

R. Karl Hanson

Public Safety and Emergency Preparedness Canada

**The Validity of Static-99  
with Older Sexual Offenders**

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## **Abstract**

Static-99 (Hanson & Thornton, 2000) is the most commonly used actuarial risk tool for estimating sexual offender recidivism risk. Recent research has suggested that its methods of accounting for the offenders' ages may be insufficient to capture declines in recidivism risk associated with advanced age. Using data from 8 samples (combined size of 3,425 sexual offenders), the present study found that older offenders had lower Static-99 scores than younger offenders and that Static-99 was moderately accurate in estimating relative recidivism risk in all age groups. Older offenders, however, displayed lower sexual recidivism rates than would be expected based on their Static-99 risk categories. Consequently, evaluators using Static-99 should consider advanced age in their overall estimate of risk.



## The Validity of Static-99 with Older Sexual Offenders

Evaluators interested in making long-term predictions about the recidivism risk of sexual offenders often rely on actuarial tools (Association for the Treatment of Sexual Abuser, 2005; Doren, 2002). Actuarial tools specify the items to be considered and provide explicit rules for combining these items into an overall evaluation of risk. Actuarial tools are more accurate than unguided clinical judgement (Hanson, Morton & Harris, 2003); furthermore, they improve procedural justice by articulating the basis of decisions having serious consequences for individuals.

For the assessment of sexual recidivism risk, the most commonly used actuarial risk measure is the Static-99 (Hanson & Thornton, 2000). In the 2002 Safer Society Survey (McGrath, Cumming & Burchard, 2003), Static-99 was used in approximately half the treatment programs surveyed. The next most common measure (used in 35% of the programs) was the Rapid Risk Assessment for Sexual Offence Recidivism (RRASOR; Hanson, 1997), which is a subset of Static-99 items. The reason for Static-99's popularity is that it is easy to score and as accurate as other actuarial measures (Hanson & Morton-Bourgon, 2004).

The authors of Static-99, however, have never claimed that it provides a complete and comprehensive assessment of sexual recidivism risk. Because it addresses only static, historical factors, Static-99 does not directly measure the enduring psychological traits that are presumed to motivate sexual offending (e.g., deviant sexual interests, lifestyle instability, intimacy deficits; Beech, Fisher & Thornton, 2003; Beech & Ward, 2004). As well, other ways of defining static factors could add information not captured in Static-99 (Hanson & Thornton, 2003).

One factor worthy of further examination is advanced age. Hanson (2002b) found that the risk for sexual recidivism was lower among older offender than among younger offenders. Less than 5% of the offenders over 60 were detected committing a sexual offence compared to over 20% for offenders in their twenties. Hanson concluded that the decline was linear for rapists and curvilinear for extrafamilial child molesters, who demonstrated the highest risk of recidivism during the late twenties and early thirties. In a re-analysis of Hanson's (2002b) data, Barbaree, Blanchard and Langton (2003) concluded that the decline was linear after the age of 25 for rapists, incest offenders and extrafamilial child molesters.

It is doubtful that Static-99 captures the effect of age across the full life span. Static-99 contains one point for "Age less than 25", but no further credit is given for advanced age. Furthermore, Barbaree et al. (2003) found that considering advanced age improved the accuracy of risk prediction once RRASOR scores were considered (RRASOR contains the same item "Age less than 25" as does Static-99). As well, Hanson and Thornton (2003) recommended greater weight be given to age in Static-2002 (4 age categories; 3 points out of 14) than it had been given in Static-99 (2 categories; 1 point out of 12). To my knowledge, however, there has not been a direct test of whether advanced age contributes information to risk assessment beyond that given by Static-99 scores.

The purpose of the present study was to examine the combined effect of age and Static-99 scores on the prediction of sexual recidivism. The low recidivism rate of older offender may be attributable to the older offender being low risk to begin with, and any age related effects may diminish or disappear when controlling for other risk factors. As well, the study addressed the question of whether age-related reductions in recidivism rates are observed for all offenders. Two potential mediating variables

were victim age (rapist versus child molester) and initial risk. It is possible that age related declines would be found only for low risk and moderate risk offenders, but not high risk offenders (who have already demonstrated considerable persistence in sexual offending). The data used to examine these questions came from 8 samples of sexual offenders, drawn from Canada, the US, and the United Kingdom (combined sample of 3,434).

