



**Randomized Trial of Population-based  
Outreach to Lock to Live - A Web-based  
Decision Aid for Safe Storage of Firearms in  
Patients with Suicide Risk**

**Health Care Systems  
Research Network  
Conference**

**April 13, 2022**

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# Thank you!



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**Funded by Kaiser Permanente’s Office of Community Health as part of their Firearm Injury Prevention Program**

- In U.S. - 10<sup>th</sup> leading cause of death for all ages and 2<sup>nd</sup> leading cause of death for those <35 years of age.
- Leading cause of “years of life lost” worldwide
- Many countries have reduced their suicide rates over the past 20 years. The U.S. stands out as a country that has dramatically increased.
  - Expanded availability of MH resources
  - More responsible media reporting
  - **Restricting access to lethal means – most successful strategy**

- Counseling interventions
  - Suicide - counseling on access to lethal means
  - General pediatric firearm safety counseling
  - Older adult firearm safety counseling
  
- Low rates of delivery for counseling interventions by clinicians across outpatient mental health, primary care, emergency, and in-patient settings
  - Lack of provider training / comfort
  - Concerns about upsetting the patient
  - Prioritization among other safety and suicide prevention practices
  - No quality metrics or accountability
  - No definitive studies on the effectiveness of lethal means counseling for reducing suicidal behavior

# WHAT IS LOCK TO LIVE?

## Lock to Live



You or someone you know may feel hopeless, down, or alone right now. Many people have gotten through times like this, and you can too.

**This tool can help you make decisions about temporarily reducing access to potentially dangerous things, like firearms, medicines, sharp objects, or other household items.**

The promise of tomorrow can start with small steps towards safety today.

[Get Started](#)

<https://lock2live.org/>

## ■ Questions about preferences for storage focusing on three areas:

- In home vs. out of home storage
- Cost
- Background check

## ■ Provides list of storage options

### In Home Storage Options

These options should include storing your ammunition in a separate safe location. Be sure to take additional steps right now to make these options safest during crisis.

-	<b>Lock Box</b> Read Less	(\$)	SELECT <input checked="" type="checkbox"/>
	<ul style="list-style-type: none"><li>• Can transfer key to a trusted person **Give the key to a trusted person who will keep it safely away from the person at risk of suicide**</li><li>• Can be stolen or taken apart</li><li>• Too small for some firearms</li></ul>		
+	<b>Gun Safe</b> Read More	(\$\$\$)	SELECT <input type="checkbox"/>
+	<b>Locking Devices</b> Read More	(\$ or FREE)	SELECT <input type="checkbox"/>
+	<b>Disassemble</b> Read More	(FREE)	SELECT <input type="checkbox"/>
+	<b>Other</b> Read More	(FREE)	SELECT <input type="checkbox"/>

**If you are still unsure about what firearm storage option is best for you during this time of concern, find additional answers in the FAQs or you can read about what's worked for other people:**

+ **See Their Stories**  
Read More

- Qualitative findings from ED providers supportive of acceptability and usefulness of L2L
- Pilot randomized trial in ED patients with suicide risk
  - High acceptability among those who enrolled (N=49) and
  - Reduced access to firearms in pilot (small numbers and not significant)
  - Enrollment challenges in the ED setting



