

Cancer survivorship

Survivorship is not just 'watching and waiting' — it is active medical care for the long-term effects of treatment and the ongoing risk of cancer.

THE ONE-LINE TRUTH

Cancer survivorship is the phase after treatment ends, when the body is healing but still at risk for late side effects, cancer coming back, or new cancers.

The chain — how it unfolds

1. Cancer treatment damages healthy cells throughout the body while killing cancer cells. — why: Chemotherapy, radiation, and surgery are not perfectly precise — they target fast-growing or localized tissue, but they also hit nearby healthy organs and tissues, leaving behind injury and scar tissue.
2. Organs that were damaged by treatment cannot work as well as they used to, so the body has less reserve to handle stress or normal demands. — why: For example, a heart weakened by doxorubicin cannot pump as hard during exercise. Lungs scarred by bleomycin or chest radiation cannot expand fully to grab oxygen. Glands destroyed by radiation or chemo cannot make the hormones the body needs to feel normal.
3. Survivors feel exhausted all the time (fatigue), even after rest, because their organs are working overtime just to keep up with basic daily tasks. — why: When the heart, lungs, glands, and blood cells are all running below normal capacity, the body never has enough oxygen, energy, or hormones to feel strong. Every activity — even getting dressed or walking to the mailbox — takes more effort than it should.
4. Nerves that were poisoned by chemotherapy fire pain signals constantly, causing burning, tingling, or stabbing pain in the hands and feet (peripheral neuropathy). — why: Chemotherapy drugs like cisplatin, paclitaxel, and vincristine damaged the long nerve fibers that run from the spinal cord to the hands and feet. Those damaged nerves misfire, sending pain signals even when nothing is actually hurting the skin. The damage is often permanent because nerve fibers grow back very slowly or not at all.

5. The heart muscle weakens over months to years after anthracycline chemotherapy (like doxorubicin or daunorubicin), leading to heart failure (shortness of breath, leg swelling, and feeling like the heart is racing). — why: Anthracyclines poison the mitochondria (the power plants inside heart muscle cells), causing those cells to die. The heart tries to compensate by pumping faster, but eventually it cannot keep up, and fluid backs up into the lungs and legs.
6. Lungs become stiff and scarred after bleomycin or chest radiation, making it harder and harder to breathe deeply or exercise (pulmonary fibrosis). — why: The treatment triggered inflammation in the lungs, and the body tried to heal by laying down scar tissue. But scar tissue does not stretch like normal lung tissue, so over time the lungs lose their ability to expand and oxygen levels drop.
7. Glands that make hormones (thyroid, ovaries, testes, pituitary) stop working after radiation or chemotherapy, leaving the body without the chemical signals it needs to control energy, mood, sex, and growth (endocrine dysfunction). — why: Radiation aimed near these glands or chemotherapy drugs that circulate through the whole body killed the cells that make hormones. Without thyroid hormone, the metabolism slows down and the patient feels cold, tired, and depressed. Without sex hormones like estrogen and testosterone, energy, mood, bone strength, and sexual function all decline.
8. Thinking becomes slow and foggy, memory gets worse, and focus is hard to maintain (chemo brain or cognitive impairment). — why: Chemotherapy and radiation injured neurons in the brain, reduced blood flow to the brain, and triggered inflammation. The hippocampus (the part of the brain that stores new memories) and the prefrontal cortex (the front part of the brain that controls focus and planning) are especially vulnerable, so survivors struggle with tasks that used to be easy.

Spot it — what you see, and why

- Fatigue that does not go away with rest: Cancer treatment—chemotherapy, radiation, or surgery—damages healthy cells alongside cancer cells. Chemotherapy can lower red blood cell counts (anemia), which means less oxygen reaches muscles and organs, like a car engine running on thin air. Radiation and surgery trigger inflammation (the body's repair alarm), and healing that damage drains energy for months or even years. The bone marrow (the factory inside bones that makes blood cells) may also recover slowly, keeping energy low long after treatment ends.

