Road to Recovery Webinar: Double the Trouble: Evacuations During COVID-19
1:15-2:00pm ET
Speaker: Stephen Wong
Moderator: Katherine Idziorek

NEXT WEBINAR
Sustaining UAS Progress While Pursuing a Regulatory Framework
Tuesday, September 1
2:00pm ET
Outline

• Background
• Preliminary Research
• Preliminary Results
  • Primary Strategies
  • Case Study
• Next Steps
Background
Large-Scale Evacuations

• One of the primary methods to safeguard human life

• Millions of people ordered to evacuate from Hurricanes Irma (2017), Florence (2018), and Dorian (2019)

• 1.1 million people ordered to evacuate from California Wildfires (2017-2019)

• 180,000 people ordered to evacuate from Oroville Dam Crisis (2017)

• 50,000 people ordered to evacuate from Port Neches, Texas Explosion (2019)
Current Disaster Seasons

- Wildfire and hurricane season are in progress
- Higher intensity and frequency of rainfall, heatwaves, and wildfires due to climate change
- Increasing land development and populations in high-risk areas
Critical Evacuation Challenges

1. **Compliance**: Persistent non-compliance to mandatory evacuation orders

2. **Congestion**: Poor transportation response leading to heavy congestion, slow evacuation clearance times, and high evacuee risk

3. **Social Equity**: Minimal attention in ensuring all populations, especially those most vulnerable, have transportation and shelter
New Challenges

• Minimizing the spread of COVID-19
• Communicating COVID-19 risks to evacuees
• Notifying evacuees of new plans and procedures for COVID-19
• Reducing staying behavior, which may arise over concerns of COVID-19
Evacuation Strategies with High Contact

PUBLIC TRANSIT

SHARED MOBILITY

CONGREGATE PUBLIC SHELTERS

FRIENDS AND FAMILY ASSISTANCE

VOLUNTEERING AND RECOVERY ASSISTANCE
An Ongoing Crisis

Stay-at-home orders and social (physical) distancing to address COVID-19 *directly* conflict with evacuation orders that typically rely upon high-capacity vehicles and shelters to protect people in disasters.

Disasters could significantly exacerbate the spread of COVID-19 due to the movement and close contact of evacuees, first responders, and volunteers.
Preliminary Research
Research Origins

• “Double the Trouble: Evacuations During COVID-19” - Medium article (Wong and Shaheen, 2020)
  • Leveraging Time
  • Changing Transportation Plans
  • Rethinking Public Sheltering
  • Encouraging Lower Contact Assistance
  • Monitoring COVID-19
  • Considering New Innovations

• Rapid response grant from the University of California Institute of Transportation Studies (UC ITS)
  • Part of a wider COVID-19 response effort (17 research projects at UC ITS)
  • https://www.ucits.org/research-projects/

• “Compound risks of hurricane evacuation amid the COVID-19 pandemic in the United States” - medRxiv pre-print (Pei et al., 2020)
Research Methodology

**Phase 1**
Needs and Strategy Assessment
- Interviews with 17 high-ranking California experts
- Critical challenges for evacuations in a COVID-19 world
- Current preparedness efforts
- Preliminary strategies

**Phase 2**
Case Study Analysis
- Case studies: Florida Wildfires, Midland Flood, Tropical Storm Cristobal, Arizona Wildfires
- Additional insights: Tropical Storm Isaias, Apple Fire, August 2020 California Wildfires, Hurricane Laura
- Lessons learned, key strategies

**Phase 3**
Public Safety Power Shutoff (PSPS) Analysis
- Dataset of ~200 participants (East Bay, CA) on hypothetical evacuation choices and real PSPS choices from two events in October in 2019
- Assessment of behavior and influencers on choice
Description of California Experts

- 16 interviews, 17 experts, 13 organizations represented
- 12 interviewees at executive, director, or chief level

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<tr>
<th>Area</th>
<th>Organization</th>
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<tr>
<td>Communications</td>
<td>Brain &amp; Bullish</td>
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<td>Disability</td>
<td>World Institute on Disability</td>
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<td>Emergency Management</td>
<td>San Diego County Office of Emergency Services</td>
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<td>Emergency Management</td>
<td>California Office of Emergency Services</td>
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<td>Emergency Management</td>
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## Audience / Roles

