Fig. 1

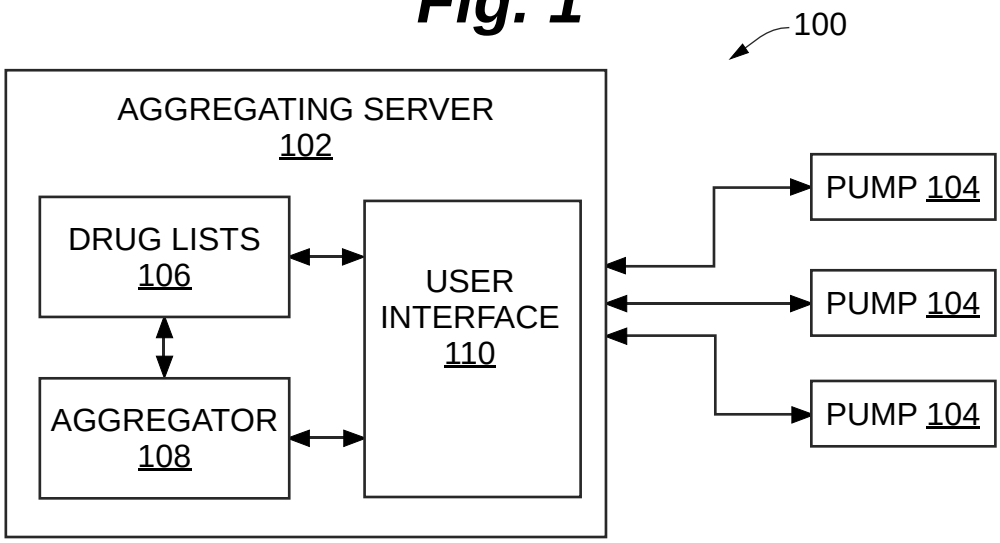

100
AGGREGATING SERVER
102
DRUG LISTS
106
AGGREGATOR
108
USER
INTERFACE
110
PUMP 104
PUMP 104
PUMP 104

Fig. 2

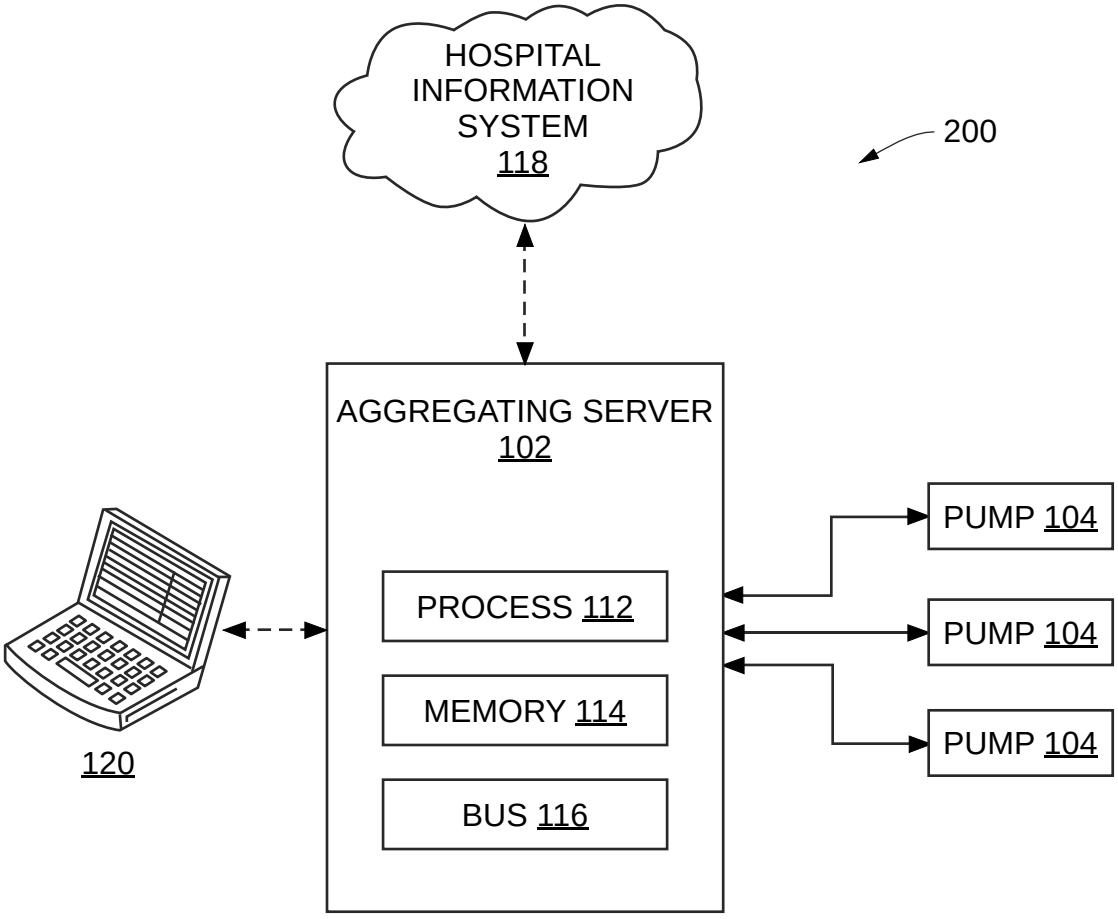

HOSPITAL
INFORMATION
SYSTEM
118
200
AGGREGATING SERVER
102
PROCESS 112
MEMORY 114
BUS 116
PUMP 104
PUMP 104
PUMP 104
120

Fig. 3

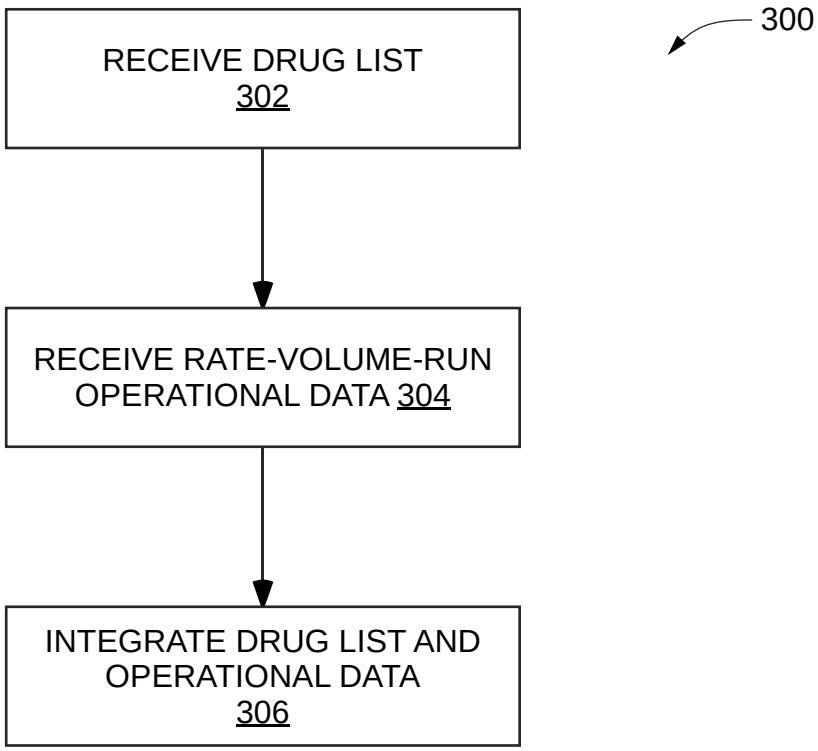

300
RECEIVE DRUG LIST
302
RECEIVE RATE-VOLUME-RUN OPERATIONAL DATA 304
