

Mental Health Consequences of the Chernobyl Disaster

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Psychological consequences of disasters

- Over the past 100 years, many studies showing that disasters → mental health impact (>20% excess morbidity in 1st year)
 - *Depression
 - *Post-traumatic stress disorder (PTSD)
 - *Health-related anxiety (unexplained medical symptoms)
 - *Substance abuse (including increased smoking)

Disasters involving radiation exposure

Special significance because:

- Most dreaded of all risks (Slovic)
- “invisible contamination” (Lifton)
- Communication about personal exposure level is unintelligible and contradicted by “reliable” sources
- Pose long-term threat to health, including next generation
- Unresolvable fear: no simple declarative statement = your changes of developing disease from your exposure = 0
- Ecological and economic disruptions
- Social disruption: permanent evacuations
- Social stigma

The importance of mental health

Poor mental health →

- A leading cause of disability worldwide (by 2020, depression = 2nd leading causing of disability)
- Failure to achieve educational and occupational potential
- Poor quality of life
- Decreased productivity and family stress
- Poor physical health
- Greater use and cost of medical services
- Mortality (not just suicide)

Small set of publications in English on mental health of a-bomb survivors

↑ Mental retardation (gestation weeks 8-15; Schull)

↑ Somatic complaints

↑ Anxiety, especially about possible “a-bomb” disease

↑ PTSD symptoms

New data by Kim et al. showing that >50 years later, a-bomb survivors had a 5-fold elevated risk of poor mental health compared to controls.

Not associated with schizophrenia or suicide

Findings after the 1979 Three Mile Island (TMI) accident

- ↑ Psychiatric distress and disorders up to 10 years later
- Risk perceptions = persistent over time
 - 42% of mothers believed health affected by TMI 10 yrs later
- No cognitive or psychological effects in young children
- No long-term mental health differences between TMI workers and workers at other nuclear power plants

Chornobyl

- General populations in exposed areas
- Young children
- First response and clean-up workers (liquidators)

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- General populations in exposed areas
 - English, peer reviewed, conducted in FSU

