Guidance note

Guidance note:

Evidence-based communication strategies for protecting communities from extreme heat in Surabaya and Medan cities in Indonesia

© PMI

Climate Centre

Table of contents

Acknowledgements

This guidance note was written by Ffion McEvoy, Ramiz Khan and Roop Singh. Many thanks to Muchrizal Harris Ritonga, Teguh Wibowo, Ishma F. Soepriadi from the American Red Cross for their review of this document.

Funding for this guidance note was provided by the Quadrature Climate Foundation.

Copy-editing is by Sarah Tempest and design is by Eszter Sarody.

1. Introduction

The Indonesian Red Cross Society *(Palang Merah Indonesia* or PMI) conducted a heat risk perception study in two cities, Surabaya and Medan, to assess how people understand and respond to extreme heat. This document shares key information from that study and suggests strategies that can be used to improve heat risk perception, behaviour change communication.

Based on the risk perception survey, persons with disabilities (PwD), older adults, outdoor workers, people living in informal settlements, pregnant women and students are groups at elevated risk of the impacts of extreme heat in both Surabaya and Medan. These individuals will be the primary target audiences of this communication guidance.

The heat perception survey findings underscore the importance and potential impact of improving heat awareness. There are many self-protective actions that people can take to reduce the impact of extreme heat, preventing heat-related illnesses and deaths. If people have greater heat risk perception, and are persuaded and empowered to take self-protective actions, they are likely to see reduced impacts and improved health.

According to the survey results there is low awareness of the severity of heat impacts, with only about one-third of respondents in Surabaya and Medan recognizing that extreme heat can be deadly. Outdoor workers, PwD and older adults also face structural barriers (income, mobility limits, health conditions) that reduce their ability to act on generic advice.

In both cities, the number of people who say heat-related symptoms can be prevented is less than 30 per cent. In Surabaya, only 17 per cent of individuals report consistently changing their behaviour when it is hot, while in Medan it is 22 per cent. This highlights a key gap which means that messaging needs to convince people that heat impacts are preventable, while offering advice on specific actions that are accessible to their lived realities and effective at reducing impacts.

While a majority of people in both cities say that checking the weather forecast is important, less than half actually do so, highlighting another gap. The surveys also highlight that the most trusted and used information channels are word-of-mouth, television (TV), WhatsApp groups and community leaders. Together, these findings indicate that communication must move beyond awareness to focus on simple, timely, practicable advice, delivered through trusted local channels.

2. Behaviour change principles for heat action

Research on behaviour change communication highlights the importance of producing messages that are personally relevant, specific and actionable. The following research-based principles can help guide communication activities to improve risk perception and encourage people to take self-protective actions.

1. Keep messages simple. Focus on including a maximum of three actions per message to avoid overwhelming the recipient.

2. Explain the impacts. People have a hard time envisioning the impacts of abstract numbers such as temperatures (e.g., 40°C). It's important to clearly communicate the consequences of the temperature or other heat-related metric. For example, "At this temperature, just 30 minutes of sun exposure could lead to fainting."

3. Pair risks with actions. Messages that only explain the health consequences of extreme heat risk overwhelming the audience. The audience needs to believe that they can do something about the risk (McLoughlin *et al.*, 2023). Therefore, these messages should be paired with actions that are accessible and effective. For example, "Heatwaves are deadly. You can lower your body temperature right now by soaking your feet in cool water or placing a damp cloth on your neck."

4. Personalize the message. One of the biggest communication challenges is the belief that "heat is dangerous for others, but not for me". Reminding people of their past unpleasant experiences with extreme heat (e.g., a headache brought on by spending too much time in the sun during the last heatwave) can help overcome this optimism bias (Valkengoed & Steg, 2019).

5. Address barriers head on. Behaviour change is more likely to occur when barriers to action are removed. Therefore, messaging that addresses potential barriers is more likely to result in action. For example, "If you don't have access to air conditioning during hot nights, sleep on the lowest floor or in the basement, and use a wet towel on your skin to stay cool."

Beyond messaging, it is also important to make it easy for people to take appropriate action by making heat-protective behaviours the default. For example, for heat alerts that use systems requiring people to 'opt out', rather than having to 'opt in' to alerts, reduces friction. Another example is bringing cooling buses to the places where people work outdoors rather than asking them to step away from their work to go to a cooling centre across town – an unrealistic ask.

Lastly, it's also critical to test messages with target groups and refine them based on feedback. Continually checking for understanding, and asking people if they remembered the messages and took action based on them, can improve messages and ensure their efficacy (Grothmann *et al.,* 2017).

