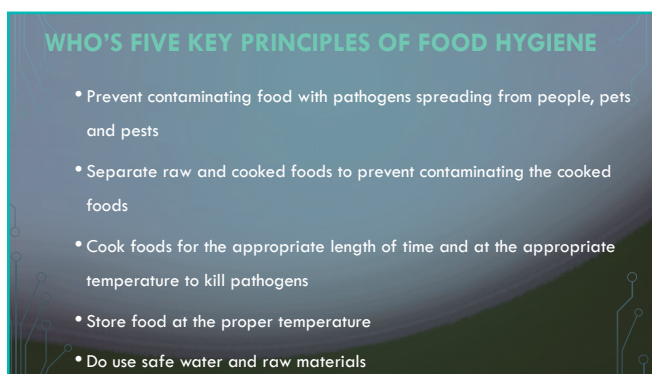
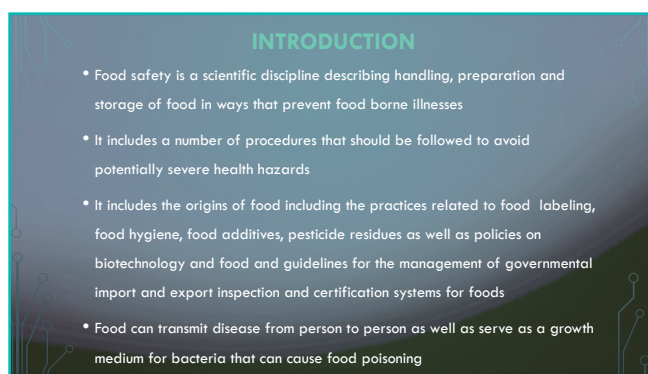


[Bangladesh]

# Ensuring Food Safety: An Important Challenge Today<sup>\*1</sup>

Jamal Uddin CHOWDHURY<sup>1</sup>



<sup>\*1</sup> This article is based on a presentation made at the Symposium “Ensuring Food Safety: An Important Challenge Today” held at the 30th CMAAO General Assembly and 51st Council Meeting, Yangon, Myanmar, on September 23-25, 2015.

<sup>1</sup> Central Executive Committee, Bangladesh Medical Association (info@bma.org.bd).

## FOOD SAFETY SITUATION IN BANGLADESH

### WHAT IS OUR CONCERN

1. FOOD ADULTERATION
2. FOOD CONTAMINATION
  - MICROBIOLOGICAL CONTAMINATION
  - PESTICIDE RESIDUES
  - MYCOTOXINS
  - VETERINARY DRUG RESIDUES
  - HEAVY METALS

## OUR CONCERN

- **Adulteration** or intentional addition of illegal agents is mostly due to unethical trade but a lack of knowledge also contributes to some extent
- **Contamination** along the food chain is mostly due to not following good practices from production level to consumption




## FOOD SAFETY SITUATION IN BANGLADESH

### RISK FACTORS ASSOCIATED WITH FISH, MEAT, POULTRY AND THEIR PRODUCTS

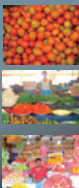
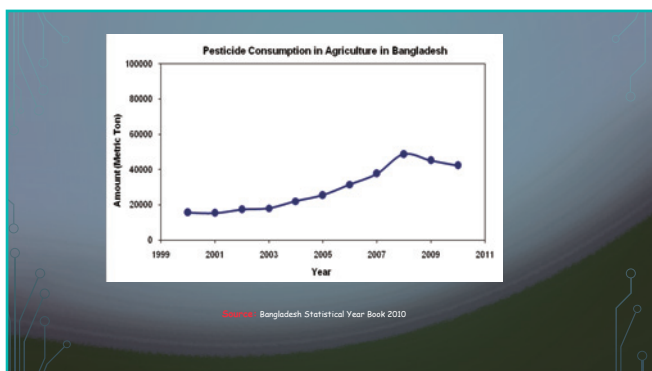
- Microbial contamination: Salmonella, Clostridia, E.coli, Vibrio, Compylobacter, listeria, H5N1, Anthrax, TB, T Saginata etc.
- Chemical contamination:
  - a. Antibiotic: Tetracycline, Chloramphenicol, Nitrofurantoin, Veterinary Medication etc.
  - b. Hormone used for fattening
  - c. Environmental contaminants: Heavy metal like chromium (from feed- using hide and skin from tannery industries)
  - d. Pesticides: DDT (particularly for dry fish), Aflatoxin
  - e. Preservatives: Formalin
  - f. Colouring matters: Particularly textile dyes
- Physical contamination: Filths, darts






