



Systemic Disease Complicating Dental Management

Stephen F. Worrall. MD, FRCS, FDSRCS
Consultant Oral & Maxillofacial Surgeon
St. Luke's Hospital, Bradford



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MFDS Course

Leeds Dental Institute

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Essential Reading



- Medical Problems in Dentistry
Scully C & Cawson RA. 3rd Edition, Oxford, Wright, 1993. ISBN
0 7236 0999 3
- Medical Problems in Dentistry
Scully C & Cawson RA. 4th Edition, Oxford, Wright, 1998. ISBN
0 7236 1056 8
- Oxford Handbook of Dental Patient Care
Scully C, Epstein J, Wiesenfield D. Oxford, OUP, 1998. ISBN 0
19 262915 8
- Various references cited for subsections



Overview

- Lecture is NOT undergraduate medical course
 - read the books and references!
- Detection of relevant systemic disease
 - full medical & drug history at every visit
 - frequently updated
 - ? European Medical Risk Related History questionnaire
 - Abraham-Inpijin *et al*, BDJ. 185: 445-448, 1998
- Implications for dental treatment

Systemic Diseases - *aide memoir*

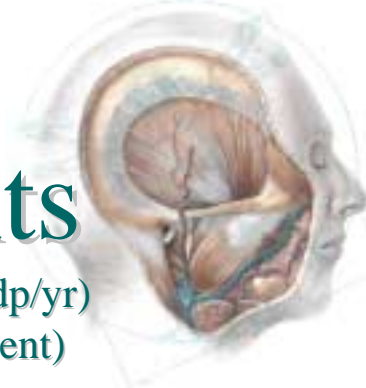


- Anaemia
- Bleeding tendency
- Cardiorespiratory
- Drugs & allergies
- Endocrine disorders
- Fits & feints
- Gastrointestinal
- Hospital admission
- Infections
- Jaundice & liver
- Kidney
- Likelihood of pregnancy
- Malignancy
- Neurological
- Other
- Prostheses & transplants

Frequency of Emergency Events

Girdler & Smith . Resuscitation 41: 159-167, 1999 (887 GDP - 34% response - 0.7/gdp/yr)

Atherton *et al.* BDJ 186: 72-79, 1999 (1000 GDP - 74% response >70% reported event)



- Vasovagal (1.9/GP/yr.)
 - Hypoglycaemia (0.17)
 - Angina (0.17)
 - Epilepsy (0.13)
 - Choking (0.09)
 - Asthma (0.06)
 - Hypertension (0.023)
 - Anaphylaxis (0.013)
 - MI/CA (0.003/0.002)
 - Epilepsy (31%)
 - Choking (15.7%)
 - Asthma (13.8%)
 - Hypoglycaemia (10.6%)
 - Angina (10.1%)
- 1 event every 4.5 practice yrs
1 death every 758 practice yrs

Primary or Secondary Care?



- **Medical risk related history (MRRH) sheet**
 - useful for detecting at risk patients esp. elderly (Smeets *et al*)
Preventive Medicine. 27: 530-5, 1998
 - insufficiently reliable for routine use in practice missed 25% of relevant medical histories OK as *aide memoir* (Fenlon & McCartan. BDJ. 186: 1999)
 - clinician not patient directed
- **Many patients inappropriately referred to hospital**
(Absi *et al*) BJOMS. 35: 133-6, 1997)
 - 70% of cases no special treatment requirements other than those available in primary care



Anaemia - 1

Hb level ↓ normal for age & sex

adult male: 13-18 g/dl

adult female: 11.5-16.5 g/dl

child < 1 yr.: 11.5 g/dl (median) 9 g/dl (LLN)

child 4 yrs: 12.2 / 10

child 12yrs: 13.8 / 11

child 16yrs: B 14.8 /12 - G 14 / 11.5

Anaemia - 2



- ? Contraindication to GA
- Oral complications include:
 - glossitis, ulcers, angular stomatitis
- Causes include:
 - ↓ production - iron, folate or B12 deficiencies
commonly dietary except B12 (vegans) PA
 - ↑ loss - haemolysis (G6PDD, spherocytosis,
haemoglobinopathies or haemorrhage (menorrhagia,
GI bleed)

