

Mental Health Consequences of the Chernobyl Disaster

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Psychological consequences of disasters

- Excess morbidity from depression, post-traumatic stress disorder, and alcoholism, during the year following a disaster is about 20%.
- The rates vary widely – from 25% to 75% during the first year - depending primarily on the magnitude of the event
- By comparison, in Japan, one-year prevalence = 3% for depression, 0.4% for PTSD, and 2% for alcoholism (defined using DSM criteria).
- After accidents involving radiation, fears start early and the emotional toll goes on for years
 - Addition of health-related anxiety, taking the form of medically unexplained physical symptoms

Multiple factors contribute to persistence

- Fear of cancer and other medical conditions
- Told by MD that health problems due to radiation
- Given specific disaster-related diagnoses
- Rumors and anecdotal reports
- Untelligible communications about radiation
- Contradictory information from 'reliable' sources
- Distrust in authority
- Ecological and socioeconomic disruption (unemployment)
- Stigma
- Media coverage (not always fair and balanced)

Consequences of persistent psychological impairment

- WHO: leading causes of disability worldwide
- Poor physical health
- Complicates recovery from medical conditions
- ↑ use and cost of medical services
- ↓ quality of life
- ↓ productivity and ↑ family stress
- Mortality (not just suicide)

1979 Three Mile Island (TMI) accident: first disaster → systematic sampling and mental health data

President's Commission report (Dohrenwend et al. 1979)

Our research funded by Nat'l Institute of Mental Health:

- Mothers of young children living within 10 miles of TMI, and controls living near nuclear & a coal fired plant
- Their children born shortly before the accident
- Workers at TMI and 2 comparison plants
- Children of workers and mothers at ~age 11

1979 Three Mile Island (TMI) accident: first nuclear power plant accident → systematic mental health data

Mothers

- TMI moms twice as likely as controls to have diagnosable depression/anxiety in year after the accident (25% v 14%)
- ↑ psychiatric symptoms up to 10 years later
- Risk perceptions = persistent and correlated with symptoms
10 y later, 42% of mothers believed health affected by TMI

Two age groups of children: no significant differences

Workers: no significant differences

Chornobyl: 7 y after TMI

- General populations in exposed areas
- Young children
- Clean-up workers (liquidators)

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- General populations in exposed areas

2 studies 6-7 years later

1. Bryansk, Russia: 325 adults in a contaminated village and 278 controls in non-contaminated village
2. Gomel, Belarus: 1,617 adults in Gomel to 1,427 controls in Tver, Russia
 - Used the same standardized mental health questionnaire

Both found that > symptom levels in exposed than controls, especially women

Our research on evacuees in Kiev 11 and 19 years later

Systematic sample of evacuee families with a child who was in utero to age 15 months in 1986

Classmate controls; general population controls (19 y)

