
There is No Meaningful Opportunity in Meaningless Data: Why it is Unconstitutional to Use Life Expectancy Tables in Post-Graham Sentences

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Table of Contents

I. Introduction	269
II. The Requirement of a “Meaningful Opportunity for Release”	273
A. Graham’s Requirement for a “Meaningful Opportunity for Release”	273
B. Colorado Courts’ Application of Graham to Lengthy Juvenile Sentences	275
C. Life Expectancy Estimates, Individual Differences, and Sentencing Children	276
III. A Primer on Life Expectancy	278
A. Estimating Length of Life	278
B. Life Expectancy of Subgroups	280
C. Variation in Life Expectancy Within and Across Groups	281
D. Implications for Sentencing	282
IV. Incarceration, Health, and Mortality	283
A. The Health of Older Prisoners and Accelerated Aging	283
B. Health Care in Prison	285
V. Discussion and Conclusion	287

I. Introduction

In *Graham v. Florida*,¹ the U.S. Supreme Court held that it is cruel and unusual punishment² to sentence a juvenile to life without parole for a non-homicide offense³ and to impose a sentence that does not afford the juvenile a “meaningful opportunity to obtain release based on demonstrated maturity and rehabilitation.”⁴ The Court left it to the States, however, to “explore the means and mechanisms for compliance.”⁵ In response to this ambiguity, states have sought to comply with *Graham*’s rulings in a number of ways. For example, California established early parole review for juveniles sentenced to lengthy prison terms.⁶ In contrast, Colorado has adopted a narrower view of *Graham*’s mandate. Rather than providing minors with increased procedural protections, Colorado courts have held that “a meaningful opportunity for release” requires juveniles to be eligible for parole at some point during their expected lifetimes.⁷

Colorado’s interpretation of *Graham* puts courts in the awkward position of having to determine the “expected lifetime” of juveniles sentenced to lengthy prison terms. In carrying out this task, Colorado courts have repeatedly referred⁸ to life expectancy tables⁹ produced by the

¹ *Graham v. Florida*, 560 U.S. 48 (2010).

² The Eighth Amendment to the U.S. Constitution provides that, “[e]xcessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.” U.S. CONST. amend. VIII.

³ *Graham*, 560 U.S. at 50.

⁴ *Id.*

⁵ *Id.* at 75.

⁶ S. B. 260, 2013-2014 Leg. Reg. Sess. (Cal. 2013).

⁷ See *People v. Rainer*, No. 10CA2414, 2013 WL 1490107 (Colo. App. Apr. 11, 2013); *People v. Lehmkuhl*, No. 12CA1218, 2013 WL 3584754 (Colo. App. June 20, 2013); *People v. Lucero*, No. 11CA2030, 2013 WL 1459477 (Colo. App. Apr. 11, 2013); *People v. Estrada-Huerta*, No. 11CA1932, 2013 WL 6512698 (Colo. App. Dec. 12, 2013) (not published pursuant to COLO. APP. R. 35(f)).

⁸ See *infra* Part II.B.

⁹ Definitions of common terms from *The Glossary of Demographic Terms*, Population Reference Bureau, available at <http://www.prb.org/Publications/Lesson-Plans/Glossary.aspx>: *Life Expectancy at Birth*: The average number of years that a newborn is expected to live if current mortality rates continue to apply. *Life Expectancy*: The average number of *additional* years a person could expect to live if current mortality trends were to continue for the rest of that person’s life. Most commonly cited as life expectancy at birth. *Life Span*: The maximum age that human beings could

Centers for Disease Control (CDC),¹⁰ or specifically to the life expectancy table in the Colorado Revised Statutes,¹¹ which is a partial reproduction of the CDC life expectancy table for 1998.¹² In practice, the Court simply compares the estimated life expectancy from the table with the estimated parole eligibility date provided by the Department of Corrections. If the estimated parole eligibility date is earlier than the life expectancy, then the courts have held that the sentence is constitutional; if not, they have held the sentence to be unconstitutional.¹³ This paper argues that Colorado's juvenile sentencing practices are unsound and ultimately result in unconstitutional sentences. The authors find fault with Colorado's use of life expectancy tables, for the following reasons.

First, the life expectancy table codified by Colorado and used by the Colorado Court of Appeals in several cases in 2013 was interpreted incorrectly. A subsequent section in this paper will define different measures of life expectancy and describe how to interpret the numbers in the tables that report them. This paper will also explore the logic and method of these calculations, since errors of interpretation can arise there as well.

Second, the statute provides a life expectancy estimate *for the general population*, thus failing to take into account the lower life expectancies, relative to the general population, of men and racial minorities. Although life expectancy estimates for these subgroups was reported in the original life expectancy table from which the statute was

reach under optimum conditions. *Life Table*: A tabular display of life expectancy and the probability of dying at each age (or age group) for a given population, according to the age-specific death rates prevailing at that time. The life table gives an organized, complete picture of a population's mortality.

¹⁰ What are commonly called "CDC tables" contain the same information as National Vital Statistics Reports. Throughout this paper, these shall be referred to as "vital statistics" and citations to the National Vital Statistics Reports, rather than to the Centers for Disease Control, will be provided for consistency.

¹¹ In COLO. REV. STAT. § 13-25-103 (2013), the table was called a "mortality table," but where the table appears, it is labeled "Expectancy of Life, U.S. Life Table: 1998." The same is true in the amended statute that goes into effect in August 2014.

¹² Compare the table in C.R.S. 13-25-103 with the first two columns in Table A, "Expectation of life by age, race, and sex: United States, 1998," National Vital Statistics Reports, Vol. 48 No. 18 United States Life Tables, 1998, Vol. 48 No. 18 2, 1-39 (Feb. 7, 2001) http://www.cdc.gov/nchs/data/nvsr/nvsr48/nvsr48_18.pdf

¹³ *Graham v. Florida*, 560 U.S. 48 (2010).

drawn, and could have been included, only the estimates for the general population were provided in statute.¹⁴

The statute was amended in May 2014 to require the use of up-to-date estimates of "life expectancies and expectations of death by sex, race and age" beginning August 6, 2014.¹⁵ If the estimated life expectancies under the old statute and the amended statute are different, which is appropriate for sentencing? Since life expectancy from any single source is updated and adjusted retroactively as new information becomes available,¹⁶ which year's tables should be consulted?

Third, if the Court were to systematically apply the updated estimates as an "upper limit" on sentences, in order to comply with *Graham*, and to take into account the different "life expectancies [...] by sex, race and age," the result would be different sentences based on the gender and race of the people being sentenced, since life expectancies differ for males and females, and for different races. The resulting disparities in sentencing, should these demographic factors be taken into account, cannot have been intended by the U.S. Supreme Court in *Graham*, and should not be sanctioned by any court. On the other hand, if the Court does *not* take into account those documented differences in life expectancy, it overestimates the average length of life of young men and minorities, and introduces systematic bias by accepting the validity of some data and rejecting or ignoring additional information provided in the very same table.

Fourth, government statistics such as those produced for the Centers for Disease Control, Vital Statistics, and the Census Bureau do not

¹⁴ *Id.*

¹⁵ COLO. REV. STAT. § 13-25-103 (2013). Note that on March 20, 2014, the Colorado Governor signed into law Senate Bill 14-048, which mandates the use of the "most recent United States census bureau [sic] expectation of life and expected deaths by race, sex and age table, as published by the United States census bureau [sic] from time to time" rather than the "table set out in section 13-25-103." The impetus for this law change appears to be unrelated to its use in criminal post-*Graham* cases, as there was no discussion of its use in that context. This is, however, further evidence that it was erroneous for the Colorado Court of Appeals to rely on the statutory table in calculating life expectancy, as it did in several cases in 2013 (discussed later in this paper). The new law can be found at: http://www.leg.state.co.us/clics/clics2014a/csl.nsf/fsbillcont3/6AAEE39423EB9C4187257C300006C52A?open&file=048_enr.pdf.

