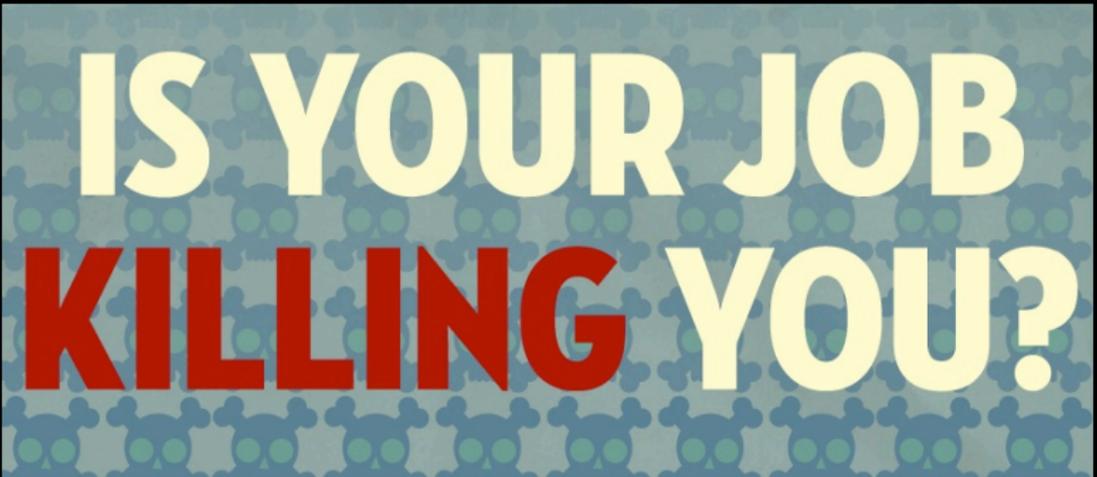


Processing work-history data to quantify occupational exposure using Stata

Ronnie Babigumira Jo S. Stenehjem
Tom K. Grimsrud

Cancer Registry of Norway

13.09.2016



**IS YOUR JOB
KILLING YOU?**

<http://thedinfographics.com/>

Work-related diseases

Globally, cardiovascular and circulatory diseases (35%) and cancers at (29%) were the top illnesses responsible for 2/3 of deaths from work-related diseases

Nenonen et.al 2014

www.notimetolose.org.uk/



WORK CANCER: THE FACTS

**CANCER CAUSED BY WORK CLAIMS THE LIVES OF AT
LEAST 666,000 PEOPLE A YEAR WORLDWIDE.**

1 DEATH EVERY 47 SECONDS

IARC has classified **107** agents, mixtures or exposure circumstances as Group 1 (*carcinogenic to humans*), many of which are encountered in occupational settings.

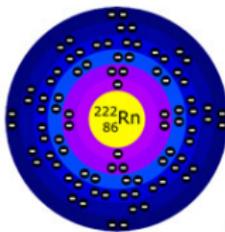
An additional **58** have been classified as Group 2A (*probably carcinogenic to humans*).

Parkin 2011

Asbestos



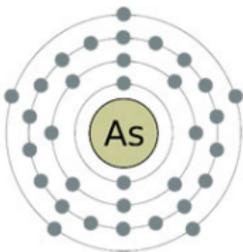
Radon



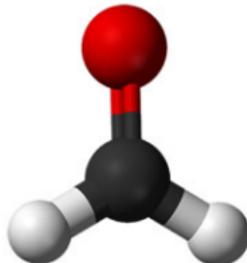
Radiation



Arsenic



Formaldehyde



Metal dust



<http://www.rahmacancercare.com/>



**KEEP CALM
AND**

**SHOW ME
THE EVIDENCE**

<http://sd.keepcalm-o-matic.co.uk>

What evidence?

Cancer risk associated with
exposure to occupational
carcinogens

Challenge?

How to obtain reasonably accurate measurements or estimates of exposure

Estimating exposure

Individual instrument-measured.
Best but..

