

Role of IT in Dialysis and How it has evolved

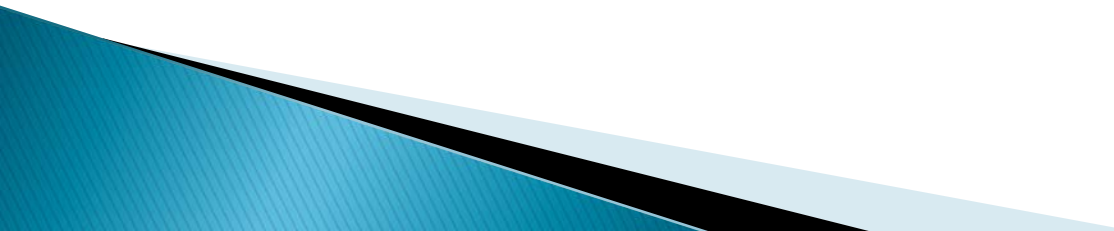
George Rovegno
MIQS Software

Why we need IT/EMRs

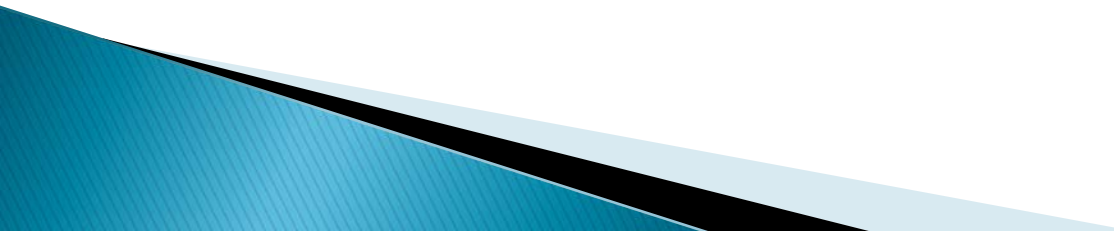


Medical Record Architecture

Traditional Record Evolved

- ▶ Functional
 - ▶ Time Oriented
 - ▶ Problem Oriented
 - ▶ Note intensive
 - ▶ **An EMR cannot and should not be a digitized paper record**
- 

A new architecture

- ▶ Patient-centered NOT user-centered
 - ▶ All data available at the point of care
 - ▶ In a single place
 - ▶ Single entry
 - ▶ Deliver care + maintain data + drive revenue
 - ▶ Serve medical, nursing, administrative and financial needs
- 

Rationale for a New Approach

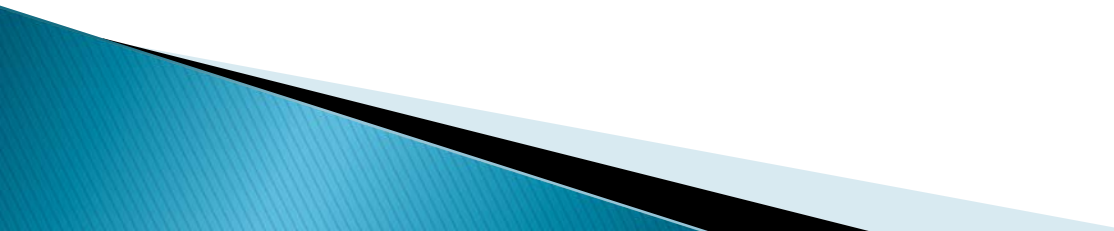
ORIGINS – 1977

“Treatment of patients with chronic renal diseases demands that the physician understand and handle a complicated interplay of many events. Effective treatment by chronic dialysis and transplantation has increased the complexity of tracking clinical events and interrelating clinical, laboratory, and therapeutic data”.

“Better data handling in ... renal disease, is clearly needed”.

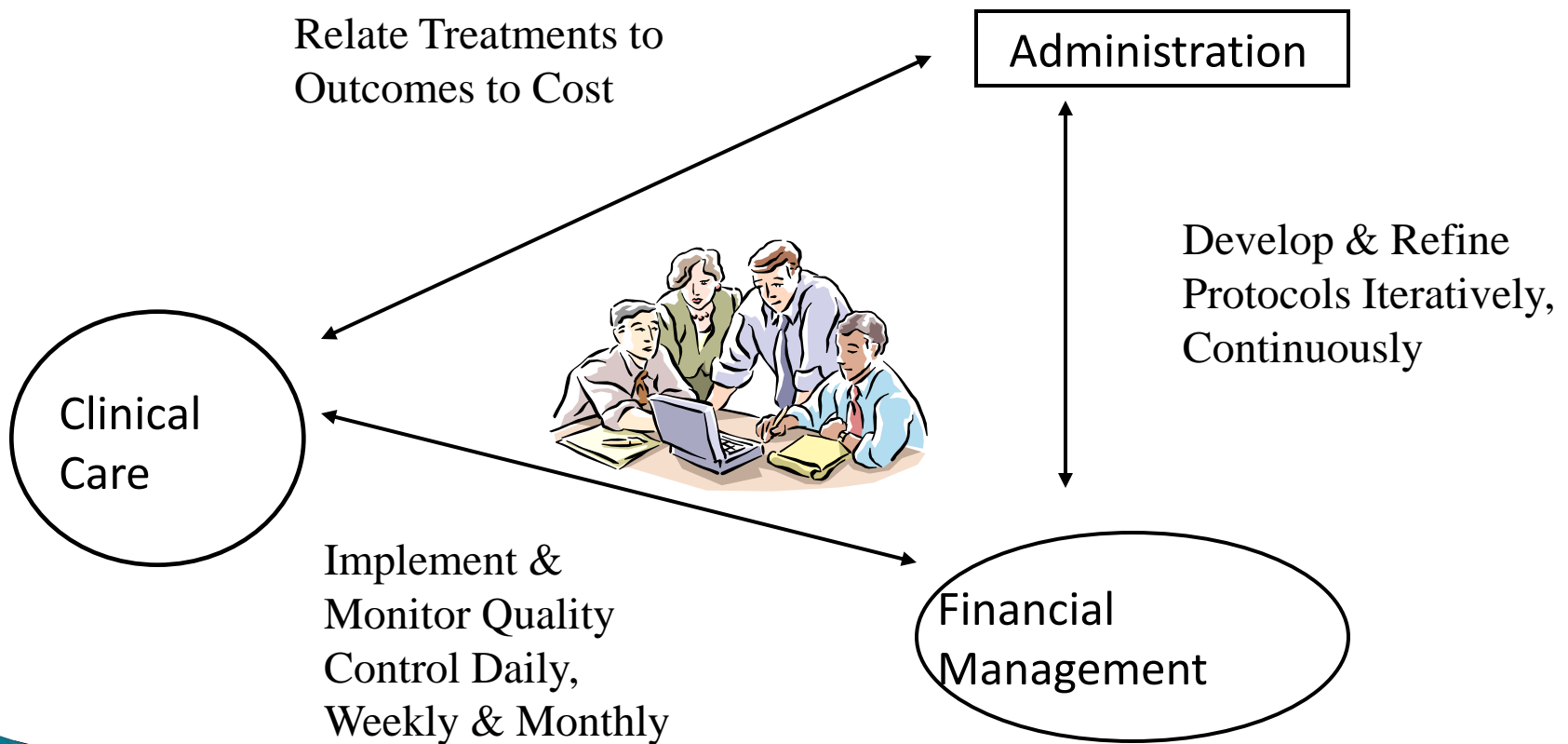
Pollak VE, Buncher CR, Donovan ER. *Arch Int Med* 137:446–456, 1977

We spend 80% of our health care dollars on chronic diseases but EMRs overwhelmingly focus on acute care and office-based practices.

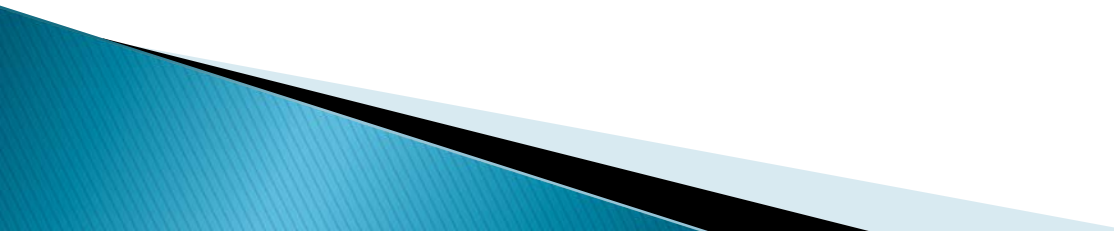


An Integrated Approach

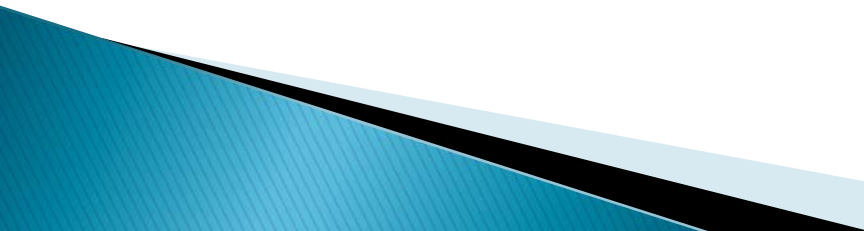
A Process-Oriented Medical Record...



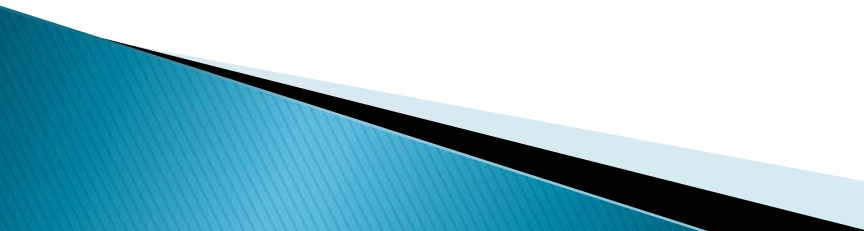
Dialysis IT

- ▶ Dialysis was too small to cause specialized technology “inventions”
 - ▶ Dialysis exploited the evolution, availability and power of tech advances.
- 

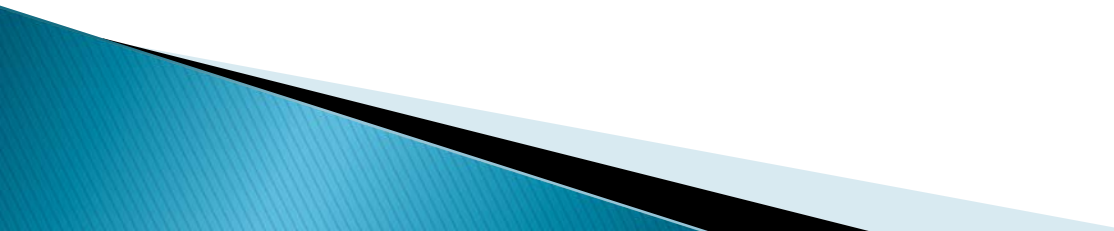
Exploit technology advances

- ▶ 1972 – relational database “invented” to improve flat field data collection/storage
 - ▶ “Main Frame” computers too expensive for clinical use
 - ▶ Minicomputers arrive in the 1970s – Digital Equipment PDP-8 then PDP-11
 - ▶ Late 1970s Commodore, Sinclair, Radio Shack, APPLE
- 

Exploit technology advances (2)

- ▶ 1981: The IBM PC
 - ▶ Medium sized machines like the CDC VAX and HP “minis”
 - ▶ “Terminals” to access databases – terminal/server application Menu driven – text
 - ▶ GUIs – Mac & Windows
 - ▶ Late 1980s – Client/Server applications
 - ▶ Each advance was applied to healthcare
- 

Exploit technology advances (3)

- ▶ Prices dropped
 - ▶ Good supply of skilled developers from educational programs
 - ▶ Scanners, Printers, laptops, hand held devices
 - ▶ Java, web apps
 - ▶ Ubiquity of computers in the hands of all
 - ▶ “You ain’t seen nothing yet
- 

EMR Technology evolution & MIQS

New manual medical record, 1972–1976



New computer medical record 1976–1981

PDP 11/70 with 256,000 bytes of memory

A resource-sharing time-sharing extended (RSTS/E) system
available 24 hours a day, seven days a week.