3. Audience communication cards

3.1 Persons with disabilities

A person with a disability is far more likely to perceive extreme heat as a problem than those in any other group. PwDs in Surabaya are aware of and worried about extreme heat with nearly nine-in-ten indicating that the heat has got worse in recent years. Nearly two-thirds of PwDs are worried it will negatively affect them. However, only one-in-five PwDs in Surabaya know that extreme heat can be deadly. PwDs in Medan were far less likely than other at-risk groups to have received formal education.

Almost half of PwDs in Surabaya say that their health issues are affected by the heat and one-in-five say that their work productivity is affected. However, this group is the least likely of any group to believe that heat sickness can be prevented. Just one of every 13 PwDs changes their behaviour when it's hot – far less than other vulnerable groups. This may be due to a number of barriers, such as physical limitations that prevent action, reduced access to tailored information and a high dependence on caregivers.

PRIORITY ACTIONS

1. RECOGNIZING THE EARLY SYMPTOMS OF HEAT-RELATED ILLNESS.
2. MAINTAINING HYDRATION AND COOLING STRATEGIES.
3. ACTIVATING CAREGIVER OR COMMUNITY SUPPORT.

MESSAGE EXAMPLE

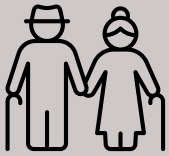
"Today's heat could make people with disabilities feel weak or faint in less than 30 minutes. If you experienced headaches or dizziness in last week's heat, today's heat could affect you again. Protect yourself now by: (1) drinking water; (2) placing a wet cloth on your neck or arms; and (3) resting in the coolest shaded place you have. If you feel dizzy or sick, ask for help immediately."

CHANNELS AND MESSENGERS

Across the two cities, PwD look for weather information through word-of-mouth, TV, social media and WhatsApp, making these suitable channels to communicate heat risk. Very few look for weather information through public displays, radio or newspapers.

COMMUNICATION IDEAS

1. Work with community and religious leaders to spread heat messages through word-of-mouth. For example, imams as well as *Ketua Rukun Tetangga* (RT) and *Ketua Rukun Warga* (RW) (RT/RW leaders are elected, non-salaried community officials) can explain why it's so important for PwDs to be protected from the heat. Leaders can share messages during Friday prayers, community meetings and in community WhatsApp groups.
2. Broadcast short TV segments on practical ways to stay cool and symptoms to watch out for. Disability-focused organizations can help to produce the content, and the segment could be aired on JTV (Jawa Timur Television) and RCTI (Rajawali Citra Televisi Indonesia) as a public health announcement or news bulletin.
3. Post short videos on social media with personalized messages shared by PwD on how stay cool in hot weather and why it's critically important to do so.
4. Make simple infographics to share on social media, WhatsApp and posters. Distribute posters in *Puskesmas* (*Pusat Kesehtatan Masyarakat* or community health centres), busy areas like markets, on social media and via WhatsApp.



3.2 Older people (60+ years)

Older people in Medan tend to have lower levels of formal education than other at-risk groups. Three-in-five older adults surveyed listed primary education as their highest level of formal education – the largest proportion of any group.

One-in-ten older people report experiencing a heatwave in the last two years, more than any other group, and 87 per cent assess the heat in Surabaya as 'moderate' or 'severe'. Older adults are more likely than any other group to say that temperatures have risen in recent years.

However, older people are the least likely of any group to be concerned about how heat-related risks will affect them. Three-in-ten older adults are not concerned about heat-related risks – the highest proportion of any group. Only a quarter of older people are aware that heat can be deadly in Medan and Surabaya – less than any other group. Despite this, close to half report experiencing unusual heat multiple times a year.

Older adults are much more affected by heat-driven health issues than other groups as well as by the disruption to electricity supply that can result from heat; nearly half of the older people surveyed say that their health issues are affected by heat.

High susceptibility to heat, yet lower awareness of heat-related health risks, poses barriers to action that messaging needs to overcome. In addition, older adults may have a higher prevalence of chronic illnesses and face limited mobility that places them at higher risk.

PRIORITY ACTIONS

1. DRINK WATER AT REGULAR INTERVALS, EVEN WHEN NOT THIRSTY.
2. STAY IN THE COOLEST AVAILABLE SPACE DURING THE HOTTEST HOURS OF THE DAY (11AM TO 3PM).
3. AVOID OUTDOOR ACTIVITY DURING PEAK HEAT HOURS.

