

HEMOPHILIA 101 FOR NON-CLINICIANS

THE U.S. HEMOPHILIA TREATMENT CENTER NETWORK

Section I

AUTHORS/PRESENTERS

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Special thanks to:

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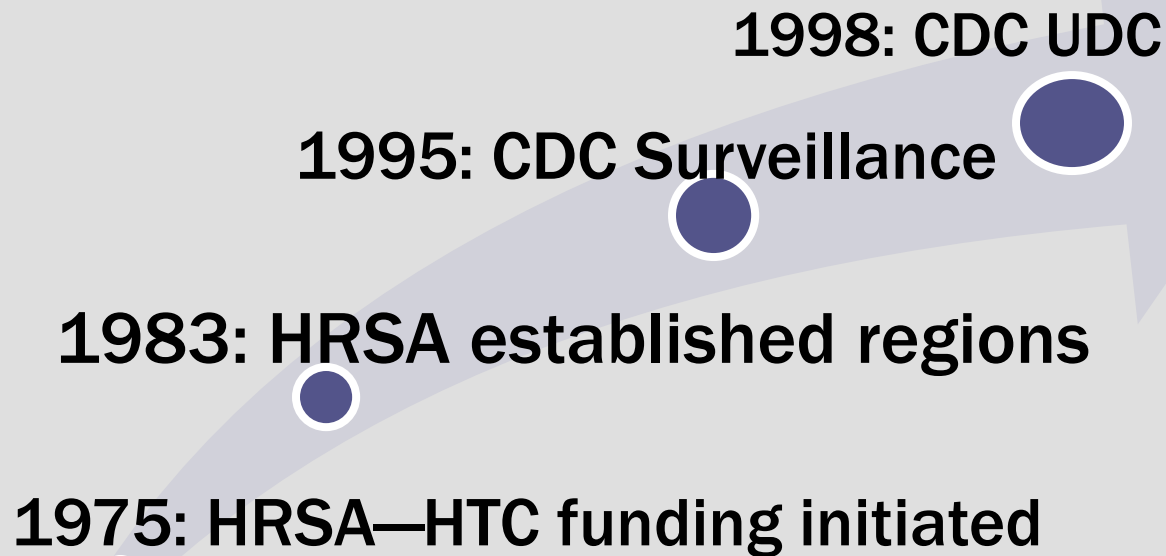
**Revised from numerous sources including Partners, NHF,
CDC, HRSA/MCHB**

LEARNING OBJECTIVES

FOR SECTION I

- Identify different parts of the organization of the federally funded U.S. hemophilia treatment center network
- Examine the key components of the hemophilia comprehensive care model
- Evaluate data collection requirements for linking the comprehensive care model to health outcomes
- Identify general scientific precepts of bleeding disorders
- Evaluate how data and clinical care are integrated and pertinent to non-clinical role

ESTABLISHMENT OF COMPREHENSIVE CARE CENTERS IN THE USA



FEDERAL FUNDING SOURCES

**Centers for Disease
Control and
Prevention (CDC)**

**National Centers on
Birth Defects and
Developmental
Disabilities
(NCBDDD)**

**Division of
Blood Disorders**

**Health Resources
and Services
Administration
(HRSA)**

**Genetic Services
Branch**

**Maternal and Child
Health Bureau**

MCHB GENETIC SERVICES BRANCH

MISSION

To facilitate early identification of children with special health care needs and those with genetic conditions and integrate them into systems of service and care that are population- and community-based and family-centered.



HRSA HEMOPHILIA PROGRAM

■ Assure access to care

- Women, non-English speaking,, racial/ethnic minorities, rural populations

■ Improve health care financing issues

■ Encourage consumer participation

■ Collaboration with community providers

National annual funding FY2011-- \$4.76 million*

*Federal Register: April 18, 2011 Notices. In: Office of the Federal Register 2011:21754.

VETERAN'S HEALTH CARE ACT 340B

Factor Distribution Programs/Pharmacies

- “Discounts” on outpatient drugs to certain federal grantees
- Dual purpose
 - Lower pricing for patients
 - Provide revenue to support HTC's
- Patient Choice
- Critical source of funding for HTC's

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CDC DIVISION OF BLOOD DISORDERS

■ Priorities

- Public health surveillance
- Prevention of complications of bleeding disorders

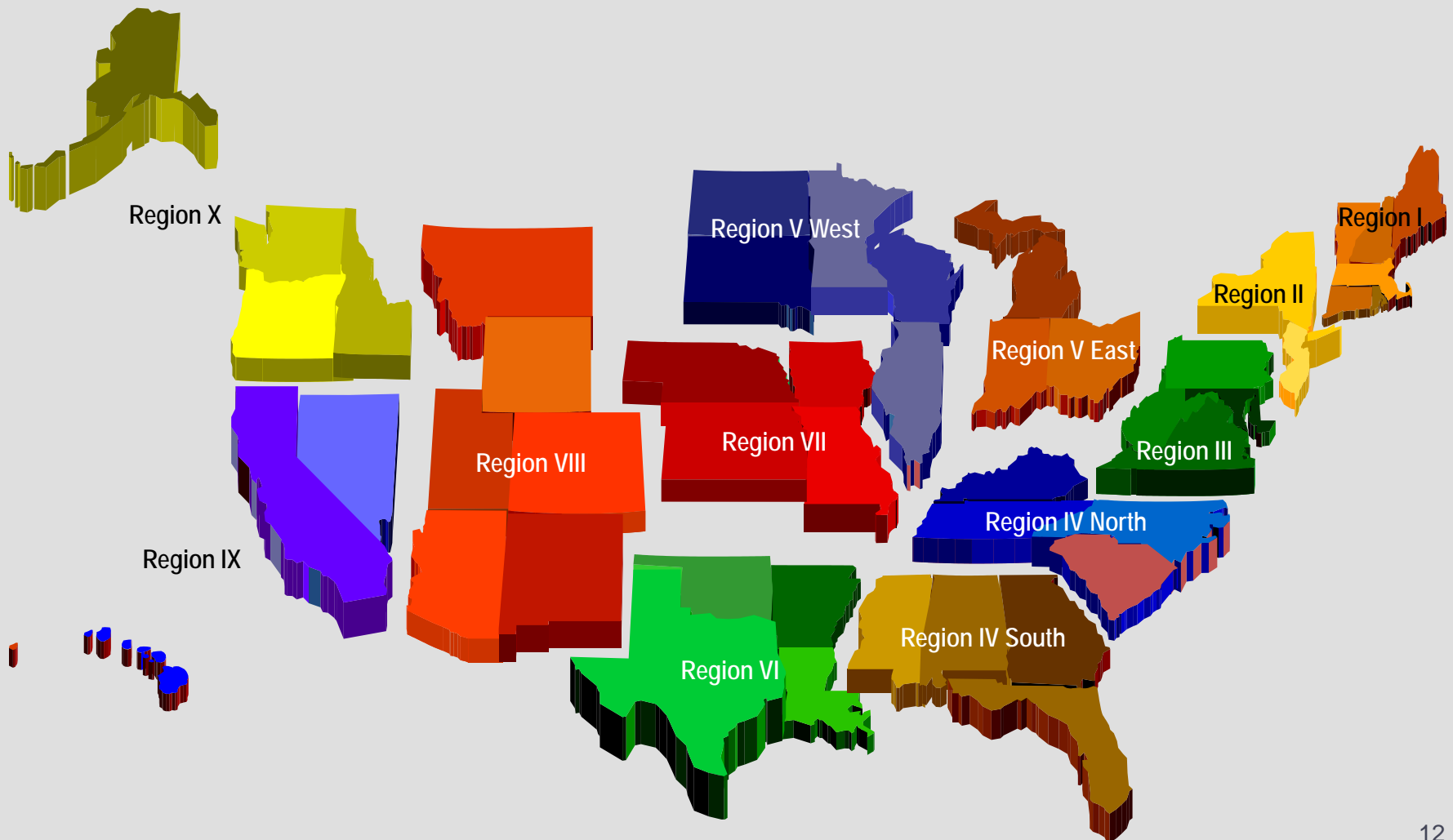
■ Promote and support data collection and research

- Universal Data Collection (UDC) project
- Cooperative agreements structured around data collection and research using UDC data

■ Blood safety

■ Annual funding ~\$3.7 million per year nationally to HTC's

HTC REGIONS -- 2011



Map created by and used courtesy of Sally McAlister at U.S. Centers for Disease Control and Prevention (CDC).