The language is BASIC+.

EMR Technology evolution & MIQS

New computer medical record 1982–90

Digital Equipment VAX 11/780

Memory 4MB increased to 8MB

Disc storage 636MB

VT240 terminals

Custom developed software of Dialysis Clinics, Inc.

The language is BASIC+

Data analysis: Digital Equipment Datatrieve

Robson MR, et al. *Am J Nephrol.* 6:101-106, 1986

Prerequisites for a New Record

Exploiting what's available

- Client/server architecture with distributed processing
- Relational database
- Centralized database available to all users, with remote access
- User friendly for physicians, nurses, and other caregivers
- Fast workstations
- Open systems to facilitate data transfer to and from other databases
- High level of security for clinical and financial information
- Integrated electronic mail for secure communication about patients

Benefits of CPR for Dialysis

- Radically reduced paperwork, with integrated, single-entry data management
- Complete elimination of double-entry and hand transfer of data
- Legible orders immediately available anywhere, displayed automatically
- Elimination of need to seek data stored separately on paper; immediate access to stored documents
- Immediate access to entire patient record in dialysis unit, hospital, office, home
- Automated download of laboratory tests eliminates time wasted in calling for, entering and checking lab results
- Automated generation of dialysis schedules
- Automated notification of needed future actions (e.g., chest X-ray in a year)

EMR Technology evolution & MIQS

1990–Present

Client–Server using relational database

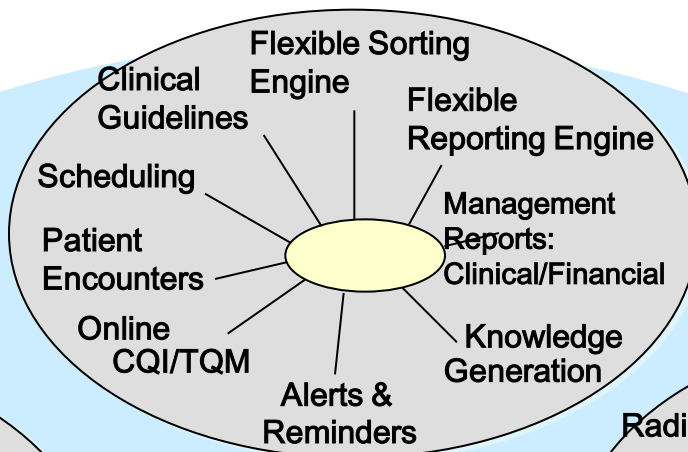
Sybase® SQL Server/Adaptive Server Enterprise

MAC and Windows Clients

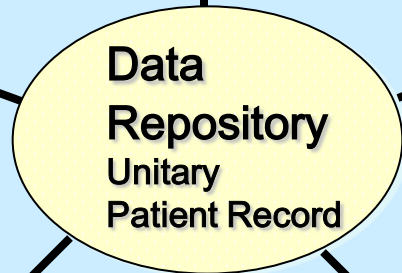
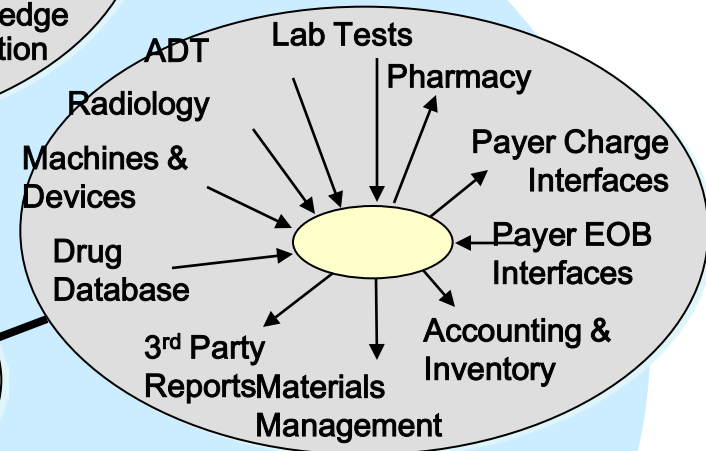
TCP/IP

Power of hardware, functionality of software explodes

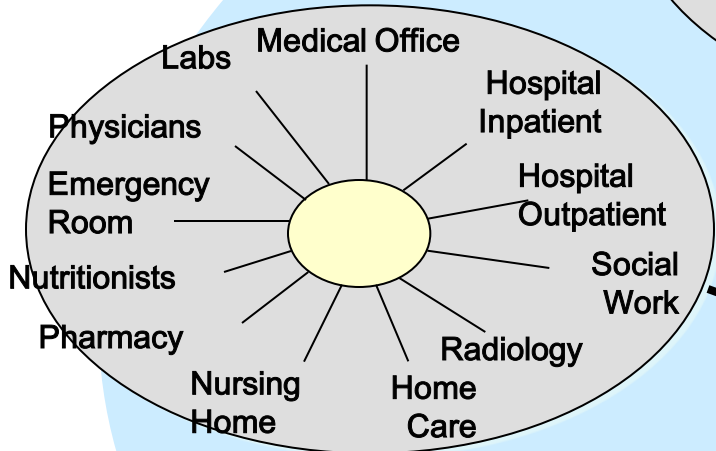
Tools & Functions



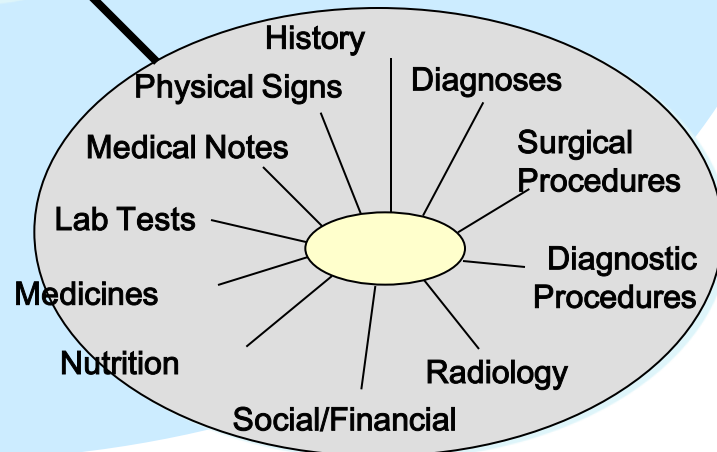
Connectivity to Other Systems



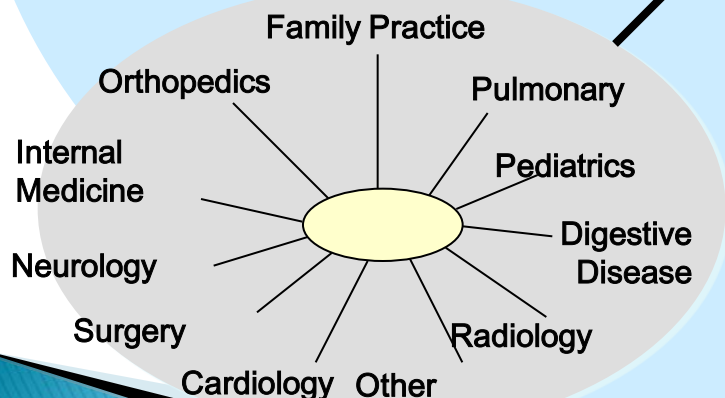
Locations of Patient Care



Domains of Medical Data



Medical Specialties



Users/Location:

Physicians Nurses
Technicians
Administrative Staff

Analysts
Medical Office
Hospital

Home
Mobile
Home Care

Tools & Applications:

Links to Other Systems:

Pharmacy
Radiology
Labs
Charges
Materials Management

Patient Encounter
Orders & Results

Scheduling
Alerts & Reminders

Reports
CQI/TQM

Internet Applications:

Patients
Family
Other Providers

Repository:

Unitary Patient Record
Pharma Database
Clinical Guidelines

Repository:

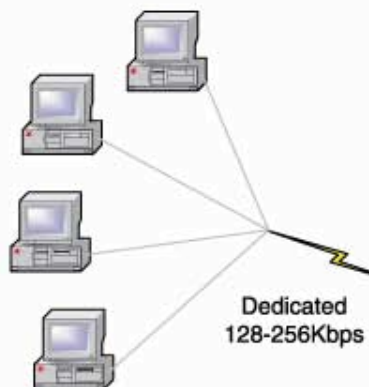
History
Diagnoses
Procedures
Radiology
Nutrition
Medications
Lab Tests
Medical Notes
Physical Signs
Social
Financial

Dialysis equipment

- ▶ Inherent use of therapeutic equipment makes connection of machines and EMRs mandatory.
- ▶ Saves staff time & effort
- ▶ Improves accuracy & care quality
- ▶ Other medical equipment interfaced with computers is largely diagnostic & not “real-time”

MIQS Sample Remote Access Architecture

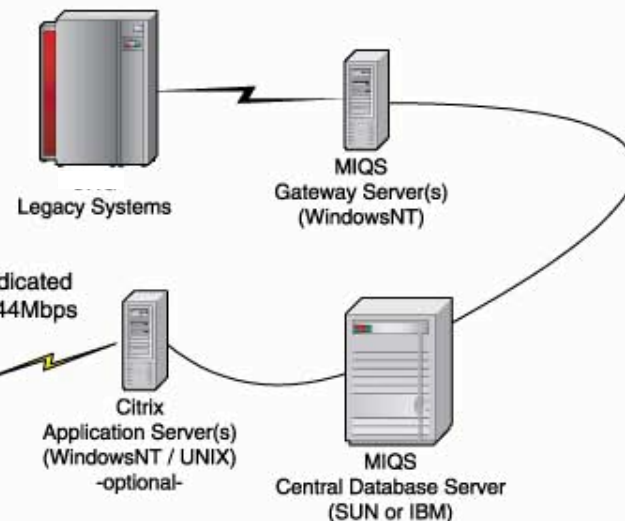
Remote Site(s)



