

Closer to home



“...older farmers, faced with financial difficulties, hint that the only way out may be to commit suicide so that their families can receive their life insurance benefits.”
(Carrie Small, Farm Hotline Coordinator)

Farmer Suicide Deaths in Kentucky,
North Carolina, and South Carolina.
1990-1998
Preliminary Results.

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Purpose

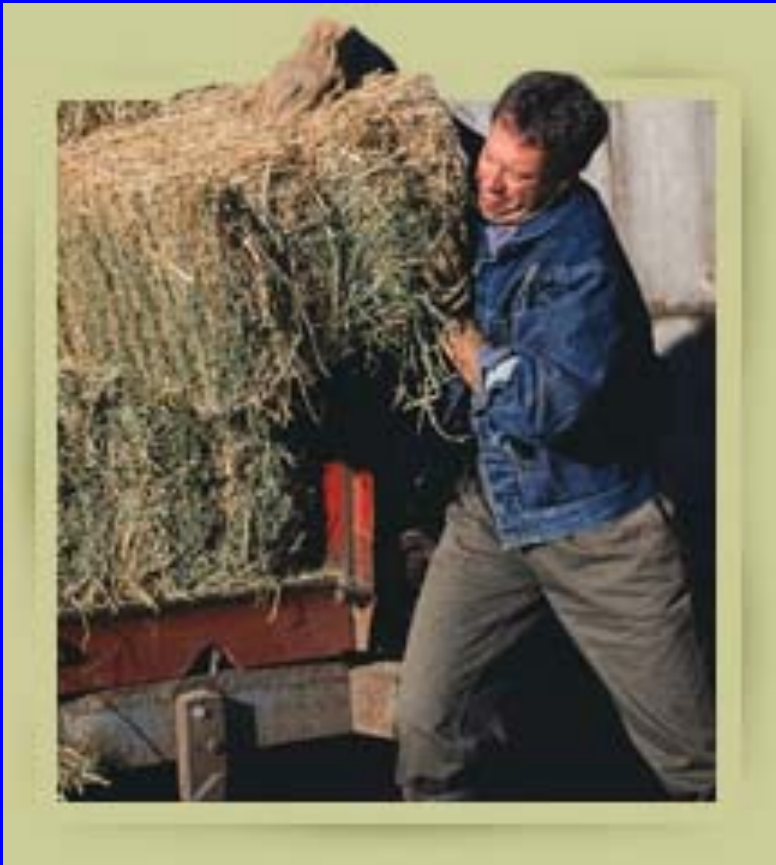
- ◆ Examine the descriptive epidemiology of farmer suicides in Kentucky, North Carolina, and South Carolina from 1990-1998 using death certificate data.
- ◆ Focus on three southeastern states which are the primary producers of tobacco.



Specific Aims

- ◆ Conduct descriptive analysis of farmer suicide deaths as identified by E-codes (ICD 9th revision) and occupation/industry codes in Kentucky, North Carolina, and South Carolina for the period 1990-1998.
- ◆ Compare farmer suicide death rates in these states to total suicide death rates.
- ◆ Evaluate temporal trends in farmer suicide death rates in these states.

Potential risk factors for farmer suicides.



- ◆ Environmental factors
 - farm type (i.e. dairy)
 - season (i.e. Spring)
 - economic factors
 - lack of mental health services
 - weather
 - animal disease outbreaks
 - chemical exposure --> neurotoxic
- ◆ Farmer factors
 - male gender
 - loss of physical abilities
 - chronic disease
 - depression, isolation, lack of support
 - personal finances
 - work load / hours
 - educational level

Research Methods

- ◆ Electronic death certificate data from NCHS for cases for the period 1990-1998.

