CHAPTER 40: COMPREHENSIVE REVIEW SECTION 1

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 41: COMPREHENSIVE REVIEW SECTION 2

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 42: COMPREHENSIVE REVIEW SECTION 3

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 43: COMPREHENSIVE REVIEW SECTION 4

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

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DENTAL INDICES:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 44: COMPREHENSIVE REVIEW SECTION 5

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

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EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 45: COMPREHENSIVE REVIEW SECTION 6

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 46: COMPREHENSIVE REVIEW SECTION 7

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 47: COMPREHENSIVE REVIEW SECTION 8

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 48: COMPREHENSIVE REVIEW SECTION 9

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 49: COMPREHENSIVE REVIEW SECTION 10

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 50: COMPREHENSIVE REVIEW SECTION 11

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
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4. ASHA - 1 per 1000 population
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 51: COMPREHENSIVE REVIEW SECTION 12

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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DENTAL INDICES:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 52: COMPREHENSIVE REVIEW SECTION 13

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 53: COMPREHENSIVE REVIEW SECTION 14

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 54: COMPREHENSIVE REVIEW SECTION 15

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

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Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 55: COMPREHENSIVE REVIEW SECTION 16

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
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4. ASHA - 1 per 1000 population
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 56: COMPREHENSIVE REVIEW SECTION 17

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 57: COMPREHENSIVE REVIEW SECTION 18

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 58: COMPREHENSIVE REVIEW SECTION 19

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 59: COMPREHENSIVE REVIEW SECTION 20

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 60: COMPREHENSIVE REVIEW SECTION 21

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 61: COMPREHENSIVE REVIEW SECTION 22

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 62: COMPREHENSIVE REVIEW SECTION 23

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 63: COMPREHENSIVE REVIEW SECTION 24

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 64: COMPREHENSIVE REVIEW SECTION 25

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 65: COMPREHENSIVE REVIEW SECTION 26

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 66: COMPREHENSIVE REVIEW SECTION 27

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

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4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

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Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 67: COMPREHENSIVE REVIEW SECTION 28

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
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7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 68: COMPREHENSIVE REVIEW SECTION 29

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 69: COMPREHENSIVE REVIEW SECTION 30

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 70: COMPREHENSIVE REVIEW SECTION 31

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 71: COMPREHENSIVE REVIEW SECTION 32

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 72: COMPREHENSIVE REVIEW SECTION 33

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
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9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 73: COMPREHENSIVE REVIEW SECTION 34

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 74: COMPREHENSIVE REVIEW SECTION 35

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 75: COMPREHENSIVE REVIEW SECTION 36

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 76: COMPREHENSIVE REVIEW SECTION 37

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 77: COMPREHENSIVE REVIEW SECTION 38

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

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Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 78: COMPREHENSIVE REVIEW SECTION 39

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 79: COMPREHENSIVE REVIEW SECTION 40

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 80: COMPREHENSIVE REVIEW SECTION 41

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 81: COMPREHENSIVE REVIEW SECTION 42

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 82: COMPREHENSIVE REVIEW SECTION 43

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
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7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 83: COMPREHENSIVE REVIEW SECTION 44

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 84: COMPREHENSIVE REVIEW SECTION 45

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

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Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
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4. ASHA - 1 per 1000 population
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 85: COMPREHENSIVE REVIEW SECTION 46

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 86: COMPREHENSIVE REVIEW SECTION 47

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

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DENTAL INDICES:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 87: COMPREHENSIVE REVIEW SECTION 48

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

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Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 88: COMPREHENSIVE REVIEW SECTION 49

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

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Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 89: COMPREHENSIVE REVIEW SECTION 50

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

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1. Epidemiology definition - John M Last
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10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 90: COMPREHENSIVE REVIEW SECTION 51

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
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BIOSTATISTICS:
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Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 91: COMPREHENSIVE REVIEW SECTION 52

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 92: COMPREHENSIVE REVIEW SECTION 53