¹⁶ Elizabeth Arias, *United States Life Tables, 2008*, 61(3) NAT'L VITAL STAT. REP. 1, 56-63 (Sept 24, 2012) http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_03.pdf (describing the data, methodology, and interpretation of vital statistics, including adjustments and revisions for various reasons, in Technical Notes).

take into account other factors that are known to affect life expectancy, e.g., socioeconomic status, level of education, and living in high-risk urban areas with high unemployment rates.¹⁷ Many of the people who received lengthy sentences as juveniles and whose cases are being reviewed because of *Graham's* requirement that they have a meaningful opportunity for release, are exactly the people whose estimated life expectancy was already diminished by race, poverty, and lack of opportunity by the time they were sentenced.¹⁸

Fifth, the most obvious difference between the juveniles being sentenced and their peers who remain at home is that the former are facing decades in adult prison. Involuntarily, they will reach early adulthood and, later, middle or old age, in conditions that will affect their physical and mental health and life expectancy not just while they are incarcerated, but throughout their lives.¹⁹ Without a good estimate of life expectancy of the long-term incarcerated, the use of *any* life expectancy table calculated for the general population to evaluate how many years a juvenile can be sentenced to prison and still have a meaningful opportunity for release is arbitrary at best. Unless incarceration either increases life expectancy or has no effect, the Court is unfairly diminishing the possibility that juvenile offenders will be released from prison before they die, violating both the Eighth Amendment and the Supreme Court's holding in *Graham*.

Finally, even if a reliable and accurate estimate of the life expectancy of prisoners existed, it would still be unjust and inappropriate to use the life expectancy figure as a sentencing ceiling. Life expectancy

¹⁷ See, e.g., M.R. Cullen, et al., *Geographic and Racial Variation in Premature Death in the U.S.: Analyzing the Disparities*, 7(4) PLOS ONE. (Apr. 12, 2012), at 2, <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0032930> (click on Table 1, "Predictor variables, sources, names and metrics for each county"); Christopher J. J. Murray, et al., *Eight Americas: Investigating Mortality Disparities Across Races, Counties, and Race-Counties in the United States*, 3(9) PLOS MED (Sept. 2006), at 1516, <http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.0030260> (click Table 1, "Definitions and Basic Sociodemographic Characteristics of the Eight Americas").

¹⁸ Cullen et al., *supra* note 17, at 6, Table 7, "Weighted means and standard deviations for each predictor variable subgroup"; "Growing Up Under Fire," in *Youth Matters: A Second Look for Connecticut's Children Serving Long Prison Sentences*, Civil Justice Clinic 10-11 (March 2013).

¹⁹ Anne C. Spaulding, et al., *Prisoner Survival Inside and Outside of the Institution: Implications for Health Care Planning*, 173(5) AM. J. OF EPIDEMIOLOGY 479, 479-87, (Mar. 2011); Evelyn J. Patterson, *The Dose-Response Of Time Served In Prison On Mortality Rates: New York, 1989-2003*, 103(3) AM. J. OF PUBLIC HEALTH 523, 523-28, (Mar. 2013).

figures are *estimates* of the *average* length of life of people at a given age.²⁰ The single life expectancy figures that are reported in all life expectancy tables, e.g., "78.1 years," takes into account all of the people who will die before they reach that age, as well as all of those who will live beyond it; the middle point of that distribution of deaths of people at various ages is 78.1 years. In any large population, some people will die tomorrow and others will live years or even decades longer than the life expectancy for people of that age. Since a significant proportion of people die before the average life expectancy of people in that age cohort, sentences which preclude an opportunity for release until shortly before the reported life expectancy will necessarily result in the deaths of people in prison before they are awarded a chance at release.

II. The Requirement of a "Meaningful Opportunity for Release"

A. *Graham's Requirement for a "Meaningful Opportunity for Release"*

In *Graham*, the U.S. Supreme Court required that all juveniles sentenced for non-homicide offenses be given a "meaningful opportunity to obtain release based on demonstrated maturity and rehabilitation."²¹ The *Graham* Court specifically noted that "youth are different [than adults]," not just younger. Because young people are *qualitatively* different than adults, the Court "condemn[ed] the sentence of life without parole in that case for qualitative reasons."²² The Court explained that life without parole "gives no chance for fulfillment outside prison walls, no chance for reconciliation with society, and no [reason for] hope."²³ Furthermore, a child "who knows that he or she has no chance to leave prison before life's end has little incentive to become a responsible individual," and "the lack of maturity that led to an offender's crime is reinforced by the prison term" due to the prison itself hindering development.²⁴ The Court decided not to employ "a rigid or formalistic

²⁰ Samuel H. Preston, Patrick Heuveline, and Michel Guillot, *Demography: Measuring and Modeling Population Processes*, 38-41 (Blackwell, 2001).

²¹ *Graham v. Florida*, 560 U.S. 48, 75 (2010).

²² *People v. Rainer*, No. 10CA2414, 2013 WL 1490107, at *13 (Colo. App. Apr. 11, 2013) (citing *Graham*, 560 U.S. at 77-78).

²³ These conditions are faced by everyone who is serving life without parole; the *Graham* decision was that it is unconstitutional to deprive juveniles of that chance for reconciliation, hope, and incentive to change.

²⁴ *Rainer*, 2013 WL 1490107, at *13 (citing *Graham*, 560 U.S. at 77-78).

set of rules designed to narrow the application of its holding."²⁵ As a result, states are complying with *Graham* in a variety of ways.

The idea that children are different from adults, and that courts should take those differences into account when imposing criminal sanctions, did not begin with *Graham*. In *Roper v. Simmons*,²⁶ the U.S. Supreme Court declared it unconstitutional to execute a person who was a child when he committed a capital offense.²⁷ The Court noted that children are less culpable than adults because: 1) they “lack [...] maturity” and have an “underdeveloped sense of responsibility;” 2) children are “more vulnerable or susceptible to negative influences and outside pressures, including peer pressure;” and 3) “the character of a juvenile is not as well formed as that of an adult,” and therefore children have more potential for rehabilitation than adults.²⁸ *Graham* reinforced these ideas about childhood,²⁹ as described above. Subsequently, the U.S. Supreme Court employed similar reasoning in *Miller v. Alabama*.³⁰ In *Miller*, the Court extended *Graham*’s holding to juveniles convicted of homicides, declaring that a mandatory sentence of life without parole for a juvenile is unconstitutional.³¹ The *Miller* Court stated, “[m]ost fundamentally, *Graham* insists that ‘youth matters’ in determining the appropriateness of a lifetime of incarceration without the possibility of parole.”³² The *Miller* Court again emphasized the three key differences between children and adults articulated by the *Roper* Court.³³

Graham’s mandate that children be afforded a meaningful opportunity for release is grounded in Supreme Court jurisprudence,³⁴ supported by science and social science research that confirms the qualitative differences between children and adults, and reinforced by subsequent Supreme Court rule.³⁵ There is no question that the lower courts must abide by and give meaning to this mandate.

²⁵ *Id.*

²⁶ *Roper v. Simmons*, 543 U.S. 551 (2005).

²⁷ *Id.*

²⁸ *Id.* at 569-70.

²⁹ *Graham v. Florida*, 560 U.S. 48, 68 (2010).

³⁰ *Miller v. Alabama*, 132 S. Ct. 2455 (2012).