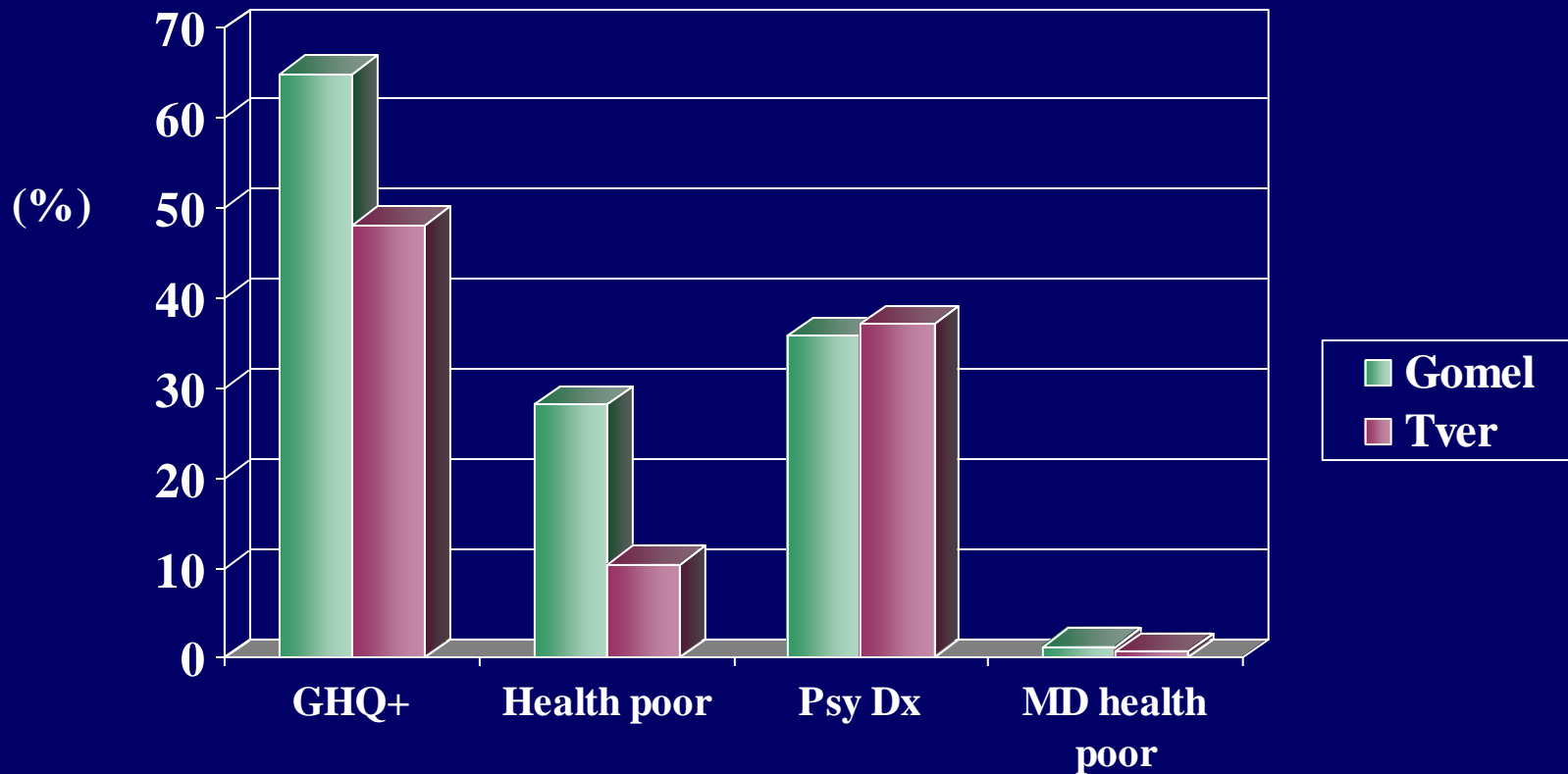
2 studies 6-7 years later

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

Both studies used the General Health Questionnaire (12-item version; GHQ)