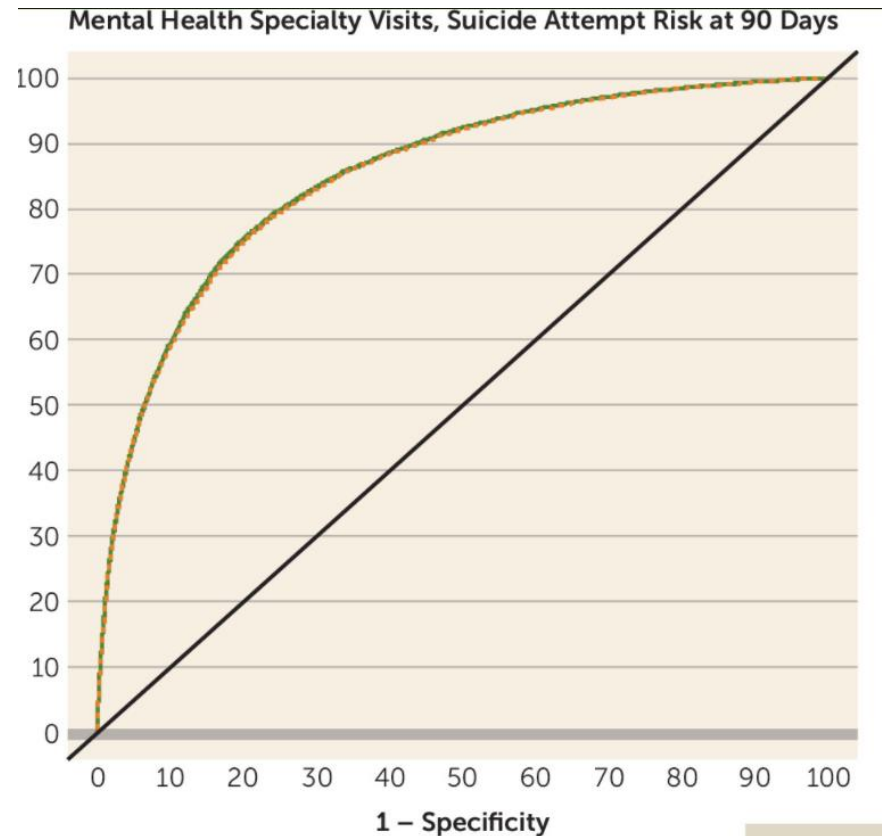
# **RANDOMIZED CONTROL TRIAL: METHODS & RECRUITMENT**

- Currently enrolled adults (18 years of age or older)
- 75-99.5<sup>th</sup> percentile for risk of suicidal behavior in subsequent 3 months (death and injury)
- Any Mental Health (MH) visit or Primary Care (PC) visit with recorded MH diagnosis, in the prior 30 days
- Exclusions:
  - No-contact list for research studies
  - English not listed as primary language
  - Not able to receive messages through health record patient portal
  - History of dementia, cognitive or developmental disability
  - History of psychotic disorders
  - Currently reside in skilled nursing facility or hospice care

Four models:

1. PC suicide deaths
2. PC suicide injury
3. MH suicide death
4. MH suicide injury

AUC for four models ranged from: .83 - .86



Simon, G.E., Johnson, E., Lawrence, J.M., Rossom, R.C., Ahmedani, B., Lynch, F.L., Beck, A., Waitzfelder, B., Ziebell, R., Penfold, R.B. and Shortreed, S.M., 2018. Predicting suicide attempts and suicide deaths following outpatient visits using electronic health records. *American Journal of Psychiatry*, 175(10), pp.951-960.

## Intervention

- 3x EHR invitations to visit L2L (initial invite + two invite reminders)
- Consent information included in invite (short and patient-friendly)
- Caring messaging
- 2 weeks after second invite reminder a survey invitation was sent
- 3x survey invitations (survey invite + two reminders)

## Control

- 3x survey invitations (survey invite + two reminders)
- Blinded to L2L condition (except if their provider told them about it)

Subject: Free resource now available

This past year has been tough for everyone. At Kaiser Permanente, we care about you, we believe that your life matters, and that better days are ahead. Your Kaiser Permanente care team encourages you to visit a new online resource called ***Lock to Live***.