³¹ *Id.* at 2475.

³² *Id.* at 2465.

³³ *Id.* at 2464.

³⁴ *Roper v. Simmons*, 543 U.S. 551 (2005).

³⁵ *Miller*, 132 S. Ct. at 2455.

B. Colorado Courts' Application of Graham to Lengthy Juvenile Sentences

Since *Graham*, Colorado courts have been judging the constitutionality of lengthy juvenile sentences by whether or not the juvenile will be eligible for parole within his or her expected lifetime. The Colorado Court of Appeals has issued decisions on four such cases, upholding the sentences in three and overturning the sentence in the fourth.

In *People v. Rainer*,³⁶ the Colorado Court of Appeals held that Mr. Rainer's aggregate sentence of 112 years was "functionally a life sentence without parole" and violated the Eighth Amendment, because the parties agreed that: 1) Mr. Rainer would not be eligible for parole until age 75; and 2) his life expectancy per the Centers for Disease Control is between 63.8 and 72 years.³⁷

In *People v. Lucero*,³⁸ the parties agreed that Mr. Lucero will be first eligible for parole at age 57, and therefore the Court of Appeals found that he will have "a meaningful opportunity for release during his natural lifetime."³⁹ Defense Counsel argued that, based on information in a corrections textbook published in 1996, "serving 20 years in prison takes 16 years off life expectancy," thereby reducing Lucero's life expectancy to 42 years.⁴⁰ However, the court refused to consider this much lower estimate of life expectancy, not because the court questioned its validity, but because the point had not first been raised before the trial court.⁴¹ Nevertheless, this case is salient because Defense counsel documented a very different estimate of life expectancy.

In a third case, *People v. Lehmkuhl*,⁴² the Court of Appeals upheld Mr. Lehmkuhl's sentence of 76 years to life. The trial court used the table found in C.R.S. § 13-25-103 to estimate Mr. Lehmkuhl's life expectancy as 78.2 years, and stated that the Colorado Department of Corrections inmate locator indicated that he will be eligible for parole at just under 67 years of age.⁴³ Defense counsel argued to the Court of Appeals that it

³⁶ *People v. Rainer*, No. 10CA2414, 2013 WL 1490107 (Colo. App. Apr. 11, 2013).

³⁷ *Id.* at *12. Note the range of life expectancy figures.

³⁸ *People v. Lucero*, No. 11CA2030, 2013 WL 1459477 (Colo. App. Apr. 11, 2013).

³⁹ *Id.* at *3.

⁴⁰ *Id.* at *4.

⁴¹ *Id.*

⁴² *People v. Lehmkuhl*, No. 12CA1218, 2013 WL 3584754 (Colo. App. June 20, 2013).

⁴³ *Id.* at *3.

should use the Centers for Disease Control table instead of the Colorado statutory table, which would have resulted in an estimated life expectancy of 70.7 years.⁴⁴ As in *Lucero*, defense counsel argued that life expectancy is lower for incarcerated people, but provided no support for the argument other than citing a case out of California, *People v. J.I.A.*⁴⁵, so the court rejected this argument and held that under either the CDC table or the statutory table, Mr. Lehmkuhl will be eligible for parole within his lifetime.⁴⁶

Finally, in *People v. Estrada-Huerta*,⁴⁷ the Court of Appeals upheld Mr. Estrada-Huerta's sentence of 40 years to life, again based on life expectancy in C.R.S. § 13-25-103. The court found that Mr. Estrada-Huerta's life expectancy was 78.1 years, and cited *Lehmkuhl* as the basis of the Court's use of this table.⁴⁸

C. Life Expectancy Estimates, Individual Differences, and Sentencing Children

Intuitively, we understand that individual differences among people in a given group affect the life expectancy of those individuals. In any population, individual differences will account for some proportion of the variation in how long people live. Some of these factors are within our control (e.g., diet, smoking, occupation). Others are not (e.g., having been born with fetal alcohol syndrome or an inherited disease, early exposure to environmental hazards like asbestos or lead paint). Presumably, it is in recognition of these individual differences that CRS § 13-25-102, as well as the amended statute that goes into effect in August 2014, expressly states that the life expectancy table will be received, "together with other evidence as to the health, constitution, habits, and occupation of the person regarding the person's expectancy of continued life."⁴⁹

The problem is that juveniles have not lived long enough to develop "habits, constitution[s], and occupation[s]."⁵⁰ Nor have they developed stable identities or persistent patterns of behavior, which will in

⁴⁴ *Id.* The Court did not challenge either life expectancy figure or determine whether 78.2 years or 70.7 years was the correct estimate.

⁴⁵ *People v. J.I.A.*, 127 Cal. Rptr.3d 141, 149 (Cal. Ct. App. 2011).

⁴⁶ *Lehmkuhl*, 2013 WL 3584754 at *3.

⁴⁷ *People v. Estrada-Huerta*, No. 11CA1932, 2013 WL 6512698, at *2 (Colo. App. Dec. 12, 2013).

⁴⁸ *Id.*

⁴⁹ COLO. REV. STAT. § 13-25-102 (2013).

⁵⁰ *Id.*

any case be disrupted by resocialization⁵¹ in the “total institution”⁵² of prison.⁵³ One of the defining differences between the young and the old is that the young have lived only a fraction of their expected years of life, under conditions over which they exerted very limited choice. Newborn babies do not choose their parents or the circumstances of their birth, and they can do nothing to improve their chances of surviving infancy. Young children cannot make independent choices that can fundamentally change the trajectories of their own lives. Adolescents gain autonomy as they spend less time under direct supervision, enjoy greater freedom of movement, and choose friends from the larger set of neighbors, classmates, and acquaintances.

However, adolescents are still developing emotionally, intellectually and physically. Since their characters have not yet formed, it is impossible to accurately predict their future behavior.⁵⁴ Thus, “the reality that juvenile still struggle to define their identity means it is less supportable to conclude that even a heinous crime committed by a juvenile is evidence of irretrievable depraved character.”⁵⁵ Seventeen-year-olds commit more crimes than any other age group⁵⁶; one leading expert on the development of antisocial behavior describes delinquent behavior as “a normal part of teenage life.”⁵⁷ As they age into adulthood, most people desist from criminal activity, and only a small proportion continue to commit crimes into adulthood.⁵⁸ The difficulty in distinguishing between

⁵¹ Resocialization is “the process of discarding former behavior patterns and accepting new ones as part of a transition in one’s life.” Richard T. Schaefer, *Sociology: A Brief Introduction*, at 96 (McGraw-Hill, 2011).

⁵² Erving Goffman, *Asylums: Essays on the Social Situation of Mental Patients and Other Inmates* (Doubleday, 1961).

⁵³ *Id.* Goffman recognized that resocialization is most effective when it occurs within a “total institution [...] that regulates all aspects of a person’s life under a single authority, such as a prison, the military, a mental hospital or convent.”; Schaefer, *supra* note 51, at 96. Resocialization is more likely when the total institution employs degradation ceremonies, rites of passage designed to deprive new members of their former identities and dignity and make them more amenable to surveillance and control.

⁵⁴ “It is difficult for even ‘expert psychologists’ to ‘differentiate between the juvenile offender whose crime reflects unfortunate yet transient immaturity, and the rare juvenile offender whose crime reflects irreparable corruption.” *Youth Matters, id.*, at 4, citing *Graham*, 130 S. Ct. at 2032.

⁵⁵ *Roper v. Simmons*, 543 U.S. 551, 570 (2005).

⁵⁶ Elizabeth S. Scott and Laurence Steinberg, *Rethinking Juvenile Justice*, HARVARD UNIVERSITY PRESS, 2008, at 16, available at <http://ssrn.com/abstract=1315359>.

