EPIDEMIOLOGY AND DISEASE SITUATION IN TUNISIA
General introduction and national context

Tunisia passed by a total medical transitional period since independence, marked by a progressive increase in the degenerative and chronic diseases to the detriment of the communicable diseases and those of the perinatal period.
Definition and models of the epidemiologic transition

1- The traditional or Western model
The transition in the Western countries during the last but one centuries, Characterized of a high mortality and an high rate of births (30 35%) at a low rate (lower than 20 per thousand)

2- The accelerated model
who characterizes the transition to Japan, in Eastern Europe In this model, the transition from mortality was held for one short period, in opposition to the traditional model.

3- The delayed model (or “contemporary”)
Case of Tunisia

The Transition is the passage of a state with another, of a situation with another (change/evolution)
The delayed model (or “contemporary”)

The model describes an incomplete transition of the XXe century, for the majority of the developing countries.

characterized by the existence of an overlapping of the phases of transition,

marked by the emergence of the non transmissible diseases and the persistence of the communicable diseases.
phases of the epidemiologic transition in Tunisia

1- Age *epidemies* and famines

2 - Age of retreat of pandemic diseases

3- Age of the degenerative diseases *(caused by the Man and his environment)*
Age of the epidemics and the famines

- Infectious illness and parasitic, bacterial and viral (epidemic, endemic)
- Famines, malnutrition, wars
- Environment (waste water; vectors and tanks of disease-causing agents)

Age of the retreat of pandemic

- Less frequent epidemics and famines
- Reduction of Infectious illness and parasitic, bacterial and viral (epidemic, endemic)
- Improvement of the environment and the living conditions
- Medical measurements

Age of the degenerative affections and the diseases

- caused by the Man
- Infectious illness and parasitic, bacterial and viral (epidemic, endemic always present, but in decrease
- degenerative Chronic diseases,
- Diseases caused by the Man
- Medical measurements and health systems. Preventive measures
Epidemiologic transition phases

closely related to the socio-economic and political conditions of the country

Epidemiological situation passed by **three principal periods:**

• Before colonisation (the signature of the Treaty of Bardo) in 1881
• During the period of French protectorate 1881-1956
• After independence直到现在
Two major epidemics of *pestis* in 1784 and 1818,
two severe epidemics of *cholera* in 1849 and 1867,
many appearances of the typhus in 1868 and 1874,

The sanitary situation of Tunisia at the time of the signature of the Treaty of Bardo in 1881:

- **no real statistics**
- **El Bey Doctors**
- **Ordinary Foreign observers**

1860, a first office of hygiene has just been set up
the medical condition of Tunisia under French Protectorate (1881-1956)

Military doctors in charge of medical service and legal medecins of military gived a description of health statut and epidemiological profile of Tunisian habitants in all main regions of the country.

Several infectious illness was appeared AND constituted the leading causes of death during this period (endemic cases, severe epidemy (chlera, pestis leprosis, ;......)

Creation of pasteur institut, research works
**Bacterial infectious diseases**
- Syphilis
- The entérocolite, the diarrhea (July and October),
- Dysentery
- The typhoid fever (the sporadic state)
- The diphteria (+++)
- Scarlet fever excessively rare (+)
- The extreme frequency of the telluric fever
- Relative endemicity of leprosy (eight to ten leprous).

**Viral infectious diseases**
- Nosology
- hepatic, dominate the morbid procession
- Granulous conjunctivitis (endemic) and corneal complications of variola
- Frequency granulous conjunctivitis
- Measles (+)
- variola
- granulous ophthalmias trachoma

**Parasitic infectious diseases**
- Paludism (endemic)
- Intestinal worms,
- ascaris,
- lombricoïdes
- oxyures, common in children (+++)
- taenia (+)
- Dysentery

**Chronic diseases**
- rheumatism, acute and chronic, and person in charge of cardiac complications, “providing a high figure of mortality”.
- keratitis, the cataract.
- “stomach upsets, constipations and dyspepsias. night punctures of mosquito
The high percentage was for gastro-intestine diseases, followed by infectious and parasites diseases but the lowest value for cancers and Tumors!
After independence/ causes of mortality

- The improvement of the living environment and the hygienic conditions as well as the progress recorded on the level of the vaccines cover had as a result of notable reduction of the communicable diseases.