- ◆ **Case ascertainment.**
 - Death occurred in Kentucky, North Carolina, or South Carolina as a state of residence.
 - E-code of 950-959, which designates suicide and manner of death
 - Occupation code of 473,474,475, 477, 479

- ◆ **Denominator data**
 - US Census data for total population denominators (state specific)
 - Census of Agriculture for estimates of white, male farmers
 - » 1992/1997 census years (linear regression to project inter-censal years)

Analytic Methods

- ◆ Descriptive analysis
- ◆ Graphical presentation of rates / deaths
 - SigmaPlot / ArcGIS (mapping by county)
- ◆ Rates analysis
 - Mantel-Haenszel and DerSimonian-Laird tests of rate ratios for age stratified data
- ◆ Poisson regression analysis
 - analysis of rates for rare events using PROC GENMOD in SAS

Preliminary Results

Case distribution of farmer suicide deaths.

Table 1. Case distribution of suicide deaths in Kentucky, South Carolina, and North Carolina for farmers (Codes: 473,474,475,477, 479) from 1990-1998.

Description	Number	Percent
White male farmer suicide deaths	590	91.5%
Black male farmer suicide deaths	41	6.4%
Other male farmer suicide deaths	1	0.16%
Female farmer suicide deaths	13	2.0%
Total Farmer suicide deaths	645	100%

Distribution of farmer suicide deaths (white males) by Occupational Code.

Table 2. Distribution of Farm Suicide Deaths by Occupational Classification for the 590 White male Farmers in Kentucky, South Carolina, and North Carolina from 1990-1998.

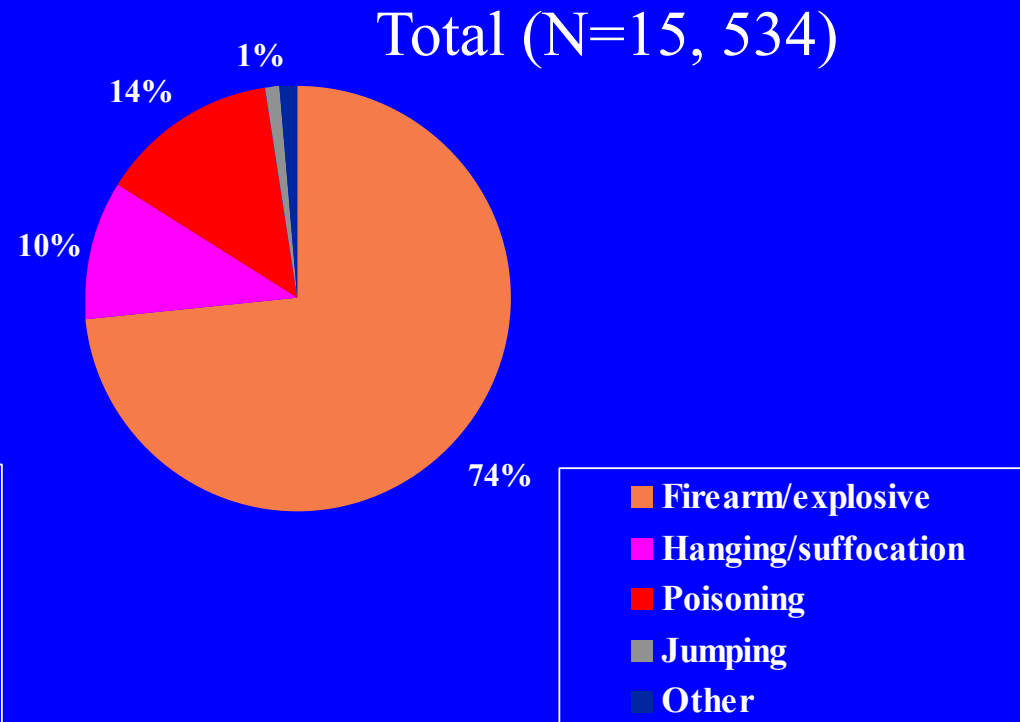
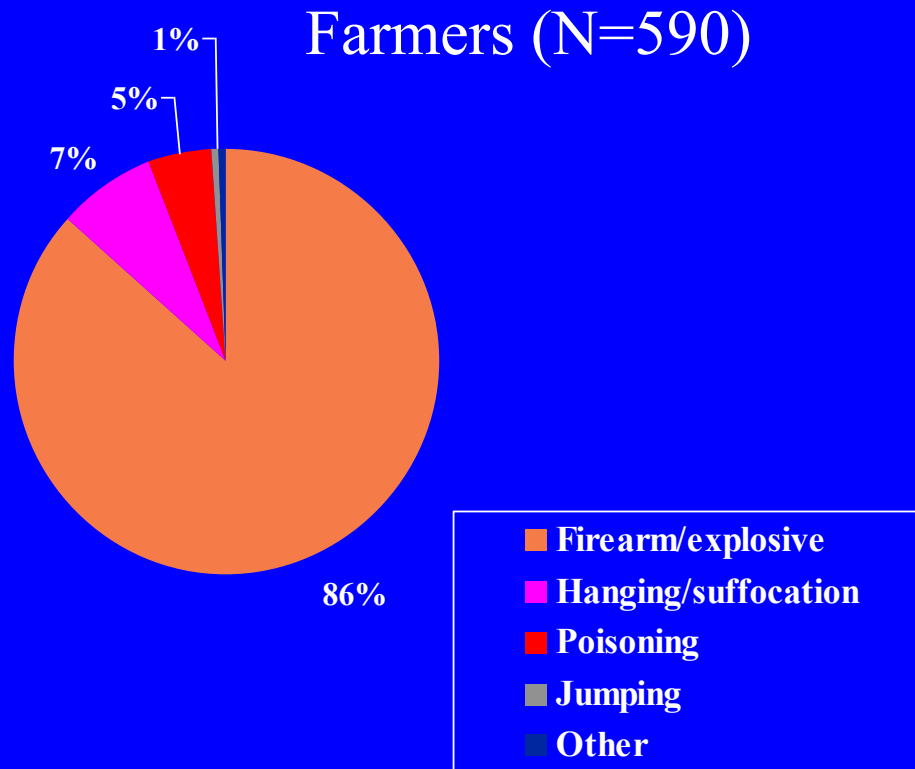
Occupational Code	Title	Number	Percent
473	Farmers, except horticultural	525	89.0%
474	Horticultural specialty farmers	2	0.34%
475	Managers, farms except horticultural	8	1.36%
477	Supervisors, farm workers	3	0.51%
479	Farm workers	52	8.81%
Total		590	100.0%

