

# Risk of suicide after exposure to suicide prevention program in the Israeli Defense forces: A cohort study



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# Introduction

- The act of killing oneself
  - Must be deliberately initiated and performed by the person concerned in the full knowledge or expectation, of its fatal outcome
- Global suicide rate 16:100,000
  - Males 18:100,000
  - Female 11:100,000

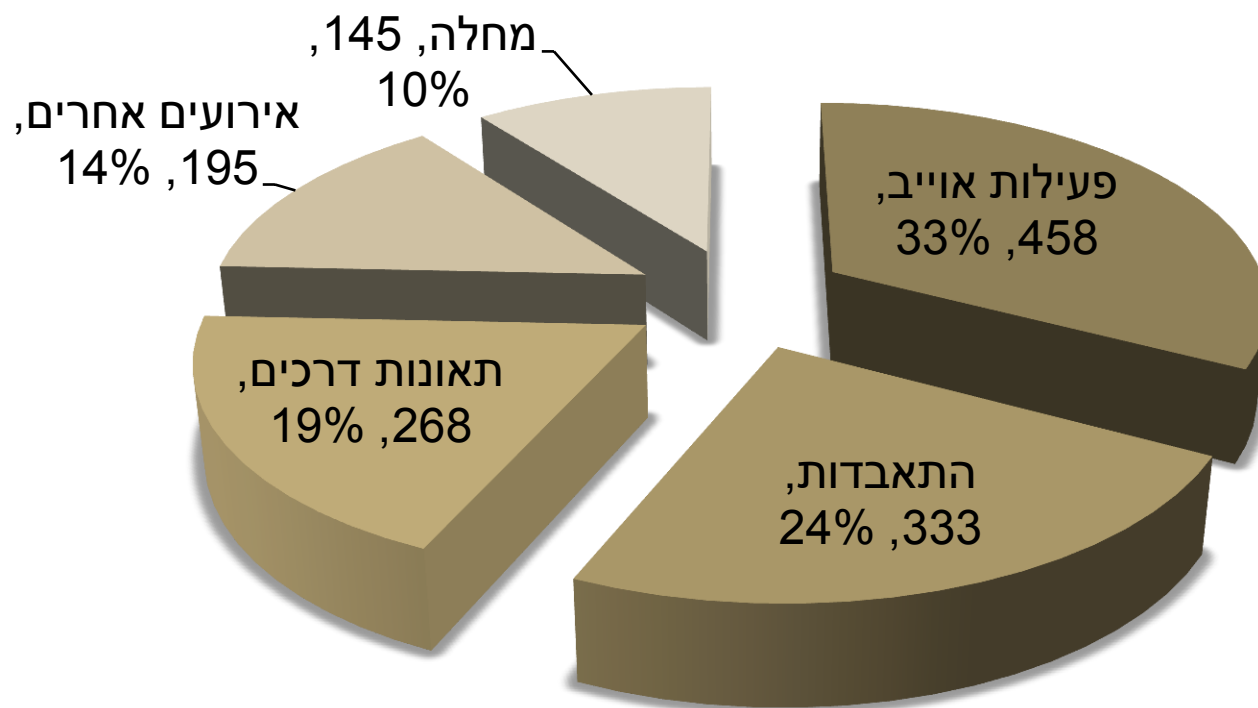
Schwartz-Lifshitz, M., Zalsman, G., Giner, L., & Oquendo, M. A. (2012). Can we really prevent suicide? *Curr Psychiatry Rep*, 14(6), 624-633.

# Suicide in the Israeli army

- Suicide rate
  - 20:100,000 (1980-1989)
  - 24:100,000 (1990)
- The reasons for suicide in the IDF are similar to those in foreign armies among adolescent soldiers
  - Availability of weapons
  - Adolescents
  - Military service stressors
  - Stigma of seeking assistance

Shelef, L., Laur, L., Raviv, G., & Fruchter, E. (2013). A Military Suicide Prevention Program in the Israeli Military Defence Force - A Review. *Archives of Suicide Research*.