- A decreasing on the infectious illness as mortality causes (ex. in 1956 and 1997)

- Tunisia managed to make its cities much healthier and livable by setting national strategies for some endemics diseases (contrôle and monitoring, Surveillance systems, development programs, etc...,
# Evolution of some epidemiologic indicators in Tunisia -1956 to 1997

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><em>Tuberculose</em></td>
<td></td>
</tr>
<tr>
<td>Risque annuel d'infection (%)</td>
<td>3.02</td>
</tr>
<tr>
<td>Incidence*</td>
<td>-</td>
</tr>
<tr>
<td>(1970)</td>
<td></td>
</tr>
<tr>
<td>Fièvre typhoïde*</td>
<td>-</td>
</tr>
<tr>
<td>Paludisme</td>
<td>-</td>
</tr>
<tr>
<td>(0.25)</td>
<td></td>
</tr>
<tr>
<td>Poliomyélite antérieure aiguë*</td>
<td>525</td>
</tr>
<tr>
<td>(1959)</td>
<td></td>
</tr>
<tr>
<td>Rougeole*</td>
<td>-</td>
</tr>
<tr>
<td>Leishmaniose cutanée*</td>
<td>3.2</td>
</tr>
<tr>
<td>Hépatites virales*</td>
<td>3.4</td>
</tr>
<tr>
<td>Infection à VIH*</td>
<td>3.4</td>
</tr>
<tr>
<td>(1980)</td>
<td></td>
</tr>
<tr>
<td>Rhumatisme articulaire aigu*</td>
<td>-</td>
</tr>
<tr>
<td>Hypertension artérielle*</td>
<td>9.9</td>
</tr>
<tr>
<td>(≥ 3 ans)</td>
<td>(≥ 20 ans)</td>
</tr>
<tr>
<td>Diabète (en milieu urbain)</td>
<td>3.5</td>
</tr>
<tr>
<td>(≥ 20 ans)</td>
<td>(tous âges)</td>
</tr>
<tr>
<td>Bronchite chronique*</td>
<td>10</td>
</tr>
<tr>
<td>(20-60 ans)</td>
<td></td>
</tr>
<tr>
<td>Cancers*</td>
<td>-</td>
</tr>
<tr>
<td>Poumon (H)</td>
<td>27.9 (N)</td>
</tr>
<tr>
<td>(1994)</td>
<td></td>
</tr>
<tr>
<td>Sein (F)</td>
<td>24.3 (N)</td>
</tr>
<tr>
<td>(1994)</td>
<td></td>
</tr>
</tbody>
</table>
The incidence of tuberculosis passed from 48.8 per 100,000 habitant in 1976 to 21.4 in 2000.

The fall of the incidence rate varies between 16% and 70%.
The incidence of the typhoid fever passed from 8,7 cases by 100,000 habitant in 1976 to 3,6 in 1994 and to 1 case for 100,000 habitant in 2000.
Evolution of the median number of episodes of diarrhea in the children

Figure 7. Évolution du nombre moyen d’épisodes de diarrhée chez les enfants de moins de 5 ans, (1985–2000)
How to explain the historical decline of infectious diseases?

- **Potential causes**
  - Evolution of the interactions host/disease-causing agents
  - Improvement of the medical system
  - Improvement of the medical care (antibiotic and vaccination)
  - Improvement of the nutrition and the living conditions
Factors of decline

A. Amélioration of the capacities of tracking of diagnosis

- Grading up of the diagnostic laboratories CHU
- To reinforce the national reference laboratory for the confirmation of the virological diagnosis.
- Provision of the medical structures of first line against dissemination
Factors of decline

B. Organization of the care structure:
   • hospital: biological appendix of the white plan,
   • structures of care ambulatory

C. Constitution of strategic stocks: in drugs, vaccines, medicinal products and equipment, biomedical...

D. Communication strategy:
   1. Aux professional: “Information and diffusion of the CAT” and measurements of hospital hygiene
   2. Information and Communication with the public

E. Organization of the collective life:
   “Plane of continuity of activities (PCA)”
The mortality of Tunisian

• With the decline of the communicable diseases, other non transmissible diseases developed taking the form of a true epidemic.

