JAN 2024 APPLICATION GUIDE

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GRANT CATEGORIES

I. Population Health Research Grant (PHRG) Open[1] and Thematic Category

(A) Aim

- Population Health is the health of a population as measured by health status indicators and as influenced by social, economic and physical environments, personal health practices, individual capacity and coping skills, human biology, early childhood development, and health services. As an approach, population health focuses on the interrelated conditions and factors that influence the health of populations over the life course, identifies systematic variations in their patterns of occurrence, and applies the resulting knowledge to develop and implement policies and actions to improve the health and well-being of those populations. A population health approach addresses the entire range of individual and collective factors that determine health. Population health strategies are designed to affect whole groups or populations of people. The overarching goals of a population health approach are to maintain and improve the health status of the entire population and to reduce disparities in health status between population groups.

- As we aim to develop an integrated ecosystem that anchors preventive health efforts in primary care and care in the community with good system linkages to support citizens at different life stages, novel strategies and approaches will be needed to drive sustained behavioural modifications for individuals to adopt healthier behaviour and habits. This would include new 'Precision Health' models that shift away from broad-based interventions to interventions that are tailored to maximise impact on high-risk groups (e.g., by combining clinical/phenotypic data, genetic data, behavioural data, digital data). To achieve this, the Population Health Research Grant (PHRG) will fund research proposals that seek to improve health outcomes through a population health approach under the following Research Areas:

  a) Health Promotion and Preventive Health
  - Singapore's rising chronic disease burden threaten the long-term sustainability of the country's healthcare system. Upstream investment in health promotion and preventive health is a key move that would decrease the incidence and/or delay the onset of non-communicable diseases (NCDs) such as cardiovascular diseases, cancers, and diabetes, and reduce the burden on Singapore's healthcare system and finite resources. This area encompasses research devoted to the building of the scientific and economic evidence base for health promotion and disease prevention in the Singapore context. This includes applied etiological or determinant research, field or community-based research, and cost-effectiveness/ analysis research that are collaborative, interdisciplinary/ multidisciplinary, problem-solving and solution-oriented, and translatable to practice for implementation.
  - The research proposals submitted under this research area must lead to a better understanding of actionable, cost-effective and sustainable drivers of physical and mental health in the following areas of interest to promote healthy behaviour and address modifiable health risks across different life stages.

  b) Health Services Research

  - Health Services Research (HSR) is the "multidisciplinary field of scientific investigation that studies how social factors, financing systems, organisational

[1] Grant Call for the PHRG Open Category will be made twice a year in January and July.

structures and processes, health technologies, and personal behaviours affect access to healthcare, the quality and cost of healthcare, and ultimately our health and well-being. Its research domains are individuals, families, organisations, institutions, communities, and populations".

- Given our population ageing resulting in increasing prevalence of chronic diseases, multi-morbidity and demand for healthcare services, rising costs and manpower demand, there is a need to transform our care delivery model and enablers (e.g., financing approach, data sharing services across settings) to anchor care in primary care and community care, to operate a more sustainable and manpower-lean healthcare system. We should also continue to leverage on digital technologies to improve health delivery (e.g., to prevent disease by empowering consumers to make better-informed decisions about their health, tailor medicine/treatment to individual needs, and lower the cost of healthcare provision), and enable new ways (e.g., through inter-disciplinary application) of intervening to effect behaviour changes whilst allowing rich data to be collected. The Population Health Research Grant could contribute to this effort by supporting a) rigorous real-world evaluation of promising interventions and/or models of care, and b) research into Implementation Science to better understand and implement effective methods to bring about widespread transformation.

(B) Research Themes

- The following Research Themes have been prioritised by MOH. More information on the Themes including the specific research questions of interest under each Theme can be found in the *Theme Brief* document that can be found within the Application Guide zipped file:
    1. Mental Health
    2. Care for Mothers and Children
    3. Population Mobilisation and Improved Access in the "War on Diabetes" and Other Common Chronic Diseases
    4. Effective Use of Technology to Improve Health
    5. Prevention and Preparedness for Healthy Ageing
    6. Care for Complex Patients
    7. Sustainable and Efficient Care Delivery
    8. Palliative Care
    9. Traditional and Complementary Medicine (T&CM)
    10. Health Systems Research
    11. Rehabilitation (Rehab)

- The PHRG will be open for grant calls in two separate categories to meet different objectives:
    - **PHRG Open Category:** To allow space for researchers to identify emerging areas of need and discover novel ideas that may contribute significantly to health outcomes in the medium- to long-term, the PHRG Open Category welcomes applications on all research topics as long as the scope is within the Research Areas as articulated above. However, if your proposed research is aligned with one or more of the above themes, it would be helpful to articulate this in your proposal write-up.
    - **PHRG Thematic Category:** To allow the grant scheme to specifically address MOH's areas of pressing research needs, only proposals with scope falling within the specific Research Themes can apply.