# קיבוץ נסיבות פטירה של חיילי צה"ל בשנים 2001-2013



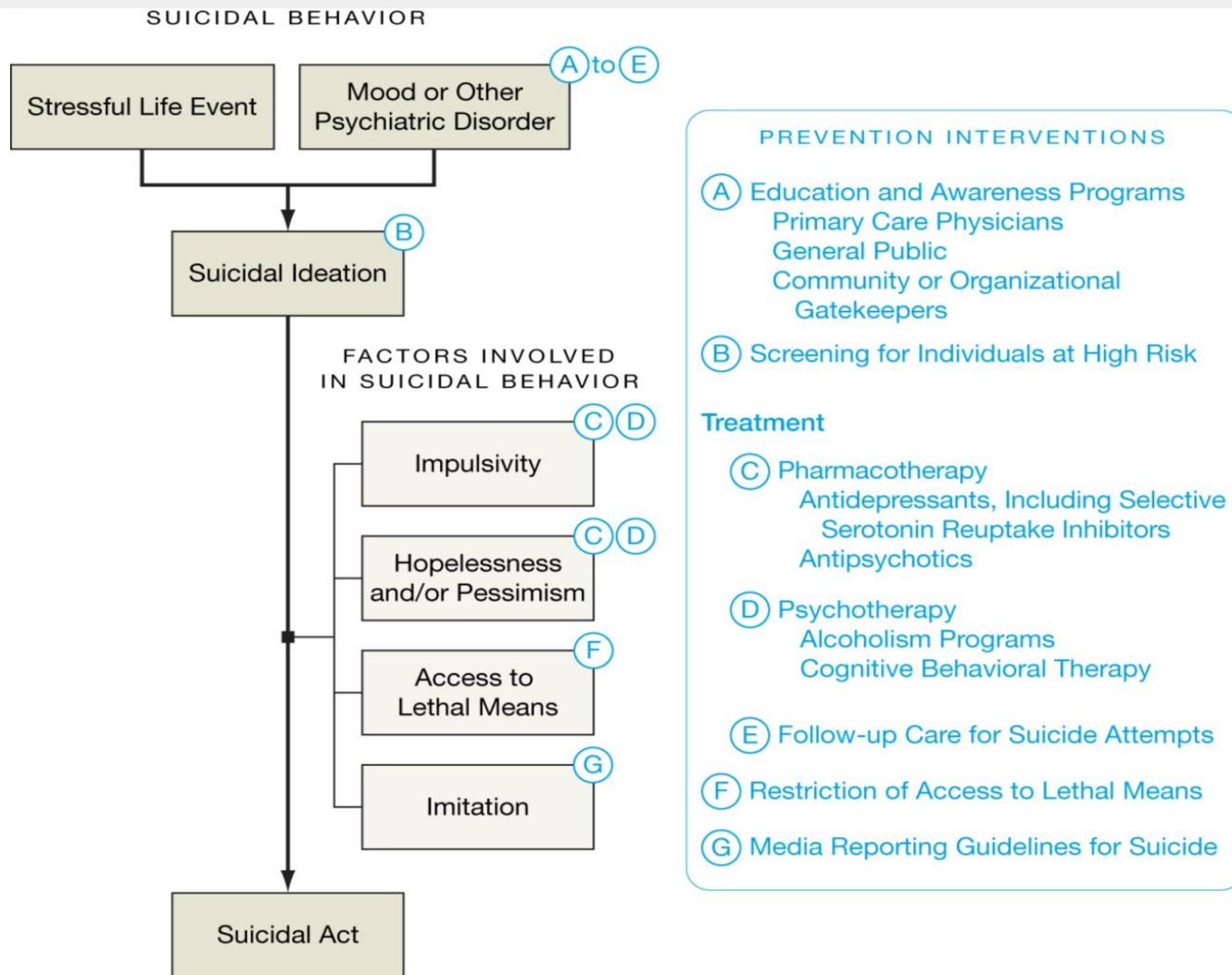
נתונים מקובץ כוח האדם הצה"לי (קובץ רישום אישי) ומחלקת נפגעים  
ענף המידע והמחשוב – נתוני חללים/רישום הסרטן הצה"לי, אפריל 2014

# Suicidal behavior causes

- Proximal stressors or triggers and predisposition
- 90% have DSM-IV Diagnosis (ex-china)
- Mood disorders-60%
- Contributory factors
  - Availability of lethal means
  - Alcohol and drug abuse
  - Access to psychiatric treatment
  - Attitudes towards suicide
  - Help-seeking behavior
  - Physical illness
  - Marital status, Age, Sex

Mann, J. J. (2002). A current perspective of suicide and attempted suicide. *Ann Intern Med*, .136(4), 302-311

Mann, J., Apter, A., Bertolote, J., & et al. (2005). Suicide prevention strategies: A systematic review. *JAMA*, 294(16), 2064-2074.



**Figure Legend:**

Circled letters refer to relevant prevention interventions listed on right.

Mann, J., Apter, A., Bertolote, J., & et al. (2005). Suicide prevention strategies: A systematic review. *JAMA*, 294(16), 2064-2074.

