International Cancer Research Partnership

The Common Scientific Outline (CSO)

The CSO was developed by the International Cancer Research Partners and is maintained for the classification and analysis of cancer research. It is openly available for use as a research management tool. The International Cancer Research Partners reserve the right to control its content and may issue new versions at: https://www.icrpartnership.org/CSO.cfm. The current version (v2) of the CSO was adopted by the International Cancer Research Partnership in April 2015. The ICRP website transitions to using this version in 2015. To register as a CSO user, please email operations@icrpartnership.org. You will then be notified of any changes or updates to the CSO.

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ICRP/CSO/v2.6
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1 – BIOLOGY

Research included in this category looks at the biology of how cancer starts and progresses as well as normal biology relevant to these processes.

1.1 Normal Functioning

Example 1
Example 2

Examples of science that would fit:

- Developmental biology (from conception to adulthood) and the biology of aging
- Normal functioning of genes, including their identification and expression, and the normal function of gene products, such as hormones and growth factors
- Normal formation of the extracellular matrix
- Normal cell-to-cell interactions
- Normal functioning of apoptotic pathways
- Characterization of pluripotent progenitor cells (e.g., normal stem cells)

1.2 Cancer Initiation: Alterations in Chromosomes

Example 1
Example 2

Examples of science that would fit:

- Abnormal chromosome number
- Aberration in chromosomes and genes (e.g., in chronic myelogenous leukemia)
- Damage to chromosomes and mutation in genes
- Failures in DNA repair
- Aberrant gene expression
- Epigenetics
- Genes and proteins involved in aberrant cell cycles

Guidance note: *investigations to test whether or not genetic/environmental factors are involved in etiology should be coded to the relevant area of CSO 2*

1.3 Cancer Initiation: Oncogenes and Tumor Suppressor Genes

Example 1
Example 2

Examples of science that would fit:

- Genes and signals involved in growth stimulation or repression, including oncogenes (Ras, etc.), and tumor suppressor genes (p53, etc.)
- Effects of hormones and growth factors and their receptors such as estrogens, androgens, TGF-beta, GM-CSF, etc.
- Research into the biology of stem cell tumour initiation

Guidance note: *investigations to test whether or not genetic/environmental factors are involved in etiology should be coded to the relevant area of CSO 2*

1.4 Cancer Progression and Metastasis

Example 1
Example 2

Examples of science that would fit:

- Latency, promotion, and regression
- Expansion of malignant cells
- Interaction of malignant cells with the immune system or extracellular matrix
- Cell mobility, including detachment, motility, and migration in the circulation
- Invasion
- Malignant cells in the circulation, including penetration of the vascular system and extravasation
- Systemic and cellular effects of malignancy
- Tumor angiogenesis and growth of metastases
- Role of hormone or growth factor dependence/independence in cancer progression
- Research into cancer stem cells supporting or maintaining cancer progression

1.5 Resources and Infrastructure

Example 1
Example 2

Examples of science that would fit:

- Informatics and informatics networks
- Specimen resources
- Epidemiological resources pertaining to biology
- Reagents, chemical standards
- Development and characterization of new model systems for biology, distribution of models to scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems.
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer-term research-based training, such as Ph.D. or post-doctoral fellowships.

Guidance note: *CSO1.5 should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead.*

What's changed in this latest version?

- CSO1.5: an additional bullet has been added to include significant development of new model systems for biology here instead of CSO7
- CSO 1.2 and 1.3: Guidance notes have been added

2 – ETIOLOGY

Research included in this category aims to identify the causes or origins of cancer - genetic, environmental, and lifestyle, and the interactions between these factors.

2.1 Exogenous Factors in the Origin and Cause of Cancer

Example 1
Example 2

Examples of science that would fit:

- Research into the role of lifestyle factors such as smoking, chewing tobacco, alcohol consumption, parity, diet, sunbathing, and exercise in the origin and cause of cancer or increasing the risk of cancer
- Research into the social determinants of cancer such as crime, housing dilapidation (poor housing), neighbourhood level socioeconomic status and services and their relationship to cancer incidence and mortality etc.
- Studies on the effect(s) of nutrients or nutritional status on cancer incidence
- Development, characterization, validation, and use of dietary/nutritional assessment instruments in epidemiological studies and to evaluate cancer risk
- Environmental and occupational exposures such as radiation, second-hand smoke / e-cigarettes, radon, asbestos, organic vapors, pesticides, and other chemical or physical agents
- Infectious agents associated with cancer etiology, including viruses (Human Papilloma Virus-HPV, etc.) and bacteria (helicobacter pylori, etc.)
- Viral oncogenes and viral regulatory genes associated with cancer causation
- Contextual factors contributing to cancer incidence (e.g., race/ethnicity, socioeconomic status, neighborhood factors, community factors, built environment).

