

MODULE 3

Earthquakes



**Readiness has to be in
place before the ground
moves.**



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About RISE

RISE Resilient Communities is a European training programme supporting adults, educators and community leaders to prepare for, respond to and recover from disasters.

It brings together experience from Ireland, Spain, Türkiye, Italy and Ukraine, covering storms, floods, earthquakes, wildfires, conflict and community recovery.

The course focuses on practical, low-cost action that people and communities can take before, during and after a crisis.

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About This Module

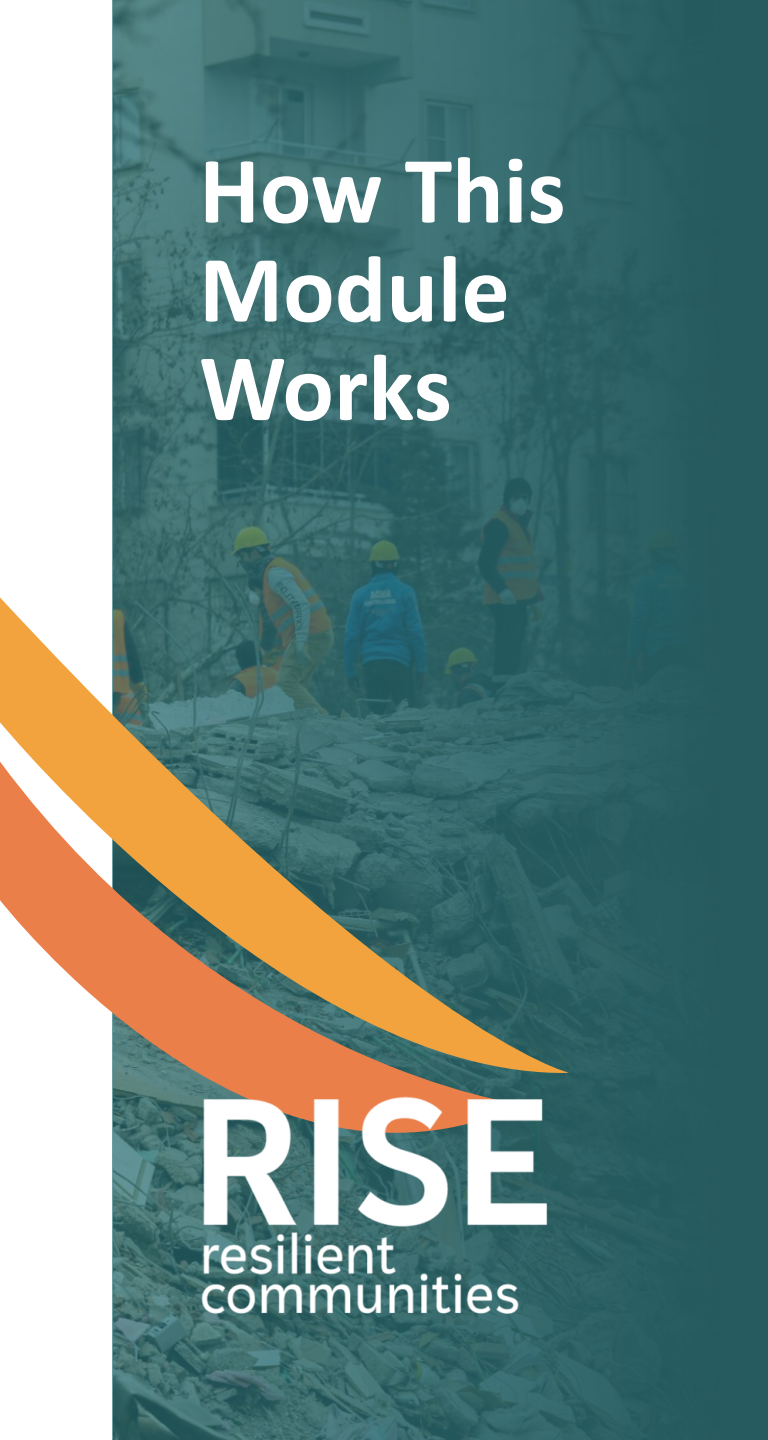
Module 3 covers one of the least predictable hazards in this training.

Unlike a flood, a storm or a heatwave, where an official warning is usually issued hours or days in advance, an earthquake gives no reliable warning at all.

Scientists can estimate the probability of an earthquake in a given area over years or decades. Reliably predicting exactly when and where a strong one will strike remains beyond current science, despite real advances in monitoring.

This is not a gap that better technology will soon close.

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The background of the slide features a photograph of a collapsed building with rescue workers in orange vests and hard hats working on the debris. A large orange and yellow curved graphic element is positioned on the left side of the slide.

How This Module Works

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The module, and the household and community preparedness it asks you to complete, is built on one premise: readiness has to be in place before an earthquake happens, because it cannot be timed to arrive after a warning.

Structure: the same four phases as every hazard module: understanding the risk, preparedness, during the disaster, after the disaster.

For: adult learners, educators, community leaders and volunteers. It is built around Türkiye's experience, but seismic risk runs across Southern Europe, so any RISE partner can localise and deliver it.

Official advice comes first: this module does not replace instructions from civil protection, emergency, engineering or local authorities. During an earthquake and its aftermath, current official local instructions always take priority.

Length: 60 to 75 minutes self-study, 90 minutes facilitated.