**Table 3.** Postintervention Decrease in Total Suicide Rates

Intervention	Suicides, % Decline in Annual Rate
Education	
Public	Not available
Primary care physician	22-73 <sup>66,47,65</sup>
Gatekeeper	
US Air Force	40 <sup>52</sup>
Norwegian Army	33 <sup>67</sup>
Increasing antidepressant prescriptions*	3.2 <sup>91</sup>
Chain of care	Not available
Restricting lethal means	
Guns	1.5-9.5 <sup>78,147</sup>
Domestic gas	19-33 <sup>79,80</sup>
Barbiturates	23 <sup>105</sup>
Vehicle emissions	Not available
Analgesics	Not available
Media blackouts	Not available

\*There was a 414% increase in antidepressant prescriptions 1987-1999.

# What don't we know

- Physician education in depression recognition and treatment and restricting access to lethal methods reduce suicide rates. Other interventions need more evidence of efficacy. Ascertaining which components of suicide prevention programs are effective in reducing rates of suicide and suicide attempt is essential in order to optimize use of limited resources.

Mann, J., Apter, A., Bertolote, J., & et al. (2005). Suicide prevention strategies: A systematic review. *JAMA*, 294(16), 2064-2074.



# The Question

- What is the impact of the IDF suicide prevention program on the risk of suicide?