• The cardiovascular diseases, the accidents and cancers currently constitute the leading causes of mortality in Tunisia.
### Major causes of mortality in Tunisian Habitants

<table>
<thead>
<tr>
<th>Principaux groupes de maladies ou causes extérieures</th>
<th>Nombre de décès</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maladies du système circulatoire</td>
<td>5219</td>
<td>28,2</td>
</tr>
<tr>
<td>Tumeurs malignes</td>
<td>2790</td>
<td>15,1</td>
</tr>
<tr>
<td>Maladies de l’appareil respiratoire</td>
<td>2104</td>
<td>11,4</td>
</tr>
<tr>
<td>Maladies endocriniennes, nutritionnelles et métaboliques</td>
<td>1800</td>
<td>9,7</td>
</tr>
<tr>
<td>Affections dont l’origine se situe dans la période périnatale</td>
<td>1489</td>
<td>8,0</td>
</tr>
<tr>
<td>Causes extérieures de mortalité (accidents, chutes...)</td>
<td>708</td>
<td>3,8</td>
</tr>
<tr>
<td>Maladies de l’appareil digestif</td>
<td>601</td>
<td>3,3</td>
</tr>
<tr>
<td>Maladies de l’appareil génito-urinaire</td>
<td>580</td>
<td>3,1</td>
</tr>
<tr>
<td>Lésions traumatiques et empoisonnements</td>
<td>580</td>
<td>3,1</td>
</tr>
<tr>
<td>Maladies infectieuses et parasitaires</td>
<td>534</td>
<td>2,9</td>
</tr>
<tr>
<td>Maladies du système nerveux et des organes des sens</td>
<td>526</td>
<td>2,9</td>
</tr>
<tr>
<td>Malformations congénitales et anomalies chromosomiques</td>
<td>368</td>
<td>2,0</td>
</tr>
<tr>
<td>Maladies du sang et des organes hématopoïétiques</td>
<td>111</td>
<td>0,6</td>
</tr>
<tr>
<td>Autres causes</td>
<td>1095</td>
<td>5,9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18505</strong></td>
<td><strong>100,0</strong></td>
</tr>
</tbody>
</table>

Source: INSP 2007, enquête sur les décès de 2003

INSP 2007: Enquête sur les décès 2003
The distribution of the causes of mortality (caused by diseases) in several studies were according to criteria of age, sex, socio-professional category, principal pathologies etc... which can give more informations on the cartography of the diseases and morbidity in Tunisia.

Principal results of the project TAHINA 2002-2007

Distribution by gender:
Causes of mortality in Men

The principal diseases which assign the men are:

1 - circulatory system diseases
2 - malignant tumors diseases
3 - respiratory diseases.
the leading causes of mortality are:
1- circulatory system diseases,
2- malignant tumors diseases
3- endocriniens, nutritional and metabolic diseases
4- respiratory diseases.
2- Distribution by age

the causes of mortality change according to the age

- going from the affections in perinatal period and congenital malformations for the children

- to external causes of mortality for the young people

- With the chronic diseases for the adults and the old men.
## Distribution by Age