(C) Eligibility Criteria

- PI must have a PhD and/or MBBS/BDS/PharmD/MD and/or other appropriate Postgraduate Qualification (at least a Master's Degree) in areas relevant to the proposed research.
- For proposals involving patients, the PI or co-I should be SMC registered; or should be able to demonstrate ability to access patients through SMC registered collaborators. It is recognized that some studies may be pre-clinical and not require the PI to be SMC registered.
- Only one Principal Investigator (PI) is allowed per application. The number of applications by an individual (as PI) is capped at 1 grant application per grant type in a grant call.

Additional Eligibility Criteria:

(a) Hold a primary appointment in a local publicly funded institution and salaried by the institution.

(b) Be an independent PI with a demonstrated track record of research as evidenced by the award of nationally competitive funding (international funding to be considered on a case-by-case basis) or substantial publication record.

(c) Have a laboratory or clinical research program that carries out research in Singapore.

(d) Hold a minimum of 9 months' employment with a local Singapore institution. Upon award, the PI must agree to fulfill at least 6 months of residency in Singapore for each calendar year over the duration of the grant award.

(e) No outstanding reports from previous BMRC, NMRC grants and other national grants.

(D) Funding Quantum and Duration

- Different caps apply for the two categories:
  - **PHRG Open Category:** Up to $1.95M* (inclusive of up to 30% indirect costs^) for up to 3 years. Projects involving prospective patient/subject recruitment may apply for up to 5 years.
    **Applicants can only apply to exceed this cap on a case-by-case basis if they can provide very strong justifications that the proposal can support MOH's national Population Health priorities.*
    ^IDC is not applicable for budget under the Research Scholarship vote.
  - **PHRG Thematic Category:** No stipulated caps in funding quantum or duration. Quantum and duration to be deliberated during the co-creation and review process.

(E) Review Process

- PHRG Open Category: Full proposals will be sent for scientific review by international experts, before the PHRG Steering Committee reviews and makes final funding recommendations. The review process will take about 5 months after the application closes.

- PHRG Thematic Category: LOIs will be evaluated by the PHRG Steering Committee, and shortlisted applications will be invited to submit full proposals. Full proposals will be sent

for scientific review by experts, before the PHRG Steering Committee reviews and makes final funding recommendations.

(F) Reporting Requirements

- Successful applicants are required to provide an annual report to NMRC and to submit a final report to NMRC within 3 months from the project completion date.

(G) Submission and Deadline Details

- PHRG Open Category: It is **mandatory** for all applications to be **submitted and endorsed** by the Host Institution's Director of Research (DOR) ***online via IGMS*** by **31 January 2024, 5pm**. We will not entertain any late submissions or submissions from individual applicants without endorsement from the Host Institution.

- PHRG Thematic Category: Applicants can submit their LOIs any time. It is mandatory for all applications to be submitted and endorsed by the Host Institution's Director of Research (DOR) ***online via IGMS***.

II. Subcategory for PHRG New Investigator Grant (PHRG-NIG)

(A) Aim

- The **PHRG New Investigator Grant (PHRG-NIG)** is a subcategory of the PHRG to cater for new investigators. The PHRG-NIG is a step for the new investigator towards winning a first independent national level grant. Applicants with substantial research experience will not be accepted under this category.

(B) Eligibility criteria

- Applicants who are applying under the new investigators' category have to work with a mentor for guidance in their research. This mentoring will provide support for a period of supervised research leading eventually to the investigators conducting larger-scale research projects independently. Please note that the NIG is intended to fund a new investigator's independent project, and not to provide additional funding for the mentor's project (or clinical trial).

- To be eligible for the PHRG-NIG, the following requirements apply in addition to the above eligibility criteria for the PHRG:

  (i) Awardees of the following grants as PI/Co-PI[2] at the point of application will **not be eligible** for the NIG: A*STAR Investigatorship, NRF Fellowship, NMRC CSA and STaR, MOE Tier 2 and 3 grants, MOH/NMRC IRG-equivalent grants[3].

  (ii) Applicants must not have received external competitive funding exceeding $500,000 (direct costs only), to conduct their own research project as the PI.

(C) Funding Quantum and Duration

- The PHRG-NIG will provide a funding quantum of up to S$130,000 per project (inclusive of up to 30% indirect costs[4]) for up to 2 years. **Projects involving prospective patient/subject recruitment may apply for up to 3 years' duration.**

(D) Research Themes

- Please refer to the Research Themes under the PHRG section. Similar to the PHRG Open Category, the PHRG-NIG welcomes applications on all research topics as long as the scope is within the Research Areas as articulated above under the PHRG section. However, if your proposed research is aligned with one or more of these PHRG Research Themes, it would be helpful to articulate this in your proposal write-up.