## Method

### Static-99

Static-99 (Hanson & Thornton, 2000) is an actuarial risk tool designed to predict sexual and violent recidivism among adult male sexual offenders. It contains 10 items: Age less than 25, Never lived with a lover for two years, Any prior convictions for non-sexual violence, Any current convictions for non-sexual violence, 4 or more prior sentencing dates, Prior sexual offences, Non-contact sexual offences, Any male victims, Any unrelated victims and Any stranger victims (see Harris, Phenix, Hanson & Thornton, 2003 for detailed coding rules). All items are accorded one point, with the exception of Prior sexual offenders, where up to 3 points can be given. Previous studies have found high levels of rater reliability ( $r \approx .90$ ; Harris et al., 2003, p. 79), and moderate accuracy in predicting sexual recidivism risk (average  $d$  of .63, based on 5,103 offenders from 21 studies; Hanson & Morton-Bourgon, 2004). Risk categories are based on the following raw scores: 0-1 “Low”, 2-3 “Moderate-Low”, 4-5 “Moderate-High” and 6-12 “High”.

### Samples

An overview of the samples can be found in Table I. Racial ethnicity was not recorded for most samples, but given the demographics of the jurisdictions from which they were selected, the offenders would be expected to be predominantly white. All offenders were adult males (18 years old or older at time of release). Five of the 8 samples were included in Hanson’s (2002b) age study and three were included in Hanson and Thornton’s (2000) Static-99 study. Subjects were retained for analysis if data was available concerning age at release, survival time to sexual recidivism, and 7 of the 10 Static-99 items.

Canadian Federal – 1991 to 1994 Releases (Motiuk, 1995; see also Motiuk & Brown, 1993; Motiuk & Brown, 1996). This study followed a group of sexual offenders released by the Correctional Service of Canada (CSC) between 1991 and 1994. In Canada, CSC is responsible for all offenders serving a period of incarceration of two years or more. The offenders in this group were those who were reviewed in 1991 (see Motiuk & Porporino, 1993) while they were still incarcerated. Follow-up information was coded from 1994 RCMP records, which includes convictions from all jurisdictions in Canada. Non-contact sex offences were approximated by index convictions for exhibitionism; Sentencing occasions for anything were approximated by twice prison sentences.

Canadian Federal – Quebec Region (Proulx, 2004). This sample was drawn from consecutive admissions to CSC’s Regional Reception Centre in Quebec between 1995 and 2000 ( $n = 477$ ; comprising 93% of the sexual offenders in the region). Also included were 10 sexual murders sentenced prior to 1995 who were released after 1996. Follow-up information was collected in 2004 from RCMP records. Information was available to code all Static-99 items.

Millbrook Recidivism Study (Hanson, Steffy & Gauthier, 1993b; see also Hanson, Scott & Steffy, 1995; Hanson, Steffy & Gauthier, 1993a). This study collected long-term recidivism information

Table I. Study Characteristics.

Sample	Total Sample Size	Age ( <i>SD</i> )	Static-99 ( <i>SD</i> )	Child Molesters (%)	Average Years of Follow-up	Sexual Recidivism Rate	Recidivism Criteria
Canadian Federal - 1991 to 1994 releases	229	36.8 (11.2)	2.9 (1.9)	42	2	5.7	Charges
Millbrook, Ontario	186	33.3 (9.8)	3.1 (2.1)	100	23	35.5	Convictions
Institut Philippe Pinel	343	36.2 (10.9)	2.9 (1.7)	70	4	14.9	Convictions
HM Prison Service (UK)	521	35.6 (12.3)	3.0 (2.0)	52	16	25.0	Convictions
Washington State SSOSA	490	36.0 (12.5)	1.3 (1.3)	89	5	6.3	Charges
Manitoba Probation	202	35.5 (12.5)	2.7 (1.8)	56	2	9.9	Charges
Canadian Federal – Quebec	487	42.9 (12.0)	2.7 (2.0)	52	5	6.8	Charges
Dynamic Supervision Project	976	40.0 (13.4)	2.8 (1.9)	53	2	3.0	Charges
Total	3,425	37.9 (12.6)	2.6 (1.9)	63	7	10.9	

(15-30 years) for child molesters released between 1958 and 1974 from Millbrook Correctional Centre, a maximum security provincial correctional facility located in Ontario, Canada. About half of the sample went through a brief treatment program. Recidivism information was coded from RCMP records in 1989 and 1991. Information was not available for Non-contact sex offences. Sentencing occasions for anything was approximated by 2/3 convictions for anything.