Network Security:

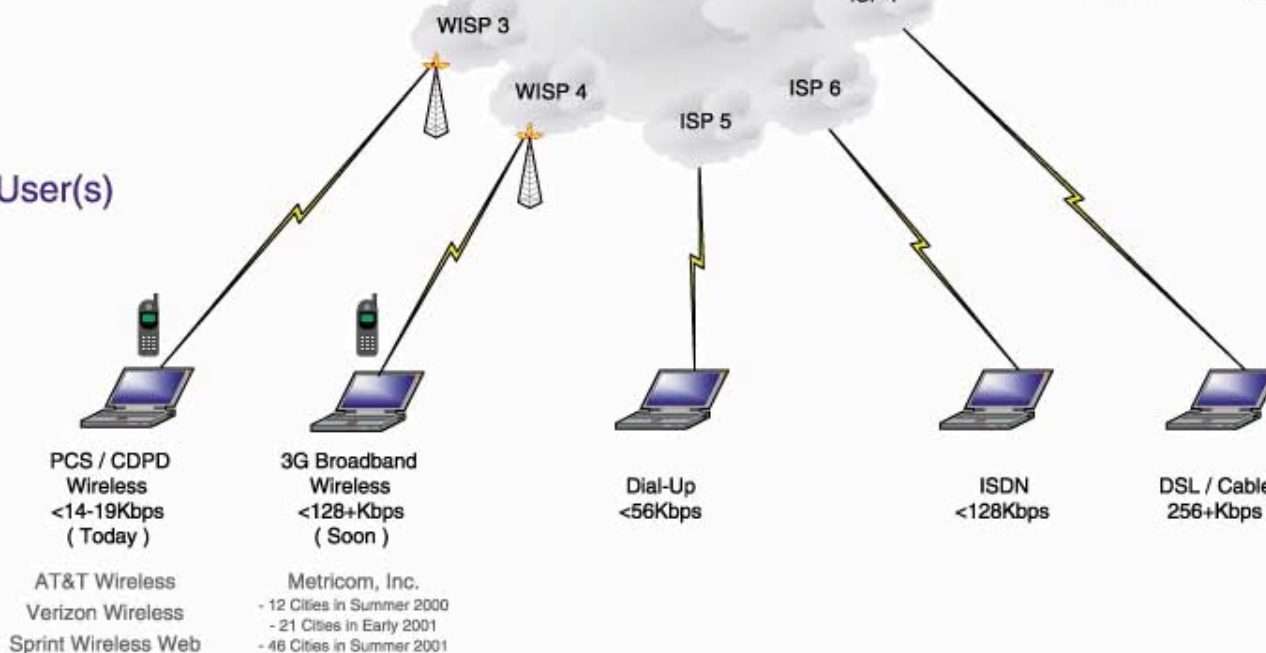
- Internet Firewall(s)
- VPN Encryption

Central Data Center



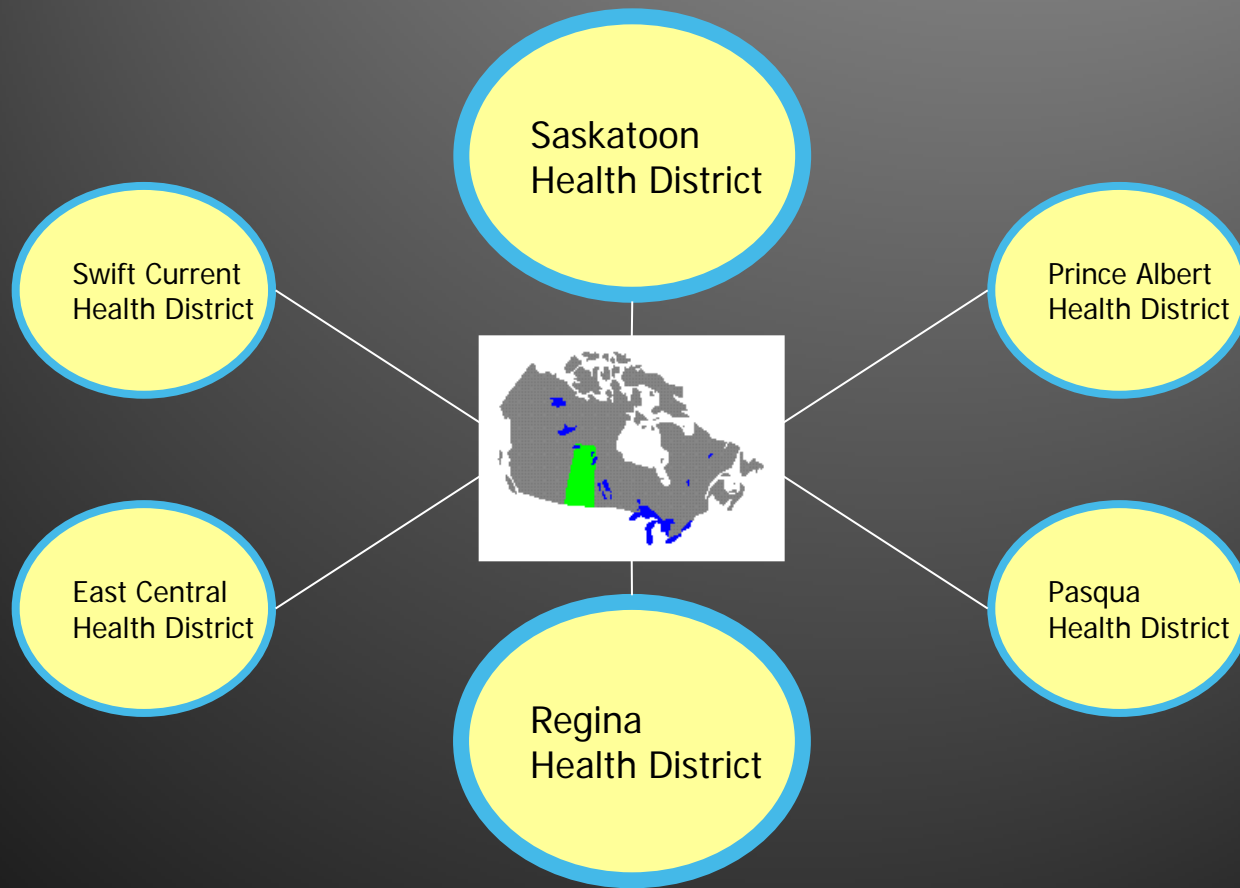
The Internet

Mobile User(s)



Saskatchewan Health Information Network

Life-time Data Available everywhere



Workflow management

- ▶ Guided by the computer
- ▶ Follow the tabs
- ▶ Enforces consistent procedures
- ▶ Prevents overlooking details

MIQS: HD Orders - 1

The screenshot shows a 'Dialysis Order' window for patient '111-22-3333 Tee, Mary Louise'. The form is divided into several sections:

- General:** Effective date (02/01/2000), Ordered by (Pollak, Victor M.D.), Location (MIQS Dialysis Center), Duration (4 hr), Dialyzer 1 (Baxter CT-190), Dialyzer 2, Dialyzer reuse (checkbox), Dialysate 1 (2.0K+, 3.0 Ca), Dialysate 2, Machine type (Cobe Centrysystem 3), Machine, Dialysate temp (37 °C), Blood flow (400 ml/min), Dialysate flow (500 ml/min), Saline (prime) (300 ml), Saline (rinseback) (300 ml).
- Access/Schedule/Special:** Heparin bolus (2000 units), Heparin rate (1000 units/hr), Heparin off (30 min before end), Target weight (53 kg), Desired weight loss, Target BP post-HD (150/100), Target blood processed (70 L), Kt/V desired (1.5), URR desired (70 %), Minimum UF rate, Na setting, Bicarb setting.
- Na Variation:** Na setting.
- UF Variation:** Minimum UF rate.
- Patient Photo:** Photo field.
- History:** Created (Apr 28 2000 3:25pm by Wanda Smith), Modified (Jan 13 2003 3:29pm by Victor Pollak), Signed off.

Buttons at the bottom right: Delete, Continue, Sign Off.

Many entries are made from standard or user defined pop-up lists (▼)

“Target or Desired” orders make it possible to measure performance delivered against performance expected: Weight, BP, Blood Processed, Kt/V & URR

HD Treatment Screens - 1

HD Treatment [X]

Patient Info | Machine Set-Up | Pre-HD | HD Tx 1 | HD Run | Post-HD | Summary

Date: 02/25/2010 Dialysis type: Full Care

Date of birth: 08/12/1943

Admit from hospital: Isolation Cardiac monitor

Location: Rogosin Institute-Manhattan Dialysis Center Hemodiafiltration Respirator

Run number: 277 Isolated ultrafiltration only

Arrival time: Mobility: Walked in

Order date: 11/14/2009

Save time by not retrieving photo

Allergies	Special orders	Tickler items
to all nuts	Please tell patient if more than 1kg of weight is to be removed	Every tuesday PT, PTT INR

HD Daily HD Monthly Lab Report Renal Event List Current Medications HD Orders

HD Treatment Screens -2

HD Treatment
✕

Patient Info
Machine Set-Up
Pre-HD
HD Tx 1
HD Run
Post-HD
Summary

02/25/2010

Orders

Shift Shift III ->

Chair 33 ->

Machine type Fresenius

Machine ID number

Dialyzer 1 Fresenius Optiflux 160NR ->

Dialyzer 2 ->

Dialyzer reuse number

Reuse tech

Disinfectant (prior to rinse)

Residual disinfectant test

Witness

Alarms tests

Dialyzer pressure test

Dialysate 1 Regular - 2.0K+ min ->

Dialysate 2 min ->

Dialysate flow 700 ->

Conductivity

Dialysate pH

Dialysate temperature 36.5 ->

Sodium variation type

Sodium & Bicarb settings ->

Actual

Shift III ▾

2 Rogosin-Manhatt ▾

Fresenius

F20 Rogosin-Manhatt ▾

Fresenius Optiflux 160NR ▾

0 (new=0) ▾

Positive

Negative

Pass Fail

Pass Fail

Regular - 2.0K+ ▾ min

▾ min

700 ml/min

from machine: from meter:

from machine: from meter:

36.5 °C

Completed by De [redacted] Je [redacted] LPN Feb 25 2010 3:00pm ET

HD Treatment Screens -3

HD Treatment
✕

Patient Info |
 Machine Set-Up |
 Pre-HD |
 HD Tx 1 |
 HD Run |
 Post-HD |
 Summary

02/25/2010

Pre-HD Physical Exam

Weight 70.5 kg Unable to weigh

BP (sitting) 198/107

BP (standing)

BP (supine)