2.2 Endogenous Factors in the Origin and Cause of Cancer

Example 1
Example 2

Examples of science that would fit:

- Free radicals such as superoxide and hydroxide radicals
- Identification /confirmation of genes suspected of being mechanistically involved in familial cancer syndromes; for example, BRCA1, Ataxia Telangiectasia, and APC
- Identification/confirmation of genes suspected or known to be involved in "sporadic" cancer events; for example, polymorphisms and/or mutations that may affect carcinogen metabolism (e.g., CYP, NAT, glutathione transferase, etc.)
- Investigating a role for stem cells in the etiology of tumours

2.3 Interactions of Genes and/or Genetic Polymorphisms with Exogenous and/or Endogenous Factors

Example 1
Example 2

Examples of science that would fit:

- Gene-environment interactions
- Interactions of genes with lifestyle factors, environmental, and/or occupational exposures such as variations in carcinogen metabolism associated with genetic polymorphisms
- Interactions of genes and endogenous factors such as DNA repair deficiencies and endogenous DNA damaging agents such as oxygen radicals or exogenous radiation exposure

2.4 Resources and Infrastructure Related to Etiology

Example 1
Example 2

Examples of science that would fit:

- Informatics and informatics networks; for example, patient databanks
- Specimen resources (serum, tissue, etc.)
- Reagents and chemical standards
- Epidemiological resources pertaining to etiology
- Statistical methodology or biostatistical methods
- Centers, consortia, and/or networks
- Development, characterization and validation of new model systems for etiology, distribution of models to the scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead.
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer term research based training, such as Ph.D. or post-doctoral fellowships.

What's changed in this latest version?

- Studies on cancer incidence related to diet/nutrition have been moved from CSO3.2 to 2.1
- CSO2.1: added bullet 2 to cover etiological components of research that were previously coded in CSO6.3
- CSO 2.1: Added contextual factors to last bullet
- CSO2.2: revised phrasing to avoid overlap with CSO1.3
- CSO2.4: added additional bullet to note that significant development of new model systems for etiology are now included here instead of CSO7
- Guidance and additional clarifying language has been added to other bullets, or new examples included

3 – PREVENTION

Research included in this category looks at identifying individual and population-based primary prevention interventions, which reduce cancer risk by reducing exposure to cancer risks and increasing protective factors.

3.1 Interventions to Prevent Cancer: Personal Behaviors (Non-Dietary) that Affect Cancer Risk

Example 1
Example 2

Examples of science that would fit:

- Research on determinants of personal behaviors, such as physical activity, sun exposure, alcohol and tobacco use, known to affect cancer risk and interventions (including educational and behavioral interventions, such as e-cigarettes, directed at individuals as well as population-based interventions including social marketing campaigns, environmental supports, and regulatory, policy and legislative changes) to change determinants or to target health inequalities.
- Directed education to specified populations of patients, health care providers, and at-risk groups about cancer risk and prevention and relevant interventions with the intent of promoting increased awareness and behavioural change. This includes communication of lifestyle models that reduce cancer risk, such as communicating smoking and tobacco cessation interventions, genetic counselling, or targeting/addressing health inequalities.

***Guidance note**:*

- *Multi-factorial/multi-risk studies to prevent cancer through reducing obesity - including behavioral factors, obesity in general - can be coded to CSO3.1. Research projects clearly split between 2 risk factors, one of which is behavioral, one diet can be dual-coded (CSO 3.1, 3.2). Research on determinants of diet and interventions solely related to diet, nutrients, or interventions to reduce obesity through diet etc. are coded to 3.2*
- *Research into cancer causation through e-cigarette usage should be coded to CSO2.1*

3.2 Dietary Interventions to Reduce Cancer Risk and Nutritional Science in Cancer Prevention

Example 1
Example 2

Examples of science that would fit:

