EUROPEAN ASSOCIATION FOR DENTAL PUBLIC HEALTH

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HISTORY OF SALT FLUORIDATION
AND
CARIES PREVENTIVE EFFECTIVENESS

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PRESENTATION APPROACH

- BACKGROUND
- METHODOLOGIES
- CLINICAL
- COMPARISON OF APPROACHES
- NEEDS –EUROPE AND WORLDWIDE
- CONCLUSIONS

WHO POLICY

World Health Organization (WHO) Global Oral Health Program advocates the effective use of fluoride as an essential approach to prevent dental caries in the 21st century

Population-wide automatic fluoridation measures are considered the most effective.

(WHA 60:17,2007)HAS IDENTIFIED SALT AND MILK AS ALTERNATIVES WHERE WATER FLUORIDATION CANNOT BE IMPLEMENTED FOR WHATEVER REASON

- **FIRST**

WE NEED TO AGREE THAT CONTINUOUS EXPOSURE TO LOW LEVELS OF FLUORIDE IN THE ORAL CAVITY HAS A POSITIVE PREVENTIVE IMPACT **ON DENTAL CARIES PREVALENCE**

- **SECOND**

  AS PUBLIC HEALTH DENTISTS, HOW DO WE ACHIEVE COMMUNITY COVERAGE FOR DENTAL CARIES PREVENTION COMPREHENSIVELY AND MOST EFFECTIVELY AT SUSTAINABLE COSTS IN THE ABSENCE OF COMMUNITY WATER FLUORIDATION **?**

SALT FLUORIDATION

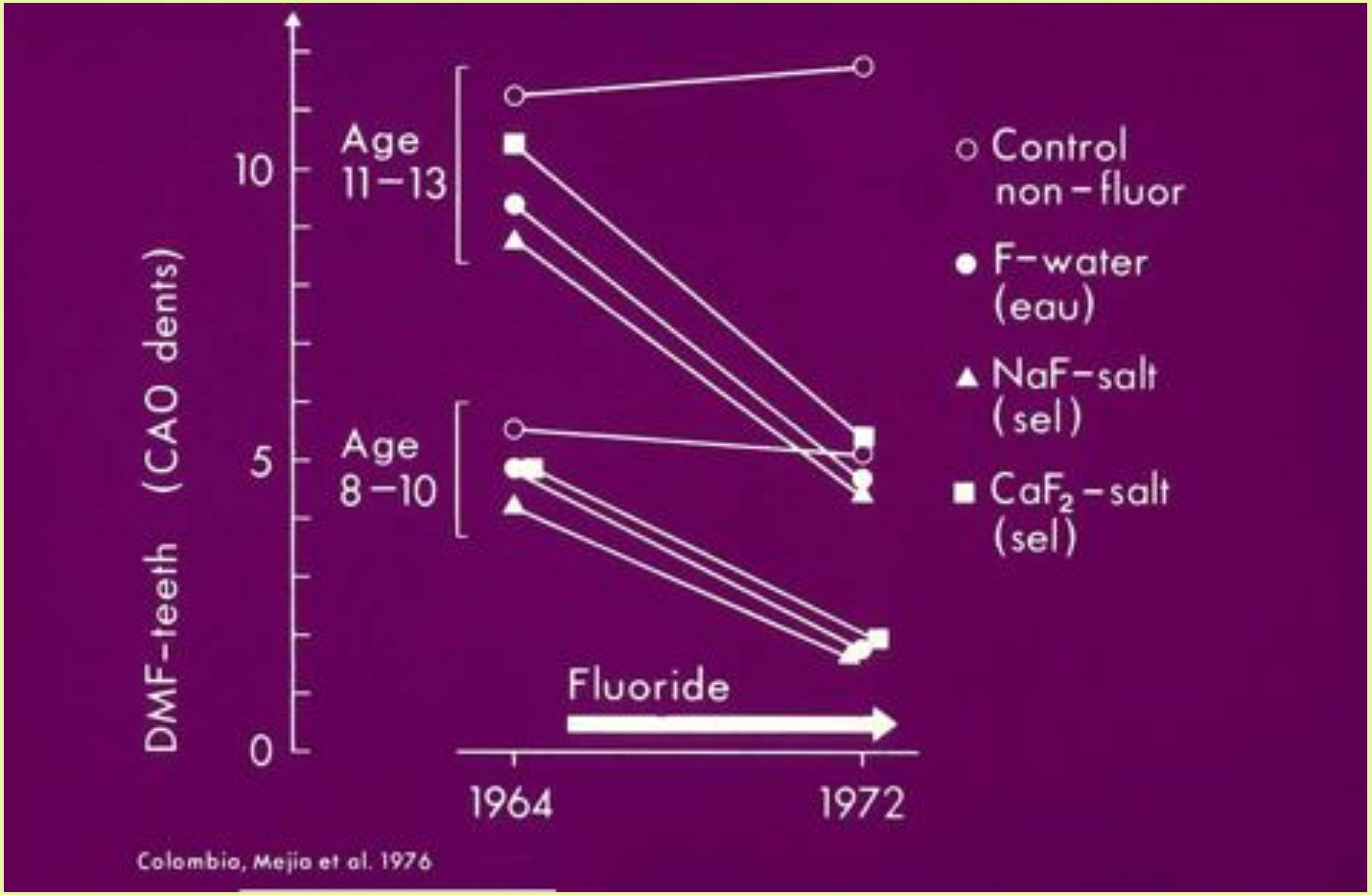
IDEA INTRODUCED BY SWISS FAMILY THAT INTRODUCED CONCEPT OF USE OF SALT AS A VEHICLE FOR IODINE