Anaemia - 3 sickle-cell anaemia 1



- Normal adult Hb (HbA) = $\alpha_2\beta_2$
- in sickle cell anaemia valine replaces glutamate β chain HbS = $\beta^6 \text{Glu} - \text{Val}$
 - Sickle cell disease = Hb SS
 - Sickle cell trait = Hb AS
 - Deoxygenated HbS polymerises (tactoids) deforms red cell membrane
 - thrombosis in microvasculature - esp. sinusoids and low flow vessels \Rightarrow infarction, pain, swelling, haemolysis (\downarrow Hb)

Anaemia - 4 *sickle-cell anaemia* 2



- At risk group
 - African ancestry, Mediterranean, Asia
- At risk dental procedures
 - general anaesthesia
- Diagnosis - positively exclude in at risk group
 - SickleDex test (positive in SS & AS)
 - check Hb (\Leftrightarrow in trait, \Downarrow in disease)
 - ? electrophoresis if SickleDex + for confirmation

Anaemia - 5 *sickle-cell anaemia* 3



- Management
 - Sickle cell disease - avoid GA if possible - if not:
 - only under ideal conditions in hospital
 - ? Preop transfusion if Hb < 9 - 10 g/dl
 - avoid hypoxia, cooling, vasoconstrictors, infections
 - Sickle cell trait
 - If Hb is normal can be safely managed as outpatients
 - local and general anaesthesia is safe
 - avoid hypoxia but extreme anoxia required to sickle

Bleeding Tendency



- Local
 - trauma, inflammation/infection, poor compliance
- Systemic
 - acquired deficiencies of haemostasis
 - anticoagulant therapy, thrombocytopenia, leukaemia
 - hereditary deficiencies of haemostasis
 - haemophilia, Christmas disease, von Willebrand's

Anticoagulant Therapy 1



- Warfarin is commonest
- Procedures at risk:
 - any that cause bleeding
- Avoid:
 - regional blocks, aspirin, NSAID's, ponstan, DG, septrin, flagyl, erythromycin, tetracycline, steroids

I N R	C o n d i t i o n
2 . 0 - 2 . 5	D V T p r o p h y l a x i s
2 . 0 - 3 . 0	D V T t r e a t m e n t P E M i t r a l s t e n o s i s T I A A F
3 . 0 - 4 . 5	R e c u r r e n t P E M e c h a n i c a l h e a r t v a l v e

Anticoagulant Therapy 2

when to stop warfarin 1



- Simple extractions and minor oral surgery
 - if INR 2.0-4.0 significant bleeding unlikely
 - maintain warfarin dose
 - check INR immediately preop
 - full local measures (atraumatic, Surgicel, sutures)
 - 5 % tranexamic acid oral rinse 10 ml preop and qds for 7 days postop

Waldrep & McKelvey. J. Oral Surg. 26:374-80, 1968

Ramstrom *et al.* JOMS. 51: 1211-6, 1993

Devani *et al.* BJOMS. 36: 107-11, 1998

Senghore & Harris. BDJ. 186: 1999

Anticoagulant Therapy 3

when to stop warfarin 2



- Intermediate & major surgery or INR >4.0
- Stop warfarin 48 hours before admission
 - admit to hospital & check INR
 - heparinise on sliding scale until KPTT = 2
 - continue heparin postop and restart warfarin
 - stop heparin when INR in therapeutic range
- For warfarin and heparin doses consult tables

Drugs & Therapeutics Bulletin. 30: 77-80, 1992

Anticoagulant Therapy 4

Heparin infusion sliding scale



Initial infusion of 25000 U in 50mls saline (500 U/ml) @ 2.8 ml/hr (1400 U/hr). Check APPT 4-6hrly and adjust as below

