### Examples of adverse events associated with unapproved stem cell treatments

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<tr>
<th>Year</th>
<th>Reported cases</th>
<th>Reported deaths</th>
<th>Patient country of origin</th>
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<th>Administration route</th>
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<tbody>
<tr>
<td>2004&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5</td>
<td>Not reported</td>
<td>China</td>
<td>Spinal cord injury</td>
<td>Olfactory ensheathing fetal cells</td>
<td>Spinal injection</td>
<td>Meningitis, CSF pleocytosis, gastrointestinal bleeding, pneumonia, fever, headache&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>2005&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1</td>
<td>Israel</td>
<td>Russia</td>
<td>Ataxia telangectasia&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Fetal neural stem cells (SCs)</td>
<td>Direct injection into brain, spine</td>
<td>Tumors in brain, spine originating from donor fetal neural stem cells</td>
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<td>2006&lt;sup&gt;f&lt;/sup&gt;</td>
<td>1</td>
<td>Not reported</td>
<td>Egypt</td>
<td>Acute inflammation of spinal cord segments</td>
<td>Mesenchymal SCs (MSCs), embryonic, and fetal neural SCs</td>
<td>Spinal injection</td>
<td>Acute inflammation of brain, spinal cord that damaged myelin sheath protecting nerve fibers</td>
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<td></td>
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<tr>
<td>2006&lt;sup&gt;g&lt;/sup&gt;</td>
<td>1</td>
<td>Thailand</td>
<td>Thailand</td>
<td>Kidney inflammation due to lupus</td>
<td>Hematopoietic SCs</td>
<td>Injection into renal regions (no ultrasound guidance)</td>
<td>Multiple lesions in kidney, liver, adrenal gland</td>
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<td>2009&lt;sup&gt;h&lt;/sup&gt;</td>
<td>1</td>
<td>U.S. (California)</td>
<td>U.S.</td>
<td>Face-lift</td>
<td>Adipose-derived stromal cells</td>
<td>Injections around eye</td>
<td>Bonelike growth in eyelid</td>
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<td>2010^</td>
<td>3</td>
<td>2</td>
<td>Italy; Azerbaijan; U.S. (Ohio)</td>
<td>Germany</td>
<td>Unspecified neurological conditions</td>
<td>Bone marrow-derived SCs</td>
<td>Direct injection into brain</td>
<td>Brain hemorrhage; death</td>
<td>Though the treating clinic in Germany was shut down, provider subsequently opened a similar clinic in Lebanon</td>
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<tr>
<td>2010-12</td>
<td>2</td>
<td>2</td>
<td>U.S. (Indiana, Florida)</td>
<td>U.S. (Florida)</td>
<td>Leg numbness, difficulty walking after cancer treatment; pulmonary hypertension</td>
<td>Grossly filtered bone marrow aspirate; adipose-derived stromal cells</td>
<td>Different methods of administration</td>
<td>Stroke; cardiac arrest; death in both cases</td>
<td>Provider was subsequently barred from practicing medicine in Florida but continues to treat patients in the Dominican Republic</td>
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<tr>
<td>2011^</td>
<td>1</td>
<td>1</td>
<td>U.S.</td>
<td>U.S. (Nevada)</td>
<td>Spontaneous widening of bronchi (for unknown reasons)</td>
<td>Nonspecified SC intervention</td>
<td>Unknown</td>
<td>Death</td>
<td></td>
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<td>2012-14^{m}</td>
<td>At least 10</td>
<td>At least 7</td>
<td>Several countries, including U.S. (Illinois)</td>
<td>Italy; Spain; Russia; U.K.; Sweden; U.S.</td>
<td>Various conditions affecting trachea function</td>
<td>SC-coated plastic or cadaveric trachea</td>
<td>Surgical transplant</td>
<td>Pulmonary embolism, postoperative infection, transplant failure, death</td>
<td>Patients were treated by the same surgeon, who was found to have engaged in numerous instances of scientific misconduct</td>
</tr>
<tr>
<td>2012^{b}</td>
<td>1</td>
<td>Not reported</td>
<td>Japan</td>
<td>Chronic kidney failure</td>
<td>Adipose-derived MSCs</td>
<td>Intravenous infusion</td>
<td></td>
<td>Unspecified neurological event</td>
<td></td>
</tr>
<tr>
<td>2013^{c}</td>
<td>3</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Herniated intervertebral disc</td>
<td>Adipose-derived MSCs</td>
<td>Intravenous infusion</td>
<td></td>
<td>Pulmonary embolism</td>
<td></td>
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<tr>
<td>2013^{p}</td>
<td>1</td>
<td>1</td>
<td>Australia</td>
<td>Australia</td>
<td>Dementia</td>
<td>Unknown</td>
<td></td>
<td>Uncontrolled blood loss during liposuction procedure, shock, death</td>
<td>Patient was on anticoagulant medication, which caused uncontrolled bleeding</td>
</tr>
<tr>
<td>2014^{n}</td>
<td>6</td>
<td>1</td>
<td>Canada, U.S. (New York)</td>
<td>Germany</td>
<td>Not reported</td>
<td>Live cell therapy/fresh cell therapy</td>
<td>Intramuscular injections</td>
