

## **Protecting the Innocent with a Premium for Child Safety Regulations**

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### **ABSTRACT**

Federal agencies regulate many products and activities that impact the safety of children. Agencies should put a premium on saving the lives of children when analyzing the costs and benefits of proposed regulations. This note uses original evidence from the infant car seat market to determine that a child-specific benefit measure should be one and a half to two times that of an adult. A child premium will encourage more regulations that protect the safety of our society's most precious and innocent members.

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## I. INTRODUCTION

In 1996, Anton Skeen was riding in a sport utility vehicle with his mother when the vehicle was involved in a rollover accident.<sup>1</sup> Four-year-old Anton, who was wearing a lap-and-shoulder seatbelt, slipped out of his seatbelt, was ejected from the vehicle, and died.<sup>2</sup> In 2002, Congress passed “Anton’s Law,” requiring the National Highway Traffic Safety Administration (“NHTSA”) to develop rules for child restraint systems that could prevent children from being ejected from vehicles.<sup>3</sup> In 2003, NHTSA promulgated a rule based on Anton’s Law, regulating child restraint systems for children up to sixty-five pounds.<sup>4</sup> The NHTSA rule saves an estimated thirty-four children per year by keeping children like Anton secured in booster seats during collisions.<sup>5</sup> In 2011, NHTSA proposed a rule that regulates restraint systems for children up to eighty pounds that could save many more children each year.<sup>6</sup>

This note argues that agencies can better reflect society’s desire to protect the innocent by passing more rules to save children. Some rules would be targeted at child safety in everyday activities, like Anton riding in a vehicle with his mother. Other rules would be targeted at child safety in rare events, like terrorist attacks and mass shootings. A tragic shooting at Sandy Hook Elementary in Newtown, Connecticut,

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<sup>1</sup> Press Release, Nat’l Highway Traffic Safety Admin., Anton’s Law Mandates Additional Child Passenger Safety Actions (Nov. 1, 2002), *available at* <http://www.nhtsa.gov/people/injury/childps/boosterseatprogress/pages/NHTSALed.htm>.

<sup>2</sup> *Id.*

<sup>3</sup> Anton’s Law, Pub. L. No. 107-318, 116 Stat. 2772 (2002) (codified at 49 U.S.C. § 30127 (2002) (ordering NHTSA to regulate child restraint systems)).

<sup>4</sup> *See* Child Restraint Systems, 49 C.F.R. § 571.213 (2003) (setting standards for booster seats for children up to sixty-five pounds).

<sup>5</sup> *See* OFFICE OF REGULATORY ANALYSIS, NHTSA, FMVSS No. 213, 225, FINAL ECONOMIC ANALYSIS OF CHILD RESTRAINT SYSTEMS, CHILD RESTRAINT ANCHORAGE SYSTEMS (1999) [hereinafter NHTSA], *available at* <http://www.nhtsa.gov/cars/rules/rulings/UCRA-OMB-J08/Econ/RegEval.213.225.html>.

<sup>6</sup> Child Restraint Systems, 76 Fed. Reg. 55825 (proposed Sept. 9, 2011) (requiring booster seat manufacturers to ensure that their products are safe for use by children up to eighty pounds); *see also* Federal Motor Vehicle Safety Standards: Child Restraint Systems, 70 Fed. Reg. 51720, 51729 (2005) (initiating rulemaking to establish regulations on restraint systems for children up to 80 pounds).

on December 14, 2012, killed twenty first-grade students.<sup>7</sup> At a prayer vigil following the event, President Obama said, “This is our first task, caring for our children. It’s our first job. If we don’t get that right, we don’t get anything right. That’s how, as a society, we will be judged.”<sup>8</sup> I argue that a first step to better caring for our children is to ensure that agencies are placing the proper focus on child safety.

This argument is not based on the idea that more regulation is always desirable, but instead that agencies should shift more focus to regulations that promote child safety. Child-safety regulations can be promoted through the existing regulatory framework in which economic analysis plays a central role.<sup>9</sup> Specifically, a benefit measure that puts a premium on children’s safety can prompt agencies to shift more focus to child-safety regulations. The desire for a child premium and how to use the benefit measure in economic analysis have been expressed in executive orders and agency guidance, but there is a gap in the literature as to what the benefit measure should be. This note surveys the landscape of economic analysis in rulemaking before turning to the difficult questions of what the child premium should be and how to justify it. In short, evidence of parent willingness to pay a premium for the safety of children supports a benefit measure for children that is larger than benefit measures that are derived from adult choices about their own safety.

Executive Order 12,866, issued by President Clinton in 1993 and substantially retained by every President since, requires agencies to weigh the expected benefits of proposed regulations against the expected costs.<sup>10</sup> Quantifying costs and benefits of regulations can be

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<sup>7</sup> Joseph Berger, *Facing the Unendurable, Families Lay to Rest Two Children, Both 6*, N.Y. TIMES, Dec. 18, 2012, <http://www.nytimes.com/2012/12/19/nyregion/more-funerals-held-in-newtown-after-massacre.html>.

<sup>8</sup> *President Obama’s Speech at Prayer Vigil for Newtown Shooting Victims (Full Transcript)*, WASH. POST, Dec. 16, 2012, [http://articles.washingtonpost.com/2012-12-16/politics/35864241\\_1\\_prayer-vigil-first-responders-newtown](http://articles.washingtonpost.com/2012-12-16/politics/35864241_1_prayer-vigil-first-responders-newtown).

<sup>9</sup> See *infra* notes 10–12 and accompanying text.

<sup>10</sup> See Exec. Order No. 12, 866, sec. 1, 58 C.F.R. 51735 (Sept. 30, 1993) (“Federal agencies should assess all costs and benefits of available regulatory alternatives . . .”). The requirement applies to any “significant regulatory action,” which the order defines as regulations that are expected to have an “annual effect on the economy of \$100 million or more.” *Id.* sec. 3(f)(1). This definition includes each of the regulations used as examples in this note. Executive Order 12,866 was largely based on Executive Order 12291, signed by President Reagan in 1981. See 46 Fed. Reg. 13193.

difficult, and the methods selected can have large impacts on whether proposed rules are estimated to have positive net benefits.<sup>11</sup> The White House Office of Management and Budget (“OMB”) reviews proposed regulations and can reject promulgation of a regulation for many reasons, including disapproval of an agency’s benefit-cost analysis methodology or dissatisfaction with the result of the analysis.<sup>12</sup> The NHTSA is unlikely to move forward with the proposed rule on child restraint systems if the regulation is not expected to produce a net benefit based on a sound benefit-cost analysis.<sup>13</sup> With OMB acting as a gatekeeper to rule promulgation based largely on economic analysis, the regulation of child restraint systems will be determined largely by how NHTSA measures benefits and costs.<sup>14</sup> If OMB rejects NHTSA’s implementation of Anton’s Law because the net benefit estimate of the regulation is “too low,” children will continue to be ejected from vehicles and killed. Although calculation of child safety benefits may seem an esoteric and morbid topic, children’s lives depend on the cost and benefit estimates that are used in economic analyses.

In 1997, President Clinton issued Executive Order 13,045 requiring every federal executive agency “ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.”<sup>15</sup> As part of the OMB review process, agencies must separate safety risks to children from the risks to the general population.<sup>16</sup> Executive Order 13,045 reflects society’s feeling that children are special, but stops short of requiring agencies to use a separate benefit measure for

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<sup>11</sup> See OFFICE OF MGMT. & BUDGET (“OMB”), EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4, at 3 (2003) (“Different regulations may call for different emphases in the analysis, depending on the nature and complexity of the regulatory issues and the sensitivity of the benefit and cost estimates to the key assumptions.”).

<sup>12</sup> See generally Paul R. Portney & Robert N. Stavins, *Regulatory Review of Environmental Policy: The Potential Role of Health-Health Analysis* 8 J. RISK & UNCERTAINTY 111 (1994) (discussing benefit-cost analysis of regulations).

<sup>13</sup> See *id.* at 114.

<sup>14</sup> See *id.* at 112–13 (discussing health-health analysis as an alternative way to approach costs and benefits in regulatory review); see also *FAQ*, OFFICE OF INFO. & REGULATORY AFFAIRS, OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, <http://www.reginfo.gov/public/jsp/Utilities/faq.jsp> (last visited Feb. 25, 2013).

<sup>15</sup> Exec. Order No. 13,045, sec. 1-101(b), 62 Fed. Reg. 19885 (Apr. 21, 1997).

<sup>16</sup> *Id.* at sec. 1-101(a).

improved safety of children.<sup>17</sup> President Clinton stopped short of mandating child-specific benefit measures because of a lack of studies on what the child-specific measures should be.<sup>18</sup>

In the wake of Executive Order 13,045, scientists and economists have turned increased attention to how safety regulations impact children and how society values the safety improvements.<sup>19</sup> The Children's Health Valuation Handbook, published by the Environmental Protection Agency in 2003, provides guidance to agencies such as the NHTSA engaged in benefit-cost analysis of proposed regulations that impact child safety.<sup>20</sup> Society appears to value child safety differently from adult safety, so the Handbook recommends that agencies use child-specific benefit measures.<sup>21</sup> Instead, agencies currently use benefit measures for adults to estimate the value of improved safety to everyone, including children.<sup>22</sup> Agencies cite a lack of studies measuring the benefits of improved child safety as the main reason they do not use child-specific benefit measures.<sup>23</sup> This note helps to fill that gap.

The federal government regulates many activities and products that impact the safety of children. For example, the Food and Drug Administration ("FDA") sets standards for baby food to ensure that infants receive the nutrients they need with products that meet exacting quality controls.<sup>24</sup> The Consumer Product Safety Commission regulates products such as toys, cribs, and strollers to ensure that they do not pose undue risks to children.<sup>25</sup> There are also regulations that impact broader populations, but have concentrated effects on young people. For example, the EPA regulates lead due to its toxicity and has

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<sup>17</sup> See *id.* at sec. 1-101 ("Children's behavior patterns may make them more susceptible to accidents because they are less able to protect themselves.").

<sup>18</sup> See *id.* at sec. 3-301 (creating a task force to develop research on child-specific risks).

<sup>19</sup> See ENVTL. PROT. AGENCY ("EPA"), CHILDREN'S HEALTH VALUATION HANDBOOK 1-1 (2003) [hereinafter HANDBOOK] (surveying scientific and economic studies of child health valuation).