HTC STANDARDS AND CRITERIA

- Standards and Criteria for the Care of Persons with Congenital Bleeding Disorders
- Formally developed by NHF Medical and Scientific Advisory Council (MASAC)
- Both HRSA and CDC grants require that HTC care be provided in conformity with these guidelines

COLLABORATION WITH CONSUMER ORGANIZATIONS

■ GOALS:

- Advocacy
- Patient education
- Regulation and product safety

THE COMPREHENSIVE CARE MODEL

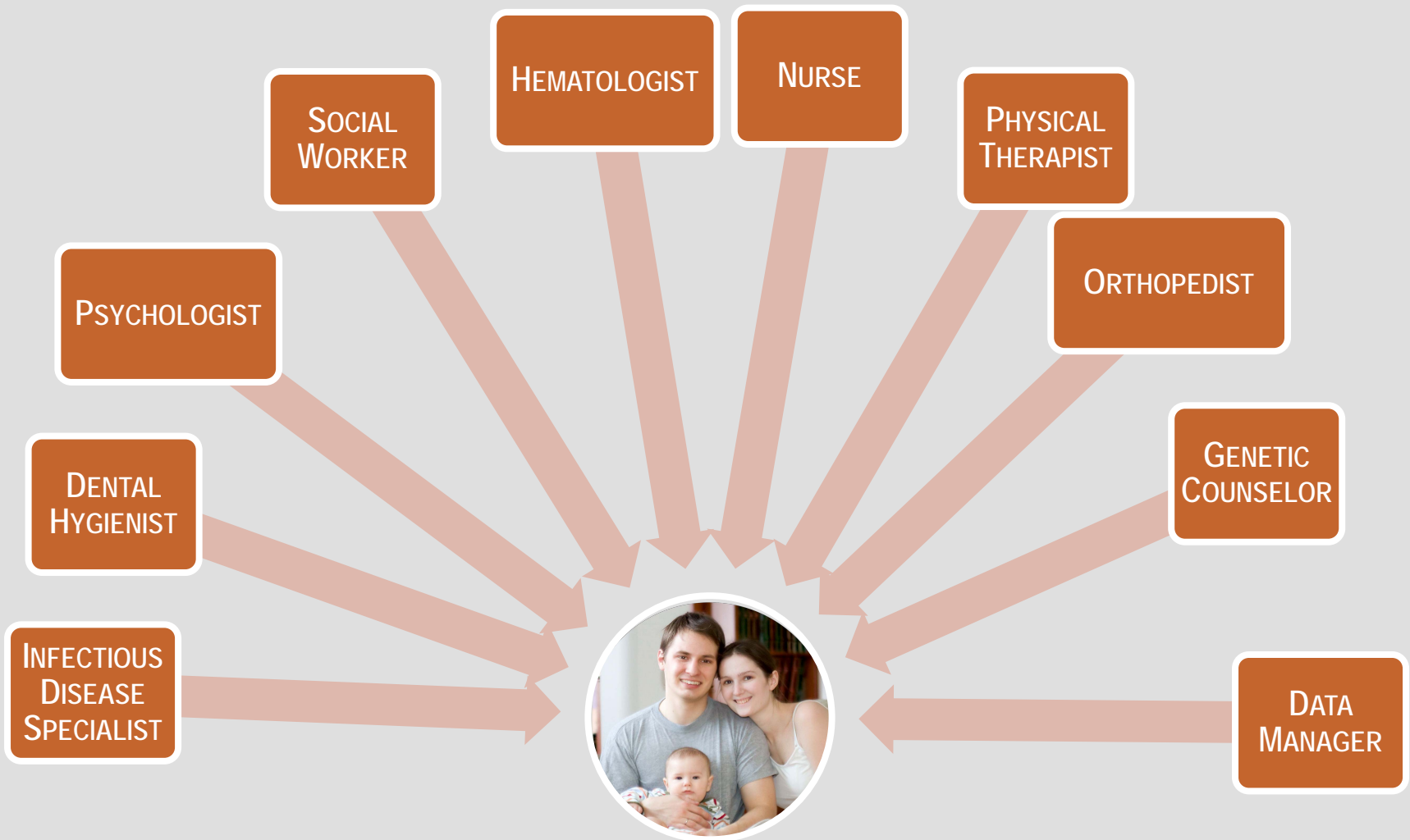
HTC SERVICES

- **Diagnosis**
- **Treatment**
- **Prevention of morbidities**
- **Education**
- **Care coordination**
- **Outreach**
- **Research**
- **Pharmacy**

COMPONENTS OF COMPREHENSIVE CARE MODEL

- **Multidisciplinary:** MD, RN, SW, PT
- **Comprehensive:** Physical and psychosocial needs of patients are met, either by clinic staff or by referral if services fall outside HTC scope
- **Prevention-focused:** Care delivered to prevent or reduce complications
- **Coordinated** within HTC and with outside providers and service agencies
- **Focused on education** to encourage patient involvement in care, promote independence, and educate larger community about bleeding disorders to improve quality of life and access to appropriate services

Family-Centered Care



HOW DO TEAM MEMBERS PARTICIPATE IN FAMILY-CENTERED CARE?

- Develop plan with patient and family
- Provide education
- Detect potential complications of bleeding or treatment
- Assist with home treatment goals
- Remain available for triage and assessment 24 hours per day for social issues and anticipatory guidance
- Manage data to ultimately improve health related outcomes

EXTENDED MULTIDISCIPLINARY TEAM

- Dental professionals
- Genetic counselors
- Infectious disease specialists
- Research coordinators
- Liver specialists
- Nutritionists
- Data managers

COMPREHENSIVE CLINIC

■ Multidisciplinary evaluation

- Minimally occurs yearly for severe patients
 - May be less often for mild patients
- Opportunity to identify emerging or existing problems

■ Includes written comprehensive clinic report

- Should include clinical assessment and changes from prior visits
- May be provided to the patient and other medical providers, depending on HTC practices and permissions granted by the patient

■ Other Data (labs, radiology, demographics)

DATA COLLECTION AND RESEARCH



OUTCOMES DATA AND RESEARCH

■ Quality of Care

- Expand our knowledge of best treatments, practices
- Assess/monitor risk factors for complications

■ Advocacy

- Preserve choice and access to therapies
- Defend against cost-driven care decisions being made by insurers and state payers
- Retain current levels of federal funding

DATA COLLECTION AND RESEARCH

- Hemophilia surveillance datasets
 - Hemophilia Data Set (HDS)
 - Universal Data Collection (UDC) Project
- Hemophilia surveillance outcomes
- Information infrastructure for data collection and management



CDC 6 STATE SURVEILLANCE STUDY

- 1995 – 1997 data collection
- 6 states – CO, GA, LA, MA, NY, OK
- Statute – hemophilia was reportable condition
- Collected HTC and non-HTC patient data (~ 20% US population)

Soucie, JM et al. Blood 2000, 96,2, 437-442

SURVEILLANCE STUDY RESULTS

- 67% received HTC care
- 8% patients died during study period
- HIV/AIDS was immediate cause of death for 52.5% of persons and 12% underlying cause
- HTCs served larger % of persons with severe disease and with those with inhibitors and/or HIV and liver disease
- Persons receiving care at an HTC were 30% less likely to die than those receiving care outside HTCs

HEMOPHILIA DATA SET (HDS)

- Established in early 1980's to track numbers of patients seen in HTC's
- Annual submission voluntarily submitted by all HTC's in network
- Aggregate, de-identified descriptive patient data
- Requires routine use and incorporation of data collection and entry as part of clinic operations
- Revisions 2011

2011 HDS PATIENT PROFILE (ALL PATIENTS)

General Demographics: Active patients by age, gender, and race	0-2 yrs		3-12		13-17		18-21		22-24		25+		Total by gender		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
White, non-Hispanic															
White, Hispanic															
Black, non-Hispanic															
Black, Hispanic															
Asian/Pacific Islander															
Native															
Other															
Total															

2011 HDS HEMOPHILIA A & B TABLE

Active patients by age, gender, and bleeding disorder diagnosis	Mild		Moderate		Severe		Total Hemophilia A		Total symptomatic acquired FVIII inhibitors	
	M	F	M	F	M	F	M	F	M	F
Age 0 – 2										
Age 3 – 12										
Age 13 – 17										
Age 18 – 21										
Age 22 – 24										
Age 25+										
Total										
Home IV therapy										
Home nasal Stimate therapy										
Inhibitor										

OTHER FACTOR DEFICIENCIES

Active patients by age, gender, and bleeding disorder diagnosis	Factor I		Factor II		Factor V		Factor VII		Factor X		Factor XI		Factor XIII		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Age 0 – 2																
Age 3 – 12																
Age 13 – 17																
Age 18 – 21																
Age 22 – 24																
Age 25+																
Total																
Home IV therapy																
Inhibitor																

ACTIVE AND INACTIVE PATIENTS

ACTIVE MULTI-YEAR PATIENTS

	Total
Number of active patients that are seen on a multi-year schedule (maximum of 3 years)	

INACTIVE PATIENTS

	Total
Number of inactive patients	

MORTALITY DATA

Active patients by age, gender, and bleeding disorder diagnosis	HIV Negative							HIV Positive							Total Deaths	
	0-2	3-12	13-17	18-21	22-24	25+	Total	0-2	3-12	13-17	18-21	22-24	25+	Total		
Hemophilia A																
Hemophilia B																
VWD																
Other factor deficiency																
Total																