Self-reported: Bias

Job exposure matrix (JEM):

JEM

What. A tool that assigns exposures based on occupation (tasks)

How: Monitoring reports, work histories, visits, interviews, expert assesment,

Application



Helikopter lander på Snorre by Harald Pettersen (Statoil)

Study population

Norwegian offshore workers (1998
offshore worker survey)

Study population

Norwegian offshore workers (1998
offshore worker survey)

27,917 men & women with at
least 20 days offshore work
between 1965 & 1999

Goal

1. Clean work history

Goal

1. Clean work history

2. Link JEM to estimate exposure

Goal

1. Clean work history
2. Link JEM to estimate exposure
3. Use estimates in risk analysis

Why Stata

1. Complete data-management facilities

Why Stata

1. Complete data-management facilities
2. Publication-quality graphics

Why Stata

1. Complete data-management facilities
2. Publication-quality graphics
3. Extensible (self, ssc)

Clean Work-History

Standing on Shoulders

Tone Eggen & Jo Stenehjem: Mapping detailed Norwegian Job Desc's into SOC

Standing on Shoulders

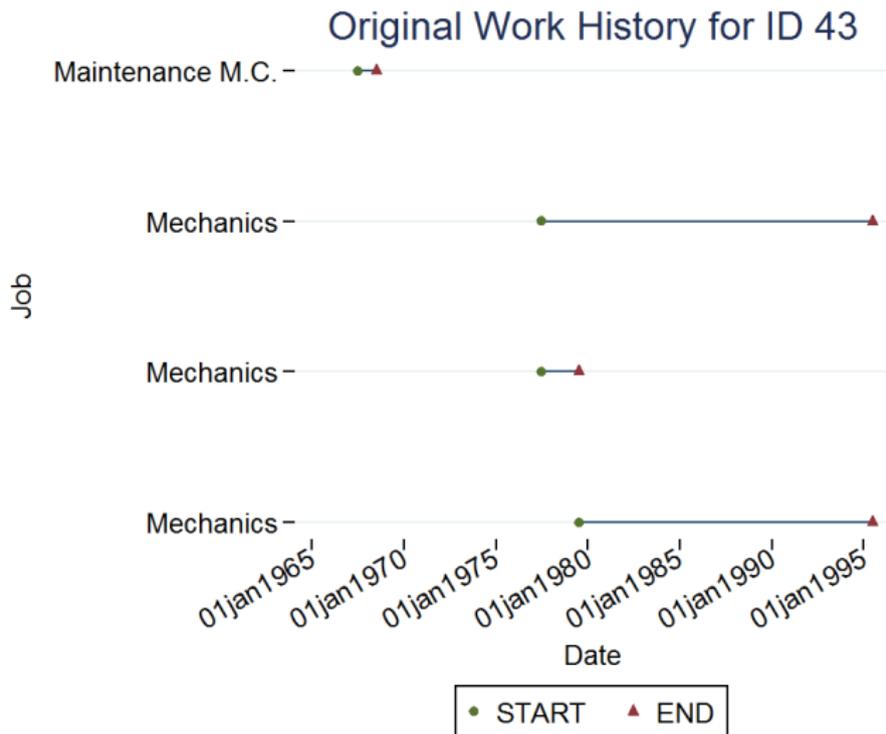
Tone Eggen & Jo Stenehjem: Mapping detailed Norwegian Job Desc's into SOC

KRG (CRONOC), UiB, & Chemical exposure project: JEM

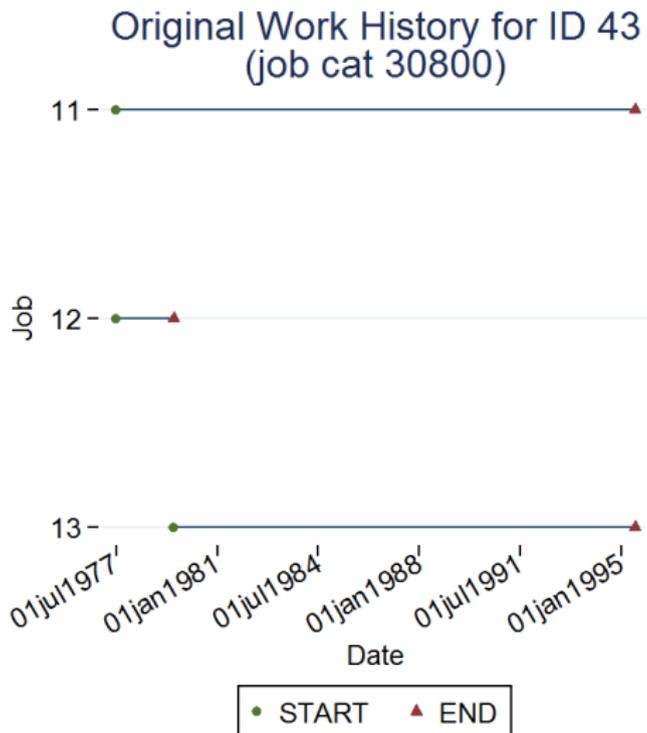
<i>id</i>	<i>job</i>	<i>soc</i>	<i>fromdate</i>	<i>todate</i>
43	10	30000	01jul1967	29jun1968
43	11	30800	01jul1977	23jun1995
43	12	30800	01jul1977	30jun1979
43	13	30800	01jul1979	23jun1995