Distribution of male, white farmer suicide deaths by state and year.

Table 3. Distribution of Suicide Deaths (N) among White Male Farmers by State and Year.

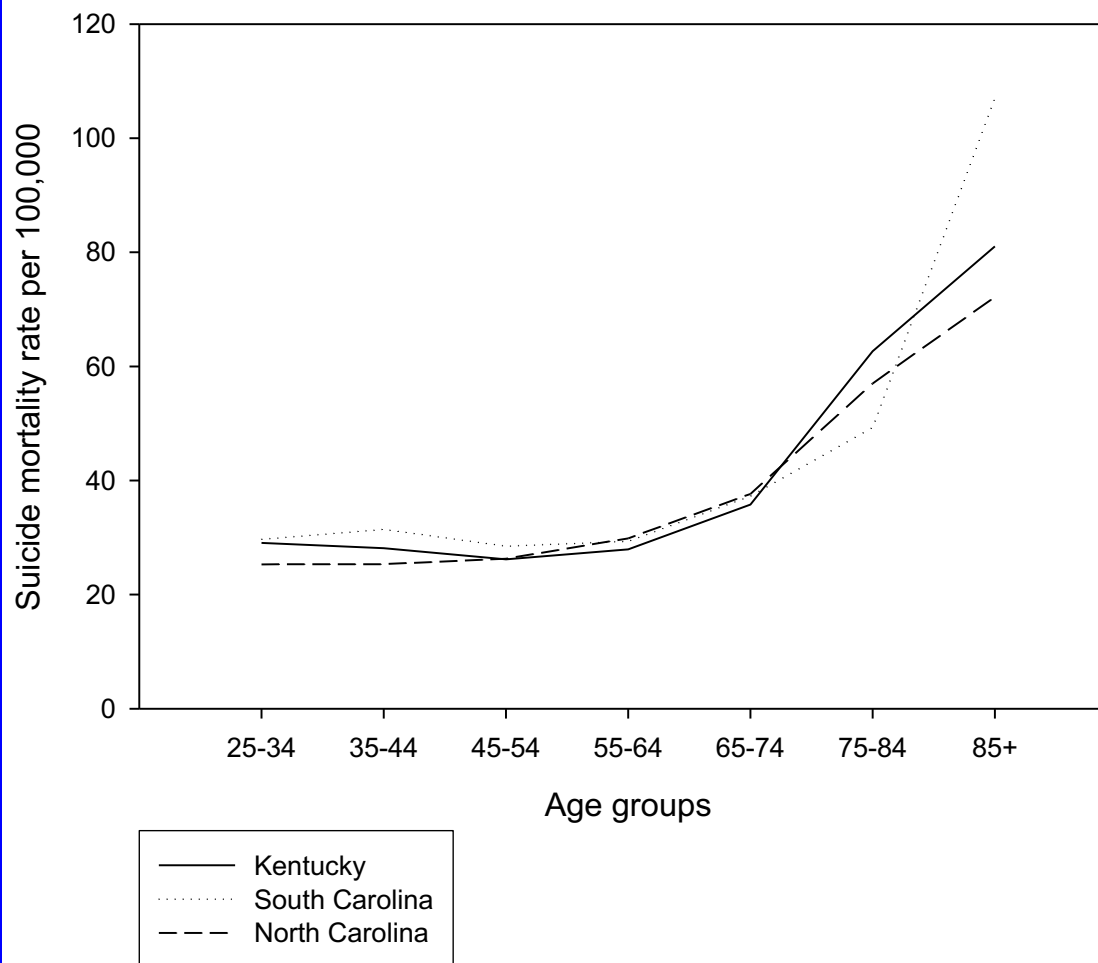
Calendar Year of Death	Kentucky	North Carolina	South Carolina
1990	50	37	9
1991	41	20	9
1992	30	29	13
1993	47	21	11
1994	24	15	5
1995	27	33	0
1996	23	19	4
1997	35	25	2
1998	35	22	4
Total	312	221	57
% of Total	52.9%	37.5%	9.7%

Distribution of cause of death for farmers and total white male suicides for three southern states 1990-1998.