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<th>Strategy Area</th>
<th>Agencies</th>
<th>Emergency Support Function (ESF)</th>
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<tr>
<td>Evacuation / Transportation</td>
<td>Transportation, Public Transit, Law Enforcement, Metropolitan Planning Organizations, Fire Service, Emergency Management</td>
<td>#1 (Transportation), #13 (Law Enforcement / Public Safety and Security), #17 (Volunteer and Donations Management, CA)</td>
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<td>Sheltering</td>
<td>Emergency Management, Social Services, Community-Based Organizations, Non-Governmental Organizations</td>
<td>#6 (Care and Shelter / Mass Care) agency, #17 (Volunteer and Donations Management, CA)</td>
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<td>Recovery / Relief / Logistics</td>
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<td>#7 (Resources / Logistics), #14 (Long Term Recovery, CA), #17 (Volunteer and Donations Management, CA)</td>
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<td>Emergency Management, Law Enforcement, Fire Services, Transportation</td>
<td>#2 (Communications), #5 (Information and Planning / Management), #15 (Public Information, CA)</td>
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<td>Access and Functional Needs</td>
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<td>All ESFs</td>
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<td>Multi-Jurisdiction</td>
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<td>Emergency Management</td>
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Strategy Timeline

- **Primary**: Must be implemented within 1-2 months
- **Secondary**: Should be implemented in 3 to 6 months
- **Tertiary**: Could be implemented next disaster season
Preliminary Results
Public Transit Evacuation Strategies

Key Opportunity: Design more comprehensive safety protocols and leverage adaptability and flexibility of right-sized vehicles

- Require masks and social distancing on vehicles
- Increase sanitization frequency on vehicles
- Ensure transportation workforce has access to PPE and other key supplies (e.g., hand sanitizer)
- Provide transit and paratransit options for carless households, people with disabilities, and other access and functional needs (AFN) populations
Evacuation Planning Strategies

Key Opportunity: Reframe evacuation transportation as a right

- Create/bolster policies that encourage residents to leave early and quickly
- Ensure workforce has training and ability to perform disaster tasks at home or in the field (e.g., traffic operations)
- Leverage changeable message signs and traveler information systems to inform people of events related to public health, disasters, and PSPS events
- Develop/strengthen statewide and regional transportation plans and mutual aid agreements that can pull resources from non-impacted COVID-19 and disaster areas
Key Opportunity: Improve accessibility, safety, and health in public shelters for the long-term

- Set up partitions around beds, space beds apart, and create isolated rooms/tents
- Create quarantine space for COVID-19 positive evacuees
- Ensure that volunteers are properly trained for a COVID-19 environment and given adequate PPE
- Require masks, increase cleaning procedures, and rework filtration systems for better air flow
- Reduce sharing of resources and food (e.g., pre-packaged)
- Implement pre-shelter screening (e.g., COVID positive, AFN)
- Create/bolster functional assessment service teams (FAST) to assist people with disabilities (e.g., translators, interpreters)
Non-Congregate Sheltering Strategies

Key Opportunity: Rethink “mass care” as more personalized, comfortable, and equitable shelter

- Pre-plan partnerships with alternative sheltering options including hotels, motels, fairgrounds, college dorms, stadiums, and peer-to-peer sharing
- Consider non-congregate shelter (e.g., hotels, motels, dorms) for smaller events and AFN populations to reduce COVID-19 exposure
- Ensure the first floor of motels and all accessible rooms are provided only to people with disabilities and those with mobility challenges
Recovery / Relief / Logistic Strategies

Key Opportunity: Build out infrastructure, partnerships, and storage for rapid relief

- Increase stockpiles of critical supplies, especially PPE, and identify storage facilities
- Revisit contracts with large suppliers (e.g., trailers, washing stations, toilets, showers) and truck companies to ensure they can still be fulfilled
- Create mechanisms and lead agencies for bulk ordering and partnerships (e.g., state-to-state aid; county-to-county aid) via memorandums of understanding (MOUs) and mutual aid agreements
Public Communication Strategies

Key Opportunity: Use existing communication tactics and lessons learned during COVID-19 for emergency management

- Identify and leverage emerging information providers that are trusted during COVID-19 (e.g., Governor)
- Develop clear and direct messaging and communication with the use of visual aids, graphics, and delivery of information in multiple languages and accessibility formats
- Communicate truthful and frequent messages
- Work closely with transportation, emergency management, and disability experts with diverse knowledge in the field to craft messages
Access and Functional Needs Strategies

Key Opportunity: Shift the culture of emergency response to fully integrate diversity of needs and equitable outcomes

- Integrate access and functional needs populations in evacuation and emergency response plans
- Create standby FASTs with adequate supplies and training to assist AFN populations
- Identify people with disabilities (e.g., through comprehensive lists of baseline needs) so that further assistance can be distributed as needed
- Consult with disability specialists when designing plans and protocols
- Create/verify MOUs with transportation providers for paratransit service
Multi-Jurisdictional Strategies

Key Opportunity: Break down silos between agencies and jurisdictions and integrate public health into emergency operations

- Coordinate COVID-19 requirements and directives between jurisdictions (e.g., facemask requirement) and provide messaging to public
- Build/strengthen relationships with other jurisdictions and agencies (e.g., 5 C’s: communication, coordination, cooperation, collaboration, and connection)
Emergency Management Strategies