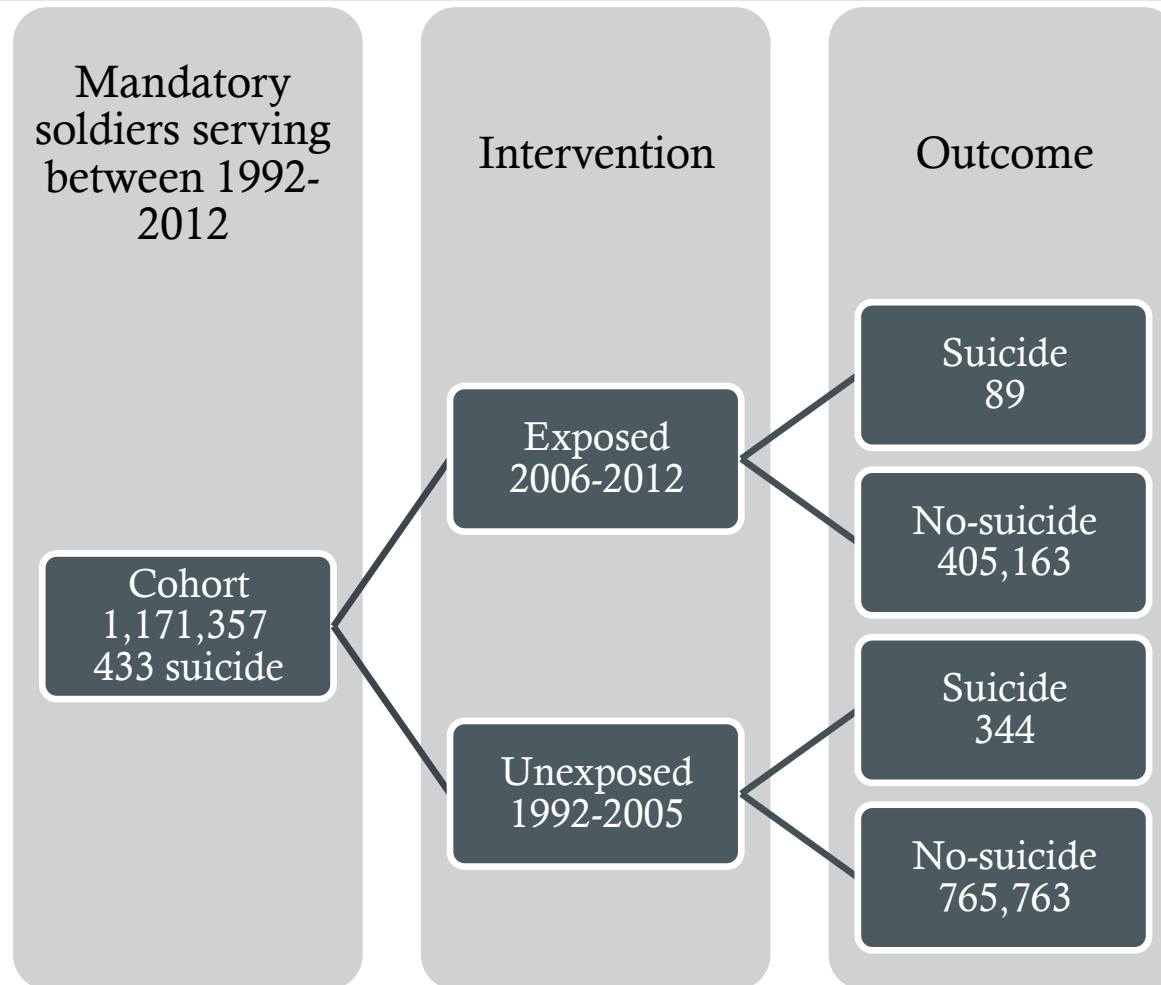
# Introduction summary

- Known
  - Suicide rates and causes worldwide
  - Suicide prevention strategies
    - Physician education in depression recognition and treatment and restricting access to lethal methods reduce suicide rates
  - Suicide rates and causes in the IDF
- Unknown
  - Suicide prevention interventions need more evidence of efficacy
- Question
  - What is the impact of the IDF suicide prevention program on the risk of suicide?
- Importance
  - Ascertaining the efficacy of suicide prevention programs is important in reducing rates of suicide and suicide attempts and is essential in order to optimize use of limited resources.

# Experimental approach

- Cohort study with quasi-experimental design and analysis of cohorts before (1992-2006) and after (2006-2012) the intervention

# Cohort study with quasi-experimental design



# Study Population

- 1,171,357 mandatory service IDF soldiers that served during the years 1992-2012.

# Intervention (Independent Variable)

- מעורבות פיקודית – 10/10/2005 הנחיית הרמטכ"ל – השקת תוכנית המניעה וכן הדגשת האחריות הפיקודית.
  - מנגנון בקרה ומעקב-
    - ועדה לבדיקת איכות (וב"א) – מנגנון צה"לי לבדיקת אירועי התאבדות
    - הקמת צוות מניעה אזרחי – צוות הטרוגני הכולל אנשים מחוץ למסגרת הצבאית שעיסוקם בתחום האקדמיה, בריאות הנפש, יעוץ ארגוני וניהול.
  - הפחתת הזמינות לנשק (2006).
- רענון הוראות מקצועיות כתוצאה מלקחים בוב"אות – הפניה לקב"ן, העברת מידע ברה"ן בין מטפלים, ביקורת ברה"ן יזומה, ישום המלצות לאחר בדיקה פסיכיאטרית, סימול קה"ס, כיבוד המלצות רופא מומחה ופקודת מטכ"ל – טיפול בחייל הנמצא במצוקה נפשית.

# Intervention (Independent Variable)

- CPR
  - התערבויות ממוקדות לציר הזמן
    - תחילת השירות הצבאי, הטירונות וההכשרה.
    - התקופה סביב השחרור.
  - התערבויות ממוקדות לאוכלוסיות שונות
    - קציני בריאות הנפש
    - מפקדים - תוכנית "יש מוצ"א" – מניעה וצמצום אובדנות.
    - חיילים –
    - תוכנית "ערבות הדדית" בשיתוף חיל חינוך.
  - תוכניות ההכשרה משלבות תכנים של היכרות עם גורמי הטיפול בפרט וכלי התמודדות עם הכניסה לשירות.
  - הוספת תקני קב"נים