<sup>20</sup> *Id.*

<sup>21</sup> *Id.* at 2-6.

<sup>22</sup> *Id.* at 2-5.

<sup>23</sup> *Id.*

<sup>24</sup> See 21 U.S.C. § 350a(1) (2006) (authorizing the FDA to inspect infant formula).

<sup>25</sup> See 15 U.S.C. § 2056a (2008) (authorizing the Consumer Products Safety Commission to regulate consumer products including toys and cribs).

banned lead paint from being used in situations where children would be exposed because children are especially sensitive to lead toxicity.<sup>26</sup> These are just a few examples of the many federal regulations that are designed to increase safety levels for children.<sup>27</sup>

The social desire to protect children, as expressed in Executive Order 13,045 and the best practices outlined in the Handbook suggest a premium on child safety as compared to adults, which conflicts with the current agency practice of using an adult benefit measure for children.<sup>28</sup> This note argues that agencies should indeed put a premium on saving the lives of children when analyzing the benefits and costs of regulations. A premium on children's lives will make regulations that focus on child safety, such as NHTSA's implementation of Anton's Law, more likely to pass a benefit-cost analysis and become law. This note is the first to combine market evidence of what people are willing to pay for child safety with a practical method for agencies to implement a child-specific benefit measure. By following the roadmap in this note, agencies can quickly implement safety regulations that better comport with the law and, most importantly, prevent innocent children from dying.

The note proceeds with Section II providing background on federal regulations and a review of why and how benefits and costs of regulations are measured. Section III sets out theoretical justifications for a child premium on benefits; children have long life expectancies with expected increases in their standards of living and are not at fault for the risks they face because they are not in a position to make informed life-and-death decisions. Section IV considers market-based evidence that parents are willing to pay more for child safety than adult safety as a justification for the child premium. Original empirical evidence from the infant car seat market, supported by existing evidence from the baby food market, provides agencies with a rationale for valuing the life of a child at one and a half to two times that of an adult. Section V provides agencies with a roadmap for implementing the child premium with a multiplier on the lives of children expected to be saved by regulations. Section VI concludes

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<sup>26</sup> See 40 C.F.R. § 745(L) (2006E) (2008) (EPA rule banning lead in most residential homes under authority of Lead-Based Paint Hazard Reduction Act, which added Title IV to Toxic Substances Control Act).

<sup>27</sup> See *supra* notes 24–26 and accompanying text; see also 40 C.F.R. § 50.9 (2004) (setting national standards for low-level ozone).

<sup>28</sup> See HANDBOOK, *supra* note 19, at 1-1 to 1-2.

that more child safety is normatively desirable and discusses alternative methods of achieving this increased safety level.

## II. THE COSTS AND BENEFITS OF CHILD SAFETY REGULATIONS

This section surveys federal safety regulations, paying special attention to rules that impact child safety. Examples of safety regulations show the broad scope of regulation in the United States and introduces the products that will be used as the basis for market evidence discussed in Section IV. Since regulatory analysis often involves the use of economic tools, the note briefly discusses market justifications for the existence of regulation in the first place. This includes discussions of the costs and benefits of increased safety as well as rationale and application of benefit-cost analysis to regulations. This discussion of the economic analysis of regulations sets the stage for why a child premium is needed and justified.

### A. Regulations that Impact Safety

Many statutes and regulations are intended to improve safety.<sup>29</sup> For example, NHTSA sets a wide array of standards for seatbelts, airbags, and structural panels of vehicles to ensure that these features meet minimum safety levels and consumers can trust that new vehicles will be reasonably safe.<sup>30</sup> NHTSA regulations play an important role in ensuring that vehicles are safe, but stringent regulations also lead to higher vehicle prices.<sup>31</sup> The tradeoff between price and safety in vehicle travel will be further explored in Section IV.

Other agencies also act to improve safety.<sup>32</sup> For example, the FDA regulates pharmaceuticals, medical devices, and food to promote our

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<sup>29</sup> See, e.g., Occupational Safety & Health Act, 29 U.S.C. §§ 655–677 (2006) (authorizing the creation of the Occupational Safety & Health Agency to create rules to improve safety in the workplace); Mine Safety Act, 30 U.S.C. §§ 801–965 (2006) (mandating mine safety).

<sup>30</sup> See Motor Vehicle Safety Act, 49 U.S.C. § 30111 (2006) (authorizing the Secretary of Transportation to create safety standards for motor vehicles).

<sup>31</sup> See Bill Vlasic, *U.S. Sets Higher Fuel Efficiency Standards*, N.Y. TIMES, Aug. 28, 2102, available at <http://www.nytimes.com/2012/08/29/business/energy-environment/obama-unveils-tighter-fuel-efficiency-standards.html> (quoting the Secretary of Transportation as estimating that more stringent fuel economy standards would lead to price increases of \$2000 to \$3000 per vehicle).

<sup>32</sup> See *infra* notes 38 and 39.



health and wellness.<sup>33</sup> The FDA approves pharmaceuticals for the market only after onerous testing procedures.<sup>34</sup> The FDA also regulates most food to ensure that it will meet certain quality criteria.<sup>35</sup> Federal regulation of food can help solve an asymmetric information problem.<sup>36</sup> Unsafe food is often hard to distinguish from healthy food before it is eaten, and since consumers eat a wide array of foods, it would be difficult to distinguish which food caused illness after it has been eaten.<sup>37</sup> Evidence of consumer willingness to pay for safety in the food market will be examined in Section IV.

Consider also the EPA regulation of air under the Clean Air Act, water under the Clean Water Act and Safe Drinking Water Act, or toxic substances under a number of other acts.<sup>38</sup> The goals of these acts include promotion of human health and environmental quality.<sup>39</sup> Regulators traditionally focus on the human health benefits of regulation, so they are most concerned with environmental issues that impact human health and welfare.<sup>40</sup> Environmental regulations are usually motivated by the classic market failures associated with public goods, and often impact large populations.<sup>41</sup> The broad scope of the

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<sup>33</sup> See 21 U.S.C. § 393 (2006) (authorizing the FDA to regulate pharmaceuticals and food).

<sup>34</sup> See *id.* § 355(b)(1)(A) (requiring proponents of new drugs to submit investigations of a drug's safety and effectiveness as part of its application for introduction to the public).

<sup>35</sup> *Id.* § 393(2)(A); see also *Mission Statement*, THE U.S. DEP'T OF AGRICULTURE ("USDA"), [http://www.usda.gov/wps/portal/usda/usdahome?navid=MISSION\\_STATEMENT.htm](http://www.usda.gov/wps/portal/usda/usdahome?navid=MISSION_STATEMENT.htm) (last visited Oct. 15, 2012) (also regulates food for similar reasons.); 21 U.S.C. § 602 (2006) (authorizing the USDA to regulate meat products because it is "essential in the public interest that the health and welfare of consumers be protected.").

<sup>36</sup> See David A. Hennessy, *Information Asymmetry as a Reason for Food Industry Vertical Integration*, 78 AM. J. OF AGRIC. ECON. 1034, 1035 (1996) (explaining that asymmetric information refers to situations in which one party knows more than the other parties involved).

<sup>37</sup> *Id.* at 1036.

<sup>38</sup> See Clean Air Act, 42 U.S.C. § 7401(b)(1) (2006); Clean Water Act, 33 U.S.C. § 1251(a)(1-7) (2006); Toxic Substance Control Act, 15 U.S.C. § 2601(b)(2) (2006).

<sup>39</sup> *E.g.*, 42 U.S.C. § 7401(b)(1).

<sup>40</sup> ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION 114 (6th ed. 2009).

<sup>41</sup> Public goods are things that are non-excludable and non-rival, meaning that it is difficult to prevent others from using the good and one person's use of the thing

environmental issues regulated by the EPA shows that the health and safety of every person living in the United States is impacted by regulations.<sup>42</sup>

Some regulations focus on the safety of children in particular.<sup>43</sup> NHTSA recommends that children under twenty-two pounds sit in rear-facing car seats, and children under sixty-five pounds use restraint systems, which are most commonly car seats or booster seats.<sup>44</sup> Parents who fail to follow these rules are subject to state traffic laws, with fines ranging from \$10 to \$500.<sup>45</sup> For new car seats to be sold in the United States, they must be approved by NHTSA.<sup>46</sup> NHTSA requires a new infant car seat to have a five-point harness, use the Lower Anchors and Tethers for Children (“LATCH”) anchor system, and pass a series of crash tests.<sup>47</sup> The five-point harness attaches to the seat at five places and is more effective than a traditional three-point

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does not prevent another person from using it. *See id.* at 162. Public goods are classically associated with a market failure of under-provision, since producers have a difficult time charging people for their use. *Id.* In extreme cases, such as the air around us, there is a total lack of a market. *See id.*

<sup>42</sup> *See Our Mission and What We Do*, EPA, Dec. 10, 2012, <http://www.epa.gov/aboutepa/whatwedo.html> (describing the EPA’s purpose as, among other things, to “ensure that all Americans are protected from significant risks to human health and the environment where they live, learn and work,” and to accomplish that mission they “develop and enforce regulations.”).

<sup>43</sup> *See Consumer Product Safety Improvement Act*, 15 U.S.C. § 2057c(d)(3)(B) (2006) (authorizing the Consumer Product Safety Commission to set regulations banning lead in children’s toys).

<sup>44</sup> MELISSA A. SAVAGE ET AL., NAT’L CONFERENCE OF STATE LEGISLATURES, *PROTECTING CHILDREN: A GUIDE TO CHILD TRAFFIC SAFETY LAWS* 6 (2002).

<sup>45</sup> *See Child Passenger Safety Laws*, GOVERNORS HIGHWAY SAFETY ASSOC., (Oct. 2012), [http://www.ghsa.org/html/stateinfo/laws/childsafety\\_laws.html](http://www.ghsa.org/html/stateinfo/laws/childsafety_laws.html) (setting out state fines for child safety violations). The lowest fine for not having your child in an appropriate restraint system is \$10 in Michigan. *Id.* Nevada has the highest at \$500. *Id.*

<sup>46</sup> Child Restraint Systems, 49 C.F.R. § 571.213.S5(a)–(c) (2003).