<table>
<thead>
<tr>
<th>Tranche d’âge</th>
<th>Cause №1</th>
<th>Cause №2</th>
<th>Cause №3</th>
<th>Cause №4</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 ans</td>
<td>Affections dont l'origine se situe dans la période périnatale (68,4%)</td>
<td>Malformations congénitales et anomalies chromosomiques (12,3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 à 14 ans</td>
<td>Tumeurs malignes (16,4%)</td>
<td>Causes extérieures de mortalité (15,9%)</td>
<td>Maladies du système nerveux et des organes des sens (14,8%)</td>
<td></td>
</tr>
<tr>
<td>15 à 24 ans</td>
<td>Causes extérieures de mortalité (27,4%)</td>
<td>Lésions traumatiques et empoisonnements (15,7%)</td>
<td>Tumeurs malignes (11,6%)</td>
<td>Maladies du système nerveux et des organes des sens (10,2%)</td>
</tr>
<tr>
<td>25 à 34 ans</td>
<td>Causes extérieures de mortalité (23,7%)</td>
<td>Tumeurs malignes (16,9%)</td>
<td>Lésions traumatiques et empoisonnements (14,8%)</td>
<td>Maladies du système circulatoire (12,9%)</td>
</tr>
<tr>
<td>35 à 44 ans</td>
<td>Tumeurs malignes (31,7%)</td>
<td>Maladies du système circulatoire (17,2%)</td>
<td>Causes extérieures de mortalité (9,3%)</td>
<td>Maladies de l’appareil respiratoire (6,7%)</td>
</tr>
<tr>
<td>45 à 54 ans</td>
<td>Tumeurs malignes (33,1%)</td>
<td>Maladies du système circulatoire (25,4%)</td>
<td>Maladies de l’appareil respiratoire (9,2%)</td>
<td>Maladies endocriniennes, nutritionnelles et métaboliques (8,1%)</td>
</tr>
<tr>
<td>55 à 64 ans</td>
<td>Tumeurs malignes (29,2%)</td>
<td>Maladies du système circulatoire (26,5%)</td>
<td>Maladies endocriniennes, nutritionnelles et métaboliques (12,1%)</td>
<td>Maladies de l’appareil respiratoire (10,4%)</td>
</tr>
<tr>
<td>&gt; 65 ans</td>
<td>Maladies du système circulatoire (36%)</td>
<td>Tumeurs malignes (14,1%)</td>
<td>Maladies de l’appareil respiratoire (13,7%)</td>
<td>Maladies endocriniennes, nutritionnelles et métaboliques (12%)</td>
</tr>
</tbody>
</table>
Less than 5 years are exposed to the congenital anomalies and pathologies having their origins during the perinatal time (80%)

Between 5 and 34 years, violent deaths constitute the first cause of mortality

From 35 years and up to 64 years, it is the cancerous pathology which becomes most important

From 65 years, they are the cardiovascular diseases. Mortality in the elderly is dominated by the invalidating chronic diseases related to ageing and difficult to reach to the prevention.
3- Distribution by principal pathologies

In Tunisia

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>maladies du système circulatoire</td>
<td>27.0%</td>
</tr>
<tr>
<td>cancers</td>
<td>18.2%</td>
</tr>
<tr>
<td>traumatismes accidentels</td>
<td>10.5%</td>
</tr>
<tr>
<td>maladies de l’appareil respiratoire et chez les femmes [42]</td>
<td>10.5%</td>
</tr>
<tr>
<td>maladies du système circulatoire</td>
<td>31.4%</td>
</tr>
<tr>
<td>cancers</td>
<td>14.0%</td>
</tr>
<tr>
<td>maladies endocrinienes et métaboliques</td>
<td>10.4%</td>
</tr>
<tr>
<td>traumatismes accidentels</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

WHO, 2010
According to the TAHINA Results

An important part was attributed to chronic diseases with consideration only of 9.5% of population have more than 60 years in 2005-2006
In 1999, a national strategy against the cardiovascular diseases was implemented for the need to reinforcing three axes of prevention:

1. Primary: **education prevention** aiming the reduction of the risk factors in the general population,
2. Secondary: **prevention** aiming at tracking and the assumption of responsibility of these risk factors,
3. **tertiary prevention** having for goal the improvement of the assumption of responsibility of the ischemic cardiopathology.

In Tunisia, the cardiovascular diseases present the first cause of mortality (28.2% in 2003 compared with 23% in 1996) (Ministry for the public health; National survey on hospital morbidity and mortality, Tunisia 1996).
On of the important epidemiologic Study, Treated the factors and results on over 5771 Tunisian adults /cardiovascular deseases and their determinants) show several important factors divided in:

two groups for Men:
Group 1: smoker and tabagism (50%)
Group 2: other factors like
✓ artériel hypertension ,
✓ obesity
✓ diabetes
✓ Cardiovascular genetic determinants
Prevalence of risk factors in women

Group 1:
Sedentries (90 %) and Tobacco-smoking (5%)

Group 2:
✓ obésity
✓ hypercholesterolemy
✓ with a level more high +20% in Men
Arterial hypertension

- According to the most recent criteria WHO [systolic blood pressure (PAS) > 140 mmHg, diastolic blood pressure (PAD) > 90 mmHg],

- (Transition Epidemiological and Health Impact North Africa), enquête nationale morbidité et recours aux soins ; 2005-2006)

- The prevalence of arterial hypertension is estimated at 38.4% in the adults from 35 to 64 years old (investigation INSP 1997-Ariana).

