RECOMMENDATIONS: NEAR-TERM solutions for reducing health impacts in high-risk fire areas (Workshop Group A)
June 26 DRAFT FOR REVIEW

DRAFT Problem Defined: 1. California wildfires have increased in size and severity and they are projected to increase further due to climate change. 2. At the same time, an increasing number of Californians are living in and around higher-fire risk areas.	3. Immediate fire impacts can include death and injuries such as burns and broken bones, while smoke can cause serious respiratory and cardiovascular health problems, particularly among individuals with pre-existing conditions. 4. Long-term health issues for fire victims can include mental health stress/trauma, pollution of water supplies, loss of jobs and forced relocation.	5. Avoiding fires and smoke is critical for the health of residents in fire-prone areas, but the lack of information and resources before and during fires keeps many residents from taking protective action. 6. Low-income residents, non-English speakers, seniors, and disabled individuals may have more trouble during fire events and will have a harder time with long-term recovery.
Top Solutions	**Actions Needed to Implement Solution**	**Research Needed to Support Solution**
Widely implement **technology solutions** (new and existing) to improve fire/smoke monitoring, communications, evacuations, and other health/fire activities.	• Develop a "Clearinghouse" of effective tech solutions that are available, in-development and in concept stage. • Develop tech strategies that take into account the 'digital divide' for vulnerable populations and communities, especially for elderly or rural populations • Develop and manage power utility shut-offs in high fire-risk environments to reduce and minimize health impacts (individuals who must have power for mobility, health aids, AC, etc.) • Develop IT solutions to support effective evacuations	• Analyze 'core technologies' available and proposed. Which are cost-effective, easily deployed, etc.? • Which languages are needed for alert and warning systems in various communities? What are the key gaps in communications systems? • Develop a better understanding about vulnerable populations' access to tech solutions
Create community **outreach** and **education** programs, tailored to specific communities, on health impacts from wildfires and smoke	• Provide substantial funding for local governments and community partners and to systematically identify individuals who are most vulnerable to fire/health impacts. • Partner with Promotores de Salud, the California Association of Community Health Workers, environmental justice organizations and immigrant community organizations to design and conduct outreach • Use trusted non-government leaders and organizations and help get the word out	• Identify best practices, lessons learned, etc. from existing outreach programs for heatwaves, earthquakes and other events.
Build **community capital** to create stronger, more resilient communities *before* fires occur	• Work with and financially support Frontline CBO's • Expand Community Emergency Response Teams (CERT) and secure funding to build the program	• Identify best practices, lessons learned, etc. from existing programs for heatwaves, earthquakes and other events.

	• Support programs that increase community and neighborhood cohesion so communities can do more to *help themselves* during and after fires • Create a state and local campaign on defensible space and other emergency preparation	
Improve and expand strategies for health protection during fire event— e.g., **evacuation routes** and procedures, and **shelter in place** procedures	• Develop evacuation routes that are clear and accessible to ALL communities • Develop transportation plans for evacuations of individuals without cars or that are unable to drive • Work with communities to design evacuation routes and hold practice exercises • Create community-based evacuation options *before* fires so they can be implemented more easily during an event	
Integrate government agencies to bring funding to state and local efforts for **infrastructure hardening**	• Rewrite building codes to upgrade and retrofit buildings in high-risk fire areas (Universal Building Codes)	• Review and study “success stories” for building code revisions (e.g. post-Paradise example)

RECOMMENDATIONS: How to reduce health impacts from SMOKE outside immediate fire areas (WORKSHOP GROUPS D1/D2)
JUNE 26 DRAFT FOR REVIEW