# Methods of measurements

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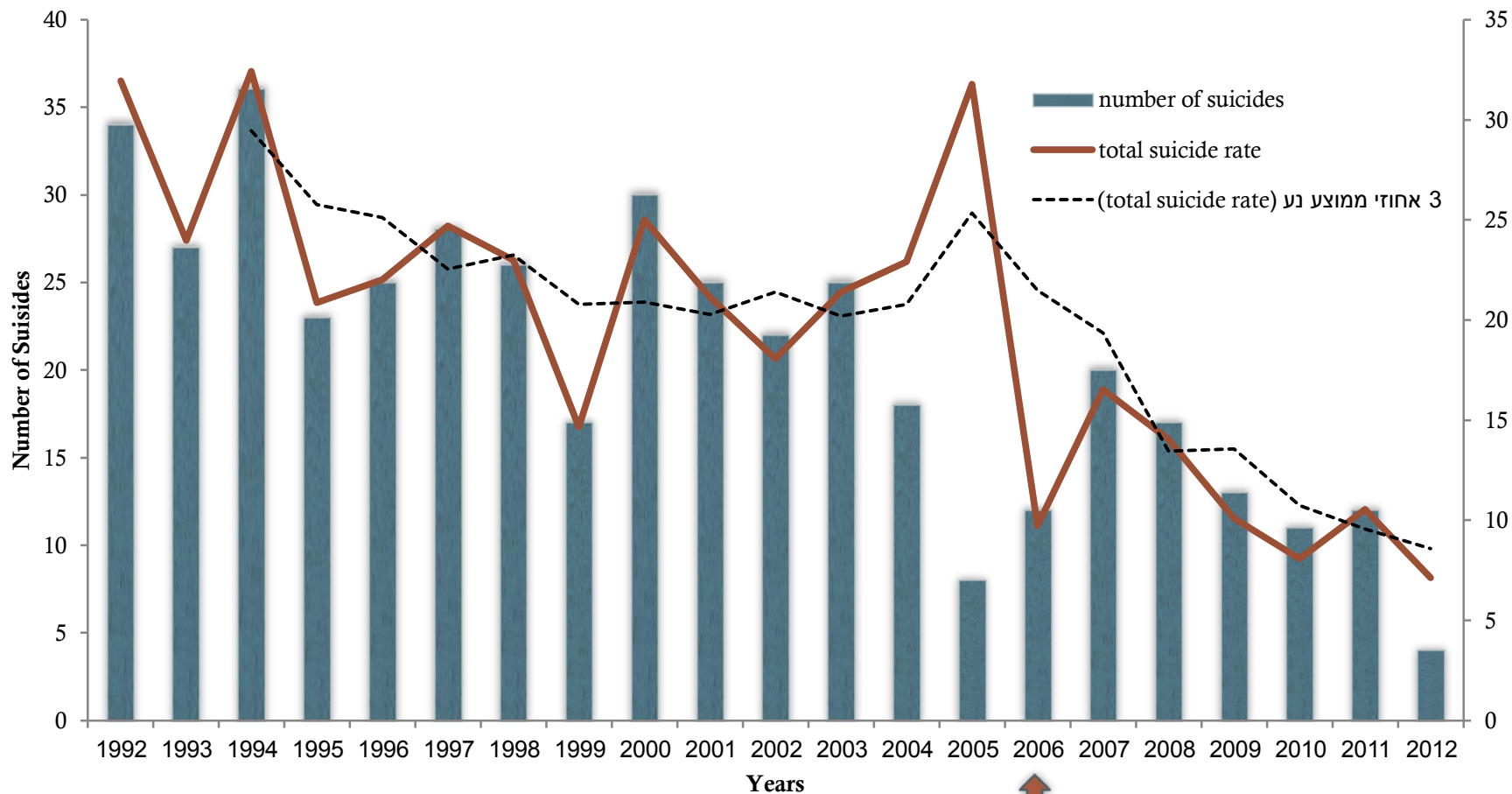
- Data routinely collected for other purposes
  - Anonymised data collected in mortality databases
  - Data from suicide committees
  - Anonymised computerized general databases