**An earthquake gives no reliable
warning at all.**

Module 3, About This Module

Learning Outcomes

By the end of this module, you will be able to:

- Identify your own and your community's exposure to ground shaking, building collapse and, where relevant, tsunami
- Take the correct protective action during shaking, whether indoors, outdoors or in a vehicle
- Prepare a household and community earthquake plan, including what to do about gas, aftershocks and damaged buildings
- Identify one household action and one community action to complete before the next high-risk period

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01

Understanding the Risk

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What Is an Earthquake?

1

Stress builds

Stress builds up along a fault, a fracture in the Earth's crust.

2

Stress is released

The stress is suddenly released.

3

The ground shakes

The release causes the ground to shake.

The size of an earthquake is measured by its magnitude: a single number describing the energy released at its source.

Magnitude Is Not the Whole Story

Two earthquakes of the same magnitude can have completely different consequences. It depends on:

How deep and close the rupture was

The depth and distance of the rupture shape how strongly the ground shakes where people live.

The type of ground people are built on

Different ground responds to shaking in different ways.

Above all, how their buildings were designed and constructed

The quality of design and construction is what decides whether a building stays standing.

Magnitude is one number. Harm depends on the place and the buildings.

Strong Buildings Do Not Remove the Worry

Anxiety about earthquakes does not respect borders, and it is not simply a function of how well-prepared a country is.

Japan

Widely regarded as having some of the world's strongest building standards and the most developed public earthquake-preparedness system.

9,000+

PEOPLE SURVEYED IN JAPAN, 2022

Most respondents still described themselves as anxious about earthquakes.

Strong buildings and good early-warning systems reduce the physical danger an earthquake poses. They do not, on their own, remove the emotional weight of living with the possibility of one.

Source: Saito, Yasumoto & Sekiya (2022), Earth, Planets and Space 74(1), 82.

A Global Hazard, Not a Regional One

Every RISE partner country sits within reach of seismic risk, though the level of exposure varies.

Türkiye

Lies across two of the most active fault systems in the eastern Mediterranean: the North Anatolian Fault and the East Anatolian Fault.

Italy

A long history of destructive earthquakes across its central and southern regions.

Spain, Ireland and Ukraine

Lower seismic activity overall, but not risk-free.

Learners should not assume that a quiet recent history means a quiet future one.



Look at Your Own Place

Understanding risk means looking at the specific conditions of your own place.

Not a general sense of how seismically active your country is as a whole.

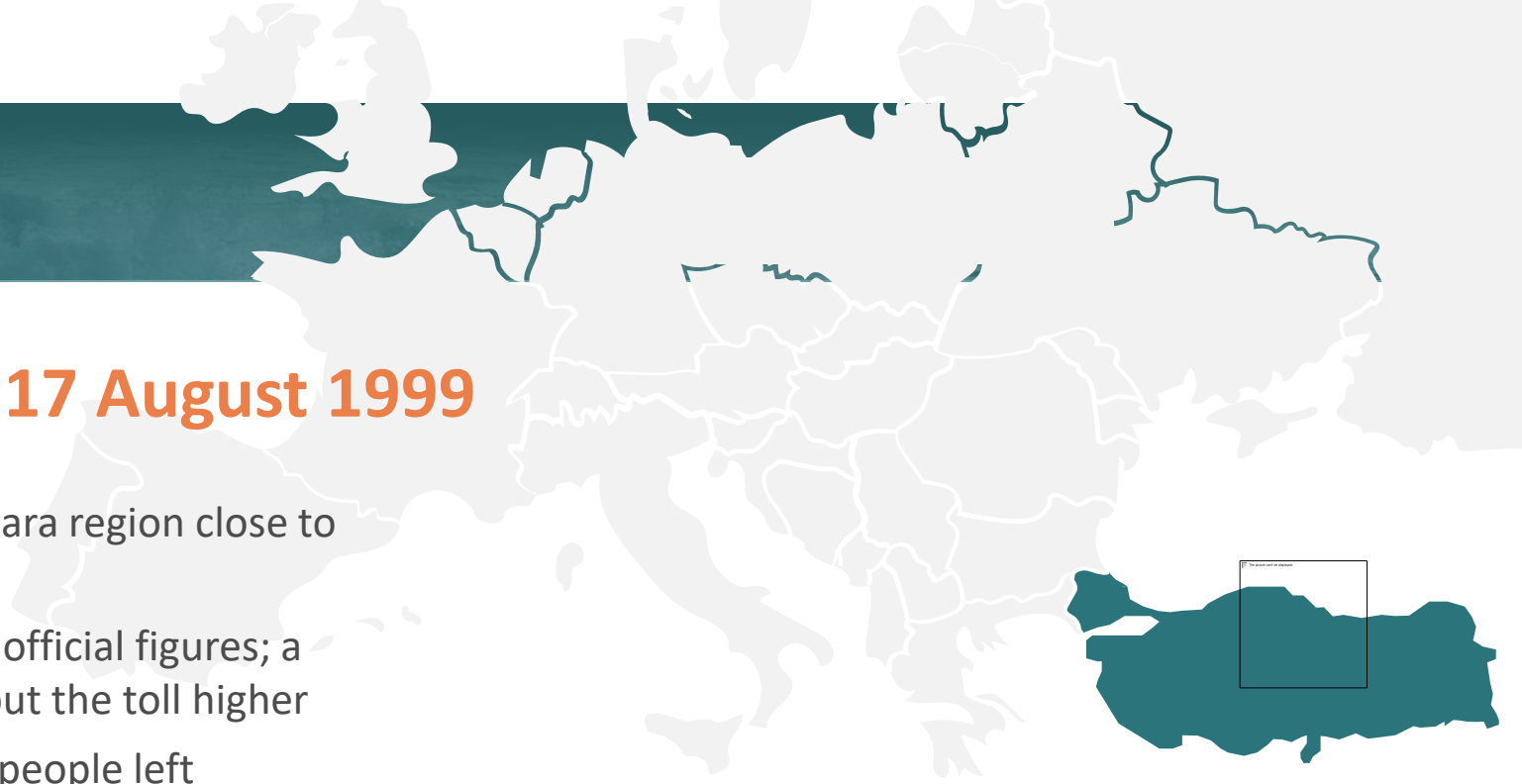
A practical first step: consult your own country's official earthquake or fault-line hazard map.