Pulse rate 88

Pulse rhythm Regular Irregular

Respiration rate

Temperature 98.6

Breath sounds Vesicular Abnormal

Edema Absent Present

Mental status Oriented Abnormal

Pain Absent Present

Prim. access site Intact Abnormal

Bruit Present Abnormal

Thrill Present Abnormal

Assessment performed by

G., Linda RN

Whom notified

Dialyzer/Patient ID match De... LPN

De... LPN

Last post BP (sitting) 185/90

Last post weight 67.4 kg

Target weight 67 kg

Weight change 3.1 kg

Ordered saline (prime + rinse) 300 ml ->

Actual saline (prime + rinse) 300 ml

Planned fluid intake 0 ml

Desired weight loss 2.5 kg =

Ordered dialysis duration 4 hr ->

Current dialysis duration 4 hr

Total fluid removal 2500 ml =

Ultrafiltration rate ml/hr =

UF profile #

Minimum UF rate ml/hr

Fluid replacement ml/hr =

Pre-HD comments pt. alert with no s.o.b. and no complaints. Dressing changed, no s/s of infection. JD LPN

Completed by De... LPN Feb 25 2010 3:01pm ET

HD Treatment Screens -4

HD Treatment
✕

Patient Info | Machine Set-Up | Pre-HD | **HD Tx 1** | HD Run | Post-HD | Summary

Date	02/25/2010	Dialysate flow rate	700	ml/min	Ultrafiltration rate		ml/hr
Duration	4 hr	Ordered blood flow	400	ml/min	Target blood processed		liters
Dialysate 1	Regular - 2.0K+	Total fluid removal	2500	ml	UF variation		
Dialysate 2		Fluid replacement		ml/hr	UF profile #		

Cannulation attempts

A/V or Arterial

Venous

Arterial/Venous or Arterial access

Instructions L5 on 4/9/08

Venous access

Instructions

Needle details

Arterial/Venous or Arterial

Gauge Length

Self-cannulate Single Buttonhole

Venous

Gauge Length

	Orders		Actual		
Heparin bolus	2500	->	2500	units	Start time 1:25pm
Heparin mid dose	0	->	0	units	Started by De [redacted] er LPN
Heparin rate	0	->	0	units/hr	Dialyzed by DeJ [redacted] er LPN
Heparin off	0	->	0	min before end	Venous pressure @ 200ml/min <input type="text"/>
Blood tubing set		->			Static venous pressure <input type="text"/>
Desired current dialysis end weight				kg	Arterial pressure @ 200ml/min <input type="text"/>
Lab tests drawn	<input type="text"/>				
Additional machine ID number	<input type="text"/>				Time changed <input type="text"/>
Additional dialysate	<input type="text"/>				Time changed <input type="text"/>

HD Treatment Screens -5

HD Treatment
✕

Patient Info |
 Machine Set-Up |
 Pre-HD |
 HD Tx 1 |
 HD Run |
 Post-HD |
 Summary

02/25/2010
Sign all Meds

Time	Medication/Fluid	Strength	Route	Dose ordered	Dose given	Signed
	Cathflo Activase	2 mg	intracath	2 mg	as needed in each po	
	Epogen	2000 units/ml	IV	5500 units	3/week	
	Hectorol	2 mcg/ml	IV	4 mcg	3 times weekly	
New	heparin sodium (porcine)	1,000 USP Units/ml	intralum	4,000 u	every dialysis 2cc in e	
New	Venofer	100 mg/5ml	IV	200 mg	q month wih monthly	

Add

Time	Weight	Temp	BP	BP stand	BP sit	BP sup	Pulse	Pump	BFR	Art p	Ven p	UFR	TMP	Cond	Kt/V	BP leg	Gluc	HCT	%BV	Sat
pre	70.5	98.6			198/107		88													
2:00pm								400		-202	168	0.68	45	13.8						
2:15pm								405		-202	160	0.68	48	13.8						
2:30pm								405		-206	174	0.68	43	13.8						
2:45pm								394		-207	170	0.68	45	13.8						
3:00pm								405		-208	168	0.68	47	13.8						
3:04pm			149/83				71	397		-208	156	0.68	47	13.8						
3:15pm								397		-202	169	0.68	48	13.8						

Add

Time	Initials	Event/Complication/Prophylaxis	Svrty	Treatment	Treatment	Treatment

Add

HD Run comments

Real-time Monitoring
Troubleshoot
Save and Refresh this Page
Write a Note

Completed by

28

Giving EPO During HD Run

The screenshot displays the 'HD Treatment' software interface. The main window has tabs for 'Patient Info', 'Machine Set-Up', 'Pre-HD', 'HD Tx 1', 'HD Run', 'Post-HD', and 'Summary'. The 'HD Run' tab is active, showing patient information for '111-22-3333 Tee, Mary Louise' on '04/28/2000'. A medication table lists 'Epogen' with a strength of '10000 units/ml' and a route of 'IV'. A 'Medication' dialog box is open, showing 'Epogen' as the medication/fluid, '4500 units tid' as the dose ordered, and 'IV' as the route of administration. The 'Reason held' dropdown menu is open, showing options like 'patient refused', 'left early', 'missed dose', etc. The 'Dose given' field is empty, and the 'Who administered' field is also empty. The 'Sign Off' button is visible in the dialog box.

Time	Medication/Fluid	Strength	Route	Dose ordered	Dose given	Signed by
	Calcijex	1 mcg/ml	IV	0.5 mcg tid		
	Epogen	10000 units/ml	IV	4500 units tid		
	Ferlecit	62.5 mg/5ml	IV	125 mg q week on Monday		

Medication

Medication/fluid: Epogen

Dose ordered: 4500 units tid

Time given: []

Dose given: []

Reason held: []

Route of administration: IV

Strength: 10000 units/ml

Supplied by patient

Who administered: []

Created: [] by []

Modified: [] by []

Signed off: [] by []

Sign Off

HD Run comments: []

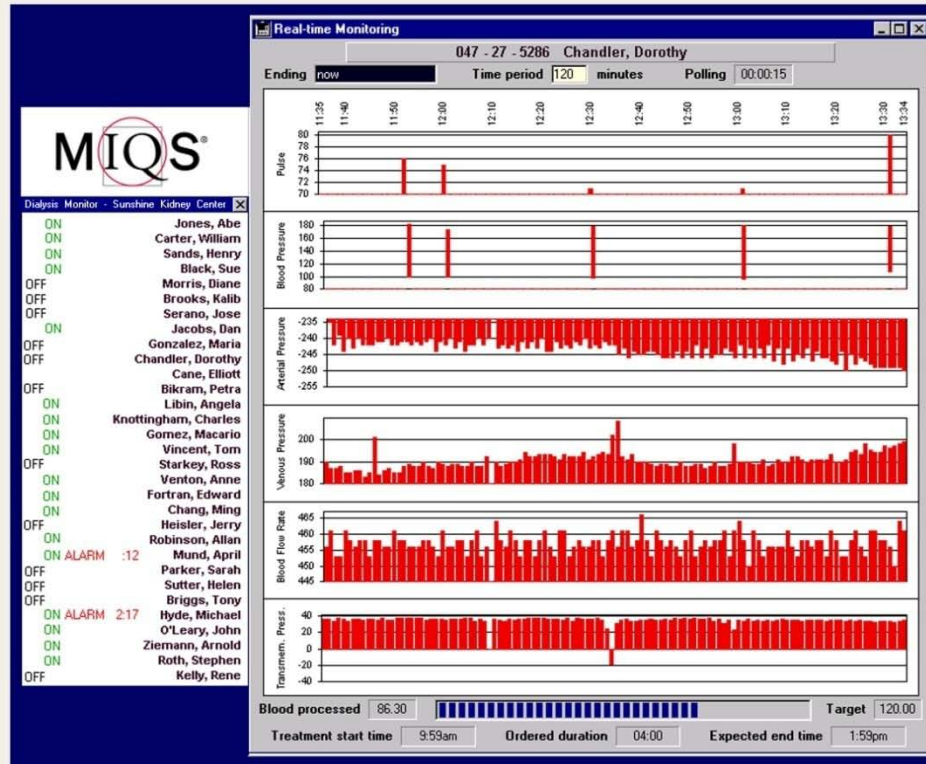
Completed [] by []

An EPO Order on the HD Run Screen

Nurse records either dose given or reason not given, and signs off

HD Monitoring

Real-Time Monitoring Made Simple from Any Dialysis Machine



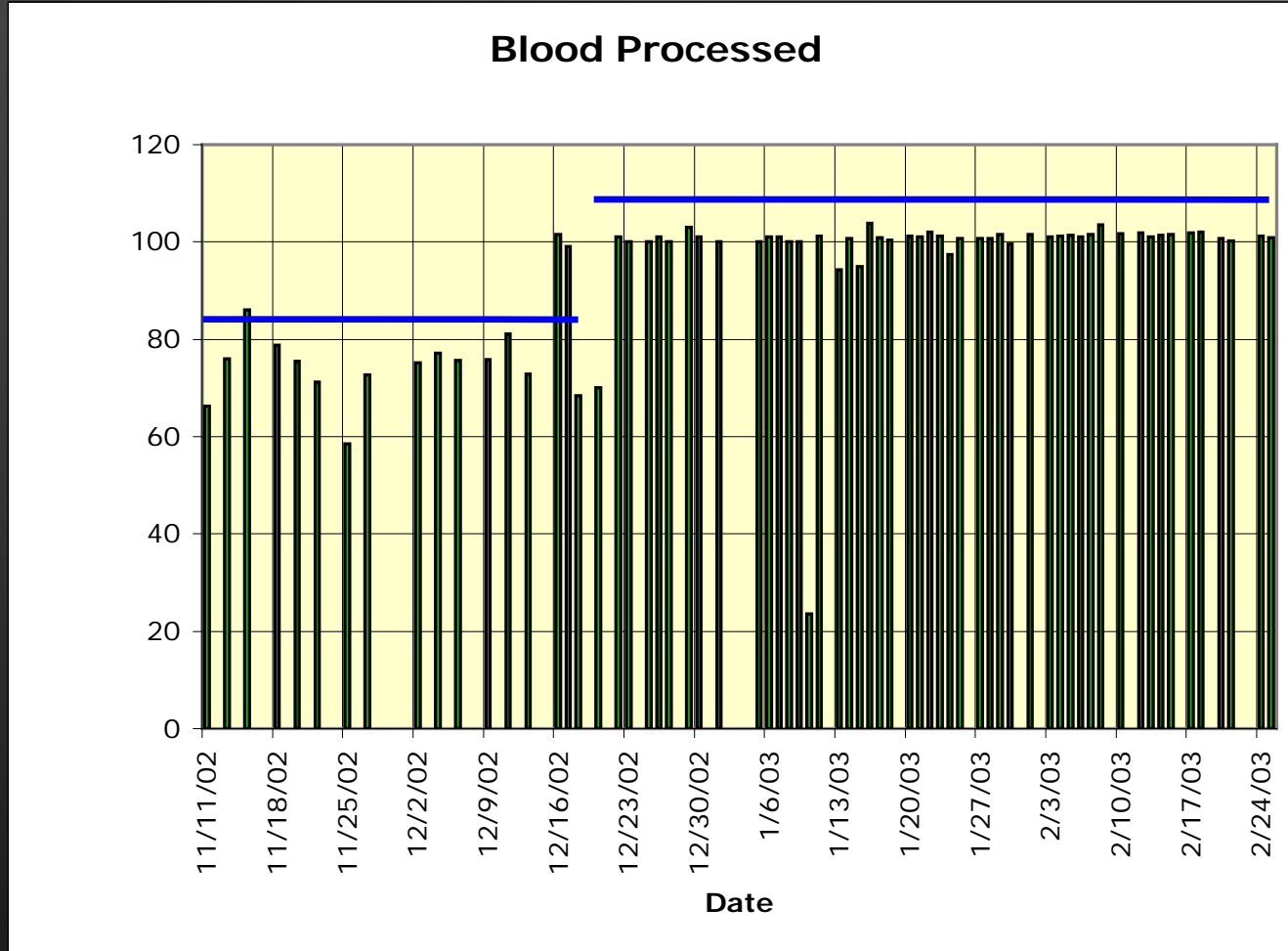
Used to Monitor Patients Dialyzing

- In the dialysis unit
- At home, by nocturnal self dialysis
- In the ICU / CCU, from the main hospital unit
- In distant "satellite" units, from the main dialysis unit



