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Number of GenBank Hits										
MDRO Assay	Escherichia coli	Klebsiella pneumoniae	Serratia marcescens	Acinetobacter baumannii	Pseudomonas aeruginosa	Enterobacter cloacae	Citrobacter freundii	Enterococcus faecalis	Enterococcus faecium	Staphylococcus aureus
KPC	8	71	1	1	8	6	5			
NDM	36	>100		21	10	4	4		1	
VIM(A)	1	7	4	9	>100	5	1			
VIM(B)		7	4	9	>100	5	1			
VIM(C)		1		1	2	2				
IMP(A)	2	4	10	6	32	1	1			
IMP(B)	2	4	10	6	32	1	1			
OXA(A)				20						
OXA(B)		1		>100						
OXA(C)	2	15				3	1			
CTX-M(A)	>100	94	3	4	1	15	4			
CTX-M(B)	16	56		3	13	1				
VanA								9	21	2

FIG. 1

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Organism	Genotype	MDRO Assay	LOD (CFU/swab)	Ct value for LOD
<i>E. cloacae</i>	KPC 3	Kpc	84	15
<i>K. pneumoniae</i>	CTX-M-28	Ctx-M(A)	79	15
<i>K. pneumoniae</i>	OXA 48	Oxa(C)	79	14
<i>K. pneumoniae</i>	IMP-1	Imp(A)	13	19
<i>S. marcescens</i>	VIM-4	Vim(A)	154	16
<i>K. pneumoniae</i>	NDM-1	NDM	93	16
<i>A. baumannii</i>	OXA-23	OXA(B)	109	14
<i>E. faecium</i>	Van A	Van A	207	18
<i>K. pneumoniae</i>	CTX-M-2	CTX-M(B)	151	15
<i>E. Cloacae</i>	VIM-5	VIM(C)	154	14
<i>P. aeruginosa</i>	VIM-2	VIM(B)	37	16
<i>K. Pneumoniae</i>	CTX-M-1	CTX-M(A)	38	17
<i>K. Pneumoniae</i>	IMP-8	IMP(B)	66	17
<i>A. baumannii</i>	??	OXA(A)	11	18