SEQUENCE:

- TRIALS IN HUNGARY & SWITZERLAND
- APPLICATION IN SWITZERLAND
- TRIAL IN COLOMBIA
- INTERNATIONAL RESOLUTIONS
- IMPLEMENTATION IN COUNTRIES (EUROPE & AMERICAS)

INITIATED IN ZURICH 1955 NOW COVERS ALL SWITZERLAND

Carious Teeth
Colombian Study, 1964-72



CHALLENGES

HOW TO MAKE THE FINDINGS APPLICABLE IN COUNTRIES AND SITES WHERE WATER FLUORIDATION WAS UNLIKELY?

- LEGALLY AND SAFELY
- TECHNICALLY
- ECONOMICALLY
- CULTURALLY
- UNIVERSALLY
- SUSTAINABLY

LEGALLY

- HEALTH REGULATIONS –DECREE
- AGENCIES INVOLVED
- GOVERNMENTAL DECISION
- COMMERCE –INTERIM MARKETING AGREEMENTS
- SALT PRODUCERS OR MARKETERS

NO REQUIREMENTS OR REQUESTS FOR REFERENDUM

TECHNICALLY

- SALT PRODUCERS OR IMPORTERS
- PROCESS –WET OR DRY MIX
- COMPOUNDS – NaF, KF, CaF_2
  - Premix or not
- EQUIPMENT
- FACILITIES –LABS AND STORAGE
- HUMAN RESOURCES –PRODUCTION & EVALUATION

ECONOMICALLY

- AVALABILITY & ASSURANCE OF COMPOUND AND TRANSPORTATION AT A REASONABLE PRICE
- STORAGE SPACE
- FACILITIES FOR MONITORING, MARKETING AND EVALUATION
- ACCEPTABLE MARKET PRICE FOR THE POPULATION