INTEGRATE DRUG LIST AND OPERATIONAL DATA
306

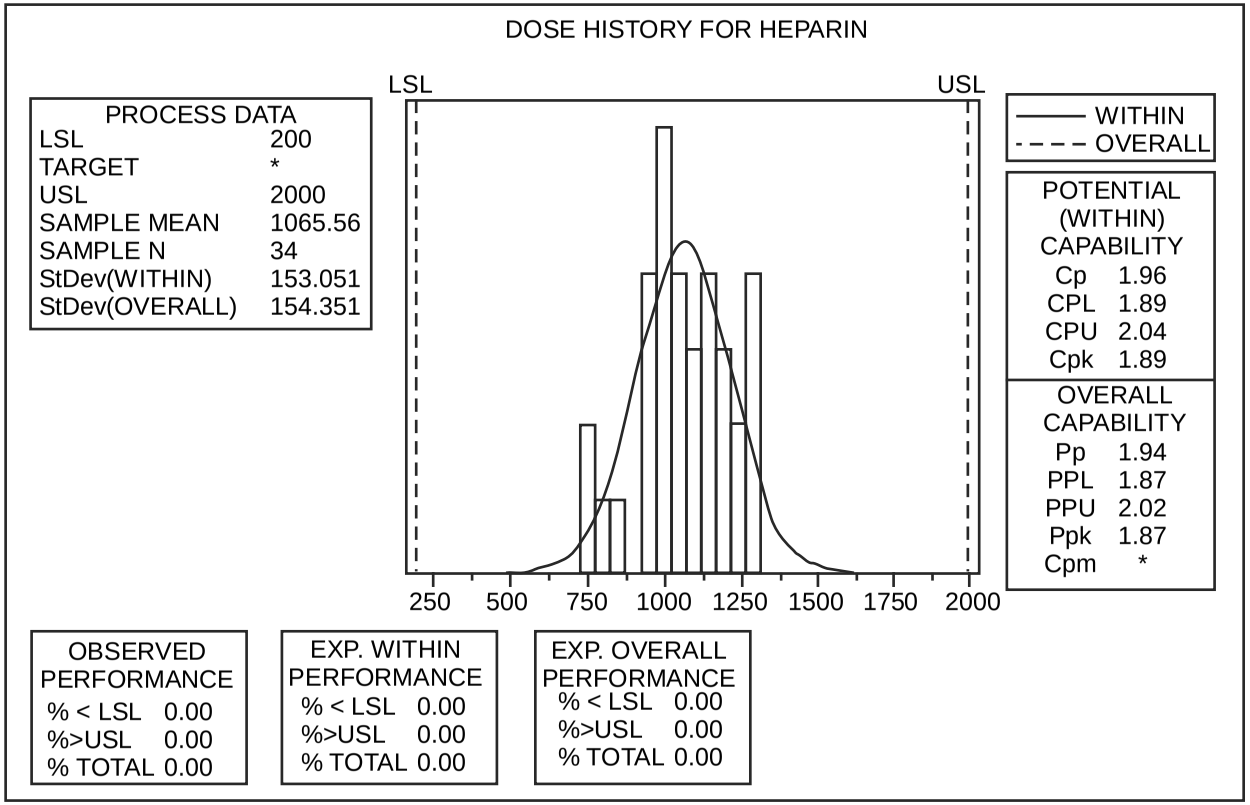
Fig. 4

DISPLAYED NAME	CCA NAME	MED. AMT	MED. UNIT	DILUENT AMOUNT	DILUENT UNIT	MED. MAX. RATE	DOSE RATE DOSING UNIT	DOSE RATE LHL	DOSE RATE LSL	DOSE RATE USL	DOSE RATE UHL
EPINEPHRINE	ICU	5	mg	250	mL		mcg/min		0.5	15	
EPINEPHRINE	ICU	16	mg	250	mL		mcg/min		0.5	15	
EPINEPHRINE-mc g/kg/min DOSING	ICU	5	mg	250	mL		mcg/kg/min		0.01	0.5	
EPINEPHRINE-mc g/kg/min DOSING	ICU	16	mg	250	mL		mcg/kg/min		0.01	0.5	
ESMOLOL	ICU	2000	mg	100	mL		mcg/kg/min		0.5	300	500
HEPARIN	ICU	25000	units	250	mL		units/hr	50	200	2000	2500
ISOPROTERENOL	ICU	1	mg	50	mL		mcg/min		0.09	20	
ISOPROTERENOL mc g/kg/min DOSING	ICU	1	mg	50	mL		mcg/kg/min		0.01	0.3	

DISPLAYED NAME	CCA NAME	MED. AMT	MED. UNIT	DILUENT AMOUNT	DILUENT UNIT	MED. MAX. RATE	DOSE RATE DOSING UNIT	DOSE RATE LHL	DOSE RATE LSL	DOSE RATE USL	DOSE RATE UHL
HEPARIN	ICU	25000	UNITS	250	mL		UNITS/HR	50	200	2000	2500

