Global Forum

Shaping the Future 2022
Föreningen Global Forum

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الجمعية العمانية للخدمات النفطية
Oman Society for Petroleum Services

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böwöع
العاصمة العربية الرقمية
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WATER AND
HUMANITY

Disease prevention

● Disease prevention has a large potential to reduce the onset of different medical conditions.

● Well-being a key factor for individuals and the society

Areas of disease prevention:

ENVIRONMENT: clean water and air, reduction of toxic exposure etc

NUTRITION: food security and control, improved quality of macro-nutrients, supply of micro-nutrients

PHYSICAL ACTIVITY: adapted for different age/ gender groups

GENETICS: Identification of risks linked to actions to minimize environmental factors

VACCINATION: Vaccination programs, food fortification etc

Disease prevention

- **Primary prevention.** Examples are nutritional and food supplementation, oral and dental hygiene education, clinical preventive services such as immunization and vaccination.

- **Secondary prevention** is associated with early detection of a disease which may result in improved chances for positive health outcomes.

    - **Whole population**

    - **Specific age / gender groups**

    - **Specific genotypes**

    - **Public health regulations**

Artificial Intelligence (AI) in preventive medicine

First computer then doctor

Artificial Intelligence (AI) is the use of machine learning models to search medical data and uncover insights to help improve health outcomes and patient experiences

- *Already used in some areas of medicine e.g. image analysis (radiology).*
- *Anticipated extended use as a diagnostic tool by the analysis of patient history, clinical examination and laboratory data.*
- *As a tool in precision medicine and in research*

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Artificial Intelligence (AI) in preventive medicine

1. AI in primary prevention of disease

Recent example concern Covid where AI could identify clusters and predict spread of infections

Other examples include natural disasters

2. AI in secondary prevention of disease

Warn the doctor of new complications or disorders

Patient oriented systems to personalize treatment

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Artificial Intelligence (AI) in preventive medicine

Little doubt that AI will become a core part of digital health systems that shape and support modern medicine.

Large opportunities for AI but also challenges

Challenges include

> *Accountability and openness in AI decisions*
>
> *Explainability*
>
> *Alogrithmic prejudice*
>
> *Standardization*
>
> *Legal aspects,collection of data, integrity of therapist and subject*

Diabetes

Metabolic disease where blood glucose regulation is defect

Reaching epidemic proportions; in some areas more than 20% of the population are affected

Different forms of diabetes:

- **Type 1 (infection?);** *lack of insulin*
- **Type 2 (life style?);** *failure to respond to insulin*
- **Gestational diabetes (hormonal?);** *diabetes during pregnancy - reversible following delivery*

Among the top ten leading causes of medical disorders, chronic diabetes leads to a variety of organ malfunctions

Dramatic increase during recent years suggest links to environment

Strong links to obesity and nutrition

How to prevent diabetes?

Information and education

Targeting food industry

Promoting healthy habits and food

Targeting risk groups

Specific example; gestational diabetes

- **Caused by genetic and environmental factors**

- **Incidence varies between different populations**

- **Usually mild symptoms but can adversely affect delivery and the off spring**

  - **- Screening programs in most Countries**

  - **- Life style recommendations (diet and exercise)**

  - **- Medical treatment in severe cases**

Specific example; gestational diabetes

On-going clinical trial to prevent gestational diabetes

● Life style recommendations including change of diet are difficult to practically implement

● Caution is needed in the case of drug treatment of pregnant women

Can intake of nutrients with a high fibre content prevent gestational diabetes?

Beta glycan is a fibre derived from oat and data show that beta-glycans reduce gatro-intestinal transit time, reduce absorption of glucose and cholesterol and may change the bacterial flora in the gastro-intestinal tract

● A biscuit specifically designed for diabetes prevention has been created

● A clinical trial to test these biscuits is on-going

Summary

Preventive medicine is an important subject in need for a higher attention

AI and digital techniques will play an important role to shape the future in medicine

Improved nutrition and lifestyle is a key for prevention of disorders notable diabetes.

Water – essential for life but can also carry disease

● *Variety of Infectious agents*

● *Variety of chemicals:*

> *- Chemical compounds that have been around for a long time*

> *- Chemical compounds, new to the environment e.g. derived from production and use of plastic material.*

>> ***Endocrine disruptors*** *is one specific category*

>> *- Activity at very low concentrations*

>> *- Can accumulate in the body*

>> *- Interferes with hormone signals*

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National Institute of Environmental Health Sciences
Your Environment. Your Health.

Endocrine Disrupting Chemicals

Chemicals that may disrupt your endocrine system

- **Bisphenol A** (BPA) is used to make polycarbonate plastics and epoxy resins found in many plastic products, including food storage containers.
- **Dioxins** are a by-product of some manufacturing processes, such as herbicide production and paper bleaching, and are released into the air from waste burning and wildfires.
- **PFAS** (per- and polyfluoroalkyl substances) are a large group of chemicals used widely in industrial applications, such as firefighting foam, nonstick pans, paper, and textile coatings.
- **Phthalates** are used to make plastics more flexible; they are found in some food packaging, cosmetics, fragrances, children's toys, and medical devices.
- **Phytoestrogens** are naturally occurring substances in plants that have hormone-like activity, such as genistein and daidzein in soy products like tofu and soy milk.

Possible effect of Endocrine Disrupting Chemicals

●**Attention.** The drug diethylstilbestrol (DES) may be linked to an increased chance of attention deficit hyperactivity disorder (ADHD) in grandchildren of women who used it during pregnancy.[4]

●**Immunity.** Children exposed to high levels of PFAS had a diminished immune response to vaccines.

●**Metabolism.** Long-term exposure to arsenic can disrupt metabolism, increasing the risk of diabetes and other metabolic disorders.[6]

•**Puberty.** Chemicals in lavender oil and tea tree oil were associated with premature breast development in girls/ and abnormal breast development in boys.[8]

•**Reproduction.** DES can alter the way genes are turned on and off in reproductive organs of mice, potentially affecting fertility and reproduction?