APPT	Infusion rate
> 7	Stop for 30 mins ↓ by 500 u/hr
5.1-7	↓ by 500 u/hr
4.1-5	↓ by 300 u/hr
3.2-4	↓ by 100 u/hr
2.6-3	↓ by 50 u/hr
1.5-2.5	No Change
1.2-1.4	↑ by 200 u/hr
<1.2	↑ by 400 u/hr

Acquired Deficiencies of Haemostasis - *thrombocytopenia*



- Causes: idiopathic, myelodysplasia, drugs:
 - indomethacin, tolbutamide, frusemide, chlorpropamide
- Significant if platelet count $< 80-100 \times 10^9/l$
- Major if platelet count $< 50 \times 10^9/l$
- Check platelet count & function
- Platelet transfusion if count $< 50 \times 10^9/l$ plus full local measures
- Avoid same factors as in anticoagulation patients

Hereditary Deficiencies of Haemostasis - *haemophilia etc*



- Haemophilia A & von Willebrands
 - factor V111 deficiency
- Christmas disease
 - factor X1 deficiency
- Treatment depends on plasma levels
- Replace missing factor + full local measures
- Avoid same factors as in anticoagulation patients

Management of Haemophiliacs



Procedure	Factor V111 level required (% of normal)	Immediate preop dose	Post op action
MOS	Min 50% Ideal 75-80%	Factor V111 @ 25 U/Kg IV + tranexamic acid 1g IV 24 hrs preop	5% tranexamic acid oral rinse tranexamic acid 1g oral 7-10 days oral antibiotics rest (? IP) & soft diet
Maxfac surgery	100% at operation; 50% for 7 days postop	Factor V111 @ 50 U/Kg IV	Factor V111 @ 25 U/Kg IV b.d for 10 days, rest IP for 10 days, oral antibiotics

Cardiorespiratory Disease 1



- Hypertension & ischaemic heart disease commonest cause of death in UK & USA
- Features: - frequently asymptomatic!
 - angina, MI, dyspnoea, cyanosis, \uparrow B/P, drugs
- Dental implications
 - anxiety, pain, supine, GA
 - ? \Rightarrow dyspnoea, angina, MI, cardiac arrest, SBE, CVA

Cardiorespiratory Disease 2



- Avoid:
 - lying supine
 - anxiety: 5mg diazepam prior to treatment
 - pain: ensure adequate analgesia
 - no evidence that adrenaline in LA is hazardous
 - hypoxia and respiratory depression
 - GA within 3/12 of MI or first attack of angina
 - care with sedation - pulse oximetry and ECG

Cardiorespiratory Disease 3



- Always use LA where possible
 - ensure adequate analgesia
 - use aspirating technique (but little evidence)
- Preop GTN 0.5 mg SL if history of angina
 - GTN if angina during Rx - suspect MI if no help
- Antimicrobial prophylaxis if risk of SBE
- Meticulous dental care to minimise need for extractions if risk of SBE

Cardiorespiratory Disease 4

SBE prophylaxis 1



- At risk patients
 - previous history of SBE
 - prosthetic heart valves
 - congenital heart defects
 - hypertrophic obstructive cardiomyopathy (HOCM)
 - rheumatic heart disease
 - mitral valve prolapse with systolic murmur

Longman *et al.* Dental Update. 26: 7-14, 1999

Cardiorespiratory Disease 5

SBE prophylaxis 2



Procedures at risk

- Tooth extraction
 - avoid intraligamentary injections
- Periodontal surgery
- Subgingival procedures
- Re-implantation or repositioning of avulsed or traumatised teeth
- Not required after CABG or MI

Cardiorespiratory Disease 6

SBE prophylaxis 3



LA		GA		
Not allergic	Allergic	No risk	High risk	Allergic
Not allergic	Allergic	Not allergic	Not allergic	Allergic
Amoxicillin Oral 3g	Clindamycin Oral 600 mg or Teicoplanin IV 400mg	Amoxicillin IM 1 g then 500 mg oral after 6hrs or Oral 3g 4hrs pre-op + 1 g probenicid	Amoxicillin + gentamycin IM amoxicillin 1 g + gentamycin 120 mg IM then 500 mg oral after 6hrs	Vancomycin + gentamycin IV vancomycin 1 g + gentamycin 120 mg or Teicoplanin IV 400mg + gentamycin 120 mg