Both found that exposed > symptomatic than controls, especially women

Gomel study also included physician exams

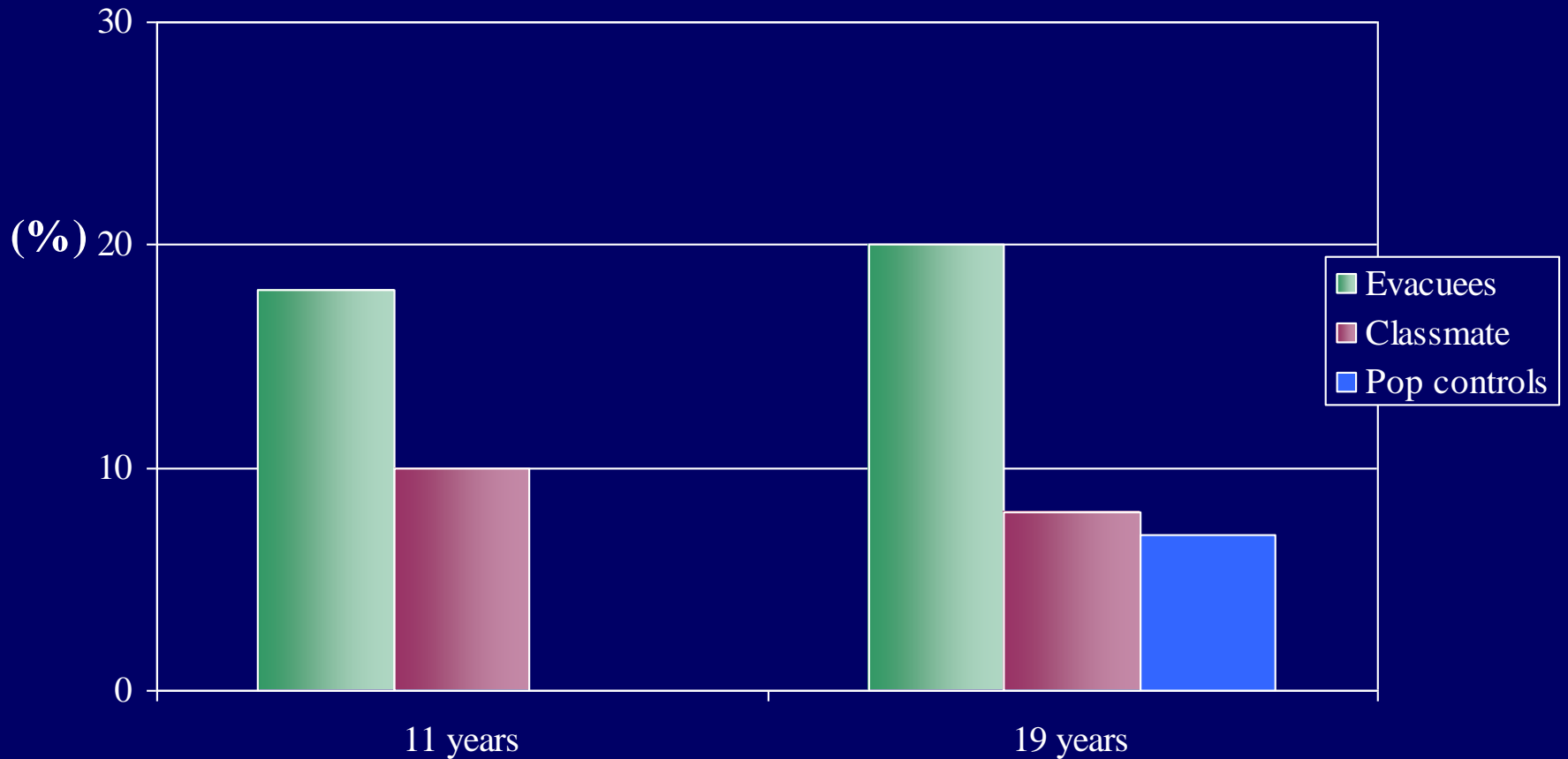


Poor health = score of 5 on a 5-point rating scale

Kyiv, Ukraine: 11 and 19 years later

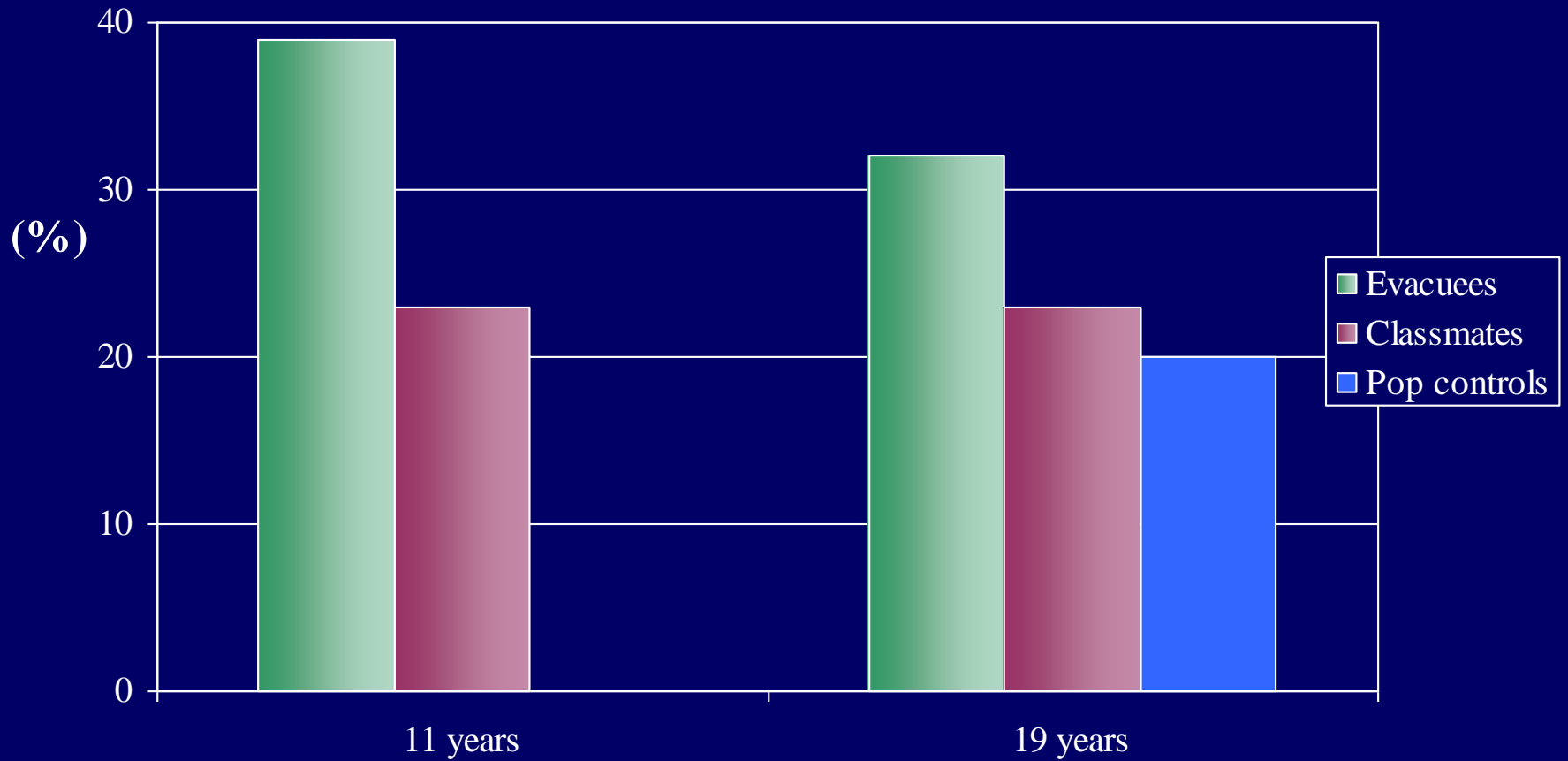
1. 300 evacuee mothers
2. 300 mothers of classmates
3. 325 mothers from Kyiv (year 19 only)
4. Offspring were in utero to age 15 months in '86