<td>Q fever</td>
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<tr>
<td>2016-17&lt;sup&gt;+&lt;/sup&gt;</td>
<td>At least 5</td>
<td>Not reported</td>
<td>U.S. (California, other locations not specified)</td>
<td>Various conditions including chronic obstructive pulmonary disease</td>
<td>Adipose-derived stromal cells</td>
<td>Infusion, direct injection into brain, knee, and eyes, inhalation</td>
<td>Loss of consciousness, headaches, confusion, inability to walk, infection, retinal detachment, hospitalization</td>
<td>These adverse events occurred at several affiliated clinics</td>
<td></td>
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<tr>
<td>2018&lt;sup&gt;+&lt;/sup&gt;</td>
<td>13</td>
<td>Not reported</td>
<td>U.S. (Texas, Florida, Arizona)</td>
<td>Various conditions causing joint and back pain</td>
<td>Umbilical cord blood-derived SCs</td>
<td>Injection or infusion</td>
<td>Acute bacterial infections of spine, bones, joints; abscesses; hospitalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018&lt;sup&gt;+&lt;/sup&gt;</td>
<td>1</td>
<td>Not reported</td>
<td>U.S. (Florida)</td>
<td>Arthritis</td>
<td>Not reported</td>
<td>Injection</td>
<td>Vomiting, hospitalization, coma</td>
<td></td>
<td></td>
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<tr>
<td>Not reported&lt;sup&gt;+&lt;/sup&gt;</td>
<td>1</td>
<td>Not reported</td>
<td>U.S.</td>
<td>Costa Rica</td>
<td>Multiple sclerosis</td>
<td>Allogeneic cord blood MSCs and autologous adipose-derived stromal cells</td>
<td>Spinal injection, intravenous infusion</td>
<td>Catastrophic demyelinating encephalomyelitis&lt;sup&gt;+&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Not reported&lt;sup&gt;+&lt;/sup&gt;</td>
<td>1</td>
<td>U.S.</td>
<td>China, Argentina, Mexico</td>
<td>Ischemic stroke</td>
<td>MSCs, embryonic, fetal neural SCs</td>
<td>Spinal injections</td>
<td>Lesions in spinal cord and surrounding membranes causing lower-back pain, paraplegia, urinary incontinence</td>
<td></td>
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<tr>
<td>Not reported</td>
<td>1</td>
<td></td>
<td>U.S.</td>
<td>U.S.</td>
<td>Face-lift</td>
<td>Fatty aspirate from abdominal wall in a procedure called “stem cell face-lift”</td>
<td>Facial injection</td>
<td></td>
<td>Necrotizing facial ulcerations</td>
</tr>
<tr>
<td>Not reported</td>
<td>1</td>
<td></td>
<td>U.S.</td>
<td>Portugal</td>
<td>Spinal fracture, associated spinal cord injury</td>
<td>Olfactory mucosal cells</td>
<td>Intraspinal transplantation</td>
<td></td>
<td>Spinal mass consisting of large amounts of mucus</td>
</tr>
<tr>
<td>Not reported</td>
<td>3</td>
<td></td>
<td>U.S.</td>
<td>U.S. (Florida)</td>
<td>Age-related macular degeneration</td>
<td>Adipose-derived stromal cells</td>
<td>Eye injections</td>
<td></td>
<td>Hemorrhage and possible retinal detachment in both eyes; one year after injection, patients were either completely blind in both eyes or had minimal vision remaining in one eye</td>
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<tr>
<td>Not reported</td>
<td>1</td>
<td></td>
<td>Not reported</td>
<td>Not reported</td>
<td>Heart disease</td>
<td>Autologous &quot;precursor&quot; cells</td>
<td>Direct injection into heart</td>
<td></td>
<td>Ventricular fibrillation; unable to undergo heart transplantation; death</td>
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<td>1</td>
<td></td>
<td>U.K.</td>
<td>Netherlands</td>
<td>Unknown</td>
<td>Umbilical cord blood-derived SCs</td>
<td>Unknown</td>
<td>Serious acute allergic reaction, hospitalization</td>
<td></td>
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<tr>
<td>Not reported</td>
<td>2</td>
<td></td>
<td>Not reported</td>
<td>Japan, China</td>
<td>Different conditions</td>
<td>Adipose-derived stromal cells</td>
<td>Unknown</td>
<td>Pulmonary embolism; death</td>
<td></td>
</tr>
<tr>
<td>Not reported</td>
<td>2</td>
<td></td>
<td>China</td>
<td>China</td>
<td>Disabilities from a minor stroke; late-stage liver cirrhosis</td>
<td>Allogenic SCs (not specified)</td>
<td>Spinal, intramuscular injections</td>
<td>Death</td>
<td>Patient with late-stage liver cirrhosis died as a result of being taken off of hepatitis B medication in order to undergo stem cell treatment</td>
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<tr>
<td>Not reported</td>
<td>1</td>
<td></td>
<td>Russia</td>
<td>Russia</td>
<td>Aging</td>
<td>Human embryonic SCs</td>
<td>Skin injection</td>
<td>Pea-size facial tumors</td>
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**Total** | 69 | 18 |
Pelocytosis means increased cell count.

Reaction to antibodies in the recipient blood.

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Reaction to antibodies in the recipient blood.


Necrosis is the death of most or all of the cells in a tissue or organ.


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