Multiple measures of mental health, cognitive function, physical health

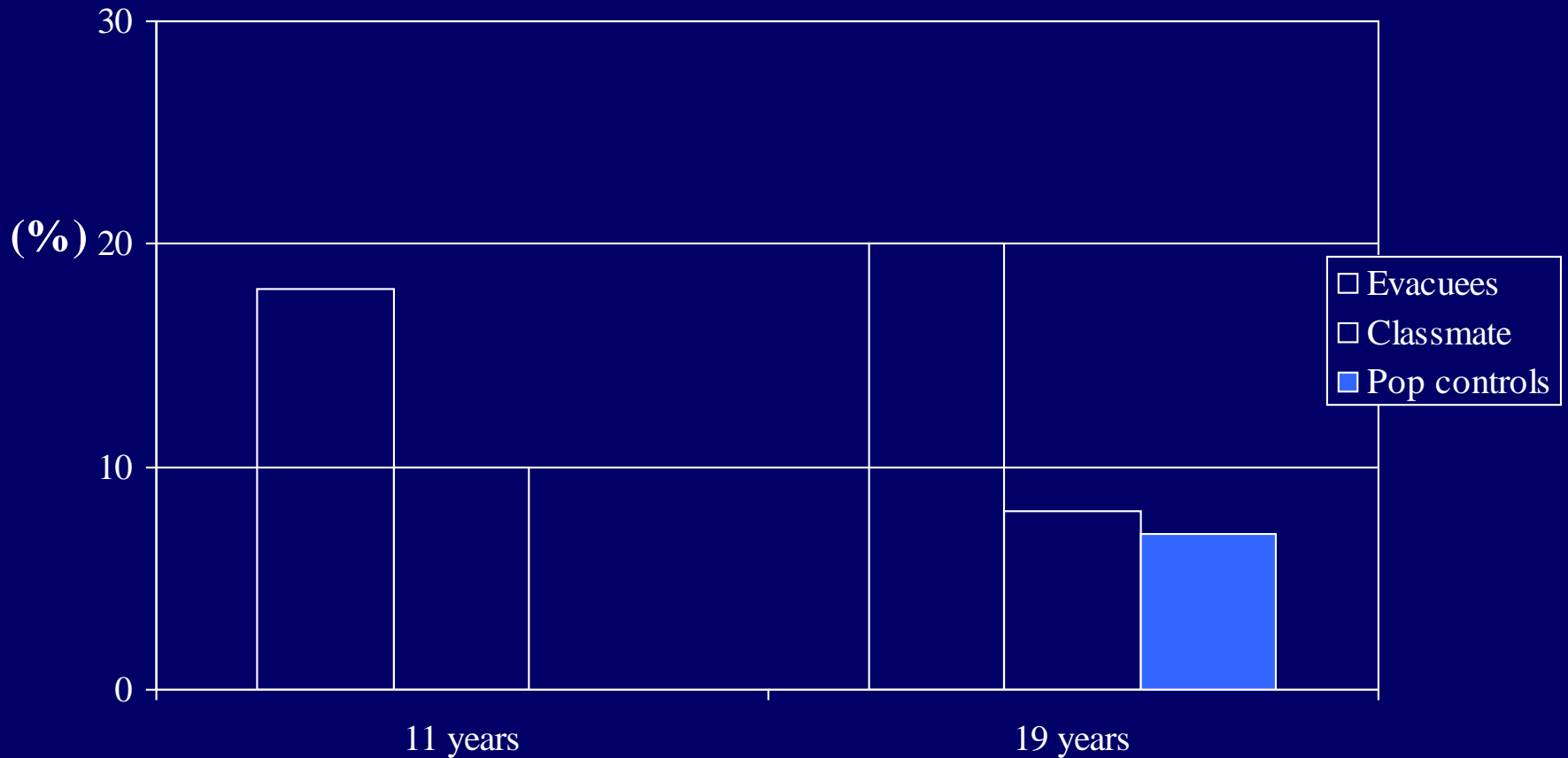
300 evacuee mothers (mostly from Pripyat)

300 mothers of classmates

325 mothers from Kyiv (year 19 only)