⁵⁷ Terrie E. Moffitt, *Adolescence-Limited and Life-Course-Persistent Antisocial behavior: A Developmental Taxonomy*, 100 PSYCHO. REVIEW 677, 674-701 (1993).

⁵⁸ *Id.*

temporary, situational deviance common in adolescence and stable, persistent antisocial behavior that continues into adulthood is an important part of the reasoning in *Graham*, since “it does not follow that courts [...] could distinguish the few incorrigible juvenile offenders from the many that have the capacity for change.”⁵⁹ The recognition of these and other essential qualities of youthfulness resulted in the decisions in *Roper v. Simmons*, *Miller v. Alabama*, and *Graham v. Florida*.

Using life expectancy tables for the general population to calculate sentence lengths for juveniles who, but for the rulings in *Roper*, *Graham*, and *Miller*, would be facing execution or life without parole, is to disregard the fact that the Court is in fact about to *remove* them from the general population. Their transition to adulthood will occur in the crucible of adult prison, which “itself [...] hinder[s] development.”⁶⁰ Should they survive in prison to middle or old age, their lives and life expectancy⁶¹ will have been profoundly affected by the years they spent in a stressful, severely restrictive, punitive environment, with other involuntarily cloistered people, in an institution that segregates them from the general population.

In Colorado, the Court has used life expectancy estimates for the general population to evaluate juvenile sentences for compliance with *Graham*. This practice suggests that a close examination of the deceptively simple life tables is in order.

III.A Primer on Life Expectancy

A. Estimating Length of Life

Life expectancy is “the average number of years a person can expect to live if current mortality trends were to continue for the rest of that person's life.”⁶² Two measures of life expectancy are commonly

⁵⁹ *Graham v. Florida*, 560 U.S. 48, 77 (2010).

⁶⁰ “The lack of maturity that led to an offender’s crime is reinforced by the prison term” due to the prison itself hindering development. *People v. Rainer*, No. 10CA2414, 2013 WL 1490107, at *13 (Colo. App. Apr. 11, 2013) (citing *Graham*, 560 U.S. at 77-78).

⁶¹ Jason Schnittker et al., *Enduring Stigma: The Long-Term Effects of Incarceration on Health*, 48 J. OF HEALTH & SOC. BEHAV. 115, 115-30 (2007); Michael Massoglia, *Incarceration as Exposure: The Prison, Infectious Disease, and Other Stress-Related Illnesses*, 49 J. OF HEALTH AND SOC. BEHAV. 56, 56-71 (2008); Michael Massoglia et al., *No Real Release*, 8 CONTEXTS 38, 38-42 (2009).

⁶² *Life Expectancy*, Glossary of Demographic Terms, Population Reference Bureau, (last visited Apr. 20, 2014), available at <http://www.prb.org/Publications/Lesson-Plans/Glossary.aspx>

reported. *Expectation of life at birth* is the average number of years a newborn is expected to live. *Life expectancy* is the average number of years of life remaining to people, given that they have already survived to a given age. The following example illustrates the difference using the National Vital Statistics Report for 2008, published in 2012.⁶³

The entry at "20" in Table B, "Expectation of Life," indicates that people who are 20 years old in 2008, i.e., were born in 1988 and are still living, have an average 59.0 years of life remaining. The expected average age at death of people 20 years old in 2008 is 79 years (20 years lived plus 59.0 expected additional years = 79 years). This life expectancy is higher than their life expectancy at birth was in 1988⁶⁴, 74.9 years, because by 2008 they had survived the first twenty years of life and are no longer subject to the probability of death they faced between birth and age twenty.

Life expectancy is a statistic that describes the "center" of the distribution of the ages at which people in a birth cohort will die. The reported life expectancy figure is usually an average, or mean. Other statistics sometimes used to describe the center of the distribution are the mode (the age or age interval during which the largest number of people die), and the median (the age at which it is expected that 50% of the population will die before reaching, and the other 50% will live beyond).⁶⁵ The mean, median and mode of a distribution vary depending upon the shape of the distribution and the extent of its symmetry.⁶⁶ In developed nations, these measures of central tendency of life expectancy vary in expected ways, because most people die in old age, skewing the distribution of age at death to the right (away from younger ages and toward old age).⁶⁷ In England and Wales in 2010, for example, the mean,

⁶³ Compare Arias, *supra* note 16, at 6 (reviewing Figure 1, "Life expectancy at birth, by race and sex: United States, 1970-2008"), with *Births, Deaths, Marriages, and Divorces*, U.S. CENSUS BUREAU, STAT. ABSTRACT OF THE U.S. 79 (2012) available at <http://www.census.gov/compendia/statab/2012/tables/12s0107.pdf> (see Table 107).

⁶⁴ *Expectation of Life at Single Years of Age, by Race, and Sex: United States, 1988*, VITAL STAT. OF THE U.S., 1988, 11 (1991) available at http://www.cdc.gov/nchs/data/lifetables/life88_2acc.pdf (see Table 6.3).

⁶⁵ Ann E. Watkins, Ronald E. Scheaffer, and George W. Cobb, *Statistics: From Data to Decision*, 2nd ed., 22-30 (Wiley & Sons, 2011).

⁶⁶ *Id.*

⁶⁷ *Id.* at 27.

median, and modal life expectancy of men was 79, 82, and 85 years, respectively.⁶⁸

B. Life Expectancy of Subgroups

On average, women live longer than men, and whites live longer than blacks.⁶⁹ The order of life expectancy of difference groups in the United States, from longest to shortest, is: 1) white women; 2) white men, black women, and Hispanics, relatively close together; 3) black men and Native Americans.⁷⁰ The reader is encouraged to examine graphs and charts that provide visual representations of differences in life expectancy at birth, life expectancy, and age at death.⁷¹

The differences in life expectancy across groups are significant. For example, according to the estimates of both the Vital Statistics and the Census Bureau, white females born in 1981 had, in 2001, a life expectancy of 60.6 years, for a total life expectancy of 80.6 years. Black men born in the same year had an estimated life expectancy of 50.3 years, for a total life expectancy of 70.3 years, a difference of more than a decade.

Unfortunately, Vital Statistics did not report life tables for Hispanics until 2007.⁷² The Census Bureau table identified by title in Colorado statute as the new standard to be used beginning in August 2014⁷³ (“Expectation of Life and Expected Deaths by Race, Sex, and Age,” verbatim in statute) reports neither life expectancy nor expectancy of death for any groups other than men and women and whites and blacks.

⁶⁸ *Mortality in England and Wales: Average Life Span, 2010*. OFFICE FOR NAT'L STAT. , Dec. 17, 2012, at 3, available at http://www.ons.gov.uk/ons/dcp171776_292196.pdf

⁶⁹ Sam Harper et al., *Trends in the Black- White Life Expectancy Gap in the United States, 1983-2003*, 297 J. OF THE AM. MEDICAL ASS'N 1225, 1225 (2007). (Referencing Figure 1, “Life Expectancy at Birth Among Black and White Males and Females in the United States and the Black-White Life Expectancy Gap, 1975-2003”).

⁷⁰ Arias, *supra* note 16, at 6.

⁷¹ *Id.* See also, e.g., *Race, Ethnicity, and the Health of Americans*, ASA SERIES ON HOW RACE AND ETHNICITY MATTER, July 2005, available at http://www.asanet.org/images/research/docs/pdf/race_ethnicity_health.pdf;

Robert Pear, *Gap in Life Expectancy Widens for the Nation*, N.Y. TIMES, Mar. 23, 2008, at 1, available at

http://www.nytimes.com/2008/03/23/us/23health.html?_r=0 (click the chart entitled “Growing Disparities”); C.J.L. Murray et al., *supra* note 17, at 2.