	Primary cause of death	Hemophilia	VWD	Other factor deficiencies	Total	
	HIV related					
	Liver disease related					
	Bleeding related					
	Other					
	Unknown					
	Total					

HTC SERVICES

	Number
Number of unduplicated patients that received an annual comprehensive evaluation*	
Number of comprehensive evaluations conducted*	
Diagnostic evaluations (unduplicated patients)*	
Number receiving consultations only (unduplicated patients)*	
*Please refer to the HDS Glossary for the definition of this data element	

Other	Number
Number of patients with an unidentified primary care physician outside of the HTC	
Number of patients whose primary care physician was sent a written summary from the HTC	
Number of group educational sessions or support groups sessions provided by the HTC	

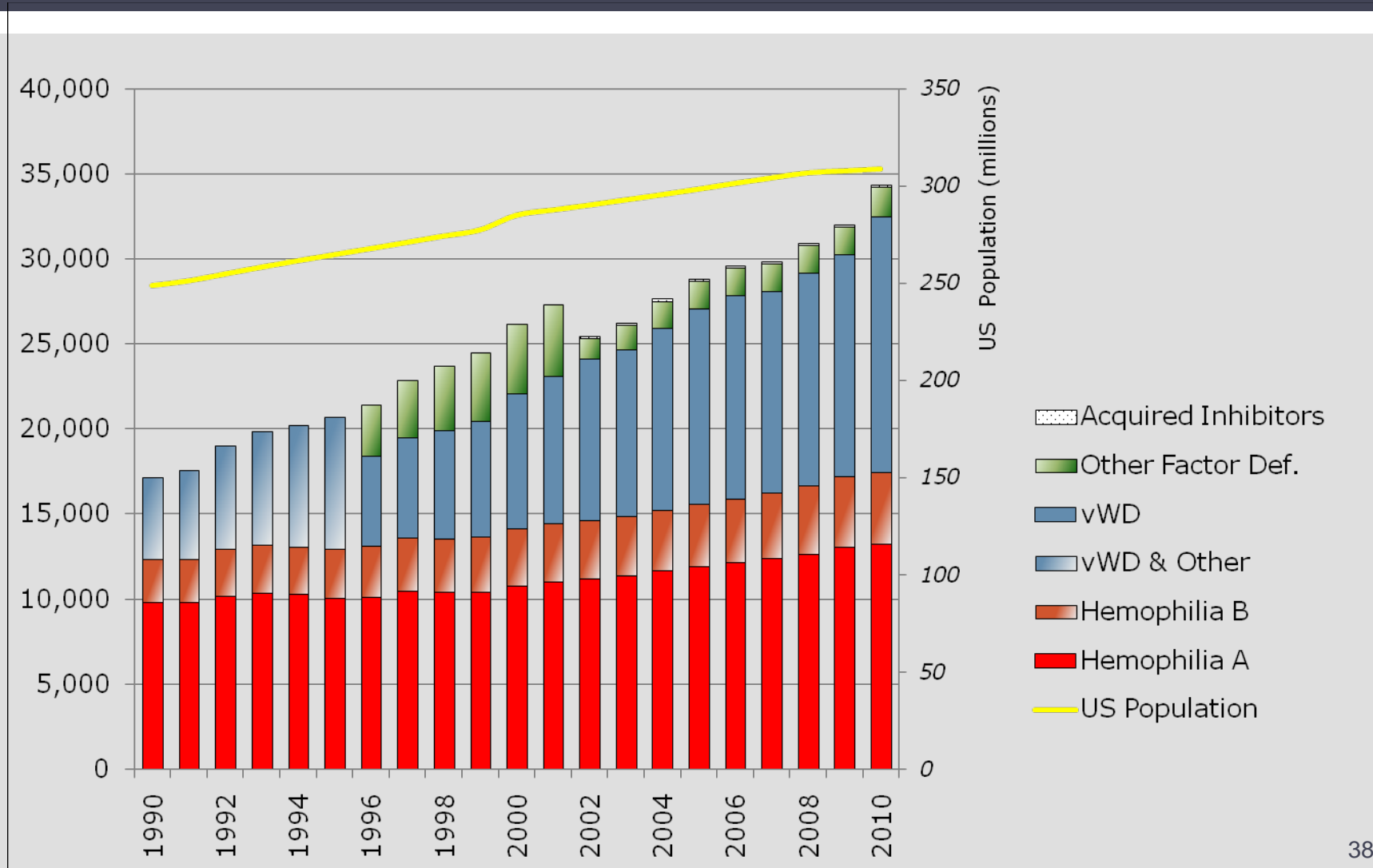
HTC SERVICES

			Yes	No
Does your HTC/institution offer interpretative services?				
Do patients participate in development of their own care plan?				
	Age	N/A		
For those HTCs providing services to pediatrics, what is the average age at which pediatric patients begin to participate in their own care?				
Does your HTC offer weekend, evening, or alternative clinics?				
Does your HTC provide transportation assistance to patients?				
Does your HTC have an advisory board? (See glossary for definition of an advisory board.)				
Does your HTC review a patient choice policy with patients/families?				
Does your HTC participate in collaborative activities with your local chapter/consumer group(s)?				
Does your HTC receive financial support from the state Title V program?				

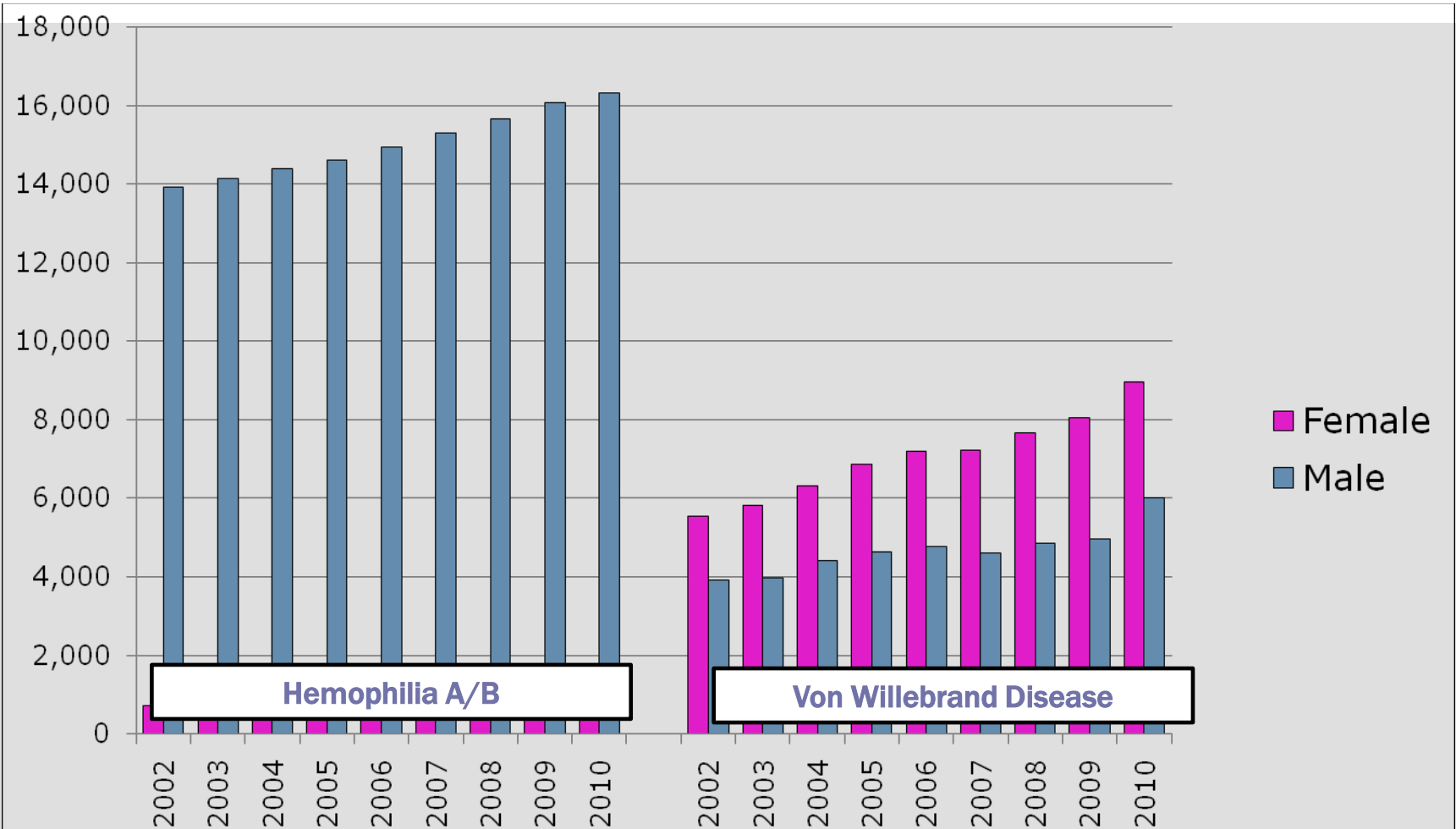
CLOTTING DISORDERS

Clotting disorders patients by age and gender	Thrombophilia		Other clotting disorders		Total by Gender		Total
	M	F	M	F	M	F	
Age 0 – 2							
Age 3 – 12							
Age 13 – 17							
Age 18 – 21							
Age 22 – 24							
Age 25+							
Total							