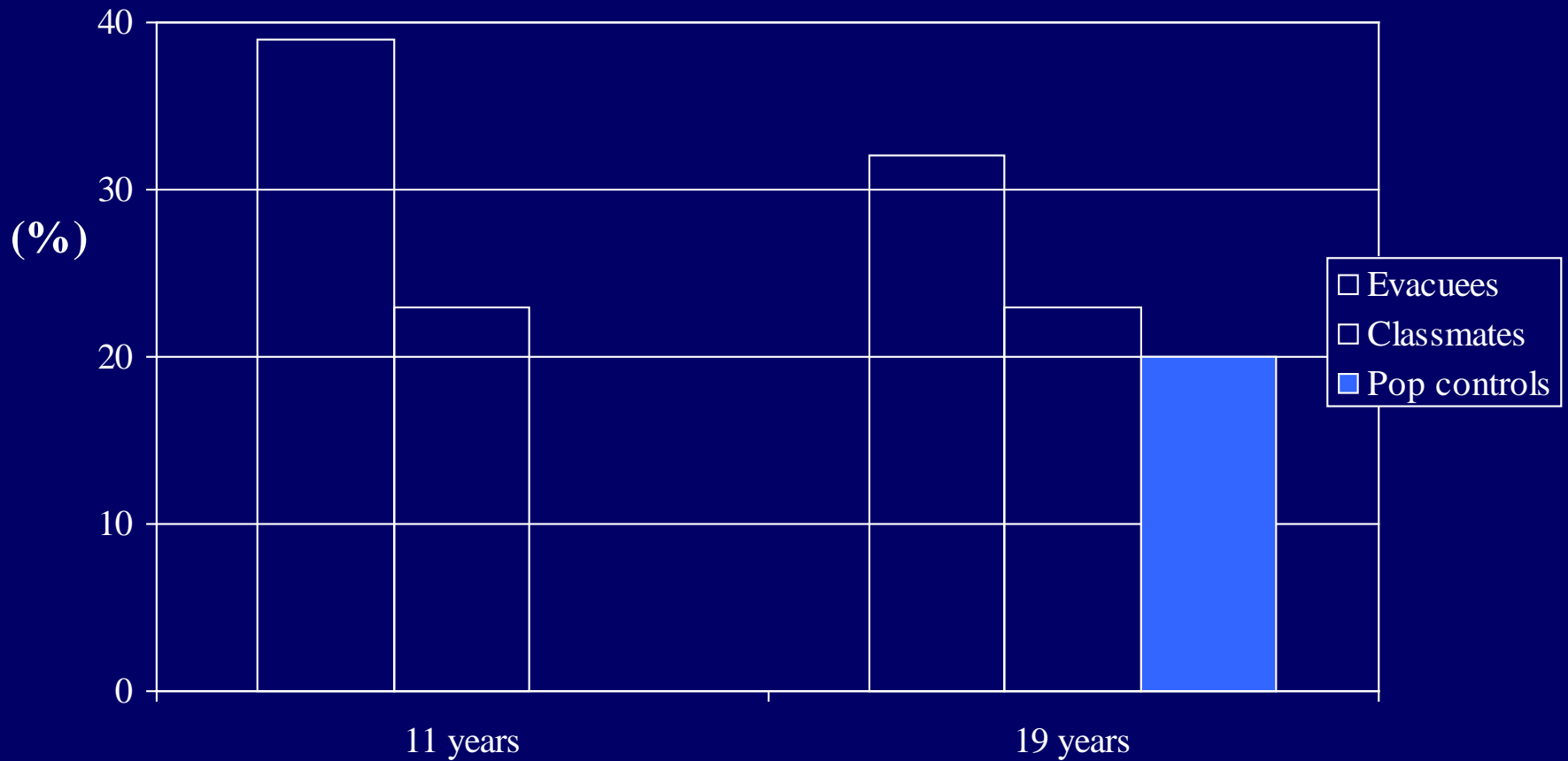
*Funded by NIMH; Bromet et al. 2000

Chernobyl-related post-traumatic stress disorder: Mothers



OR (11 yr vs 19 yr)=4.2; 95% CI=2.3-7.6; strongest risk factor = risk perceptions