Merge nested overlapping periods

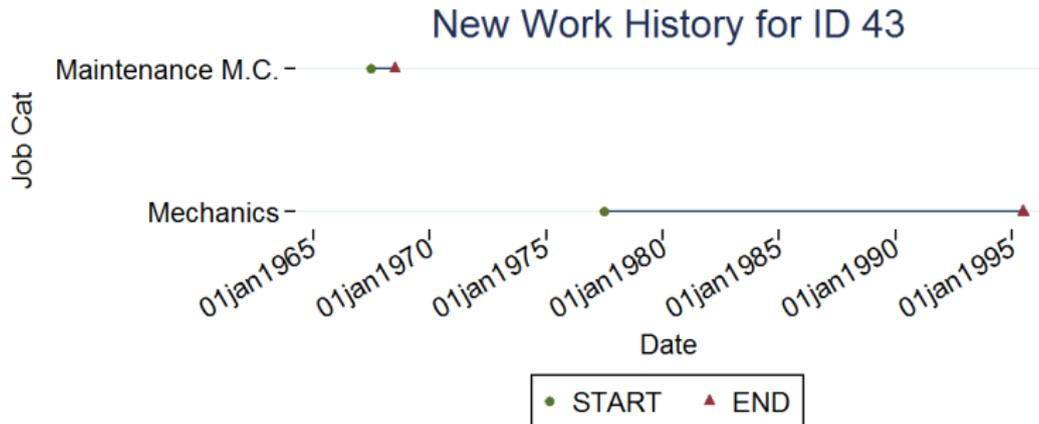
ssc -pairplot-



Merge nested



Merge nested



Overlapping but not nested

<i>id</i>	<i>job</i>	<i>soc</i>	<i>fromdate</i>	<i>todate</i>
2974	14	31 100	01jul1966	30dec1966
2974	10	30000	01jul1966	26jan1975
2974	13	31 100	01jul1967	29jun1968
2974	12	10000	01jul1968	27jun1977
2974	11	31 100	01jul1971	29jun1973
2974	16	30000	01jul1973	30dec1973
2974	15	31 100	01jul1973	30dec1973
2974	20	31 100	01jul1976	22mar1997

Spells

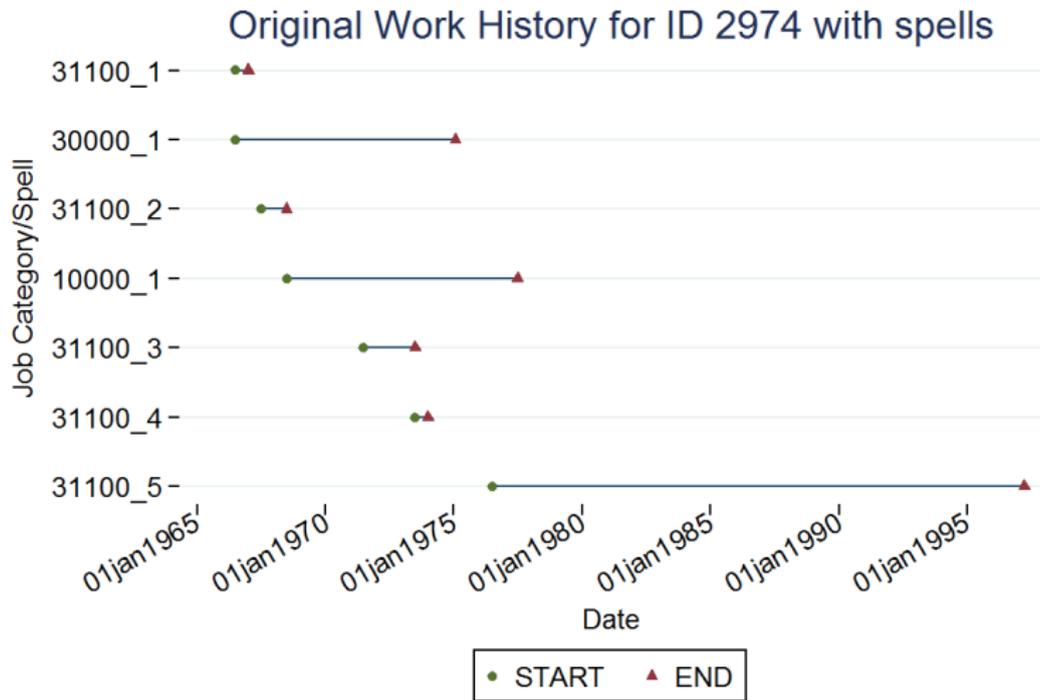
The Stata Journal (2007)
7, Number 2, pp. 249–265