Two earthquakes, one lesson repeated.

Türkiye: İzmit 1999 and Kahramanmaraş 2023

Türkiye

A map showing Turkey and its surrounding regions, including parts of Europe, the Middle East, and North Africa. Turkey is highlighted in a dark teal color, while the surrounding areas are in a light gray color. The map is positioned in the background of the slide.

İzmit earthquake, 17 August 1999

- Magnitude 7.4, in the Marmara region close to Istanbul
- More than 17,000 deaths in official figures; a later parliamentary review put the toll higher
- Around 250,000 to 500,000 people left homeless
- Poor construction quality was found to be a major factor in the scale of the disaster
- It led directly to Türkiye's compulsory earthquake insurance scheme, created to guarantee faster financial support for people who lost their homes

“Poor construction quality was a major factor in the scale of the disaster.”

Türkiye

Kahramanmaraş, 6 February 2023

- Two major earthquakes, magnitude 7.8 and 7.5, struck south-eastern Türkiye within hours of each other
- Eleven provinces were affected
- Highest losses in Hatay and Kahramanmaraş provinces
- Tens of thousands more people died in northern Syria

The next slide gives the numbers for Türkiye.

“Two major earthquakes struck within hours of each other.”

Kahramanmaraş, in Numbers

53,000

PEOPLE DIED IN TÜRKİYE

Around 53,000 people died in Türkiye, with the highest losses in Hatay and Kahramanmaraş provinces.

38,000+

BUILDINGS COLLAPSED

More than 38,000 buildings collapsed outright.

~900,000

MORE BUILDINGS CONDEMNED

Close to 900,000 more buildings were damaged badly enough to be condemned.

It remains the deadliest natural disaster in modern Turkish history.

Sources: Yildirim (2024); Disasters Emergency Committee (2024); ReliefWeb (2023).



**Construction quality and
enforcement, not magnitude alone,
decide how many people survive.**

The lesson of 1999 and 2023, 24 years apart

Better Maps Are Not Enough

Türkiye's earthquake hazard mapping has been strengthened considerably since 1999. The national active fault map, maintained by the General Directorate of Mineral Research and Exploration, was most recently updated in 2026.



active faults in the 2013 map



active faults in the current map

The number of identified active faults has risen sharply as mapping technology has improved.

Better maps do not, on their own, protect a building that was never built to code.