Fig. 5

DRUG	CCA	DATE AND TIME	DOSE GIVEN
HEPARIN	ICU	9/1/2011 12:24:00	1212
HEPARIN	ICU	9/6/2011 9:57:07	731
HEPARIN	ICU	9/12/2011 18:00:58	944
HEPARIN	ICU	9/12/2011 22:41:46	839
HEPARIN	ICU	9/18/2011 18:11:02	1284
HEPARIN	ICU	9/21/2011 23:19:12	1292
HEPARIN	ICU	9/23/2011 6:55:41	1015
HEPARIN	ICU	9/29/2011 13:21:36	798
HEPARIN	ICU	10/5/2011 21:18:14	1093
HEPARIN	ICU	10/13/2011 16:48:58	1200
HEPARIN	ICU	10/21/2011 15:42:43	1173
HEPARIN	ICU	10/26/2011 7:40:19	980
HEPARIN	ICU	11/4/2011 0:55:41	1052
HEPARIN	ICU	11/11/2011 4:31:41	1128
HEPARIN	ICU	11/15/2011 4:54:43	1083
HEPARIN	ICU	11/23/2011 17:14:53	1096
HEPARIN	ICU	11/28/2011 1:57:36	1071
HEPARIN	ICU	12/3/2011 14:17:46	973
HEPARIN	ICU	12/12/2011 23:03:22	1013
HEPARIN	ICU	12/18/2011 0:18:14	996
HEPARIN	ICU	12/24/2011 23:30:43	996
HEPARIN	ICU	12/31/2011 2:48:00	950
HEPARIN	ICU	1/1/2012 0:58:34	1127
HEPARIN	ICU	1/6/2012 5:24:58	1299
HEPARIN	ICU	1/12/2012 10:43:12	729
HEPARIN	ICU	1/16/2012 16:56:10	1299
HEPARIN	ICU	1/17/2012 4:50:24	1046
HEPARIN	ICU	1/18/2012 2:22:05	984
HEPARIN	ICU	1/25/2012 4:48:58	943
HEPARIN	ICU	1/25/2012 13:14:24	1058
HEPARIN	ICU	1/30/2012 4:47:31	1182
HEPARIN	ICU	2/3/2012 7:43:12	1143
HEPARIN	ICU	2/9/2012 5:53:46	1265
HEPARIN	ICU	2/16/2012 12:57:07	1235