(E) Review Process

- All PHRG-NIG applications will be sent for scientific review by local experts, before the PHRG Steering Committee reviews and makes final funding recommendations. The review process will take about 5 months after the application closes.

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[2] Co-PIs refer to PIs whose projects are jointly led by other PIs (e.g., projects under NMRC's Bedside & Bench grant). They are not the same as, and should not be confused with Co-Investigators (Co-Is).
[3] NIC Ageing Grants (with the exception of Health and Longevity Catalyst Awards) are considered IRG-equivalent grants.
[4] IDC is not applicable for the Research Scholarship budget.

(F) Reporting requirements

- Grantees are required to provide an annual report to NMRC and to submit a final report to NMRC within 3 months from the project completion date.

(G) Submission and deadline details

- It is **mandatory** for all PHRG-NIG applications to be **submitted and endorsed** by the Host Institution's Director of Research (DOR) ***online via IGMS*** by **31 January 2024, 5pm**.

- We will not entertain any late submissions or submissions from individual applicants without endorsement from the Host Institution.

GENERAL INSTRUCTIONS

- Please prepare your application **using the templates available on the IGMS** online submission system and upload these documents to the relevant sections in IGMS:
  (i) Research proposal
  (ii) CV template (PI, Co-I/Collab, Mentor)
  (iii) Research Team Signatories and Other Supporting Details
  (iv) Data Sharing Plan (for PHRG)

- Any softcopy document must be uploaded to IGMS in Word Document or PDF format (please do not submit scanned PDF format except for signatories). Please adhere to the page limit where specified and reformat softcopy such that all blank or irrelevant pages are removed.

- The applicants are required to complete the grant submission using the **IGMS online submission system**.

- For applications involving mentor, please upload the completed mentor CV under the Mentor section in IGMS.

- Once you have completed your application in IGMS, please proceed to download a copy for your safekeeping.

- **Resubmission attempts are capped at two times, and please note that funding is not guaranteed for resubmitted proposal.** (Resubmission refers to proposals resubmitted based on Review Panel/ External Reviewers' comments. It is not a re-written proposal from a new perspective. If more than 50% of the proposal is to be revised, it should be submitted as a new application).

- In any single grant call, each PI is allowed to submit up to one application per grant type.

- **Note that Co-Investigators need to hold at least an adjunct position in a local public institution.** Researchers from overseas institutions or private companies can only participate as collaborators. The terms of collaboration with overseas research institutions and private companies must conform to NMRC's existing policies.

- **PI's, Co-Investigators' and Collaborators' CVs are limited to 3 pages each. Please indicate NA if the required information is not applicable. Please take note that NMRC will not be responsible for any missing information not provided in the CV.**

- **Mentor's CV is limited to 2 pages (for applications involving mentor).**

- Use **Arial font size 10** for all attachment/text.

- Plagiarism (without permission from author or reference made to source) will be referred to the Host Institution for investigation and may be subjected to disciplinary actions.

- Refer to Appendix 1 for details on the Health Research Classification System (HRCS) to complete the "HRCS Coding" sub-section in IGMS.

- Refer to Appendix 2 for the checklist on Study Design and Statistical Considerations to complete the "Methods/Approach" section in the research proposal.

Submission of application

- For the PHRG Open Category and PHRG-NIG, it is **mandatory** for all applications to be **submitted and endorsed** by Host Institution's Director of Research (DOR) ***online via IGMS*** by **31 January 2024, 5pm**. Internal Host Institution submission deadlines may apply, please check with your Office of Research (ORE) for more information. We will not entertain any late submissions or submissions from individual applicants without endorsement from the Host Institution. Please note that any clarifications sought by the DOR/ORE will need to be addressed by the PI prior to submission by 31 January 2024, 5pm.

- Please note that applications are **subject to rejection upon submission** if:
    - Any of the required documents was not submitted (Please refer to Read-Me Document Appendix I)
    - Wrong template (e.g., outdated, different programme's) was used for any of the required documents (Please use latest templates as available in IGMS)
    - Any of the Proposal or CV documents exceeds page limits
    - Missing or incomplete declarations (e.g., past funding received, concurrent grant applications)

- No late submission or revision to the submitted application will be entertained after the closing date.

Additional document required for Resubmission Applications

- Resubmission refers to proposals resubmitted based on Review Panel/External Reviewers' comments. It is not a re-written proposal from a new perspective. If more than 50% of the proposal is to be revised, it should be submitted as a new application.

- A proposal can only be resubmitted **two times**. A proposal which has been resubmitted for more than two times will be rejected.