Chernobyl-related post-traumatic stress disorder



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



4 powerful risk factors

Belief that health very adversely affected by Chernobyl

Belief that health of future generations very adversely affected

Distrust in authorities

Told by MD that your health problems were related to Chernobyl

Ukraine World Mental Health Survey: 2002

Representative national sample of 4,725 adults 18 years and older.

At end of interview asked if ever lived in area contaminated by Chernobyl or ever worked as liquidator

Diagnosable major depression since 1986:

Women: 23% exposed vs 19% not

Men: 14% exposed vs 9% not

Severe headaches:

Women: 55% exposed vs 45% not

Men: 28% exposed vs 19% not

General population: summary

Long-term psychological and subjective health effects

Fueled by risk perceptions, by distrust in authorities, and MD diagnoses

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- Children

Cognitive impairment: findings are inconsistent

Neuropsychological tests:

memory

intelligence

attention

3 of 6 peer review studies to date found no differences between exposed children and controls

- WHO International Pilot Study of Brain Damage *In-Utero* (age 7)
- Stony Brook/Kyiv at ages 11 and 19
- Israeli study of adolescents expo *in utero*-age 4

Neuropsychological tests of memory, intelligence, attention

Belarus: difference but no dose response relationship

1. Ages 6-7; follow-up ages 10-11
2. Higher rate of mental retardation in exposed vs controls (1.5% vs 0.8%)
3. Differences in developmental disorders
4. No dose-response relationships
5. Attributed differences to socio-cultural factors

Two studies suggest radiation effects:

1. Kiev RCRM study of exposed vs controls (Kharkiv) reported differences in borderline intelligence, mental retardation, and EEG measures; dose-response relationship.
2. Prenatally exposed vs controls in Norway (at age 20); differences on verbal tasks only

NB: controls not appropriate; analysis not adjusted for parental IQ, alcoholism, etc.

Emotional consequences: also inconsistent

1. Kiev RCRM found more psychopathology
2. Twin study in Finland found increased depression and ADHD at age 14
3. Stony Brook-Kiev study:
 - no differences on several mental health measures; highly resilient
 - ↑ poor 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

3 studies on neurocognitive impairment

1. RCRM: Radiation → schizophrenia and EEG abnormalities
 2. Institute of Gerontology: Radiation → accelerated aging
 3. Florida/Kyiv Polytechnic Institute
Radiation → impairment in brain functioning
- All have significant methodological limitations, and findings need to be confirmed
- Stress and radiation exposure = confounded; no adjustment for alcoholism