CULTURALLY

- SALT QUALITY
- SALT USE
- PACKAGING AND PURCHASING PATTERNS
- PREPARING THE COMMUNITY
- HEALTH MESSAGE

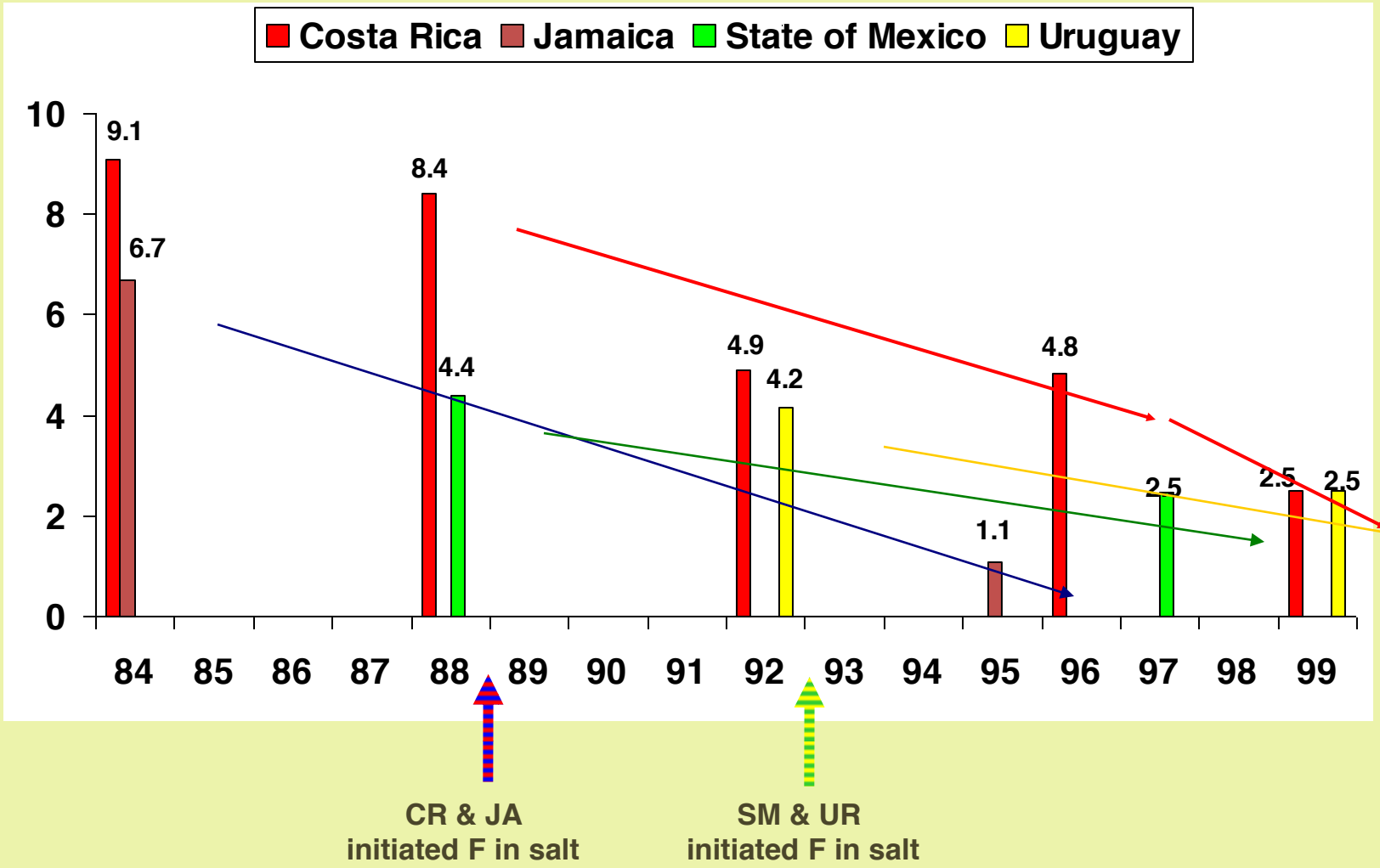
UNIVERSALLY

- EFFECTIVE PACKAGING FOR THE ENVIRONMENT
- UNIFORMITY AND CONSISTENCY OF PRODUCT
- MEETS SPECIFICATIONS

SUSTAINABLY

- SALT QUALITY –SAME PRICE AS DOMESTIC SALT WITHOUT FLUORIDE ADDITIVE
- CONTINUOUS CAPABILITY TO PROVIDE PRODUCT AT LOW COST WITHIN LOCAL ECONOMY
- EFFECTIVE MARKETING
- ABILITY TO MAINTAIN COST & PRODUCT DESPITE INTERNATIONAL CURRENCY FLUCTUATIONS
- ROUTINE MONITORING, EVALUATION OF COVERAGE & HEALTH EVALUATION
- EFFECTIVE REPORTING & COLLABORATION WITH OTHER AGENCIES

Change in the Mean Number of Permanent Teeth Decayed, Missing, or Filled in 12 Year Old Children in Costa Rica, Jamaica, State of Mexico, and Uruguay 1984 - 1999



E.D Beltran Personal Communication

Fluoridated and Iodized Salt in México

Salt Fluoridation, F-Salt

Efficacy	40 - 80% reduction in prevalence
Coverage	Complete or selective
Costs	U$0.10 or less/capita/year
Limitations	Domestic salt quality, Production capability