⁷² “Hispanic” is an ethnic group, not a racial group. For a description of concepts and definitions used by the Census Bureau, see Karen R. Humes et al., *Overview of Race and Hispanic Origin: 2010*, 2010 CENSUS BRIEFS, (Mar. 2011), available at <http://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf>.

⁷³ COLO. REV. STAT. § 13-25-102 (2013).

Even more worrying, a footnote in one of the columns⁷⁴ states that the reported life expectancy for the total population “includes other races, not shown separately;” presumably these “other races” are Hispanic, American Indian or Alaska Native, Asian, and native Hawaiian or Other Pacific Islander, groups for which no separate statistics are reported.⁷⁵ This probably accounts for the slightly higher reported life expectancies for the total population and for whites, as well as the slightly lower life expectancies for blacks, compared to the Vital Statistics estimates. Moreover, subgroup totals for whites and blacks are not reported in the Census Bureau table. Given the racial and ethnic diversity of Colorado, the growing proportion of the population that is Hispanic, and the overrepresentation of Hispanic and Native American men in jail and prison, it is surprising that the new statutory report on life expectancy offers no information on the life expectancies of these subgroups.

C. Variation in Life Expectancy Within and Across Groups

Life expectancy is the number representing the center of a distribution. Another important characteristic of distributions is how widely dispersed around the center the numbers are.⁷⁶ This dispersion is important because it indicates how accurately life expectancy represents the individuals who make up the general group. A society whose members all either die at birth or live to 100 has a life expectancy of 50 years, as does a society in which everyone lives exactly 50 years. In the first society, people’s actual life expectancy is wrong by exactly 50 years for every individual (maximum variance); in the second, the life expectancy of the group is exactly the length of life of every member (zero variance).

It is also important to know if subgroups within a larger general population have distributions with similar variance. If a subgroup within the general population has a different life expectancy and ages at death that are widely dispersed around the mean, the measure of life expectancy

⁷⁴ U.S. Census Bureau, *supra* note 63, at 79 (review Table 107, second column, under “Total”).

⁷⁵ *Id.* at 2. The Office of Management and Budget required federal agencies to use these five categories, as well as a sixth - Some other Race - beginning in 1997. For the 2000 Census, respondents could for the first time identify themselves with more than one category.

⁷⁶ Range, interquartile range, standard deviation and variance are all statistics that describe how scores are dispersed around measures of central tendency like the mean and median.

for that subgroup is a less accurate predictor of life expectancy.⁷⁷ In the hypothetical example above in which one-half of the population dies at birth and the other one-half all live to exactly 100 years of age, the life expectancy of 50 years is correct and accurate. Because of the pattern of variance of this distribution; however, the calculated *group* life expectancy of 50 years is a very poor estimate for every *individual* in the group.

As it turns out, shorter life expectancy, more variance around the estimated center of the distribution, and volatility of the estimate over time are all characteristic of poorer groups within wealthier countries with overall high life expectancies.⁷⁸ In a recent study that combined geographic and racial disparities in survival, Cullen et al. found that life expectancies for white men in the U.S. were about 7% higher than for black men, but for the people who survived to the age of 10, white men were 17% more likely than black men to reach the age of 70.⁷⁹ Murray found that "the life expectancy gap between the 3.4 million high-risk urban black males and the 5.6 million Asian females was 20.7 years in 2001."⁸⁰ The biggest disparities in mortality between advantaged and disadvantaged groups were not among the very young and the very old, but in the age categories 15-44 and 45-59.⁸¹

Taking into account the effect on life expectancy of variables that have long been studied by social scientists but are not included in U.S. Census or vital statistics reports – income, education, region, type of community, access to regular health care, and the like – further widens the observed and projected gaps in life expectancy between disadvantaged and privileged groups in the United States.

D. Implications for Sentencing

Life expectancy is a statistic that represents the estimated average length of life of a group of people whose deaths will occur over a long period of time. The easiest way to demonstrate the implications is to

⁷⁷ Cullen et al., *supra* note 17, at Figure 5. This figure, "Frequency distribution (kernel plot) of survival to age 70 county for each subpopulation, 1999-2001" illustrates both the mean and the frequency distributions of survival to age 70 of black men, black women, white women and white men.

⁷⁸ C.J.L. Murray et al., *supra* note 17, at 1519 ("[M]illions of Americans, distinctly identified by their sociodemographic characteristics and place of residence, have life expectancies that are similar to some low-income developing countries").

⁷⁹ Cullen et al., *supra* note 17, at 1.

⁸⁰ C.J.L. Murray et al., *supra* note 17, at 1519.

⁸¹ *Id.*

imagine a hypothetical distribution of numbers on a standard bell curve. The center of the distribution is at the tallest point on this perfectly symmetrical curve. That single point represents the mean, median, and mode of that distribution. It is the mean because it is the average score; it is also the “most frequent,” or modal score. Finally, the midpoint of a bell curve is also the median, because exactly one-half of the scores are lower and one-half are higher.

Not all distributions are symmetrical. However, all distributions have a mean, median, and mode. Earlier, the mean, median, and mode of the life expectancy of men in England and Wales were given as 79, 82, and 85, respectively. One-half of the men die before the age of 82, and one-half die at a later age. The mean age at death is only slightly lower, at 79 years of age. Nearly one-half of the male population will have died before reaching average life expectancy.

Prison sentences that prevent people from being released until shortly before they reach average life expectancy ensures that almost one-half of them will have died before they reach that age. This is true when the estimate of average life expectancy for that group is perfectly accurate and precise. And if people facing or serving prison terms that approach the life expectancy of the general population actually have a lower life expectancy, then *fewer* than one-half will have *any* opportunity for release, because they will have died.

Under the conditions described, this result is unavoidable; it is based on the mathematics of probability. If the median life expectancy for people facing very lengthy terms in prison were known, and if each of those people received a sentence that guaranteed release on the very day that represented median life expectancy, the odds of any individual living until (or, for that matter, dying before) release, amounts to flipping a coin.

IV. Incarceration, Health, and Mortality

The effect of long-term incarceration on health, morbidity and mortality is a complex issue beyond the scope of this paper. However, the direct and indirect effects of incarceration itself on health are central to the question of life expectancy of people serving long prison terms. For that reason, several relevant issues—the health of older prisoners, accelerated aging, and health care in prison -- will be described in this section.

A. The Health of Older Prisoners and Accelerated Aging

The number of older prisoners has skyrocketed over the past 20 years; between 1981 and 2010, the number of state and federal prisoners

age 55 and older grew from 8,853 to 124,900.⁸² This “graying of prisons”⁸³ poses great challenges, because older prisoners are more vulnerable, less able to care for themselves, and require more medical care, often for multiple, chronic health conditions.⁸⁴

Older prisoners are, as a group, “older” physiologically than they are chronologically. Their physical condition and health problems are characteristic of people ten or fifteen years older than their chronological age.⁸⁵ The widely-documented phenomenon is usually referred to as “accelerated aging.” As a result of the observed discrepancy between the chronological and physiological ages of incarcerated people, the National Commission on Correctional Health Care has adjusted its definition of “older inmates” down to those 55 years of age or older.⁸⁶ A 2008 survey⁸⁷ found that, at the time, fifteen states defined inmates 50 years and above as elderly, while another five states used 55 and four used 60.⁸⁸ The American Correctional Association recommends classifying inmates based on their level of physical impairment rather than their chronological age.⁸⁹ In a March 2011 presentation to the Colorado Commission on Criminal and Juvenile Justice, then-Head of the Colorado Department of Corrections Tom Clements noted that the most common chronic illnesses among the incarcerated elderly were heart disease, hypertension, diabetes, and chronic obstructive lung disease.⁹⁰ The considerable overlap among

⁸² Tina Chiu, *It's About Time: Aging Prisoners, Increasing Costs, and Geriatric Release*, VERA INST. OF JUST., Apr. 2010, at 4, <http://www.vera.org/pubs/its-about-time-aging-prisoners-increasing-costs-and-geriatric-release-0> (last visited Apr.26, 2014).