<sup>47</sup> *See Lower Anchors and Tethers for Children (LATCH) Restraint System*, NHTSA, (2012) <http://www.nhtsa.gov/safety/latch>; Nat’l Highway Trans. Safety Occupant Crash Protection, 49 C.F.R. § 571.208 at S4.1.2.2 (2003) (requiring five-point harness); Child Restraint Anchorage Systems, 49 C.F.R. § 571.225 (requiring most new vehicles to have the LATCH system and specifying crash test parameters).

seatbelt at keeping the child in the seat.<sup>48</sup> The LATCH system uses straps and buckles to make the seat itself less likely to move than if it were strapped down with a traditional seatbelt.<sup>49</sup> Front and rear crash tests ensure that the seat can retain and protect a child in low and mid speed crashes.<sup>50</sup> More recently, Congress has charged NHTSA with the task of “minimizing head injuries from side impact collisions,” which NHTSA is currently studying.<sup>51</sup> In the interim period while NHTSA is studying the issue, some car seat producers have already started offering side impact protection in car seats. Consumer willingness to pay for side impact protection will be the source of this note’s original market evidence that parents are willing to pay a premium for the safety of children.

Another regulation impacting child safety is the FDA’s regulation of baby food to ensure that parents can be confident that the foods on the store shelves will be reasonably safe for their children.<sup>52</sup> The FDA requires baby food processors to test their products and facilities for a range of pathogens and toxic substances.<sup>53</sup> When there is reason to suspect a tainted product, the FDA has authority to require the producer to recall the product.<sup>54</sup> These safety measures increase the costs of producing baby food.<sup>55</sup> Much of this increased cost is passed on to consumers, especially since demand for a product like baby food

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<sup>48</sup> See 49 C.F.R. § 571.225 at S1 (2003) (describing the purpose of the LATCH requirement as “to increase the likelihood that child restraints are properly secured and thus more fully achieve their potential effectiveness”).

<sup>49</sup> See Nat’l Highway Trans. Safety Administration, *Lower Anchors and Tethers for Children (LATCH) Restraint System* (2012) <http://www.nhtsa.gov/Safety/LATCH>.

<sup>50</sup> 49 C.F.R. § 571.208 at S2 (2003).

<sup>51</sup> Transportation Recall Enhancement, Accountability, and Documentation Act, sec. 14, Pub. L. No. 106-414, 114 Stat. 1806 (2000) (codified as amended at 49 U.S.C. §§ 30127).

<sup>52</sup> See 21 U.S.C. § 350a (2006) (outlining requirements for nutrient content, quality control, and recall of infant formula).

<sup>53</sup> *Id.* at § 350a(b)(2).

<sup>54</sup> *Id.* at § 350a(e)(1)(B).

<sup>55</sup> See FDA, SUPPORTING STATEMENT FOR INFANT FORMULA RECALL REGULATIONS 6 (estimating manufacturer cost per recall of \$758,240 for information sharing requirements). This is only a small piece of the expected cost of recalls, which is only one of the expected costs that are prompted by FDA regulations. *Id.*

is relatively insensitive to changes in price.<sup>56</sup> This note surveys existing research measuring willingness to pay a premium for safer baby food to support the empirical results from the child car seat data.

Many EPA regulations significantly impact child safety. Young children are especially susceptible to many kinds of pollutant exposure. For example, exposure to heavy metals like mercury and lead is especially toxic to fetuses and young children.<sup>57</sup> The Centers for Disease Control and Prevention (“CDC”) have a target blood level of lead of ten micro-grams per liter ( $\mu\text{g/L}$ ) or less for children because this concentration appears to be a threshold above which adverse health effects appear.<sup>58</sup> The threshold for adults, who are more resilient to lead exposure, is twenty-five  $\mu\text{g/L}$ .<sup>59</sup>

Because of children’s increased sensitivity to lead, the EPA bases its lead standards largely on how children will be impacted.<sup>60</sup> In 1973, the EPA promulgated a finding that lead was dangerous to human health and safety after studies showed that lead impaired cognitive development in children.<sup>61</sup> This finding was followed by a rule that phased out the use of lead as an additive in gasoline.<sup>62</sup> Based on more scientific evidence of lead’s toxicity, the EPA classified lead as a criteria air pollutant under the Clean Air Act, which led to regulation of other sources of airborne lead.<sup>63</sup> Children are also exposed to lead

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<sup>56</sup> When consumers are relatively insensitive to changes in price, economists call demand for the product inelastic; when producers face an inelastic demand, they are able to pass along the majority of cost increases in the form of higher prices without seeing a large corresponding drop in the quantity purchased. W. KIP VISCUSI ET AL., *ECONOMICS OF REGULATION AND ANTITRUST* 210–12 (4th ed. 2005).

<sup>57</sup> See 40 C.F.R. § 141.86 (2010) (setting out requirements for water systems to lower lead and copper levels in drinking water to prevent harm to children).

<sup>58</sup> *Lead*, CENTERS FOR DISEASE CONTROL (“CDC”), (Aug. 24, 2012), <http://www.cdc.gov/nceh/lead/>.

<sup>59</sup> CDC, *Adult Blood Lead Epidemiology and Surveillance-United States 2008–2009*, MORBIDITY AND MORTALITY WEEKLY REPORT, vol. 60 no. 25 at 841 (2011), available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6025a2.htm>.

<sup>60</sup> See Exec. Order No. 13,045, sec. 1-101, 62 Fed. Reg. 19885 (Apr. 21, 1997).

<sup>61</sup> See 40 C.F.R. § 80.1(a) (2002) (limiting the amount of lead allowed in gasoline because of health concerns).

<sup>62</sup> *Id.* at § 80.22(b).

<sup>63</sup> 42 U.S.C. § 7412(b)(1) (2006).

through drinking water.<sup>64</sup> In 1986, the EPA started regulating lead under the Safe Drinking Water Act.<sup>65</sup> The EPA's regulation of lead demonstrates how safety regulations that are largely driven by concern for children can have far-reaching impacts on broader populations.

The above discussion of safety regulations gives a picture of the broad scope of regulations that aim to correct market failures and protect the population of the United States. By focusing on a few of these regulations that are targeted towards children, this note suggests that people care deeply about the safety of children and are willing to pay a premium for it. This finding has implications for a broad range of regulations that impact everyone in the United States. In order to set the stage for why and how to better promote child safety, this note turns next to a discussion of the role of economic analysis in agency rulemaking.

### **B. Costs and Benefits of Safety Regulations**

When an agency is setting a safety regulation, it has the difficult decision of determining the appropriate level of safety. Determining the appropriate level of safety can be difficult because there are tradeoffs to safety in the form of higher product prices, less consumer choice, and increased burdens on industry.<sup>66</sup> For example, should NHTSA require car seats to be made of a safe, but expensive, polymer? If car seats made of this polymer would cost several hundred dollars and would be unaffordable for many families, the answer may be no. The agency has to determine the appropriate balance between safety and the costs of that safety.<sup>67</sup> Economic theory suggests that a regulation that is a response to a market failure, such as information asymmetry or lack of a market, is more likely to pass a balancing of costs and benefits.<sup>68</sup>

Occasionally, Congress has mandated a particular safety level that regulators must strive to reach.<sup>69</sup> Consider, for example, the Delaney

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<sup>64</sup> S. Triantafyllidou et al., *Lead Exposure Through Drinking Water: Lessons to be Learned from Recent U.S. Experience*, 11 GLOBAL NEST J. 341 (2009).

<sup>65</sup> 42 U.S.C. § 300g-6 (2012).

<sup>66</sup> HANDBOOK, *supra* note 19 at 22.

<sup>67</sup> *Id.*

<sup>68</sup> *Id.* at 4.

<sup>69</sup> See Cass R. Sunstein, *Cost-Benefit Default Principles*, 99 MICH. L. REV. 1651, 1663–67 (2001) (surveying statutes with mandated safety levels).

Clause, which says that zero artificial carcinogens should be allowed as additives in food products.<sup>70</sup> In this case, the FDA must either follow the statutory mandate, leading to over-regulation, or follow a more sensible course fraught with political risk.<sup>71</sup> If the FDA chooses to allow a non-zero amount of artificial carcinogens as food additives, it could face judicial challenges or budget cuts.<sup>72</sup> Most statutory mandates, however, leave a good deal of discretion to agencies to determine the “reasonable” or “justifiable” level of safety.<sup>73</sup>

When so directed by Congress, how can an agency determine what is a reasonable or justifiable level of safety? And if there are multiple safety levels that are reasonable, which level should the agency choose? Executive Order 12,866 instructs agencies to use economic analysis to review major federal regulations.<sup>74</sup> Major regulations are defined as those that have an expected impact of more than \$100 million per year.<sup>75</sup> Agencies must submit proposed regulations to the OMB, which has authority to reject proposed rules or require amendment or additional analysis by the agency; because of OMB review, economic analysis often plays a central role in determining a regulation’s reasonableness.<sup>76</sup>

In 2003, the OMB issued Circular A-4, containing guidance on how the economic analysis should be performed.<sup>77</sup> Circular A-4 lays out the preferred form of economic analysis called the benefit-cost analysis, which compares the expected benefits of the regulation with

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<sup>70</sup> *Id.* at 1663–64 (citing 21 U.S.C. § 376(b)(5)(B) (1994)).

<sup>71</sup> *Id.*

<sup>72</sup> *Id.* at 1655 n.17.

<sup>73</sup> *See, e.g.*, 15 U.S.C. § 2605(a) (2006) (instructing EPA to limit use of substances when there is a “reasonable risk”); 42 U.S.C. § 2167(d)(1)–(3) (2006) (justifiable risk).

<sup>74</sup> Exec. Order No. 12, 866, sec. 1(a), 58 C.F.R. 51735 (Sept. 30, 1993).

<sup>75</sup> *Id.* sec. 3(f)(1).