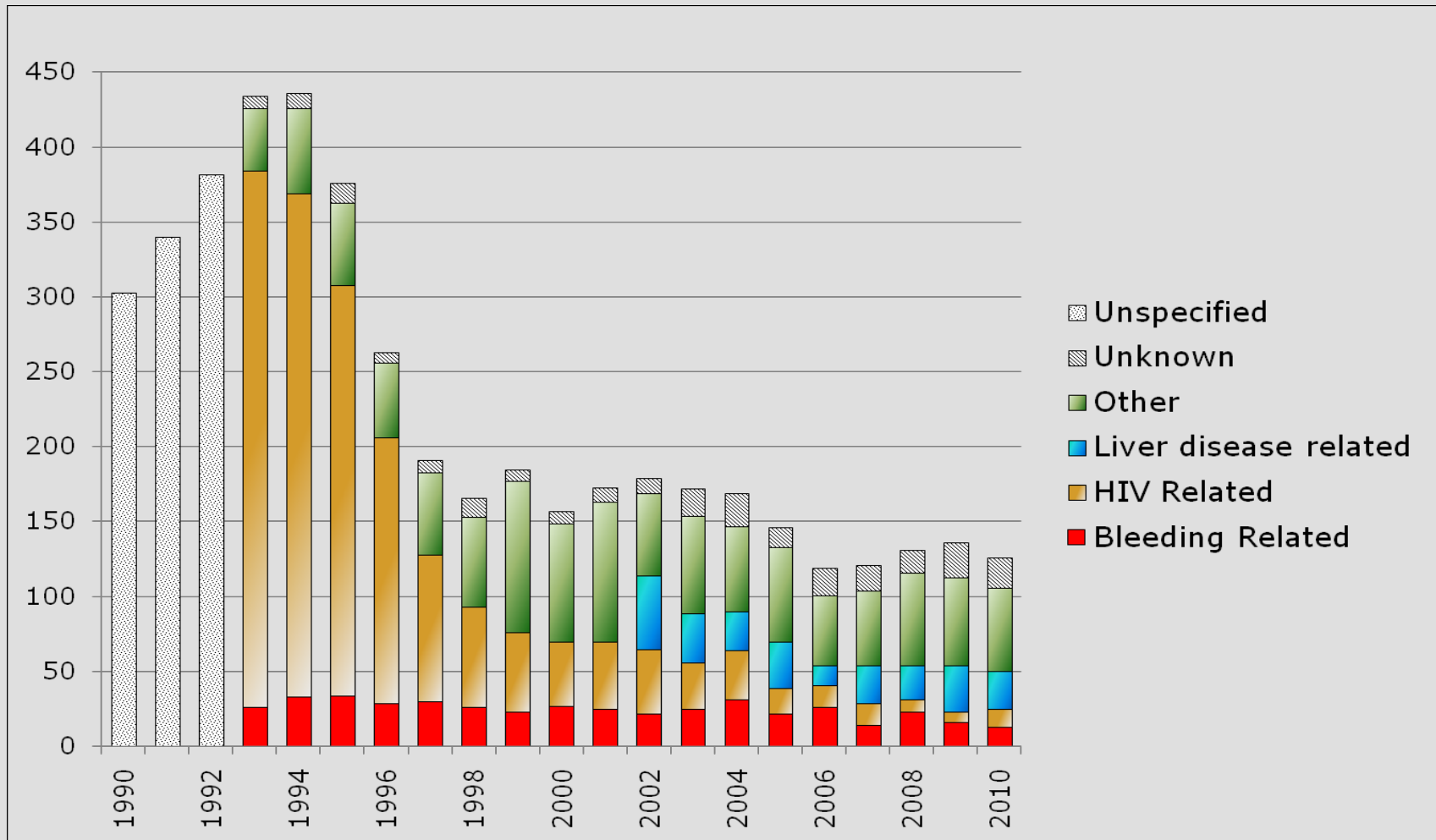
US HTC PATIENT POPULATION BY DIAGNOSIS



US HTC HEMOPHILIA & VWD POPULATION BY GENDER



US HTC PATIENT MORTALITY BY CAUSE



HDS: VALUABLE TOOL WITH LIMITATIONS

- 👍 Valuable in tracking regional and national trends
 - Population served
 - Need
 - Impact of initiatives: women with bleeding disorders
 - Trends over time
- 👍 National statistics used to continued allocation of federal funding
- 👎 Does not provide information about effectiveness of treatment or patient outcomes

Acknowledgements

- **HTC staffs from 1990 – present**
- **HTC Regional Coordinators**
- **CDC staff**
- **HRSA**

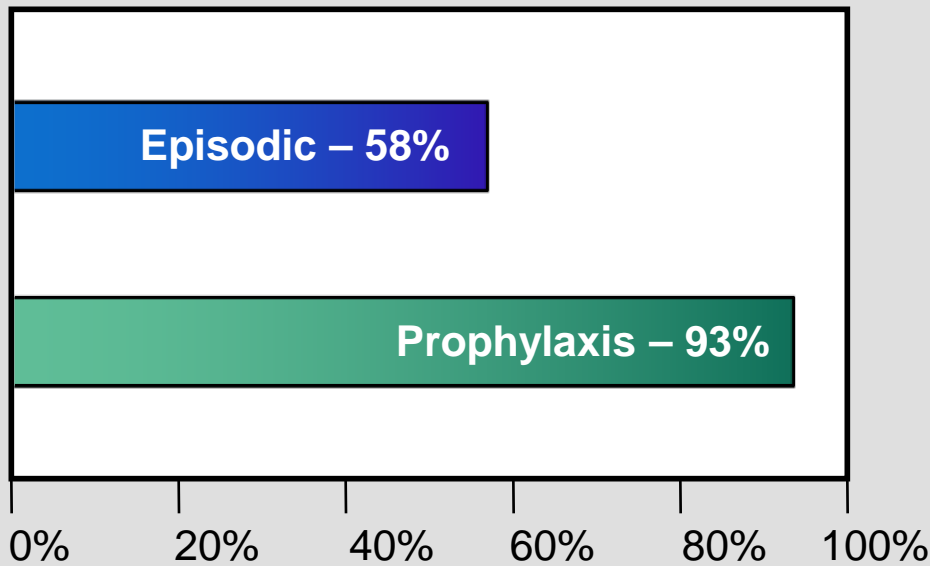
JOINT OUTCOME STUDY

- 5 year randomized clinical trial of 65 children with severe hemophilia A
- Comparison of prophylaxis vs. on-demand, enhanced
- Baseline, end of study MRI, x-rays, physical evaluation
- Funded by CDC, Bayer

Manco-Johnson, et al NEJM 2007 357;6, 535-544

JOS - PRIMARY OUTCOME

Proportion of children with normal bone and cartilage by MRI in all six index joints at study exit



$p < 0.01$

Using MRI, relative risk for joint damage in enhanced episodic is 6.29

(CI 1.6-26.6) using MRI

UNIVERSAL DATA COLLECTION PROJECT (UDC)

■ Purpose

- Monitor blood safety among recipients of blood products
- Monitor extent and progression of joint disease
- Identify issues for further study

■ Collect

- Routine clinical data on an annual basis
- Blood sample for HIV, hepatitis A, B & C testing and serial sample storage
 - Test results of patients re-enrolled are monitored by CDC to detect new infections
 - All seroconversions are investigated to determine if the infection was due to transmission through blood products

- Protocol: Universal Data and Serum Specimen Collection (UDC) System for Hemophilia. CDC, 2005. http://www.cdc.gov/ncbddd/blooddisorders/udc/documents/UDC-PROTUCOL_508.pdf.
- Information for Hemophilia Treatment Centers (HTCs). CDC, 2011. <http://www.cdc.gov/ncbddd/blooddisorders/udc/udc-hemophilia.html>.

UNIVERSAL DATA COLLECTION PROJECT (UDC)

September, 2011 update

- New UDC will be developed based on discussion between HTC staff and CDC
- Once identified, data elements will be part of two systems
 - CDC/UDC online data collection
 - WebTracker for electronic submission to CDC
- Keep track of updates, via ATHN or Regional Coordinators

UDC ENROLLMENT

- Since May 1998 – Aug 2011
 - > 27,054 persons with bleeding disorders enrolled
 - 92078 UDC visits
- More than 70% of all patients with hemophilia are enrolled
- Most annual UDC visit data submitted electronically

UDC RESEARCH PRIORITIES

1. Joint outcomes
2. Women with bleeding disorders
3. Socioeconomic factors impacting outcomes
4. Rare bleeding disorders
5. Inhibitors
6. Healthy weight
7. Baby studies

OTHER UDC SPECIAL DATA COLLECTION

- Baby Form
- Mortality Form
- Quality of Life
- Inhibitor Project

NATIONALLY IDENTIFIED DATA AND RESEARCH NEEDS

- Clinical outcomes data and research
- Data to support evidence-based clinical standards
- Consolidation/conservation of efforts and resources
- Collaboration to form one national clinical database

NHLBI Working Group: Hemophilia and Thrombosis Disorders Executive Summary. NHLBI, 2011.