Self-rated health = poor/very poor



5 strongest Chernobyl risk factors

Belief that health very adversely affected by
Chernobyl

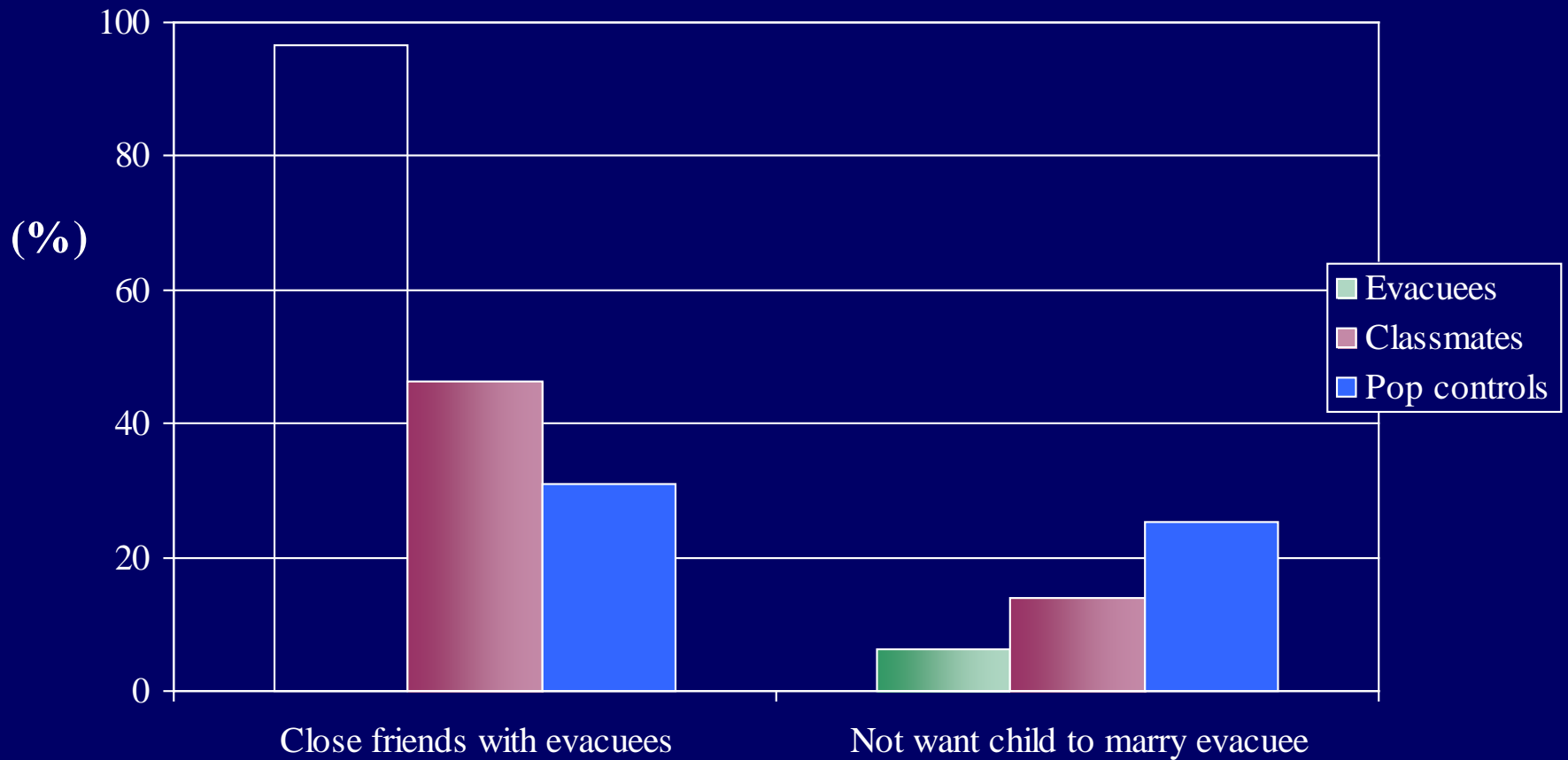
Told by MD that their health problems were due to
Chernobyl

Diagnosed with vascular dystony

Belief that health of future generations very
adversely affected

Distrust in authorities

Evidence of stigma 19 y later



Ukraine World Mental Health Survey: 2002

Prevalence and risk factor study; cross-sectional design

Representative national sample of 4,725 adults 18+ years

Kiev International Institute of Sociology & Ukrainian
Psychiatric Association

After modules on depression, anxiety, neurasthenia,
alcoholism, and service utilization, asked if ever lived in
a Chernobyl-contaminated area or worked as liquidator