- Under Research Proposal's Section A, in no more than 2 pages, provide a summary of how the resubmission has addressed past reviewers'/panel's comments and highlight new features/merits of the resubmission.

- Append the following documents to the end of the research proposal under Section C, Annex B:
    - Response to past reviewers (no more than 3 pages)
    - Past review reports (inserted as images)

Additional document required for Renewal Applications (follow-up study from NMRC projects)

- Append the following documents to the end of the research proposal under Section C, Annex C:
    - Summary of progress and research outputs of the previous project (no more than 2 pages)

- As this section may be submitted to both overseas and local reviewers, PI is to ensure that all sensitive information on IP issues and such are cleared from the Office of Research before submitting to NMRC.

Appendix 1

HEALTH RESEARCH CLASSIFICATION SYSTEM

The Health Research Classification System is a bespoke system for classifying the full spectrum of biomedical and health research - from basic to applied - across all areas of health and disease. It was developed by the UK Clinical Research Collaboration Partners. It is supported by an online reference source and manual - https://hrcsonline.net/

Appendix 1

Health Categories

Category	Includes
Blood	Haematological diseases, anaemia, clotting and normal development and function of platelets and erythrocytes
Cancer and neoplasms	All types of neoplasms, including benign - malignant cancers (includes leukaemia)
Cardiovascular	Coronary heart disease, diseases of the vasculature and circulation including the lymphatic system, and normal development and function of the cardiovascular system
Congenital Disorders	Physical abnormalities and syndromes that are not associated with a single type of disease or condition including Down's syndrome and cystic fibrosis
Ear	Deafness and normal ear development and function
Eye	Diseases of the eye and normal eye development and function
Infection	Diseases caused by pathogens, acquired immune deficiency syndrome, sexually transmitted infections and studies of infection and infectious agents
Inflammatory and Immune System	Rheumatoid arthritis, connective tissue diseases, autoimmune diseases, allergies and normal development and function of the immune system
Injuries and Accidents	Fractures, poisoning and burns
Mental Health	Depression, schizophrenia, psychosis and personality disorders, addiction, suicide, anxiety, eating disorders, learning disabilities, autistic spectrum disorders and studies of normal psychology, cognitive function and behaviour
Metabolic and Endocrine	Metabolic disorders (inc Diabetes) and normal development and function. Includes all research on pineal, thyroid, parathyroid, pituitary and adrenal glands
Musculoskeletal	Osteoporosis, osteoarthritis, muscular and skeletal disorders and normal musculoskeletal and cartilage development and function
Neurological	Dementias, transmissible spongiform encephalopathies, Parkinson's disease, neurodegenerative diseases, Alzheimer's disease, epilepsy, multiple sclerosis and studies of the normal brain and nervous system
Oral and Gastrointestinal	Inflammatory bowel disease, Crohn's disease, diseases of the mouth, teeth, oesophagus, digestive system including liver and colon, and normal oral and gastrointestinal development and function
Renal and Urogenital	Kidney disease, pelvic inflammatory disease, renal and genital disorders, and normal development and function of male and female renal and urogenital system
Reproductive Health and Childbirth	Fertility, contraception, abortion, *in vitro* fertilisation, pregnancy, mammary gland development, menstruation and menopause, breast feeding, antenatal care, childbirth and complications of newborns
Respiratory	Asthma, chronic obstructive pulmonary disease, respiratory diseases and normal development and function of the respiratory system
Skin	Dermatological conditions and normal skin development and function
Stroke	Includes both ischaemic (blood clots) and haemorrhagic (cerebral haemorrhage) strokes
Generic Health Relevance	Research applicable to all diseases and conditions or to general health and well-being of individuals. Public health research, epidemiology and health services research that is not focused on specific conditions. Underpinning biological, psychosocial, economic or methodological studies that are not specific to individual diseases or conditions
Disputed Aetiology and Other	Conditions of unknown or disputed aetiology (such as chronic fatigue syndrome/ myalgic encephalomyelitis), or research that is not of generic health relevance and not applicable to the top 19 specific health categories listed above

