Families can choose between funeral expenses, tax credits, or contributions to a tax-free retirement account
· A public agency, coordinated by the U.S. Department of Health and Human Services, would regulate and oversee the process

·   Families and donors may still choose to make uncompensated donations, if they wish.

2.   Living Financial Incentive System:
·   Living donors receive $10,000 non-cash compensation from the government
·   Donors can choose between health insurance, tax credits, contributions to a tax-free retirement account, tuition vouchers, or loan repayment
·   A public agency, coordinated by the U.S. Department of Health and Human Services, would regulate and oversee the process
·   Donors may still choose to make uncompensated donations, if they wish.

3.   Opt-out System:
·   Every adult in the United States is automatically "opted-in" to organ donation. This means that if someone does not wish to be an organ donor, they must "opt-out."
·   It is as easy to "opt-out" of organ donation as it currently is to "opt-in." People can indicate that they do not wish to be organ donors via their driver's license and or on their state's registry.
·   If a potential organ donor did not "opt-out," they will automatically be an organ donor. Their family will not be asked. Similarly, if a potential donor did "opt-out," they will automatically not be an organ donor.
·   A public agency, coordinated by the U.S. Department of Health and Human Services, would regulate and oversee the process

4.   Priority System:
·   Registered donors, previous living donors, and consenting family members of deceased donors receive priority on organ donation waiting lists if they ever need an organ
·   A public agency, coordinated by the U.S. Department of Health and Human Services, would regulate and oversee the process

5.   Registration Incentive System:
·   Registered organ donors receive an annual $500 discount on health insurance premiums from the government
·   A public agency, coordinated by the U.S. Department of Health and Human Services, would regulate and oversee the process

	Current System	Deceased Financial Incentive System	Living Financial Incentive System	Opt-out System	Priority System	Registration Incentive System
Compensation	none	$10,000 paid by government	$10,000 paid by government	none	none	$500 paid by government

Incentive type	none	Funeral expenses, tax credits, contributions to a tax-free retirement account, tuition vouchers, or loan repayment paid to **deceased** donor's family	Health insurance, tax credits, contributions to a tax-free retirement account, tuition vouchers, or loan repayment paid to **living** donor	Opt-out system replaces opt-in	Priority on organ donation waiting list for registered donors, previous living donors, and consenting family members of deceased donors	Health insurance premium discount paid by government for registered donors
Number of kidney transplants (annual)	20,000	30,000	30,000	30,000	30,000	30,000
% of demand for transplants satisfied	50%	75%	75%	75%	75%	75%

Assuming that these are the best available estimates of the outcomes under each alternative
System, please indicate which System you think is **best**:

Current System	Deceased Financial Incentive System	Living Financial Incentive System	Opt-out System	Priority System	Registration Incentive System

[page break]

1. In your opinion, does the [system they picked?] <u>benefit or exploit donors (and their families)</u>?
    a. Greatly exploits donors
    b. Somewhat exploits donors
    c. Neutral
    d. Somewhat benefits donors
    e. Greatly benefits donors

[page break]

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2. In your opinion, does the [system they picked?] <u>respect or limit individual autonomy (i.e., self-determination)</u>?
   a. Severely limits autonomy
   b. Somewhat limits autonomy
   c. Neutral
   d. Somewhat respects autonomy
   e. Fully respects autonomy

[page break]

3. Overall, does the [system they picked?] let individuals make <u>fully informed choices or does it exert undue influence</u>?
   a. Severe undue influence
   b. Somewhat undue influence
   c. Neutral
   d. Somewhat informed choices
   e. Fully informed choices

[page break]

4. In your opinion, is the [system they picked?] <u>fair or unfair to patients who need a transplant</u>?
   a. Very unfair to patients
   b. Somewhat unfair to patients
   c. Neutral
   d. Somewhat fair patients
   e. Very unfair to patients

[page break]

5. In your opinion, does the [system they picked?] <u>promote or violate human dignity</u>?
   a. Greatly violates human dignity
   b. Somewhat violates human dignity
   c. Neutral
   d. Somewhat promotes human dignity
   e. Greatly promotes human dignity

[page break]

We would now like to ask you some background questions. Please be assured that we take your privacy and confidentiality very seriously. Your identity WILL NEVER be linked directly with any of the information that you provide. We appreciate your responses to these questions.

1. What is your age (in years)?
   a. Box

b. I would prefer not to answer

<div align="center">[page break]</div>

2. What is your gender?
   a. Man
   b. Woman
   c. Non-binary
   d. Other
   e. I would prefer not to answer

<div align="center">[page break]</div>

3. What is your race?
   a. White
   b. Black
   c. Asian
   d. Other race
   e. I would prefer not to answer

<div align="center">[page break]</div>

4. Which of the following describes your ethnic background?
   a. Hispanic/Latino
   b. Not Hispanic/Latino
   c. I would prefer not to answer

<div align="center">[page break]</div>

5. Please select your state or territory of residence
   a. Box
   b. I would prefer not to answer

<div align="center">[page break]</div>

6. How would you describe the area where you live?
   a. City
   b. Suburb
   c. Small town
   d. Country/rural

<div align="center">[page break]</div>

7. What is your marital status?
   a. Currently married
   b. Currently living in a marriage-like relationships
   c. Widowed

<div align="center">150</div>

d. Separated
    e. Divorced
    f. Never Married

[page break]

