

# SMOKING AND HEALTH



ALL FORMS OF TOBACCO ARE  
ADDICTIVE AND LETHAL

# *ACCUTE EFFECTS*



- ACTIVATION OF BRAIN RECEPTORS
- CARDIOVASCULAR CHANGES
- HYPOXEMIA
- IRRITATION

# *NICOTINE IN BRAIN*

- NICOTINE REACHES THE BRAIN WITHIN 10-20 SECONDS AFTER THE PUFF
- NICOTINE OCCUPIES THE SPECIFIC CHOLINERGIC RECEPTORS AND INDUCES THEIR ACTIVATION

# *RELEASE OF NEUROTRANSMITTERS:*



- DOPAMINE
- SEROTONINE
- ACETYLCHOLINE
- EPINEPHRINE, NOREPINEPHRINE,
- BETA-ENDORPHINE
- ACTH

# *EFFECTS OF NICOTINE*

- WELL BEEING (DOPAMINE)
- COPING THE STRESS (ACTH)
- BETTER SHORT-TERM PERFORMANCE (ACETYLCHOLINE, ADRENALINE)

# *WHAT IS TRUE?*

- „NICOTINE IS THE ADDICTING AGENT IN CIGARETTES“

Private statement, Brown & Williamson official in 1983

„I BELIEVE THAT NICOTINE IS NOT ADDICTIVE“

Sworn testimony before the US Congress;  
CEOs of the seven leading tobacco companies in 1994

# *OFFICIAL STATUS*



- Dg. F 17:

PSYCHOLOGICAL AND BEHAVIORAL  
DISORDERS CAUSED BY  
TOBACCO USE

International statistic classification of  
diseases, 10th revision, 1991

# *SMOKING ADDICTION*

- 80 – 85% OF CURRENT SMOKERS WILL BE DEPENDENT, SIMILARLY LIKE CURRENT USERS OF HEROINE OR COCAINE
- ABOUT ONE THIRD OF OCCASSIONAL SMOKERS WILL BE DEPENDENT



# *SMOKING IS A DISEASE*

- DEPENDENCE ON SMOKING IS NOT A LACK OF WILLING OR „BAD HABIT“ BUT
- CHRONICAL, PROGRESSIVE AND RELAPSING DISEASE
- BOTH PHARMACOLOGICAL AND BEHAVIORAL ADDICTION

# *ALTERED DOPAMINERGIC SYSTEM*

- PREMATURE ACTIVATION OF FETAL RECEPTORS
- DECREASED AMOUNT OF NEURAL CELLS IN THE BRAIN
- SUDDEN INFANT DEATH SYNDROME
- IMPAIRED NEURO-PSYCHOLOGICAL DEVELOPMENT
- BEHAVIORAL PROBLEMS

# *ALTERED SEROTONERGIC SYSTEM*



- MAJOR PSYCHIATRIC DISORDERS  
(SCHIZOPHRENIA, DEPRESSION)
- HIGHER FREQUENCY OF SUICIDES

# *CARDIOVASCULAR CHANGES*

- VASOCONSTRICTION: SKIN, CORONARY, BRAIN, ABDOMINAL, VERTEBRAL, PLACENTAL ARTERIES
- HIGHER BLOOD PRESSURE
- HIGHER HEART RATE
- HIGHER HEART VOLUME/MIN
- DECREASED SKIN TEMPERATURE

# *MECHANISMS OF ACTION*

- ACTIVATION OF SYMPATIC NERVOUS SYSTEM
- RELEASE OF SUPRARENAL HORMONES (ADRENALINE, NORADRENALINE)
- BY QUICK ADMINISTRATION OF NICOTINE

# *HYPOXEMIA*

- DECREASED AMOUNT OF BLOOD DUE TO VASOCONSTRICTION (caused by nicotine)
- DECREASED AMOUNT OF OXYGEN IN BLOOD (caused by carbon monoxide – COHb)
- DECREASED BLOOD-TISSUE TRANSPORT ON OXYGEN (caused by hydrogen cyanid HCN)

## *IN PREGNANCY*

- LOCAL PLACENTAL NECROSIS  
(caused by cadmium Cd)
- POWERFUL AFFINITY OF FETAL HEMOGLOBIN TO CARBON MONOXIDE ENHANCES COHb LEVELS BY 25% (fetal x maternal blood)