MESSAGE EXAMPLE

"Today will be very hot, especially from late morning to mid-afternoon. Heat can make you dizzy, weak or seriously ill. This is especially true for older adults over the age of 60. Encourage your parents and grandparents aged 60+ to drink lots of water, even if they're not thirsty. If they feel unwell, contact a healthcare professional or the nearest Puskesmas."

CHANNELS AND MESSENGERS

Across both cities, older adults tend to find weather information through word-of-mouth, TV and social media. Far fewer use WhatsApp, radio or newspapers.

Effective messengers and channels could include community health workers, mosque announcements, household visits by volunteers, and local TV programmes.

COMMUNICATION IDEAS

1. Share heat risk messages with older adults via community leaders and PMI volunteers. Give local leaders and volunteers the script to follow during home visits, check-ins, Friday prayers and community meetings.
2. Hang posters at *Puskesmas* and *Posyandu Lansia* (community health centres for the elderly) to spark conversations with healthcare workers. Collaborate with healthcare workers to encourage heat risk communication by word-of-mouth.
3. Broadcast TV segments (JTV/RCTI) on symptoms and solutions for older adults in hot weather. Ask older adults and healthcare workers for short interviews to add to the segment.
4. Share short videos on social media featuring older adults talking about extreme heat.

3.3 Outdoor workers

Outdoor workers are often engaged in informal jobs such as street vending, daily wage labour and construction work, which tend to be low-paying, high-risk and lack social protection.

Most outdoor workers surveyed have experienced unusually or uncomfortably hot weather and think that city temperatures are increasing. In Surabaya, only one-quarter know that heat can be deadly while more than one-third think that heat cannot kill. More than half of outdoor workers in Medan spend eight hours or more working outside each day, putting them at considerable risk of extreme heat impacts.

People in informal jobs such as street vendors and delivery drivers are most likely to experience unusual heat multiple times per year (58 per cent). Outdoor workers are severely affected by heat-driven issues. Four-in-ten outdoor workers say that heat affects their health, while three-in-ten say that it affects their work productivity – the most of any group. The necessity to work outdoors during dangerous heat conditions, along with limited shade and rest opportunities, are key barriers that prevent self-protective behaviours in this group and must be addressed in the messaging.

PRIORITY ACTIONS

1. TAKE SHORT SHADE BREAKS EVERY HOUR.
2. DRINK WATER FREQUENTLY, ENSURING CLEAR-COLOURED URINE.
3. RECOGNIZE THE SIGNS OF HEAT-RELATED ILLNESS.

MESSAGE EXAMPLE

"Between 12–5pm, today's heat could be dangerous. Protect yourself: drink water every 20 minutes, take 10-minute breaks in the shade every hour, and stop work immediately if you feel dizzy or weak."

CHANNELS AND MESSENGERS

Across both cities, outdoor workers look primarily to social media for weather information, closely followed by word-of-mouth and TV.

Effective messengers and channels could include briefings to employers, driver associations and community groups.

COMMUNICATION IDEAS

1. Give safety briefings for employers and employees at construction sites and outdoor markets.
2. Share messages through trade unions, workers' associations, community and religious leaders.
3. Post short videos of outdoor workers taking self-protective actions on social media and in worker WhatsApp groups.
4. Make posters for *Grab* and *Gojek* drivers and position them at sites where the drivers often gather.

3.4 People living in informal areas

Informal settlements in Indonesia – referred to as *Kampungs* – are characterized by high density dwellings, a predominance of low-income groups and inadequate basic services, including sanitation and shelter. [1] In most cases, informal settlements are not registered and are, therefore, often excluded from formal government systems and benefits.

Nine-in-ten people living in informal areas in Surabaya have experienced unusually or uncomfortably hot weather and felt an increase in temperatures in recent years. Many people living in informal areas said that their health issues, productivity and social activities are affected by the heat. In Medan, almost half of people living in informal settlements have no or inconsistent access to water during high temperatures and about 40 per cent of people living in informal settlements find cooler locations on hot days.

People living informally face structural barriers including poor ventilation, dense housing and limited access to cooling infrastructure. Heat communications to this group need to address these issues and provide actionable solutions.

PRIORITY ACTIONS

1. MINIMIZE INDOOR HEAT USING LOW-COST METHODS.
2. SHIFT ACTIVITIES AWAY FROM PEAK HEAT TIMES.
3. USE COMMUNITY COOLING SPACES WHERE AVAILABLE.