# Methods of measurements

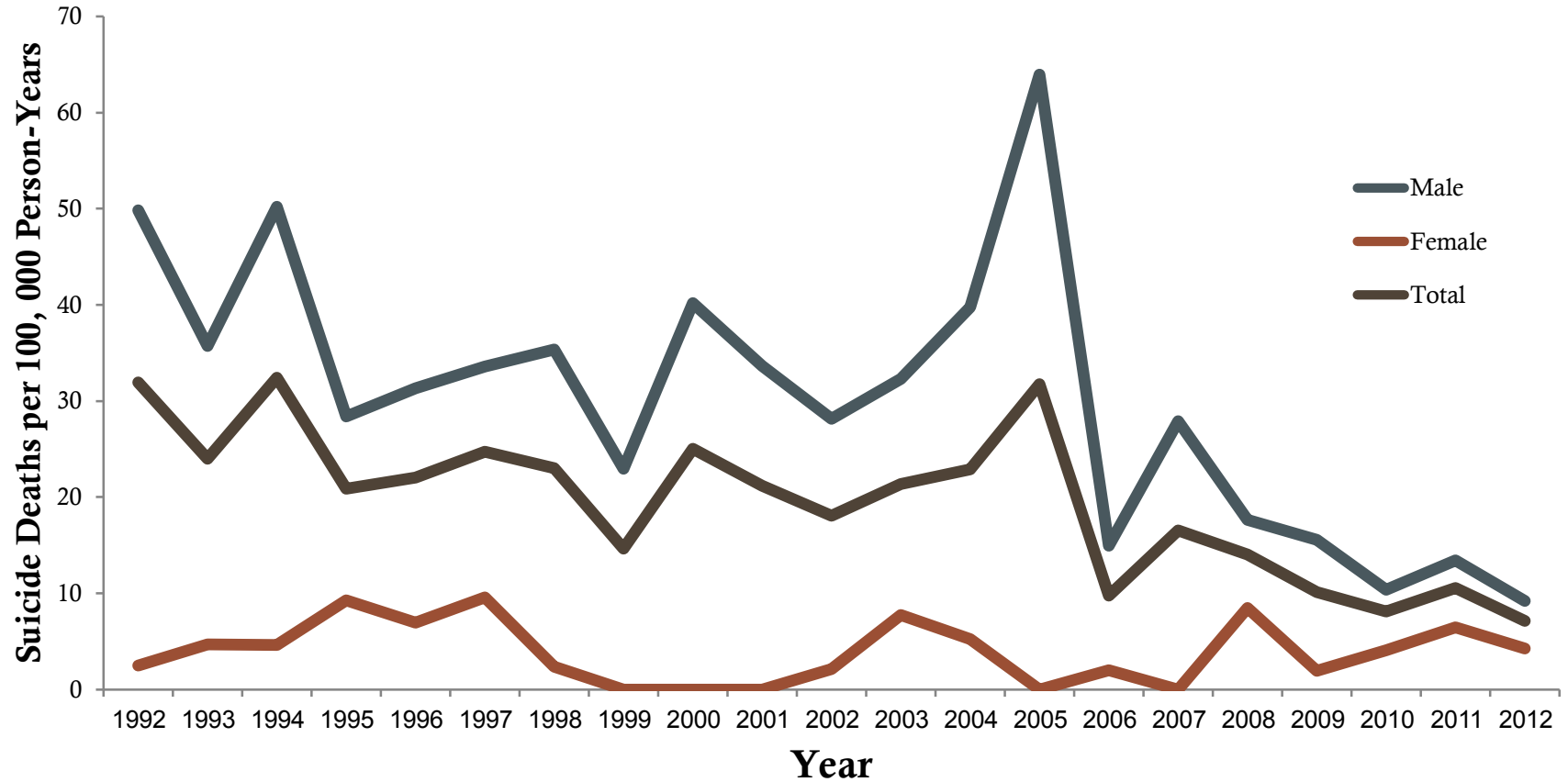
- Unexposed Cohort – Mandatory military service soldiers serving between 1992-2005
- Exposed Cohort – Mandatory military service soldiers serving between 2006-2012
- Hyp: Hazard ratio reduction= Program's overall effectiveness
- Trend Analysis of suicide rates
- Survival Analysis using univariable and multivariable proportional (cox) hazards ratio
- Analyzing explanatory and confounding factors (gender, SES, country of origin)

# Number of suicides, suicide rates, and three year moving average for rates of suicide, IDF Mandatory service, 1992-2012



**Implementation of program**

# Suicide Deaths per 100,000 Person-Years of Active Duty Mandatory Service IDF Soldiers



# Trend analysis- Linear regression

	Total	
	B (95% CI)	P
Male	-1.413 (-2.273 to -0.553)	P=0.003
Female	-0.07	P=0.56
Total	-0.947 (-1.333 to 0.561)	P<0.001

# Trend Analysis – Univariable Survival Analysis (Male)

	Suicide Deaths per 100,000 Person-Years	Relative Hazard (95% CI)	Risk reduction (1-HR)	P
1992 - 1996	39	1.00 (ref.)		-
1997 - 1999	31	0.78 (0.58 to 1.06)	22%	0.11
2000 - 2002	34	0.87 (0.66 to 1.16)	13%	3.56
2003 - 2005	38	0.83 (0.59 to 1.17)	17%	2.88
2006 - 2008	20	0.52 (0.37 to 0.73)	48%	< 0.001
2009 - 2012	13	0.29 (0.20 to 0.43)	71%	< 0.001