<sup>76</sup> *Id.* sec. 2(b). The OMB has authority to reject rules proposed by executive agencies like those mentioned in this note. Independent agencies such as the Federal Communications Commission (“FCC”) and National Labor Relations Board (“NLRB”) are not subject to binding review by the OMB, although they are required to report their regulatory activities. *See id.* Although this note discusses review by the OMB, economic analysis is handled by the Office of Information and Regulatory Affairs, a division of the OMB. *Id.*

<sup>77</sup> *See* OFFICE OF MGMT. & BUDGET (“OMB”), EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4, at 2 (2003).

the expected costs.<sup>78</sup> Agencies are supposed to look at a range of alternatives to see which alternative provides the largest net benefit.<sup>79</sup> For safety regulations, this can be instructive in determining how stringently to regulate potential risks of bodily harm.<sup>80</sup> If the regulation has a positive net benefit, the agency has an argument that the safety level is reasonable.<sup>81</sup> The safety level of the alternative that leads to the highest net benefit might be considered the best alternative, although agencies can, and often do, deviate from this alternative for reasons such as politics, uncertainty, and institutional constraints.<sup>82</sup>

Costs in a benefit-cost analysis are usually calculated by adding the predicted burden on industry and regulatory costs.<sup>83</sup> Although these numbers are not always easy to estimate, agency analysts and outside consultants usually work with the affected industry to figure out how production and sales will be impacted, then work with the agency to predict costs of implementation and enforcement.<sup>84</sup> To come up with these numbers, information from the market can often be used directly, such as the difference in prices between goods that have and lack the safety feature, or indirectly, such as agency official wages multiplied by the expected hours spent on the rule.<sup>85</sup>

### C. Measuring Benefits of Regulations that Impact Safety

The benefits of safety regulations are often more difficult to measure and quantify than the costs of regulations.<sup>86</sup> It is hard to

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<sup>78</sup> *Id.*

<sup>79</sup> *Id.*

<sup>80</sup> *Id.* at 10.

<sup>81</sup> *Id.* at 28.

<sup>82</sup> *Id.* at 10.

<sup>83</sup> *Id.* at 2.

<sup>84</sup> *Id.* at 3.

<sup>85</sup> *Id.* at 21–22. For a critique of this methodology and suggestions for improvement, see William A. Pizer & Raymond Kopp, *Calculating the Costs of Environmental Regulation* (Resources for the Future, Discussion Paper 03-06, (2003)). Pizer and Kopp explain the standard agency process for calculating costs as a collaborative effort with industry and the agency. *Id.* They argue that this process gives industry incentives to provide exaggerated estimates and makes the agency decision prone to undue influence from industry. *Id.* They recommend improving the process by having more independent research done by outside consultants. *Id.*

<sup>86</sup> OFFICE OF MGMT. & BUDGET (“OMB”), EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4, at 18 (2003).

quantify the value of things like health and clean air that are not traded in markets.<sup>87</sup> The methods outlined below use art and science to try to measure how much people value particular aspects of safety compared with other goods and services. Scholars and professionals use market evidence and surveys to estimate the benefits of safety regulations. This note turns to these methodologies in Section IV to estimate a child premium.

A widespread methodology starts by quantifying the change in health outcomes due to the safety regulation.<sup>88</sup> For example, regulation of lead in drinking water was expected to prevent 30,000 children annually from exceeding the maximum recommended level of lead in their blood.<sup>89</sup> The decrease in exposure was predicted to prevent cognitive development problems that would have decreased intelligence and later required remedial education.<sup>90</sup> This type of estimate is usually the result of a series of studies that look at the dose-response relationship between the regulated substance and various exposed populations.<sup>91</sup>

After a change in health outcomes has been quantified, the agency must convert this benefit to dollars if it wants to compare the benefits of the regulation to the costs.<sup>92</sup> This step is especially difficult and controversial as people tend to be averse to the idea of putting a monetary value on things that are seen as intensely personal and even sacred.<sup>93</sup> How much is it worth to avoid a case of chronic bronchitis or a premature death from respiratory failure? When dealing with regulatory policy, which inevitably impacts a large population, it is important to remember that the monetization of a prevented case of bronchitis or premature fatality is not for a specific person, but rather a

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<sup>87</sup> *Id.*

<sup>88</sup> See PERCIVAL ET AL., *supra* note 40, at 202 (describing benefit-cost analysis of lead regulation).

<sup>89</sup> *Id.*

<sup>90</sup> *Id.* at 204.

<sup>91</sup> See ENVTL. PROT. AGENCY, HUMAN HEALTH RISK ASSESSMENT: DOSE-RESPONSE ASSESSMENT (2012), *available at* [http://www.epa.gov/risk\\_assessment/dose-response.htm](http://www.epa.gov/risk_assessment/dose-response.htm).

<sup>92</sup> See OFFICE OF MGMT. & BUDGET (“OMB”), EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4, at 2 (2003).

<sup>93</sup> See VIVIANA ZELIZER, PRICING THE PRICELESS CHILD: THE CHANGING SOCIAL VALUE OF CHILDREN 148 (2001) (arguing that putting an implicit price on the life of a child is immoral).



small change in probability for everyone in the impacted population.<sup>94</sup> A life of an actual person may well be considered priceless,<sup>95</sup> but small changes in the probability of fatality are part of everyday life whenever someone makes a decision of whether to get into a car, take medication, or eat a hamburger.<sup>96</sup> Monetizing these changes in probabilities is not the same as putting a dollar value on the life of a particular human.<sup>97</sup>

OMB Circular A-4 requires agencies to make the difficult quantification of how much people value a change in health or safety whenever possible.<sup>98</sup> The preferred method for quantifying the dollar impact of changes in health outcomes is to use market-based estimates of people's willingness to pay ("WTP") to avoid the negative health outcome.<sup>99</sup> The Handbook explains that WTP is the theoretically preferred starting point for measuring benefits because "individuals are best suited to judge for themselves the value of goods or services."<sup>100</sup> For example, if a consumer is willing to spend an extra four dollars to avoid a one in one hundred chance of contracting the flu, the implicit value of averting a case of the flu is \$400. When averaged across a sample of the population, these WTP values for risk reduction are indicative of the safety versus cost tradeoff that matches the population's preferences.<sup>101</sup> As long as those WTP values are based on informed decision-making, a responsive government agency should choose regulations that match those preferences.<sup>102</sup>

If there is no market evidence available for estimating WTP, agencies can use evidence from stated-preference studies.<sup>103</sup> Stated-preference studies use surveys to ask people hypothetical questions

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<sup>94</sup> W.KIP VISCUSI, FATAL TRADEOFFS: PUBLIC AND PRIVATE RESPONSIBILITIES FOR RISK 84 (1992).

<sup>95</sup> ZELIZER, *supra* note 93, at 147.

<sup>96</sup> VISCUSI, *supra* note 94, at 19.

<sup>97</sup> *Id.* at 20.

<sup>98</sup> OFFICE OF MGMT. & BUDGET ("OMB"), EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4, at 29 (2003).

<sup>99</sup> *Id.*

<sup>100</sup> HANDBOOK, *supra* note 19, at 2-6.

<sup>101</sup> *Id.*

<sup>102</sup> *Id.* at 2-6 to 2-7.

<sup>103</sup> *Id.* at 2-7. Stated-preference studies are also called contingent valuation studies.

about their preferences.<sup>104</sup> For example, after receiving information about the endangered red-cockaded woodpecker, I may be asked how much I am willing to pay to help protect ten nesting pairs of these woodpeckers.<sup>105</sup> Stated preferences are generally considered less reliable than market data because respondents do not have clear, strong incentives to give truthful responses about how they feel.<sup>106</sup> If I believe this survey is going to be used to set policy and I prefer more conservation, I may act strategically and say that I would pay \$1,000,000 to protect the woodpeckers. Since I do not really pay the amount of my response and “put my money where my mouth is,” there is not the same check on responses as there is in market situations where people are actually paying to enact their preferences.<sup>107</sup>

The bulk of studies looking at monetization of health benefits focus on the value of preventing fatalities, called the value of a statistical life (“VSL”).<sup>108</sup> VSL is usually based on how much people are willing to pay for a small change in the probability of death.<sup>109</sup> If everyone in a city of one million people were willing to pay \$10 to prevent an unknown one of those million people from dying, that would lead to a VSL estimate of \$10 million.<sup>110</sup> The majority of VSL studies use data from the labor market to see how much workers must be paid to take a job that has a risk of fatality.<sup>111</sup> Labor economists call extra pay to tolerate an undesirable attribute of a job a compensating

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<sup>104</sup> *Id.* at 4-6.

<sup>105</sup> See REPORT OF THE NOAA PANEL ON CONTINGENT VALUATION (May 9, 2001) available at 58 Fed. Reg. 4601, 4603-04 (recommending best practices for stated-preference studies). This example uses an open-ended question about WTP. Most stated-preference studies actually have a closed-ended format, which is found to be more reliable.

<sup>106</sup> *Id.* at 4605.

<sup>107</sup> *Id.* at 4610.

<sup>108</sup> VISCUSI, *supra* note 94, at 19. Agencies are also interested in the non-fatal health and safety effects of regulation. For a variety of reasons, it tends to be much more difficult to get reliable evidence for WTP for non-fatal outcomes. See Richard Zeckhauser, *Measuring Risks and Benefits of Food Safety Decisions*, 38 VAND. L. REV. 539, 545 (1985) (describing tradeoffs of health risks and the difficulties in quantifying these tradeoffs).

<sup>109</sup> VISCUSI, *supra* note 94, at 19.

<sup>110</sup> To calculate this value, take the average willingness-to-pay of \$10, multiplied by the change in risk of one per million = \$10 million.

<sup>111</sup> W. Kip Viscusi, *The Heterogeneity of the Value of Statistical Life: Introduction and Overview*, 40 J. RISK & UNCERTAINTY 1, 7 (2010).

differential.<sup>112</sup> These labor market studies tend to show that workers demand compensating differentials that lead to VSL estimates around \$7 million.<sup>113</sup> For example, for a worker to be indifferent between a completely safe job and a similar job with an annual fatality risk of one in ten-thousand he would require an additional \$0.35 per hour to work the risky job.<sup>114</sup> Professors Aldy and Viscusi show that VSL estimates from labor market studies result in an inverted *U*-shape when VSL is plotted over a range of worker ages, meaning that VSL estimates start low for young workers, increase to a maximum around forty-five years old, then decrease slowly for older workers.<sup>115</sup> The VSL has increased with time as income has risen, with an estimate of \$4.6 million in 1984, and a current estimate of \$7.4 million.<sup>116</sup>

Although most studies are based on information from the labor market, there are also VSL estimates that result from consumer product markets for things like medicine and bicycle helmets.<sup>117</sup> These studies look at how much consumers are willing to pay for safety features in products. A benefit of consumer product studies is that they can provide VSL estimates for populations that are not in the labor market.<sup>118</sup> Another alternative is to use stated-preference surveys to

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<sup>112</sup> VISCUSI, *supra* note 94, at 34.