- Quantification of nutrients, micronutrients, and purified nutritional compounds in cancer prevention studies
- Development, characterization, validation, and use of dietary/nutritional assessment instruments to evaluate cancer prevention interventions
- Research on determinants of dietary behavior and interventions to change diet (including educational and behavioral interventions directed at individuals as well as population-based interventions including social marketing campaigns, environmental supports, and regulatory and legislative changes)

- Education of patients, health care providers, at-risk populations, and the general population about cancer risk and diet
- Communicating cancer risk of diet to underserved populations, at-risk populations, and the general public
- Communication of nutritional interventions that reduce cancer risk

***Guidance note**: Multi-factorial/multi-risk studies to prevent cancer through reducing obesity - including behavioral factors, obesity in general - can be coded to CSO3.1. Research projects clearly split between 2 risk factors, one of which is behavioral, one diet can be dual-coded (CSO 3.1, 3.2). Research on determinants of diet and interventions solely related to diet, nutrients, or interventions to reduce obesity through diet etc. are coded to 3.2*

3.3 Chemoprevention and other medical interventions

Example 1
Example 2

Examples of science that would fit:

- Chemopreventive agents and their discovery, mechanism of action, development, testing in model systems, and clinical testing
- Other (non-vaccine) preventive measures such as prophylactic surgery (e.g., mastectomy, oophorectomy, prostatectomy etc.), use of antibiotics, immune modulators/stimulators or other biological agents.

***Guidance note**: please note that research into prevention of cancer by vaccination against the causative agent should be coded to CSO3.4.*

3.4 Vaccines

Example 1
Example 2

Examples of science that would fit:

- Vaccines for prevention, their discovery, mechanism of action, development, testing in model systems, and clinical testing (e.g., HPV vaccines)

***Guidance note**: only preventive/prophylactic vaccine* research should be included here. Vaccines for the treatment of cancer should be coded to CSO 5.3 or 5.4, depending on the phase of development.*

** an antigenic substance prepared from the causative agent of a disease or a synthetic substitute, used to provide immunity.*

3.5 Complementary and Alternative Prevention Approaches

Example 1
Example 2

Examples of science that would fit:

- Discovery, development, and testing of complementary/alternative medicine (CAM) approaches or other primary prevention interventions that are not widely used in conventional medicine or are being applied in different ways as compared to conventional medical uses
- Mind and body medicine (e.g., meditation, acupuncture, hypnotherapy), manipulative and body-based practices (e.g., spinal manipulation, massage therapy), and other practices (e.g., light therapy, traditional healing) used as a preventive measure.

***Guidance note**: dietary interventions or micronutrient supplementation should be coded to CSO3.2*

3.6 Resources and Infrastructure Related to Prevention

Example 1
Example 2

Examples of science that would fit:

- Informatics and informatics networks; for example, patient databanks
- Specimen resources (serum, tissue, etc.)
- Epidemiological resources pertaining to prevention
- Clinical trials infrastructure
- Statistical methodology or biostatistical methods
- Centers, consortia, and/or networks
- Development and characterization of new model systems for prevention, distribution of models to scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead.
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer term research based training, such as Ph.D. or post-doctoral fellowships.

What's changed in this latest version?

- Primary preventions based on educational/behavioral/policy changes have been moved from CSO6 to CSO3.1
- CSO3.1: additional language added to aid interpretation and avoid overlap with CSO2.1
- CSO3.2: all dietary prevention research is consolidated here
- CSO3.4: added other medical preventive interventions in addition to
- CSO3.6: significant development of new model systems is included here instead of CSO7
- Guidance and additional clarifying language added.

4 – EARLY DETECTION, DIAGNOSIS, AND PROGNOSIS

Research included in this category focuses on identifying and testing cancer markers, imaging and other methods that are helpful in detecting and/or diagnosing cancer as well as predicting the outcome or chance of recurrence or to support treatment decision making in stratified/personalised medicine.

4.1 Technology Development and/or Marker Discovery

Example 1
Example 2

Examples of science that would fit:

- Discovery or identification and characterization of markers (e.g., proteins, genes, epigenetic), and/or technologies (such as fluorescence, nanotechnology, etc.) that are potential candidates for use in cancer detection, staging, diagnosis, theranostics and/or prognosis
- Use of proteomics, genomics, expression assays, or other technologies in the discovery or identification of markers
- Defining molecular signatures of cancer cells, including cancer stem cells (e.g., for the purposes of diagnosis/prognosis/theranostic and to enable treatment decision planning in personalized/stratified/precision medicine)

> ***Guidance note**:* research defining the molecular signature of cancer cells and how they will respond to treatment (patient biology focused) should go in CSO 4. However where the therapy is being tested and this testing will form the basis of future treatment decisions (therapy focused), this should go in CSO 5.