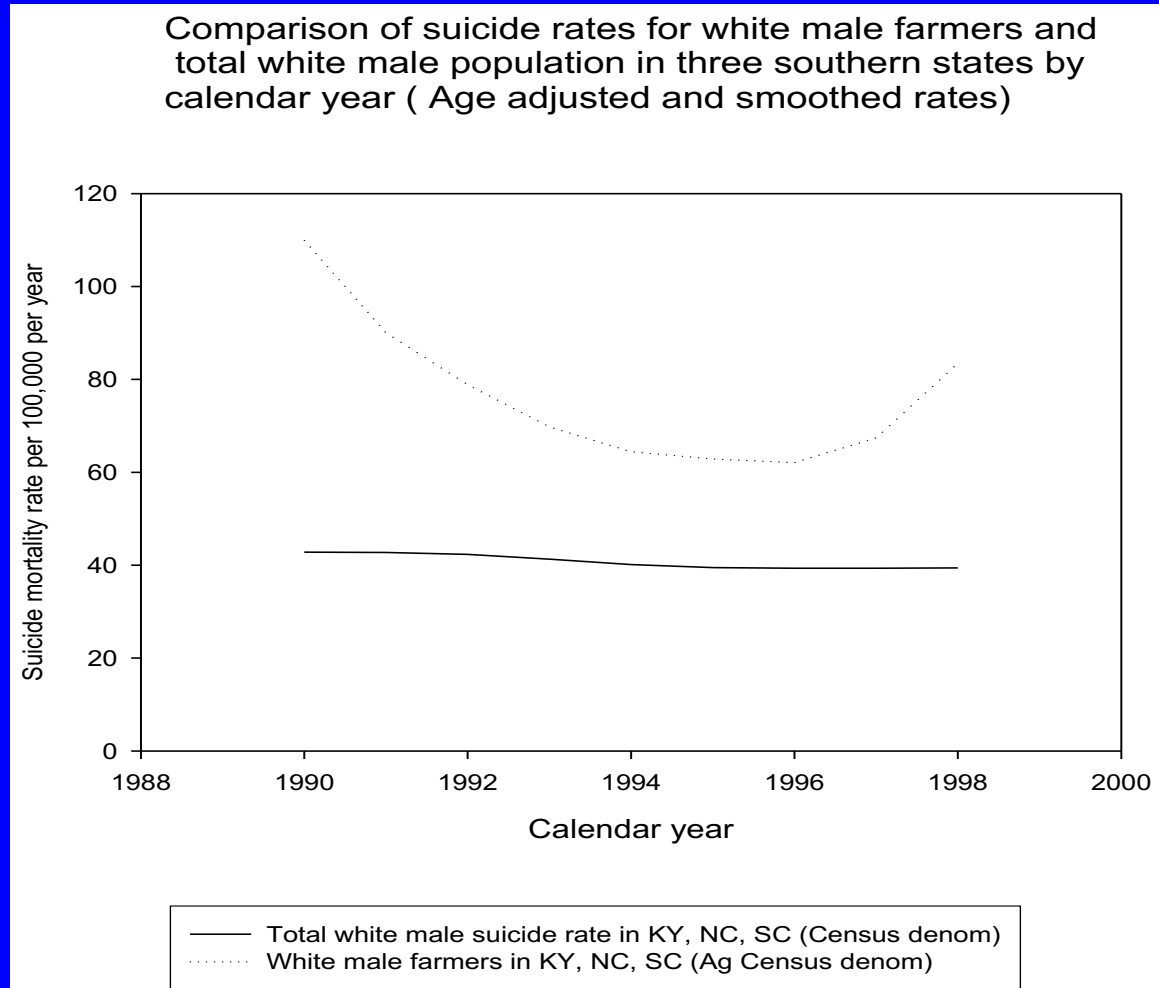


Suicide mortality rates: all white males

Suicide mortality rates for white males in Kentucky, South Carolina, and North Carolina by Age groups, 1990-1998.



Farmer and total rates by year.