<http://www.nhlbi.nih.gov/meetings/workshops/hrht.htm>.

Benefits of a national patient registry. WFH, no date.

http://www.wfh.org/2/docs/Publications/Hemo_Org_Resources/Fact-sheet_5_Eng.pdf.

HTC Clinical Software Timeline

2000-2004: Development and rollout of Lab Tracker to HTCs

2003: UDC forms incorporated into Lab Tracker

2005: Regions adopt Lab Tracker as national information platform

2006: ATHN established to support data collection infrastructure

2008: ATHN funding for HTC data coordinators initiated

2009: Beta testing of WebTracker, initial data migration

2010: National Rollout of WebTracker

2011: >85 sites using WebTracker

CDC developed online data entry system

Review of Objectives

- Identify different parts of the organization of the federally funded U.S. hemophilia treatment center network
- Examine the key components of the hemophilia comprehensive care model
- Evaluate data collection requirements for linking the comprehensive care model to health outcomes
- Identify general scientific precepts of bleeding disorders
- Evaluate how data and clinical care are integrated and pertinent to non-clinical role

ACKNOWLEDGMENTS

- CDC Division of Blood Disorders
- HRSA Maternal and Child Health Bureau Genetics Services Branch
- U.S. Hemophilia Treatment Center Network Regional Coordinators and Directors
- Judith Baker
- The Indiana Hemophilia & Thrombosis Center
- National Hemophilia Foundation
- Tami Wood-Lively, Colleen Joiner, Chris Roberson



1967 - 2011

**THANK YOU, TAMI,
FOR YOUR YEARS OF
SERVICE,
DEDICATION, AND
FRIENDSHIP TO ALL IN
THE HEMOPHILIA
COMMUNITY.**

**WE WILL MISS
YOU!**

BLOOD CLOTTING BASICS

SECTION II

LEARNING OBJECTIVES

FOR SECTION II

- Identify basic components necessary for blood to clot
- Examine the key components considered in treatment of hemophilia
- Identify general scientific precepts of bleeding disorders
- Evaluate how data and clinical care are integrated and pertinent to non-clinical role

HEMOSTASIS AND COAGULATION

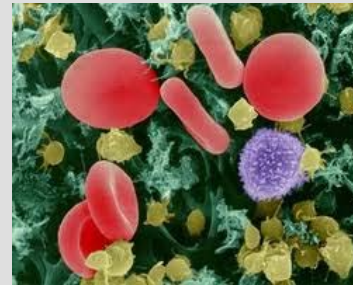
A complex series of reactions that leads to the control of bleeding at the site of injury

HEMOSTATIC SYSTEM COMPONENTS

■ Blood vessels



Platelets



■ Plasma coagulation system

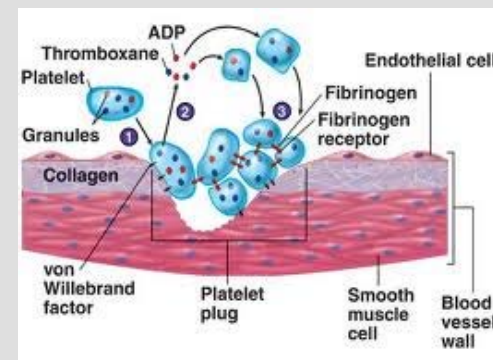
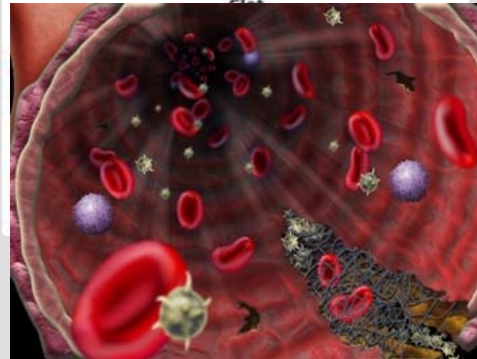
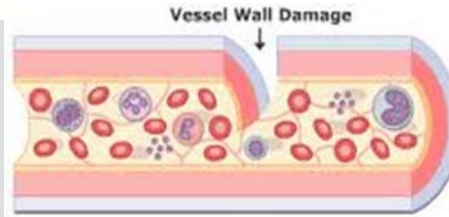
- Factors (II, V, VII, VIII, IX, XI, XIII)

■ Proteolytic or Fibrinolytic system

- Form mature clot and begin to breakdown

HOW BLEEDING STOPS

- Vessel wall damage
- Vasoconstriction
- Platelet plug formation
- Clotting cascade activated to form fibrin clot



LABORATORY TESTING

■ Laboratory evaluation of pathways

- Extrinsic pathway: Prothrombin time – PT
- Intrinsic pathway: Activated partial thromboplastin time – aPTT

■ PT and aPTT

- Measured in seconds
- Normal ranges are individual laboratory and reagent dependent
- Prolongation suggests factor deficiency or inhibitor of coagulation

Late Joint Bleeding in Hemophilia: Knee

- Increased pain
- Increased swelling
- Decreased range of motion
- Therapy initiated at this time results in prolonged treatment and greater risk for sequelae



Medscape CME

Osteoarthritis



Healthy knee joint

Hypertrophy and spurring of bone and erosion of cartilage

ADAM

HEMOPHILIA

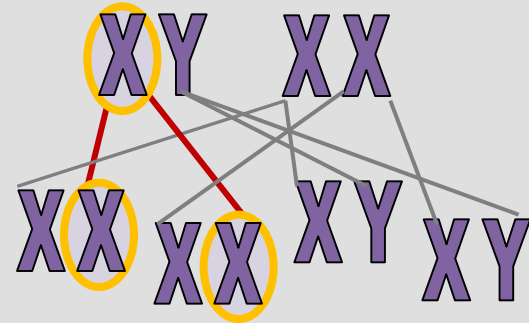
- Factor VIII deficiency: Hemophilia A
- Factor IX deficiency: Hemophilia B or Christmas disease
- Factor XI deficiency: Hemophilia C or Rosenthal's disease

Factor VIII	>	Factor IX	>	Factor XI	>	Others
4	→	1	→	?	→	?