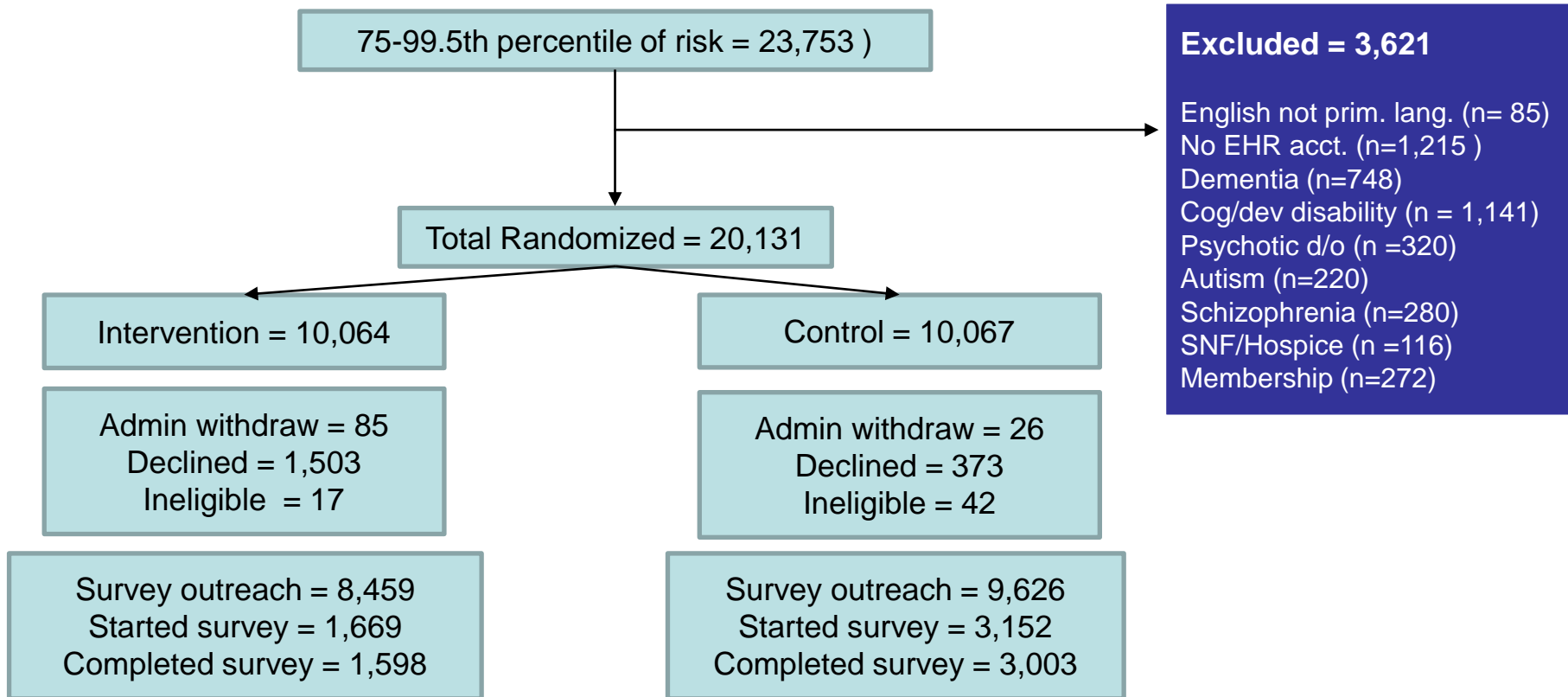
People are spending a lot more time at home now and many are experiencing increased feelings of stress, isolation, and hopelessness. We know that when someone in the home is experiencing a crisis, or is feeling down or anxious, choosing to responsibly store firearms and medications can save lives. This is why we want to tell you about this new online tool called ***Lock to Live***. ***Lock to Live*** can help you to identify different ways to manage access to firearms and medications that make the most sense for your household. Kaiser Permanente recognizes that responsible gun ownership protects our community.

This invitation is part of a research study to understand how the *Lock to Live* website may help people. Your participation will be anonymous and is completely voluntary. Medical and therapy visit notes are kept private, which means researchers have not viewed this information.

If you are interested, click this link to learn more: [KP9.lock2live.org](https://kp9.lock2live.org)

- **Pre-contemplative** – *does not believe* in safe storage when someone in the house has thoughts of suicide
- **Contemplative** – *believes* in safe storage when someone in the house has thoughts of suicide
- **Thinking** – *thinking* about changing current storage
- **Planning or Preparation** – *planning* to change current storage
- **Action** – *endorses* at least 1 firearm restriction behavior

- **Primary analysis: Cumulative logistic regression**
  - DV: Stages of Change (5)
  - IV: Group and Age
- **Logistic regression**
  - DV: Secure/planning/thinking and contemplative/pre-contemplative
  - IV: Group and Age
- **Chi-Square between intervention and control groups**
  - Firearm: firearm and safe storage vs. firearm and no safe storage vs. no firearm
  - Med: restrictions vs. no restrictions