Appendix 1

Overview of the Research Activity Codes

1	**Underpinning Research**
1.1	Normal biological development and functioning
1.2	Psychological and socioeconomic process
1.3	Chemical and physical sciences
1.4	Methodologies and measurements
1.5	Resources and infrastructure (underpinning)
2	**Aetiology**
2.1	Biological and endogenous factors
2.2	Factors relating to physical environment
2.3	Psychological, social and economic factors
2.4	Surveillance and distribution
2.5	Research design and methodologies (aetiology)
2.6	Resources and infrastructure (aetiology)
3	**Prevention of Disease and Conditions, and Promotion of Well-Being**
3.1	Primary prevention interventions to modify behaviours or promote well-being
3.2	Interventions to alter physical and biological environmental risks
3.3	Nutrition and chemoprevention
3.4	Vaccines
3.5	Resources and infrastructure (prevention)
4	**Detection, Screening and Diagnosis**
4.1	Discovery and preclinical testing of markers and technologies
4.2	Evaluation of markers and technologies
4.3	Influences and impact
4.4	Population screening
4.5	Resources and infrastructure (detection)
5	**Development of Treatments and Therapeutic Interventions**
5.1	Pharmaceuticals
5.2	Cellular and gene therapies
5.3	Medical devices
5.4	Surgery
5.5	Radiotherapy and other non-invasive therapies
5.6	Psychological and behavioural
5.7	Physical
5.8	Complementary
5.9	Resources and infrastructure (development of treatments)
6	**Evaluation of Treatments and Therapeutic Interventions**
6.1	Pharmaceuticals
6.2	Cellular and gene therapies
6.3	Medical services
6.4	Surgery
6.5	Radiotherapy and other non-invasive therapies
6.6	Psychological and behavioural
6.7	Physical
6.8	Complementary
6.9	Resources and infrastructure (evaluation of treatments)
7	**Management of Diseases and Condition**
7.1	Individual care needs
7.2	End of life care
7.3	Management and decision making
7.4	Resources and infrastructure (disease management)
8	**Health and Social Care Services Research**
8.1	Organisation and delivery of services
8.2	Health and welfare economics
8.3	Policy, ethics and research governance
8.4	Research design and methodologies

8.5 Resources and infrastructure (health services)

Appendix 1

Research Activity Codes

1. Underpinning Research	**Research that underpins investigations into the cause, development, detection, treatment and management of diseases, conditions and ill health**
1.1 Normal biological development and functioning	Studies of normal biology including - genes and gene products - molecular, cellular and physiological structures and function - biological pathways and processes including normal immune function - developmental studies and normal ageing - bioinformatics and structural studies - development and characterisation of model systems
1.2 Psychological and socioeconomic process	Studies that do not address health directly but cover issues that may have a bearing on health and well-being including - perception, cognition and learning processes - social and cultural beliefs - individual or group characteristics and behaviours - politics, economies and urban development - development and characterisation of model systems
1.3 Chemical and physical sciences	Research in chemical and physical sciences that may lead to the future development of diagnostic tools or medical treatments including - bioengineering and biophysics - chemical structures, interactions and properties - molecular modelling - material science
1.4 Methodologies and measurement	Development of novel underpinning research measures and analytical methodologies including - development of statistical methods and algorithms for genomic analysis - development of mapping methodologies and novel data comparison methods - development of biological, psychological and socioeconomic research measures
1.5 Resources and infrastructure (underpinning)	- development and/or distribution of resources for use by the research community including equipment, cell lines, DNA banks, and genomic and proteomic sequence resources - infrastructure to support research networks, consortia and centres

Appendix 1

Research Activity Codes

2 Aetiology	Identification of determinants that are involved in the cause, risk or development of disease, conditions and ill health
2.1 Biological and endogenous factors	Identification and characterisation of endogenous factors known or suspected to be involved in the cause, risk or development of disease, conditions or ill health including - genes and gene products, molecular, cellular and physiological structures and functions - biological factors linked to ethnicity, age, gender, pregnancy and body weight - endogenous biological factors or pathways involved in responses to infection or damage by external factors - metastases, degenerative processes, regeneration and repair - complications, reoccurrence and secondary conditions - bioinformatics and structural studies - development and characterisation of models
2.2 Factors relating to physical environment	Environmental or external factors associated with the cause, risk or development of disease, conditions or ill health including - physical agents, occupational hazards, environmental surroundings, radiation and pollution - chemicals and nutrients - infection by pathogens and studies of infectious agents
2.3 Psychological, social and economic factors	Research into psychological conditions, or research into the cause, risk or development of disease, conditions or ill health associated with social, psychological and economic factors including - individual or group behaviours and lifestyle - cultural or religious beliefs or practices - ethnicity, age and gender differences - socioeconomic factors
2.4 Surveillance and distribution	Observational studies, surveys, registries, and studies that track incidence, prevalence, morbidity, co-morbidity and mortality including ongoing monitoring of large scale cohorts
2.5 Research design and methodologies (aetiology)	Development of aetiological and epidemiological research designs, measures and methodologies including - methodological innovation and modelling complex epidemiological data - development and evaluation of novel research designs - development of epidemiological research measurements including outcome measures - development of analytical and statistical methods to understand disease cause, susceptibility and risk including genetic linkage and association studies
2.6 Resources and infrastructure (aetiology)	- development and/or distribution of resources for general use by the research community including equipment, cell lines, tissue and DNA banks, and genomic and proteomic sequence resources - infrastructure to support research networks, consortia and centres