- The women have more raised prevalence (39.8%) that the men (35.4%).

- If one retains the criteria NOT > 160 mmHg and PAD > 95 mmHg, the differential man (12.2%) and women (21.9%) are marked more.

- More observed in urban (39.59%) than in rural (34.76%)
According to the Regional registers of North, the Center and South and national register with the national institute of public health) the Incidence of 103 per 100,000 habitant for man and of 78 for women, and a standardized incidence of 127.5 in men and 93 for women.

According to the register of the North for which one has reliable data for the period passed between 1995 et 1998, the most frequent localizations are:

- **In men:** the lung (22%), the bladder (10%) and the prostate (6.6%), the skin (6.2%), the stomach (5.1%), the larynx (5.1%) the LNH (4.5%), lecavum (3.2%), the rectum (3%) and the colon (3%).

- **In women:** breast (28%) et cervical (6%), skin (5%), ovries (4%), stomach (4%), le colon (4%), les LNH (4%), la thyroïde (3.6%), vésicule (3.4%) and rectum (3.4%).
### Cancers

<table>
<thead>
<tr>
<th><strong>Man</strong></th>
<th><strong>Woman</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>lung cancer (20,8/100 000), (27,6/100 000) *</td>
<td>breast cancer (19,7/100 000), (23,6/100 000)</td>
</tr>
<tr>
<td>the cancer of the bladder (10,7/100000), (13,1/100 000)</td>
<td>the cancer of the skin (5,8/100000), (7,5/100 000)</td>
</tr>
<tr>
<td>the cancer of the skin (7,2/100000),</td>
<td>the cancer of the uterine collar (4,8/100 000). 5,8/100 000</td>
</tr>
<tr>
<td>the cancer of the prostate (6,1/100 000)</td>
<td>and 7,5/100 000 and that of the cancer of the uterus with 5,8/100 000</td>
</tr>
</tbody>
</table>

* According to the DSSB in 2003.
Diabetes

- The diabetes concerns the people presenting a glycemia « fast » > 7,8 mm/l.
- According to the results of investigation TAHINA, 9.07% people answer criteria.
- The prevalence of the diabetes varies according to the sex, age, genetic, alimentation, ... etc.

- 9.6% in women compared with 8.9% in men
- 10.73% in urban environment compared with 5.59% in rural environment
- **12.1% in the district of Tunis**, 9.10% in North Are, 5.3% in Western North, 12.1% in the Center Is, 5.9% in the Western Center, 10% in the South Are and 10% in the Western South.
- Except for the Western South, the area Is Tunisian seems to be much more concerned by the diabetes than the Western area.
According to the results of project TAHINA, the prevalence of obesity at the most 20 years (defined by an index of body mass - BMI > 30 kg/m²).

The prevalence of obesity is of 27.26%, more in urban environment that in rural environment (31.6% vs 18.13%), and twice more in women in men (38.16% vs 15.97%).

The principal affected regions by obesity are in Tunis (35.32%), the Center Is (28.78%), the South Is (27.7%).
Hyperlipidemia

- The total prevalence of the hypercholesterolemia is of 14.3%; it is more important among women (15.9%) than at the men (12.4%).
- These rates are lower than those of the developed countries.
- The hyperlipidemia exists at 13.6% for adults from 35 to 64 years completed (15% for men, 11.3% for women).
Chronic diseases of respiratory system

- The prevalence of the chronic bronchopathology in adults are more than 25 years (5 to 6 times higher than men).
- For asthma, the prevalence is variously appreciated, according to the studied populations and the criteria adopted for the diagnosis.
- The reported rates vary between 1.7 and 6.5%. 1.3% of the deaths (that is to say 400 cases) are charged to him.
Handicaps

According to the study of the population and work institute, social affairs ministry and the National institute of Statistics (INS) in 1999, recorded that 90,800 handicapped (56,200 male and 34,600 of female.