Diagnosable major depression since 1986:

Women: 23% exposed vs 19% not

Men: 14% exposed vs 9% not

General population: summary

Long-term emotional effects

Associated with persistent health concerns

Also associated with physician diagnoses

People don't dwell on Chernobyl all the time

*19 y later, 36% of evacuees and 14% of controls say thoughts return to C. often or constantly

But the topic touches off a cascade of negative emotion

In most countries, primary care doctors source of care for common mental disorders

Huge responsibility after disasters of this type

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- Children

Cognitive impairment: findings are inconsistent

Local and international studies of:

memory

intelligence

attention

Internationally-based studies

- WHO International Pilot Study of Brain Damage *In-Utero* (age 7): ns
- Stony Brook/Kyiv at ages 11 and 19: ns
- Israel: adolescents expo *in utero*-age 4: ns
- Norway at age 20: differences on verbal tasks only
- Finland: exposed (b Apr '86 – Jan '87) and non-exposed (b in yr before and after) twins (419 pairs), age 14, >depression (6% v 3%), no other diffs

Local studies in Belarus and Ukraine

1. Ages 6-7; and 10-11
2. Higher rate of mental retardation and developmental delays in exposed vs controls
3. Ukraine: dose-response relationships

Samples/controls? Rater bias? No control for parental alcoholism, IQ

Studies of emotional consequences

1. Local studies also reported $>$ psychopathology
2. Stony Brook-Kiev study:
 - no differences on mental health measures from moms' or teens' perspectives
 - poorer self-rated health at age 19
 - on physician examination and blood test results, no significant differences among the groups

Summary of children's studies

Best evidence shows no significant effect of Chernobyl on the cognitive functioning and mental health of children who grew up in its shadow.

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- Liquidators (clean-up workers)

Neurocognitive impairment from radiation

Emotional consequences of stress

Studies on neurocognitive impairment

RCRM: Radiation → schizophrenia and EEG abnormalities;
recent paper on ARS patients assessed 14 y post