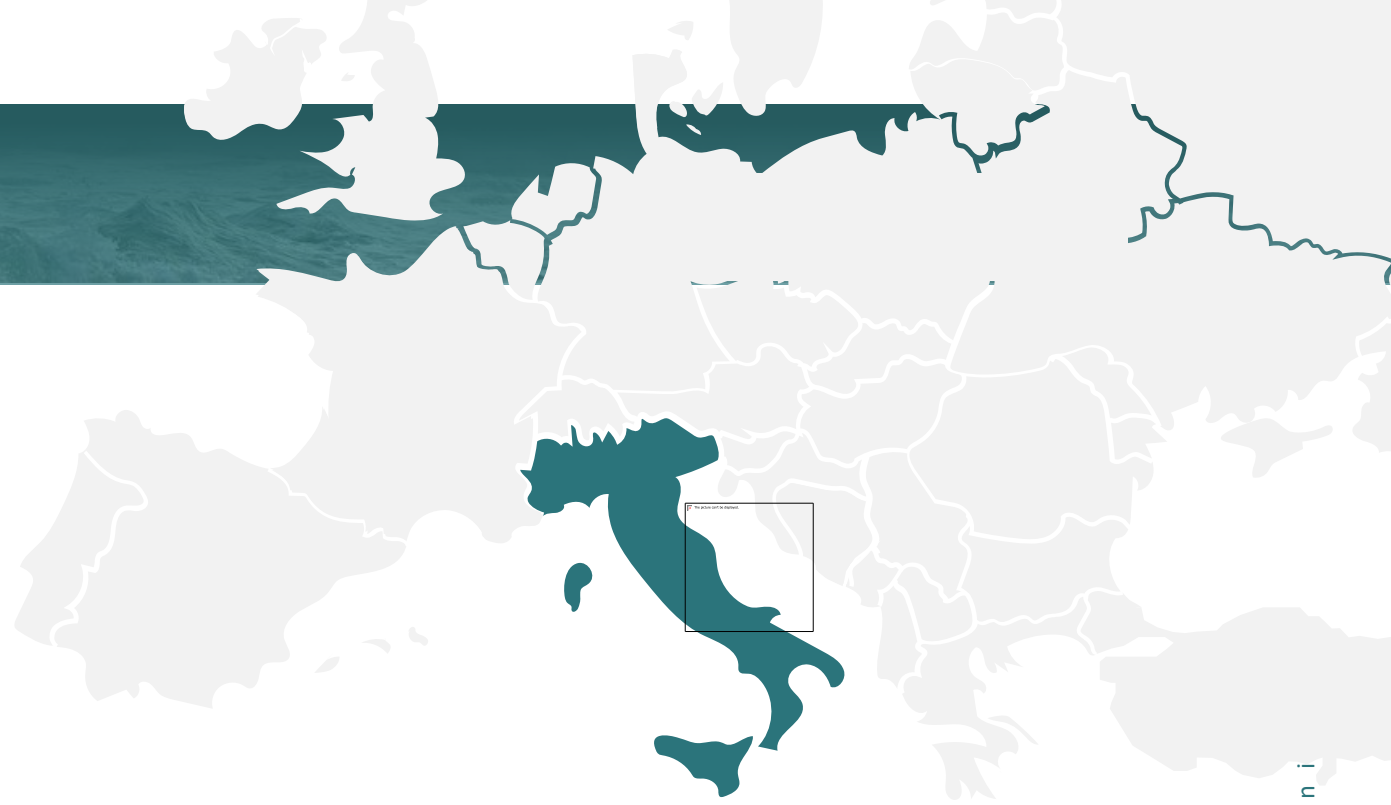
Italy

L'Aquila, 6 April 2009

- Magnitude 6.3, in the Abruzzo region of central Italy
- More than 300 people killed
- Around 65,000 left homeless in and around the city of L'Aquila
- As in Türkiye, poor construction standards and a lack of enforcement in older buildings made the damage far worse than the magnitude alone would suggest

Türkiye is not the only RISE country with this risk.

"The damage was far worse than the magnitude alone would suggest."



Three Earthquakes Compared

Earthquake	Magnitude	Deaths	Buildings and homes
İzmit, Türkiye, 17 August 1999	7.4	More than 17,000 in official figures; a later parliamentary review put the toll higher	Around 250,000 to 500,000 homeless; poor construction quality a major factor
L'Aquila, Italy, 6 April 2009	6.3	More than 300	Around 65,000 homeless; poor standards and weak enforcement in older buildings
Kahramanmaraş, Türkiye, 6 February 2023	7.8 and 7.5	Around 53,000 in Türkiye; tens of thousands more in northern Syria	More than 38,000 collapsed; close to 900,000 more condemned

Who Is More Exposed?

Older people and people with disabilities or reduced mobility

May need more time or assistance to take protective action or evacuate a damaged building.

People in older or informal buildings

Living or working in older buildings, informal construction, or buildings never assessed for seismic safety.

People who rent their home

May have less control over structural repairs or retrofitting.

Children, and the people responsible for them

Particularly around school buildings during the school day.

People who depend on powered medical equipment

Electrically powered medical equipment, or a regular supply of medicines.

Exposure to earthquake harm is not evenly spread.

It depends on health, housing, income, mobility and access to information.

Understand Your Own Exposure: Home and Building

☐

Do you know the seismic hazard level of the area where you live, work and study?

☐

Do you know the age, construction type and structural history of the building you live in?

☐

Has your building ever been formally assessed for seismic safety, or altered without professional supervision?

☐

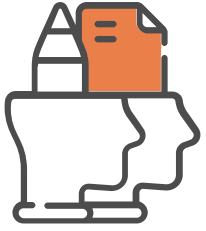
Is heavy furniture, a water heater or a bookcase in your home secured against falling?

☐

Do you know where the gas, electricity and water shut-offs are in your home?

Understand Your Own Exposure: Plan and People

- ☐ Where is the safest place for you to protect yourself if shaking starts while you are indoors?
- ☐ Do you live, work or spend time near the coast, and would you know to move to high ground after strong or prolonged shaking, in case of tsunami?
- ☐ Is there an official assembly area near your home, and do you know how to reach it?
- ☐ Is there somebody you should check on immediately after a strong earthquake?
- ☐ Do you know where you will get official information if the mobile network is overloaded or the power fails?



Exercise (2 minutes)

**Where is your area
on the map?**

- Find out whether your area is classified as a seismic risk zone by your national geological or civil protection authority.
- Note roughly how it is described: low, moderate or high.

Section 3.1 Key Takeaways

- An earthquake gives no reliable warning, and magnitude alone does not decide how much harm it causes
- Construction quality and enforcement decide how many people survive: the lesson of İzmit, L'Aquila and Kahramanmaraş
- Exposure is not evenly spread: health, housing, income, mobility and information all matter
- Understand the risk where you are, starting with your official hazard map