⁸³ Carrie Abner, *Graying Prisons: States Face Challenges of an Aging Inmate Population*, COUNCIL ON ST. GOV'TS, (Nov./Dec. 2006) <http://www.csg.org/knowledgecenter/docs/sn0611GrayingPrisons.pdf> (Last visited Apr. 26, 2013)

⁸⁴ *Id.*

⁸⁵ Ronald H. Aday & Jennifer J. Krabill, *Older and Geriatric Offenders: Critical Issues for the 21st Century*, in SPECIAL NEEDS OFFENDERS IN CORRECTIONAL INSTITUTIONS, (Lior Gordon ed., 2013). See also, Abner, *supra* note 83; *Old Behind Bars: The Aging Prison Population in the United States*, HUMAN RIGHTS WATCH (Jan. 2012).

⁸⁶ Chiu, *supra* note 82, at 4.

⁸⁷ Anthony A. Sterns, et al., *The Growing Wave of Older Prisoners: A National Survey of Older Prisoners Health, Mental Health and Programming*, 70(4) CORRECTIONS TODAY 70, 70-72, 74-76 (Aug.2008).

⁸⁸ *Id.*

⁸⁹ Ronald H. Aday and Jennifer A. Krabill, *Older and Geriatric Offenders: Critical Issues for the 21st Century*, in SPECIAL NEEDS OFFENDERS IN CORRECTIONS 203, 206 available at http://www.sagepub.com/upm-data/49941_ch_7.pdf.

⁹⁰ Tom Clements, Presentation of “Aging Out In Prison,” to the Colorado Commission on Criminal and Juvenile Justice, (Mar. 11, 2011), powerpoint available at

Summer 2014 *There is No Meaningful Opportunity in Meaningless Data* 285

elderly prisoners, prisoners with chronic health issues, and terminally ill prisoners was also described.⁹¹ Almost 40% of inmates 50 or older in Colorado had “significant” medical needs.⁹²

In prison, older inmates are more vulnerable to many of the risks of prison already described. According to the U.S. Department of Justice, for both natural and unnatural deaths, the age of inmates was strongly associated with high mortality rates.⁹³ In other words, the risk of death by illness, homicide and accidents rises drastically as inmates age. Prisoners age 55 and older died of cancer, heart disease, and respiratory disease at rates that were at least five times higher than for any other age group [of the incarcerated population].⁹⁴ The rate of death by homicide among prisoners age 55 and older was two to three times higher than for prisoners in the 18-44 age group.⁹⁵ The accident-related mortality rate for prisoners aged 55 and older was at least 2.5 times higher than for younger inmates.⁹⁶

Mr. Clements’s presentation also noted the re-entry challenges for older prisoners, who are sicker, poorer, less employable, and less likely to have social support than inmates being released from prison at a younger age.⁹⁷ The older inmates being released also experienced more difficulty finding housing and transportation.⁹⁸

B. Health Care in Prison

Once a person develops a chronic condition like diabetes or heart disease, or a serious illness like cancer, the intensity and quality of medical care greatly affects long-term survival rates.⁹⁹ Socio-economic

http://www.colorado.gov/ccjdir/Resources/Resources/Handout/2011/031111_AgingOutinPrison.pdf

⁹¹ See B. Jayne Anno et al., *Correctional Healthcare: Addressing the Needs of Elderly, Chronically Ill, and Terminally Ill Inmates*, NAT’L INST. OF CORRECTIONS, 2004, at viii. .

⁹² C.R.S. 17-1-102(7.5)(a)(II) Special Needs Offender (Regardless of the acknowledgment of accelerated aging in Colorado prisons, inmates in Colorado are not considered “elderly” unless they are 65 years of age or older and unable to care for themselves).

⁹³ BUREAU OF JUST. STAT., U.S. DEP’T OF JUST., MORTALITY IN LOCAL JAILS AND STATE PRISONS, 2000-2011, available at <http://www.bjs.gov/content/pub/pdf/mljsp0011.pdf>.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ Clements, *supra* note 90, at slide 16.

⁹⁸ *Id.*

⁹⁹ N. Howlader et al., *SEER Cancer Statistics Review 1975-2010*, NAT’L CANCER INST., (June 2013), http://seer/cancer/gov/csr/1975_2010; *Cancer Health Disparities*, NAT’L

status affects not just whether a person becomes ill or not, but the extent to which their illnesses are treated once they are contracted. For example, in the period 1975-77, the five-year cancer survival rate for white Americans was 51% and 39.8% for black Americans; by the period 1996-2002, the survival rates for whites and blacks had risen to 67.5% and 57.2% respectively; the differences in survival rates had narrowed but not disappeared.¹⁰⁰

Correctional institutions do provide health care to prisoners who are or become ill,¹⁰¹ and the conditions of health care in prison improved after the Supreme Court ruled that "indifference to prisoners' serious medical needs violates the Eighth Amendment's prohibition of cruel and unusual punishment."¹⁰² Despite the basic right of the incarcerated to medical services, the provision of health care is inadequate in many facilities and thus health outcomes fall short as well. In 2011, for example, the Supreme Court ruled that prison overcrowding in California interfered with medical care and created a culture of "cynicism and fear."¹⁰³

Medical services in jails and prisons have been affected by the sharp rise in the number of people who are incarcerated, growth in the number and proportion of elderly inmates, and rising costs of medical care in a time of tightening budgets.¹⁰⁴ Most facilities contract out health care to private companies, which cut costs in various ways. In Colorado, for example, the Department of Corrections contracts with a third-party provider. Costs for specialized medical treatment are scrutinized by both the provider and the Department of Corrections, as are hospitalizations, hospital discharges, and insurance claims.¹⁰⁵ A medication formulary

CANCER INST. (Mar. 11, 2008), <http://www.cancer.gov/cancertopics/factsheet/disparities/cancer-health-disparities#2>.

¹⁰⁰ *Cancer Statistics: Interactive Tools*, NAT'L CANCER INST., <http://www.seer.cancer.gov/faststats/selections.php?series=race>

¹⁰¹ In Colorado, the policy of the Department of Corrections is to "ensure that offenders will be provided with health care services that maintain basic health and prevent other than normal physical and emotional deterioration." See "Offender Health Services" at <http://www.doc.state.co.us/administrative-regulations/42>

¹⁰² Josiah D. Rich et al., *How Health Care Reform Can Transform the Health of Criminal Justice-Involved Individuals*, 33 HEALTH AFFAIRS 462, 463 (March 2014).

¹⁰³ *Id.* (discussing the Supreme Court case *Brown v. Plata*).

¹⁰⁴ *Aging Prisoners Stressing Health Care System*, 292(4) J. OF AM. MEDICAL ASS'N 423, 423-24 (July 28, 2004) "We're in hard times," Brown [Assistant Secretary, Office of Health Services. Florida Department of Corrections] said. "The question becomes, 'what do we fund?' Is it schools? Hospitals? Inmates?"