<sup>113</sup> W. Kip Viscusi & Joseph E. Aldy, *The Value of a Statistical Life: A Critical Review of Market Estimates Throughout the World*, 27 J. RISK & UNCERTAINTY 5, 18 (2003).

<sup>114</sup> *See id.* at 19–21. To calculate this compensating differential, \$7 million VSL multiplied by .0001 (the change in probability that a fatal accident will happen) divided by 2000 hours per year, equals \$.35 per hour. This assumes that workers know that there is a change in risk and work forty hours per week for fifty weeks per year. These assumptions are standard in the literature. *Id.* at 55.

<sup>115</sup> Joseph E. Aldy & W. Kip Viscusi, *Adjusting the Value of a Statistical Life for Age and Cohort Effects*, 90 REV. ECON. & STAT. 573, 573–74 (2008).

<sup>116</sup> *Mortality Risk Valuation*, EPA (2011), <http://yosemite.epa.gov/ee/epa/eed.nsf/pages/MortalityRiskValuation.html>. Other agencies have seen similar increases in their VSL estimates over this time period. *Id.* These values have been adjusted for inflation to a common unit of 2006 dollars. *Id.*

<sup>117</sup> *See* Glenn C. Blomquist et al., *Willingness to Pay for Improving Fatality Risks and Asthma Symptoms: Values for Children and Adults of All Ages*, 33 RES. & ENERGY ECON. 410, 410–11 (2011) (estimating VSL from willingness to pay for asthma medicine); Robin R. Jenkins et al., *Valuing Reduced Risks to Children: The Case of Bicycle Safety Helmets*, 19 CONTEMP. ECON. POL'Y 397, 400 (2001) (estimating VLS from data on bicycle helmet usage).

<sup>118</sup> *Id.*

compute a VSL.<sup>119</sup> Regulators in the United Kingdom tend to use stated preference studies to estimate VSL.<sup>120</sup>

With a measure of the value of a change in health or safety in hand, an agency can multiply the estimated impact of the regulation on health or safety by the value measure.<sup>121</sup> For example, a regulation of workplace safety that is expected to save ten workers per year would have an expected benefit of \$74 million using a VSL of \$7.4 million.<sup>122</sup> The EPA used this methodology to predict that decreasing exposure to airborne lead yields health benefits of \$236 million per year, \$193 million of which come from reducing children's exposure.<sup>123</sup> Later studies found that this prediction probably underestimated the true benefits of reducing lead exposure.<sup>124</sup> The EPA predicted that reducing lead in drinking water would generate \$2.8 billion in annual benefits, with \$2.2 billion coming from a decrease in damage to children's cognitive development.<sup>125</sup>

The above examples give a sense for why it is important to accurately estimate society's desire to balance the tradeoff between safety and cost. When the desire for safety is overestimated, consumers face restricted choices and pay higher prices for marginal increases in safety. When the desire for safety is underestimated, unsafe products or conditions are allowed to continue despite society's willingness to pay for increased safety. As the next section explains, agencies currently underestimate society's desire for child safety regulations. Fortunately, correcting the estimate can be done within the existing regulatory analysis framework by implementing a child premium when measuring benefits of safety.

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<sup>119</sup> OFFICE OF MGMT. & BUDGET ("OMB"), EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4, at 22 (2003).

<sup>120</sup> See Viscusi & Aldy, *supra* note 113 at 56–57.

<sup>121</sup> LISA SCHULTZ BRESSMAN, ET AL., THE REGULATORY STATE 484 (2010).

<sup>122</sup> Ten workers saved per year multiplied by VSL of \$7.4 million = \$74 million.

<sup>123</sup> EPA, COSTS AND BENEFITS OF REDUCING LEAD IN GASOLINE 13 (Mar. 1984).

<sup>124</sup> See Joel Schwartz, *Societal Benefits of Reducing Lead Exposure*, 66 ENVTL. RES. 105, 117 (1994) (describing the unexpected benefit of lower blood pressure with reduced lead exposure).

<sup>125</sup> See EPA, REGULATORY IMPACT ANALYSIS ADDENDUM: PROPOSED CHANGES TO NATIONAL PRIMARY DRINKING WATER REGULATIONS FOR LEAD AND COPPER 5 (1996) (anticipating costs and benefits of reducing lead and copper in drinking water).

### III.A CHILD PREMIUM: THEORETICAL JUSTIFICATIONS

Estimation of the benefits of improved child safety poses unique challenges.<sup>126</sup> Children depend on parents or guardians for support, so they do not regularly make autonomous decisions that can be used as market evidence of willingness to pay.<sup>127</sup> Children are not in the labor market, so compensating differentials cannot be used to estimate a VSL.<sup>128</sup> Children do not regularly make purchasing decisions on consumer products involving safety that could provide evidence of a WTP for safety.<sup>129</sup> Even if children did make these decisions, there would be doubts about what this evidence would mean.<sup>130</sup> Children have not fully developed their cognitive abilities, including the parts of the brain that process risky decisions.<sup>131</sup> Regulations aim to set safety levels that are reasonable based on WTP, but if decision-makers are not rational, then it is unclear what their decisions reveal.<sup>132</sup> It may well be that society wishes to increase the safety of children, even if those children may not make that choice for themselves.<sup>133</sup> For example, a ten-year-old boy may be perfectly willing to ride on a roller coaster of dubious safety, but his parents, and society in general, probably wish to prevent him from doing so.

The EPA's *Children's Health Valuation Handbook* serves as a guide for measuring benefits of regulations that impact child safety.<sup>134</sup> The Handbook is not legally binding but is instead meant to serve as guidance for the EPA and other federal agencies that are performing cost-benefit analyses.<sup>135</sup> The most common current approach is to measure benefits of child safety using a VSL calculated from adult

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<sup>126</sup> HANDBOOK, *supra* note 19, at 1-6.

<sup>127</sup> *Id.* at 2-7.

<sup>128</sup> *Id.*

<sup>129</sup> *Id.*

<sup>130</sup> *Id.*

<sup>131</sup> Valerie F. Reyna & Frank Farley, *Risk and Rationality in Adolescent Decision Making: Implications for Theory, Practice, and Public Policy*, 7 PSYCH. SCI. IN THE PUB. INTEREST 1, 29 (2006).

<sup>132</sup> HANDBOOK, *supra* note 19, at 2-7.

<sup>133</sup> *Id.*

<sup>134</sup> *Id.* at 1-1.

<sup>135</sup> *Id.* at 1-3.

data.<sup>136</sup> The Handbook provides advice on how adult VSL could be adjusted for use with children.<sup>137</sup> However, this practice is uncommon. Essentially, agencies currently regard all lives saved by regulation as equal.<sup>138</sup> Although there is a simple moral appeal to this idea, there are several reasons we may say there is something special about saving the lives of children.<sup>139</sup> Children and adults play very different roles in society.<sup>140</sup> Children engage in special activities and generally have less responsibility than adults.<sup>141</sup> These differences might well prompt us to value benefits to children differently.

### A. Long Life Expectancy

One of the obvious differences between children and adults is age: children are younger than adults. From a 2012 perspective, a three-year-old child born in 2009 would be expected to live for 75 more years.<sup>142</sup> A twenty-year-old adult born in 1992 has a life expectancy of 56 more years.<sup>143</sup> A forty-year-old born in 1962 can be expected to live another 30 years.<sup>144</sup> The precise value of a saved life depends on the characteristics of the life saved.<sup>145</sup> A young person has a longer life expectancy, so in some respects, regulations that save children offer more bang for the buck.<sup>146</sup> As medical technology continues to improve, we hope and expect that life expectancy at birth will continue to rise in the future.

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<sup>136</sup> *Id.* at 3-12.

<sup>137</sup> *Id.* at 2-13-14.

<sup>138</sup> See Cass R. Sunstein, *Lives, Life-Years, and Willingness to Pay*, 104 COLUM. L. REV. 205, 206 (2004).

<sup>139</sup> *Id.*

<sup>140</sup> Annette Ruth Appell, *Representing Children Representing What? Critical Reflections on Lawyering for Children*, 39 COLUM. HUM. RTS. L. REV. 573 (2008).

<sup>141</sup> See, e.g., RESTATEMENT (SECOND) OF TORTS § 283A (1965) (defining the child actor's standard of care in a negligence action to be that of a reasonable child of like age, intelligence, and experience under like circumstances).

<sup>142</sup> SOC. SEC. ADMIN., LIFE EXPECTANCY TABLES, (2011), available at [http://www.ssa.gov/oact/NOTES/as120/LifeTables\\_Tbl\\_14.html#wp1046284](http://www.ssa.gov/oact/NOTES/as120/LifeTables_Tbl_14.html#wp1046284).

<sup>143</sup> *Id.*

<sup>144</sup> *Id.*

<sup>145</sup> Sunstein, *supra* note 138, at 208.

<sup>146</sup> *Id.*

## B. Innocence of Children

A second reason we may wish to put a premium on children's lives is that children are often thought of as blameless. Young children, especially infants, have not made life choices that put themselves or others at risk of harm. The law recognizes the doctrine of "assumption of risk" for adults who choose to engage in activity that has high inherent risks.<sup>147</sup> This same doctrine does not apply to children in like manner because children are different.<sup>148</sup> Children have not fully developed their decision-making abilities.<sup>149</sup> They have fewer experiences and less knowledge to draw on when making a decision.<sup>150</sup> Often they lack the authority to make the decision in the first place.<sup>151</sup> Although people tend to think of children as curious and mischievous, people also think of them as innocent when it comes to life-threatening situations. The theory is that some adults, whether parents or tortfeasors, should have prevented the child from being harmed.

This sense of innocence could transfer from the tort realm to the regulatory realm. Children have not made choices to emit lead into the air, allow dangerous bacteria into processed food, or drive recklessly. Some adults have made these choices, and our society has come up with mechanisms for how to regulate, deter, and punish that behavior. Perhaps, as a society, we wish to see extra regulation, deterrence, and punishment when children's lives are at stake.