Countries	Developing & industrialized
Advantages	Technology similar to iodization; EU approved food additive; less F compound required; cost, storage, and maintenance

IMPLEMENTATION

- REFINED DOMESTIC SALT

  OBLIGATORY

  FREEDOM OF CHOICE

  SPECIFIC GROUPS OR POPULATIONS
- FOOD GRADE SALT IN COOKED FOODS

  BAKERIES, CANTEENS, SCHOOLS
- PROCESSED FOODS

  UNLIKELY TO HAVE FLUORIDATED SALT

SALT COMBINATIONS

F SALT vs. CONTROL
F SALT + SEALANT
F SALT + F TOOTHPASTE
F SALT + SEALANT + F TOOTHPASTE
F SALT + F WATER

COMBINED IODIDE AND FLUORIDE IN SALT ARE USED IN MANY PROGRAMS.THEY ARE EFFECTIVE IN PREVENTION OF IDD AND CARIES AND COMPATIBLE.

RESULTS ON CARIES REDUCTION & TYPE OF SALT FLUORIDATED

EPIDEMIOLOGICAL EVALUATIONS AT AGE 12 YEARS

JAMAICA	**84% (ALL SALT FLUORIDATED)**
COSTA RICA	**73% (HOUSEHOLD AND RESTAURANT USE)**
GERMANY	**68% (HOUSEHOLD)**
SWITZERLAND	**30-60% (HOUSEHOLD, SOME SCHOOLS)**
COLOMBIA	**50% (ALL SALT FOR HUMAN CONSUMPTION)**
MEXICO	**44% (HOUSEHOLD USE, RESTAURANTS)**
URUGUAY	**40% (HOUSEHOLD, RESTAURANTS)**