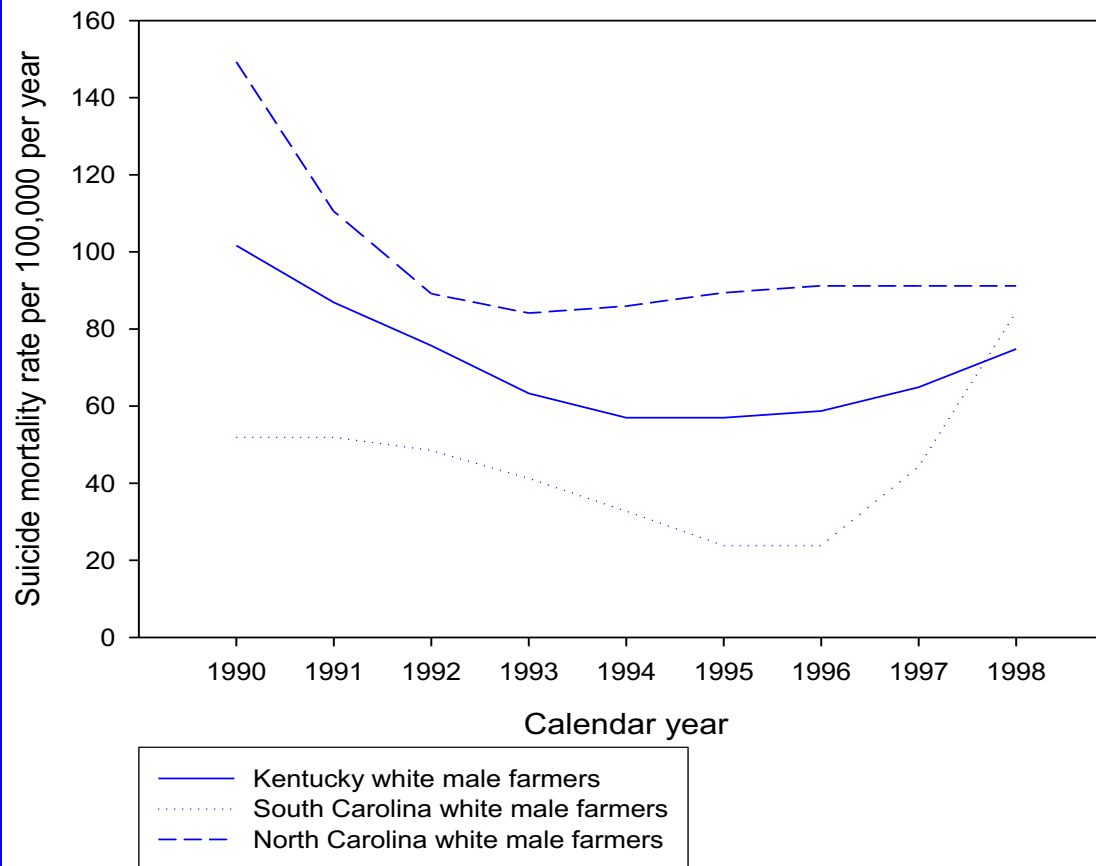
Crude and adjusted rates: White males by state.

Table 5. Crude and adjusted suicide mortality rates for white males compared to white male farmers for three Southern States 1990-1998.

State	Crude rate Per 100,000 (All white males) / Census denom	Crude rate per 100,000 (White male farmers) / Ag stat denom	Age