Institut Philippe Pinel (Montreal). (Proulx, Pellerin, McKibben, Aubut & Ouimet, 1995; see also Proulx, Pellerin, McKibben, Aubut & Ouimet, 1997; Pellerin *et al.*, 1996). This study focused on sexual offenders treated at a maximum security psychiatric facility between 1978 and 1993. The Institut Philippe Pinel in Montreal provides long term (1-3 years) treatment for sexual offenders referred from both the mental health and correctional systems. Recidivism information was collected in 1994 from RCMP records. Information was not available concerning Stranger victims, Non-contact sex offences, and Index non-sexual violence.

Her Majesty's Prison Service (UK) (Thornton, 1997). This study provided a 16 year follow-up of all sexual offenders released from Her Majesty's (HM) Prison Service (England and Wales) in 1979 ( $n = 573$ ). Recidivism information was based on Home Office records collected in 1995. Very few of the offenders in this sample would have received specialized sexual offender treatment. Information was available to code all Static-99 items.

Washington. (Berliner, Schram, Miller & Milloy, 1995; Song & Lieb, 1995). This data set was created to evaluate Washington State's Special Sex Offender Sentencing Alternative (SSOSA), which allows judges to sentence sex offenders to community treatment. To be eligible for SSOSA, offenders must be facing their first felony conviction for sexual crimes other than first or second degree rape. The sample consisted of 287 offenders who received SSOSA and 300 who were statutorily eligible for SSOSA but did not receive it. The majority of the sample was White (85%). Offenders were convicted between January 1985 and June 1986, with follow-up data collected in December, 1990. Information was missing concerning Prior non-sexual violence and Index non-sexual violence. Any non-contact sex offences was approximated by "index convictions were only exhibitionism or peeping"; Sentencing occasions for anything were approximated by 2/3 convictions.

Manitoba Probation. (Hanson, 2002a). This follow-up study was conducted as an evaluation of a risk scale used by probation officers in Manitoba, Canada. The 202 offenders were consecutive admissions to probation between May, 1997 and February, 1999. Recidivism information was collected in November, 2000, based on RCMP records. Unlike the RCMP records used in the other studies (which included only charges and convictions that went to court), the RCMP records for the Manitoba sample included unresolved charges and cases currently under police investigation. The demographic, victim and offence information was collected by the probation officers in the course of their normal duties. The criminal history variables needed for coding Static-99 were coded by trained research assistants (median  $r = .93$ ; median Kappa = .87). Information was missing concerning male victims.

Dynamic Supervision Project (Hanson, Harris & Thomas, 2005; Harris & Hanson, 2003). Offenders were selected from all provinces and territories of Canada as well as the states of Alaska and Iowa. The aim of this prospective study was to test the validity of a system of risk assessment for sexual offenders on community supervision (probation or parole). Assessments were conducted between 2001 and 2004, with recidivism information provided on an ongoing basis by the officers supervising the cases (up to February, 2005). Of the total sample of 967, 5.7% were developmentally delayed, 11.5% had a history of psychiatric hospitalisation, and 19% were of aboriginal heritage. Static-99 scores were coded by the officers supervising the cases (intraclass correlation of .90,  $n = 60$ ).

### Plan of analysis

The combined effects of Static-99 and age were tested using Cox regression with each sample identified as a stratum (SPSS, 1999). Cox regression controls for time-at-risk and permits both linear and categorical predictors (Cox & Oates, 1984). Specifying each study as strata minimizes variance due to differences in the definitions of recidivism across samples. The exponent of the Cox regression weights can be interpreted as rate ratios, i.e., the change in the recidivism rate for each unit change in the predictor variable.