ADDITIONAL COUNTRIES HAVE NOT REPORTED EVALUATIONS AND/OR MARKET SHARE

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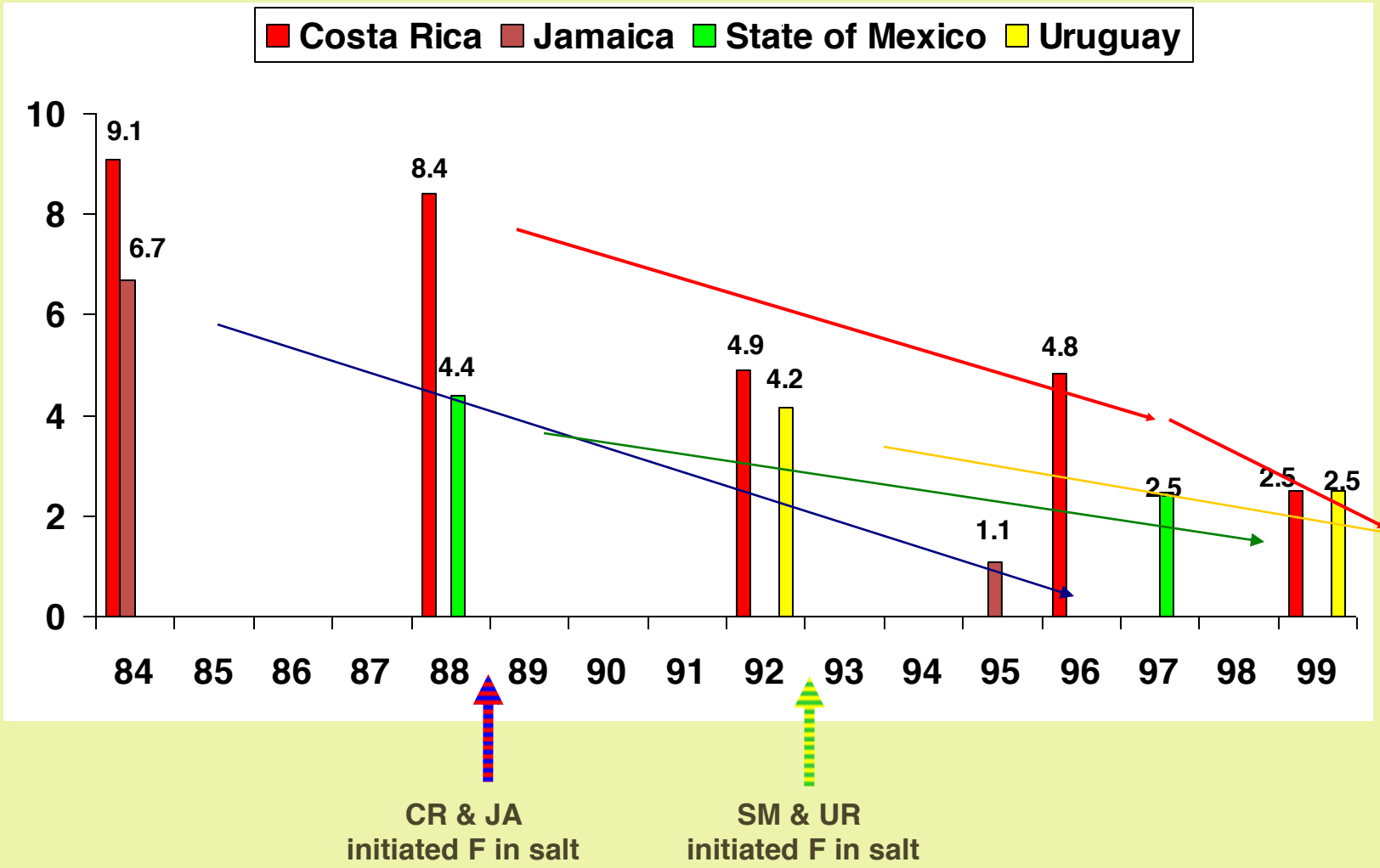

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POTENTIAL OF F-SALT IN EUROPE

- SOUTH EASTERN EUROPE
- EASTERN EUROPE

- - ABSENCE OF EFFECTIVE EXTENSIVE COMMUNITY WIDE PREVENTIVE PROGRAMS
- - INSUFFICIENT DENTAL TREATMENT COVERAGE
- - PERSISTING MEDIUM-HIGH CARIES LEVELS
- - FINANCIAL CONSTRAINTS
- - **LARGE SALT PRODUCTION FACILITIES**
- **- COUNTRIES THAT DO NOT PRODUCE FORTIFIED SALT FOR HUMAN CONSUMPTION**

DMFT: Western vs. Eastern Europe

Western Europe after 2000:

DMFT <2.0 in Spain & Belgium

High prevalence rate of dental caries in 12-year-old children in Central and Eastern Europe