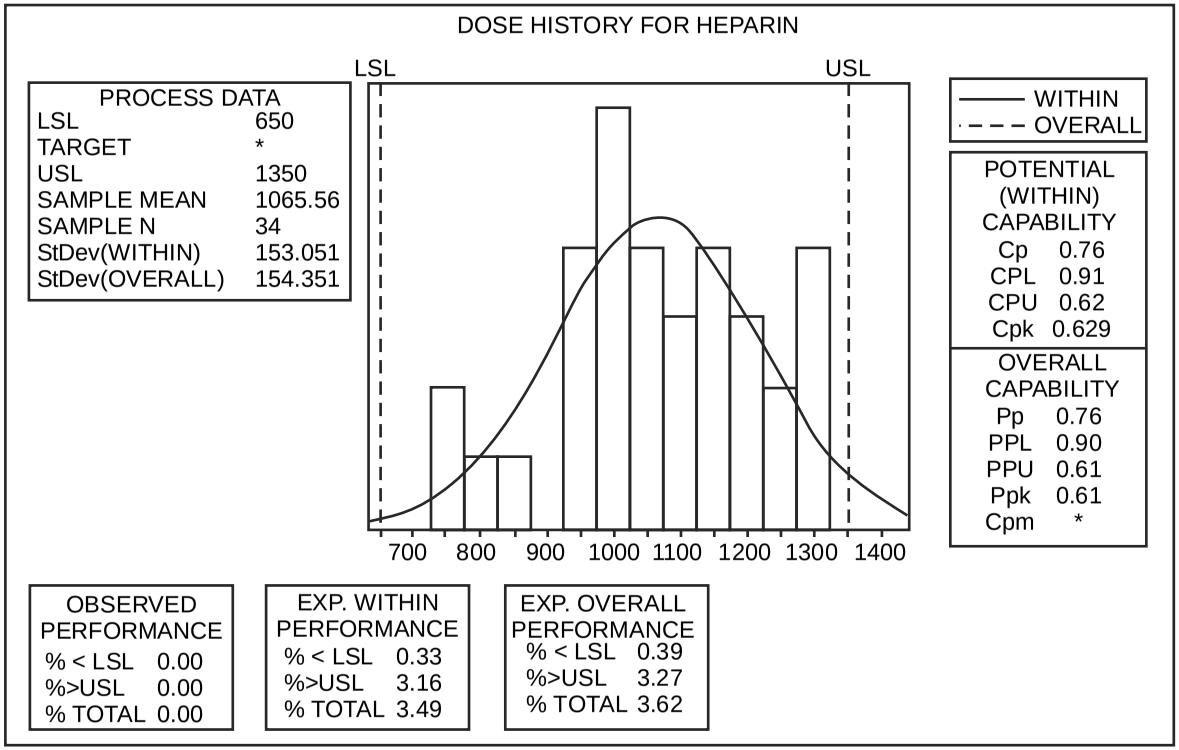


NUMBER OF INFUSIONS	34
AVERAGE DOSE	1065.56
STANDARD DEVIATION	154.35

DISPLAYED NAME	CCA NAME	MED. AMT	MED. UNIT	DILUENT AMOUNT	DILUENT UNIT	MED. MAX. RATE	DOSE RATE DOSING UNIT	DOSE RATE LHL	DOSE RATE LSL	DOSE RATE USL	DOSE RATE UHL
HEPARIN	ICU	25000	UNITS	250	mL		UNITS/HR	50	650	1300	2500

Fig. 6

DRUG	CCA	DATE AND TIME	DOSE GIVEN
HEPARIN	ICU	9/1/2011 12:24:00	1212
HEPARIN	ICU	9/10/2011 10:43:12	731
HEPARIN	ICU	9/14/2011 20:26:24	944
HEPARIN	ICU	9/21/2011 1:41:46	839
HEPARIN	ICU	9/23/2011 17:20:38	1284
HEPARIN	ICU	9/28/2011 20:46:34	1292
HEPARIN	ICU	10/3/2011 21:58:34	1015
HEPARIN	ICU	10/4/2011 5:37:55	798
HEPARIN	ICU	10/9/2011 17:52:19	1093
HEPARIN	ICU	10/13/2011 22:38:58	1200
HEPARIN	ICU	10/18/2011 4:01:26	1173
HEPARIN	ICU	10/21/2011 9:58:34	980
HEPARIN	ICU	10/29/2011 13:34:34	1052
HEPARIN	ICU	11/6/2011 6:24:00	1128
HEPARIN	ICU	11/14/2011 4:34:34	1083
HEPARIN	ICU	11/23/2011 15:39:50	1096
HEPARIN	ICU	11/27/2011 1:17:17	1071
HEPARIN	ICU	12/3/2011 18:55:41	973
HEPARIN	ICU	12/7/2011 13:51:50	1013
HEPARIN	ICU	12/14/2011 4:14:24	996
HEPARIN	ICU	12/23/2011 14:00:29	996
HEPARIN	ICU	1/1/2012 5:49:26	950
HEPARIN	ICU	1/8/2012 22:20:100	1127
HEPARIN	ICU	1/18/2012 14:56:38	1299
HEPARIN	ICU	1/21/2012 0:54:14	729
HEPARIN	ICU	1/21/2012 13:23:02	1299
HEPARIN	ICU	1/31/2012 1:51:50	1046
HEPARIN	ICU	2/5/2012 19:12:58	984
HEPARIN	ICU	2/11/2012 14:59:31	943
HEPARIN	ICU	2/18/2012 4:40:19	1058
HEPARIN	ICU	2/20/2012 13:50:24	1182
HEPARIN	ICU	2/27/2012 14:46:34	1143
HEPARIN	ICU	3/2/2012 16:51:50	1265
HEPARIN	ICU	3/12/2012 1:46:05	1235