adjusted rate (White male farmers)/Referent: white male population for state. (95% CI)	Rate Difference Farmers-Total Per 100,000 per year
Kentucky	31.15	39.24	39.50 (34.3-45.1)	8.35
North Carolina	29.53	47.26	48.09 (39.63-57.44)	18.56
South Carolina	32.16	30.48	35.51 (22.47-51.43)	3.35

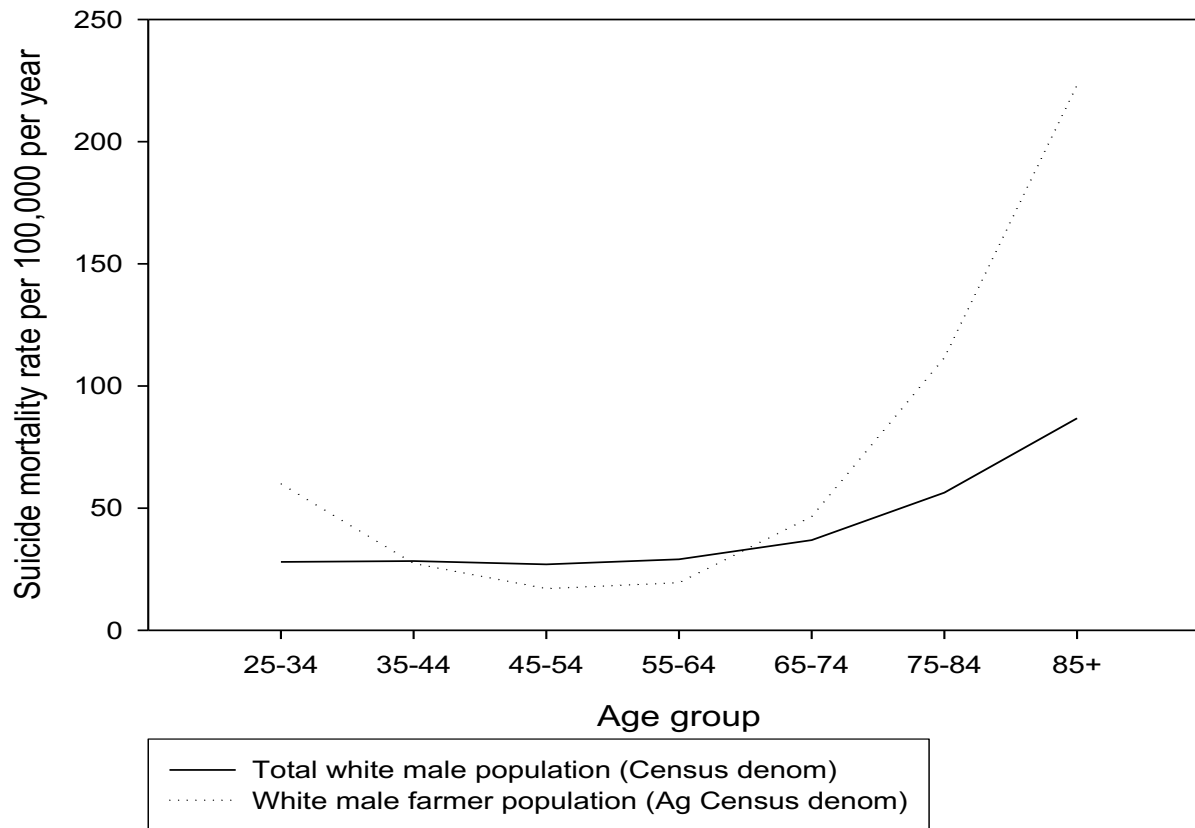
Farmer rates by state and year.