## FOOD SAFETY SITUATION IN BANGLADESH contd.

### RISK FACTORS ASSOCIATED WITH FRUITS AND VEGETABLES

- **Microbial contamination:** E. coli, Helminths, Klebsiella, Enterobacter etc.
- **Chemical contamination**
  - a. Pesticides residues
  - b. Artificial ripening agents: Calcium Carbide, Ethrel
  - c. Preservatives: Formalin
  - d. Environmental contamination: From polluted water during washing

## Newspaper Cuts Regarding Adulterated Food

- Recently newspaper reported that rice prepared from plastic materials and artificially prepared eggs are marketed in Bangladesh which are imported items
- Scrupulous merchants are using engine oil in the preparation of food Urea in preparation of puffed rice

### Unsafe Food Creating Burden On Public Health

**Diarrhea**

- About 3 million cases reported/Year (Health Bulletin 2013 : 2.6 million)
- Responsible for 15% of mortality in children under 5 years (Health Bulletin 2013 : 45/1000 live birth)
- Among the Top 10 diseases in Upazilla and District Hospital ,No. 1 is diarrhea (Health Bulletin 2013)

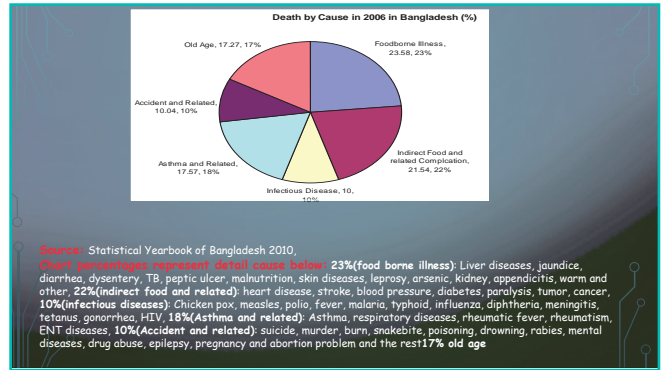
**Typhoid**

17.74% and 12.24% of top 10 diseases in Upazilla Health Complex and District Hospital (Health Bulletin 2013)

**Hepatitis A and E**

**Long term health effects**

- Renal failure, Liver damage, Cancer



### BRIEF OVERVIEW OF THE CONTAMINANTS

□ **Environmental contaminants** – industrial processes emit several thousand of inorganic and organic chemicals. Due to this emission, agricultural commodities and thus also our food may become contaminated

1. **Organic** – most important is dioxin and dioxin like compounds(DLC). People are exposed to these although at low levels, particularly by eating animal fat in meat, dairy products and fish. Now a days it is said that plastic water container emits dioxin if kept in heated or chilled environment. Dioxin or DLCs cause skin damage, cancer, NIDD in adults, neurological and immune system impairments in infants and endocrine system disruption

### CONTD.....

2. **Inorganic**

i. **Arsenic**

- Arsenic can enter into plants from soil. The terrestrial plants can accumulate a large amount of arsenic. On the other hand, marine plants and animals have arsenic detoxification system
- In Bangladesh, water is contaminated by arsenic widely. Almost one in five tubewells is not providing safe drinking water. About 20 million people in Bangladesh are using tubewells with more than 50 ppb of arsenic. Arsenic is found in rice also in endemic areas. There are now almost 66000 patients with Arsenicosis in Bangladesh.
- Long term exposure to arsenic can cause cancer of skin, lungs, bladder and kidney and in children impaired cognitive development. It also causes disfigurement which ultimately creates social problem especially for women

### CONTD.....

ii. **Lead**

Lead is stored in bones but it is in equilibrium with the lead present in blood. In Bangladesh, lead poisoning in young children is alarming. Chronic exposure to lead may result in anaemia, neuropsychological disorders in young children.

iii. **Mercury**

Mercury tends to bioaccumulate as methyl mercury in the food chain. Seafoods seem to be contaminated at a higher level. Exposure to foetus may cause serious brain damage. Tuna fish is a particular concern. Recent high use of Compact Fluorescent Lamp (energy saving bulbs) and its injudicious disposal in soil is also a concern.

### CONTD.....

□ **Process contaminants :**

- During heating or fermentation nitrosamines, polycyclic amines, histamine, acrylamide, furan, benzene trans fat, monochloropropanediol, semicarbazide, 4-hydroxynineal(4-HNE), ethyl carbamate etc are produced. Heating processes that induce a surface dehydration of the food such as frying or oven baking process gives rise to appreciable acrylamide production.
- Acrylamide also occurs in many cooked starchy foods such as potato chips, French fries and bread that has been heated.
- Acrylamide is indicted for its carcinogenicity, neurotoxicity and reproductive toxicity.