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 93: COMPREHENSIVE REVIEW SECTION 54

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 94: COMPREHENSIVE REVIEW SECTION 55

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
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6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 95: COMPREHENSIVE REVIEW SECTION 56

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
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4. ASHA - 1 per 1000 population
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 96: COMPREHENSIVE REVIEW SECTION 57

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 97: COMPREHENSIVE REVIEW SECTION 58

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 98: COMPREHENSIVE REVIEW SECTION 59

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

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CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

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Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 99: COMPREHENSIVE REVIEW SECTION 60

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 100: COMPREHENSIVE REVIEW SECTION 61

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

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EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 101: COMPREHENSIVE REVIEW SECTION 62

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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FLUORIDES:
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BIOSTATISTICS:
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10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 102: COMPREHENSIVE REVIEW SECTION 63

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 103: COMPREHENSIVE REVIEW SECTION 64

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 104: COMPREHENSIVE REVIEW SECTION 65

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 105: COMPREHENSIVE REVIEW SECTION 66

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

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EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 106: COMPREHENSIVE REVIEW SECTION 67

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

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Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
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10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 107: COMPREHENSIVE REVIEW SECTION 68

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
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DENTAL INDICES:
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FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

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Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 108: COMPREHENSIVE REVIEW SECTION 69

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 109: COMPREHENSIVE REVIEW SECTION 70

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

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DENTAL INDICES:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 110: COMPREHENSIVE REVIEW SECTION 71

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 111: COMPREHENSIVE REVIEW SECTION 72

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
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DENTAL INDICES:
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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
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Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
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8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 112: COMPREHENSIVE REVIEW SECTION 73

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

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DENTAL INDICES:
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FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

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BIOSTATISTICS:
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2. Chain of infection - Reservoir, Transmission, Host
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9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 113: COMPREHENSIVE REVIEW SECTION 74

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
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OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 114: COMPREHENSIVE REVIEW SECTION 75

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

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Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

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Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

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4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 115: COMPREHENSIVE REVIEW SECTION 76

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

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DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

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BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

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10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 116: COMPREHENSIVE REVIEW SECTION 77

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

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FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

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11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 117: COMPREHENSIVE REVIEW SECTION 78

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
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FLUORIDES:
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11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 118: COMPREHENSIVE REVIEW SECTION 79

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
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13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate

CHAPTER 119: COMPREHENSIVE REVIEW SECTION 80

DETAILED COMPREHENSIVE CONTENT FOR EXAM PREPARATION

EPIDEMIOLOGY - ADVANCED CONCEPTS:
Epidemiology studies the distribution and determinants of health-related states in populations. Distribution involves analyzing patterns by time (seasonal, cyclic, secular trends), place (geographic, urban-rural, clustering), and person (age, sex, occupation, socioeconomic status). Determinants include agent factors (virulence, infectivity), host factors (immunity, genetics, nutrition), and environmental factors (physical, biological, social).

The chain of infection model identifies three essential links: the reservoir (source of infection including human cases/carriers, animals, environment), the mode of transmission (direct contact, droplets, vectors, vehicles), and the susceptible host (immunity status, age, nutrition, genetics). Breaking any link prevents disease transmission.

Immunity types include active immunity (natural from infection or artificial from vaccines) which is long-lasting, and passive immunity (natural from maternal antibodies or artificial from immunoglobulins) which provides immediate but temporary protection.

HEALTH CARE SYSTEMS:
The National Health Policy 2002 established goals including eradicating polio and yaws, eliminating leprosy and kala-azar, reducing IMR to 30/1000 and MMR to 100/100,000, and increasing health expenditure to 2% of GDP.

Primary Health Care per Alma-Ata includes 8 components: education on health problems, food supply and nutrition, safe water and sanitation, maternal and child health including family planning, immunization, endemic disease control, treatment of common diseases, and essential drugs.