White male farmer suicide mortality rates by calendar time and state from 1990-1998.

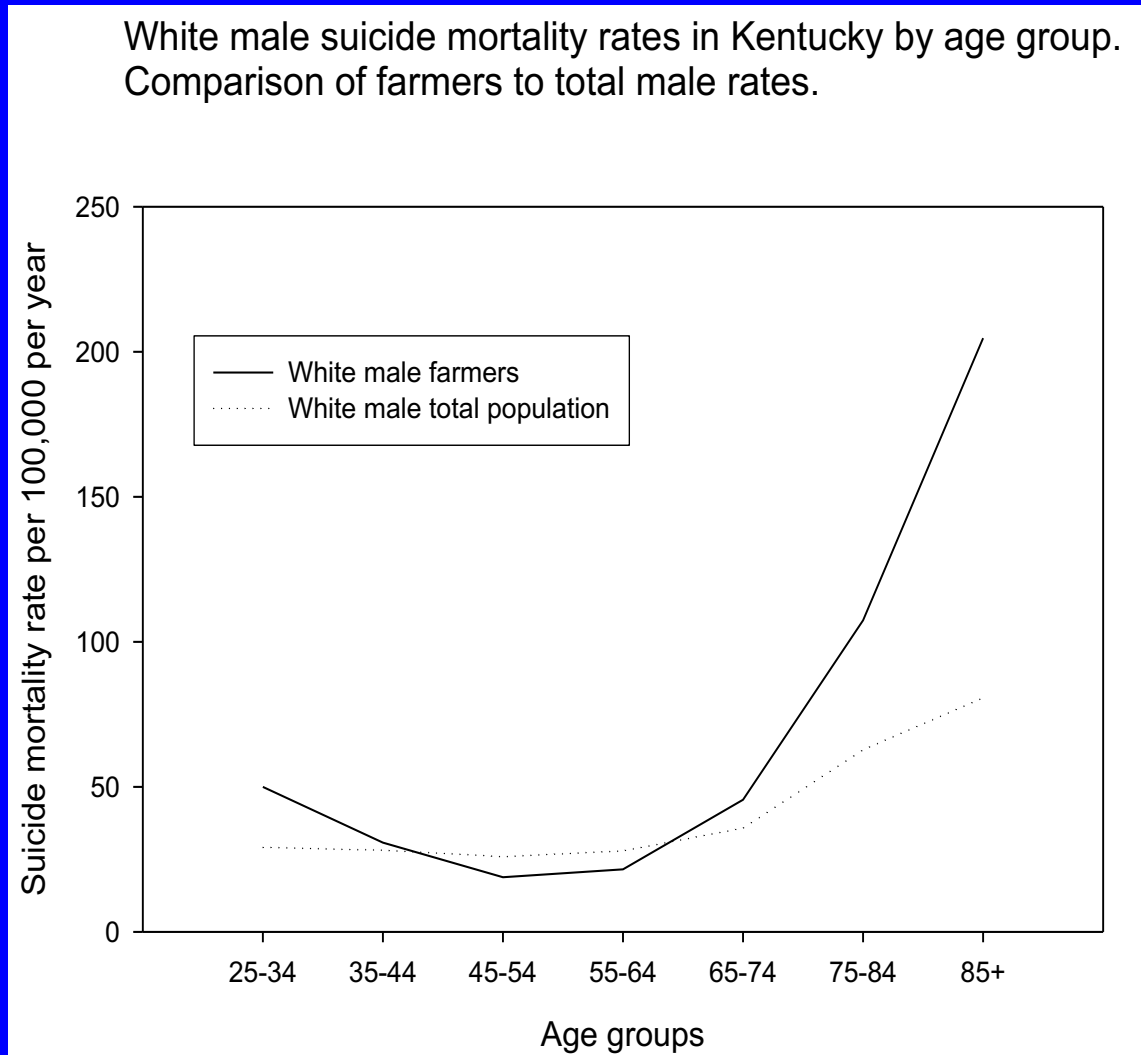


All states: farmer vs. total by age group.

White male suicide mortality rates in three Southern States by Age Group. Comparison of total population to farmers 1990-1998. (Rates adjusted for calendar year)



Kentucky : farmers vs. total rates



Poisson regression of farmer rates.

Table 6. Preliminary Results: Poisson Regression Analysis for White Male Farmer Suicides in Kentucky, North Carolina, and South Carolina. 1990-1998.

Variable	Incidence Density Ratio	95% Confidence Limits
State		
Kentucky	0.82	0.64-0.99
North Carolina	1.00	-----
South Carolina	0.62	0.32-0.91
Age Group		
25-34	1.0	-----
35-44	0.51	0.17-0.85
45-54	0.32	0.04-0.67
55-64	0.38	0.03-0.72
65-74	0.86	0.55-1.17
75-84	2.06	1.76-2.36
85+	4.01	3.66-4.36

Poisson regression analysis, controlling for age group, state, and calendar year.

Findings (to date)

- ◆ Suicide mortality rates for white male farmers are higher than for white males in the total population.
- ◆ The cause of death for the majority of these farmers is by firearm, with the use of rifles and shotguns more prevalent among farmers.
- ◆ Older white male farmers (>75 years) are at increased risk of suicide in comparison to total white male population.
- ◆ Rates of farmer suicides vary by state, with North Carolina having the highest rates of farmer suicide mortality. The largest burden of cases of farmer suicides among three states is in Kentucky.
- ◆ Since 1990, on average, there has been a modest decline in farmer suicide mortality, although a slight increase may be present at the end of the decade.

Comparison of white male suicide mortality rates by study.

Table 7. Comparison of Suicide Mortality Rates Among Kentucky White Male Farmers by Study.

	Suicide mortality rate Stallones (1990) (1979-1985)	Suicide mortality rate Browning et al. (2003) (1990-1998)
Kentucky White Male Farmers	42.2	39.2
Kentucky White Males	30.1	31.2
United States White Males	19.2	-----

Kentucky Males Suicide Deaths from 1990-1998 by Highest Counties.

Table 8. Number of Male Farmer Suicide Deaths in Kentucky Counties from 1990-1998. Highest Counts by County.

County	Number of Male Farmer Suicide Deaths
Henry	10
Barren	9
Adair	8
Fayette	8
Carter	7
Casey	7
Lincoln	7
Scott	7
Taylor	7