4.2 Technology and/or Marker Evaluation With Respect to Fundamental Parameters of Method

Example 1
Example 2

Examples of science that would fit:

- Development, refinement, and preliminary evaluation (e.g., animal trials, preclinical, and Phase I human trials) of identified markers or technologies such as genetic/protein biomarkers (prospective or retrospective) or imaging methods (optical probes, PET, MRI, etc.)
- Preliminary evaluation with respect to laboratory sensitivity, laboratory specificity, reproducibility, and accuracy
- Research into mechanisms assessing tumor response to therapy at a molecular or cellular level

4.3 Technology and/or Marker Testing in a Clinical Setting

Example 1
Example 2

Examples of science that would fit:

- Evaluation of clinical sensitivity, clinical specificity, and predictive value (Phase II or III clinical trials), including theranostics and prediction of late/adverse events
- Quality assurance and quality control
- Inter- and intra-laboratory reproducibility
- Testing of the method with respect to effects on morbidity and/or mortality

- Study of screening methods, including compliance, acceptability to potential screenees, and receiver-operator characteristics. Includes education, communication (e.g., genetic counselling), behavioral and complementary/alternative approaches to improve compliance, acceptability or to reduce anxiety/discomfort.
- Active surveillance / watchful waiting approaches.
- Research into improvements in techniques to assess clinical response to therapy

***Guidance note**: Development or clinical testing of theranostic agents (combining therapeutic and diagnostic components in a single agent) may be dual-coded to the appropriate diagnostic and treatment category (e.g., CSO5.1 - 5.5). Imaging for the purpose of treatment planning may be coded to the relevant CSO5 category.*

Active surveillance or watchful waiting approaches using screening / monitoring as part of the approach to detect disease progression can be coded to CSO4.3. If there is a strong quality of life aspect, co-coding to CSO6.1 should be considered.

4.4 Resources and Infrastructure Related to Detection, Diagnosis, or Prognosis

Example 1
Example 2

Examples of science that would fit:

- Informatics and informatics networks; for example, patient databanks
- Specimen resources (serum, tissue, images, etc.)
- Clinical trials infrastructure
- Epidemiological resources pertaining to risk assessment, detection, diagnosis, or prognosis
- Statistical methodology or biostatistical methods
- Centers, consortia, and/or networks
- Development, characterization and validation of new model systems for detection, diagnosis or prognosis, distribution of models to the scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead.
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer term research based training, such as Ph.D. or post-doctoral fellowships.

What's changed in this latest version?

- CSO4.4: new bullet added. Significant development of new model systems for detection, diagnosis, prognosis are now included here instead of CSO7
- Header: added additional text "support treatment decision-making in stratified/personalized medicine" to assist coders
- Guidance and additional clarifying language added to other bullets, or new example bullets included.

5 – TREATMENT

Research included in this category focuses on identifying and testing treatments administered locally (such as radiotherapy and surgery) and systemically (treatments like chemotherapy which are administered throughout the body) as well as non-traditional (complementary/alternative) treatments (such as supplements, herbs). Research into the prevention of recurrence and treatment of metastases are also included here.

5.1 Localized Therapies - Discovery and Development

Example 1
Example 2

Examples of science that would fit:

- Discovery and development of treatments administered locally that target the organ and/or neighboring tissue directly, including but not limited to surgical interventions, cryotherapy, local/regional hyperthermia, high-intensity, focused ultrasound, radiotherapy, and brachytherapy
- Therapies with a component administered systemically but that act locally (e.g., photodynamic therapy, radioimmunotherapy, radiosensitizers and theranostics)
- Development of methods of localized drug delivery
- Research into the development of localized therapies to prevent recurrence

5.2 Localized Therapies - Clinical Applications

Example 1
Example 2

Examples of science that would fit:

- Clinical testing and application of treatments administered locally that target the organ and/or neighboring tissue directly, including but not limited to surgical interventions, cryotherapy, local/regional hyperthermia, radiotherapy, and brachytherapy.
- Clinical testing and application of therapies with a component administered systemically but that act locally (e.g., photodynamic therapy, radiosensitizers and theranostics)
- Phase I, II, or III clinical trials of promising therapies that are administered locally
- Side effects, toxicity, and pharmacodynamics
- Clinical testing of localized therapies to prevent recurrence and prevent and treat metastases

> ***Guidance note**: localized therapies are considered to be localized when the site of action is the same as the site of administration*

5.3 Systemic Therapies - Discovery and Development

Example 1
Example 2

Examples of science that would fit:

- Discovery and development of treatments administered systemically such as cytotoxic or hormonal agents, novel systemic therapies such as immunologically directed therapies

(treatment vaccines, antibodies , antibiotics, theranostics or other biologics), gene therapy, angiogenesis inhibitors, apoptosis inhibitors, whole body hyperthermia, bone marrow/stem cell transplantation, differentiating agents, adjuvant and neo-adjuvant treatments

- Identifying mechanisms of action of existing cancer drugs and novel drug targets, including cancer stem cells for the purposes of treatment/identifying drug targets
- Drug discovery and development, including drug metabolism, pharmacokinetics, pharmacodynamics, combinatorial chemical synthesis, drug screening, development of high-throughput assays, and testing in model systems, including that which may aid treatment planning in stratified/personalised medicine
- Investigating the molecular mechanisms of drug resistance (including the role of cancer stem cells) and pre-clinical evaluation of therapies to circumvent resistance
- Development of methods of drug delivery
- Research into the development of systemic therapies to prevent recurrence

5.4 Systemic Therapies - Clinical Applications

Example 1
Example 2

Examples of science that would fit:

- Clinical testing and application of treatments administered systemically such as cytotoxic or hormonal agents, novel systemic therapies such as immunologically directed therapies (treatment vaccines, antibodies, antibiotics, theranostics or other biologics), gene therapy, angiogenesis inhibitors, apoptosis inhibitors, whole body hyperthermia, bone marrow/stem cell transplantation, and differentiating agents
- Phase I, II, or III clinical trials of promising therapies administered systemically
- Side effects, toxicity, and pharmacodynamics
- Clinical testing of systemic therapies to prevent recurrence and prevent and treat metastases

***Guidance note**: Development or clinical testing of theranostic agents (combining therapeutic and diagnostic components in a single agent) may be dual-coded to the appropriate treatment category and diagnostic category (e.g., CSO4.1, 4.2, 4.3)*

5.5 Combinations of Localized and Systemic Therapies

Example 1
Example 2

Examples of science that would fit:

- Development and testing of combined local and systemic approaches to treatment (e.g., radiotherapy and chemotherapy, or surgery and chemotherapy)
- Clinical application of combined approaches to treatment such as systemic cytotoxic therapy and radiation therapy
- Development and clinical application of combined localized and systemic therapies to prevent recurrence and prevent and treat metastases

***Guidance note**: combinations of various systemic therapies should be coded to 5.3 or 5.4; combinations of various localized therapies to 5.1 or 5.2. Dual coding should be used where there are two unconnected treatments (one localized and other systemic) in the same project. Coding should be guided by the study purpose. For example, in a Phase II study where different drugs are being tested with the same surgical regimen, the code would be 5.4*

5.6 Complementary and Alternative Treatment Approaches

Example 1
Example 2

Examples of science that would fit:

- Discovery, development, and clinical application of complementary/alternative medicine (CAM) treatment approaches such as diet, herbs, supplements, natural substances, or other interventions that are not widely used in conventional medicine or are being applied in different ways as compared to conventional medical uses
- Complementary/alternative or non-pharmaceutical approaches to prevent recurrence and prevent and treat metastases

***Guidance note**: primary prevention using complementary or alternative approaches should be coded to 3.5.*

5.7 Resources and Infrastructure Related to Treatment and the Prevention of Recurrence

Example 1
Example 2

Examples of science that would fit:

- Informatics and informatics networks; for example, clinical trials networks and databanks
- Mathematical and computer simulations
- Specimen resources (serum, tissue, etc.)
- Clinical trial groups
- Clinical treatment trials infrastructure
- Epidemiological resources pertaining to treatment
- Statistical methodology or biostatistical methods
- Drugs and reagents for distribution and drug screening infrastructures
- Centers, consortia, and/or networks
- Development and characterization of new model systems for treatment, distribution of models to scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead.
- Reviews/meta-analyses of clinical effectiveness of therapeutics/treatments
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer term research based training, such as Ph.D. or post-doctoral fellowships.