SEX LINKED GENETICS

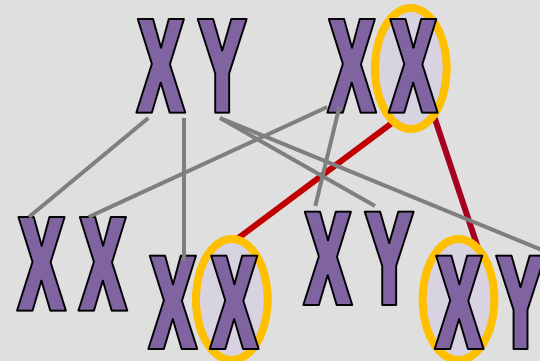
■ Affected males

- All daughters are carriers
- No sons are affected



■ Female carrier

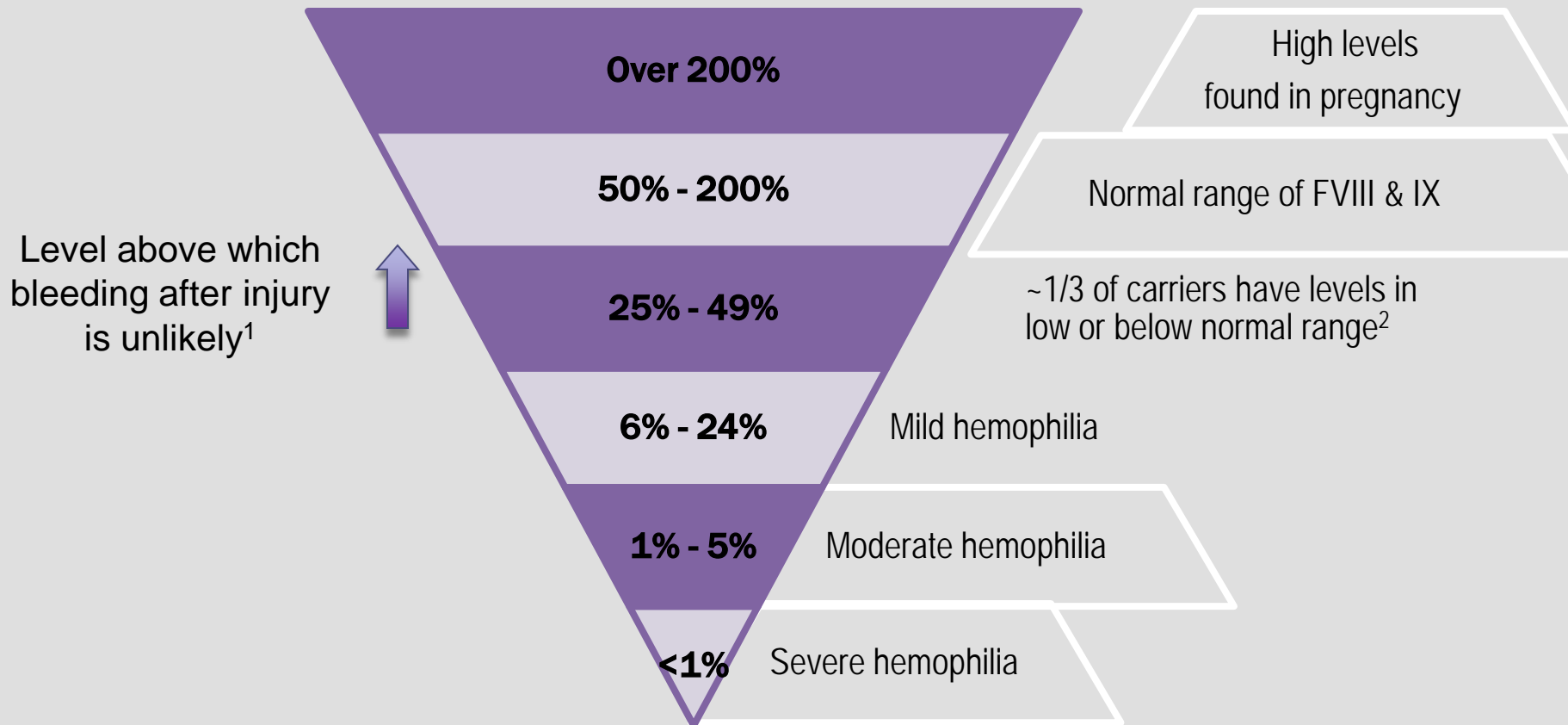
- 50% risk for carrier daughter
- 50% risk for affected son



DETECTION OF HEMOPHILIA

- **Family history**
- **Symptoms**
 - Bruising
 - Bleeding with circumcision
 - Muscle, joint, or soft tissue bleeding
- **Hemostatic challenges**
 - Surgery
 - Dental work
 - Trauma, accidents
- **Laboratory testing**

RANGE OF FACTOR VIII OR IX ACTIVITY



1. Jones P. Living with Hemophilia. 4th ed. New York: Oxford University Press; 2006.

2. Plug I et al. *Blood* 2006;108:52-6.

U. S. INCIDENCE OF HEMOPHILIA

- Hemophilia A: 20.6 per 100,000 males
 - Severe: 50-60%
- Hemophilia B: 5.3 per 100,000 males
 - Severe: 44%

CONSEQUENCES OF HEMOPHILIA

■ Physical consequences

- Musculoskeletal issue
- Functional disability
- Consequences related to treatment
 - Disease transmission
 - Inhibitor development
 - Treatment and other factors

CONSEQUENCES OF HEMOPHILIA

■ Psychosocial

- Effects on the family
- Effects on the individual

■ Societal systems

- Effects on the healthcare system
- Effects on educational systems

TYPES OF BLEEDS

- Joint bleeding - hemarthrosis
- Muscle hemorrhage



- Soft tissue
- Life threatening-bleeding

PRINCIPAL SITES OF BLEEDING

■ 70-80% of bleeding episodes are into joints

■ Acute

- Pain, swelling, interference with normal activities

■ Chronic

- Synovial hypertrophy and synovitis leading to hemophilic arthropathy, disability

Common bleeding sites:

■ Knees	45%
■ Elbow	30%
■ Ankle	15%
■ Shoulder	3%
■ Wrist	3%
■ Hip	2%
■ Other	2%

Arun B, Kessler CM. In: Colman et al, eds. *Hemostasis and Thrombosis: Basic Principles and Clinical Practice*. 4th ed. 2000:815-824.

World Federation of Hemophilia (WFH). *Guidelines for the Management of Hemophilia* 2005.

http://www.ehc.eu/fileadmin/dokumente/Gudelines_Mng_Hemophilia.pdf.

COMMON SITES OF BLEEDING IN HEMOPHILIA: FVIII REPLACEMENT GUIDELINES

Site of Bleeding	Typical Target FVIII Range %	Typical Duration of Replacement Therapy, days
Joint (70-80% of bleeding episodes)	40-60	1-2
Muscle* (10-20% of bleeding episodes) *except for iliopsoas	40-60	2-3
Oral mucosa	30-50	Until bleed cessation
Epistaxis	30-50	Until bleed cessation
Renal/Hematuria	50	3-5
Deep laceration	50	5-7
Retroperitoneal	50-100	7-10

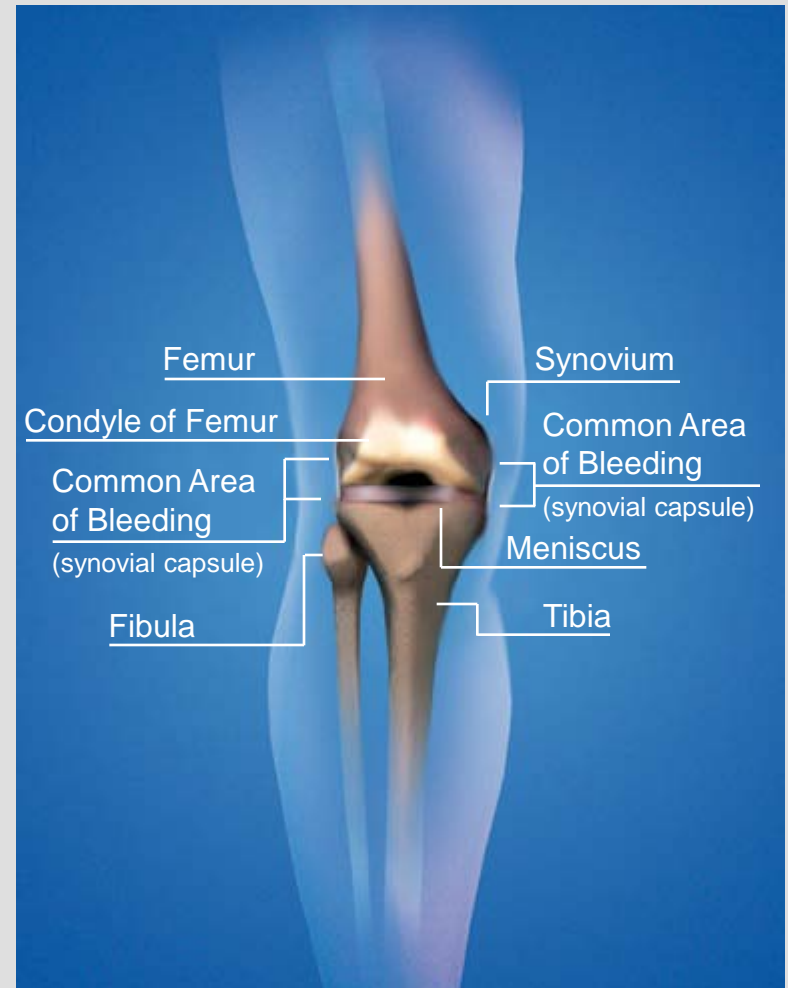
COMMON SITES OF BLEEDING IN HEMOPHILIA: FVIII REPLACEMENT GUIDELINES

Site of Bleeding	Typical Target FVIII Range %	Typical Duration of Replacement Therapy, days
CNS* (<5% of bleeding episodes)	60–100	7–10
• initial	80–100	1–7
• maintenance	50	8–21
Throat and neck		
• initial	80–100	1–7
• maintenance	50	8–14
Gastrointestinal tract		
• initial	80–100	1–6
• maintenance	50	7–14
Surgery (major)		
• Pre-op	80–100	
• Post-op	60–80	1–3
	40–60	4–6
	30–50	7–14

* CNS = Central nervous system
 World Health Organization (WHO). *Delivery of Treatment for Hemophilia* 2002.
 World Federation of Hemophilia (WFH). *Guidelines for the Management of Hemophilia* 2005.
http://www.ehc.eu/fileadmin/dokumente/Gudelines_Mng_Hemophilia.pdf.

