Section 5. Promotion of Science and Technology to Prolong Healthy Years of Life

The "New Health Frontier Strategy" compiled in April 2007 describes the use of science and technology in "efforts to expand areas of human activities (ability to expand human activity areas)" and "innovations in medical and welfare technology (research and development capabilities)".

It is expected that the number of elderly suffering from both disease and disabilities will increase in the future. Therefore with respect to "efforts to expand areas of human activities (ability to expand human activity areas)", development in health science technologies according to need and effective utilization of those technologies provide the possibility of enabling those suffering from diseases or disabilities and elderly to involve themselves in social activities on their own free will and related people to spend more active lives.

"Innovation in medical and welfare technology (research and development capability)" aims at making an international contribution to the aging global society through the realization of the "ability to expand human activity areas" and enhanced international competitiveness of the health science technology industry. In consideration of this, efforts will be made to promote the development and spreading use of "general purpose technologies" that already exist or have been improved, technologies that are risky to do business with due to a shortage of users or being a risk to people's health, "innovative technologies" that utilize technologies such as gene therapy, regenerative therapy, gene diagnosis technology (such as biomarkers), and nanotechnology (such as ultra-miniaturized medical devices).

1. Promotion of Science and Technology Research in FY 2007

The Ministry of Health, Labour and Welfare set three principles in FY 2007 to promote science technology development: "promotion of health and security", "realization of advanced medical care", and "securing health and safety".

(1) Promotion of Health and Security

Research and development on prevention, diagnosis, and treatment methods for diseases and disabilities to prolong healthy years of life is being promoted.

1) Research on lifestyle diseases

Research to promote systematic and strategic countermeasures against lifestyle diseases, from their primary prevention to diagnosis and treatment of lifestyle diseases, are being carried out. In addition, strategic research is being conducted on creating scientific evidence on metabolic syndrome (visceral fat syndrome), something that has gained people's attention in recent years as a

risk factor in heart disease and cerebral apoplexy, and on diabetes and renal diseases that can be the cause of lowering quality of life (QOL) of patients and increasing medical fees.

2) Research on promoting mental health

Mental illnesses that include schizophrenia, depression, neurosis, stress disorder, and developmental disorder are causing a wide range of serious problems. As countermeasures against these illnesses the development of prevention, diagnosis, and treatment methods for them along with a support system and epidemiology studies are being strategically conducted.

In many cases, fundamental treatment for neuromuscular diseases does not exist. Hence multilateral multilayered research is being conducted which includes the development of symptom clarification, diagnosis, and treatment methods through genetic analysis, molecular mechanism elucidation, and image analysis, improving the quality of life (QOL) of patients, and association with social systems including welfare.

3) Development of prevention, diagnosis, and treatment methods for cancer

Research in the following areas is being conducted with the aim of decreasing the number of deaths from cancer, the pain that cancer patients' and their families' are exposed to, and maintaining or improving the quality of their recuperation: ① Research to elucidate the nature of cancer and research to incorporate its results and apply it to clinical medicine, ② Multi-institutional collaborative clinical research aimed at establishing standard treatments methods for cancer medical care, and ③ Research to facilitate the establishment of a secure and satisfactory nationwide cancer medical care system and the even distribution of high quality cancer treatment.

4) Research on promoting the prevention of the need for nursing care

Research on the prevention, diagnosis, treatment, and rehabilitation of locomotorium disorders and dementia, the two main causes of elderly requiring long-term care, is being conducted.
In addition, research on technology and programs for preventing decreased motor function and preventing the need for nursing care that improves living functions is being conducted.

Efforts are being made through the research given above to prevent the elderly from requiring long-term care and to support them living self-sufficiently if they do require long-term care.

5) Research to overcome immune diseases and allergic diseases

Efforts are being made to reveal the relationship between causes of the onset and symptoms of immune and allergic diseases such as rheumatism, bronchial asthma, atopic dermatitis, and pollinosis, to develop new technologies for use in prevention, diagnosis, and treatment methods,

and to provide appropriate medical care of a better quality through reassessing existing treatment methods.

6) Research for improving the quality of life (QOL) of people with disabilities and intractable diseases

Research on comprehensive health and welfare measures for people with disabilities is being promoted that includes improving and promoting measures for their employment and habitation in supporting them to live self-sufficiently, support for people with developmental disorders and higher brain dysfunctions that do not fit in the conventional categories of the so-called three disabilities, provide support for social participation, and to evaluate welfare equipment.

In addition, of the so-called intractable diseases whose cause is still unknown and with no established fundamental treatment, those with long term harmful effects on daily lives, and the research on them that has not progressed very rapidly due to the small number of patients, will be the subjects of focused efficient research to be conducted in developing innovative methods of diagnosis and treatment aimed at preventing their progression and functional recovery and reproduction so that patients' quality of life (QOL) will improve.

(2) Advanced Medical Care

With regard to the "realization of advanced medical care", efforts will be promoted that include improving women's health throughout their lives, the development of basic technology to realize advanced medical care utilizing genomics, protein science, nanotechnology, and bio resources, and the establishment of a clinical research (clinical trial) infrastructure.

1) Development of basic technology for realizing advanced medical care

Aiming at the realization of innovative medical care according to the characteristics of individuals based on the outcome of genomics and the realization of regenerative medicine utilizing the self-repair ability for producing bones and blood vessels, research on ensuring its safety and the utilization of bio resources is being promoted.

In addition, research and development of non-invasive and low-invasive medical devices through utilizing nanotechnology in medical science are being promoted in cooperation with industry to provide safer and more secure medical technology for use with patients.

Furthermore, for patients with diseases that mainly include hypertension, diabetes, cancer, and dementia, efforts will be made to identify the SNPs (Single Nucleotide Polymorphisms) and microsatellites which are closely relate to the effect and side effect of pharmaceuticals and, by utilizing the results, develop a simple and inexpensive analysis system. This will result in safer and

more secure medical technologies being provided for use with patients. For example, it will be possible to reveal the individual differences at the genomic level with respect to responses to drugs and optimal prescriptions being available not only at major hospitals with the latest examination devices but also at clinics.

In addition to that, research to promote clinical applications is being conducted in cooperation with industry to utilize the outcome of basic studies such as gene therapy, cell therapy, treatments using humanized antibodies, and research on developing new medical devices.

2) Promoting the establishment of a clinical research (clinical trial) infrastructure

In order to achieve a further improved clinical research environment in Japan, efforts have been made to promote the establishment of a system in which medical institutions can conduct high quality clinical research in accordance with the "New 5-Year Clinical Trial Activation Plan" since April 2007. 10 core hospitals and 30 local medical institutions have already been selected for this purpose.

Additional efforts to establish an environment where clinical research can be promoted are being made in such a way that in addition to the conventional training provided for Clinical Research Coordinators (CRCs) in improving clinical research environments, training for senior CRCs and data managers is being provided as a measure to nurture the human resources needed in conducting clinical research.

2. 3rd Science and Technology Basic Program

The Japanese government has formulated a "3rd Science and Technology Basic Program" plan for the period of FY 2006 to FY 2010, which is currently being implemented. In consideration of providing complete accountability to society and citizens as well as passing on the outcome of science technology, this basic program sets political goals for contributing to "overcoming diseases that distress people" and "creating a society where all people can enjoy healthy lives" based on the idea of "securing health and safety".

As with the 2nd planning period (from FY 2001 to FY 2005), life sciences, information and communication, the environment, and nanotechnology and materials were defined as the "4 priority areas" and a budget and human resources are being allocated for them as a high priority.