The Future of School Based Fluoride Mouthrinse Programs- Where are we, Where are we going?

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Chair, ASTDD Fluorides Committee

Fluoride Mouthrinse Programs– Evidence: Yesterday, Today and Tomorrow

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History of Preventive Programs- 20th century

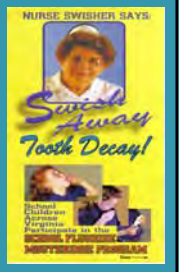
1900's Removal of teeth-foci of infection
1930's Control of infection – topical silver nitrates
1940's Advent of fluorides
- Fluoride supplements
- Community water fluoridation
- Concentrated topical application

1950's Fluoride toothpastes
1960's Fluoride rinses –
1970's – National Caries Program
- **Fluoride mouthrinse programs**

1980's Evaluation of fluoride rinse program
1990's Dental sealant programs
2000's Fluoride Varnishes
2020 Diamide silver fluoride?

ASTDD Synopsis

- 35 States with School Based FMR programs (2009)
  - Estimated <1 million children, 4% of schools
  - Small changes over the last five years
- At program height nearly all states had FMR(1980's)
  - Estimated 3-12 million children



Interest in FMR is growing

- Less than 10 years 22%
- More than 10 years 16%
- More than 20 years 61%

- Shrinking 14.3%
- Maintaining 42.9%
- ***Growing 42.9%***

- **Cost is low**
  - **$1.52 per child**
  - **Range $0.54 – $2.54**

1981- National Caries Program

Preventing Tooth Decay: A Guide for Implementing Self-Applied fluorides in School Settings

A low cost alternative to professionally applied fluorides

1986, NPPD prevention assumptions

- Prevalence of dental caries stable
- Combinations of successful procedures would reduce dental caries up to 90%
- If cost of the individual procedure was low, then the cost of the program would be less than restoring teeth
- School based programs would be efficient since they provided a captive audience

APHJ, Review of the National Preventive Dentistry,1986

Policy Outcome of NPPD

- Match program to expected burden of dental disease
- Multiple preventive agents to the majority of children are not likely to be cost-effective
  - Target services toward high risk
- Include cost benefit measures
- Combine strategies: Dental sealants, education, linkage
- Improve monitoring and research

Since NDDP

Disney JA, Bohannan HM, Klein SP, Bell RM: **1990**

- Providers were slow to change
- Research insufficient- based upon historical , cross-sectional decay experience overestimating prevention
- Changing providers actions will be more likely when alternative preventive practices are recommended

Greater prevention on smooth surfaces

Ripa L, Leske GS, Levinson A. J Am Dent Assoc. **1978**

- proximal surfaces 40.0% reduction
- occlusal and buccolingual 19.6% and 15.6%

Improved results with program length

Horowitz H, Meyers RJ, Heifetz SB, Driscoll WS, LiSH.. 1984

- Findings in smooth tooth surfaces continued to improve as the length of the program increased
- Reductions in caries in mesio distal surfaces were 32%, 69%, 85%, and 86% after 2,4,6, and 8 years, respectively.

Compliance matters

Stamm JW, et al. J Dent Educ, 1984

- A high drop out rate can compromise viability
- School support and utilization
  - Are we reaching those that need it?
  - Is it accessible to all who could benefit?
  - How is it actually delivered?

High caries reductions with very low fluoride exposure

Kobayashi S, J Public Health Dent. **1995** Fall;55(4):229-33

N=1,129 Japanese children
Weekly rinse with .2% sodium fluoride

- Fluoride exposure nearly non-existent in 1974
  - No Supplements
  - No PATF
  - No Water fluoridation
  - Little Fluoride toothpaste
- Caries reductions 64%

Combinations of topical fluoride NOT additive

Cochrane Reviews

- Modest (10%)reductions in caries compared to toothpaste alone.
- Most effective in communities with caries incidence of +2DMFS/year
- High risk approaches alone will fail to deal with the majority of new disease in the majority who are at lower risk

Caries incidence reduced in smooth surfaces in adolescents

Skold UM, et al Caries Res 2005

- N= 622 with low to moderate caries risk
- Rinsing weekly, fortnightly, 6 days/semester
- .2% sodium fluoride

FMR Improved oral health status

Pieterse S, Intl J. Dental Hyg. 2006

- Age 6-12 years
- Once weekly rinsing
- N=124

Primary molars powerful predictors for permanent teeth

Skeiem, et al. International Journal of Paediatric Dent Int 2006

- N=186
- Ages 5-10 years
- Sensitivity 76%

Cost-Benefits depend upon public values

- Oscarson N,Community Dent Oral Epidemiol 2007
  - The value of healthy teeth and good oral health might be higher than the cost of a filling.
  - Cost of restoring failed restorations over lifetime rarely included in studies