DRAFT Problem Defined: 1. California wildfires have increased in size and severity and they are projected to increase further due to climate change. 2. Larger fires are exposing more individuals, including some at considerable distance from the actual fire area, to problems related to smoke.	3. Air pollution from wildfire smoke includes particulate matter (PM), carbon monoxide, nitrogen dioxide, polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs). 4. When structures and vehicles burn, smoke contains additional toxic air contaminants including hydrogen cyanide (HCN), hydrogen chloride (HCI), phosgene, metals, toluene, styrene and dioxins. (NOTE: This primarily affects people in the actual fire zone.)	5. Smoke health advisory systems are plagued by insufficient smoke monitoring/forecasting, imprecise health AQ standards, poor messaging, inability to reach all populations, and limited understanding about the efficacy of intervention strategies for different smoke levels. 6. Among the most vulnerable to smoke impacts are individuals with asthma or other cardiovascular or respiratory disease, pregnant mothers/babies, young children, seniors, as well as socially vulnerable populations—low-income, persons of color, people living in substandard housing, etc.
Top Solutions	**Actions Needed to Implement Solution**	**Research Needed to Support Solution**
Create a **Health/Smoke Coordinated Game Plan**	• Determine who has authority (state, regional, etc.) and create a coordinated and collaborative management approach • Identify funding for coordination and convening • Involve and engage key institutions beyond government agencies (e.g. hospitals, schools, nursing homes) • Engage vulnerable populations/communities through working with community-based organizations • Identify and map impacted populations • Tie a coordinated smoke plan to planning for reducing pollution in communities that already suffer from high PM levels year-round	• Best practices: How are other states or provinces addressing smoke/health management in a coordinated fashion? • What has worked/not worked in managing fire/smoke events in California? • Identify key smoke issues facing low-income and other vulnerable populations • When is AQI an appropriate index and when is it not? What are appropriate thresholds for action? • What are the positive and negative impacts on vulnerable populations of strategies such as school closings?
Develop **equitable intervention solutions** for different populations and environments with different degrees of risk. Smoke solutions for all, but with a special focus on *access to solutions for* **vulnerable populations and communities**.	• Convene interagency task force to identify best practices on smoke technologies • Create or improve solutions for individuals, buildings and communities • Clearly identify the most vulnerable populations and engage them in design and implementation of solutions • Secure funding to intervene at scale, including $$ earmarked for vulnerable communities • Put funding and distribution programs in-place *before* fires so they can be effectively implemented when an event occurs	• Understand how filtration technology works in different real-world contexts. • What are low-cost approaches to creating safe environments inside buildings? • How have other communities, states and countries made smoke solutions available and affordable for ALL • What are best strategies for outdoor populations? What strategies are effective and which are not? • What measures are people taking and how effective are they? • Review legal regulations (state laws, ordinances)

	• Improve overall health care access so individuals with asthma and other pre-existing conditions get needed care before fire/smoke events • Funding for evaluation of short- and long-term medical impacts of smoke	
Fund the development of **low-cost technologies**—sensors, building filtration systems, masks, etc.—that can be widely deployed.	• Deploy low-cost PM sensors spatially distributed in relevant locations—Indoor/outdoor, real time, high quality data quality • Distribute low cost filtration systems—provide guidance, widely available, full access for vulnerable groups • Provide Individual masks—wide availability, low/no cost, guidance on when and how to use	
Develop and implement a **Coordinated Communications Strategy**. Establish clear and consistent messaging and guidance that is timely and tailored to different groups (public, private entities, individuals, etc.)	• Get multi-disciplinary/multi-stakeholder input • Establish triggers for messaging, content, and how to disseminate • Coordinate who has authority for different messaging and decision-making • Provide practical guidance on what to do in specific situations, what to have, what to buy, etc. • Use schools, community buildings/centers as models	• When is AQI an appropriate index and when is it not? What are appropriate thresholds for action? • Social science – how do perceptions of risk affect behavior? • Understand and identify best practices for effective communication • Evaluate existing California guidance • Need better guidance and information on how to communicate effectively in rural areas
Manage fires with a health lens. Deploy fire management strategies that reduce air quality impacts (in addition to reducing risks in WUI)	• Engage all CA communities and agencies to support improved fire management efforts. • Focus preventative efforts in wildlands as well as WUI.	• How to implement prescribed fire practices that accomplish the goal of reduced catastrophic fires but do not degrade air quality?

RECOMMENDATIONS: How to protect <u>workers</u> from adverse health impacts during and after fires (WORKSHOP GROUP C) — JUNE 26 DRAFT FOR REVIEW