Research Activity Codes

3 Prevention of Disease and Conditions, and Promotion of Well-Being	**Research aimed at the primary prevention of disease, conditions or ill health, or promotion of well-being**
3.1 Primary prevention interventions to modify behaviours or promote well-being	Development, implementation and evaluation of interventions to modify personal or group behaviours and lifestyles affecting health and well-being including - risk behaviours associated with diet, tobacco use, physical activity, alcohol consumption, sexual health and substance misuse - age, gender, cultural or religious practices - public health policy, health communication and educational interventions - behavioural, psychological, social and physical interventions
3.2 Interventions to alter physical and biological environmental risks	Development, implementation and evaluation of interventions surrounding physical, biological and environmental risk factors including - radiation, second-hand smoke, physical and chemical agents, occupational hazards and environment surrounding - contraceptive devices - infectious agents - policy, educational and physical interventions
3.3 Nutrition and chemoprevention	Research on chemopreventative agents and health protective effects of nutrients including - development, characterisation and mechanism of action - chemical contraceptives - testing and evaluation in model systems and clinical, applied and community settings - evaluation of evidence to inform policy
3.4 Vaccines	Research on vaccines for prevention of disease including - discovery, development and testing of vaccines and vaccination in model systems - mechanism of action - development, implementation and evaluation of vaccination programmes and studies to increase uptake - decision making, outcomes from vaccination and evaluation of evidence to inform policy
3.5 Resources and infrastructure (prevention)	- development and/or distribution of resources for use by the research community including equipment, cell lines, tissue and DNA banks - infrastructure to support research trials, networks, consortia and centres

Appendix 1

Research Activity Codes

4 Detection, Screening and Diagnosis	Discovery, development and evaluation of diagnostic, prognostic and predictive markers and technologies
4.1 Discovery and preclinical testing of markers and technologies	Discovery, development and preclinical testing of novel markers (that may be derived from patient samples) and technologies for use in detection, diagnosis, prediction, prognosis and monitoring including - biological and psychological markers - diagnostic and monitoring devices, imaging, scanning, predictive and diagnostic tests - development and characterisation of models - diagnostic measures and methodologies
4.2 Evaluation of markers and technologies	Testing and evaluation of markers and technologies in humans for use in detection, diagnosis, prediction, prognosis and monitoring in clinical, community or applied settings including - assessment of sensitivity, efficacy, specificity, predictive and prognostic value, reproducibility and safety - medical devices, imaging, diagnostic and predictive tests - evaluation of diagnostic models, methods and methodologies in clinical or applied settings
4.3 Influences and impact	Studies investigating impact of screening and factors affecting uptake including - attitudes and beliefs including cultural and religious practices - issues relating to gender, age and ethnicity - genetic counselling and decision making - psychological, social and economic factors - development, implementation and evaluation of interventions to promote screening including policy, education and communication
4.4 Population screening	Studies investigating population screening programmes including - feasibility studies, pilot studies and trials - evaluation of effectiveness, benefits and economic evaluation - impact on health services and policy issues - models of population surveillance
4.5 Resources and infrastructure (detection)	- development and/or distribution of resources for use by the research community including equipment, cell lines, tissue and DNA banks, and informatics systems - infrastructure support for research trials, networks, consortia and centres

Research Activity Codes

5 Development of Treatments and Therapeutic Interventions	**Discovery and development of therapeutic interventions and testing in model systems and preclinical settings**
5.1 Pharmaceuticals	Identification and development of pharmaceutical small molecules, therapeutic vaccines, antibodies and hormones including - drug screening and development of delivery systems - mechanism of action including side effects and drug resistance - pharmacogenetics, prediction of genetic variation and responses to drugs - testing in *in vitro* and *in vivo* model systems
5.2 Cellular and gene therapies	Discovery and development of cellular, tissue and gene therapies including - gene therapy, stem cells therapy, *in vitro* fertilisation and tissue engineering - Fecal Microbiota Transplantation (FMT) - development of delivery and culture systems - testing in *in vitro* and *in vivo* model systems
5.3 Medical devices	Discovery and development of medical devices including - implantable devices, mobility aids, dressings, medical equipment and prostheses - biological safety assessments and investigation of adverse events - sterilisation and decontamination of equipment or surfaces - testing in *in vitro* and *in vivo* model systems
5.4 Surgery	Development of surgical, obstetric and dental interventions including - histocompatability, transfusions, transplantations including xenograft studies and bone marrow transplants - mechanisms of recovery, tolerance, rejection and side effects including infection - testing in *in vitro* and *in vivo* model systems
5.5 Radiotherapy and other non-invasive therapies	Discovery and development of interventions including - radiobiology, radiotherapy, radioimmunotherapy, radiosensitisers, microwaves, ultrasound, laser and phototherapy - development of delivery systems - investigation of mechanisms of action and side effects - testing in *in vitro* and *in vivo* model systems
5.6 Psychological and behavioural	Development of psychological and behavioural interventions including - cognitive behavioural therapy, electro-convulsive therapy, counselling, therapy and social interventions - testing in model systems
5.7 Physical	Development of physical interventions including - physical therapies, physiotherapy, occupational therapy, speech therapy, dietetics, exercise and osteopathy - mechanisms of action - testing in model systems
5.8 Complementary	Discovery and development of complementary approaches to conventional medical therapies including - hypnotherapy, meditation, massage, acupuncture and homeopathy - mechanisms of action - testing in model systems
5.9 Resources and infrastructure (development of treatments)	- development and/or distribution of resources for general use by the research community including equipment, cell lines, tissue and DNA banks - infrastructure support for networks, consortia and centres