Cardiorespiratory Disease 7

SBE prophylaxis 4 - children



- Same regimen as for adults but dose reduction required:
 - < 10 yrs: 50% adult dose amoxicillin & clindamycin
 - < 5 yrs: 25% adult dose amoxicillin & clindamycin
 - < 10 yrs: 20 mg/kg vancomycin & 2 mg/kg gentamycin
- Notes:
 - give clindamycin with water (oesophageal irritation)
 - amoxicillin OK x2/month but x3 until after month
 - leave 2 weeks between clindamycin doses

Cardiorespiratory Disease 8



- Respiratory disease is common
 - asthma
 - > 2% of population
 - COAD
 - chronic bronchitis and emphysema
 - GA may precipitate respiratory failure
- URTI & LRTI contraindications to GA
- Avoid IV sedation if significant respiratory disease - RA is safer

Cardiorespiratory Disease 9

asthma



- Acute exacerbation common cause of collapse
- Avoid:
 - aspirin, β -blockers, anxiety, hypoxia, GA if severe
- Associations
 - steroids - inhaled and/or systemic
 - oral candidiasis - inhaler technique, oral hygiene
 - ? need for steroid cover

Drugs & Allergies 1



- Importance
 - marker of systemic disease
 - may influence dental procedures or drug use
 - allergy : proven or putative
- Main drugs of direct dental importance
 - warfarin, corticosteroids, metronidazole, digoxin, erythromycin, ketoconazole

Drugs & Allergies 2

corticosteroids



- Systemic steroids \Rightarrow ACTH suppression
 - adrenal atrophy
 - 1 week prednisolone >7.5 mg/day \downarrow HPA axis
 - suppression may persist for months or years
 - inability to respond adequately to stress
 - trauma, dental treatment, surgery, infection
 - \Rightarrow hypotension \Rightarrow collapse \Rightarrow \dagger
 - at risk from diabetes, hypertension, psychoses and infections (? prophylactic antibiotics)

Drugs & Allergies 3

management of patients on corticosteroids



Treatment	No steroids for previous 12 months	Steroids taken during previous 12 months	Steroids currently taken
Cons or MOS (single extraction) under LA	No cover required	Hydrocortisone 200 mg IV stat preop or 200 mg oral 2 hours preop	Hydrocortisone 200 mg IV stat preop or 200 mg oral 2 hours preop continue normal steroids postop
Intermediate (multiple extractions GA)	Consider cover if large/extended doses given ? synacthen test	Hydrocortisone 200 mg IV stat preop or 200 mg oral 2 hours preop + IM 6-hrly for 24 hrs	Hydrocortisone 200 mg IV stat preop or 200 mg oral 2 hours preop + IM 6-hrly for 24 hrs + normal steroids postop
Major surgery	Consider cover if large/extended doses given ? synacthen test	Hydrocortisone 200 mg IV stat preop or 200 mg oral 2 hours preop + IM 6-hrly for 72 hrs	Hydrocortisone 200 mg IV stat preop or 200 mg oral 2 hours preop + IM 6-hrly for 72 hrs + normal steroids postop

Drugs & Allergies 4

adverse reactions and allergy



- Main drugs involved
 - penicillin & aspirin
 - full history many are gastric upsets amoxil reactions
 - avoid if strong evidence ~ 10% of penicillin allergic patients react with cephalosporins
- True allergy to amide local anaesthetics v rare
 - feints, intravascular injection, allergy to preservative
 - use preservative & adrenaline free + aspirate

Drugs & Allergies 5



some common clinically important interactions

Hersh EV. JADA. 130: 236-251, 1999. ~ Moore PA. JADA. 130: 541-554, 1999.