Problem Defined: 1. California wildfires have increased in size and severity and they are projected to increase further due to climate change. 2. Firefighters are having to deal with more dangerous, fast-moving fires and a longer fire season. 3. Wildland firefighters, who work long shifts, are exposed to high levels of wood smoke including hazardous air pollutants formed during incomplete combustion.	4. Wildfires that burn into urban areas expose firefighters to toxic chemicals through inhalation or skin contact. This can include hydrogen cyanide (HCN), hydrogen chloride (HCI), phosgene, metals, toluene, styrene and dioxins. 5. Laborers doing post-fire cleanup contend with health hazards—including ash, dust and smoke inhalation, and asbestos exposure—as well as safety hazards from power lines, unstable structures, etc. 6. Outdoor workers (outside of burn areas) such as farmworkers and construction workers are exposed to poor smoke conditions.	7. Indoor workers with no filtration systems and those with "open" buildings such as auto repair shops are exposed to poor smoke conditions. 8. Police, EMTs and other first responders have to rescue and provide assistance to individuals during dangerous fire events. 9. It is difficult to effectively track, research and protect this population of workers. There is no registry of individuals who respond into--or otherwise work in--major wildfire incidents,
Top Solutions	**Actions Needed to Implement Solution**	**Research Needed to Support Solution**
Prevent Harm: Take action, where appropriate, to reduce fire frequency, intensity, and duration, AND protect workers during all of these activities. • Forest management—fuel load, prescribed burns, ignition prevention, etc. • Fire suppression (where appropriate) • Fire alert activities • Energy shut-downs	Develop improved health and safety programs for workers dealing with Forest Management Hazards—Tree falls, smoke exposure, heavy equipment operation injuries, forest thinning injuries • Contractor registry – accountability and tracking • Contractor oversight by state • Improved worker training • Improved health and safety standards • Stronger illness and injury prevention programs • Training and/or regulations for laborers hired by homeowners and private forest owners • More health/safety oversight for CAL FIRE employees • More health/safety oversight for incarcerated firefighters • Provide basic fire training for communities so they can support professional fire fighters prior to and during events	
Reduce Harm: Protect workers during fire events, smoke events and in post-fire activities. Prevent & reduce exposures. Examples include: • Respiratory protection • Rotating workers out • Clean-air basecamps • Avoiding/reducing outdoor work	To support frontline fire responders - fire fighters, EMS workers, Hazmat workers, evacuation workers, law enforcement, utility workers, etc. • We know enough to act and the technology exists. California should be the U.S. leader in fire worker protection. • Effective Respiratory protection equipment products are available — Powered Air-Purifying Respirators (PAPRs)— but we need regulations and funding to create markets and get manufacturers to scale-up production. N95 masks are not adequate. • Effective respiratory protection must be lightweight, durable, reduce work of breathing, cool, long-lasting. • OSHA emergency standard likely needed • Develop and deploy effective clean air trailers. To support post-fire workers in burned areas for clean-up, salvage and re-building—laborers, construction workers, equipment operators**,** hazmat, utility workers, media, local government staff, etc. • Post-fire conditions vary widely, but we know enough to take action. • Need effective respiratory protection (PAPRs). N95 probably not	• Exposure research needed for post-fire workers, particularly for laborers and others with prolonged exposure • Need exposure studies for outdoor workers and smoke • Need better understanding of the triggers for determining respiratory protection (N95s) for outdoor workers • Research to assess pre- and post-response efficacy of respiratory protection equipment and of biomarkers of exposure. • Research on existing safety nets/support systems resources available and where there are gaps i.e. no FEMA benefits for undocumented, no financial assistance for workers who don't want to expose themselves to PM2.5. during wildfires and cannot take time off work;

	sufficient for workers. • Will need new OSHA standards for unique hazards in this setting. • Contractor standards/registry needed to monitor health issues and conduct exposure research. • Assess and plan for housing and other needs immediately after fire to ensure access to affordable housing and services for all workers • Ensure fair wages/good working conditions for all workers who are participating in the recovery and rebuild To support outdoor workers and indoor workers in unfiltered buildings during smoke events—farmworkers, construction, transit, delivery, road work, landscapers, day laborers, utility workers, plus many types of unprotected indoor workers. • Stronger New emergency standard proposed (in progress) at Cal-OSHA for outdoor workers in smoke conditions. • AB 1124 introduced in legislature February 2019 to require protection for outdoor workers	• Exposure research to include skin exposure hazards and safety hazards for both response and recovery workers. • Research towards improved design of personal protective equipment for use during response and during recovery operations, including field testing under hazardous and difficult conditions.
Manage & Treat Harmed Workers: Help people recover from health impacts during and after fires • Treat symptoms • Medical monitoring • No-return policies • Long-term care	To support frontline fire responders - fire fighters, EMS workers, evacuation workers, law enforcement, utility workers, etc. • Need to define pop at risk. (Tens of thousands of workers). • Create a registry of workers who enter fire zones—fire fighters, laborers, incarcerated, etc.—and track those who are harmed. • Support community health centers to provide post-fire care To support post-fire workers in burned areas for clean-up, salvage and re-building—laborers, construction workers, equipment operators**,** hazmat, utility workers, media, local government staff, etc. • Need a registry of these workers and training programs for them. • Support community health centers to provide post-fire care • Create contingency plans to ensure prompt medical care is available if existing medical services are severely limited or unavailable to responders. To support outdoor workers during smoke events—farmworkers, construction, transit, delivery, road work, landscapers, utility workers, etc. • For workers who do not work due to smoke conditions, need provision allowing for claim of unemployment insurance under “good cause quit” to claim benefits. In addition, consider how to provide similar protection for undocumented workers. • Require employers to keep records of employees who have been exposed to smoke like we already do for chemical exposures.	• Need long term exposure research for outdoor workers • Assessment of the effectiveness of various strategies to support workers who have been harmed long-term.