## IV. A CHILD PREMIUM: EMPIRICAL JUSTIFICATIONS

The Handbook asks for empirical evidence to support the theoretical arguments for a premium on child safety regulations.<sup>152</sup> Empirical support can show that people in society are already making

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<sup>147</sup> See RESTATEMENT (SECOND) OF TORTS § 496A(1965) (general rule); *Id.* at § 496D cmt. c. ("If by reason of age, or lack of information, experience, intelligence, or judgment, the plaintiff does not understand the risk involved in a known situation, he will not be taken to assume the risk . . .").

<sup>148</sup> See RESTATEMENT (SECOND) OF TORTS § 283A (1965) (noting that a children's standard of conduct in negligence actions is different from that of adults).

<sup>149</sup> Reyna & Farley, *supra* note 131, at 20.

<sup>150</sup> *Id.*

<sup>151</sup> HANDBOOK, *supra* note 19, at 2-7.

<sup>152</sup> *Id.* at 1-1.

choices consistent with a premium on children's lives.<sup>153</sup> As mentioned above, it is difficult to get evidence for constructing a child VSL from either the labor market or from purchases by children.<sup>154</sup> Instead of using evidence from children's decisions, this note follows the recommendation of the Handbook to use evidence of their parents' willingness to pay.<sup>155</sup> Parent WTP seems like a reasonable proxy for child WTP because parents are usually the ones making safety decisions in the market for their children.<sup>156</sup> If parents are willing to pay more for the safety of their children than for themselves, that is evidence that they put a premium on the lives of children. Although there is a special relationship between parents and children that impacts WTP for safety, that does not dilute the value of market evidence for use in a VSL calculation.<sup>157</sup> The Handbook describes the theoretically preferred basis for VSL calculations as individuals' WTP for their own safety, and clearly there is a special relationship between the purchaser and beneficent in that situation.<sup>158</sup> Parent WTP, in lieu of unavailable or undesirable child WTP, seems like the most appropriate gauge for society's preferences for child safety.

#### A. Original Evidence: Car Seats

This note contributes to the literature by collecting original data to estimate a VSL for children. Parent WTP for additional safety in a particular product market can give a sense of our society's preferences for the appropriate tradeoff between safety and cost. Agencies should use these estimates when considering proposed rules so government regulations will reflect what people in the United States consider to be the appropriate level of safety.

The car seat market is one place where parents make purchases that have implications for the safety of their children. As mentioned above, NHTSA requires car seats to have certain safety features that

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<sup>153</sup> *Id.* at 2-7.

<sup>154</sup> *See supra* notes 127, 128 and accompanying text.

<sup>155</sup> HANDBOOK, *supra* note 19, at 2-9.

<sup>156</sup> *Id.* at 2-8.

<sup>157</sup> One could argue that parents' WTP for their children's safety is partially a product of evolution; humans are programmed to feel and act in ways that will increase the probability that their genes will be passed on. *But see id.* (recommending WTP measures for safety of the respondent).

<sup>158</sup> *Id.* at 2-9.



are common to all car seats.<sup>159</sup> Groups like Consumer Reports find that there are still variations in the safety levels of car seats that are available.<sup>160</sup> For example, all car seats may protect the child in front and rear collision tests at thirty miles per hour, but some seats may provide protection in collisions at forty miles per hour while others may not.

One car seat feature that has recently become popular is side impact protection (“SIP”).<sup>161</sup> A car seat with SIP is supposed to provide protection for the child in the event of a side impact collision.<sup>162</sup> The NHTSA does not currently regulate SIP, although Congress has ordered them to consider doing so.<sup>163</sup> The European Union currently requires infant car seats to pass a side impact test.<sup>164</sup> To come up with a concrete estimate of WTP for child safety, data is collected on SIP in car seats designed for infants less than one year old.

### 1. Willingness to Pay for Side Impact Protection

Target and Toys “R”Us are two of the largest car seat retailers in the country. A sample of the car seats available on their websites in October 2011 resulted in 161 car seats, 68 of which provide SIP.<sup>165</sup> Table 1 shows average prices of the car seats, with a column for the entire sample, a column for seats with SIP, and a column for seats without SIP. Car seats with SIP have an average price of \$181.92, while car seats without SIP have an average price of \$129.20.

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<sup>159</sup> NHTSA, *supra* note 5, at 2.

<sup>160</sup> See *Report on Infant Car Seat Safety*, CONSUMER REPORTS (2011) (summary of main report), available at <http://www.consumerreports.org/cro/babies-kids/baby-toddler/travel-gear/car-seats/car-seats/what-we-found-in-our-recent-tests/index.htm>.

<sup>161</sup> See *What Does Car Seat “Side-Impact Protection” Really Mean?*, CONSUMER REPORTS (Apr. 28, 2010, 5:00 AM) (describing SIP as an “increasingly popular” feature on infant car seats), available at <http://news.consumerreports.org/baby/2010/04/side-impact-protection-tested-infant-convertible-car-seats-collision-crashes.html>.

<sup>162</sup> *Id.*

<sup>163</sup> See generally NHTSA, *supra* note 1, at 1–2.

<sup>164</sup> Mathew L. Wald, *Most Baby Car Seats Fail Basic Safety Test*, N.Y. TIMES, Jan. 4, 2007, available at <http://www.nytimes.com/2007/01/04/business/world-business/04iht-BABY.4102386.html>.

<sup>165</sup> See *infra* Table 1.

**Table 1: Summary Statistics of Car Seat Prices**

	All Car Seats	Seats with SIP	Seats without SIP
Average Price	\$160.1	\$181.92	\$129.20
(Standard Deviation)	(61.96)	(60.93)	(49.38)
Sample Size	116	68	48

The \$52.72 difference in average prices between seats with and without SIP may not accurately reflect what parents are willing to pay for side impact protection because there may be other features that seats with SIP tend to have.<sup>166</sup> Regression analysis can isolate the WTP for SIP by controlling for other variables.<sup>167</sup> This type of regression is called hedonic analysis because it isolates certain features that are desirable to consumers.<sup>168</sup> Control variables that may impact the price of the car seat include certain features: whether the seat has a rotating canopy, removable cushions, a detachable base, the maximum weight of the child, the store where it was purchased, and the top ten brands (in terms of number of car seat models available). These ten brands can be compared with the omitted category, which comprises brands that have less than three car seat models available at Target and Toys “R”Us.

One would expect that seats with features like a rotating canopy and removable cushions would increase the convenience of the seat and command a higher price. In this hedonic regression, that should translate to positive coefficients on those variables. Consumers should be willing to pay for a higher maximum weight because children can use those seats for a longer period of time. SIP, the variable of interest, should have a positive coefficient showing that parents are willing to pay more for seats with a higher safety level. Since parents may well use brand as a proxy for quality, one would also expect brands to have a large impact.<sup>169</sup> As reputation is very important in the child car seat market, companies invest in quality and in advertising.<sup>170</sup>

<sup>166</sup> See *infra* Table 2 and additional discussion in the Technical Appendix.

<sup>167</sup> See JOSHUA D. ANGRIST & JÖRN-STEFFEN PISCHKE, *MOSTLY HARMLESS ECONOMETRICS: AN EMPRICIST’S COMPANION* 16–18 (2008).

<sup>168</sup> ERWIN DIEWERT, *HEDONIC REGRESSIONS: A CONSUMER THEORY APPROACH* 321 (Robert C. Feenstra & Matthew D. Shapiro eds., Univ. of Chicago Press 2003), available at <http://www.nber.org/chapters/c9740>.

<sup>169</sup> See generally Merrie Brucks et al., *Price and Brand Name as Indicators of Quality Dimensions for Consumer Durables*, 28 J. ACAD. OF MARKETING SCI. 359, 359 (2000).

<sup>170</sup> *Id.*

Results show that parents are willing to pay \$26.47 more for a seat with side impact protection, which is statistically significant with a high degree of confidence.<sup>171</sup> Coefficients on other variables are either of the expected sign or statistically insignificant.<sup>172</sup> There is strong evidence that brands play a large role in the car seat market.

**Table 2: Regression Results**

Variable	Price Coefficient
Side Impact Protection (SIP)	26.465*** (8.484)
Base (stay in car)	-3.325 (14.800)
Removable Cushions	-2.428 (5.777)
Rotating Canopy	8.294 (9.863)
Max. weight of infant	4.888*** (0.350)
BRANDS: Graco	-27.016*** (6.764)
Safety1st	-36.685*** (9.773)
Peg Perego	82.023*** (12.551)
Combi	8.648 (12.263)
Babytrend	-44.288*** (10.479)
Chicco	24.654*** (7.270)
Maxi Cosi	40.508*** (11.819)
Evenflo	-62.175*** (12.426)
STORE: Toys“R”Us	1.325 (6.571)
Constant	-2.246 (21.767)
Observations	116
R-squared	0.88

Ordinary least squares regression; robust standard errors in parentheses.  
 \* significant at 10%  
 \*\* significant at 5%  
 \*\*\* significant at 1%

<sup>171</sup> This estimate is significant at the 1% level, meaning that one can say with over 99% confidence that the coefficient on this variable is different from zero. A high level of confidence comes from a relatively large coefficient and small standard error. See ANGRIST & PISCHKE, *supra* note 167, at 18 (describing statistical significance in regression analysis).

<sup>172</sup> See *infra* Table 2 and additional discussion in the Technical Appendix.

## 2. Risk Measure for Side Impact Collisions

In 2009, the most recent year for which data is available, 430 children under age five were killed in automobile collisions.<sup>173</sup> Assuming that injury rates are constant across the age distribution, about eighty-six children under age one are killed annually in vehicle crashes. Side impact collisions account for one-third of child vehicle fatalities.<sup>174</sup> This means that about twenty-nine children under one are killed in side impact collisions each year.<sup>175</sup>

To calculate a fatality rate, the number of deaths must be divided by the population that is at risk. There were 4.1 million children born in the United States in 2009, so these infants would be under one year old during the relevant time period.<sup>176</sup> Since 92% of American households have at least one automobile, approximately 3.8 million infants are riding in automobiles.<sup>177</sup> This implies a fatality rate from side impact collisions of eight per million for infants.<sup>178</sup>

If side impact protection would save all of the children in these crashes, the \$26.47 willingness to pay for SIP would imply a value of statistical life for children of \$3.5 million.<sup>179</sup> However, SIP is not likely to save all of the children involved in side impact collisions. A NHTSA study found that the cause of serious injury for children in side impact collisions was usually an intruding door surface, where “increased padding . . . within the [child restraint system] might have

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<sup>173</sup> NHTSA, FATALITY ANALYSIS REPORTING SYSTEM ENCYCLOPEDIA (2011), available at <http://www-fars.nhtsa.dot.gov/people/peopleallvictims.aspx>. This statistic is the sort of thing that could prompt a parent to spend extra money on a car seat with side impact protection.