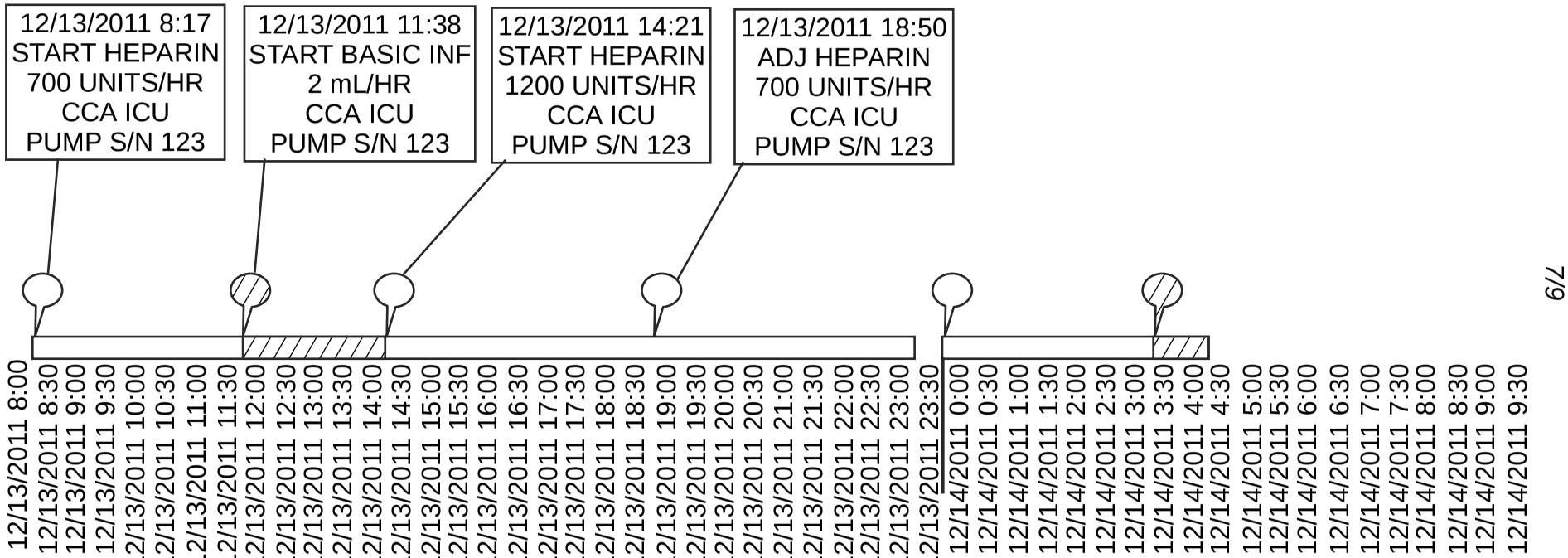


NUMBER OF INFUSIONS	34
AVERAGE DOSE	1065.56
STANDARD DEVIATION	154.35

Fig. 7

DISPLAYED NAME	CCA NAME	MED. AMT	MED. UNIT	DILUENT AMOUNT	DILUENT UNIT	MED. MAX. RATE	DOSE RATE DOSING UNIT	DOSE RATE LHL	DOSE RATE LSL	DOSE RATE USL	DOSE RATE UHL	COMPLI-ANCE
EPINEPHRINE	ICU	5	mg	250	mL		mcg/min		0.5	15		98.2%
EPINEPHRINE	ICU	16	mg	250	mL		mcg/min		0.5	15		99.5%
EPINEPHRINE-mc g/kg/min DOSING	ICU	5	mg	250	mL		mcg/kg/min		0.01	0.5		100.0%
EPINEPHRINE-mc g/kg/min DOSING	ICU	16	mg	250	mL		mcg/kg/min		0.01	0.5		100.0%
ESMOLOL	ICU	2000	mg	100	mL		mcg/kg/min			300	500	100.0%
HEPARIN	ICU	25000	units	250	mL		units/hr	50	200	2000	2500	65.0%
ISOPROTERENOL	ICU	1	mg	50	mL		mcg/min		0.09	20		99.0%
ISOPROTERENOL mc g/kg/min DOSING	ICU	1	mg	50	mL		mcg/kg/min		0.01	0.3		98.5%
BASIC INFUSIONS	ICU						NUMBER OF INFUSIONS			6		0.0%