MESSAGE EXAMPLE

"When heat is strongest at midday, use wet cloths to cool your body, drink water often and rest in shaded community spaces if your home is too hot."

CHANNELS AND MESSENGERS

In both cities, social media, word-of-mouth and TV were the most popular communication channels for people living in informal settlements.

Effective messengers and channels could include community leaders using loudspeakers, local nongovernmental organizations, RT/RW leaders.

COMMUNICATION IDEAS

1. Arrange community meetings after *maghrib* prayers (the fourth of five daily Islamic prayers) with snacks and information sharing.
2. Commission a mural and/or street art at the entrance of the *kampung* (neighbourhood).
3. Start a social media campaign with short videos of trusted community members.

1 https://www.mdpi.com/2076-0760/9/6/104#:~:text=3.2.&text=According%20to%20UN%20Habitat%20(2003,%2Dcultural%2C%20and%20spatial%20characteristics

3.5 Pregnant women

Pregnant women of various age groups, educational backgrounds and monthly income levels.

In Surabaya, eight-in-ten pregnant women are concerned about heat-related risks, but 35 per cent do not know that heat can be deadly. Over 90 per cent of pregnant women have experienced unusually or uncomfortably hot weather and think that extreme temperatures are a problem in the city.

Three-in-ten pregnant women work outdoors for more than ten hours a day in Surabaya and two-in-ten in Medan. Long working hours and prolonged exposure to heat pose serious risks to maternal health. In Surabaya, almost half (47 per cent) of pregnant women say that their health issues are affected by the heat – more than any other group.

Overall, pregnant women are more susceptible to extreme heat but, due to their caregiving and other responsibilities, may have limited time to take self-protective actions.

PRIORITY ACTIONS

1. INCREASE HYDRATION.
2. REDUCE HEAT EXPOSURE (INDOORS AND OUTDOORS).
3. LOOK FOR EARLY SYMPTOMS OF HEAT ILLNESS.

MESSAGE EXAMPLE

"During pregnancy, heat affects your body faster. Today it is very hot. Please drink water often, stay in the coolest room available, and rest during the midday heat. If you feel a headache or any nausea or weakness, seek care immediately."

CHANNELS AND MESSENGERS

Pregnant women look for weather information via social media, word-of-mouth, TV and WhatsApp.

Effective messengers and channels could include Puskesmas staff, midwives, doctors and mothers' support groups.

COMMUNICATION IDEAS

1. Train health workers to deliver tailored talks during routine check-ups.
2. Feature testimonials from local mothers on TV and radio about staying safe during hot weather.
3. Make animated videos and infographics to show key heat protection actions for pregnant women.
4. Send SMS reminders linked to antenatal visits.

3.6 Students

'Students' here refer to learners across all levels, from primary and secondary learning through to higher education.

Most students in Surabaya have experienced unusually hot weather and felt temperatures rise in recent years. More than any other group, students rate heat in Surabaya as severe. Over 90 per cent think that extreme temperatures are a problem in the city. The findings are similar in Medan.

Extreme heat affects students' health, work productivity and social activities. Concentration issues was a heat-related symptom reported by a higher proportion of students than any other group. While heat communication is needed to target students themselves, they can also be powerful messengers for other groups – such as older parents and grandparents – given their education level and comparative willingness to take action on heat.

PRIORITY ACTIONS

1. PEER-TO-PEER HEAT SAFETY ACTIONS.
2. AVOID SPORTS AND OUTDOOR ACTIVITY DURING PEAK HEAT TIMES.

MESSAGE EXAMPLE

"Most students protect themselves on hot days by drinking water, resting during peak heat and helping friends and family who feel unwell. Do your part today – stay cool and look out for each other.""

CHANNELS AND MESSENGERS

Social media, word-of-mouth and WhatsApp were the most common channels used by students.

Effective messengers and channels could include parents, peers, student environmental groups, school administrators and staff.

COMMUNICATION IDEAS

1. Arrange a project with an association of mural/graffiti street artists in the city, involving local students.
2. Set up a heat awareness and safety competition with student organizations.
3. Support schools to hold heat awareness days and share heat warnings in class and assemblies.

4. Timing of communication

Effective heat communication depends not only on what is communicated, but also when messages are delivered. Communication should begin before the heat season, continue through the event and include post-event learning.

Pre-season communication is essential for priming the population to take action. Repeated exposure to simple self-protective actions before heat events improves recall and increases the likelihood that people act during alerts (Ebi *et al.*, 2004).