FMR vs Fluoride Varnish(FV) in schools

Sköld UM, Acta Odontol Scand. **2008**

- Varnish Model ($63.00 pp/yr)
  - 4 hours- 2 staff-150 students
  - Students brushed – the staff flossed and varnished
  - Twice annually-3 years
- Rinse Model ($35.80 pp/yr)
  - 4 hours – 1 staff -225 students
  - 9 school classes supervised by each nurse (not teacher)
  - 6 FMR semester 36 FMR in 3 years (90 recommended)

FMR vs FV programs

Petersson LG, **1993**:27(supp) Review

- Supervision requirement
  - Staffing costs are highest outlay
- Expected caries reductions
  - Lower caries reductions will increase cost

Target population, not individuals

Peres MA, Barros AJ, et al. Community Dent Oral Epidemiol 2009

- N=359 children age 6-12
- Very high response rate 95%.
- Socioeconomic variables were not strongly associated with dental caries

Select at-risk populations for FMR

Levin KA, Community Dent Oral Epidemiol. 2009

- N=1333
- Bi-weekly rinse, .2% sodium fluoride
- Age 6-11 years

Fluoride and sealants = extra 5 yrs

Nakamura A, Int Dent J. **2009**

- Rinsed from age four through junior high school
- Once weekly in primary and junior high (daily in nursery school)
- Evaluation of those that completed 11 years of program

Combine sealants with FMR to increase outcomes

Sterritt GR, et al, J Public Health Dent. J Public Health Dent.

- 13 years FMR – 25% caries reduction after 8 years
- 5 years Dental Sealants – 44% additional decline
- 3 years of Community Water Fluoridation – 35%

An intensified preventive dentistry program introduced on an island with high caries prevalence twice that of the US mainland was successful (72% caries decline overall)

Fluoride mouthrinse programs are effective

Chen CJ, Community Dent Oral Epidemiol. 2010

- 8-9 year olds
- Rinse weekly with .2% sodium fluoride
- Four schools
- N=242

FMR programs reduce caries prevalence when increased risk

Canadian Agency for Drugs and Technologies in Health 2010
www.cadth.ca Review

- Varied in frequency, longevity of rinsing program
- Varied fluoride rinse concentrations
- All socially deprived schools

- Lack of water fluoridation is one factor that increases caries risk.
  - ¾ studies didn't indicate fluoridation status
  - Limited research available

Summary

FMR programs are effective when targeted

Efficiency and effectiveness depends upon:

- Higher caries incidence, (rather than prevalence)
- Lower use of other topical and systemic fluorides: toothpaste, PATF, CWF
- Increases with length of program
- Use of risk assessment – smooth surface caries of primary molars predict caries in permanent molars

A combination of different preventive approaches are more likely to be effective: sealants + fluoride

ASTDD Fluoride Policy Statements

- Fluoride modalities are both systemic and topical
- Caries protection, lifetime cost and appropriateness for use in populations will vary by the fluoride method or combination of fluoride methods selected.
- Fluorides are most effective when used in combination with other modalities
- Fluorides are more effective in preventing dental caries on the smooth surfaces of teeth than in the pits and fissures.
- However, for carious lesions that are limited to the pits and fissures of permanent molar teeth, dental sealants alone or combined with multiple fluoride applications are more effective than fluoride alone.
- Daily, multiple low exposures to fluoride facilitate the balance between remineralization and demineralization of tooth enamel, thus reducing caries incidence.

Conclusion

- *ASTDD supports the use of fluoride mouthrinse programs in schools, for children age six years and over, when exposure to optimal systemic and topical fluorides is low, populations of children are at high risk for tooth decay and there is demonstrated support by school personnel.*

The Illinois Fluoride Mouthrinse Program – Past and Present

- Julie Ann Janssen, RDH, MA
- Acting Dental Director
- Illinois Department of Public Health- Division of Oral Health

In 1967

- Fluoridate all community water supplies.
- One of the ??? states that mandate fluoride in community drinking water.
- While this step was beneficial to most children in Illinois, it did not reach all children.