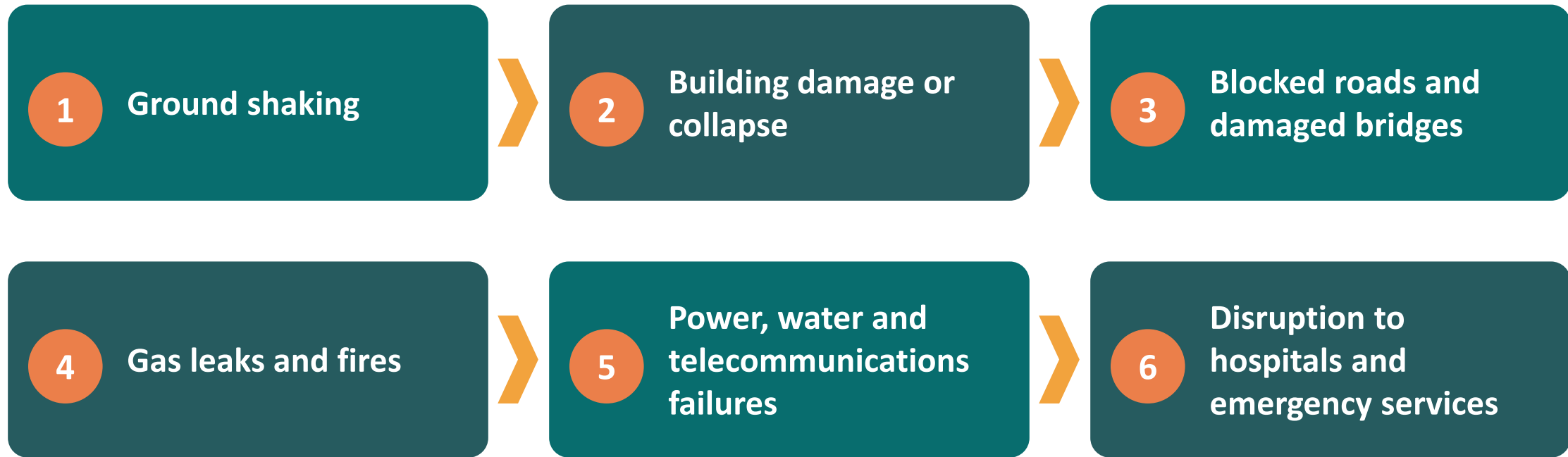


02

Preparedness

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One Earthquake, Many Problems



A severe earthquake can set off a chain of connected problems well beyond the shaking itself.

Not every earthquake causes every one of these. The chain shows why preparedness has to go beyond the moment of shaking, into how you will manage the days that follow it.

Your Household Plan

1

Practise the drill

Learn and practise “drop, cover and hold on” until it is automatic (see Section 3.3).

2

Secure heavy items

Secure heavy furniture, water heaters and shelving that could fall or block an exit.

3

Agree a meeting point

Agree a family meeting point outside the building, away from walls and glass.

4

Keep a kit ready

Keep an earthquake kit accessible, including sturdy shoes, since broken glass and debris make bare feet dangerous.

5

Know the weak points

Know your building’s structural weak points, if this information is available to you.

6

Know your shut-offs

Know where your gas, electricity and water shut-offs are, and how to use them safely.

Key Action: Secure One Heavy Item

1

Walk through your home and identify the heaviest piece of furniture that is not fixed to a wall.

2

Secure it with a strap, bracket or anchor, or move it away from beds and seating areas.

At Community Level

Make a plan together

Find out whether your building or street has an informal earthquake response plan (who checks on whom, where to meet) and help set one up if it does not.

Know who can help

Learn who in your building or street has first aid or search and rescue training, and who might need extra help, using the list in Section 3.1.

Support stronger buildings

Support retrofitting and stronger building-code enforcement where you can, whether that means raising it with a residents' association, a landlord, or local government.

Key action, community level: agree a meeting point with your neighbours, not just your own household, so a headcount is possible quickly after a quake.