Possible interaction

Mechanism & presentation

metronidazole + alcohol
metronidazole or

Headache, nausea & vomiting

tetracyclines + lithium
erythromycin or
tetracyclines + digoxin

lithium toxicity, ataxia & renal failure

digitalis toxicity, arrhythmias, visual
disturbance, salivation

broad-spectrum antibiotics
+ warfarin

↓ vit k synthesis ⇒ ↑ bleeding

erythromycin or
metronidazole + warfarin

↓ warfarin metabolism ⇒ ↑ bleeding

Erythromycin +
carbamazepine

↑ risk of ataxia, vertigo & drowsiness

ALWAYS CONSULT BNF BEFORE PRESCRIBING

Drugs & Allergies 6

miscellaneous drugs & reactions



- Xerostomia
 - tricyclics, antimuscarinics (benzhexol)
- Licehnoid reactions
 - NSAID's, H₂ blockers, amalgam

Endocrine Disorders 1



- **Pancreas**
 - non-insulin dependent diabetes (maturity onset)
 - insulin dependent diabetes (juvenile)
- **Thyroid**
 - hypothyroidism (myxoedema)
 - hyperthyroidism
- **Adrenal**
 - Addison's (autoimmune, TB)
 - Cushing's (iatrogenic, hyperplasia, tumour)

Endocrine Disorders 2

diabetes 1



- Impaired glucose utilization due to insulin resistance or deficiency
 - random > 10 mmol/l or fasting > 6.7 mmol/l
 - affects 4% of population
 - 50% undiagnosed
 - prone to infection & worsening control
- Hypoglycaemia is main concern
 - pain, \downarrow food intake, infection, stress

Endocrine Disorders 3

diabetes 2 - management 1



- Avoid hypoglycaemia
 - treat early in morning (first on GA list)
 - blood glucose AND result 30 mins preop
 - err on side of hyperglycaemia (~ 8 mmol/l)
 - glucose drink for outpatient & LA
 - IV access and glucose immediately available
 - need for medical intervention depends on ability to return to normal diet postop
 - no change if immediate normal diet postop
 - intervene if unlikely/unable to resume normal diet

Endocrine Disorders 4

diabetes 3 - management 2



- Admit 2-3 days preop for stabilisation & refer to diabetic team if available
- NIDD usually OK with no significant change
 - omit oral hypoglycaemics day of surgery
- IDD will usually require intervention
 - minor ~ no breakfast & omit morning insulin
 - glucose 7-10 mmol/l no glucose or insulin needed
 - if above or below requires insulin / glucose respectively
 - major ~ need insulin/glucose IV regime

Endocrine Disorders 5

diabetes 4 - management 3



- Major surgery ~ aim for glucose 5-10 mmol/l
 - 500 ml 10% dextrose + 10 units Actrapid + 10 mmol KCl IV @125 ml/hour
 - monitor glucose hourly & adjust insulin accordingly
 - OR
 - 500 ml 10% dextrose + 10 mmol KCl IV + insulin pump with 50 units Actrapid in 50 ml 0.9% saline (1 u/ml) @ ~5 ml/hr
 - monitor glucose hourly & adjust insulin accordingly

Endocrine Disorders 6

Hypothyroidism



- Local anaesthesia is preferable
- Avoid:
 - IV sedation, opioids & GA if possible \Rightarrow coma
- Associated with:
 - hypotension
 - hypoadrenocorticism
 - Sjogren's syndrome

Endocrine Disorders 7

Hyperthyroidism



- Treated patient poses no special problems
 - but beware of *hypothyroidism* especially if GA
- Untreated patients at risk from thyrotoxic crisis
 - ⇒ anxiety, tremor, dyspnoea, arrhythmia ⇒ VF ⇒ †
 - avoid: pain, anxiety, trauma, IV sedation, GA
 - RA is safer sedation & desirable
 - no proven problems with adrenaline LA
 - better analgesia
 - use citanest & octapressin if worried