RECOMMENDATIONS: LONG-TERM solutions for reducing health impacts in high-risk fire areas (WORKSHOP GROUP B)
JUNE 26 DRAFT FOR REVIEW

DRAFT Problem Defined: 1. California wildfires have increased in size and severity and they are projected to increase further due to climate change, fuel buildups and other factors. 2. At the same time, an increasing number of Californians are living in the Wildland Urban Interface (WUI). Future trends will be influenced by changing demographics in the state.	3. Direct fire impacts include death, burns, broken bones, etc. while smoke cause respiratory and cardiovascular health problems, particularly among individuals with pre-existing conditions. 4. Fires can also produce long-term health issues for fire area residents including mental health stress/trauma, pollution of water supplies, loss of jobs and forced relocation.	5. Vulnerable populations—Low-income residents, seniors, disabled individuals, undocumented workers and others—will have a harder time with long-term recovery.
Top Solutions	**Actions Needed to Implement Solution**	**Research Needed to Support Solution**
Develop a **Culture Change** in California among the general public to support a shift in forest management practices that will increase forest resilience and health.	• Education about how/why changes in forest management needed for forest and public health	
Expand the pace and scale of statewide **Forest & Vegetation Management**—thinning, prescribed/natural burns, etc.	• Increase funding for this work to implement long-term, on-going forest management at the landscape scale across California. • Develop wood products and markets that prioritize carbon storage and durable utilizations. • Coordinate with tribal communities and rural residents who live in areas that need effective forest management • Develop a job pathway for prison inmates who work on fires to get training and forest management jobs when they are released	• Create more reliable mapping of forest inventory • Develop better and more detailed fire risk maps to focus forest management efforts • Develop better understanding of the health impacts of prescribed burns vs. major wildfires, including chronic and acute effects • Produce the spatial analysis of fire risk under various climate change scenarios • Create better understanding of carbon storage long-term for prescribed burns vs. catastrophic wildfire
Align Financial Solutions—insurance, bonds, development fees, etc.—to reduce risk in high fire hazard areas and to fund actions like retrofitting homes to combat fires	• Accurately price risk of development in Wildland Urban Interface (WUI) • Secure funding to support development and land use goals that reduce fire risk • Focus on the power insurance • Design financial programs to benefit vulnerable communities such as renters	• Conduct research into the ways that financial solutions can help and not hurt low-income residents
Reform **Land Use** regulations to restrict, reduce or prohibit new development in fire-prone areas.	• Create a State/Local Blue Ribbon Commission to study and make recommendations on this critical, but charged issue	• Create reliable mapping of development and fuel loads so we can better understand our situation and make better decisions

	• Develop a statewide/local plan for Managed Retreat • Provide incentives to discourage rebuilding in fire areas • Develop and implement improved building codes and landscaping codes for both new and rebuilt structures and properties. • Ensure that displaced renters, not just displaced homeowners are protected and supported in post-fire recovery.	• Develop improvements in building and landscaping standards for use in fire-prone areas and the wildland/urban interface.
Build Adaptive Capacity in fire areas.	• Fund communities to carry out self-directed programs (not just funding for agencies) – ask them what they need • Implement Rural Broadband • Support and expand Community Fire Safe Councils (California) and learn from the Fire-Adapted Communities Network (U.S.) • Adapt best Practices from other adaptation disciplines (sea level rise, urban heat, etc.) • Build economic resilience in rural areas that often are already economically depressed • Develop Participatory Planning models with community based organizations — community driven/facilitated solutions • Fund paid positions for community members to work with government agencies charged with community fire safety programs • Underground utilities in high fire risk areas • Ensure that economic development recovery plans include and feature the needs of displaced workers.	
Accelerate California Action to **substantially reduce greenhouse gas emissions** — adaptation and resilience activities must be conducted in conjunction with carbon pollution reduction	• Accelerate action to reduce GHGs and attain the goals of AB 32, SB 32 and California's other climate manates.	• Which GHG cutting/eliminating actions would have the greatest health impacts in California?