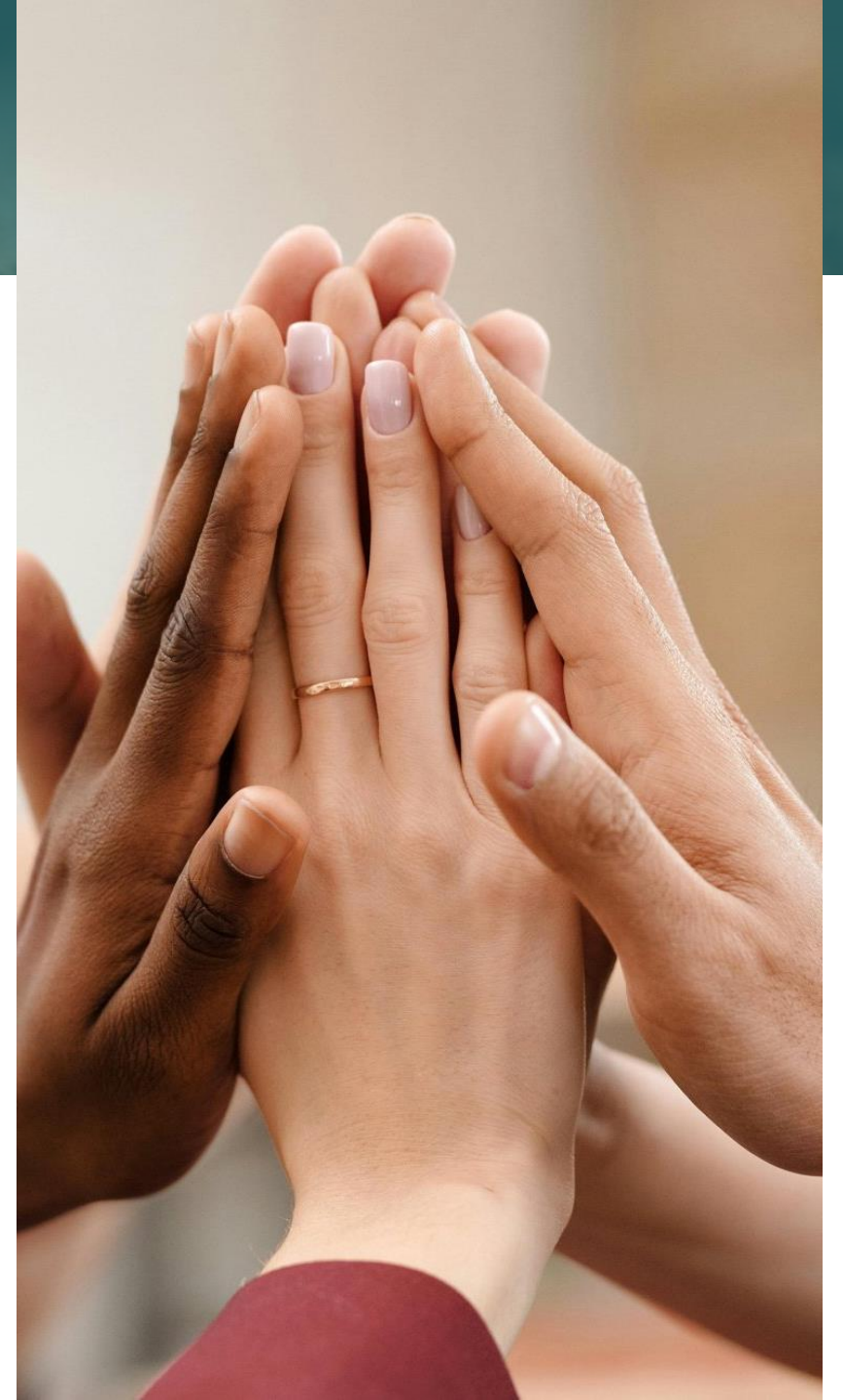


This is slow, unglamorous work, and it is also the single most effective thing a community can do to reduce harm in the next earthquake.

Supporting retrofitting and stronger building-code enforcement

Section 3.2 Key Takeaways

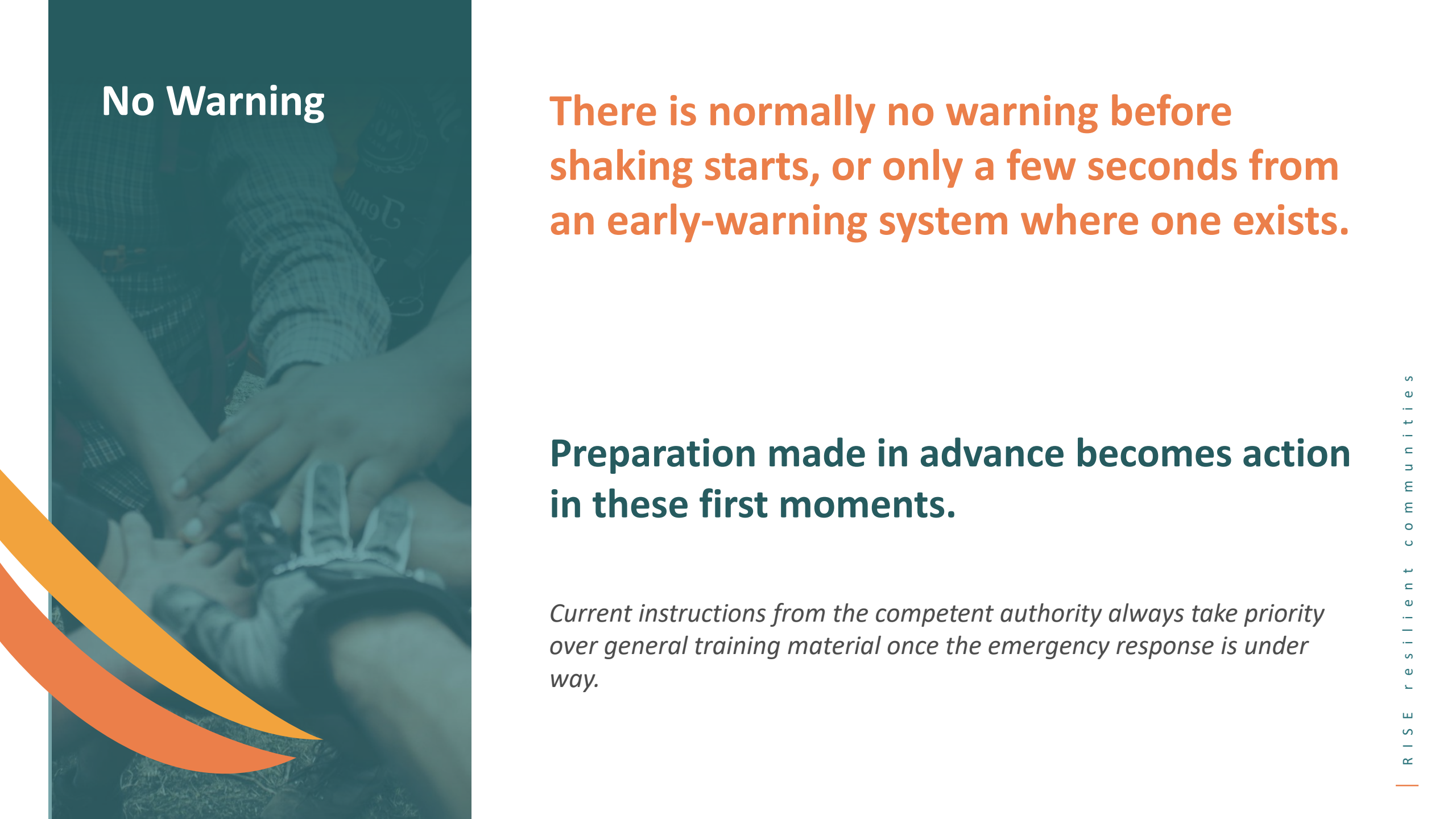
- An earthquake sets off a chain of problems; preparedness has to cover the days after the shaking
- Household plan: practise the drill, secure heavy items, agree a meeting point, keep a kit, know your shut-offs
- Secure one heavy item this month
- Community level: agree a neighbours' meeting point and support stronger buildings



03

During the Earthquake

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No Warning

There is normally no warning before shaking starts, or only a few seconds from an early-warning system where one exists.