SITES OF JOINT BLEEDING IN HEMOPHILIA: KNEE

- The knee is a common target joint in hemophilia



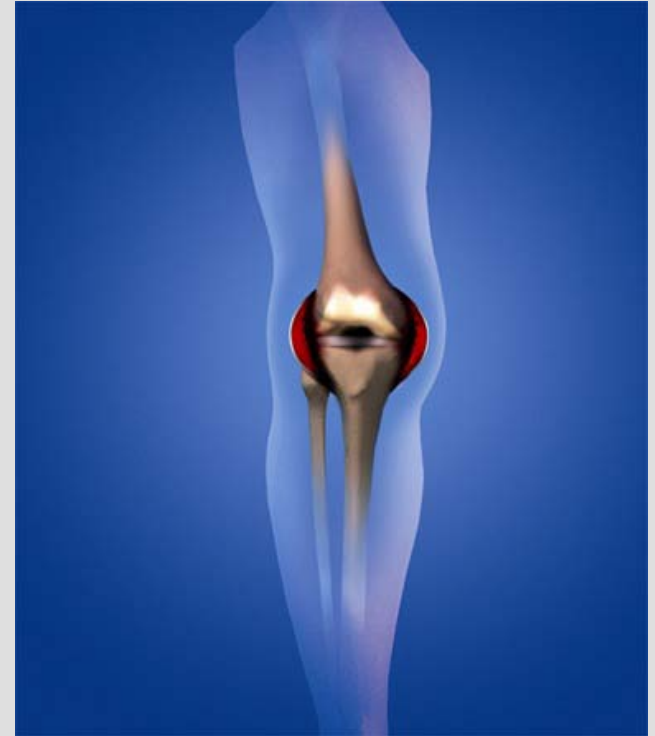
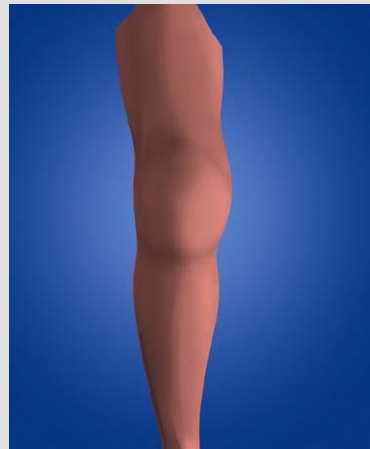
EARLY JOINT BLEEDING IN HEMOPHILIA: KNEE

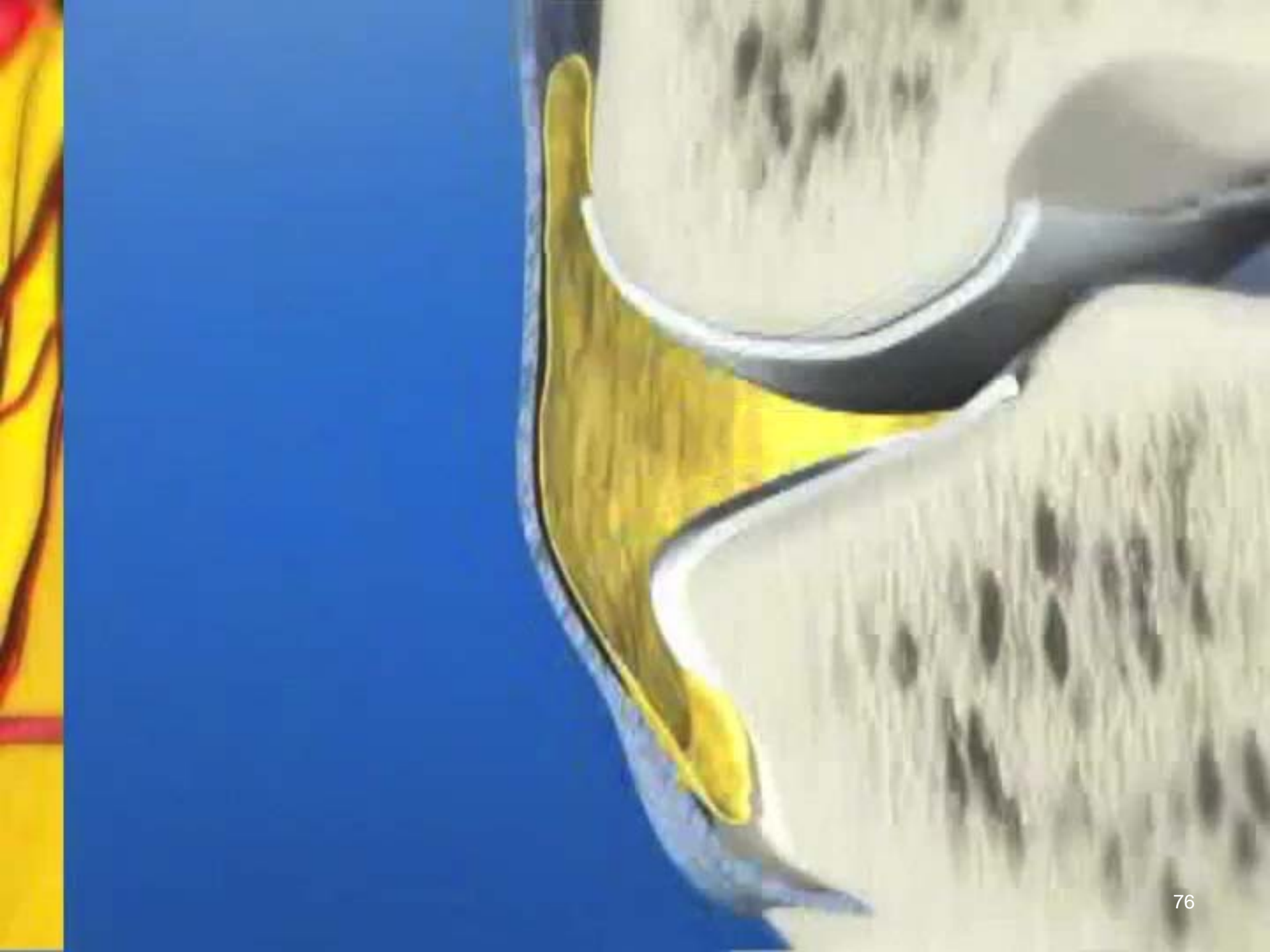
- Warmth, tingling
- Optimal time to initiate treatment



LATE JOINT BLEEDING IN HEMOPHILIA: KNEE

- Increased pain
- Increased swelling
- Decreased range of motion
- Therapy initiated at this time results in prolonged treatment and greater risk for sequelae





LIFE-THREATENING BLEEDING

■ Head / Intracranial

- Nausea, vomiting, headache, drowsiness, confusion, visual changes, loss of consciousness

■ Neck and Throat

- Pain, swelling, difficulty breathing/swallowing

■ Abdominal / GI

- Pain, tenderness, swelling, blood in the stools

■ Iliopsoas Muscle

- Back pain, abdominal pain, thigh tingling/numbness, decreased hip range of motion

OTHER BLEEDING EPISODES

- Mouth bleeding
- Nose bleeding
- Scrapes and/or minor cuts
- Menorrhagia

COMPLICATIONS OF BLEEDING

■ Flexion contractures



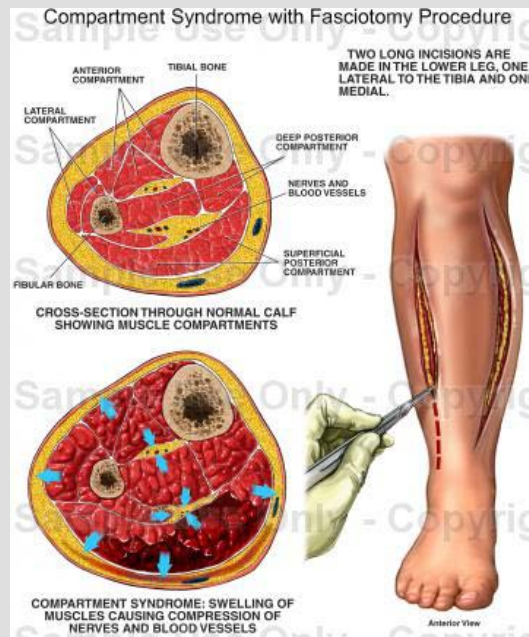
COMPLICATIONS OF BLEEDING

- Joint arthritis / arthropathy



COMPLICATIONS OF BLEEDING

- Compartment syndrome/neurologic impairment



TREATMENT OF HEMOPHILIA

- Replacement of missing clotting protein
 - Factor I, VIII, IX, VII, XIII concentrates
- Other treatments
 - Mild or moderate disease and VWD
- Oral agents
 - Amicar® (Epsilon Amino Caproic Acid)
 - Lysteda ®/Cyclokapron® (Tanexamic acid)
- Supportive measures
 - Icing
 - Immobilization
 - Rest