- 34,2% of mentally handicapped persons,
- 30,5% motor disabilities,
- 6,1% of total handicapped people.
- The total prevalence of the handicap is of 0,96%, with a prevalence of rural environment (1,05%) on urban environment (0,91%).
Neurological diseases

- The neurological diseases are multiple, from vascular cerebral accident (AVC) to neurological genetic deseases.

- 75% of the patients having a AVC have more than 65 years, the vascular risk remains in the concerns of the neurologists.
Among the epidemiologic studies which were interested in the mental health and the psychiatry,

A study carried out in 1995 on a representative sample of 3000 individuals by pr. H. Zouhaier et al and in collaboration with WHO

8.8% of the interviewed people during their life a major depressive episode and 26% presented at least 3 depressive symptoms in a concomitant way.
Tobacco

- It’s an important risk factor and contribute in a big part in mortality caused by tobacco-smoking in 1997 is estimated at 22% for men and 4% for women.
- Currently the total prevalence is estimated at 30% (52.8% at the men, 5.2% for women).
- The prevalence in the young people varies according to the studies of 15% to 29.2% and in regression at would be provided education for, but in progression in the young people in situation of exclusion.
International Research projects / Tunisia

- To understand the nutritional transition of the Maghreb to contribute to the prevention of obesity and the associated nontransmissible diseases (2007 – 2010)

- This project is a project CORUS 2 (Co-operation for the University research and Scientist) made following the results of the INCO-Med project

- Institut National de Nutrition and of Food Technology, the technical support European and Maghrebian teams, Research unit 106 “Nutrition, Food and Health” of the Research institute for Development (IRD) of Montpellier, of the University will de Kénitra of Morocco and the University of Nottingham of England
International Research projects/Tunisia

- Impact of large distribution on the quality of the food consumption of the habitants of Large Tunis (2006 - 2007)


(European commission INCO-Med, n° ICA3-2001-10015)

Installation of Food and Nutritional Monitoring in Tunisia (1999 - 2002)
Communicable diseases

This system records performances for the majority of major communicable diseases and most of them has been eradicated.

The Management of the basic health care department (DSSB) is in charge of the piloting of this system.
The principal results (Ministry for the public health; DSSB; Annual report 2006)

• Paludism:

Tunisa set up a programme of eradication of paludism since the Seventies and for this reason no indigenous case was recorded since 1979.

- A few tens of case are currently recorded, (36 cases in 2006, against 38 in 2005) imported by Tunisian travellers:
  - (sportsmen, workers, business men)
  - foreigners mainly of the students originating in the zones of endémie annually are diagnosed and dealt with.
Tuberculosis:

- Incidence - around 21.2 for 100,000 habitants in 2006 -

- The most infected cities are Mednine (39.6 for 100,000 hab), Jendouba (34 for 100,000 hab) and Zaghouan (31.3 for 100,000 hab).
Leishmaniose:

- Leishmaniose recorded a fall in 2005 - 2006 with 9030 cases compared with 15373 cases in 2004 - 2005.
- This disease was not éradiquated of the Western Center and the South, in particular SidiBouzid, Kairouan and Gafsa.
Many sectors against AIDS in Tunisia
- departments of basic health
- Medicine school
- Academy of Ministry of Health
- The NGO

A national program against AIDS and the MST (the Management of the DSSB /evolution/year.

Since the notification of the first cases in 1985, a monitoring system was set up. Since, the number of cumulated cases is of 1383 of which 467 died up to 2006.
155 new cases were recorded in 2006. 69 are Tunisian (against 74 in 2005). - 42 men, (61% of the cases) - 24 women (35%) - 3 children (4% contaminated by their mother).