### Results

The average age at release was 37.9 years ( $SD = 21.6$ ), with a range from 18 to 85. Most of the offenders (83%) were less than 50 years old, 6% was over 60, and 1.5% were over 70 ( $n = 51$ ). Of the total 3425 offenders, 10.9% were charged or reconvicted of a sexual offence at some point during the follow-up period. The five year sexual recidivism rate based on survival analysis was 12.0 (95% confidence interval of 10.6% to 13.4%). The average Static-99 score was in the Moderate-Low range for all samples, with the exception of the Washington State SSOSA sample, where the average score was in the Low range (1.3).

Older offenders had lower Static-99 scores than younger offenders ( $r = -.199$ ; 95% CI of  $-.166$  to  $-.232$ ). When the age item was removed from the Static-99, the remaining items were still significantly correlated with age, although the association was smaller ( $r = -.093$ ; 95% CI of  $-.060$  to  $-.126$ ). For offenders less than 40 years old, the average Static-99 total score was 2.9 ( $SD = 1.8$ ), 2.4 ( $SD = 2.0$ ) for offenders in their forties, 2.3 ( $SD = 2.0$ ) for offenders in the fifties and 1.9 ( $SD = 1.9$ ) for offender older than 60 at time of release.

As can be seen in Table II, age at release made a significant contribution to the prediction of sexual recidivism after controlling for Static-99 scores ( $\chi^2$  change = 17.52,  $df = 1$ ,  $p < .001$ ). The interaction between age and Static-99 scores was not significant, meaning that the amount of age related decrease in risk was the same for all risk levels ( $\chi^2$  change = 0.173,  $df = 1$ ,  $p > .65$ ).

Victim type (884 rapists; 1833 child molesters) did not contribute significantly to the prediction of sexual recidivism once Static-99 and age were considered ( $\chi^2$  change = 2.10,  $df = 1$ ,  $p = .15$ ). The interaction between Static-99 and victim type was also not significant ( $\chi^2$  change = 0.18,  $df = 1$ ,  $p = .67$ ) nor was the interaction between age and victim type ( $\chi^2$  change = 0.68,  $df = 1$ ,  $p = .41$ ) or the three way interaction between Static-99, age and victim type ( $\chi^2$  change = 0.29,  $df = 1$ ,  $p = .86$ ). The rapist/child molester categorization was based on the classifications used by the original researchers and typically involved the predominant (or exclusive) victim type; the precise age limits varied across samples. Offenders with missing data and those classified as “mixed” were eliminated from the above analyses.

When Static-99 scores are controlled, the relationship between age and sexual recidivism risk was not completely linear (see Table II, Block 3b). The curvilinear component was evaluated by entering the variable “(age at release) X (age at release)”, i.e., “age squared”, as a separate step after entering Static-99 and age at release. The Cox regression weight for age cannot be easily interpreted once the curve component is also entered; however, it is possible to use the equation generated by the regression model to identify local maximums and minimums (rates of change of zero; Iversen, 1996). When controlling for Static-99, the recidivism risk increased slightly between age 18 and 30, then

Table II. Cox regression survival analysis for Static-99 and age predicting sexual recidivism.

	<i>B</i>	<i>SE</i>	$e^B$	95% CI for $e^B$		$\chi^2$ change from previous block
				Lower	Upper	
Block 1						150.47***
Static-99	.305	.025	1.36	1.29	1.43	
Block 2						17.52***
Static-99	.302	.026	1.35	1.28	1.42	
Age at release	-.019	.005	.98	.97	.99	
Block 3a						0.17
Static-99	.335	.083	1.40	1.19	1.64	
Age at release	-.016	.010	.98	.97	1.00	
Interaction	-.00089	.00213	.999	.995	1.003	
Block 3b						11.12***
Static-99	.307	.026	1.36	1.29	1.43	
Age at release	.072	.030	1.07	1.01	1.14	
Age <sup>2</sup> (curve)	-.0012	.000395	.999	.998	.999	

\*\*\*  $p < .001$ .

declined thereafter (30 was the local maximum). The shape of the curve was such that offenders over age 41 started to show lower age related recidivism risk than 18 years olds, and that the rates declined gradually thereafter with further increases in age.