¹⁰⁵ Colorado Department of Corrections, Budget Hearing, Prepared answers to questions by the Joint Budget Committee (Jan. 5, 2012), at 23-25, *available at*

Summer 2014 *There is No Meaningful Opportunity in Meaningless Data* 287

limits the number of different medications that can be prescribed, and the lowest costs are negotiated by a multi-state purchasing agreement.¹⁰⁶

Barriers to health care in prison include lack of access to medical staff, prescription medication, and laboratory tests.¹⁰⁷ A nationwide survey of inmates in federal and state prisons and jail¹⁰⁸ characterized the access to health care of the 800,000 inmates with at least one chronic medical condition as “poor.”¹⁰⁹ One in five people who entered state prison with a chronic medical condition had not received a medical examination at the time of the interview, and more than one-quarter of state prisoners who had been taking a prescription medication before they were incarcerated stopped taking the medication while in prison.¹¹⁰ After a serious injury, 12% of those incarcerated in state prisons were not seen by medical staff.¹¹¹

Even when medical care is provided, inmates typically fill out a form to request a visit with a physician and then wait for approval.¹¹² Care by medical specialists like surgeons and oncologists is often provided off prison grounds and must be carefully arranged. For these reasons, inmates with chronic or life-threatening illnesses can suffer lapses of care or delays in receiving medical care, with implications for health and mortality both during incarceration and after release.¹¹³

V. Discussion and Conclusion

Colorado’s practice of estimating a juvenile’s life expectancy and then sentencing him to a lengthy prison sentence that will potentially allow for release just prior to his death is inappropriate because: 1) using life expectancy as a sentencing guideline focuses on exacting maximum

http://www.tornado.state.co.us/gov_dir/leg_dir/jbc/2011-12/corhrg.pdf

¹⁰⁶ *Id.*

¹⁰⁷ Andrew P. Wilner et al., *The Health and Health Care of US Prisoners: Results of a Nationwide Survey*, 99 AM. J. OF PUB. HEALTH 666, 667-68 (Apr. 2008).

¹⁰⁸ *Id.*

¹⁰⁹ *Id.* at 669.

¹¹⁰ *Id.*

¹¹¹ *Id.*

¹¹² Zulficar Gregory Restum, *Public Health Implications of Substandard Health Care*, 95 AM. J. OF PUB. HEALTH 1689, 1691 (Oct. 2005).

¹¹³ A good example of prevalence and treatment of a particular disease in prisoners is liver cancer. See, e.g., Amy J. Hartzke et al., *Liver Cancer Mortality Among Male Prison Inmates in Texas, 1992-2003* 48 PREVENTIVE MEDICINE 588, 588 (2009) (reporting that the incidence of liver cancer deaths among prisoners was at least 4.7 times higher than in the general population).

punishment and retribution; 2) the life tables currently being used provide estimates for the general population and should not be applied to the distinctive group of young people facing decades of incarceration, who are mostly poor and disproportionately black and Hispanic;¹¹⁴ and (3) sentences that deprive young people of the opportunity to demonstrate their maturity and rehabilitation until they become eligible for parole in their mid-fifties or even later could lead to the same hopelessness, irretrievable loss, and lack of motivation for change of juveniles receiving the death penalty (*Roper*), life without parole for non-homicide offenses (*Graham*), and life without parole for any offense committed by a juvenile (*Miller*).

The focus on maximum punishment runs counter to the reasoning employed in *Graham*, which carefully described and evaluated the lesser culpability and greater capacity for change of adolescents, including those who commit violent crimes. Indeed, the Court chose not to employ a rigid or formalistic set of rules” for the states to implement, and the reason for that was to avoid “narrow[ing] the application of its holding.”¹¹⁵

The use of life expectancy estimates to judge the constitutionality of long sentences for juveniles raises several troubling issues. Official life tables do provide a deceptively simple estimate of how long a child will live, and thus may be used as a bright line between what are thought to be constitutional and unconstitutional sentences post-*Graham*. But this logic is defensible only to the extent that the tables are accurate for the children who were, are, or will be sentenced to long prison term; it is possible – probable, even – that the line is bright but wrong. Every indication is that the tables currently in use by Colorado courts overestimate, by an unknown degree, the life expectancy of those sentenced to long prison terms for crimes committed when they were children. Life expectancy is lower for men, racial minorities, and the poor. People enter prison in poorer health than their counterparts in the general population. While incarcerated, they experience relentless stress, exposure to infectious diseases, and the threat of violence. They have very little autonomy over their own diets, movement, exercise, and hobbies. They may spend long periods of time isolated in small spaces. Their contact with family and

¹¹⁴ See Ashley Nellis, *The Lives of Juvenile Lifers: Findings from a National Survey*, THE SENTENCING PROJECT, (Mar. 2012), available at http://sentencingproject.org/doc/publications/jj_The_Lives_of_Juvenile_Lifers.pdf.

¹¹⁵ *People v. Rainer*, No. 10CA2414, 2013 WL 1490107, at *13 (Colo. App. Apr. 11, 2013) (citing *Graham v. Florida*, 560 U.S. 48, 77-78 (2010)).

friends is limited and tightly controlled. Incarceration causes accelerated aging, and a significant proportion of prisoners in their forties and fifties have multiple chronic health conditions. Health care is provided, but it is limited by cost and often sporadic or delayed. Each of these points is well supported in Section IV of this paper.

We have challenged the use of general population life expectancy tables currently used by the Colorado Court of Appeals to evaluate sentences for juveniles. Every indication is that these estimates are too high. We are not able to calculate and provide life expectancy estimates for the long-term incarcerated, however, because the data are simply not available. This "knowledge gap"¹¹⁶ exists for many reasons, including the lack of sympathy for prisoners, a lack of funding from the National Institute of Health, the reluctance of correctional administrators, and security concerns in the midst of budget constraints. In a review of 36 data sets on individual health, Ahalt et al. found only three that could be used to study people who were formerly incarcerated, one that contained information about how long people had been incarcerated and at what age, and none that could be used to study people who are currently incarcerated.¹¹⁷ Similarly, in a review of studies comparing the mortality of former prisoners with some other group,¹¹⁸ Dirkzwager concluded in 2012 that "knowledge on the exact nature of the relationship between incarceration and mortality remains scarce."¹¹⁹ Unless and until a state or federal agency systematically gathers and publishes vital statistics specific to the imprisoned population, we cannot evaluate the extent to which the life expectancy of the general population matches that of the long-term incarcerated.

In two of the four Colorado Court of Appeals cases described in this paper, it was asserted that the district court's use of the life tables published in statute was in error. The Colorado Court of Appeals was "not persuaded [...] by Lehmkuhl's perfunctory assertion that his life expectancy is actually shorter than that indicated by the CDC tables."¹²⁰ Lehmkuhl cited a case in support, but the Court maintained that it

¹¹⁶ See Brie A. Williams et al., *Addressing the Aging Crisis in U.S. Criminal Justice Health Care*, 60 J. OF THE AM. GERIATRICS SOC'Y 1150 (June 2012).

¹¹⁷ *Id.*

¹¹⁸ Anja Dirkzwager et al., *Effects of First-Time Imprisonment on PostPrison Mortality: A 25-Year Follow-Up Study with a Matched Control Group*, 49 J. OF RES. IN CRIME AND DELINQ. 383, 384 (2012).

¹¹⁹ *Id.*

¹²⁰ *People v. Rainer*, No. 10CA2414, 2013 WL 1490107, at *18 (Colo. App. Apr. 11, 2013).

"provide[d] no basis on which [it] could conclude, without speculation, that Lehmkuhl would not be eligible for parole until after his life expectancy."¹²¹

Is it not also true, however, that evidence *confirming* the accuracy of these life expectancy estimates for the incarcerated is also absent? It is certainly possible – and, given what has been established in the academic literature about incarceration, health and mortality, even probable – that there is no basis on which the Court can conclude, without speculation, that Lehmkuhl will likely survive to his parole eligibility date at age 67.