CFU = colony forming units of bacteria

FIG. 2

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Species	Reported Genotype	Assay Result from OpGen's MDRO Test	Species	Reported Genotype	Assay Result from OpGen's MDRO Test
<i>E. coli</i>	NDM-1	Ndm	<i>E. cloacae</i>	VIM-2	Vim (A) and Vim (B)
<i>K. pneumoniae</i>	CTX-M-15	Ctx-M(A)	<i>K. pneumoniae</i>	CTX-M-14 and IMP-1	Imp (A)
<i>P. aeruginosa</i>	VIM-2	Vim (A) and Vim (B)	<i>K. pneumoniae</i>	IMP-8	Imp (B)
<i>E. cloacae</i>	KPC-3	Kpc	<i>K. pneumoniae</i>	CTX-M-65	negative
<i>E. cloacae</i>	VIM-5	Vim-C	<i>K. pneumoniae</i>	CTX-M-38	negative
<i>E. coli</i>	CTX-M-15 and NDM-4	Ctx-M(A) and Ndm	<i>K. pneumoniae</i>	CTX-M-15 OXA-181	CTX-M(A), OXA (C)
<i>E. coli</i>	CTX-M-15	Ctx-M(A)	<i>S. marcescens</i>	CTX-M-2, CMY-2	CTX-M (B)
<i>E. coli</i>	TEM-29	negative	<i>E. coli</i>	CTX-M-8	negative
<i>E. coli</i>	SHV-31	negative	<i>S. marcescens</i>	OXA-48	OXA (C)
<i>E. coli</i>	VIM	Vim (A) and Vim (B)	<i>S. marcescens</i>	CTX-M-15; ACT/MIR; NDM-1; OXA-181	CTX-M(A), Ndm, Oxa(C)
<i>P. aeruginosa</i>	CTX-M-2	Ctx-M(B)	<i>E. cloacae</i>	CTX-M-9; ACT/MIR;	negative
<i>E. cloacae</i>	KPC-3	Kpc	<i>E. cloacae</i>	CTX-M-2	CTX-M (B)
<i>E. coli</i>	CTX-M-15 and NDM-1	Ctx-M(A) and Ndm	<i>E. coli</i>	CTX-M-65	negative
<i>E. cloacae</i>	CTX-M-15 and IMP-26	Ctx-M(A) and Imp(A)	<i>E. coli</i>	KPC-2	Kpc
<i>K. pneumoniae</i>	NDM-1	Ndm	<i>E. coli</i>	CTX-M-14	negative
<i>K. pneumoniae</i>	CTX-M-15 and IMP-4	Ctx-M(A) and Imp(A)	<i>E. cloacae</i>	KPC-2	Kpc
<i>S. marcescens</i>	VIM-4	Vim (A) and Vim (B)	<i>E. cloacae</i>	CTX-M-14, NDM	Ndm
<i>P. aeruginosa</i>	VIM-4	Vim (A) and Vim (B)	<i>E. cloacae</i>	CTX-M-2	CTX-M (B)
<i>K. pneumoniae</i>	CTX-M-15 and VIM-27	Ctx-M(A), Vim(A) and Vim(B)	<i>K. oxytoca</i>	KPC-2	Kpc
<i>K. pneumoniae</i>	VIM-26	Vim (A) and Vim (B)	<i>K. pneumoniae</i>	SHV-11(b), CTX-M-9	negative
<i>K. pneumoniae</i>	VIM-1	Vim (A) and Vim (B)	<i>E. cloacae</i>	SHV-31(e), TEM-1(b), CTX-M-15, NDM-1	CTX-M(A), Ndm
<i>E. coli</i>	CTX-M-15	Ctx-M(A)	<i>K. oxytoca</i>	SHV-1(b), TEM-1(b), CTX-M-15	CTX-M(A)
<i>P. aeruginosa</i>	IMP-13	Imp(B)	<i>C. freundii</i>	KPC-2	Kpc
<i>S. marcescens</i>	CTX-M-22 and OXA-48	Ctx-M(A) and Oxa-C	<i>K. pneumoniae</i>	CTX-M-2	CTX-M (B)
<i>K. pneumoniae</i>	CTX-M-26 and OXA-48	Ctx-M(A) and Oxa-C	<i>K. pneumoniae</i>	SHV-11(b), KPC-3	Kpc
<i>E. coli</i>	CTX-M-55 and CTX-M-79	Ctx-M(A)	<i>C. freundii</i>	CTX-M-15	CTX-M(A)
<i>K. pneumoniae</i>	KPC-2	Kpc	<i>E. coli</i>	TEM-1(b), CTX-M-14, OXA-48	OXA (C)
<i>P. aeruginosa</i>	CTX-M-3 and VIM-4	Ctx-M(A), Vim(A) and Vim(B)	<i>K. pneumoniae</i>	SHV-11(b), TEM-1(b), CTX-M-27	negative
<i>E. cloacae</i>	SHV-38	negative	<i>E. cloacae</i>	SHV-1(b), CTX-M-9	negative
<i>K. pneumoniae</i>	TEM-20, CMY-2	negative	<i>K. oxytoca</i>	CTX-M-14	negative
<i>E. coli</i>	SHV-12(e), TEM-1(b), CTX-M-22, DHA-1	CTX-M(A)	<i>E. coli</i>	SHV-5(e), CTX-M-27	negative
<i>S. marcescens</i>	KPC-2	Kpc	<i>K. oxytoca</i>	CTX-M-15	CTX-M(A)