Disease Manager Plus

HD Monitoring w/ Data Capture



In Center HD



Home Nocturnal HD

HD Treatment Screens - 6

HD Treatment
✕

Patient Info | Machine Set-Up | Pre-HD | HD Tx 1 | HD Run | Post-HD | Summary

02/25/2010

Post-HD Physical Exam

<p>Weight <input type="text"/> kg <input type="checkbox"/> Unable to weigh</p> <p>Weight change <input type="text"/> kg</p> <p>BP (sitting) <input type="text"/></p> <p>BP (standing) <input type="text"/></p> <p>BP (supine) <input type="text"/></p> <p>Pulse rate <input type="text"/></p> <p>Pulse rhythm <input type="checkbox"/> Regular <input type="checkbox"/> Irregular</p> <p>Respiration rate <input type="text"/></p> <p>Temperature <input type="text"/></p> <p>Breath sounds <input type="checkbox"/> Vesicular <input type="checkbox"/> Abnormal</p> <p>Edema <input type="checkbox"/> Absent <input type="checkbox"/> Present</p> <p>Mental status <input type="checkbox"/> Oriented <input type="checkbox"/> Abnormal</p> <p>Pain <input type="checkbox"/> Absent <input type="checkbox"/> Present</p> <p>Prim. access site <input type="checkbox"/> Intact <input type="checkbox"/> Abnormal</p> <p>Bruit <input type="checkbox"/> Present <input type="checkbox"/> Abnormal</p> <p>Thrill <input type="checkbox"/> Present <input type="checkbox"/> Abnormal</p> <p>Assessment performed by <input type="text"/></p> <p>Whom notified <input type="text"/></p>	<p>Start time 1:25pm <input type="text"/></p> <p>End time <input type="text"/></p> <p>Time blood pump off <input type="text"/> sec</p> <p>Time in bypass <input type="text"/> sec</p> <p>Elapsed duration <input type="text"/> min -></p> <p>Actual dialysis duration <input type="text"/> min</p> <p>Dialysis time decreased <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Reason for decrease <input type="text"/></p> <p>Blood returned <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Dialyzer appearance <input type="text"/></p> <p>Dressing applied <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p># Dressing changes <input type="text"/></p> <p>Catheter care completed <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Catheter instillation <input type="text"/></p> <p>Bleeding stopped in <input type="text"/> min</p> <p>Estimated blood loss <input type="text"/> ml</p> <p>Total heparin <input type="text"/> units</p> <p>Total saline <input type="text"/> ml</p> <p>Time heparin turned off <input type="text"/></p> <p>Total Kt/V (ID) <input type="text"/></p> <p>Total blood processed 70.37 L</p> <p>Total fluid removed 2203 ml</p> <p>Mobility status <input type="text"/></p> <p>Discharge destination <input type="text"/></p> <p>Ended by <input type="text"/></p> <p>Responsible for care <input type="text"/></p> <p>Post-HD comments <input style="width: 100%; height: 50px;" type="text"/></p> <p>Completed by <input type="text"/></p>
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HD Treatment Screens - 7

HD Treatment
✕

Patient Info
Summary

02/25/2010

	Orders	Actual		
Duration	240		min	<input checked="" type="checkbox"/> Actual HD treatment
Blood pump setting	400	400	ml/min - avg	<input type="checkbox"/> Ignore for billing
Blood flow rate			ml/min - avg	
Blood processed		70.37	liters	
Arterial pressure		-204	mmHg - avg	
Venous pressure		163	mmHg - avg	
Blood pressure	151	77	mmHg - avg	<input type="checkbox"/> Save time by not retrieving photo
Kt/V (ID)				
Total heparin			units	
Total saline			ml	
Post-HD weight	67		kg	
Weight change			kg	
Post-HD BP (sitting)				
Time blood pump off			seconds	
Time in bypass			seconds	

Events/complications documented Yes No

Special orders

Please tell patient if more than 1kg of weight is to be removed

Tickler items

Every tuesday PT, PTT INR

HD comments Copy to clipboard

*** PRE ***

pt. alert with no s.o.b. and no complaints.
Dressing changed, no s/s of infection. JD LPN

Delete
Sign Off

Created Feb 25 2010 2:55pm ET

Modified Feb 25 2010 5:00pm ET

Signed off

by Automated Dialysis Interface

by Automated Dialysis Interface

by

Checking prescription delivery at HD Sign off

Nurse Signs off at End of HD Treatment

HD Treatment

Patient Info | Machine Set-Up | P

04/28/2000

Duration

Blood flow

Blood process

Arterial pressure

Venous pressure

Total heparin

Total saline

Post-HD weight

Weight change

Post-HD BP (sitting) 150/100

Time blood pump off

Time in bypass

Complications documented Yes No

Special orders

Avoid sticking venous needle in upper area of loop graft

Tickler items

Needs dietitian consult for hyperkalemia

Start Ferrlecit on Mon.

Review HD orders, treatments and access function

Review patient's nutritional status

Do you want to sign the treatment even though:

Dialyzer/patient match was not confirmed.
Calcijex was ordered but not given.
Epogen was ordered but not given.
Ferrlecit was ordered but not given.

Save time by not retrieving photo

Created Jan 10 2003 9:35am by Victor Pollak

Modified Jan 10 2003 9:35am by Victor Pollak

Signed off by

A warning appears if something was ordered and not recorded as given.

Some “Recent” Billing issues in Dialysis

- Demands coordination of clinical and administrative staff
- Jan '98 - Place URR on the dialysis bill
- Jul '03 - Place Hct on bill for patients on EPO
- Jan '04 - Document & bill for MCP capitation (MDs)
- Jan '05 - Place height & weight on dialysis bill
- Apr '05 - Case mix payments for services
- Late '05 - Other mandates under CMS conditions for coverage

**Billing requires patient-specific time-sensitive clinical data
- and the complexity of data needed is increasing.**

More Reporting

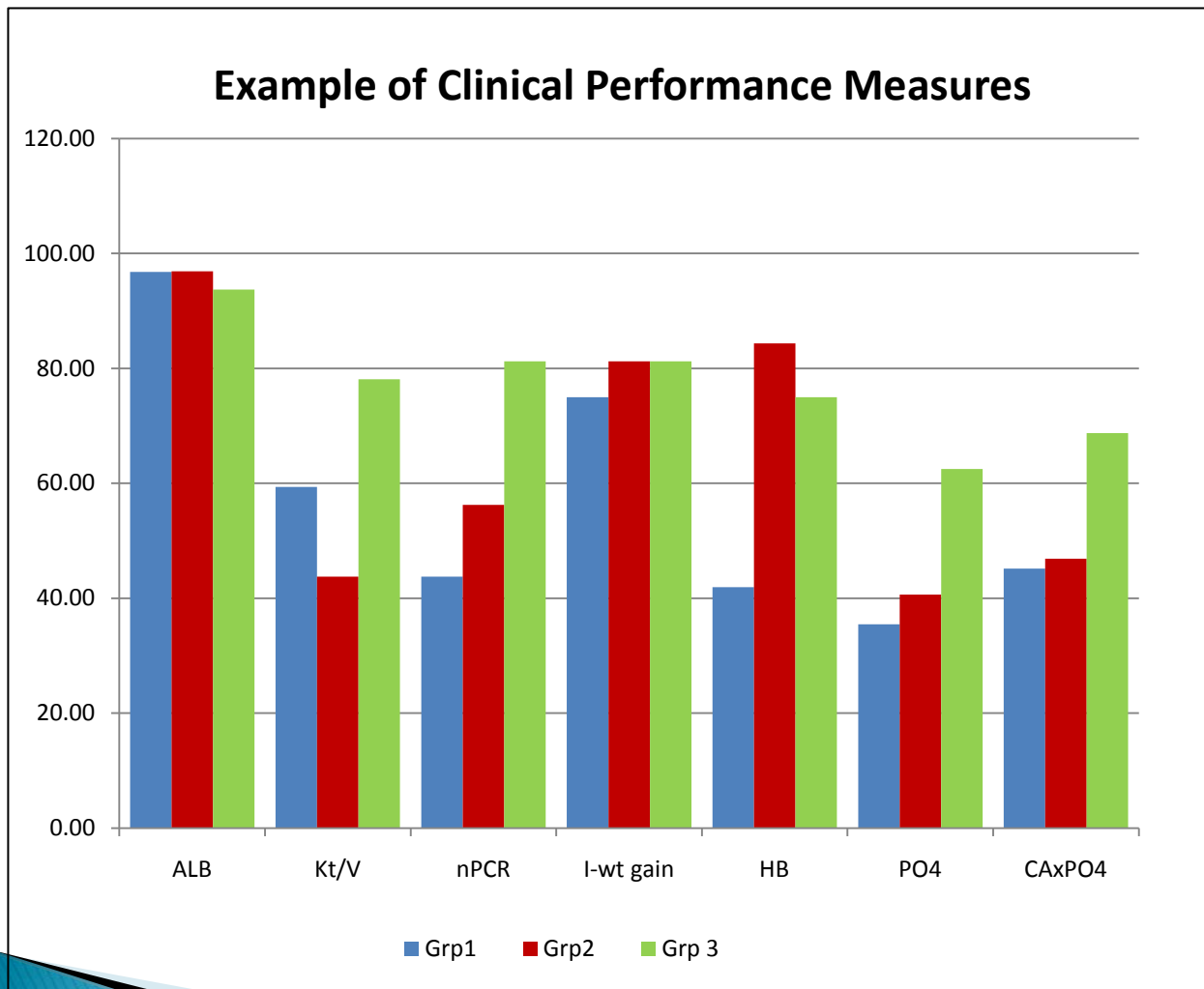
- ▶ CMS issued two new regulations on January 29, 2010. These will require providers to report dialysis adequacy, infection, and vascular access results and values on all ESRD claims with dates of service on or after July 1, 2010.