8. What is the highest level of education that you completed?
    a. High school or less
    b. Some college or an Associate degree
    c. Bachelor's degree
    d. Graduate or professional degree

[page break]

9. What was the total income of your household last year?
    a. Less than $10,000
    b. $10,000 to $29,999
    c. $30,000 to $49,000
    d. $50,000 to $74,999
    e. $75,000 to $99,999
    f. $100,000 to $124, 999
    g. $125,000 to $149,999
    h. Over $150,000
    i. I would prefer not to answer

[page break]

10. Are you currently working for pay or profit?
    a. Yes, full-time
    b. Yes, part-time
    c. No

[page break]

11. How may children do you have under the age of 18?
    a. Box
    b. I would prefer not to answer

[page break]

12. Generally speaking, do you think of yourself as a Republican, a Democrat, or an Independent?
    a. Republican
    b. Democrat
    c. Independent
    d. I would prefer not to answer

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13. On social issues, do you think of yourself as liberal or conservative?
   a. Liberal
   b. Moderate
   c. Conservative
   d. I would prefer not to answer

14. On economic issues, do you think of yourself as liberal or conservative?
   a. Liberal
   b. Moderate
   c. Conservative
   d. I would prefer not to answer

15. Who did you vote for in the 2020 Presidential Election?
   a. Donald Trump
   b. Joe Biden
   c. Other
   d. I did not vote
   e. I would prefer not to answer

16. What is your religion?
   a. Atheist/Agnostic
   b. Buddhist
   c. Protestant Christian
   d. Catholic
   e. Hindu
   f. Jewish
   g. Muslim
   h. Other
   i. I would prefer not to answer

17. How often do you attend religious services (excluding occasional weddings, funerals, etc.)?
   a. Once or more a week
   b. Once or twice a month
   c. For major holidays
   d. Never

e. I would prefer not to answer

18. Have you or has anyone you know ever needed an organ transplant? Please check all that apply, or select "None of the above" if none of the cases listed applies to you
    a. Yes, I currently need an organ transplant
    b. Yes, a relative or friend currently needs an organ transplant
    c. Yes, I did need an organ transplant and obtained one
    d. Yes, a relative or friend needed an organ transplant and obtained one
    e. Yes, a relative or friend needed an organ transplant but did not obtain one
    f. None of the above applies to me

19. How would your risk of needing an organ transplant in the future compare to the average American's?
    a. I have an above-average risk
    b. I have an average risk
    c. I have a below-average risk

20. Have you or has anyone you know ever donated an organ? Please check all that apply, or select "None of the above" if none of the cases listed applies to you
    a. Yes, I have donated an organ
    b. Yes, a relative or friend was a living organ donor
    c. Yes, a relative or friend was a deceased organ donor
    d. None of the above applies to me

21. Have you or has anyone you know ever worked in the medical field? Please check all that apply, or select "None of the above" if none of the cases listed applies to you
    a. Yes, I currently work in the medical field
    b. Yes, a relative/friend works in the medical field
    c. Yes, I worked in the medical field in the past but do not now
    d. Yes, a relative/friend worked in the medical field but does not now
    e. None of the above applies to me

22. Did you donate money or volunteer time to a charitable organization in the past 2 years?
    a. Yes
    b. No
    c. I would prefer not to answer

23. Are you a registered organ donor?
    a. Yes
    b. No
    c. I would prefer not to answer

24. Did you have any problems understanding any of the questions in the survey? (or how well did you read, or put q before how much should we count on your answers)?
    a. Many questions were unclear or confusing
    b. A few questions were unclear or confusing
    c. The questions were clear and understandable
    d. Some questions seemed overly simple

Figure B.2. Structure and Flow of Experiment.

Information on kidney failure, transplants, and donation. Description of current procurement system. Questions on moral views about current system.											
Information on and question on support for one of twelve alternative kidney procurement systems: (Payment amount, Payment type, Number of kidneys)											
$10k, cash, 20K	$10k, cash, 30K	$10k, cash, 40K	$30k, cash, 20K	$30k, cash, 30K	$30k, cash, 40K	$10k, non cash, 20K	$10k, non cash, 30K	$10k, non cash, 40K	$30k, non cash, 20K	$30k, non cash, 30K	$30k, non cash, 40K
Questions on moral views about the incentive system.											
Assignment to four more of eleven remaining alternative kidney procurement systems (excluding question already answered): (Payment amount, Payment type, Number of kidneys)											
$10k, cash, 20K	$10k, cash, 30K	$10k, cash, 40K	$30k, cash, 20K	$30k, cash, 30K	$30k, cash, 40K	$10k, non	$10k, non	$10k, non	$30k, non	$30k, non	$30k, non

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						cash, 20K	cash, 30K	cash, 40K	cash, 20K	cash, 30K	cash, 40K
Information on and question on support for one of three opt-out systems: (Number of kidneys)											
20K			30K				40K				
Questions on moral views about the opt-out system.											
Information on five alternative systems: (System name, Payment amount and type if applicable, Number of kidneys)											
Current System: 20K	Deceased Financial Incentive System: $10k, noncash, 30K	Living Financial Incentive System: $10k, noncash, 30K	Opt-Out System: N/A 30K	Priority System: priority on waiting list for registered donors, previous living donors, and family members of deceased donors, 30K	Registration Incentive System: $500, health insurance premium discount for registered donors, 30K						
Questions on moral views about selected multiple choice alternative system											
Sociodemographic questions											

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