Reported Market Shares of Domestic Fluoridated Salt, Europe ≈2008

RECENT ACTIONS

- 2006 FDI /WHO CONSULTATION ON USE OF FLUORIDES
- 2007 EU RENEWED APPROVAL OF NaF & KF AS FOOD ADDITIVES
- TOPIC OF SALT FLUORIDATION FOR CARIES PREVENTION PRESENTED AT WORLD SALT SYMPOSIUMS 2000 & 2009 AND EU-SALT GENERAL ASSEMBLY 2010
- INITIATION OF FLUORIDATED SALT PROGRAMS IN SE ASIA
- ILLUSTRATED COMPATABILITY OF IODIZED AND FLUORIDATED SALT
- CODEX ALIMENTARIUS LABELLING OF FOOD ADDITIVES
- SCHER
- COCHRANE REVIEW OF SALT FLUORIDATION FOR PREVENTION OF CARIES IN PROGRESS
- ARTICLE IN SA DENTAL JOURNAL WITH META ANALYSIS OF F SALT EFFICACY

WHY SALT FLUORIDATION NOW?

- LIMITATIONS OF WATER FLUORIDATION & MILK FLUORIDATION
- UNIVERSALITY, EFFICACY, AND SAFETY OF SALT AS A VEHICLE
- POLITICAL SITUATIONS
- ECONOMY AND ECONOMIC CRISIS
- HEALTH
- WHO RESOLUTIONS; EU REGULATIONS; CODEX
- EXISTENCE OF STANDARDS & SPECIFICATIONS
- EVIDENCE BASED POSITIVE EVALUATIONS OF IMPACT, EFFICACY, SAFETY, AND COMMUNITY ACCEPTANCE OF F-SALT

POTENTIAL OF F-SALT WORLDWIDE

- WORLD POPULATION 2009 – 6,773,737,057
- MORE DEVELOPED COUNTRIES 2009 – 1,221,613,710
- LESS DEVELOPED COUNTRIES 2009 – 5,546,554,002
- LATIN AMERICA & CARIBBEAN 2009 – 585,585,686
- ASIA -3,798,007,081
- EST.WORLD POPULATION 2020 - 7,700,087,264

POPULATION PROJECTED TO INCREASE 1,000,000,000 BY 2020
EST. 27% 14 YRS AND UNDER
20-25% NO ACCESS TO HEALTH SYSTEMS

SOURCE: US CENSUS INTERNATIONAL DATA BASE

LESSONS LEARNED I

- MOST COUNTRY HEALTH REGULATIONS HAVE PROVISION FOR INTRODUCTION OF F-SALT
- SOME COUNTRIES ONLY PERMIT SALE OF IODIZED AND FLUORIDATED DOMESTIC SALT, AND BAN IMPORTS THAT DO NOT MEET THESE SPECIFICATIONS: PREFERABLE BECAUSE OF OPTIMUM EFFECTIVENESS AND LOWEST COST
- FLUORIDATED SALT SHOULD HAVE NO ADDITIONAL MARKET COST TO CONSUMER
- TECHNOLOGY AND EVALUATION PROCEDURES ARE SIMILAR TO IODIZATION. CAN BE ADDED BY DRY OR WET METHODS
- DOES NOT INCREASE INDIVIDUAL SALT INTAKE. NO IDENTIFIED ADVERSE HEALTH IMPACT
- PROVEN COMPATIBILITY OF IODIDE AND FLUORIDE IN SALT AND SUBSEQUENT POSITIVE IMPACT OF BOTH UPON DISEASE PREVENTION

LESSONS LEARNED II

- IMPLEMENTATION NATIONALLY OR LOCALLY WITH OR WITHOUT FREEDOM OF CHOICE & IN SPECIFIED POPULATIONS
- 200-250 MG F/ KG SALT HAS PROVEN EFFECTIVE AND SAFE
- RESULTS COMPARABLE TO WATER FLUORIDATION & IMPACT ON BOTH PRIMARY AND PERMANENT DENTITIONS
- MOST COST EFFECTIVE COMMUNITY WIDE APPROACH FOR CARIES PREVENTION
- POSITIVE COMMUNITY ATTITUDES & ACCEPTANCE; MARKET SHARE INCREASES IF ADEQUATELY PROMOTED
- NO UNSIGHTLY ENAMEL FLUOROSIS AT LEVELS OF 180-250 MG F/KG ATTRIBUTABLE TO SALT FLUORIDATION
- TOOTHPASTE INGESTION BY YOUNG CHILDREN: MOST FREQUENT CAUSE FOR ENAMEL FLUOROSIS APART FROM FLUORIDE TABLETS AND EXCESS FLUORIDE IN WATER.