Early warning messages should be delivered close enough to the event to create a sense of urgency, while still allowing time to prepare water, adjust schedules and identify cooling options. Heat warning studies show that same-day reminders, especially in the morning, significantly improve self-protective behaviours such as increased hydration and reduced outdoor activity (Mehiriz et al., 2018; Li *et al.,* 2024).

These messages align with planning daily schedules and are critical for converting risk awareness into self-protective actions. In addition, short reminder messages during peak heat hours act as behavioural cues, helping people pause risky activities and adopt self-protective actions in real time. And finally, post-event learning strengthens the future response by identifying message clarity gaps, channel effectiveness and behavioural barriers.

© PMI

5. Next steps

While this document brings together the results of heat risk perception surveys with research on behaviour change communication, further work is required to turn these guidelines into a communication campaign. The messages in this document can be developed into multi-channel, context-specific communication materials for local organizations such as PMI, the National Disaster Management Agency (Badan Penanggulangan Bencana Daerah or BPBD), civil society and other humanitarian organizations in the cities to adapt and use effectively. Local organizations responsible for implementing the communication initiatives in Surabaya and Medan can use the guidance in this document to gather ideas for comprehensive communication campaigns, outlining further details on timelines, phases and specific communication channels.

Bibliography

Ebi, K.L., Teisberg, T.J., Kalkstein, L.S., Robinson, L., & Weiher, R.F. (2004). *Heat watch/warning systems save lives: Estimated costs and benefits for Philadelphia 1995–98.* https://doi.org/10.1175/BAMS-85-8-1067

Grothmann, T., Leitner, M., Glas, N., & Prutsch, A. (2017). 'A five-steps methodology to design communication formats that can contribute to behavior change: The example of communication for health-protective behavior among elderly during heat waves', *Sage Open*, 7(1), 2158244017692014. https://doi.org/10.1177/2158244017692014

Li, Jiayan, Sun, R., Li, Jialei, Ma, Y., Zhang, M., & Chen, L. (2024). 'Human extreme heat protective behaviours: The effects of physical risks, psychological perception, and public measures', *Humanities and Social Sciences Communications*, 11(1), 327. https://doi.org/10.1057/s41599-024-02790-3

McLoughlin, N., Howarth, C., & Shreedhar, G. (2023). 'Changing behavioral responses to heat risk in a warming world: How can communication approaches be improved?', *WIREs Climate Change*, 14(2), e819. https://doi.org/10.1002/wcc.819

Mehiriz, K., Gosselin, P., Tardif, I., & Lemieux, M.-A. (2018). 'The effect of an automated phone warning and health advisory system on adaptation to high heat episodes and health services use in vulnerable groups: Evidence from a randomized controlled study', *International Journal of Environmental Research and Public Health*, 15(8), 1581. https://doi.org/10.3390/ijerph15081581

Valkengoed, A. van, & Steg, L. (2019). 'The psychology of climate change adaptation', *Elements in Applied Social Psychology*. https://doi.org/10.1017/97811085954

Glossary

Extreme heat: An umbrella term for unusually high daytime and/or nighttime temperatures, sometimes combined with other factors like humidity, wind or solar radiation, that create above-normal heat stress compared to local climate conditions. What is considered 'extreme' varies by region, depending on the typical climate.

Heatwave: One form of extreme heat is called a 'heatwave' – a period when temperatures, or temperature combined with other factors such as maximum temperature, nighttime temperature and humidity are unusually high and hazardous to human health and well-being. However, there is no single, universal definition for a heatwave because different temperatures have varying impacts in different parts of the world. For example, in London, United Kingdom, a high of 28°C is considered to be a heatwave, while in the plains of India the temperature must be higher than 40°C to qualify as a heatwave.[1] Heatwave definitions can vary even within a country due to differences in climate, geography, topography, population vulnerability and observed health impacts.[2] Heatwaves must be defined using thresholds that correspond to local weather conditions and their impact on human health and systems.

Hot weather: Refers to a period when the temperature is above the normal or average temperature for a specific location and time of year but does not reach an extreme level that impacts human health and well-being.

1 https://www.ifrc.org/sites/default/files/2019_RCCC-Heatwave-Guide-for-RCRC-Branches-1.pdf

2 https://www.preventionweb.net/understanding-disaster-risk/terminology/hips/mh0501?utm_source=undrr&utm_medium=redirect&utm_campaign=hips&utm_content=MH0501


Climate
Centre