# Trend Analysis – Multivariable Survival Analysis (Male)

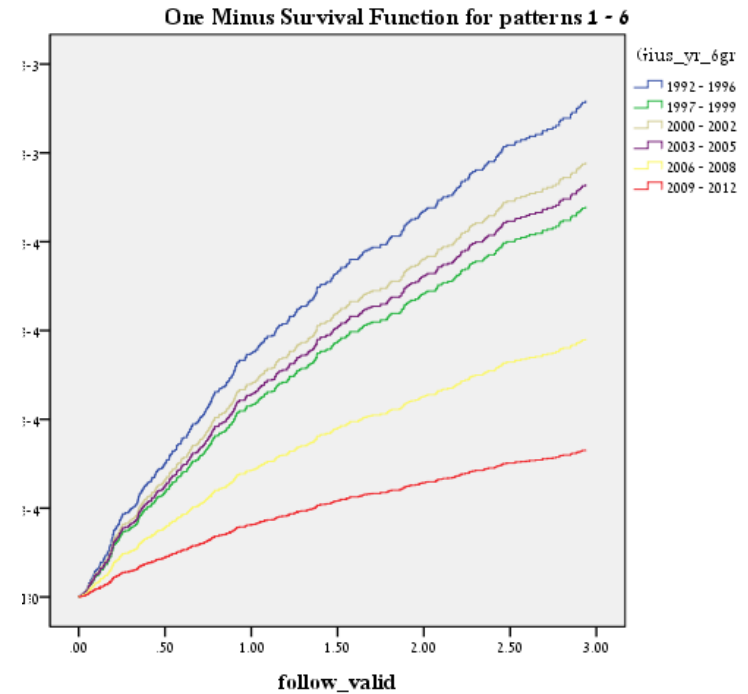
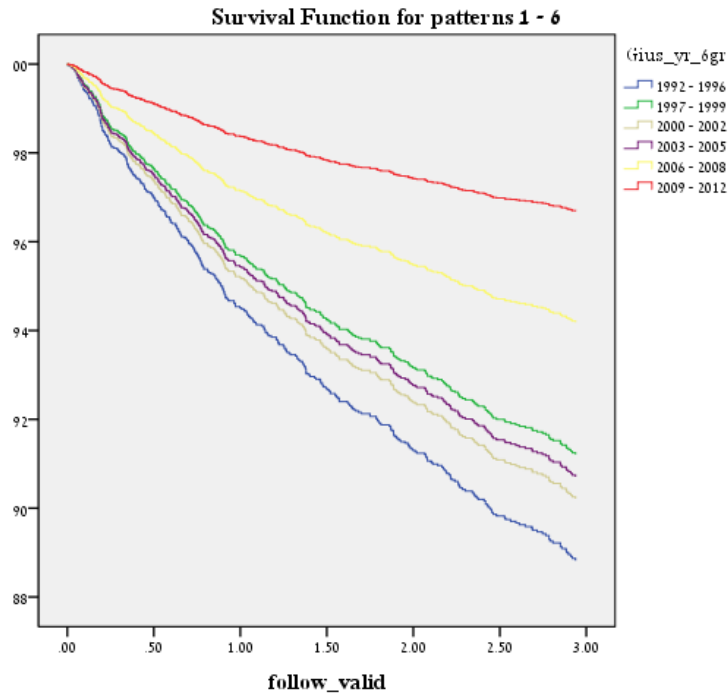
	Suicide Deaths per 100,000 Person-Years	Relative Hazard (95% CI)	Risk reduction (1-HR)	P
1992 - 1996	39	1.00 (ref.)	-	-
1997 - 1999	31	0.72 (0.53 to 0.98)	28%	0.04
2000 - 2002	34	0.76 (0.57 to 1.03)	24%	0.08
2003 - 2005	38	0.82 (0.58 to 1.16)	12%	0.267
2006 - 2008	20	0.50 (0.33 to 0.71)	50%	< 0.001
2009 - 2012	13	0.27 (0.18 to 0.41)	73%	< 0.001

,Adjusted for: gender, country of birth, Intellectual rating score  
SES, Mental health diagnosis, combat duty