<sup>174</sup> Beata Mostafavi, *Child Car Seat Designed for Side Impact Crashes*, THE FLINT JOURNAL (Dec. 20, 2009), available at [http://articles.southbendtribune.com/2009-12-20/news/26746752\\_1\\_car-seat-side-impact-booster-seats.htm](http://articles.southbendtribune.com/2009-12-20/news/26746752_1_car-seat-side-impact-booster-seats.htm).

<sup>175</sup> See *infra* Technical Appendix for additional risk data.

<sup>176</sup> CTRS. FOR DISEASE CONTROL, 60 NATIONAL VITAL STATISTICS REPORTS 2 (2010), available at [http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60\\_01.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_01.pdf).

<sup>177</sup> See DEP'T OF TRANS., HOUSEHOLD, INDIVIDUAL, AND VEHICLE CHARACTERISTICS 2 (2011), available at [http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/highlights\\_of\\_the\\_2001\\_national\\_household\\_travel\\_survey/pdf/entire.pdf](http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/highlights_of_the_2001_national_household_travel_survey/pdf/entire.pdf).

<sup>178</sup> 29 Fatalities divided by 3.8 million infants = 0.0000076.

<sup>179</sup> \$26.47 / 0.0000076 = \$3,482,301. See *infra* Technical Appendix for additional information.

mitigated the severity of the injury sustained.”<sup>180</sup> The International Standards Office (“ISO”) performed a study on side impact collisions to recommend testing procedures.<sup>181</sup> The ISO study found that door intrusion in the rear seats averages 170mm to 280mm in depth with a velocity of seven meters per second to thirteen meters per second.<sup>182</sup> With this range of depth and velocity of door intrusion, car seats that meet side impact specifications set by the European Union protect children in approximately one quarter of these crashes.<sup>183</sup> If SIP can protect one quarter of the twenty-nine children who are in potentially fatal side impact collisions, this implies a value of statistical life for children of \$13.9 million.<sup>184</sup>

While a VSL of almost \$14 million is within the range of VSL estimates, it is at the high end of this range. A high estimate could be due to several factors. Since most VSL estimates are based on WTP for adult safety, I argue that the higher estimate for a child VSL reflects a WTP a premium for child safety. However, it could also be that the high VSL estimate is a product of idiosyncratic features of the infant car seat market, or the relatively small sample used.

## B. Existing Evidence

### 1. Organic Baby Food

Parents make many other market decisions that impact the safety of their children.<sup>185</sup> Many parents choose to buy organic baby food for their children because they believe it is healthier and less risky.<sup>186</sup> Organic food presumably does not contain artificial pesticide residues that may be present in small quantities in food made from

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<sup>180</sup> LINDA MCCRAY, ET AL., NHTSA, INJURIES TO CHILDREN ONE TO THREE YEARS OLD IN SIDE IMPACT CRASHES 14 (2010), *available at* <http://www-nrd.nhtsa.dot.gov/pdf/esv/esv20/07-0186-W.pdf>.

<sup>181</sup> *See* HEIKO JOHANNSEN, ET AL., REVIEW OF THE DEVELOPMENT OF THE ISO SIDE IMPACT TEST PROCEDURE FOR CHILD RESTRAINT SYSTEMS 3 (2007), *available at* [www-nrd.nhtsa.dot.gov/pdf/esv/esv20/07-0241-W.pdf](http://www-nrd.nhtsa.dot.gov/pdf/esv/esv20/07-0241-W.pdf).

<sup>182</sup> *Id.* at 4–5.

<sup>183</sup> *Id.*; *see also infra* Technical Appendix for additional information.

<sup>184</sup> *See infra* Technical Appendix for additional information.

<sup>185</sup> For example, parents choose not only car seats, but also cars partially based on the safety implications for their children. Purchases of strollers, toys, and infant formula also have implications for child safety.

<sup>186</sup> Kelly B. Maguire, et al., *Focus on Babies: A Note on Parental Attitudes and Preferences for Organic Babyfood*, 24 J. AGRIBUSINESS 187 (2006).

conventionally grown crops.<sup>187</sup> EPA economists Maguire, Owens, and Simon use a hedonic model similar to that above to calculate that parents are willing to pay an additional \$.03 to \$.04 per ounce for organic baby food.<sup>188</sup> The authors perform a series of focus groups to measure perceived riskiness of conventional baby food compared to organic baby food.<sup>189</sup> They find that parents believe conventional food results in a risk of cancer that is between one per million and eight per million higher than the risk from organic baby food.<sup>190</sup> This subjective risk belief closely aligns with the actual risk of two per million as measured by USDA and FDA data on child fatalities.<sup>191</sup> Using the willingness to pay and risk measures for organic baby food results in a child VSL of \$9 million.<sup>192</sup>

## 2. Asthma Medicine

Parents who have children with asthma decide what medicines to buy to prevent a potentially fatal asthma attack.<sup>193</sup> Professors Blomquist, Dickie, and O'Connor use information from a stated-preference survey to determine how much parents are willing to pay for a hypothetical asthma medicine that could improve safety for people of various ages.<sup>194</sup> The estimated VSL from this data is \$14.1 million for children and \$8.0 million for adults.<sup>195</sup>

## 3. Bicycle Helmets

Not all evidence points to a higher VSL for children than adults.<sup>196</sup> Professors Jenkins, Owens, and Wiggins use data from a stated-preference study to determine the annualized cost of owning and using

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<sup>187</sup> *Id.*

<sup>188</sup> Kelly B. Maguire, et al., *The Price Premium for Organic Babyfood: A Hedonic Analysis*, 29 J. AGRIC. & RES. ECON. 132, 147 (2004).

<sup>189</sup> Maguire, et al., *supra* note 186 at 192.

<sup>190</sup> *Id.*

<sup>191</sup> *Id.*

<sup>192</sup> Maguire et al., *supra* note 188. \$.03–\$.04 per ounce is multiplied by the average annual consumption of organic baby food in the sample to arrive at \$18 x 2/million = \$9 million.

<sup>193</sup> Blomquist et al., *supra* note 117, at 421.

<sup>194</sup> *Id.* at 422.

<sup>195</sup> *Id.* at 412, 421.

<sup>196</sup> Jenkins et al., *supra* note 117, at 406–407.

a bicycle helmet.<sup>197</sup> When combined with data from the Centers for Disease Control on bicycle-related fatalities, this number can be used to estimate a child VSL of \$2.7 million and adult VSL of \$4 million.<sup>198</sup> Although this estimate does not support a child premium, the study was based on stated-preference as opposed to market data and relied heavily on assumptions about the opportunity cost of time used to buckle the bicycle helmets.<sup>199</sup> The market data on child car seats and organic baby food is more reliable and is supported by the other stated-preference data on asthma medicine.<sup>200</sup>

Although not all evidence points in the same direction, there is strong empirical support for a child VSL in the range of \$9 million to \$14 million. The lower and upper points of this range come from estimates derived from revealed-preferences in the market, which is the Handbook's preferred methodology.<sup>201</sup> Evidence from stated-preference surveys is more ambiguous.

## V. SOLUTION: IMPLEMENTING A CHILD PREMIUM

The above theoretical arguments and empirical evidence point toward a social desire to put a premium on the lives of children. As mentioned in Section II, most estimates of a value of statistical life for adults are around \$7 million.<sup>202</sup> These estimates are based on revealed preferences in the labor, car, and housing markets.<sup>203</sup> The hedonic regression methodology used here is very similar to that used in the car and housing markets.<sup>204</sup> The estimates of child VSL are roughly one

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<sup>197</sup> *Id.* at 401.

<sup>198</sup> *Id.* at 404.

<sup>199</sup> *See generally id.* at 402 (describing the costs of bicycle helmets as a combination of the purchase price and the opportunity cost of the time spent buckling the helmet, which is estimated to equal two-thirds of the respondent's wage rate).

<sup>200</sup> *See* NOAA, *supra* note 105, at 6–10 (pointing out weaknesses of stated-preference methodology).

<sup>201</sup> HANDBOOK, *supra* note 19, at 4-5 to 4-6.

<sup>202</sup> Viscusi & Aldy, *supra* note 113, at 26.

<sup>203</sup> *Id.* at 31.

<sup>204</sup> *Id.* at 31.

and a half to two times that of adults, so agencies should measure benefits of child safety in a way that reflects this premium.<sup>205</sup>

Agencies can do this by using a multiplier on the VSL for children who are predicted to be saved by a regulation. The range of child VSL and adult VSL differ by a factor of one and a half to two, so this range, or any point in it, could be supported by an agency engaged in regulation of activities or products that impact child safety.<sup>206</sup> This will increase the estimated benefits of proposed regulations by adjusting benefit measures to more accurately reflect the social desire to save children, as expressed in E.O. 13,405 and the EPA's Handbook.<sup>207</sup> By better reflecting society's preferences for child safety, agencies will be better fulfilling their obligation under Executive Order 13,563 to "quantify . . . benefits [of health and safety] as accurately as possible."<sup>208</sup>

If an agency decides to use a child premium when conducting a cost-benefit analysis, they must decide who qualifies as a "child" for purposes of the child premium. The revealed-preference estimates above both deal with infants. Should teenagers be treated in the same way? Agencies have discretion to use their expertise when making this sort of decision.<sup>209</sup> In many situations, it seems appropriate to include more than infants in the category that qualifies for a child premium. A default rule might be that people under the age of majority, which is usually eighteen, are the appropriate population to qualify for the child premium. This rule has the benefit of clarity. An alternative approach could be to use common law concepts to determine who should be considered a child. For example, for the tort of negligence, children under five years old are usually not expected to exercise care.<sup>210</sup>

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<sup>205</sup> The low end of the child VSL range leads to a child premium factor of \$9 million / \$7 million adult VSL = 1.29. The upper end of the child VSL range leads to a factor of \$14 million / \$7 million = 2. This range is rounded and shortened to one and a half to two for ease of implementation.