Research Activity Codes

6 Evaluation of Treatments and Therapeutic Interventions	**Testing and evaluation of therapeutic interventions in clinical, community or applied settings**
6.1 Pharmaceuticals	Clinical application and evaluation of pharmaceutical small molecules, therapeutic vaccines, antibodies and hormones in humans including - small scale settings and pilot studies - phase I, II, III and IV trials - assessing sensitivity, efficacy, specificity, relapse, survival, therapeutic value, pharmacokinetics, reproducibility and safety - studies monitoring response, outcome, drug resistance and side effects
6.2 Cellular and gene therapies	Clinical application and evaluation of cellular, tissue and gene therapies in humans including - small scale and pilot studies - phase I, II, III and IV trials - gene therapy, stem cell therapy, *in vitro* fertilisation, tissue engineering & FMT - evaluation of applied delivery systems
6.3 Medical devices	Application and evaluation of medical devices in humans in a clinical, community or applied setting including - implantable devices, mobility aids, dressings, medical equipment and prostheses - validation of design and post market surveillance
6.4 Surgery	Clinical and applied application and evaluation of surgical, obstetric and dental interventions in humans including - small scale and pilot studies - phase I, II, III and IV trials - procedures including organ and bone marrow transplantation, tissue grafts and transfusions - monitoring outcomes, side effects and rejection
6.5 Radiotherapy and other non-invasive therapies	Clinical application and evaluation of interventions in humans including - small scale and pilot studies - phase I, II, III and IV trials - radiotherapy, radioimmunotherapy and radiosensitisers, microwaves, ultrasound, laser and phototherapy - monitoring side effects
6.6 Psychological and behavioural	Application and evaluation of psychological and behavioural interventions in humans in clinical, community and applied settings - phase I, II, III and IV trials - cognitive behavioural therapy, electro-convulsive therapy, counselling, therapy and social interventions
6.7 Physical	Testing and evaluation of physical interventions in humans in a clinical, community or applied setting including - physical therapies, physiotherapy, occupational therapy, speech therapy, dietetics, osteopathy and exercise
6.8 Complementary	All aspects of testing, evaluation and provision of complementary approaches to conventional medicine in humans in a clinical, community or applied setting including - hypnotherapy, massage, acupuncture and homeopathy - issues relating to health and social services and health care delivery - attitudes and beliefs of patients and health care professionals
6.9 Resources and infrastructure	- provision and distribution of resources related to clinical and applied therapeutic interventions

(evaluation of treatments)	✚ infrastructure support for clinical and applied research networks and trials, consortia and centres

Appendix 1

Research Activity Codes

7 Management of Diseases and Condition	Research into individual care needs and management of disease, conditions or ill health
7.1 Individual care needs	Studies of patients and service user care needs including - quality of life, management of acute and chronic symptoms, management of side effects, rehabilitation, long term morbidity and reproductive issues - psychological impact of illness - social and economic consequences of ill health - behaviour affecting disease management including secondary prevention, compliance to treatment and attitudes and beliefs relating to seeking treatment - assessment of social care and health services needs - educational or communication interventions to promote self-care or improve health care by carers - impact on carers
7.2 End of life care	Studies involving all issues related to palliative care and end of life care including - assessment of patient, service user and carer needs - provision and evaluation of palliative and end of life care services - quality of life for patients and carers - evaluation of interventions for health and social care professionals - social, economic and policy issues - pain management for terminally ill people - bereavement
7.3 Management and decision making	Studies into all aspects of management of diseases, ill health and conditions by health and social care professionals - attitudes, beliefs and behaviours of health and social care professionals - investigation of decision making including factors influencing diagnosis, treatment, referral and management strategies - educational interventions and communication practices - development of guidelines, interventions or models to assist decision making and management, including identifying symptoms, predicting outcomes and identifying individuals at risk - testing and evaluating management regimes and strategies
7.4 Resources and infrastructure (disease management)	- development and/or distribution of resources and equipment for use by the community including informatics systems - infrastructure support for trials, networks, consortia and centres