# Trend Analysis – Univariable Survival Analysis (Female)

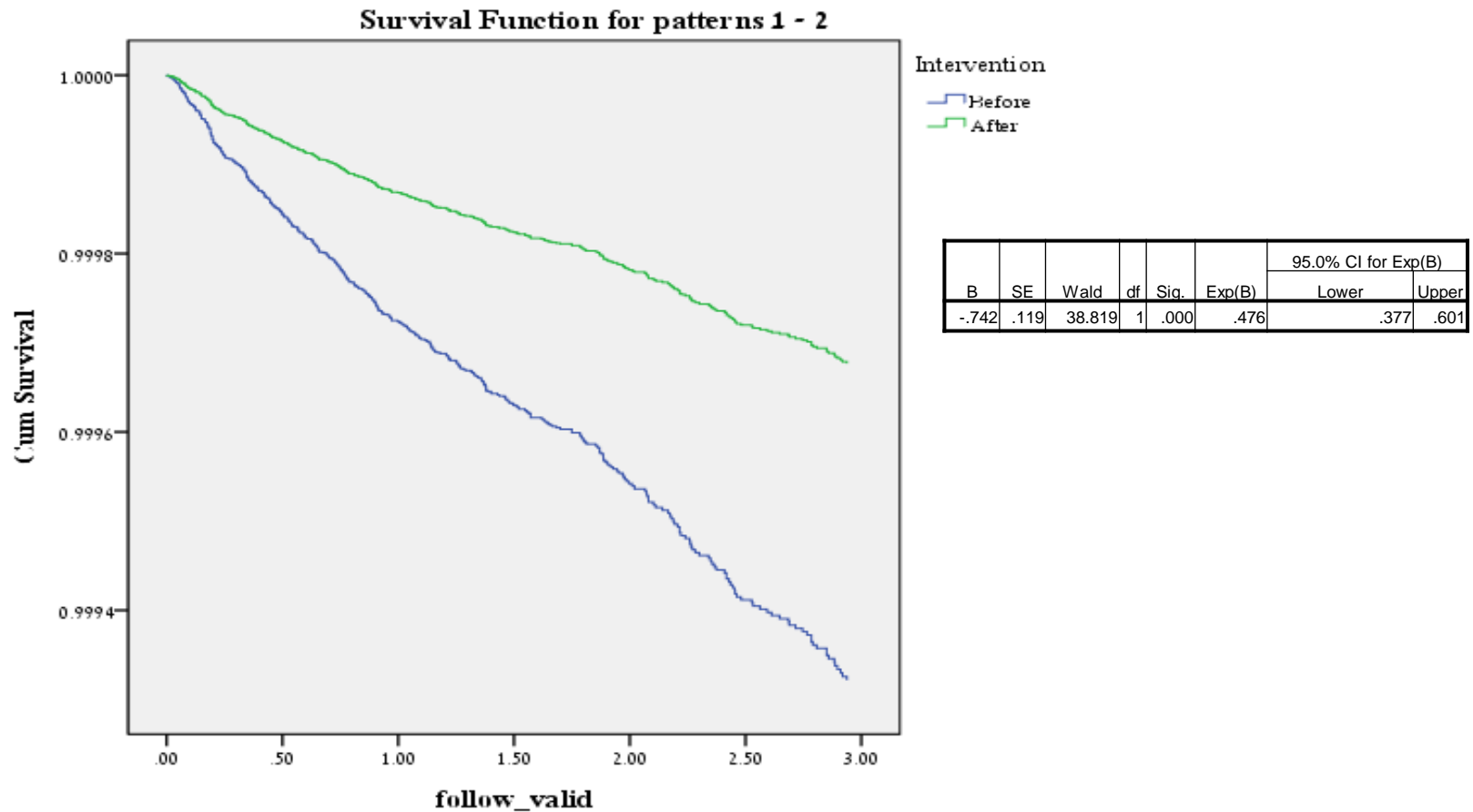
	Suicide Deaths per 100,000 Person-Years	Relative Hazard (95% CI)	Risk reduction (1-HR)	P
1992 - 1996	6	1.00 (ref.)		-
1997 - 1999	4	0.71 (0.25 to 2.01)	29%	0.51
2000 - 2002	1	0.13 (0.02 to 1.01)	87%	0.05
2003 - 2005	6	0.97 (0.36 to 2.60)	3%	0.953
2006 - 2008	3	0.60 (0.20 to 1.75)	40%	0.355
2009 - 2012	4	0.70 (0.27 to 1.81)	30%	0.467

# Cox regression for recruitment year cohorts





# Cox proportional hazards model



# Results- Hazards ratio

- Hazards Ratio = 0.476
- 95% CI – 0.37 to 0.60
- Relative Risk Reduction – 47%

# Discussion

- A community-wide suicide prevention program aimed at gun restriction, decreasing stigma, enhancing social networks, facilitating help seeking through system level policy changes, and enhancing understanding of mental health in the community was associated over time with 47% risk reduction for completed suicide.

# Discussion

- Can we generalize the results?
- Special population
- What exactly works?

Thank you !

# Results –Trend Analysis

Years	B	P for Trend	comments
1992-2012	-0.618	<0.001	מובהק
1992-2005	-0.428	<0.118	לא מובהק
2006-2012	-0.615	<0.354	לא מובהק

# Trend Analysis – Linear regression

	Unexposed		Exposed		Total	
	B (95% CI)	P	B (95% CI)		B (95% CI)	
Male					-1.413 (-2.273 to -0.553)	P=0.003
Female					-0.07	P=0.56
Total					-0.947 (-1.333 to 0.561)	P<0.001