Endocrine Disorders 8

Adrenal



- Addison's & Cushing's diseases
 - essentially same problems as long-term systemic steroids but for different reasons
 - Addison's ~ primary low circulating cortisol
 - ⇒ hypotension ⇒ shock ⇒ †
 - Cushing's ~ secondary low circulating cortisol POST treatment ~ maintained on systemic steroids ∴ at risk of crisis during treatment
 - ⇒ hypotension ⇒ shock ⇒ †

Fits & Feints 1 - *epilepsy*



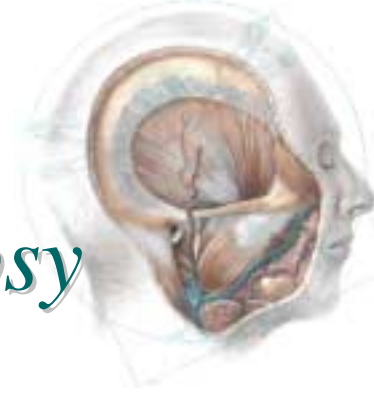
Types

- Grand mal
 - aura \Rightarrow tonic \Rightarrow clonic \Rightarrow
 - \Rightarrow recovery OR \Rightarrow if $>$ 5 min
 - \Rightarrow status epilepticus
- Petit mal (absences)
- Partial seizures
 - simple (Jacksonian)
 - complex (psychomotor)

Causes ~ all types $>$ 1% pop

- Idiopathic
- Symptomatic
 - febrile convulsions
 - intracranial
 - SOL's, phakomatoses, cerebral palsy, rubella syndrome, infections
 - systemic
 - hypoglycaemia, drug withdrawal, anoxia

Fits & Feints 2 - *grand mal epilepsy*



- Assess control ~ treat in “good phase” and continue normal medication
- Associated problems:
 - facial trauma from falls, psychiatric disorders, associated handicaps, drug reactions
- Avoid:
 - tricyclics, fluoxetine, alcohol, methohexitone
- Precautions:
 - prop, aspirate, clear space, diazemuls, stesolid

Gastrointestinal Disorders



- Associations
 - vomiting
 - oral manifestations & implications
 - Crohn's disease
 - orofacial granulomatosis, ulcers
 - systemic steroids or other immunosuppressives
 - coeliac disease
 - anti-endomysial & anti-gliadin antibodies, ↓folate & carotene
 - anaemia (from bleeding ulcers or malabsorption)
 - aphthae, candidosis, angular stomatitis, atypical stomatitis

Hospital Admissions



- Evidence of past/present systemic disease
 - obtain and read hospital records
 - note:
 - diseases
 - drugs and doses
 - allergies
 - operations
 - psychiatric history
 - social circumstances

Infections

useful web sites



<http://www.astdhpphe.org/infect/>

http://www.diseases.nu/infectious_disease.htm

<http://www.cdc.gov/ncidod/index.htm>

<http://www.cdc.gov/ncidod/diseases/hepatitis/>

<http://www.ama-assn.org/special/hiv/hivhome.htm>

http://www.ama-assn.org/insight/spec_con/hiv_aids/hiv_aids.htm

<http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00052722.htm>

Hepatitis & HIV

the unknown patient is the greatest risk



Hepatitis B ~ liver failure

- 1:1000 UK patients HBsAg +ve
- 10^{-7} ml blood infectious
- 25% needlestick infection rate
- Saliva poses low risk
- Vaccination mandatory for HCW's

HIV ~ CD4 T lymphocytes

- $CD4 < 200 /\mu l = AIDS$
- Impaired cell-mediated immunity (T helper cell)
 - fungal
 - viral
 - mycobacterial
- $<1\%$ needlestick infection rate in HCW's
- Little risk from saliva alone