Bundling

- ▶ January 1, 2011 ?
- ▶ Final regulations?
- ▶ Requirements met to be properly paid
- ▶ 26 CPMs – CrownWeb
- ▶ Accountable through incentives and penalties for e.g. low fistula rates and high central venous catheter rates.

Monitoring Outcomes and Alerts

Clinical Performance Measures



1. Extract data
2. Chart performance measures
3. Monitor & Improve patient care

EMRs have something for everyone

- ▶ Dietician
- ▶ Social Worker
- ▶ Repair/Service Technician
- ▶ Reuse Tech
- ▶ Patient Care Technician
- ▶ Physician & Nursing staff
- ▶ Integrated single database – the whole choir sings from the same hymnal

Dietician

- ▶ Diet Orders
- ▶ Assessments
- ▶ Plan of Care
- ▶ Care Plan reviews

Disease Manager Plus (Renal) Gayle Hall RN Demo1/Trng

1.2 Gm/Kg Pro, 2Gm K, 2Gm Na, 1L per day No concentrated sweets if diabetic

No Restrictions
80 80 gm Protein
70 70 gm Protein
60 60 gm Protein Diet
40 40 gm Protein
None No Concentrated Sweets
low Low Fat Low Cholesterol

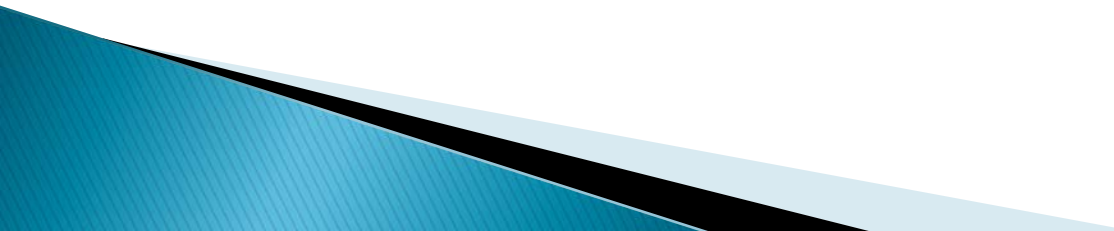
Add **Cancel**

[MIQS User's Guide](#)
www.miqs.com
support@miqs.com

MIQS, Inc.
Boulder, CO
(303)440-5181
Emergency Tech. Support:
(303)785-7530

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Social Worker

- ▶ Assessments
 - ▶ Plan of Care
 - ▶ Care Plan reviews
- 

Repair/Service Technician

Dialysis Machine

Machine | **PMs** | **Services**

Location: UMDC

ID number/name: 1550 # 2

Description: [Empty]

Date began using: 08/03/1994 Enabled

Manufacturer: Baxter

Serial number: 050761

Machine type: Baxter SPS 1550

CentryNet/Phoenix CCM ID: [Empty] (not Station ID)

IP address/port: [Empty]

Dialysis type

chronic acute

Positive hepatitis

Comment Preventive Maintenance (PM) records will be found in the "Service" box, and are designated by a blank space under the "Problem" heading.

Created Nov 16 1994 7:34am MT **by** Mark Bechtler

Modified Sep 22 1997 1:19pm MT **by** John Flynn

New **Find** **Delete**

Dialysis Machine [Close]

Machine | **PMs** | **Services**

Location

ID number/name

Description

Date	PM Hours	Next PM Due Hours	Current Hours	Reading Date	Next PM Due Date
03/04/1996	5541	7000	5541	03/04/1996	

Dialysis Machine

Machine PMs **Services**

Location: UMDC

ID number/name: 1550 # 2

Description:

Add Service

Date	Hours	Problem
11/16/1994	1	Electronics
12/13/1994	1118	See problem text
03/13/1995		Mechanical
06/28/1995	2722	Mechanical
08/17/1995	3190	Leak
12/04/1995	4556	UFC
03/02/1996	5541	Leak
04/02/1996	5091	See problem text
05/02/1996	6064	See problem text
05/07/1996	6064	See problem text
06/13/1996		Electronics
07/12/1996	6205	Mechanical
09/24/1996	7000	See problem text

Billing Manager Dialog Event Manager Dialog Dialysis Manager Dialog User Manager Dialog

Service Record

Date 12/13/1994

Hours 1118

Parts cost 0.00

Performed by GL

Labor hours 2

Machine problem See problem text

Problem text Quarterly PM (1000-1200 hours)

Service performed The following areas are checked for operating integrity. See Baxter 1550 Technical Manual for detailed PM list.
-blood pump occlusion
-infusion pump

Parts used

Created Dec 15 1994 3:40pm MT **by** Mark Bechtler

Modified Jun 7 1995 4:55pm MT **by** Gi Lee

Delete

Reuse & IT/Software

- ▶ Greg Bogenschutz of software consulting company Sunbend Corp programmed the first commercial reuse software, Renalog for Renal Systems.
- ▶ As a CDC developer he used Control Data's "Micro IPF" relational database for Renalog I and II
- ▶ IPF stood for "Information Processing Family". When the Renatron connection features were added to Renalog II, a Control Data upgrade version called "IM" (Information Manager) was used.
- ▶ Following slides compliments of Wayne Carlson Minntech

Active Patient Dialyzer Summary

Average Uses: 41.00 Average Rep.: 41.00 Number of Dialyzers: 1

MJ1750 Me, Jas .

Dial. No.	Model	Lot No.	Uses	Rep.	Date Rep.	Failure Description
8A49934A3	T220	8896H08B	16	16	01/06/1997	Volume
8A6E71DBE	2000	6068B	2	3	01/13/1997	Volume
8A737D930	F80	6K00908	7	9	02/03/1997	Volume
8A9D678AD	F80	6N02308	5	5	03/10/1997	Volume
8AAD623A2	F80	6N02308	5	6	03/26/1997	Volume
8A9F8E6DF	F80	6K00908	3	8	04/02/1997	Volume
8AC35F243	F80	6N02308	6	7	04/21/1997	Volume
8AD5823A6	F80	7B01808	4	5	05/02/1997	Volume
8AD3494BC	F80	7B01808	6	9	05/19/1997	Volume
8AF17752E	F80	7C00308	4	5	05/30/1997	Volume
8AE18E429	F80	7C00308	5	9	06/12/1997	Volume

Average Uses: 5.73 Average Rep.: 7.45 Number of Dialyzers: 11

(L) Line, (S) Screen, (P) Pan, (W) Window, (C) Continuous, (R) Restart, (Q) Quit



Dialyzer



Patients



Notes



Reports



Print New Label



Daily Care



Exit

Standard Reports

Reuse

Daily

Weekly

Monthly

Advanced Reports

Dialyzers

Patients

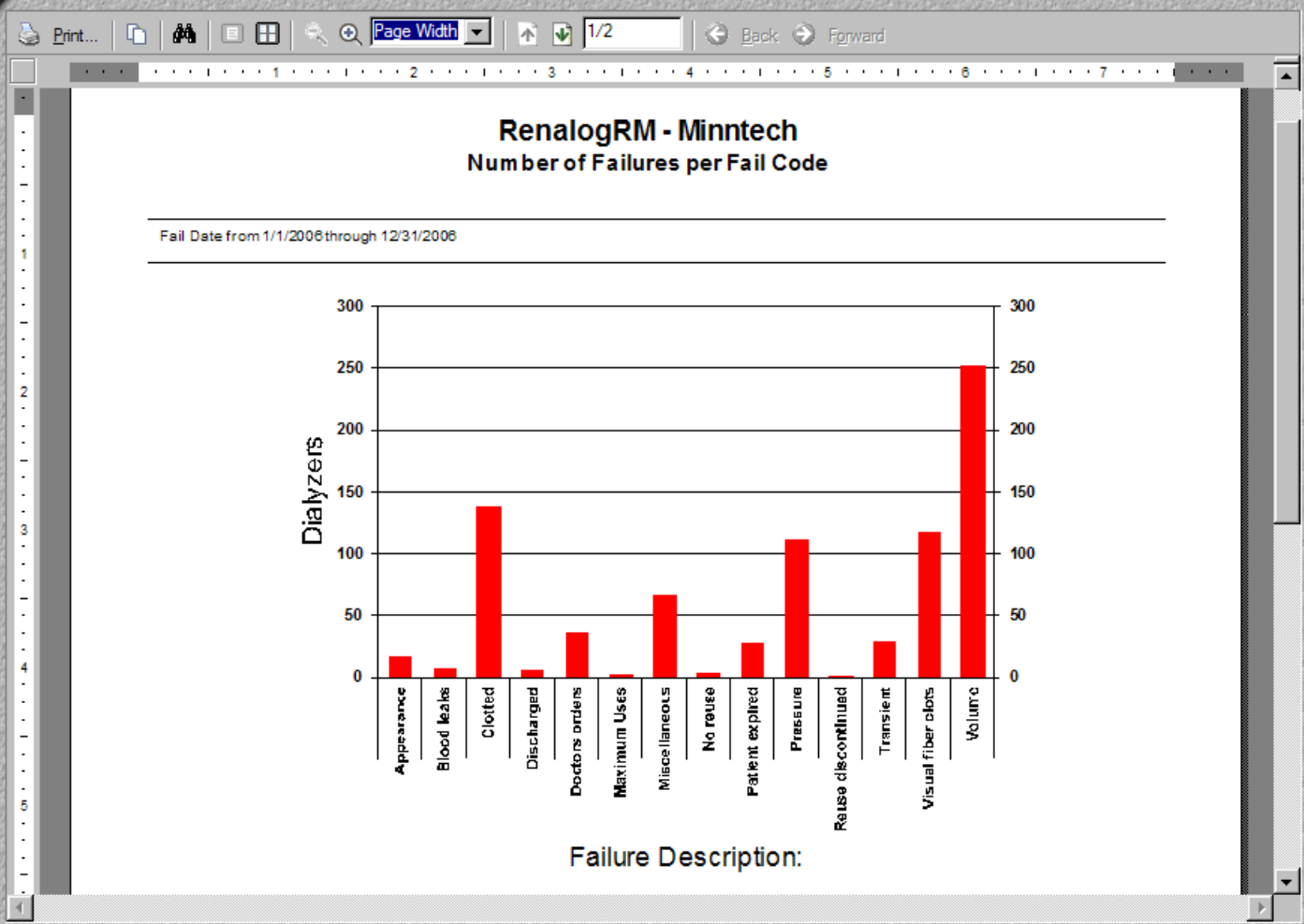
Audit

Graphs

Miscellaneous

JGreen
01:26:38 PM
2/8/2007

Return to Previous Menu



MKuan
01:58:16 PM
2/20/2007

Export Type:



State of the Art Reuse Labels circa 1985



(Compliments of Vern Taaffe)