1970….1974…..1976

- Fluoride Brush On Program – DOH staff went into schools 2 x year and had students brush with lorvic paste with fluoride
- New research and studies shifted to fluoride mouthrinse, DOH piloted the Fluoride Mouthrinse Program
- Fluoride Brush On Program was discontinued and the FMR program replaced it.
- FMR studies were showing highly effective results and was proving to be cost effective

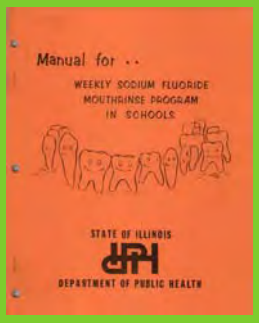
PITTSBURGH D. DALLAS (21-17)

Paradigm Shifts

- Systemic - Fluoride contained in food and water is incorporated into the enamel of the developing teeth.
- Topical - Fluoride is applied to erupted teeth, such as in a mouth rinse program. Re-mineralization

Sodium Fluoride Mouthrinse Program

- Offered to schools where the student population is predominantly rural or low-income.
- Teachable moments – children, parents, teachers, administrators



Classroom Instructions

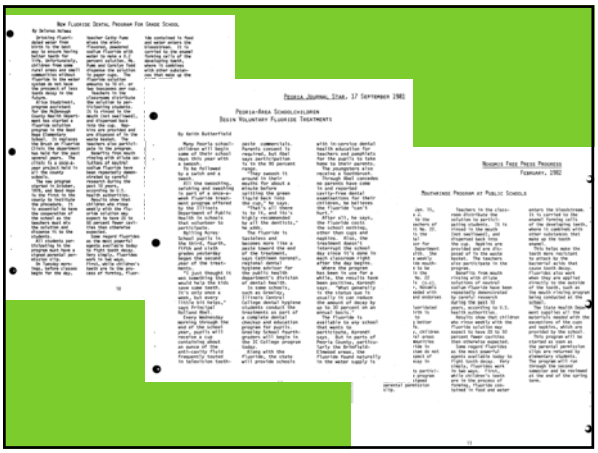
- Ten (10) ml. of solution (one stroke of the pump) are dispensed in each paper cup. This can be done outside of classroom and brought on a tray to the classroom.
- Each student is given a cup with 10 ml. of solution and an absorbent towel or napkin on their cleared desk top (if this is done while at their desks).
- Demonstrate how to "swish" the solution between all the surfaces of back and front teeth.
- Have the students "swish" for 60 seconds and empty back into paper cup.
- **Children should not eat or drink anything for at least 30 minutes after rinsing**.

1988 -- ??? schools, representing ?? counties with 100,000 students

2009 -- 23 schools, representing 15 counties with 5,900 students

Strengths:

- Population based
- School-based
- Opportunity to choose – schools, parents
- Minimal cost
- Creates awareness about oral health
- Oral health teachable moments
- Minimal administration
- Serves school children in rural areas/private wells/ low income
- Provides a weekly oral health activity
- Local health department buy-in
- Empower communities
- Basis to "sell" other oral health programs



Program Weakness:

- No outcome data specific to Illinois
- No budget specific for mouth-rinse program
- Current research does not encourage continuation of program
- No assurance the program is actually done
- No control over who administers the program
- Competes with higher priority programs
- Few participants
- Time consuming
- Minimal evaluation
- Little media exposure
- May be perceived as substitute for brushing
- No longer a "fashionable" dental public health intervention

Program Threats:

- Questions whether it is necessary
- More communities have public water supplies
- Communities have dropped the program
- Emphasis has shifted
- Parents opposing fluoride
- Organized groups opposing fluoride
- Efficacy questionable
- Funding is limited
- Community expectations are too great
- Fed partners don't encourage the program
- Research is limited
- Product security & handling

Program: State of Illinois Fluoride Mouthrinse Program **Logic Model**

INPUTS	ACTIVITIES	OUTPUTS To produce these results	OUTCOMES Which will yield these benefits.
Schools **School Personnel** • Principles • School Nurses • Parents • Volunteers • PTO/ PTA • RDH/DDS • School Staff **DOH Staff** Program Administrator Mouthrinse Coordinator Staff members **Fiscal Unit** **Supplier** Medical Products Laboratories **Funding Source** • General Revenue	**School(s) request fluoride** **Review Orders and collect data from previous school year** 1- Budget 2- Data Collection 3- Submit new Order 4- Update contact list (New staff) 5- Monitor Progress 6- Submit New Orders to Main Office **Data Analysis & Reporting** **Evaluation**	Computer automatically generates data form and order forms to school participants. Mouthrinse coordinator follows up on schools and ensures that all schools have completed proper forms by May of each school year. Orders are reviewed and placed to central management by May 31 of each school year. Due to fiscal budget orders are not placed until after new fiscal year (July). Mouthrinse is shipped to schools Schools purchase their own paper supplies for the program each school year. Community Ownership	Facilitates program implementation/provision of topical fluoride in rural areas Increased utilization of topical fluoride where the student population is predominantly rural or low-income Elimination and/or reduction of dental decay in school children Reduce unmet need Increase children's awareness of good oral health Provides a weekly activity emphasizing oral health Opportunity to educate teachers and kids Achievement of Healthy People 2020 objectives: OH 1.1, OH 1.2., OH1.3.and OH 2.2. Sustainability.