3 studies on emotional consequences

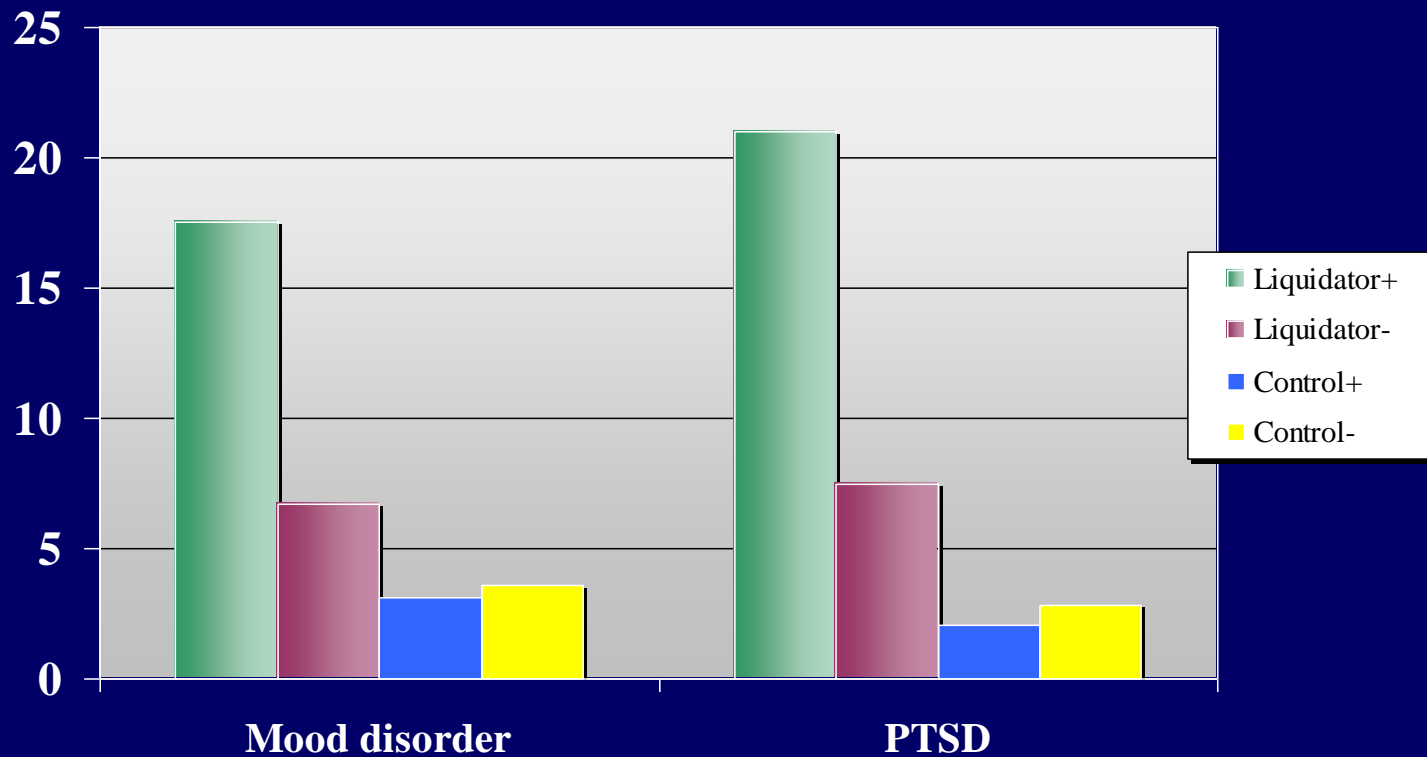
Estonian liquidators: Significant excess of suicide
(SMR=1.52; 95% CI=1.01-2.19)

Latvian liquidators: Increased prevalence of ICD9
depression and psychosomatic disorders

RCRM/World Mental Health:

↑ depression, PTSD, suicide ideation and severe
headaches in liquidators vs WMH controls

Days lost from work in liquidators and controls with (+) and without (-) mood disorders and PTSD in past 12 months



Summary on mental health of liquidators

- Missed opportunity to systematically evaluate whether there were neurocognitive effects
- Emotional consequences are compelling

Conclusions

- The mental health impact of Chernobyl for adults is clear, long-term, tied to risk perceptions, fueled by physicians, consistent with studies of other toxic exposure events.
- **Lessons for future research on Fukushima:**
 - Design a needs assessment with an eye toward developing targeted interventions, especially for high risk groups
 - Integrate mental health measures in medical surveillance to reduce stigma and improve reporting
 - Educate primary care providers to recognize and manage health anxiety, depression, and impairment in daily functioning

Thank You
Arigato Gozaimasu