When the age item is removed from the Static-99 total score, the curvilinear effect for age (controlling for the additional Static-99 items) was smaller although still statistically significant ( $\chi^2$  change = 3.98,  $df = 1$ ,  $p = .046$ ). In this case, the shape of the curve showed greater decline in the later years than in the earlier years, with the highest risk age being 19 years (near the lower end of the age range). Without controlling for Static-99, the curvilinear effect for age was statistically significant ( $\chi^2$  change = 5.52,  $df = 1$ ,  $p = .019$ ) with a local maximum at 22 years.

Table III presents the five year sexual recidivism rates divided by age and Static-99 risk categories. The recidivism rates and confidence intervals were calculated with the Life Tables Survival routine in SPSS Version 12.0 (SPSS, 2003). The sample size refers to the number starting the interval; not all offenders were followed for the full five years. The average recidivism rates steadily declined from 14.8% in the offenders less than 40, to 8.8% for the offenders in their forties, 7.5% for offenders in their fifties, and 2.0% for offenders greater than 60. Visual inspection of the table indicates similar progressive declines for offenders within each Static-99 risk category. There was, however, one exception: the Moderate-High offenders in their forties had lower recidivism rates (13.8%) than Moderate-High offenders in their fifties (19.4%). Given that the confidence intervals for these estimates overlapped, and that the overall interaction between Static-99 and age was not significant,

there is no evidence that this deviation from the overall trend is more than would be expected by chance.

Although the overall recidivism rates were lower for the older offenders, Static-99 was equally effective at ranking the relative risk of both the younger and older offenders. The overall ROC AUC was .70, and ranged from a low of .66 for the 40-49 age group to a high of .81 for the oldest age group (see Table III). The confidence intervals for the AUC overlapped for all age groups, again suggesting that the predictive accuracy of Static-99 was similar for all age groups. In order to minimize variance due to differing follow-up times across samples, the ROC AUCs were calculated from the survival estimates in Table III, which control for time at risk (rather than the raw recidivism rates).

### Discussion

The present study found that advanced age contributed information to the prediction of sexual recidivism risk after controlling for Static-99 – a commonly used actuarial measure for sexual offenders. When controlling for Static-99 scores, the influence of age was curvilinear between the ages of 18 and 40, with 30 years being the age at greatest risk. In all the analyses (with or without controlling for Static-99 risk factors), there was a steady decline in recidivism rates for offenders after the age of 40 years. The 5 year recidivism rates of offenders over 60 was only 2%, compared to 14.8% for offenders less than 40.

Static-99 was equally good at ranking the relative risk of offenders in all age groups. There was no significant interaction between age and risk level, indicating that the age related decline should be expected for low, moderate and high risk offenders as defined by Static-99.

The current results are specific to one risk instrument, and it cannot be assumed that age would add to the predictive accuracy of other risk instruments. The Sex Offender Risk Appraisal Guide (SORAG; Quinsey, Harris, Rice & Cormier, 1998), for example, assigns points ranging from +2 to -5 for offenders between the ages of 26 and 39 at the time of the index offence; including the full range of age as a separate variable did not improve the prediction of sexual recidivism (Grant Harris, personal communication, June 8, 2002). The results do suggest, however, that Static-99 can be improved by giving more weight to advanced age. In Static-2002 (a similar but distinct measure; Hanson & Thornton, 2003), the following weights captured all the unique variance attributable to age at release: 18 – 24.9 = 3; 25 – 34.9 = 2; 35 – 39.9 = 1; and 50 and older = 0 (i.e., 3 out of a possible 14 total points).

Researchers should continue to strive to find the best method of weighing age in actuarial risk tools, but even optimal age weights would not be expected to result in large increases in the overall predictive accuracy of actuarial measures. There are few offenders in the age categories most influenced by age (i.e., over 60), so how they are treated by an actuarial instrument would make little difference in the scale's overall predictive accuracy. Empirically, scales that give more weight to age than does Static-99 have not demonstrated superior overall predictive accuracy for the prediction of sexual recidivism (Boer, 2003; Hanson & Morton-Bourgon, 2004).