Hepatitis B -1

CLINICAL FEATURES	<ul style="list-style-type: none">• Jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting
ETIOLOGIC AGENT	<ul style="list-style-type: none">• Hepatitis B virus
INCIDENCE	<ul style="list-style-type: none">• 140,000-320,000 infections/yr in United States• 70,000-160,000 symptomatic infections/yr
SEQUELAE	<ul style="list-style-type: none">• Of symptomatic infections, 8400-19,000 hospitalizations/yr and 140-320 (0.2%) deaths/yr;• Of all infections, 8,000-32,000 (6%-10%) chronic infections/yr, and 5,000-6,000 deaths/yr from chronic liver disease including primary liver cancer
PREVALENCE	<ul style="list-style-type: none">• Estimated 1-1.25 million chronically infected Americans
COSTS	<ul style="list-style-type: none">• Estimated \$700 million (1991 dollars)/yr (medical and work loss)
TRANSMISSION	<ul style="list-style-type: none">• Bloodborne• sexual• perinatal



Hepatitis B - 2

<u>RISK GROUPS</u>	<ul style="list-style-type: none">• Injection drug users• Sexually active heterosexuals• Men who have sex with men• Infants/children of immigrants from disease-endemic areas	<ul style="list-style-type: none">• Low socioeconomic level• Sexual/household contacts of infected persons• Infants born to infected mothers• Health care workers• Hemodialysis patients
SURVEILLANCE	<ul style="list-style-type: none">• National Notifiable Diseases Surveillance System• Viral Hepatitis Surveillance Program• Sentinel Counties Studies	
TRENDS	<p>Incidence increased through 1985 and then declined 55% through 1993 because of wider use of vaccine among adults, modification of high-risk practices, and possibly a decrease in the number of susceptible persons. Since 1993, increases observed among the three major risk groups: sexually active heterosexuals, homosexual men, and injection drug users.</p>	
PREVENTION	<ul style="list-style-type: none">• Hepatitis B vaccine available since 1982• Screening pregnant women and treatment of infants born to infected women• Routine vaccination of infants and 11-12 year olds• Catch-up vaccination of high-risk groups of all	



Hepatitis C -1

CLINICAL FEATURES	<ul style="list-style-type: none"> • jaundice • fatigue • abdominal pain 	<ul style="list-style-type: none"> • loss of appetite • intermittent nausea • vomiting
ETIOLOGIC AGENT	<ul style="list-style-type: none"> • Hepatitis C virus (HCV) 	
INCIDENCE	<ul style="list-style-type: none"> • 36,000 new infections in the United States (1996 estimates) • 25-30% of infections are symptomatic 	
SEQUELAE	<ul style="list-style-type: none"> • Chronic infection $\geq 85\%$ of infected persons • Chronic liver disease: 70% of infected persons • Deaths from chronic liver disease: 8,000-10,000/yr • Leading indication for liver transplantation 	
PREVALENCE	<ul style="list-style-type: none"> • Estimated 3.9 million (1.8%) Americans have been infected with HCV of whom 2.7 million are chronically infected 	
COSTS	<ul style="list-style-type: none"> • Estimated \$600 million (1991 dollars) (medical and work loss, excluding transplantation) 	
TRANSMISSION	<ul style="list-style-type: none"> • Primarily bloodborne; also sexual and perinatal 	



Hepatitis C - 2

RISK GROUPS

- Injecting drug users
- Hemodialysis patients
- Health care workers
- Sex contacts of infected persons
- Persons with multiple sex partners
- Recipient of transfusions before July 1992
- Recipient of clotting factors made before 1987
- Infants born to infected women

TRENDS

- Incidence stable in 1980's; decline in 1990's
- Transfusion-associated cases occurred prior to donor screening, now very rare
- Most new infections due to high risk drug (60%) behaviors



Hepatitis C - 3

Routine Testing

- Transfusion recipients notified of receipt of blood from positive donor
- Recipients of transfusions or solid organs prior to July 1992
- Recipients of clotting factor concentrates prior to 1987
- Chronic hemodialysis patients
- Persons who ever injected illegal drugs, even if a few times many years ago
- Health care and public safety workers after exposure to HCV-positive blood
- Children born to HCV-positive women

PREVENTION

- Screening of blood/organ/tissue donors
- Counseling to reduce/modify high-risk practices

TREATMENT

- Drugs are licensed for the treatment of persons with chronic hepatitis C
- Treatment is effective in 10-40% of persons