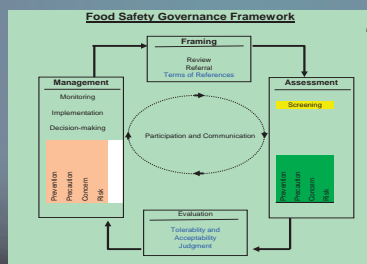
CONTD....

- **Furan** is found in cooked or heat-processed foods such as canned meat, baked bread, cooked chicken, caramel and coffee. Derivatives of furan are used as flavouring agents in food and tobacco products. Cancer, liver toxicity is detected in lab. Animals
- **Food additives and processing aids :**
- **Calcium carbide and ethrel** is used as ripener in fruits. Calcium carbide in contact with moisture produces acetylene which is analogue of natural ripening hormone ethylene. Acetylene reduces oxygen supply to the brain. In acute stage it causes headache, vertigo, dizziness, seizure and even coma. In the long term, mood disturbance and loss of memory.

GOVERNANCE ISSUE  
MAIN MINISTRIES AND AGENCIES INVOLVED IN FOOD CONTROL

Ministry	Agency / Department
Ministry of Food	-Bangladesh Food Safety Authority -Directorate of Food
Ministry of Local Government, Rural Development and Cooperatives	- Municipalities - City Corporations
Ministry of Health and Family Welfare	- Directorate General of Health Services
Ministry of Industries	- Bangladesh Standards and Testing Institution - Universal Salt Iodization Project, BSCIC
Ministry of Fisheries and Livestock	- Department of Fisheries - Department of Livestock Services
Ministry of Finance	- Department of Customs
Ministry of Agriculture	- Department of Agricultural Extension
Ministry of Establishments	- Executive Magistrates (Mobile Courts)
Ministry of Science and Technology	-Bangladesh Atomic Energy Commission -Institute of Food Science and Technology, BCSIR

Global Governance Model for Food Safety (General Framework)



Source: Marion Dreier and Rami Orwin, *Food Safety Governance: Integrating Science, Prevention and Public Involvement*, Verlag: Springer, 2009, 1-10

Food Safety Governance in Bangladesh (Notional)



Governance Gaps in Bangladesh as per Global Model

Governance Stage	Purpose and procedures	Implementation Status in the UK and EU	Implementation Status in Bangladesh
<b>Framing</b> : Cover finance design as per laws, regulation, institution, resources	Setting terms of reference, procedure and focus using, e. g. law, institution, regulators	Full implementation undertaken using, for example, up to date law, coordination by regulators, guidelines, and resources	Partially exercised without defining goals as governance model. <b>Causes</b> : No governance design, non-related law, no single regulator, coordination gaps, resources gaps
<b>Assessment Stage 1</b> : Screening	Gathering knowledge by identifying risks using, e. g. sound science, or by social scientists or economists	Implementation undertaken except concern based assessment to be undertaken by social scientists or economists.	Partial implementation proved to be non-effective. <b>Causes</b> : Science based screening, and Testing labs non-functional, precaution, concern and risk based assessment gaps
<b>Evaluation</b> (Assessment decisions are evaluated)	Value-based judgment e. g. on tolerability or acceptability prior to management decision	Moderate implementation and full implementation is in experimental stage	Absent and not exercised as governance process. <b>Causes</b> : Evaluation gaps
<b>Management Stage 1</b> : Decision making, <b>Stage 2</b> : Implementation, <b>Stage 3</b> : Monitoring	Selection of appropriate food safety risk decision by Management Board or regulator and decisions are based on prevention, precaution, concern or risk analysis.	Full implementation undertaken	Partially undertaken without setting proper goals and thus non-effective. <b>Causes</b> : No single management body or regulator, hence decisions are taken by different agencies piecemeal basis and no coordination

Different Policies Related to Food Safety

- National Agriculture Policy 1996
- New Agricultural Extension Policy 1996
- National Fisheries Policy 1998
- National Food and Nutrition Policy 1997
- National Food Policy 1996
- National Health Policy 2000
- National Livestock Policy 2007
- Product Labeling Policy 2006
- National Policy for Safe Water and Sanitation 1998
- Import Policy 2009-2012
- Export Policy 2009-2012
- National Plan of Action for Nutrition 1997

### Different Laws Related to Food Safety

- The Bangladesh Food Safety Act 2013
- The Bangladesh Pure Food Ordinance 1959
- Bangladesh Pure Food (Amendment) Act 2005
- The Cantonments Pure Food Act 1966
- The Bangladesh Pure Food Rules 1967
- Protection and Conservation of Fish Act 1950
- Fish and Fish Products (Inspection and Quality Control) Ordinance 1983
- Animal Slaughter (Restriction) and Meat Control Act 1957
- Fish Feed and Animal Feed Act 2010
- Agricultural Pest Ordinance 1962
- The Pesticide Ordinance 1971
- BSTI Ordinance and many others