Speaking Stata: Identifying spells

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Abstract. Spells in time series (and more generally in any kind of one-dimensional series) may be defined as sequences of observations that are homogeneous in some sense. For example, a categorical variable may remain in the same state, or values of a measured variable may satisfy the same true–false condition. Devices for working with spells in Stata include marking the start of each spell with indicator variables and tagging spells with integer codes. Panel data are easy to handle with

Spells



The Stata Journal (2015)
15, Number 1, pp. 155–172

newspell: Easy management of complex spell data

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Abstract. Biographical data gathered in surveys are often stored in spell format, allowing for overlaps between spell states. On the one hand, these kind of data provide useful information for researchers. On the other hand, the data structure is often complex and not easy to handle. The `newspell` program offers a solution to the problem of spell-data management with three important features. First, it can rank spells and cut off overlaps according to the rank order. Second, `newspell` can combine overlapping parts of spells into new categories of spells, generating entirely new states. Third, it can detect gaps in the spell data that are not yet coded. It also includes subcommands for the management of complex spell data. Spell states can be merged and filled in with information from adjacent spells, and the data can be transformed to `long` or `wide` format. The command can be used to clean data, to combine two spell-data sources that have information on different kinds of states, or to deal with spell data that are complex by survey design. `newspell` is useful for users who are not familiar with complex spell data and have little experience in Stata programming or data management. For experienced users, `newspell` saves a lot of time and coding work.

Complex spells

Merge

Rank

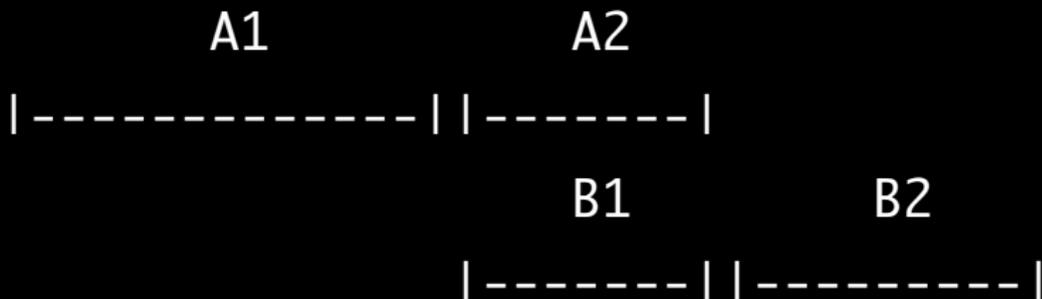
Fillin

Combine

ssc -splitit-



Split spells of this case



JEM link

id	year	days_exp	soc	benz_rat_ann
43	1967	184	30000	0.23
43	1968	181	30000	0.22
43	1977	184	30800	0.96
43	1978	365	30800	1.90
43	1979	365	30800	1.90
43	1980	366	30800	1.90
43	1981	365	30800	1.90
43	1982	365	30800	1.90
43	1983	365	30800	1.90
43	1984	366	30800	1.90

id	year	days_exp	jobcat_jem	benz_rat_ann
43	1985	365	30800	1.90
43	1986	365	30800	1.90
43	1987	365	30800	1.90
43	1988	366	30800	1.90
43	1989	365	30800	1.90
43	1990	365	30800	1.60
43	1991	365	30800	1.60
43	1992	366	30800	1.60
43	1993	365	30800	1.60
43	1994	365	30800	1.60
43	1995	174	30800	0.76

Findings

Stenehjem (2017)

Increased risk of skin cancer on the forearm
and hands related to exposure to aromatic
hydrocarbons in male offshore workers

Stenehjem (2017)

Increased risk of skin cancer on the forearm and hands related to exposure to aromatic hydrocarbons in male offshore workers

Increased risk of melanoma and of non-melanoma related to sunburn frequency and solarium use in male offshore workers.

Thank you