Key Opportunity: Improve technological capabilities and flexibility in planning documents

- Continually update evacuation and emergency plans in response to COVID-19 and other evolving threats
- Rethink emergency operation centers (EOCs) (e.g., social distancing/sanitation) and/or create/maintain a virtual EOCs and tools
- Ensure substantial and continual training for changing COVID-19 guidelines and requirements for employees and volunteers
- Ensure that all employees can work from home
- Ensure employees are mentally healthy via benefits, mental health days, and morale boosting programs
- Hold regular meetings and exercises to reevaluate planning and preparedness measures
Other Key Strategies

Public Health
- Devote specific support staff to addressing COVID-19 needs apart from other emergencies and disasters
- Ensure social distancing measures are maintained and encouraged

Hospitals/Nursing Homes
- Review evacuation and PSPS event plans from peer hospitals and adapt plans as necessary (hospital strategy)
- Identify the location and emergency needs of hospitals and nursing homes

Public Safety Power Shutoff Events
- Improve and explore effective communication of outages to the public, especially vulnerable individuals
- Hold consistent meetings to discuss more robust plans and regulations for wildfires and PSPS concurrently
- Develop plans for alternative power sources and preparedness (e.g., generators) for transportation, sheltering, and medical
August 2020 California Wildfires

California Wildfires (367+ fires, 125,000+ people ordered to evacuate):

- LNU Lightning Complex (350,000 acres, 70,000+ ordered to evacuate) - 2\textsuperscript{nd} largest in California history;

- SCU Lightning Complex (340,000 acres, 7,000+ ordered to evacuate) - 3\textsuperscript{rd} largest in California history.

- CZU Lightning Complex (74,000 acres, 48,000+ ordered to evacuate) – mandatory evacuation of UC Santa Cruz campus;

- August Complex (180,000 acres)

- River Fire (48,000 acres)
August 2020 California Wildfires

Concurrent with rolling blackouts and heat wave and producing poor air quality

Smoke increasing vulnerability to COVID-19

Minimal notice, rapid fire spread, confusion

Power loss threatened emergency notifications

Encourage full evacuations despite COVID-19
August 2020 California Wildfires

- Considered use of college dorms, Airbnb, campgrounds, hotels/motels
- Encourage people to stay with friends/family
- New shelter protocols
  - Health screenings upon entry to shelters
  - Extra cleaning and isolation COVID-19 symptom evacuees
  - PPE and sanitizer at shelters and for volunteers
  - Required to wear masks in shelters
  - Social distancing required, cots spread out, individual tents

Sources: Beamish, 2020; Cabanatuan et al., 2020; del Castillo, 2020; Deruy and Angst, 2020; KCRA Staff, 2020; Morris, 2020; Ravani and Cassidy, 2020; Savidge et al., 2020
Next Steps
Unresolved Challenges and Research Needs

- Evacuation of AFN populations
- Long term fiscal impact on public transit, paratransit, and emergency response (including higher costs of non-congregate shelters)
- Staffing/workforce/volunteer levels for operating vehicles, running shelters, and providing medical care
- Lack of PPE and supplies for workforce
- Poor multi-jurisdictional and multi-agency coordination (e.g., minimal attention to evacuee destinations and level of resources)
- Concerns about ability of hospitals and nursing homes to evacuate
- How to stockpiles supplies
- Mechanisms to share lessons learned and best practices efficiently across jurisdictions
Thought for the Future

• During this time of COVID-19, how can we rethink future evacuations to be more equitable, sustainable, and safe?
Stephen Wong is a doctoral candidate at the University of California, Berkeley studying Transportation Engineering. His research focuses on the multi-disciplinary intersection of evacuations, decision-making, shared mobility, sustainable transportation, resilience, public policy, and sociology.

Stephen is also currently a graduate student researcher for the California Resilient and Innovative Mobility Initiative (CA RIMI). CA RIMI aims to inform the state’s and nation’s immediate COVID-19 response and recovery needs, while establishing a long-term pathway for a more sustainable and resilient transportation system.

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Appendix
Citations


Citations


Midland Dam Failures and Flooding

Midland, Michigan (11,000 ordered to evacuate; near a superfund site and Dow Chemical)

- Encouraged to wear masks and social distance (evacuees and volunteers)
- Extra impact on small businesses that were hoping to reopen
- National Guard deployed for both pandemic and floods
Midland Dam Failures and Flooding

New shelter protocols
- Spacing of beds, free masks, and enhanced cleaning
- Temperature and symptom screening at shelters
- Staying at shelters while wearing masks
- Known COVID-19 infections sent to hotels

Some slept in cars outside of shelter

Challenges with providing for access and functional needs population

Sources: Gray and Bosman, 2020; Shamus, 2020; Rahal, 2020; Sankofa II, 2020