

# The Correlation between Therapeutic Massage and Life Expectancy

By Philip Martin McCaulay, FSA, FCA, MAAA, EA

January 6, 2009

An actuarial analysis indicates that therapeutic massage tends to increase life expectancy. There is a positive correlation between the number of massage therapists per 1,000 residents of a state and the life expectancy for that state. As the number of massage therapists per resident increases, the life expectancy tends to increase. Hawaii is the state with the greatest number of massage therapists per resident, 4.17 per 1,000 residents, and is the state with the greatest life expectancy, 78.21 years, as well. Utah and Colorado also place in the top ten in both categories. Utah has 1.45 massage therapists per 1,000 residents a life expectancy of 77.70 years. Colorado has 1.31 massage therapists per 1,000 residents and a life expectancy of 76.96 years. Washington, Maine, Oregon, New Hampshire, Vermont, Connecticut, Montana, and Massachusetts rank in the top twenty in both categories.

The states with lowest concentrations of massage therapists tend to have the lowest life expectancies. Louisiana, Kentucky, Georgia, Mississippi, and Alabama all place in the bottom ten for both number of massage therapists and life expectancy. Alabama has 0.26 massage therapists per 1,000 residents a life expectancy of 73.64 years. Mississippi has 0.29 massage therapists per 1,000 residents and a life expectancy of 73.03 years. West Virginia, Tennessee, Michigan, Illinois, New York, South Carolina, Virginia, North Carolina, Maryland, and Oklahoma rank in the bottom twenty in both categories.

Therapeutic massage increases life expectancy as a result of the positive physiological effects of soft tissue manipulation. The effects of massage on the muscular system include allowing more flexibility, the prevention of stiffness and soreness of muscles, and the removal of metabolic waste. The effects of massage on the cardiovascular system include increasing blood cell counts, increasing stroke volume, and decreasing the heart and pulse rate. The effects on the nervous system include reductions in pain, stress, and anxiety. Massage also improves the function of the lymphatic system.

The chart on the following pages shows the number of massage therapists per 1,000 residents for each of the fifty states, ranked in order from highest to lowest, and the life expectancy by state and the life expectancy rank. The states in the top twenty or bottom twenty of both categories are highlighted. After the chart is a linear regression analysis that develops a formula for estimating life expectancy based on the concentration of massage therapists in a state along with the calculation of the correlation coefficient. The linear regression formula for life expectancy is 74.66 years plus 1.12 times the number of therapists per 1,000, and the correlation coefficient is 0.27.

Other factors besides the concentration of massage therapists, such as age, gender, smoking, marital status, body mass index, type of employment, education and income level as well as differences in health behavior, are significant in explaining differences in life expectancy. Massage therapy is a component of a healthy lifestyle that leads to a greater life expectancy.

State	Massage Therapists per 1000	Therapist Rank <sup>1</sup>	Life Expectancy <sup>2</sup>	Life Expectancy Rank
HI	4.17	1	78.21	1
WA	1.81	2	76.82	12
NM	1.65	3	75.74	25
ME	1.54	4	76.35	19
UT	1.45	5	77.70	3
FL	1.33	6	75.84	24
CO	1.31	7	76.96	6
OR	1.28	8	76.44	18
NH	1.26	9	76.72	15
NV	1.20	10	74.18	45
VT	1.17	11	76.54	17
AZ	1.16	12	76.10	22
TX	0.99	13	75.14	32
DE	0.97	14	74.76	38
CT	0.97	15	76.91	8
MT	0.95	16	76.23	20
AK	0.94	17	74.83	36
MA	0.94	18	76.72	14
CA	0.93	19	75.86	23
WY	0.90	20	76.21	21
ND	0.86	21	77.62	4
MN	0.80	22	77.76	2
NJ	0.78	23	75.42	26
ID	0.78	24	76.88	10
AR	0.75	25	74.33	42

<sup>1</sup> Associated Bodywork & Massage Professionals (ABMP), May 2006

<sup>2</sup> U.S. National Center for Health Statistics, 1989-91 average lifetime in years by state

State	Massage Therapists per 1000	Therapist Rank	Life Expectancy	Life Expectancy Rank
RI	0.73	26	76.54	16
WI	0.70	27	76.87	11
IA	0.70	28	77.29	5
SD	0.69	29	76.91	9
OH	0.68	30	75.32	29
WV	0.68	31	74.26	44
TN	0.65	32	74.32	43
PA	0.64	33	75.38	28
MI	0.62	34	75.04	34
IL	0.58	35	74.90	35
NE	0.58	36	76.92	7
NY	0.57	37	74.68	39
SC	0.56	38	73.51	48
VA	0.55	39	75.22	31
MO	0.54	40	75.25	30
IN	0.53	41	75.39	27
NC	0.51	42	74.48	40
MD	0.51	43	74.79	37
LA	0.45	44	73.05	49
KY	0.42	45	74.37	41
KS	0.35	46	76.76	13
GA	0.34	47	73.61	47
MS	0.29	48	73.03	50
OK	0.27	49	75.10	33
AL	0.26	50	73.64	46

## Linear Regression Analysis

### The Correlation between Massage Therapists per Resident and Life Expectancy

The correlation can be demonstrated by performing linear regression on the two variables, therapists per 1,000 and life expectancy. The formula for life expectancy is 74.66 years plus 1.12 times the number of therapists per 1,000. For example, Pennsylvania has 0.64 massage therapists per 1,000 residents. The life expectancy for Pennsylvania predicted by the formula is 74.66 years plus 1.12 times 0.64, or 75.38 years, which is an exact match of the life expectancy for the state. The formula produces an expected value within 0.9 years of the actual life expectancy for most states. The correlation coefficient  $r$  is 0.27, with 0.0 meaning no correlation and 1.0 meaning a perfect correlation. There is a positive correlation between the number of massage therapists per resident and life expectancy. As the number of therapists per resident increases, the life expectancy for the state tends to increase.

$$Y = m(x) + b$$

**Y = predicted life expectancy**

**x = number of massage therapists per 1,000 residents**

**m = 1.12**

**b = 74.66**

### About the Author

Philip Martin McCaulay is the President of Medical Massage Care Authority LLC and a graduate of Bodymechnics School of Myotherapy and Massage in Olympia, Washington. He writes and publishes study aids for massage therapy licensing and certification examinations, including [Medical Massage Care's Therapeutic Massage National FSMTB Massage & Bodywork Licensing Examination MBLEx Practice Exams](#), [Medical Massage Care's Therapeutic Massage National FSMTB Massage & Bodywork Licensing Examination MBLEx Study Guide](#), [Medical Massage Care's Therapeutic Massage National Certification Practice Exams 2008 Edition](#), and [Medical Massage Care's Therapeutic Massage National Certification Exam Study Guide](#). The books are available from major online retailers and directly from the publisher at <http://stores.lulu.com/martinmccaulay>. Martin has also written and published practice exam books and study guides for licensing and certification exams in the pension, investment, and real estate fields. With a B.A. in Mathematics from Indiana University, Martin is a Fellow of the Society of Actuaries (FSA), a Fellow of the Conference of Consulting Actuaries (FCA), a Member of the American Academy of Actuaries (MAAA), and an Enrolled Actuary (EA). Martin serves on the Education and Examination Committee of the Society of Actuaries.