# *CONSEQUENCES OF HYPOXEMIA*

- FETAL GROWTH RETARDATION = FETAL TOBACCO SYNDROME
- ALTERATION OF FETAL LUNG DEVELOPMENT
- RISK OF PRE-TERM BIRTH
- RISK OF INTRAUTERINE DEATH



# *HYPOXEMIA IN ADULTS*

- HEART ATTACK (IM)
- CEREBROVASCULAR ATTACK (STROKE)
- WRINKLING, PREMATURE AGEING
- IMPAIRED WOUND HEALING
- LEG AND HAND PAIN, GANGRENE – PERIPHERAL VASCULAR DISEASE

# *IRRITATION*



- EYES: excessive tearing, blinking, stinging
- NOSE: bad smell, stinging, phlegm
- NASOPHARYNX: cough, cold in the chest
  
- STRESS DUE TO DYSCOMFORT

# *SHORT/MILD-TERM EFFECTS*



- IMPAIRED IMMUNITY
- HORMONAL DYSBALANCE
- IMPAIRED BLOOD LIPIDS
- IMPAIRED HEMOCOAGULATION
- CHRONIC INFLAMMATION

# *IMMUNE SYSTEM*



- IMPAIRED RESISTANCE TO INFECTION
- CONTRIBUTION TO ALLERGIES
- INFANTS AND CHILDREN ARE THE MOST VULNERABLE POPULATION

# *MALE REPRODUCTION*



- IMPOTENCE
- IMPAIRED SPERMIOGENESIS:  
deformity, loss of motility, reduced number,  
aneuploid sperm cells
- FETAL MALFORMATIONS
- INFERTILITY

# *FEMALE REPRODUCTION*



- PAINFUL MENSTRUATION
- EARLIER MENOPAUSE
- INFERTILITY
- ECTOPIC PREGNANCY
- PLACENTA PRAEVIA
- PREMATURE BIRTH
- SPONTANEOUS ABORTION

# *OTHERS*



- HORMONAL DYSBALANCE  
CONTRIBUTES TO
- DIABETES MELLITUS and  
COMPLICATIONS
- OSTEOPOROSIS and
- HIP FRACTURES

# *BLOOD LIPIDS*



- INCREASED LEVELS OF
  - TOTAL CHOLESTEROL
  - LDL – CHOLESTEROL
  - VLDL – CHOLESTEROL
  
- DECREASED LEVELS OF
  - HDL- CHOLESTEROL



# *HEMOCOAGULATION*



- ENHANCED ACTIVITY OF THROMBOCYTES
- ARTERIAL/CORONARY THROMBOSIS

# *SMOKING IS RESPONSIBLE*

- FOR 25% OF ISCHEMIC HEART D.
- FOR 25% OF VASCULAR DISEASES (stroke, Burger d., aneurysma, macular degeneration, cataracts)
- FOR EARLIER ATHEROSCLEROSIS
- FOR 75% OF CHRONIC OBSTRUCTIVE PULMONAL DISEASE (chr. Bronchitis, emphysema)

# *SMOKING CONTRIBUTES TO*



- STOMACH AND DUODENAL ULCERS
- LOOSE TEETH
- GUM DISEASES – GINGIVITIS,  
PARADENTOSIS
- HEARING LOSS
- PSORIASIS
- TREMOR

# *LONG-TERM EFFECTS*



- TOBACCO SMOKE CONTAINS OVER 5.000 CHEMICALS,
- 67 OF WHICH ARE KNOWN OR SUSPECTED HUMAN CARCINOGENS

# *CARCINOGENS IN SMOKE*

- POLYCYCLIC AROMATIC H.  
(benzo/a/pyrene)
- HEAVY METALS (Cd, As)
- RADIOACTIVE POLONIUM 210
- INDUSTRIAL CARCINOGENS: beta-naphthylamine, 4-aminobiphenyle, benzene, formaldehyde

# *SMOKING IS RESPONSIBLE*

- FOR 90-95% OF ALL LUNG CA
- FOR 40-60% OF HEAD/NECK CA
- FOR 40-60% OF KIDNEY/BLADDER CA
- FOR 30% OF CERVICAL CA
- FOR 30% OF GASTRIC/PANCREATIC CA
- FOR COLON, LIVER, BREAST CA