IMPACT
Improved Oral Health, Better quality of life, Less school hours missed due to dental problems, Reduced disease/burden

The Illinois Department of Public Health's Division of Oral Health is continually exploring new products, methods, and techniques to maintain and improve this and other oral health programs for Illinoisans.

Starting Fresh – Fluoride Mouthrinse Programs Today

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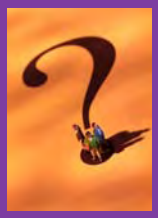
Division of Public Health
NC Department of Health and Human Services

Program Selection

- Fluoride mouthrinse
- Fluoride varnish
  - requires one-on-one
- Fluoride tablets
  - who writes scripts?
  - quantity stored on site
- Brushing
- Education
- Sealant



Resources to Consider

- Operating budget
- Personnel
- Geographic area of coverage

School Selection

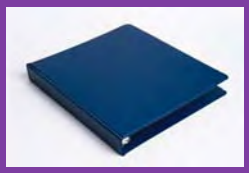
- Fluoridation status
- Disease status
  - total disease (not just untreated)
    - Basic Screening Survey (BSS)
    - other surveillance data
- Race/ethnicity
- SES: % free/reduced lunch
- School support – compliance

Costs

- Stable funding source
- Availability of product – sole source
  - packets of fluoride powder
    - pump and jug
    - cup and napkin
  - pre-mixed unit dose
    - inclusive materials
- Printed materials
- Travel
- Staff time
- School personnel time

Safety

- Training
- Manual
- On-site coordinator
  - school nurse
  - secretary
  - health teacher
  - volunteer
- Storage
  - both when school is in and out
    - locked
    - larger issue with pre-mixed
      - climate controlled



Paperwork

- Parental permission forms
- Parental notification
- Classroom rosters
- Ordering supplies
- End of year reporting

NC FMR Program

- 1974 – pilot in eastern NC
  - at 3 years, 34% reduction DMFT
- State OHS Central Office
  - oversight and purchasing
  - distributed packets, pumps and jugs, forms to staff
- School provided
  - 1 cup and napkin/child/week
- PH RDHs: Local administration
- Target: all elementary schools
  - K – 5/6th grade

Early 1990s

- Decline in caries continued
- Peaked at ~420,000 children participating
- Began targeting to high risk schools
- Many lower risk schools did not want to lose service

2002

- UNC School of Public Health wrote Special Interest Project (SIP) grant to CDC "to evaluate community prevention programs." Funding not available.
- Bad budget year
  - Had to cut something
  - No recent FMR data
  - FMR program discontinued

2003

- CDC funded evaluation of community based preventive services*
- Statewide survey 2003-2004 included
  - Free/reduced lunch status
  - Fluoridation
  - FMR participation

*CDC SIP Grant CFDA NO # 93.135

Effect of Fluoride Mouthrinse*

FRL	Fluoride Mouthrinse	Mean dfs
No	No	3.09
Yes	No	5.36

*2003-2004 NC OHS Statewide Dental Survey

Effect of Fluoride Mouthrinse*

FRL	Fluoride Mouthrinse	Mean dfs
No	No	3.09 ←
	Yes	1.38
Yes	No	5.36
	Yes	3.55 ←

P<.001

*2003-2004 NC OHS Statewide Dental Survey

2003-04 FMR Survey Results

- Estimated reduction of about 1/3 if low income and participated in FMR
- Included intermittent participation by child and by school
- More detailed FMR analysis needed (in progress)

2006

- Program funding under scrutiny
- Used rough survey results in request for Legislature to provide funding to restart FMR
- Funding expanded (twice)
- Changed to unit dose
- Serve ~77,000 children
- Stress school compliance

School Selection

- School selection
  - Use K assessment data
  - Principals have to promise compliance
  - Approved at state level
  - Additional considerations
    - disparities
    - school/kids in fluoridated area
    - SES
      - free/reduced lunch

Meeting with Principal/s

- Designated coordinator
- Confirm grade levels (grades 1-5 usually)
- Distribution for written parental permission
  - annual
  - permanent
- Annual information for parents

Implementation

- Meet with school coordinator – provide manual, discuss duties & forms
- Ordering protocol
- Set up safety assessment, principal's signature
- Teacher packets
  - information & permissions for parents
  - teacher's checklist and roster of children
- Monitor and troubleshoot
- EOS:
  - collect rosters, return to CO
  - store for 1 year

2011

- Some reductions of numbers due to budget cuts (~58,000)
- Further analysis of 2003-2004 FMR data underway

Questions?