TREATMENT METHODS

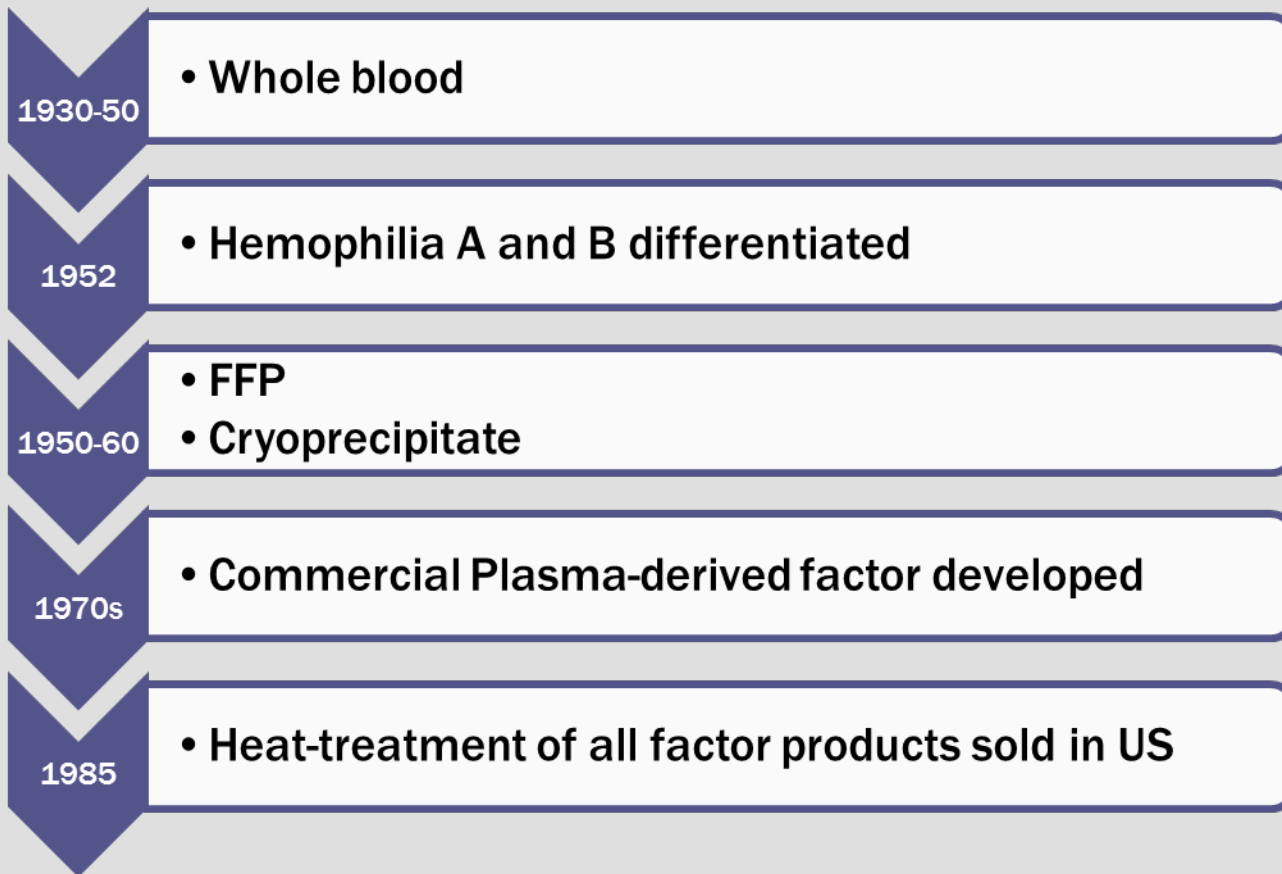
■ On-demand

- A treatment method which provides replacement therapy for bleeding episodes once they have occurred

■ Prophylaxis

- Treatment methods that provide replacement therapy in the absence of bleeding of episodes

HISTORY OF CLOTTING FACTOR CONCENTRATES



PRODUCT CLASSES

Source	Purity	Comments/Generation
Plasma	Intermediate* High ⁺	Blood donors versus plasma pheresis
Recombinant	High ⁺	1 st : Albumin added as stabilizer 2 nd : Albumin removed as stabilizer, human/animal protein exposure during production 3 rd : No added human or animal protein during Production

*Intermediate: More than just clotting factor in the vial

- Activity/protein ratio mid range

+High Purity: Just clotting factor in the vial exclusive of added stabilizers

- Activity/protein ratio is very high

FACTOR REPLACEMENT PRODUCTS

■ FVIII Products

- Xyntha® [r-3rd gen]
- Advate® [r-3rd gen]
- Refacto® [r-2nd gen]
- Kogenate FS® [r-2nd gen]
 - Helixate FS® [r-2nd gen]
- Recombinate® [r-1st gen]
- Hemophil-M® [pd]
- Monoclate-P® [pd]

■ FIX Products

- BeneFIX® [r-3rd gen]
- Bebulin VH® [pd]
- Mononine® [pd]
- Profilnine® [pd]

■ VWF Products

- Stimate® [drug]
- Humate-P® [pd]
- Alphanate® [pd]
- Wilate® [pd]

■ Bypassing agents

- Novo Seven® [r]
- FEIBA® [pd]

TREATMENT METHODS

■ On-demand

- A treatment method which provides replacement therapy for bleeding episodes once they have occurred

■ Prophylaxis

- Treatment methods that provide replacement therapy in the absence of bleeding of episodes

FACTOR VIII CONCENTRATE

- Intravenous infusion
 - IV push
 - Continuous infusion
- Dose varies depending on type of bleeding
 - Ranges from 20-50+ units/kg
- Half-life 8-12 hours
- Each unit infused raises serum factor VIII level by 2 %



FACTOR IX CONCENTRATE

- Intravenous infusion
 - IV push
 - Continuous infusion
- Dose varies depending on type of bleeding
 - Ranges from 20-100+ units/kg
- Half-life 12-24 hours
- Each unit infused raises serum factor IX level by 1%



INFUSIONS OF FACTOR CONCENTRATES

- Dose may be +/- 10% ordered
- Factor is not wasted even if the dose is not exactly what is ordered
- Document lot number, expiration date, time of infusion, and exact dose given in units

PROPHYLAXIS

- Scheduled infusions of factor concentrates to prevent most bleeding
- Frequency: 2 to 3 times weekly to keep trough factor VIII or IX levels at 2-3%
- Types
 - primary prophylaxis
 - secondary prophylaxis
- Use of access device necessary in some patients

DDAVP (DESMOPRESSIN ACETATE)

■ Synthetic vasopressin

■ Administration -

- Intravenous
- Subcutaneously
- Nasally (Stimate)

■ Side effects

- Water toxicity



AMICAR

(EPSILON AMINO CAPROIC ACID)

- Antifibrinolytic
- Uses
 - Mucocutaneous bleeding
- Dosing: 50 - 100 mg./kg. q. 6 hours
- Side effects
- Contraindications
 - Hematuria



LYSTEDA (TRAXEMAMIC ACID)

- Oral or IV (Cyclokapron) formulation
- Uses
 - Mucocutaneous bleeding (dental, uterine)
- Dosing:
 - 1300 mg three times/day (oral) x 5 days
 - 10 mg/kg 3 - 4 times/day (IV) x 2 - 8 days
- Side effects
 - Renal and retinal impairment
- Contraindications
 - Hematuria
 - Concurrent use of factor replacement products



COMPLICATIONS OF TREATMENT

- Inhibitors/Antibody development
- Hepatitis A
- Hepatitis B
- Hepatitis C
- HIV

INHIBITORS

■ Definition

- antibody to infused “foreign” factor concentrates

■ Prevalence

- 20-30% of patients with severe hemophilia A
- 1-4% of patients with severe hemophilia B

HEPATITIS

- **Hepatitis A** - small risk of transmission
 - Vaccination recommended
- **Hepatitis B** - no transmissions since 1985
 - Vaccination recommended
- **Hepatitis C** - no transmissions since 1990
 - ~90% of patients receiving factor concentrates prior to 1985 are HCV antibody positive

HUMAN IMMUNODEFICIENCY VIRUS (HIV)

- **No transmissions via factor concentrates since 1985**
 - viral inactivation procedures
- **Seropositive rate in concentrate prior to 1985**
 - 69.6% persons with severe hemophilia A
 - 48.6% of persons with severe hemophilia B

WHY IS SOCIAL WORK PART OF TEAM?

- Guilt
- Challenge of hospitalizations
- Control issues
- Financial / insurance challenges
- Feeling different / unable to do certain activities
- Counseling needs

CONSEQUENCES OF HEMOPHILIA

■ Psychosocial

- Effects on the family
- Effects on the individual

■ Societal systems

- Effects on the healthcare system
- Effects on educational systems

HEMOPHILIA: THINGS TO REMEMBER

- ~ 50% of patients with severe hemophilia bleed with circumcision
- ~ 30% of cases of severe hemophilia result from spontaneous mutations → negative family history
- When a new patient is diagnosed with mild/moderate disease, other at-risk family members may be tested regardless of prior history

HEMOPHILIA: THINGS TO REMEMBER

- Carriers of hemophilia are at-risk of bleeding
- Baseline factor level on carriers are done to determine risk and need for intervention
- Genetic testing best for determination of carrier status but reserved until patient is able to decide for themselves
- Factor activity level inaccurate for carrier detection unless positive

CONSEQUENCES OF HEMOPHILIA

■ Physical consequences

- Musculoskeletal issue
- Functional disability
- Consequences related to treatment
 - Disease transmission
 - Inhibitor development
 - Treatment and other factors

LEARNING OBJECTIVES

FOR SECTION II

- Identify basic components necessary for blood to clot
- Examine the key components considered in treatment of hemophilia
- Identify general scientific precepts of bleeding disorders
- Evaluate how data and clinical care are integrated and pertinent to non-clinical role