Institute of Gerontology in Kiev: Radiation → accelerated
aging

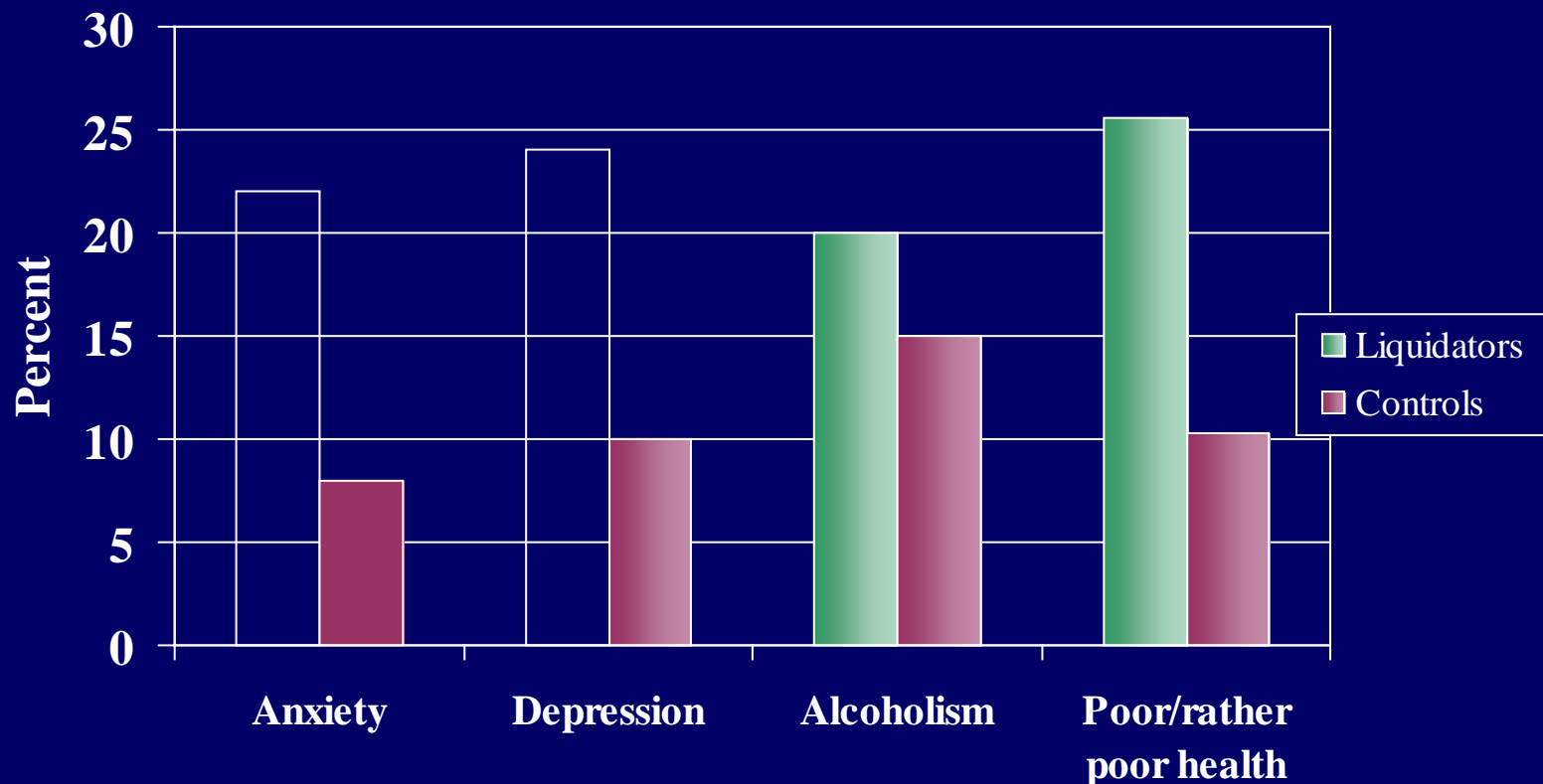
Florida/Kyiv Polytechnic Institute Radiation → impairment in
brain functioning

Methodological questions: samples? Controls? non-blinded
raters, confounding of stress and radiation, if alcoholism
was adjusted – how?

3 systematic studies of emotional consequences

1. Estonian liquidators (Rahu): Significant excess of suicide (1986-2011; SMR=1.3 (CI 1.1-1.6))
2. RCRM/World Mental Health (Loganovsky):
 - ↑ depression, PTSD, suicide ideation and severe headaches in liquidators vs controls
 - liquidators with PTSD and depression had the most functional impairment by far

3. Comparison of 614 liquidators* and 706 age-matched controls in Tallinn 24 years later: mail survey; mean age of both groups = 55



Laidra/Rahu, in preparation

*all liquidators from Tallinn; rr=80%; rr controls 58%

Summary on mental health of liquidators

- Mental health was not studied early on
- Missed opportunity not to include mental health measures in cancer surveillance
- Long-term emotional consequences are compelling

Conclusions

- From Three Mile Island, we know that there were acute mental health effects.
- From Chernobyl, long-term mental health legacy.
- Fukushima published findings:
 - Questionnaire survey of 885 Daiichi and 610 Daini workers in May-June 2011 (Shigemura et al., JAMA August 2012):
 - levels of distress and ptsd symptoms higher in Daiichi workers
 - Discrimination/slurs associated with higher distress

Lessons for Fukushima

- Given physical/mental comorbidity, mental health measures should be integrated into medical research and surveillance studies (and vice versa)
- Educate primary care providers to recognize and manage health anxiety, depression, and impairment in daily functioning after exposure events
- Create alliances with participants (community advisors, community ambassadors, sharing findings directly)

Participants should be the first to hear about findings directly (not from media), and give their feedback



Thank You
Arigato Gozaimasu