# *SMOKING KILLS*



- HALF OF ALL LIFETIME USERS
- HALF OF THOSE DIED BETWEEN  
30-69 YEARS OF AGE
- IN THE 20th CENTURY,  
100 MILLION PEOPLE  
DIED FROM TOBACCO USE

# *SMOKING KILLS*



IN 2000

- 4,8 MIL ANNUAL PREMATURE DEATH
- 3,8 MILLION MEN
- 1,0 MILLION WOMEN

BY 2020 TOBACCO WILL KILL ABOUT

- 10 MILLION PEOPLE EVERY YEAR



# *SMOKING KILLS*



- TOBACCO WILL KILL

1 BILLION = 1 000 000 000

PEOPLE

- IN THE 21<sup>st</sup> CENTURY

# *SMOKING KILLS NON-SMOKERS*

- MAIN STREAM

- 800-900° C
- 16% O<sub>2</sub>
- 6,0-6,7 pH

- SIDE STREAM

- 600° C
- 2% O<sub>2</sub>
- 6,7-7,5 pH

## *SS : MS - IRRITANTS*

- ACROLEIN 8 – 15
- FORMALDEHYDE 10 – 15
- AMONIUM 73
- NITROGEN OXIDES 4 – 10
- FORMAMIC ACID 1,5
- NAFTALENE 16

# *SS : MS - TOXINS*

- CARBON MONOXIDE 2 – 5
- TOLUENE 6 – 8
- NICOTINE 2,6-3,3
- NICKEL 13 – 30
- POLONIUM 210 1 – 4
- PCDD, PCDF 2

# *SS : MS - CARCINOGENS*

- BENZENE 5 – 10
- NITROSAMINES 20 – 100
- 2-NAFTYLAMINE 30
- 4-AMINOBIFENYLE 30
- BENZO/A/PYRENE 2,5 – 3,5
- TAR 1,7

# *INDOOR CONCENTRATIONS OF NICOTINE*

- WORK-PLACES 20 ug/m<sup>3</sup>
- CONFERENCE HALL 40 ug/m<sup>3</sup>
- RESTAURANTS 26-28 ug/m<sup>3</sup>
- CARS 40 ug/m<sup>3</sup>
- HOMES 7-11 ug/m<sup>3</sup>
- HOSPITALS 0,01- 4 ug/m<sup>3</sup>

# *INDOOR CONCENTRATIONS OF NITROSAMINE NNK*

- BARS 10 – 24  $\mu\text{g}/\text{m}^3$
- RESTAURANTS 1 – 3  $\mu\text{g}/\text{m}^3$
- TRAINS 5  $\mu\text{g}/\text{m}^3$
- CARS 29  $\mu\text{g}/\text{m}^3$
- OFFICES 26  $\mu\text{g}/\text{m}^3$
- HOMES 2  $\mu\text{g}/\text{m}^3$

# *INVOLUNTARY EXPOSURE TO ETS:*

- AN HOUR A DAY IN A ROOM WITH SMOKER
- IS NEARLY A HUNDRED TIME MORE LIKELY TO CAUSE LUNG CANCER IN A NON-SMOKER
- THAN TWENTY YEARS SPENT IN A BUILDING CONTAINING ASBESTOS

Sir Richard Doll, 1989



# *ANTENATAL EXPOSURE*

- GROWTH RETARDATION
- DELAYED LUNG DEVELOPMENT
- ACTIVATION OF ACETYLCHOLINE RECEPTORS (by NICOTINE) = NEUROTERRATOGENICITY

# *EXPOSURE TO ETS- CHILDREN*

- UNPLEASANT DYSCOMFORT
- IRRITATION
- IMPAIRMENT IMMUNITY
- RESPIRATORY INFECTIONS
- SIDS
- LEUKEMIA

# *EXPOSURE TO ETS -ADULTS*

- UNPLEASANT DYSCOMFORT
- IRRITATION
- CHRONIC OBSTRUCTIVE  
PULMONARY DISEASE
- LUNG CANCER
- AC. CORONARY ISCHAEMIA

# CONCLUSSION



- CIGARETTE IS UNIQUE ARM KILLING BY ITS BOTH ENDS
- GLOBAL TOBACCO EPIDEMY IS WORSE TODAY THAN 50 YEARS AGO AND MAY BE WORSE IN ANOTHER 50 YEARS
- SMOKING IS THE MOST IMPORTANT PREVENTABLE RISK FACTOR