Fig. 8


12/13/2011 8:17
START HEPARIN
700 UNITS/HR
CCA ICU
PUMP S/N 123
12/13/2011 11:38
START BASIC INF
2 mL/HR
CCA ICU
PUMP S/N 123
12/13/2011 14:21
START HEPARIN
1200 UNITS/HR
CCA ICU
PUMP S/N 123
12/13/2011 18:50
ADJ HEPARIN
700 UNITS/HR
CCA ICU
PUMP S/N 123
12/13/2011 8:00
12/13/2011 8:30
12/13/2011 9:00
12/13/2011 9:30
12/13/2011 10:00
12/13/2011 10:30
12/13/2011 11:00
12/13/2011 11:30
12/13/2011 12:00
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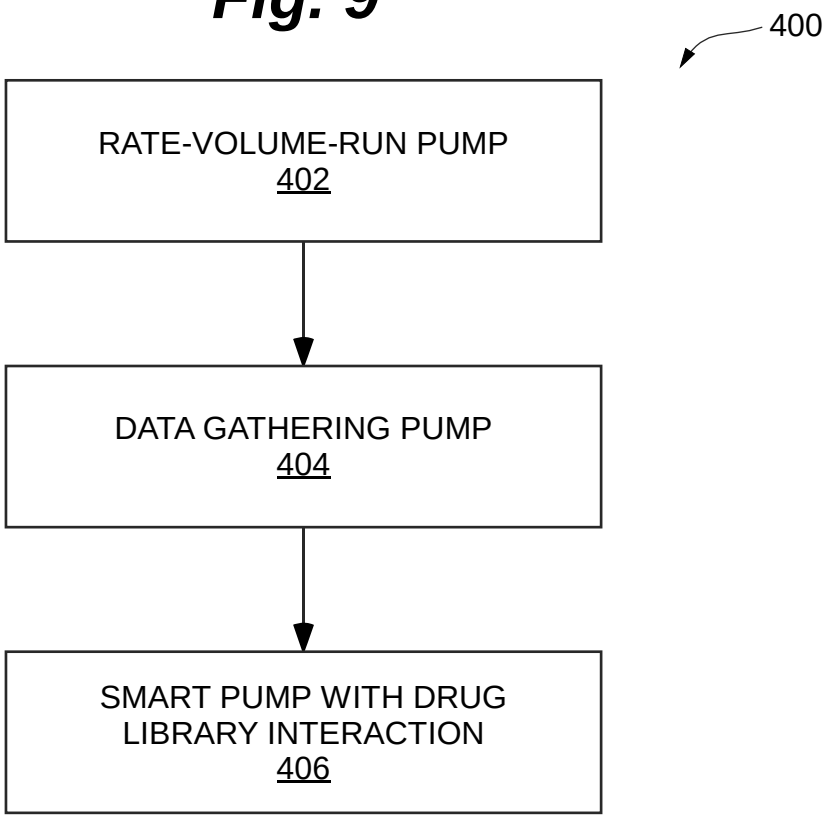
12/14/2011 6:30
12/14/2011 7:00
12/14/2011 7:30
12/14/2011 8:00
12/14/2011 8:30
12/14/2011 9:00
12/14/2011 9:30