Appendix 1

Research Activity Codes

8 Health and Social Care Services Research	**Research into the provision and delivery of health and social care services, health policy and studies of research design, measurements and methodologies**
8.1 Organisation and delivery of services	Examining the organisation and provision of health and social care services and evaluating factors affecting the quality of care - workforce and career issues - organisation and management of services - access to health and social care and geographical variations in outcomes - effectiveness of different care settings and models of service delivery - evaluating quality of care including patient safety issues - evaluation of experiences of service users - assessment of current and future health care demands - development and evaluation of interventions to improve services
8.2 Health and welfare economics	Economic evaluation of health and social care interventions and delivery including - cost-benefit analysis of services including economic modelling - cost effectiveness or economic feasibility of implementing new interventions or technologies within health services - economic assessment of service productivity and outcomes - health care costs - development and evaluation of economic models of health care
8.3 Policy, ethics and research governance	- evaluation of local, regional and national healthcare policy - impact of legislation - synthesis and evaluation of evidence to inform policy - dissemination and implementation of research evidence - research ethics including use of personal data and biological material, consent and confidentiality - research governance and regulation processes including interpretation of guidelines - issues surrounding research subjects and donor recruitment
8.4 Research design and methodologies	Development of research designs and novel methodologies for health care including treatment, management and health services research - analytical innovation, methodological research, statistical methods and modelling - development of research measurements including outcome measures - development of methods of research assessment and evaluation - development and evaluation of research designs and methodologies
8.5 Resources and infrastructure (health services)	- development and distribution of resources for use by the community including informatics systems - infrastructure support for networks, trials, consortia and centres

Appendix 2

STUDY DESIGN AND STATISTICAL CONSIDERATIONS - CHECKLIST

All applicants must give careful thought to the following study design, methods and statistical considerations, and ensure that they are reflected in the grant application. Consider the following questions for the clinical research study design and methodological planning.

1. Is the main objective exploratory (for which a formal sample size justification is not relevant) or are you testing a quantitative hypothesis?
2. If the former, what are the population parameter/s you are trying to estimate? (E.g. annual incidence of AIDS, prevalence of teenage smokers, relative risk of a relapse etc)
3. If the latter, use the checklist below which could assist you to describe your study design and methods more clearly.
4. Some sample questions related to the check list below: (a) State the primary quantitative hypothesis (e.g. the hazard ratio is 0.5) and the required precision for the estimate in the form of a confidence interval e.g. 95% CI of the HR (0.3, 0.7)? (b) State the sample size required to achieve that precision. Be sure to specify the type 1 error, any other required assumptions needed and the sample size software / formula used in the calculation.

The following checklist provides guidelines for describing the study and design and methods as adapted from the CONSORT statement[5].

Area	Descriptor	Y/N/NA
Participants	Eligibility criteria for participants' description of settings/ locations where data are collected.	
Recruitment Methods	How will subjects be identified, enrolled and retained?	
Interventions	Detail the interventions intended for each group and how, when and by whom they are to be administered.	
Objectives hypotheses	Provide specific objectives or aims and related specific hypotheses.	
Outcomes	Clearly define primary and secondary outcome measures, AND when applicable, methods to enhance measurements quality (*e.g.*, multiple observations, assessor training).	
Sample size	How was sample size determined? When applicable, explain any interim analyses and stopping rules.	
Randomization - Sequence generation	Method used to generate the random allocation sequence, and any restrictions (*e.g.*, blocking, stratification)	
Randomization - Allocation concealment	Method used to implement the random allocation sequence (*e.g.*, numbered containers or central telephone). Clarify whether the sequence will be concealed until interventions to be assigned.	
Randomization - Implementation	Who will generate the allocation sequence, who will enroll participants, and who will assign participants to their groups	
Blinding	How was blinding of the assigned treatment achieved for (i) subjects (ii) care-givers (iii) outcome assessors?	
Data collection	Outline how data will be collected, stored, managed. How will you ensure data quality (e.g. rater drift)?	
Adverse Events	How detected, measured, and managed?	
Study Period	When will enrollment start, stop, when is last data point?	
Statistical analyses for each hypothesis	What specific statistical analysis is planned for each primary and planned secondary hypothesis?	
Statistical Collaboration	Who provides design and statistical collaboration	

[5] The CONSORT is primarily for randomized controlled trials, but nevertheless has many features that would apply more generally to other types of clinical research projects. Visit http://www.consort-statement.org/index.aspx?o=1017 for more details.