What's changed in this latest version?

- CSO5.7: Significant development of new model systems for treatment are now coded here, instead of CSO7
- Guidance and additional clarifying language added to other bullets, or new example bullets included

6 - CANCER CONTROL, SURVIVORSHIP, AND OUTCOMES RESEARCH

Research included in this category includes a broad range of areas: patient care and pain management; tracking cancer cases in the population; beliefs and attitudes that affect behavior regarding cancer control; ethics; education and communication approaches for patients, family/caregivers, and health care professionals; supportive and end-of-life care; and health care delivery in terms of quality and cost effectiveness.

6.1 Patient Care and Survivorship Issues

Example 1
Example 2

Examples of science that would fit:

- Research into patient centred outcomes
- Quality of life
- Pain management
- Psychological impacts of cancer survivorship
- Rehabilitation, including reconstruction and replacement
- Economic sequelae, including research on employment, return to work, and vocational/educational impacts on survivors and their families/caregivers
- Reproductive issues
- Long-term issues (morbidity, health status, social and psychological pathways)
- Symptom management, including nausea, vomiting, lymphedema, neuropathies, etc.
- Prevention and management of long-term treatment-related toxicities and sequelae, including symptom management (e.g., physical activity or other interventions), prevention of mucosities, prevention of cardiotoxicities, opportunistic infections, cachexia etc.
- Psychological, educational or complementary/alternative (e.g., hypnotherapy, relaxation, transcendental meditation, imagery, spiritual healing, massage, biofeedback, herbs, spinal manipulation, yoga, acupuncture) interventions/approaches to promote behaviors that lessen treatment-related morbidity and promote psychological adjustment to the diagnosis of cancer and to treatment effects
- Burdens of cancer on family members/caregivers and interventions to assist family members/caregivers
- Educational interventions to promote self-care and symptom management
- Research into peer support, self-help, and other support groups
- Behavioral factors in treatment compliance

***Guidance note**:*

- *Palliative care research should be coded here if it is primarily targeted at survivors and to code 6.6 if associated primarily with end-of-life care. If it is impossible to distinguish on the basis of the abstract, dual coding to both 6.1 and 6.6 is acceptable.*
- *Retrospective assessment of biomarkers that predict of the late effects of treatment in a clinical setting can be dual-coded to CSO4.3 and 6.1*
- *Active surveillance or watchful waiting approaches to enhance quality of life can be coded to CSO6.1. If there is an active surveillance /screening approach, co-coding to CSO4.3 should be considered.*

6.2 Surveillance

Example 1
Example 2

Examples of science that would fit:

- Epidemiology and end results reporting (e.g., SEER)
- Registries that track incidence, morbidity, co-morbidities/symptoms, long-term effects and/or mortality related to cancer
- Surveillance, measurement, evaluation or tracking of established cancer risk factors in populations such as diet, body weight, physical activity, sun exposure, and tobacco use, including method development
- Analysis of variations in established cancer risk factor exposure in populations by demographic, geographic, economic, or other factors
- Trends in use of interventional strategies in populations (e.g., geographic variation)

***Guidance note**: Studies aimed at identifying whether or not potential risk factors are causative belong in CSO 2.*

6.3 Population-based Behavioral Factors

Example 1
Example 2

Examples of science that would fit:

- Research into populations' attitudes and belief systems (including cultural beliefs) and their influence on behaviors related to cancer control, outcomes and treatment. For example, how populations' beliefs can affect compliance/interaction with all aspects of the health care/service provision
- Research into the psychological effects of genetic counselling
- Research into behavioral barriers to improving cancer care/survivorship clinical trial enrolment

***Guidance note**: Behavioral research and interventions directed at primary prevention should be coded to CSO3.1*

6.4 Health Services, Economic and Health Policy Analyses

Example 1
Example 2

Examples of science that would fit:

- Development and testing of health service delivery methods
- Interventions to increase the quality of health care delivery
- Impact of organizational, social, and cultural factors on access to care and quality of care, including studies on variations or inequalities in access among racial, ethnic, geographical or socio-economic groups
- Studies of providers such as geographical or care-setting variations in outcomes
- Effect of reimbursement and/or insurance on cancer control, outcomes, and survivorship support
- Health services research, including health policy and practice and development of guidelines/best practice for healthcare delivery across the diagnostic/ preventive/ treatment spectrum
- Analysis of health service provision, including the interaction of primary and secondary care
- Analyses of the cost effectiveness of methods used in cancer prevention, detection, diagnosis, prognosis, treatment, and survivor care/support
- Ethical, legal or social implications of research/health service delivery (e.g. genetic counselling)
- Research into systemic or operational barriers to trial enrolment

6.5 Education and Communication Research

Example 1
Example 2

Examples of science that would fit:

- Development of generic health provider-patient communication tools and methods (e.g., telemedicine/health)
- Tailoring educational approaches or communication to different populations (e.g., social, racial, geographical, or linguistic groups)
- Research into new educational and communication methods and approaches, including special approaches and considerations for underserved and at-risk populations
- Research on new methods and strategies to disseminate cancer information/innovation to healthcare providers (e.g., web-based information, telemedicine, smartphone apps, etc.) and the effectiveness of these approaches
- Research on new communication processes and/or media and information technologies within the health care system and the effectiveness of these approaches
- Media studies focused on the nature and ways in which information on cancer and cancer research findings are communicated to the general public
- Education, information, and assessment systems for the general public, primary care professionals, or policy makers
- Research into barriers to successful health communication

***Guidance note**: Communication research focused on prevention, early detection, diagnosis and prognosis, treatment, patient care/survivorship should all be coded to the respective CSO code and not to 6.5. Please note also that training programs for researchers/students are coded to the relevant research & infrastructure codes.*

6.6 End-of-Life Care

Example 1
Example 2

Examples of science that would fit:

- Hospice/end-of-life patient care focused on managing pain and other symptoms (e.g., respiratory distress, delirium, cachexia) and the provision of psychological, social, spiritual and practical support through either conventional or complementary/alternative interventions/approaches throughout the last phase of life and into bereavement
- Quality of life and quality of death for terminally-ill patients
- Provision of psychological, social, spiritual and practical support to families/caregivers through either conventional or complementary/alternative interventions/approaches
- Research into the delivery of hospice care

***Guidance note**: Palliative research should be coded here if it is primarily targeted to end of life and to 6.1 if associated with care of survivors. If it is impossible to distinguish on the basis of the abstract, dual coding to both 6.1 and 6.6 is acceptable.*

6.7 Research on Ethics and Confidentiality

Example 1
Example 2

Examples of science that would fit:

- Informed consent modeling/framing and development
- Quality of Institutional Review Boards (IRBs)
- Protecting patient confidentiality and privacy
- Research on publication bias within the cancer research field

6.8 – Historical code [no longer used]

6.9 Resources and Infrastructure Related to Cancer Control, Survivorship, and Outcomes Research

Example 1
Example 2

Examples of science that would fit:

- Informatics and informatics networks
- Clinical trial groups related to cancer control, survivorship, and outcomes research
- Epidemiological resources pertaining to cancer control, survivorship, and outcomes research
- Statistical methodology or biostatistical methods pertaining to cancer control, survivorship and outcomes research
- Surveillance infrastructures
- Centers, consortia, and/or networks pertaining to cancer control, survivorship and outcomes research
- Development and characterization of new model systems for cancer control, outcomes or survivorship, distribution of models to scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead.
- Psychosocial, economic, political and health services research frameworks and models
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer-term research-based training, such as Ph.D. or post-doctoral fellowships.

What's changed in this latest version?

- Primary prevention elements of CSO6.3 and 6.5 have been moved to CSO3, to reduce overlap and ambiguity.
- CSO6.3: is now focused on population-based behavioral factors that cannot be assigned to any specific area of research, and relevant to all areas of research.
- CSO6.8 has been consolidated into 6.1 to reduce overlap
- CSO6.9: Significant development of new model systems for cancer control, survivorship & outcomes are now included here instead of CSO7

Historical codes

The following codes are historical and are no longer used:

- CSO1.6
  Awards are now coded to either CSO1.1, 1.2, 1.3, 1.4 or 1.5
- CSO6.8
  Awards are now coded to CSO 6.1
- CSO7.1
- CSO7.2
- CSO7.3
  Research into model systems (CSO 7) is now included in the relevant "Resources & Infrastructure" categories of CSO 1, CSO 2, CSO 3, CSO 4, CSO 5 and CSO 6.