- since 1990
  The number of new cases recorded annually in Tunisian remains stable (around 70),
  Vigilance is essential and this in raison:
  ✓ expansion of tourism
  ✓ of leisure but also in certain cases for care
  ✓ transborder of the immigration (temporary, clandestine or declared) of populations originating in country of known endémie.
Emergent diseases & Réemergents risks
facteurs of risk:

- Modification of the human behavior,
- International travels and trade,
- Modifications of the medium,
- Modification and environmental pollution,
- Fast population growth,
- Deficiency of medical systems

Tunisia implemented until 1992, a strategy of health monitoring and epidemiologic monitoring
Epidemiologic situation of communicable diseases in Tunisia

Results of the preventive actions of the health system

- Most programs against the endemic diseases were put in place during the Sixties and Seventies.

Program eradication of Malaria/paludism

- In 1968 - Last indigenous case: 1979,
- diagnosed current Cases: (30-60/an) “are imported”.
Eliminated since 1979, paludism remains of topicality in Tunisia because:

- Persistence of the anophelism
- Coexistence of a potential tank of plasmodies consisted the imported cases of the disease.

From 1999 to 2006, 98 imported cases of paludism were diagnosed at the Pasteur Institute of Tunis who indexes approximately 30% of the national cases.

Tunisian accounted for 24.5% of the cases compared with 75.5% from abroad.
The co-operators, tradesmen, diplomats and sportsmen are concerned more and more, 41.9% of the cases compared with only 17.4% between 1980 and 1995, p<0.01.

The contaminations mainly took place in sub-Saharan Africa (96.5%); the Ivory Coast (23 case) and Mali (8 cases), with which Tunisia from now on are connected by direct flights, are more providers of case.

**Paludism-Tunisia 2009**
- 40 cases (62 in 2008):
  - 20 African students,
  - 15 Tunisian cases in zone of Douz (south)
Program of fight/ against Bilharziose

- Program vaccination vaccine deposit rate (2006): 98% of the target children (age 12-23 month) completely vaccinated.
- Implementation a national program 1970:
  - the systematic treatment of the carriers of S. haematobium
  - To prevent the spreading of molluscus in the lodgings of B. truncatus for total elimination of the disease
- Last indigenous case: 1983;
  - as from 1983: 3-4 imported cases /year.
Program of fight against Poliomyelitides

- Tunisia started a national surveillance and reporting of Acute Flaccid Paralysis (AFP) on regular basis since 1991.

- The last laboratory confirmed indigenous polio case was reported in 16 April 1992.

- National immunization Days (NID) have been held on the years 1995 - 1997 and SNIDs in 1998 and 1999.

- Tunisia has maintained a rate of non-polio AFP of more than 1/100,000 below 15 years since 1995, with more than 80% adequately collected stool samples since 1997.
Epidemiologic situation of the MIE in Tunisia

Epidemic of meningitis WNV in 1997 and 2003

West Nile fever (WNF) has mosquito-borne flavivirus infection.

- Epidemic (autumn) 1997: 173 notified cases including 129 positive results
  - 8 deaths.
- Epidemic 2003: 233 notified cases including 219 positive,
  - No the death.
Geographical distribution of cases WNV positifs2003

Risk factor:
- Way of the migratory flux of the birds,
- Presence of viral vector,
- Climate changes
the epidemic of the influenza “has (H1N1) v” of 2009

national strategy against dissimination of virus H1N1 2009

- the high number of the cases of contamination was detected in school, with 201 cases.

- November 15th, 2009: running 338 cases, including 02 death.

- Two thirds of the people reached were listed in large Tunis (215) then Nabeul (38 cases), Sfax (28 cases) and Bizerte (14 case)…
Wild Birds and Avian Influenza: Current Knowledge and Approaches to Surveillance in the Northern and Western Africa Region” was conducted in Tunisia December 11 - 14 2007 and hosted in cooperation with the Ministry of Agriculture and Water Resources and the Food and Agriculture Organization (FAO) Regional Animal Health Centre for North Africa in Tunisia.
Projet GCP/RAB/002/FRA – FAO –

Study on emergent and re-emergent diseases to reinforce sanitary updating and surveillance system. ([5500155002552]-Aout2009-janvier2011)

The project coordinated by par « l’Observatoire National des Maladies Nouvelles et Émergentes (ONMNE).

The study financed by development African Bank (BAD) and Tunisian government.
Thank you for your Kind attention