FIG. 3

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Assay	Ct Values						Ct Values					
	Positive Control	Negative Control	No Template Control	Day One			Positive Control	Negative Control	No Template Control	Day Two		
				High Target Level	Mid Target Level	Low Target Level				High Target Level	Mid Target Level	Low Target Level
KPC	13	NEG	NEG	4 4 4	9 8 8	12 13 11	12	NEG	NEG	4 4 5	7 7 7	11 11 10
NDM	14	NEG	NEG	5 5 5	9 9 9	12 14 12	13	NEG	NEG	6 5 4	8 8 8	12 12 11
VIM(A)	17	NEG	NEG	8 8 8	14 12 13	16 18 15	14	NEG	NEG	7 8 9	12 11 11	14 14 13
VIM(B)	17	NEG	NEG	8 9 9	13 13 13	16 18 15	15	NEG	NEG	8 10 11	13 12 11	15 15 14
VIM@	10	NEG	NEG	3 3 3	5 5 5	8 9 6	8	NEG	NEG	3 3 3	4 4 4	7 7 5
IC	13	11	14	12 11 11	12 13 12	12 14 12	13	12	999	12 12 12	12 12 12	12 12 12
OXA(A)	13	NEG	NEG	5 5 5	9 9 8	12 14 12	12	NEG	NEG	5 5 5	7 7 7	11 11 10
OXA(B)	12	NEG	NEG	4 4 5	8 7 7	11 13 11	12	NEG	NEG	5 5 6	8 7 7	11 10 10
OXA@	15	NEG	NEG	6 6 6	10 10 10	14 15 13	13	NEG	NEG	5 5 5	8 8 8	12 11 10
IMP(A)	18	NEG	NEG	8 8 9	13 12 12	16 17 15	14	NEG	NEG	6 6 6	9 9 9	13 12 11
IMP(B)	18	NEG	NEG	9 10 9	14 14 13	17 18 17	15	NEG	NEG	8 8 8	10 11 11	15 14 13
VAN A	12	NEG	NEG	4 4 4	7 7 7	10 12 10	8	NEG	NEG	3 3 3	4 4 4	8 7 6
CTX(A)	14	NEG	NEG	6 6 6	10 10 10	14 15 13	13	NEG	NEG	6 6 6	9 8 9	12 13 12
CTX(B)	15	NEG	NEG	6 6 6	11 11 10	15 15 14	13	NEG	NEG	5 5 5	8 8 8	12 12 10

FIG. 4

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		* ACC-1 * ACC-3 * MOX-1/CMY-1 * CMY-2/CFE-1 * CMY-41	AmpC
CRE	* KPC-2 * NDM-1 * OXA-48 * VIM-1/VIM-13 * IMP-1	* ACT-1/MIR-1 * DHA-1 * FOX-1	
		* IMP-5 * OXA-2	
		* OXA-10 * OXA-18 * OXA-23 * OXA-24 * OXA-45 * OXA-50 * OXA-51 * OXA-54 * OXA-55 * OXA-58 * OXA-60 * OXA-62 * IMI-1/NMC-A * SME-1 * GIM-1 * SPM-1 * SFC-1	
ResistomeTest: for colony isolates			
ESBL	* CTX-M-1 * CTX-M-2 * CTX-M-8/25 * CTX-M-9 * SHV-238/240 * SHV-156 * TEM-104 * TEM-164 * TEM-G238/240 * BEL-1 * VEB-1 * GES-1 * PER-1 * SFO-1 * BES-1 * TLA-1		Carbapenemase