- Pain in bones, joints, or muscles: Chemotherapy and hormone treatments (like aromatase inhibitors for breast cancer or androgen blockers for prostate cancer) pull calcium out of bones, making them weaker and achy—like old, brittle wood. Radiation leaves scar tissue in muscles, joints, and connective tissue, which stiffens and hurts when you move. Some drugs (platinum-based chemo, taxanes) also irritate nerves directly, sending pain signals even after the drug is gone.
- Memory problems or trouble focusing (sometimes called 'chemo brain'): Chemotherapy and radiation can injure brain cells and the insulation (myelin) around the wires (axons) that let brain cells talk to each other—like frayed phone cables that drop calls. Treatment also triggers inflammation in the brain and lowers levels of brain-derived neurotrophic factor (BDNF), a protein that helps grow and protect brain cells. Fatigue, stress hormones (cortisol), and sleep problems after cancer pile on, making it even harder to remember or concentrate.
- Numbness, tingling, or burning in hands or feet (peripheral neuropathy): Certain chemotherapy drugs—platinum drugs (cisplatin, oxaliplatin), taxanes (paclitaxel, docetaxel), and vinca alkaloids (vincristine)—damage the long nerves that run from the spine out to fingers and toes. They strip away the protective myelin coating and poison the nerve's power plant (mitochondria), so signals get scrambled or lost. The result is tingling, burning, numbness, or sharp pain in a stocking-and-glove pattern. Nerves heal very slowly—sometimes an inch per month—and some damage may be permanent.
- Shortness of breath or new cough: Radiation to the chest scars the delicate air sacs (alveoli) and tissue between them (interstitium), making the lungs stiff and less stretchy—like a dried-out sponge that cannot expand. This is called pulmonary fibrosis. Some chemotherapy drugs (bleomycin, methotrexate, nitrosoureas) also poison lung cells directly. In addition, anthracycline chemo (doxorubicin, daunorubicin) and chest radiation can weaken the heart muscle (cardiomyopathy), so the heart cannot pump blood forward efficiently; blood backs up into the lungs, causing fluid buildup (pulmonary swelling (edema)) and breathlessness.
- Chest pain, fast heartbeat, or irregular heartbeat: Anthracycline chemotherapy (doxorubicin, epirubicin) and chest radiation damage the heart muscle cells (cardiomyocytes) by creating toxic free radicals (unstable molecules that tear apart cell parts) and harming the mitochondria (the cell's battery). The heart muscle weakens and cannot squeeze as hard, a condition called cardiomyopathy. Radiation also scars the arteries feeding the heart (coronary artery disease) and can stiffen the sac around the heart (pericardium), all of which cause chest pain, skipped beats, or a racing feeling.

Red flags — act now

- New or growing lump, especially in an area where cancer was treated before

- Sudden shortness of breath or chest pain at rest
- Coughing up blood or severe new cough that does not go away
- Unexplained weight loss—more than 10 pounds in a few months without trying
- Severe headache with vision changes, confusion, weakness on one side of the body, or trouble speaking

Treat it — in this order

1. Survivorship care plan — a written document listing the cancer type, all treatments received (chemo drugs, radiation dose and field, surgeries), expected late effects, and a schedule for screening and follow-up → Gives the patient and all their doctors a clear map of what happened and what to watch for. It tells you which organs were hit and when to check them, so nothing gets missed. Guidelines (ASCO, NCCN) say every survivor should get one.
2. Cardiology screening with echocardiogram, troponin, and EKG — done within 1 year after finishing treatment if anthracyclines (doxorubicin, daunorubicin) or chest radiation were used, then every 1-2 years → Finds heart weakening before the patient feels short of breath or their legs swell. If caught early, ACE inhibitors (like lisinopril) or beta-blockers (like carvedilol) can slow the damage and prevent full heart failure.
3. Pulmonary function testing and chest CT if bleomycin or mediastinal (middle-chest) radiation were used → Catches lung scarring before it steals too much oxygen. Tells you which patients need supplemental oxygen or limits on heavy activity. Helps avoid infections that scarred lungs cannot fight.
4. Hormone screening — TSH for thyroid, testosterone or estrogen depending on sex, and growth hormone or cortisol if the pituitary (the brain's hormone control center) was radiated — checked based on radiation field and patient age → Replaces hormones that radiation or chemotherapy destroyed. Fixing low thyroid or sex hormones improves energy, strengthens bones, lifts mood, and restores sexual function.
5. Neuropathy treatment with gabapentin (a nerve-pain blocker) or duloxetine (an antidepressant that also quiets nerve pain); compression garments and physical therapy for lymphedema → Quiets the pain signals from damaged nerves so patients can sleep and use their hands. Moves lymph fluid out of swollen limbs so the arm or leg feels lighter and works better.

Your top priorities at the bedside

1. Assess vital signs including heart rate, rhythm, blood pressure, oxygen saturation, and respiratory rate; listen to lung sounds for crackles or wheezing and heart sounds for murmurs or extra beats. — why: Anthracycline chemotherapy and chest radiation damage the heart muscle and pericardium (sac around the heart), causing heart failure (fluid backs up into lungs), arrhythmias, and valve disease; crackles in lungs signal fluid overload, low oxygen means the heart is not pumping well, and irregular pulse may indicate atrial fibrillation (an irregular, quivering heartbeat) or other dangerous rhythm that needs immediate EKG and cardiology consult.
2. Screen for signs of recurrence or new cancer by asking about new lumps, unexplained weight loss, persistent pain, bleeding, or cough; examine any area of concern and escalate positive findings to the provider immediately. — why: Cancer survivors have higher risk of the original cancer coming back (recurrence) and developing second primary cancers due to genetic factors, prior radiation damaging DNA, and immune system changes; early detection through surveillance improves survival because smaller tumors respond better to treatment and have not spread to distant organs yet.
3. Perform a fall-risk assessment and check sensation in hands and feet by testing light touch, pinprick, and ability to feel vibration; ask if the patient has dropped objects or tripped recently. — why: Platinum chemo and taxanes damage peripheral nerves (nerves outside the brain and spinal cord), causing numbness and weakness that raises fall risk and injury; peripheral neuropathy can be permanent, so early physical therapy referral and home safety modifications like grab bars and removing loose rugs prevent fractures and head trauma.