Administrators / Financial Managers

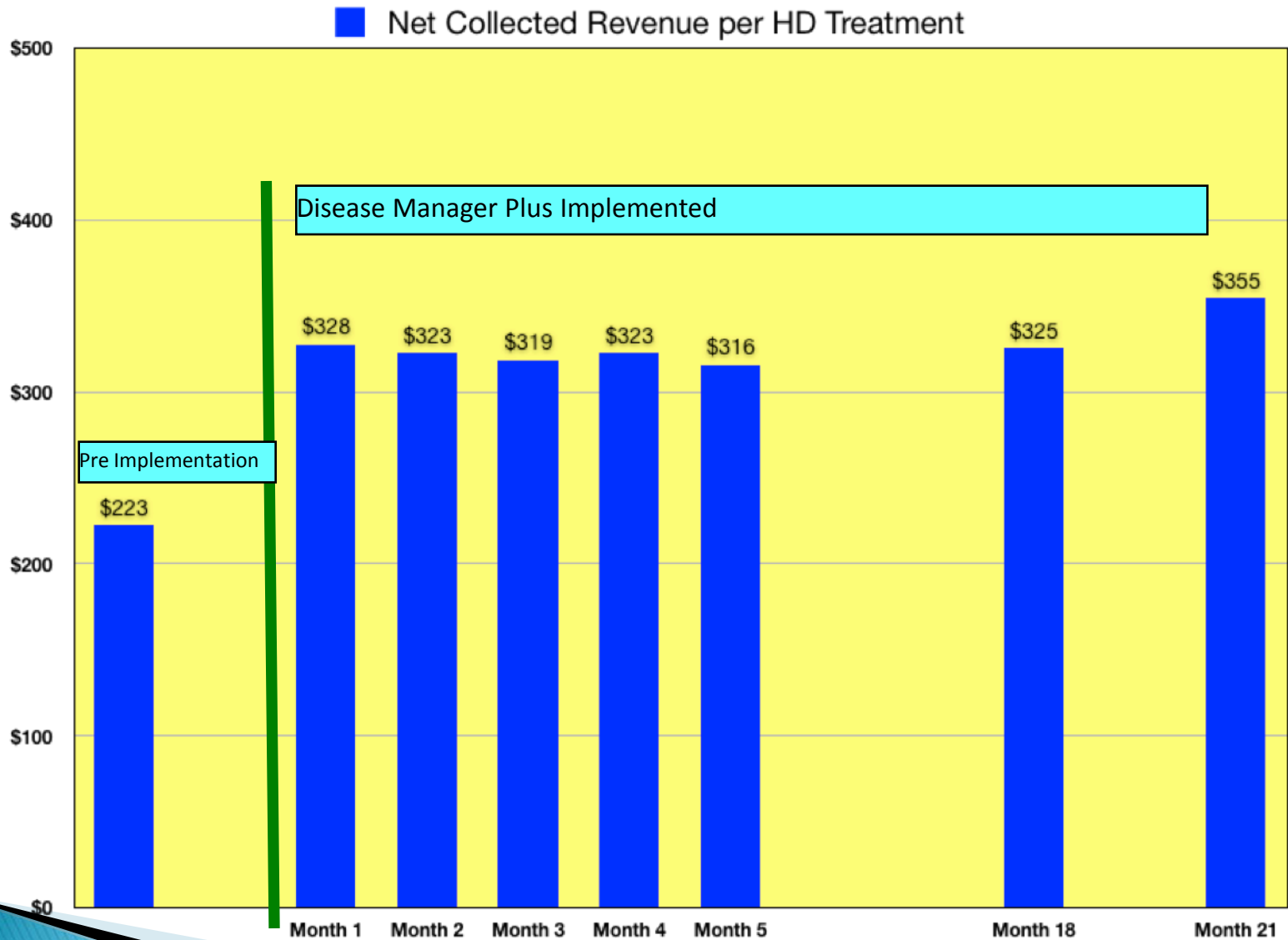
Why an EMR?

- ▶ Internal controls
- ▶ Bill & collect all revenue properly due
- ▶ Capture charges
- ▶ Bill secondary claims
- ▶ Compliance

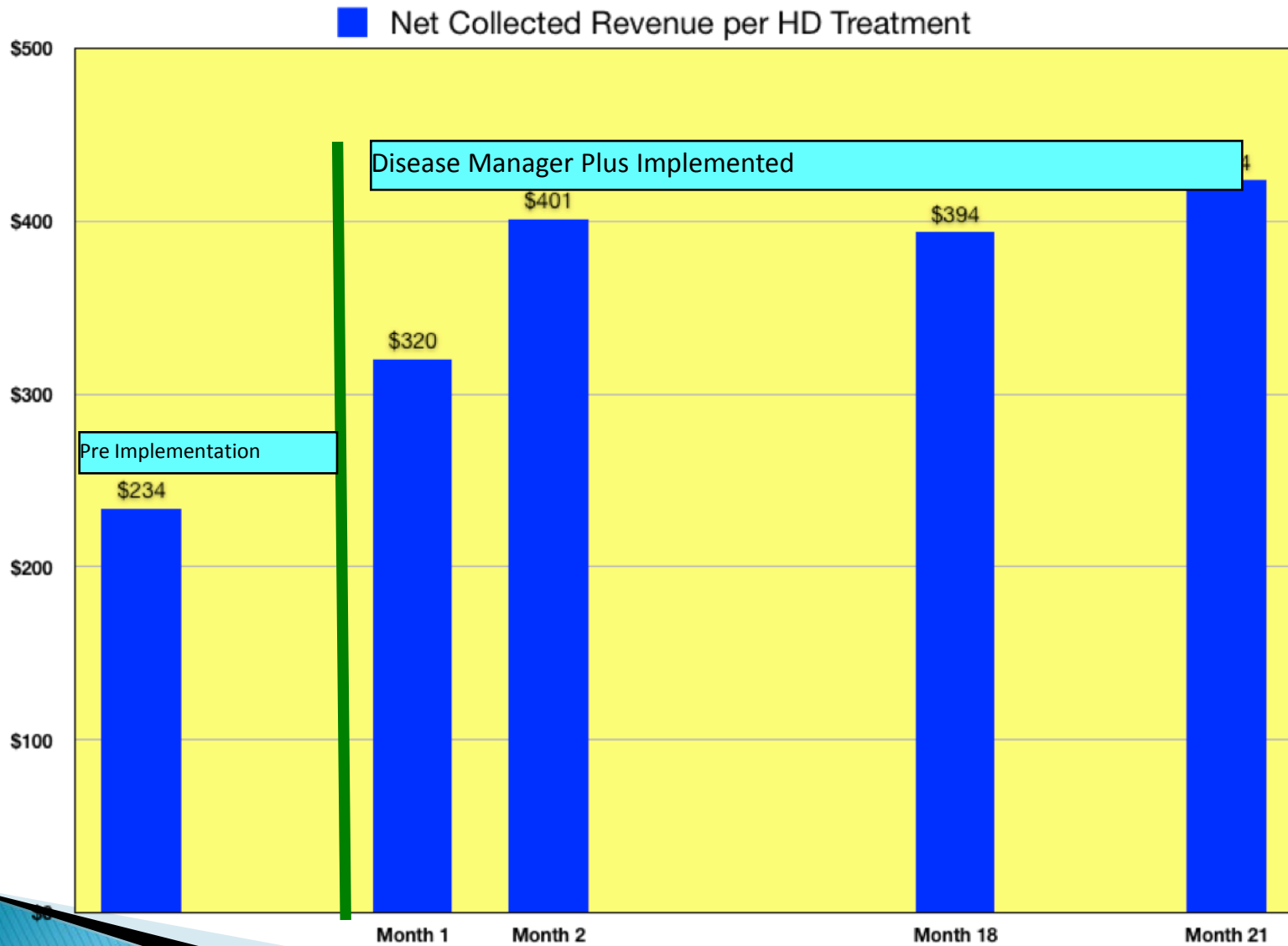
Capture & Enter charges

- ▶ Do it right the first time
- ▶ Avoid rejections
- ▶ 15 billion health claims annually – 30% are rejected by payers
- ▶ Of the 30%, 15% are never resubmitted even though there is a payer. (Smith, BT: APA Matrix 16:2 2001)
- ▶ 4.6 claims per MD per week are denied due to bad claims (MGMA Center for Research,2003)

Independent Dialysis Unit #1

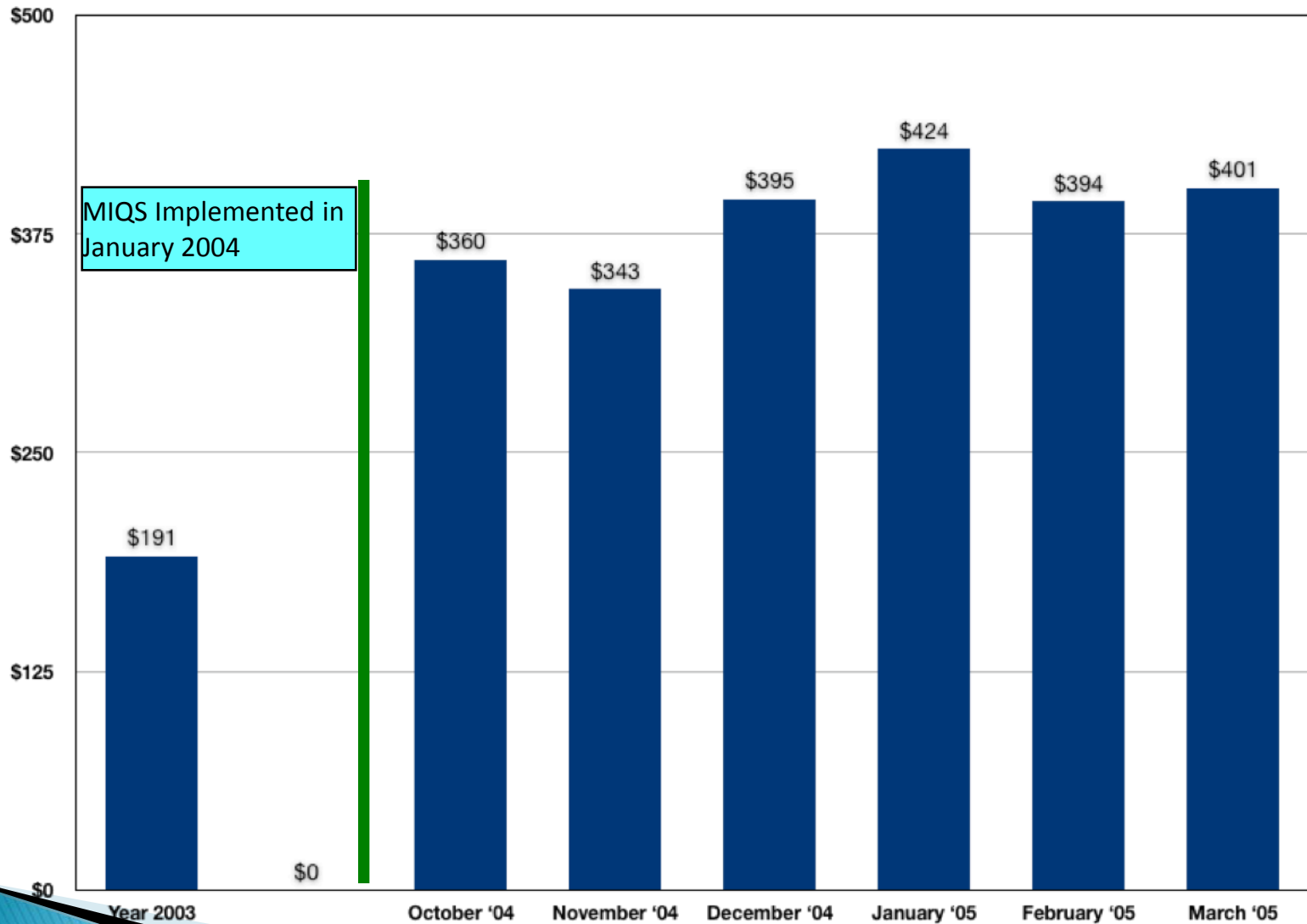


Independent Dialysis Unit #2



Hospital Dialysis Unit

■ Net Collected Revenue per HD Treatment



CMS Rule for EPO/Anemia Alert - 1

Outcomes Wizard

Text for output

Label for listing

All of these conditions must be met:

Diagnosis ICD of 585.6 (END STAGE RENAL DISEASE)
Treatment group is In-center Hemodialysis
Drug class is Antianemic

Any one of these must be met:

HEMOGLOBIN (g/dl) over 13, within 7 days
HEMATOCRIT (%) over 39, within 7 days

Activation date (blank means effective now), for days (blank means indefinitely)
From day **through day** **in each month**

Comments

Destination

- HD treatment screen / flowsheet
- Encounters
- Tickler Report
- Anemia Management Report

Created **by**

Modified **by**

CMS payment rules require a 25% reduction in EPO & Aranesp dosage when Hb and/or Hct exceed the levels indicated

CMS Rule for EPO/Anemia Alert - 2

Outcomes Wizard

Text for output

Label for listing

All of these conditions must be met:

- Diagnosis ICD of 585.6 (END STAGE RENAL DISEASE)
- Treatment group is In-center Hemodialysis
- Drug class is Antianemic
- No HEMOGLOBIN (g/dl), within 21 days
- No HEMATOCRIT (%), within 21 days

Any one of these must be met:

Activation date (blank means effective now), for days (blank means indefinitely)

From day **through day** **in each month**

Comments

Destination

- HD treatment screen / flowsheet
- Encounters
- Tickler Report
- Anemia Management Report

Created **by**

Modified **by**

CMS payment rules for EPO & Aranesp require reporting an Hb and/or Hct level measured in each calendar month

CMS Rule on Height for Payment - 1

Outcomes Wizard

Text for output

Label for listing

All of these conditions must be met:

- No height (cm)
- No height (in)
- Treatment group type is dialysis
- Diagnosis ICD of 585.6 (END STAGE RENAL DISEASE)

Any one of these must be met:

Activation date (blank means effective now), for days (blank means indefinitely)

From day **through day** **in each month**

Comments

Destination

- HD treatment screen / flowsheet
- Tickler Report
- Dialysis Management Report
- Billing Tickler Report

Created **by**

Modified **by**

CMS payment rules for dialysis treatments require that the patient's height be reported on the bill

CMS Rule on Height for Payment - 2

The screenshot shows the 'Outcomes Wizard' window with the following configuration:

- Text for output:** Amputation status code (V49.7X) needed
- Label for listing:** Amputation (lower limb) status coding check
- All of these conditions must be met:**
 - Procedure ICD of 84.1 (AMPUTATION OF LOWER LIMB)
 - No Diagnosis ICD of V49.7 (LOWER LIMB AMPUTATION STATUS)
- Any one of these must be met:**
 - Treatment group type is dialysis
- Activation date:** (blank) (blank means effective now), for (blank) days (blank means indefinitely)
- From day:** (blank) **through day:** (blank) **in each month**
- Comments:** (empty text area)
- Destination:** Dialysis Management Report, Billing Tickler Report, HD treatment screen | flowsheet
- Created:** Oct 26 2005 10:03am **by:** Victor Pollak
- Modified:** Oct 26 2005 11:39am **by:** Victor Pollak
- Buttons:** Export..., Import..., New, Find, Delete

CMS payment rules for dialysis treatments require an “adjusted height” in lower limb amputees (ICD V49.7X)

What do you want to know?

- ▶ Who do you want to know it about?
- ▶ Who wants to know?
- ▶ Cohort selection – by unit, by nephrologist, by diagnosis, by meds, by lab tests
- ▶ Very difficult

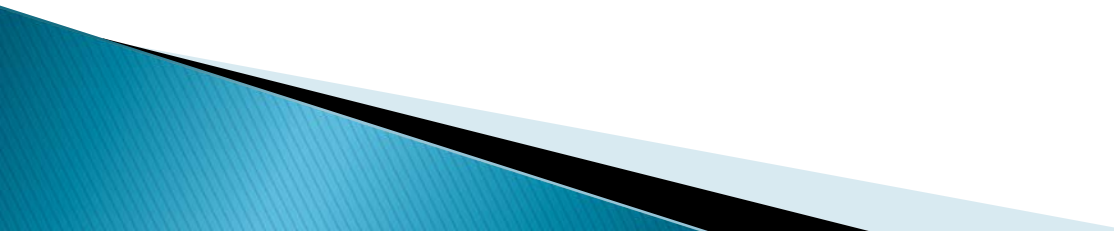
Users of MIQS Software Include...

Physicians	Financial counselors
Nurses	Schedulers
Nurse practitioners	Administrators
Physician assistants	Transplant coordinators
Patient care technicians	Research coordinators
Dialysis machine technicians	CQI personnel
Dialyzer reuse technicians	Facility billing personnel
Dietitians	Physician billing personnel
Social workers	

Data Analysis: Report Types

- Wordprocessing reports
- Spreadsheet reports
- Graphic reports
 - Single Patient
 - Multiple Patient
- Tabular reports
 - Single Patient
 - Multiple Patient

What do you want to know?

- ▶ Who do you want to know it about?
 - ▶ Cohort selection – by unit, by nephrologist, by diagnosis, by meds, by lab tests
 - ▶ Very difficult
- 

Patient Selection Engine

Demographics

The screenshot shows a software window titled "Custom Patient Selection" with several tabs: "Demographic" (selected), "Groups", "ICD", "Lab/Drug/Tickler", "Handpick", "ESRD", and "Financial".

Filters include:

- All patient names from [] to []
- Age range [] to []
- Zip/postal code []
- State/province []
- Location []
- Primary physician []

Demographic filters:

- Sex:** Male, Female
- Ethnic origin:** White, Black, Hispanic, Asian, Native American, Other
- Hospitalized:** Hospitalized, Not hospitalized
 - currently
 - in the range 01/01/2001 to 12/31/2001
- Expired:** Expired, Not expired
 - at any time
 - in the range 01/01/2001 to 12/31/2001

Other options:

- Patient authorizes research use of PHI
- Date range: [01/01/2001] to [12/31/2001]
- Clear button

Selection can be by age, sex, ethnicity, alive or expired, hospitalized or not. Also, by physician, location, and by authorization of research use of data (HIPAA)

Patient Selection Engine

Treatment Groups

The screenshot shows a window titled "Custom Patient Selection" with several tabs: Demographic, Groups (selected), ICD, Lab/Drug/Tickler, Handpick, ESRD, and Financial. The Groups tab contains three identical sections for selecting treatment groups. Each section has three radio buttons: "currently", "at any time", and "in the range 01/01/2001 to 12/31/2001". A checkbox labeled "Not" is positioned to the left of the "at any time" radio button. To the right of the radio buttons is a "Treatment group" label followed by a dropdown menu. The first section has "Chronic Kidney Disease" selected in the dropdown. The second section has "Merck Drug Study" selected. The third section has an empty dropdown. A "Clear" button is located at the bottom right of the dialog.

Selection can be by inclusion or exclusion of 1 to 3 Treatment Groups.
Treatment groups can be developed for various purposes by users
(see next slide)

Patient Selection Engine

Diseases & Procedures

The screenshot shows a software window titled "Custom Patient Selection" with several tabs: "Demographic", "Groups", "ICD", "Lab/Drug/Tickler", "Handpick", "ESRD", and "Financial". The "ICD" tab is selected. Below the tabs are three rows of selection criteria, each with an "Exclude" checkbox, an "ICD code" field, a dropdown arrow, and a date range checkbox. The first row has "Exclude" unchecked, "ICD code" 250, and "in the range 01/01/2001 to 12/31/2001" unchecked. The second row has "Exclude" unchecked, "ICD code" 581, and "in the range 01/01/2001 to 12/31/2001" unchecked. The third row has "Exclude" checked, "ICD code" 428, and "in the range 01/01/2001 to 12/31/2001" unchecked. Each row has a text box containing the disease name: "DIABETES MELLITUS", "NEPHROTIC SYNDROME", and "HEART FAILURE". A "Clear" button is located at the bottom right of the window.

Exclude	ICD code	in the range 01/01/2001 to 12/31/2001	Disease Name
<input type="checkbox"/>	250	<input type="checkbox"/>	DIABETES MELLITUS
<input type="checkbox"/>	581	<input type="checkbox"/>	NEPHROTIC SYNDROME
<input checked="" type="checkbox"/>	428	<input type="checkbox"/>	HEART FAILURE

Selection can be by inclusion or by exclusion of 1 to 3 ICD-coded diseases and/or procedures.

Patient Selection Engine

Lab and Drugs

The screenshot shows a software window titled "Custom Patient Selection" with several tabs: Demographic, Groups, ICD, Lab/Drug/Tickler, Handpick, ESRD, and Financial. The "Lab/Drug/Tickler" tab is active. Under the "Lab test" section, the text "SERUM CREATININE (mg/dl)" is entered in a text box. Below it, "Values under" and "and/or over" are followed by input fields containing "1.2". Three radio buttons are present: "at any time", "within the past 2 months" (which is selected), and "in the range 01/01/2001 to 12/31/2001". The "Drug name" section has "losartan potassium" in a text box. To its right is a sub-panel with three radio buttons: "Phonetic search", "'Starts with'", and "'Contains'" (which is selected). Below the drug name are three radio buttons: "currently" (selected), "at any time", and "in the range 01/01/2001 to 12/31/2001". At the bottom, "Outcomes Wizard/Tickler" is set to "Dr. John's report" in a dropdown menu. A "Clear" button is located in the bottom right corner.

Selection can also be by Lab test (including exception values) and by medications.

Tech Support of users

- ▶ User : Hi, our printer is not working.
- ▶ Tech: What is wrong with it?
- User : Mouse is jammed.
- Tech: Mouse? Printers don't have a mouse.
- User: Well you're wrong I will even send a picture to prove it.

The Proof