Preparation made in advance becomes action in these first moments.

Current instructions from the competent authority always take priority over general training material once the emergency response is under way.



Drop. Cover. Hold on.

The correct protective action during shaking



Drop

1

Get down onto your hands and knees.

This makes it far harder for the shaking to knock you over, and puts you in the best position to move quickly toward shelter if you need to.

Cover

2

Cover your head and neck with one arm and hand.

If there is a sturdy table nearby, get underneath it.

If there is no table in reach, move next to an interior wall, away from tall furniture, shelving or anything else that could topple onto you.

Hold On

3

Stay where you are until the shaking stops completely.

If you are sheltering under a table, hold on to it with one hand so you can move with it if it shifts.

If you are in the open with no shelter available, keep your head and neck covered with your arms until the shaking ends.

The Doorway Myth

MYTH

A common misconception is that standing in a doorway offers the best protection.

FACT

This is only true in older, unreinforced buildings. In most modern buildings a doorway is no stronger than the rest of the structure, and standing there offers no meaningful extra protection.

Drop, cover and hold on.

Outdoors, in a Vehicle or Near the Coast

Outdoors

Move away from buildings, trees, streetlights and power lines, and drop, cover and hold in the open.

In a vehicle

Pull over away from bridges, overpasses and buildings, stop, and stay inside with your seatbelt on until the shaking stops.

Near the coast

Treat strong or prolonged shaking as a tsunami warning in itself. Do not wait for an official alert. Move to high ground as soon as the shaking allows you to move safely.

Expect aftershocks, and treat each one with the same response.

Avoid lifts. Use stairs once shaking has stopped and it is safe to move.



Near the coast, strong or prolonged shaking is a tsunami warning in itself.

Do not wait for an official alert. Move to high ground as soon as it is safe to move.

At Community Level

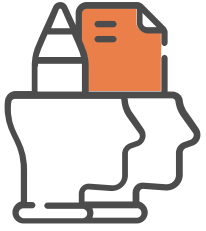
1 Once you and your household are safe



2 Join the informal search and rescue effort with neighbours if you are able to do so safely, rather than waiting alone for professional teams.

Earthquake Action Card

If you are...	Do this
Indoors	Drop, cover and hold on. Get under a sturdy table, or next to an interior wall away from tall furniture. Stay until the shaking stops completely.
Outdoors	Move away from buildings, trees, streetlights and power lines. Drop, cover and hold in the open.
In a vehicle	Pull over away from bridges, overpasses and buildings. Stay inside with your seatbelt on until the shaking stops.
Near the coast	Treat strong or prolonged shaking as a tsunami warning. Move to high ground as soon as it is safe to move.
After the shaking	Expect aftershocks and repeat the response. Avoid lifts; use stairs once it is safe to move.



Exercise: Practise the Drill

Stand up. Do it now.

- **Drop.** Get down onto your hands and knees.
- **Cover.** Cover your head and neck with one arm and hand, and get under a sturdy table if there is one.
- **Hold on.** Hold the table with one hand and stay put until the shaking stops.
- **Repeat until it is automatic.**

Section 3.3 Key Takeaways

- There is normally no warning: preparation made in advance becomes action in the first moments
- Drop, cover and hold on; the doorway is not safer in most modern buildings
- Outdoors, in a vehicle or near the coast, adapt the response; near the coast, move to high ground without waiting for an alert
- Expect aftershocks, avoid lifts, and join community rescue only once you and your household are safe



04

After the Earthquake

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Five Themes for the Days After

1

Coordination and
communication

2

Digital tools and
misinformation

3

Psychological
dimension

4

Short-term
actions

5

Long-term and
sustaining
solutions

These five themes carry through every RISE hazard module. We take them one at a time.



Coordination and Communication

Neighbourhood search and rescue efforts often organise themselves in the hours before professional teams arrive, as happened widely after the Kahramanmaraş earthquakes.

Check a building's safety before re-entry, and coordinate with whoever is directing the local response rather than working alone.



Digital Tools and Misinformation

Networks are often overloaded or down after a major earthquake.

Agree an alternative way to check in with family in advance.

Treat unverified aftershock predictions circulating online with caution. No one can reliably predict the timing of an aftershock.



Psychological Dimension

The trauma of loss and injury is compounded by the ongoing anxiety that aftershocks can cause for weeks or months afterwards.

This is a normal response to an abnormal event, not a sign of weakness. It is worth watching for in others as much as in yourself.

A man and a woman are working on a wooden frame structure outdoors. The man is in the foreground, smiling, and the woman is behind him, also smiling. They are both wearing white t-shirts. The structure they are working on appears to be a roof or a wall frame made of wooden beams and a mesh material.

SHORT-TERM ACTIONS

01

Arrange temporary shelter

- Arrange temporary shelter.

02

Get a structural assessment

- Get a structural assessment of any damaged building before re-entry.

03

Wait for the all-clear

- Access belongings only once a building has been declared safe.

Do not rely on your own judgement of whether a cracked building is safe to enter.