LESSONS LEARNED III

CAPABILITY OF DEVELOPING COUNTRIES TO IMPLEMENT COMMUNITY SALT FLUORIDATION DESPITE HIGH AND LOW WATER FLUORIDE AREAS

CAPABILITY OF DEVELOPING COUNTRIES TO PRODUCE AND EXPORT FLUORIDATED SALT

POTASSIUM AND SODIUM FLUORIDE COMPOUNDS PREFERRED

FREEDOM OF CHOICE REQUIRES CONJOINT & CONSTANT PROMOTION TO ACHIEVE SIGNIFICANT PARTICIPATION AND UTILIZATION

WHY SALT FLUORIDATION NOW?

NEED FOR DENTAL CARIES PREVENTION AND COMMUNITY COVERAGE TO BE AVAILABLE FOR ALL WHERE WATER FLUORIDATION NOT FEASIBLE OR SUSTAINABLE

STALLED DEVELOPMENT OF WATER FLUORIDATION –UK 10% OF POPULATION AFTER 60 YEARS;30,000 CHILDREN UNDER 5 YRS ADMITTED ANNUALLY TO HOSPITAL FOR MULTIPLE EXTRACTION OF TEETH;
USA -30% OF POPULATION WITHOUT ACCESS AND INCREASE IN COVERAGE ONLY 7% 1992 - 2006
CANADA – 57% OF POPULATION WITHOUT WATER FLUORIDATION

WORLD POPULATION INCREASE BY 1 BILLION BY 2020 – EST. 80% IN DEVELOPING COUNTRIES
RURAL POPULATION X 6 LESS LIKELY TO HAVE ACCESS TO TREATED WATER SUPPLY

EST. 27% OF WORLD POPULATION UNDER 14 YEARS OF AGE

WHAT NEEDS TO BE ACHIEVED?

- **REDUCTION IN MISINFORMED ANTI-SALT PROPAGANDA**
- **INCREASE POLITICAL AND COMMERCIAL AWARENESS**
- **BUILD ON SUCCESS OF IODIZATION PROGRAMMES**
- **PROJECT HUMANITARIAN VALUE OF SALT TO COMMUNITY**
- **COLLABORATION AND COORDINATION WITH THE HEALTH SECTOR**
- **PRODUCT AUTHENTICITY**
- **TECHNOLOGY AND TRAINING FOR IMPLEMENTATION AND MONITORING**
- **ROUTINE MONITORING AND EVALUATION OF BENEFICIAL IMPACT OF PRODUCT**
- **IMPROVED HEALTH AND QUALITY OF LIFE**

CONCLUSIONS

EVIDENCE FROM THE PAST TWO DECADES HAS ILLUSTRATED THE CAPABILITY OF DOMESTIC SALT TO ACHIEVE WORLDWIDE COUNTRY COVERAGE AS A VEHICLE FOR DISEASE PREVENTION

GIVEN PAST EXPERIENCE AND THE NEED FOR URGENT IMPLEMENTABLE, COST EFFECTIVE, AND SUSTAINABLE DENTAL CARIES PREVENTION IN THE EXPANDING WORLD POPULATION, AT THIS POINT IN TIME SALT MUST BE CONSIDERED THE VEHICLE OF CHOICE IN MANY SITES FOR COMMUNITY WIDE INGESTED FLUORIDE APPLICATION IN PUBLIC HEALTH

FINALLY

ANY QUESTIONS ?