The health hierarchy in India includes subcentres (3,000-5,000 population), PHCs (20,000-30,000), CHCs (80,000-120,000), and district hospitals. ASHA workers (1 per 1000 population) serve as health activists and DOTS providers.

DENTAL INDICES:
Plaque Index (Silness and Loe, 1964): Scores 0-3 based on plaque thickness at gingival margin. Calculated per area, per tooth (average of 4 areas), and per individual.

OHI-S (Greene and Vermillion, 1964): Simplified Oral Hygiene Index examining 6 specific teeth (16, 11, 26, 46, 31, 36). Debris and calculus scored 0-3 each. OHI-S = DI-S + CI-S, range 0-6.

Gingival Index (Loe and Silness, 1963): Scores 0 (normal), 1 (mild inflammation, no bleeding), 2 (moderate, bleeding on probing), 3 (severe, spontaneous bleeding).

CPITN (WHO): Uses probe with markings at 3.5-5.5-8.5-11.5mm. Codes: 0=healthy, 1=bleeding, 2=calculus, 3=shallow pocket (4-5mm), 4=deep pocket (6mm+). Treatment needs: TN-0=none, TN-1=OHI, TN-2=scaling, TN-3=complex.

DMFT (Klein, Palmer, Knutson, 1938): D=decayed, M=missing due to caries only, F=filled. Range 0-28 (32 teeth minus

4 wisdom teeth). DMFS measures surfaces (128 without wisdom teeth).

FLUORIDES:
History: McKay observed Colorado brown stain (1901), Churchill identified fluoride (1931), Dean's 21-city study showed 1 ppm = 50-60% caries reduction (1942), Grand Rapids first fluoridation (1945).

Mechanisms: Enhances remineralization (most important), inhibits demineralization, affects bacterial metabolism (enolase inhibition), alters tooth morphology.

Sources: Water (optimal 0.7-1.2 ppm), salt (200-250 mg/kg), milk, supplements. Topical: APF 1.23% (not for children), NaF 2%, varnishes 2.26%.

Toxicity: CLD 32-64 mg/kg, STD 8-16 mg/kg. Symptoms include nausea, vomiting, hypocalcemia. Treatment: induce vomiting, give calcium, IV fluids.

Fluorosis: Dean's Index 0-4 (normal to severe). Occurs during tooth development. Skeletal fluorosis requires 20-80 mg/day for 10-20 years.

BIOSTATISTICS:
Data types: Nominal (categories), ordinal (ordered), interval (equal intervals, no true zero), ratio (true zero).

Measures: Mean (average, affected by outliers), Median (middle value, not affected by extremes), Mode (most frequent).

Dispersion: Range (max-min), SD (standard deviation, square root of variance), SE (standard error, SD/sqrt(n)).

Normal distribution: Mean=Median=Mode. 68% within +/-1 SD, 95% within +/-2 SD, 99.7% within +/-3 SD.

Hypothesis testing: H0 (null, no difference), H1 (alternative, difference exists). Type I error (false positive), Type II error (false negative). $P<0.05$ significant.

Sensitivity = TP/(TP+FN). Specificity = TN/(TN+FP). PPV = TP/(TP+FP). NPV = TN/(TN+FN).

EXAM HIGH-YIELD POINTS:
1. Epidemiology definition - John M Last
2. Chain of infection - Reservoir, Transmission, Host
3. PHC components - 8 essential (Alma-Ata)
4. ASHA - 1 per 1000 population
5. DMFT - Missing only if due to caries
6. OHI-S - 6 teeth, score 0-6
7. CPITN - WHO probe 3.5-5.5-8.5-11.5mm
8. GI - 0-3 scale (Loe and Silness)
9. Dean's Fluorosis - 0(normal) to 4(severe)
10. Optimal water fluoride - 0.7-1.2 ppm
11. APF - 1.23% F, pH 3.5
12. Mean +/- 2 SD - 95% of values

13. $P < 0.05$ - Statistically significant
14. Sensitivity - True positive rate
15. Specificity - True negative rate