Long-Term and Sustaining Solutions

Retrofit homes

Retrofitting homes reduces the harm caused by the next earthquake.

Advocate for stronger codes

Community advocacy for stronger building codes and enforcement reduces the harm caused by the next earthquake.

Who gets left behind?

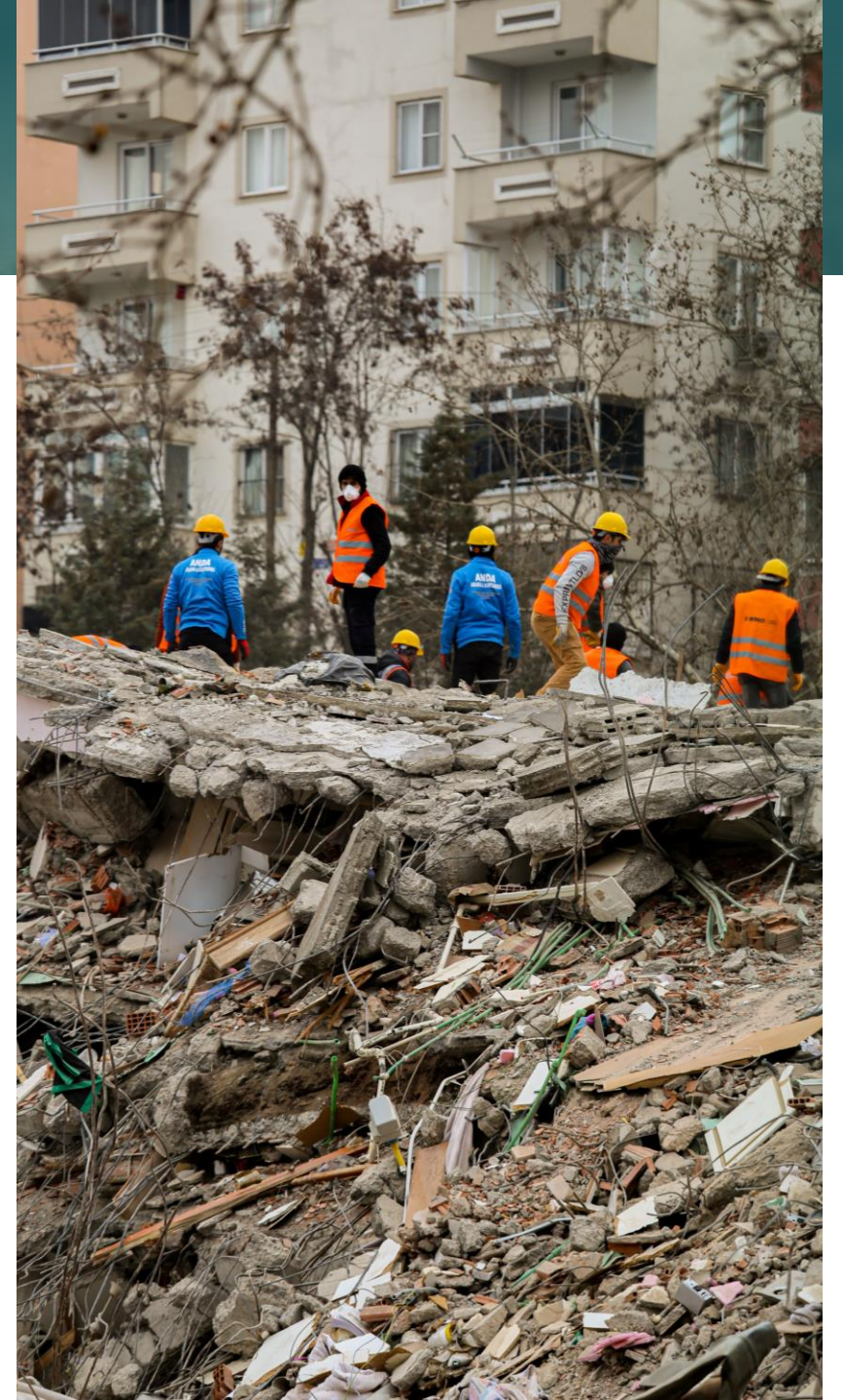
Recovery tends to take longer, and hit harder, in lower-income areas and communities, since damaged homes are often people's main asset. Long-term recovery planning should pay particular attention to who gets left behind.

Where to Find Help

Organisation	What it does	Contact
[Add organisation]	[What it does]	[Website or phone]
[Add organisation]	[What it does]	[Website or phone]
[Add organisation]	[What it does]	[Website or phone]
[Add organisation]	[What it does]	[Website or phone]
[Add organisation]	[What it does]	[Website or phone]

Section 3.4 Key Takeaways

- Neighbourhood rescue often starts before professional teams arrive; check a building's safety before re-entry
- Networks fail: agree another way to check in, and be wary of aftershock predictions
- Anxiety after an earthquake is normal; watch for it in others as well as yourself
- Do not enter a damaged building until it has been declared safe, and plan for who gets left behind



Closing Reflection

Before you finish this module, complete five short prompts.

- 1 One building risk.** Name one building where you spend regular time whose seismic safety you are unsure of.
- 2 One home hazard.** Name one object in your home that could fall, slide or block an exit during shaking.
- 3 One person.** Identify one person who may need a call, a visit or assistance immediately after a strong earthquake.
- 4 One official source.** Write down where you will get official earthquake and aftershock information.
- 5 Two safe places.** Identify the safest place to protect yourself indoors at home, and your community's official assembly area outdoors.

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