Sexual offender risk assessments are likely to improve as researchers identify the reasons for the age related decreases. The current data was cross-sectional, which means that any apparent age-related declines could be attributed to lower risk offenders being apprehended at older ages. The observation that the Static-99 scores (excluding the age item) were lower for older offenders supports the position that the older offender were different than the younger offenders, and not simply equivalent offenders

Table III. Five year sexual recidivism rates divided by age and Static-99 risk categories.

Static-99 Category	Age at Release									
	18 – 39.9		40 – 49.9		50 – 59.9		60 and older		All ages	
	n	recid.±95%CI	n	recid.±95%CI	n	recid.±95%CI	n	recid.±95%CI	n	recid.±95%CI
Low	503	6.7 ± 2.6	321	5.5 ± 2.9	159	2.5 ± 2.8	112	0.0 ± 0.0	1095	5.2 ± 1.6
Moderate-Low	865	10.3 ± 2.5	260	6.7 ± 4.3	126	4.3 ± 4.4	56	3.0 ± 5.7	1307	8.7 ± 1.9
Moderate-High	520	24.5 ± 4.6	124	13.8 ± 8.0	63	19.4 ± 16.1	25	4.8 ± 9.1	732	21.4 ± 3.8
High	177	37.0 ± 9.1	71	25.7 ± 13.2	32	24.3 ± 22.6	11	9.1 ± 17.0	291	31.6 ± 6.9
All Levels	2065	14.8 ± 1.9	776	8.8 ± 2.5	380	7.5 ± 3.8	204	2.0 ± 2.3	3425	12.0 ± 1.4
ROC AUC (95% CI)	.68	(.65 – .72)	.66	(.58 – .73)	.76	(.66 – .85)	.81	(.68 – .95)	.70	(.67 – .72)

Note : “recid.±95%CI” is the sexual recidivism rate calculated through survival analysis with its 95% confidence interval. “n” is the sample size starting the interval. ROC AUC is the area under the receiver operating characteristic curve.

“grown up”. With increased age, an offender’s total criminal would be expected to increase, which would result in increases in Static-99 scores. Although the age effects remained after controlling for Static-99 risk variables, there could be any number of unmeasured variables that lower the risk of the older offenders.

Hanson (2002b) has argued that older offenders are lower risk because of declining sexual drive, increased self-control and decreased access to victims. Age related declines in sexual drive are supported by decreased sexual activity among older men in the general population (Långström & Hanson, in press) and by decreased arousal in older sexual offenders (Barbaree, Blanchard & Langton, 2003; Blanchard & Barbaree, in press). One question for further research is the extent to which these declines are mediated by poor health. It is quite plausible, for example, that a vigorous 50 year old offender may not show the expected decline in sexual recidivism risk. Although shortened life expectancy effectively lowers long term recidivism risk, it would be useful for evaluators to be able to separate the influences of a) shorten life expectancies from b) other personal characteristics that could mitigate recidivism risk in older offenders. Death records were not available in the current study.

### Implications for applied evaluations

Evaluators using Static-99 should considered advanced age as one factor in their overall estimate of risk. How best to consider age remains unresolved by the current study. The average age of the offenders was 38 years in the current sample (34 years in the Static-99 development samples), so there is little justification for using age to reduce the expected Static-99 recidivism rates for offenders under 40. At the other end of the age range, offenders over 60 appeared substantially lower risk than expected. There were very few offenders over the age of 60, and their recidivism risk was low even when Static-99 scores are controlled. In the 40 – 60 age range, however, there is no clear dividing line where evaluators would be compelled to consider advanced age as a mitigating factor, although some consideration of age could be justified somewhere in this age range.

Although it is possible to compute numeric estimates of the combined effect of Static-99 and advance age using the numbers in Table II and Table III, the stability of these estimates are unknown until they have been replicated in independent samples. Even large samples contain chance variations and unique features that may not generalize to other samples. Consequently, evaluators using Static-99 with older offenders are left with the familiar problem of knowing that a factor external to an actuarial scheme contributes information to risk assessment, but lacking sufficient scientific evidence to formally include the factor in the actuarial measure. How evaluators proceed in the face of this dilemma depends on the confidence they place in the specific actuarial measure, the evidence supporting the external factor, and the potential contribution of other factors considered (or not) in the overall evaluation.



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