Moreover, as a practical matter, the rate at which people in Colorado are actually granted discretionary parole is currently very low, at 13% between 2004-2008.¹²² It is questionable whether such a low chance at parole within one's expected lifetime actually provides a "realistic opportunity to obtain release before the end of [his] term."¹²³ Lehmkuhl raised this issue as well, when he argued that "it is extremely unlikely"¹²⁴ that he will be paroled when he is first eligible, because of "present parole board practices."¹²⁵ The Court rejected this argument, again because the issue had not been raised in the trial court, but added the following: "[I]t is speculative to assume that [...] parole practices will be in 2050 what they may be today." To assume anything at all about parole practices in 2050 – that they will be the same, that they will be different in some specific way or another, that discretionary parole in 2050 will be granted more often or less often or never – is to engage in speculation.

Graham says that "youth matters" for sentencing, in part because the "habits and characters" of youths are unformed. They deserve a chance at life outside of prison because, as juveniles, their brains aren't fully developed, making juveniles less culpable. They are less capable of good judgment and more vulnerable to peer pressure. If this is true, it is counter-productive to send a child to prison, only to have his habits and characters formed there.

¹²¹ *Id.*

¹²² REPORT OF THE STATE AUDITOR: DISCRETIONARY PAROLE PERFORMANCE AUDIT, STATE OF COLORADO (Nov. 2008) http://www.ccjrc.org/pdf/Parole_Board_Performance_Audit_Nov_2008.pdf, A new audit of the Colorado parole system was ordered by Gov. Hickenlooper on April 4, 2013 and is underway, which will go back ten years.

¹²³ *Graham v. Florida*, 560 U.S. 48, 82 (2010).

¹²⁴ *Lehmkuhl* at *19.

¹²⁵ *Id.*

Prison is not fertile ground for "that considered reflection which is the foundation for remorse, renewal, and rehabilitation."¹²⁶ Prisons are violent. Juveniles are particularly vulnerable due to their age and generally smaller stature. They are isolated from family and surrounded by adults with antisocial and deviant attitudes. Long sentences prevent or inhibit educational attainment, the development of job skills, age-appropriate sexual development, personal responsibility, practice in making good choices, and the development of an identity and self-presentation that is appropriate for life outside of prison. The punishment and deprivation of prison, coupled with the absence of opportunities to observe, practice and develop the very qualities that will be required for release and successful reentry, are barriers to release.

Should a child sentenced to prison be lucky enough to get out, he will face the same barriers to reentry as adults do: for example, developing life skills, finding a job, a home, and a support network. However, he will be at an even further disadvantage, because he has been raised and indoctrinated in a prison environment from a very young age. He will have grown and developed in a world comprised almost exclusively of adult men fighting for survival and respect, and then will be expected to understand and thrive in what is essentially an alternate universe outside of prison. The danger is that these conditions make the hope of a meaningful chance of life outside of prison a cruel illusion, since the sentence itself prevents them from the maturation and development of the qualities that would make that possible.

There is a persuasive argument to be made that the mandate of *Graham* cannot be fulfilled without providing juveniles opportunities and procedures that do not exist in adult prison. Appropriate alternatives might include affording juveniles periodic review hearings after they are sentenced, designing special facilities and programs for these juveniles that will support healthy development, or imposing a sentencing cap for juveniles of, for example, 15 or 25 years. It is important that we invest in these children early, work hard on supporting their reentry, and release them when they are ready.

It is clear that the juvenile justice landscape has changed. Colorado has been charged by the U.S. Supreme Court with finding a way to give meaning and purpose to its directive in *Graham* that each child sentenced to prison be given a meaningful opportunity for release.¹²⁷ Given the accepted and growing knowledge about adolescent brain

¹²⁶ *Graham*, 560 U.S. at 79.

¹²⁷ *Id.* at 75.

development and the clear direction provided by the Supreme Court in *Roper*, *Graham*, and *Miller*, the appropriate guideline for sentencing juveniles might be, "What kind of sentence, and sentence length, will provide this child who has been found guilty of a serious crime the best opportunity to develop the qualities and characteristics that will earn him the right to be released from prison to rejoin the larger community?" Instead, by using estimates that overestimate the length of life of the juveniles being sentenced, the Colorado Court of Appeals is systematically decreasing their chances at surviving until they are eligible for a parole hearing. The conditions of prison and the low rate of discretionary parole further diminish the likelihood that children who are sentenced to long prison sentences in Colorado will ever be released. The question being asked seems to be, "How long a sentence can we impose on children and still be in compliance with *Graham*?"

It calls to mind the long road after the landmark decision in *Brown v. Board of Education*.¹²⁸ Thurgood Marshall drew on studies by psychologists to demonstrate the lifelong damage to black children who were stigmatized by the "separate but equal" doctrine.¹²⁹ By 1956, 82 of 106 Southern congressmen signed the Southern Manifesto and called for resistance to "forced integration."¹³⁰ Some states made it illegal for the NAACP to operate within their boundaries.¹³¹ Prince Edward County, Virginia, chose to *close* all of its public schools in 1959 rather than integrate them.¹³² The University of Mississippi did not admit its first black student until 1962.¹³³ In 1963, riots exploded in Birmingham, Medgar Evers was assassinated, and a bomb killed four girls at a black church. In 1964, the Supreme Court ordered Prince Edward County to reopen its schools.¹³⁴ The Civil Rights Act and the Voting Rights Act were passed in 1964 and 1965, respectively. The Court's mandate had been ignored, resisted, and circumvented. This time, the courts must aim

¹²⁸ *Brown v. Board of Education*, 347 U.S. 483 (1954).

¹²⁹ *Id.* at footnote 11.

¹³⁰ See *The Southern Manifesto of 1956*, HISTORY, ART & ARCHIVES, U.S. HOUSE OF REP., <http://history.house.gov/HistoricalHighlight/Detail>.

¹³¹ Dorothy Autrey, *National Association for the Advancement of Colored People in Alabama (NAACP)*, ENCYCLOPEDIA OF ALABAMA, available at <http://www.encyclopediaofalabama.org/face/Article.jsp?id=h-1670>

¹³² Katy June-Friesen, *Massive Resistance in a Small Town: Before and After Brown in Prince Edward County, Virginia*, 34(5) HUMANITIES (Sept./Oc. 2013), available at <http://www.neh.gov/humanities/2013/septemberoctober/feature/massive-resistance-in-small-town>

¹³³ Eric Foner, *Give Me Liberty! An American History*, 914-915 (W.W. Norton, 2009).

¹³⁴ June-Friesen, *supra* note 132.

Summer 2014 *There is No Meaningful Opportunity in Meaningless Data* 293

for where we are going instead of finding ways to stay where we are; the courts must not sacrifice an entire generation of young people who had the misfortune to be sentenced after the *Roper*, *Graham* and *Miller* decisions but before we decided to comply with them.

Colorado must find a way to provide children sentenced to prison for non-homicide offenses with a meaningful opportunity for release. The use of life expectancy data does not provide such an opportunity, but instead leads down a path where a juvenile will at best be sentenced based on the color of his skin, raised by other prisoners, and afforded a parole hearing prior to his death, but at worst will die in prison without ever having had the opportunity to appear before a parole board. The hope is that a review of the *Graham* decision, a greater understanding of the limitations of vital statistics, and a reminder of the harsh conditions of prison will spur a deeper, more sophisticated conversation in the legal and judicial community.