Fig. 9


400
RATE-VOLUME-RUN PUMP
402
DATA GATHERING PUMP
404
SMART PUMP WITH DRUG LIBRARY INTERACTION
406

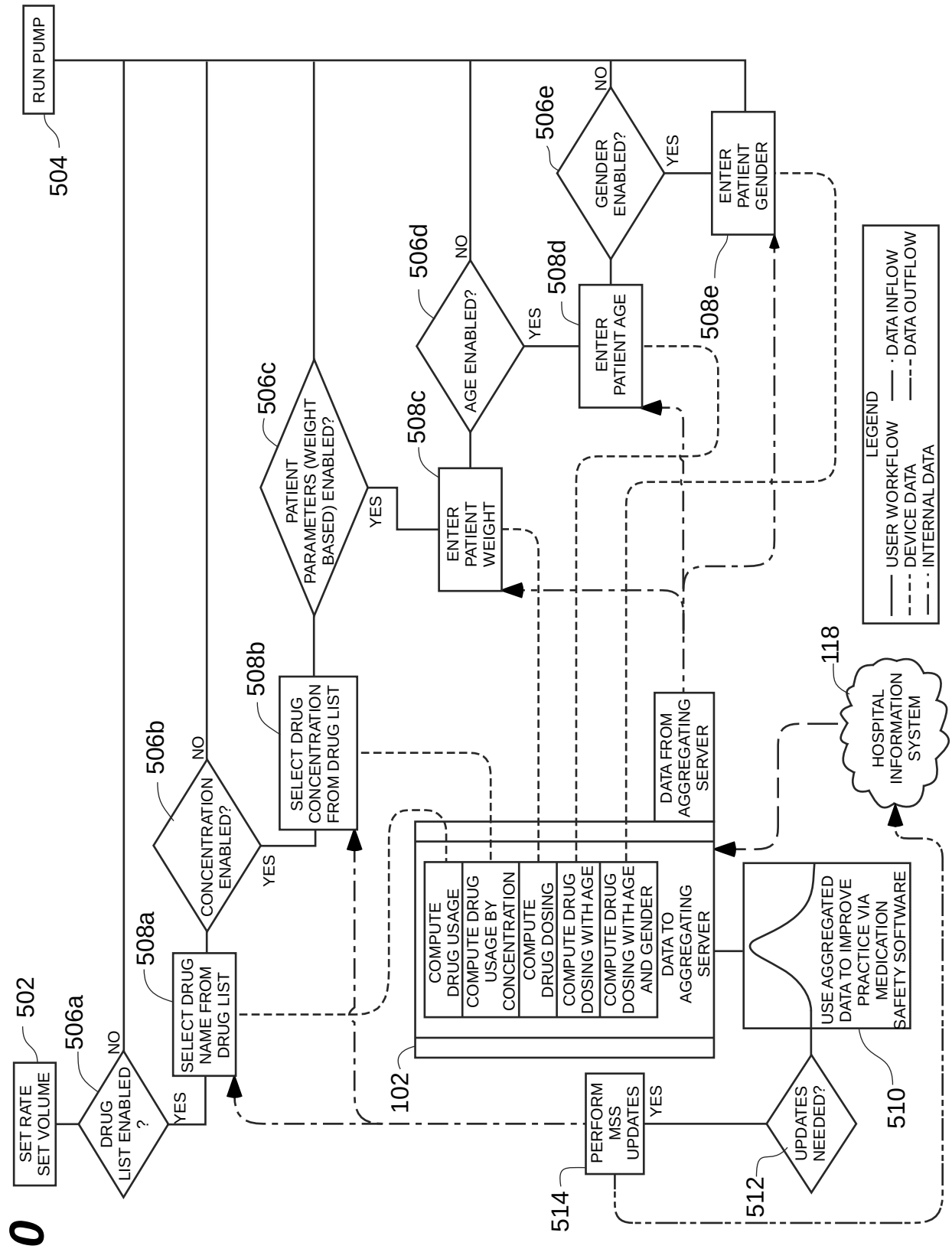

RUN PUMP
504
SET RATE SET VOLUME
502
DRUG LIST ENABLED ?
506a
NO
YES
SELECT DRUG NAME FROM DRUG LIST
508a
CONCENTRATION ENABLED?
506b
NO
YES
SELECT DRUG CONCENTRATION FROM DRUG LIST
508b
PATIENT PARAMETERS (WEIGHT BASED) ENABLED?
506c
YES
ENTER PATIENT WEIGHT
508c
AGE ENABLED?
506d
NO
YES
ENTER PATIENT AGE
508d
GENDER ENABLED?
506e
NO
YES
ENTER PATIENT GENDER
508e
LEGEND
USER WORKFLOW
DEVICE DATA
INTERNAL DATA
DATA INFLOW
DATA OUTFLOW
HOSPITAL INFORMATION SYSTEM
118
DATA FROM AGGREGATING SERVER
COMPUTE DRUG USAGE
COMPUTE DRUG USAGE BY CONCENTRATION
COMPUTE DRUG DOSING
COMPUTE DRUG DOSING WITH AGE
COMPUTE DRUG DOSING WITH AGE AND GENDER
DATA TO AGGREGATING SERVER
102
USE AGGREGATED DATA TO IMPROVE PRACTICE VIA MEDICATION SAFETY SOFTWARE
510
UPDATES NEEDED?
512
YES
PERFORM MSS UPDATES
514

Fig. 10