# Demographics

	<b>Control (N=3003)</b>	<b>Intervention (N=1598)</b>	<b>p- value</b>
<b>Age</b>			0.002
18-24 years old	268 (8.9%)	180 (11.3%)	
25-44 years old	1011 (33.7%)	576 (36%)	
45 to 64 years old	737 (24.5%)	399 (25%)	
65 years or older	773 (25.7%)	341 (21.3%)	
Unknown	214 (7.1%)	102 (6.4%)	
<b>Gender</b>			0.492
Other	68 (2.3%)	44 (2.7%)	
Female	1248 (41.6%)	705 (44.1%)	
Male	1457 (48.5%)	733 (45.9%)	
Unknown	230 (7.7%)	116 (7.3%)	
<b>Race</b>			0.185
American Indian	24 (0.8%)	18 (1.1%)	
Asian	58 (1.9%)	30 (1.9%)	
Black	64 (2.1%)	31 (1.9%)	
White	2322 (77.3%)	1253 (78.4%)	
Multiple Race	110 (3.7%)	56 (3.5%)	
Other	107 (3.6%)	38 (2.4%)	
Unknown	318 (10.6%)	170 (10.6%)	
<b>Hispanic ethnicity</b>			0.996
Yes	288 (9.6%)	152 (9.5%)	
No	2379 (79.2%)	1267 (79.3%)	
Unknown	336 (11.2%)	179 (11.2%)	
<b>Education</b>			0.175
Bachelor's degree or higher	1611 (53.6%)	838 (52.4%)	
Some college or Trade/Technical	914 (30.4%)	491 (30.7%)	
Highschool grad/GED equi.	221 (7.4%)	147 (9.2%)	
Some Highschool	27 (0.9%)	16 (1%)	
Unknown	230 (7.7%)	106 (6.6%)	

	<b>Control (N=2713)</b>	<b>Intervention (N=1448)</b>	<b>p-value</b>
Have a firearm, not stored with any secure storage behavior	943 (34.8%)	523 (36.1%)	0.603
Have a firearm, stored with at least one secure storage behavior	229 (8.4%)	126 (8.7%)	
Do not have firearm	1541 (56.8%)	799 (55.2%)	

- Among 4,821 participants, 4,161 responded to questions regarding firearm access.
- No differences between groups for the “Action” stage of safe storage
- Among those with access to a firearm only 19.5% used any secure storage.

<b>Stage of Change for Firearm Behaviors</b>			
	<b>Control</b>	<b>Intervention</b>	<b>P-val</b>
Stage of change	(N=1172)	(N=649)	
Secure	229 (19.5%)	126 (19.4%)	0.0392
Planning	<b>164 (14%)</b>	<b>133 (20.5%)</b>	
Thinking	94 (8%)	54 (8.3%)	
Contemplative	<b>639 (54.5%)</b>	<b>313 (48.2%)</b>	
Precontemplative	46 (3.9%)	23 (3.5%)	
Tables notes: Multinomial logit: OR = 1.21 (1.01 - 1.452)			

- Cumulative logit significant for changes on firearm stage of change.
- Differences driven by more intervention patients in the planning stage (6.5 %) and less in the contemplative stage.
- Logistic analyses of two groups “secure, planning or thinking” v. “contemplative or pre-contemplative” yielded an adjusted OR of 1.30 (1.07, 1.58) for the intervention v. control

# Lethal means storage plans among patients with unrestricted access to a firearm

A higher proportion (8%) of respondents in the intervention indicated they are thinking and or planning to store firearms safely

	Control (N=943)	Intervention (N=523)	p-val
Thinking and or planning	258 (27.4%)	187 (35.8%)	0.001
Not thinking or planning	685 (72.6%)	336 (64.2%)	

# CONCLUSIONS, LIMITATIONS, NEXT STEPS

- Patients are accepting of outreach encouraging safe storage of firearms when sent through the electronic medical record
- Suicide risk prediction models identify more males at risk than screening questionnaires do, allowing better targeting of firearm safety interventions.
- 43% of patients at high-risk of suicide based on prediction modeling have access to a firearm and most (81%) do not store their firearms safely
- High efficiency population-based outreach with L2L encourages patients more planning behavior for safer storage, but a stronger intervention is needed to change their storage behavior.

- Anonymous survey encourages more open reporting, but limits what we can learn about respondents.
- Response bias: the response rate was low and may not be generalizable.

- Increase the intensity of the intervention with a follow-up call
  
- Considerations
  - If we intensify the intervention, this may require narrowing the risk percentile (e.g. 90<sup>th</sup>)
  - Do we update the L2L tool and/or do we build out more around the tool?
  - Are there community health worker models that would be a good fit for this intervention?



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# QUESTIONS?