### FAO Report, 2010 On Food Safety Management System in Bangladesh

Areas	Status
Food laws and regulations	-New Food Safety Act enacted -Rules and regulation need formulation
Food safety management system	-Complex but now trying to make simple
Analytical facilities	-Insufficient
Inspection and enforcement	-considerable gaps and overlapping responsibilities, Food safety authority will take care
Coordination, communication and exchange	-Limited among ministries -Inefficient use of resources
Knowledge and awareness	-Limited



### FOOD-BORNE ILLNESS SURVEILLANCE

Very little data are available

IEDCR (Institute of Epidemiology, Disease Control and Research) has developed a Food born illness surveillance system



Based on Recent food safety emergencies management

- Anthrax (2010)
- Nipah outbreak (2010, 2011)
- Hepatitis E & A (2010)
- Contaminated Litchi poisoning (2012)

**Food Safety Emergency management plan developed**

### FOOD-BORNE DISEASE SURVEILLANCE

- Capacity building activities (IEDCR)
  - Setting up hotline/SMS service
  - Reporting food related illness
  - Developing surveillance protocols
  - Investigating outbreaks
  - Collecting suspected food samples
- Analysis of risk factors (NFSL)
  - Pathogens
    - E. coli, Salmonella, Campylobacter, Listeria*
  - Chemical contamination
    - Pesticides, vet. drugs, heavy metals
    - Additives, adulterants

Target : Develop baselines on occurrence of FBDs

### RISK-BASED FOOD INSPECTION

- Risk based inspection of food from primary production to retailer is the key issue to ensure consumption of safe food
- However, the size and complexity of the responsibilities of the inspectors is enormous
- Identification of risk factors that are threatening to public health needs skill and logistics.



**Food Safety Program is providing support in building national capacity to operate and manage a risk-based, coordinated food inspection.**

### PREVENTIVE APPROACHES TO FOOD SAFETY



- Civil Society Organizations supported and the BFSN\* created
- Food safety behavior change communication campaign conducted
- Training and manuals to improve hygiene and manufacturing practices in food industry provided



### PREVENTIVE APPROACHES TO STREET FOOD SAFETY

Pilot project with Khulna City Corporation

- 350 street food carts distributed
- Vendors trained in good hygiene practices





### Dissemination of food safety messages

- Sustained and intensive behavior change campaigns
- Use of traditional media (folk music, theatre), print and electronic media
- Targeting of special groups
  - Food chain participants such as producers, processors
  - Consumers such as women, school children



Global Hand washing Day

### Consumers' Role

The consumers can play an important role in contributing towards food safety by-

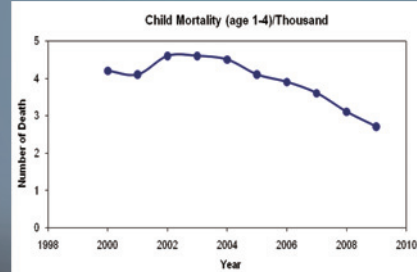
- ❖ Respecting refrigerating temperature during storage
- ❖ Respecting shelf-life of the product
- ❖ Preventing cross contamination during preparation of food
- ❖ No undercooking of raw fish, meat or vegetables

#### Role of Medical Associations

- As unsafe food is causing much harm to public health, Medical Associations should act as pressure groups to motivate the policy makers, bureaucrats and administrators to be active in executing the law and increasing effective surveillance
- As doctors' advice is expected to be heard by all the stakeholders particularly the consumers than anyone else, Medical Associations both national and international should take active part in the campaign for safe and healthy food

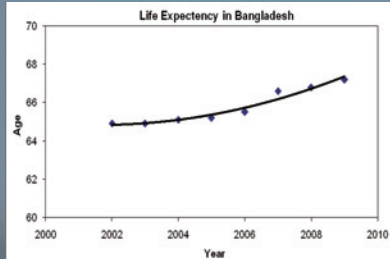
## RECOMMENDATIONS

- ❑ Implement Food Safety Act 2013
- ❑ Formulate rules and regulations
- ❑ Establish linkages between international and national activities to mutually benefit
- ❑ Be prepared for emerging issues
  - ✔ Dealing with consumer perceptions
  - ✔ Emerging hazards and food technologies
- ❑ Involve stakeholders in food safety
- ❑ Share experiences
- ❑ Communication



Source: Bangladesh Statistical Year Book 2010

Child Mortality Rate would decline more rapidly if safe food could be ensured



Source: Bangladesh Statistical Year Book 2010

Life Expectancy would be higher if safe food could be ensured



THANK YOU FOR YOUR KIND ATTENTION !