<sup>206</sup> OFFICE OF MGMT. & BUDGET ("OMB"), EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4, at 31 (2003).

<sup>207</sup> Exec. Order No. 13,045, sec. 1-101(b), 62 Fed. Reg. 19885 (Apr. 21, 1997).

<sup>208</sup> Exec. Order No. 13,563, sec. 1(c), 76 Fed. Reg. 3821 (Jan. 21, 2011).

<sup>209</sup> *See* *Entergy Corp v. Riverkeeper, Inc.* 556 U.S. 208, 212 (2009) (holding that agency deserved deference for reasonable assumptions made about the economic analysis of proposed regulations).

<sup>210</sup> KENNETH S. ABRAHAM, *THE FORMS AND FUNCTIONS OF TORT LAW* 15 (2d ed. 2002).



Children above five years are held to a “reasonable child” standard.<sup>211</sup> There is no individual conduct to hold to a reasonable standard in a regulatory setting, but an agency could determine whether children above a certain age could be expected to exercise care, such as engage in a defensive activity like letting tap water run before drawing water.<sup>212</sup> A rule like this may better reflect who society feels needs extra protection from danger, but would make implementation more difficult for agencies and add uncertainty to the regulatory environment.

If NHTSA were to use a multiplier of two when considering what to require for side impact protection in car seats, that would double the benefits of the proposed regulation.<sup>213</sup> This would make it more likely for the agency to choose a higher level of safety, and for the proposed rule to pass a cost-benefit analysis and be approved by the Office of Management and Budget. This can help correct market failures in the car seat market and prevent infant deaths. Likewise, the EPA can use a child benefit multiplier when deciding on regulations that impact child safety, like the appropriate national standard for low-level ozone.

#### **A. Alternative Approaches**

Another way to place a benefit on the lives of children is to use a value of statistical life-year (VSLY) instead of a VSL.<sup>214</sup> A VSLY takes evidence of willingness to pay for safety and translates it to a measure of value for an additional year of life.<sup>215</sup> This implicitly leads to a premium on saving the lives of children, who have high life expectancies.<sup>216</sup> The theoretical arguments in Section III directly support a VSLY approach in that benefits can be directly tied to the

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<sup>211</sup> *Id.* at 106.

<sup>212</sup> Letting tap water run before drawing tap water drastically reduces the concentration of lead compounds, which usually enters water from old plumbing. *See* HANDBOOK, *supra* note 19, at 2-2 (describing efforts that can mitigate damages caused by lead in tap water).

<sup>213</sup> Since all of the benefits from this regulation come from improvements in child safety, the multiplier on child safety acts to increase the benefit estimate by one and a half to two depending on what multiplier the agency chooses. For regulations that have a mix of benefits to adults and children, only the benefits that accrue to children are increased with the multiplier.

<sup>214</sup> Sunstein, *supra* note 138, at 205.

<sup>215</sup> *See id.* at 231.

<sup>216</sup> *Id.* at 208.

high life expectancy and expected improved standards of living for children. However, empirical evidence does not seem to support a VSLY approach, which assumes that the benefit of saving a life will decrease in an almost linear fashion.<sup>217</sup> Although the high child VSL values in Section IV combined with the inverted-U shape found by Professors Viscusi and Aldy would suggest a decreasing function, a linear approximation does not seem the best fit.<sup>218</sup>

### **B. Controversial Extension: Senior Discount**

Although the VSLY approach captures much of the rationale behind a child premium, it comes with a controversial impact on the other end of age spectrum – senior citizens.<sup>219</sup> A VSLY approach means that the lives of senior citizens are valued at a fraction of the life of a middle-aged person, and a small fraction of the life of a child.<sup>220</sup> Again, the theoretical arguments in support of a child benefit seem to support a discount for senior citizens.<sup>221</sup> However, as mentioned above, empirical estimates of VSL show a slow downward trend after their peak at age forty-five, but do not resemble a steep linear decline that is implied with a VSLY approach.<sup>222</sup> If senior citizens seem to be willing to pay a significant amount for their own safety, then it seems unreasonable for agencies to discount the benefits of that safety.

Since there appears to be a mismatch in theory and empirical evidence, this is an area ripe for further research. This is especially true considering that some other countries do discount benefits of saving the lives of senior citizens; some agencies in the United Kingdom have used a multiplier of .59 and European Union agencies have used a .7 discount factor on the lives of senior citizens in benefit calculations.<sup>223</sup>

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<sup>217</sup> Aldy & Viscusi, *supra* note 115, at 579.

<sup>218</sup> *Id.* at 580.

<sup>219</sup> Sunstein, *supra* note 138, at 208–09.

<sup>220</sup> *Id.* at 222–23.

<sup>221</sup> *Id.* at 214.

<sup>222</sup> Aldy & Viscusi, *supra* note 115, at 574.

<sup>223</sup> *See generally* Aldy & Viscusi, *supra* note 113.

## VI. CONCLUSIONS

There is theoretical and empirical support for putting a premium on the lives of children when agencies measure benefits for regulations that improve safety. Children have a long life expectancy with an increasing standard of living. They have not made choices to put themselves in risky situations, so they are generally considered innocent in life-threatening situations. Empirical evidence from the car seat market shows that parents are willing to pay a premium for the safety of their children. This high willingness to pay is consistent with other estimates of a child VSL in the range of \$9 million to \$14 million. Current estimates of adult VSL center around \$7 million, indicating that a premium of one and a half to two should be put on the lives of children who are expected to be saved by regulations.

The President can mandate the use of a child premium by issuing an executive order to update Executive Order 13,045. An executive order would have the benefit of creating predictable, uniform economic analysis regarding child safety in all executive federal agencies. However, the President would likely face political pressure from the opposing party, interest groups, and perhaps agencies themselves if he were to require the use of a child premium. Agencies should not wait until they are ordered to use a child premium, but should instead choose to use a child premium as the best way to reflect the preferences of society and to follow the law as expressed in E.O. 12,866. This note shows agencies that the choice of how to measure benefits of child safety is within their realm of discretion and that there is sufficient evidence to back up a child-specific measure of one and a half to two times that of adult VSL estimates.

A child premium will help protect children through safety regulations promulgated by agencies like the National Highway Traffic Safety Administration, the Food and Drug Administration, and the Environmental Protection Agency. It is normatively desirable to encourage this type of regulation because people consistently display a desire to increase safety for children, but many products and activities that impact child safety are either not traded on markets or are sold in markets that exhibit failures. Without well-functioning markets, parents and other altruistic adults are often unable to get the level of child safety that they desire. Regulation can help correct these market failures and ensure that our children will enjoy long and rich lives. If agencies adopt a child premium, there will be more rules to protect

against tragedies like Anton's death and the mass shooting at Sandy Hook Elementary.

## TECHNICAL APPENDIX

### Willingness to Pay Measure

The hedonic analysis in Section IV largely follows the standard VSL estimation techniques in the economics literature.<sup>224</sup> The estimated VSL from a regression like this is actually a lower bound on the WTP for a safety feature, as some of the purchasers may have been willing to pay significantly more for SIP.<sup>225</sup>

To determine whether a car seat included SIP, information was gathered from the websites of the stores selling the seats as well as the websites of the car seat manufacturers. Car seats that were advertised as including SIP by either of the stores or the manufacturer were coded as one. This methodology was intended to mimic the information gathering process that parents would go through when deciding which car seat to buy. Other features, such as rotating canopy and maximum occupant weight, were ascertained in the same way.

One way that this note's hedonic analysis differs from the standard methodology in the literature is that the data points on car seats were gathered from website sales offers, not from actual sales data. Sales data are preferred because they reflect actual equilibrium points where buyers and sellers have agreed to an exchange.<sup>226</sup> A website may offer items for sale that no one is purchasing, which could lead to overestimation of WTP for a safety feature like SIP. For proper inference, one must assume that at least some consumers are purchasing each of the car seats offered on the websites of Target and Toys 'R Us. To check this assumption, the hedonic regression was run with the observations restricted to the top half of the sample when sorted by "best sellers" on the websites. Results were very similar, although the statistical significance of the coefficient on SIP dropped to a lower confidence level of 10%.<sup>227</sup>

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<sup>224</sup> See Viscusi & Aldy, *supra* note 113, at 2–4 (surveying VSL literature).

<sup>225</sup> Jenkins et al., *supra* note 117, at 340.

<sup>226</sup> Sales data has the additional benefit of adding many observations which weighs the results based on popularity and gives the regressions much more statistical power. See ANGRIST & PISCHKE, *supra* note 167, at 70 (discussing statistical power in regression analysis).

<sup>227</sup> *Id.* (By cutting the number of observations in half from 116 to 58, it is not surprising that the significance level drops from 1% to 10%. Results available upon request).

Willingness to pay estimate for side impact protection: \$26.47.

### **Risk Measure**

A 2009 NHTSA study shows that most child fatalities in side impact collisions result from head injuries, mostly due to door intrusion.<sup>228</sup> A report commissioned by the ISO finds that door intrusion in rear seats averages 170mm to 280mm in depth with a velocity of seven meters per second to thirteen meters per second.<sup>229</sup> According to the ISO report, this would protect children in twenty-seven percent of side impact collisions.<sup>230</sup> With a statistical error of plus or minus three percent, one-quarter is within this estimate, and is used in this paper.<sup>231</sup> Use of twenty-seven percent instead of one-quarter results in a child VSL estimate that is within the suggested range.

Baseline risk measure: 29 fatalities / 3.8 million infant riders = .000007632.

Risk measure with SIP: (29 fatalities – 1/4 \* 29 saved by SIP) / 3.8 million = .000005724.

### **VSL Calculation**

To calculate the VSL, the WTP estimate is divided by the change in risk due to SIP.

Model:  $WTP / (\text{Baseline risk} - \text{risk with SIP}) = \text{VSL}$

VSL:  $\$26.47 / (.000007632 - .000005724) = \$13,873,165$

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<sup>228</sup> NHTSA, *supra* note 188, at 4.

<sup>229</sup> JOHANNSEN ET AL., *supra* note 181, at 5.

<sup>230</sup> *Id.*

<sup>231</sup> *Id.*