FIG. 5

Resistome Test Screening to Establish Evolution Tree

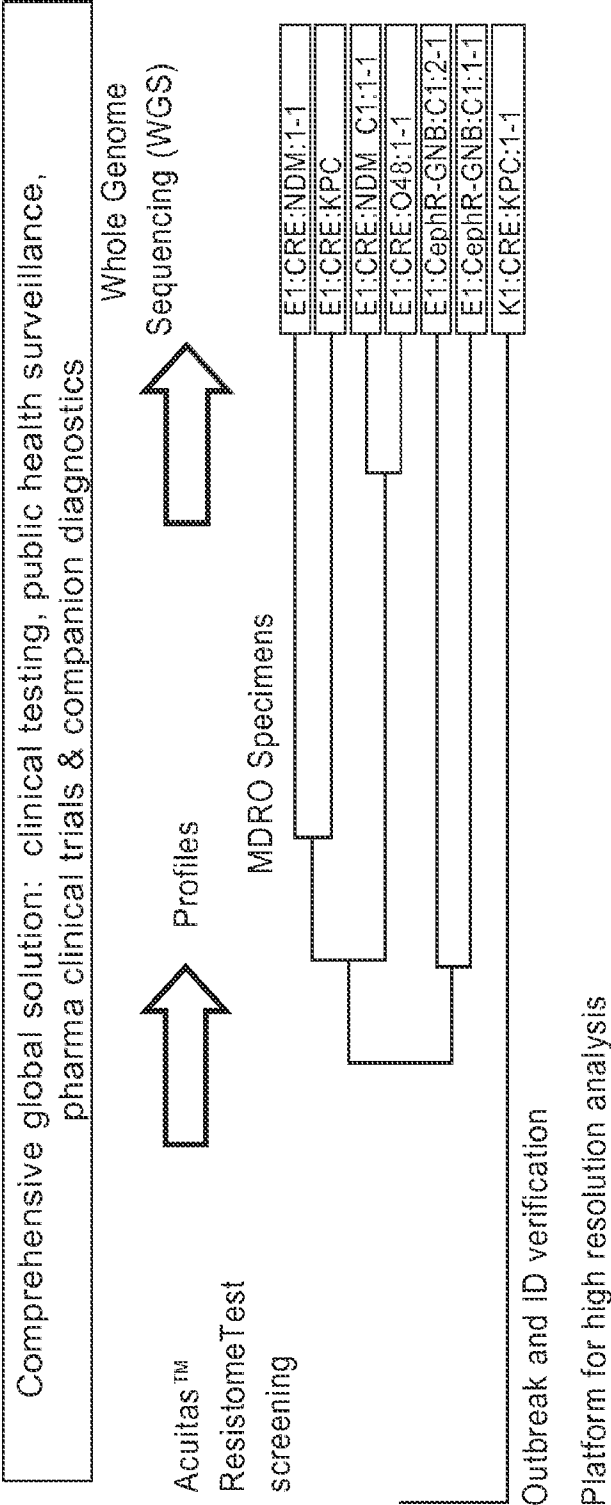
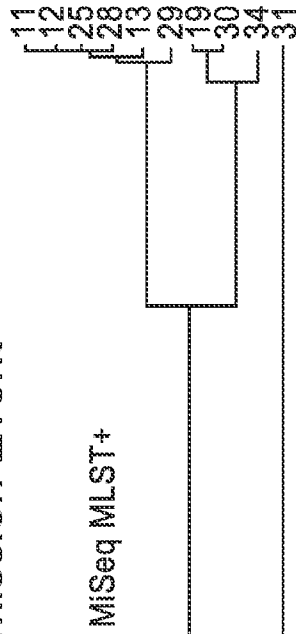


FIG. 6

Complete Solution for High-resolution Transmission Event Confirmation



Positive Results from MDRO Gene Test				Positive Results from Resistome Test					Positive Results from Whole Genome Sequencing					
Sample	KPC	CTX-M	Lighthouse Profile	KPC	CTX-M	OXA	SHV	TEM	Lighthouse Profile	KPC	CTX-M	OXA	SHV	TEM
11	KPC		K1:CRE:KPC	KPC		OXA-2	wild type	wild type	K1:CRE:KPC_O2_S4_T4	KPC-3		OXA-2	SHV-11	TEM-1
12	KPC		K1:CRE:KPC	KPC		OXA-2	wild type	wild type	K1:CRE:KPC_O2_S4_T4	KPC-3		OXA-2	SHV-11	TEM-1
25	KPC		K1:CRE:KPC	KPC		OXA-2	wild type	wild type	K1:CRE:KPC_O2_S4_T4	KPC-3		OXA-2	SHV-11	TEM-1
28	KPC		K1:CRE:KPC	KPC		OXA-2	wild type	wild type	K1:CRE:KPC_O2_S4_T4	KPC-3		OXA-2	SHV-11	TEM-1
13	KPC		K1:CRE:KPC	KPC		OXA-2	wild type	wild type	K1:CRE:KPC_O2_S4_T4	KPC-3		OXA-2	SHV-11	TEM-1
29	KPC		K1:CRE:KPC	KPC		OXA-2	wild type	wild type	K1:CRE:KPC_O2_S4_T4	KPC-2		OXA-2	SHV-11	TEM-1
19	KPC		K1:CRE:KPC	KPC			ESBL 238/240	wild type	K1:CRE:KPC_S1_T4	KPC-2			SHV-12	TEM-1
30	KPC		K1:CRE:KPC	KPC			ESBL 238/240	wild type	K1:CRE:KPC_S1_T4	KPC-2			SHV-12	TEM-1
34	KPC		K1:CRE:KPC	KPC			wild type	wild type	K1:CRE:KPC_S4_T4	KPC-2			SHV-11	TEM-1
31	KPC	CTX-M-1	K1:CRE:KPC C1	KPC	CTX-M-1	OXA-50	wild type	wild type	K1:CRE:KPC C1	KPC-2	CTX-M-15	OXA-50	SHV-28	TEM-1

FIG. 7

Environmental and Anatomical Maps Using Resistome Test Results:
Hypothetical Examples

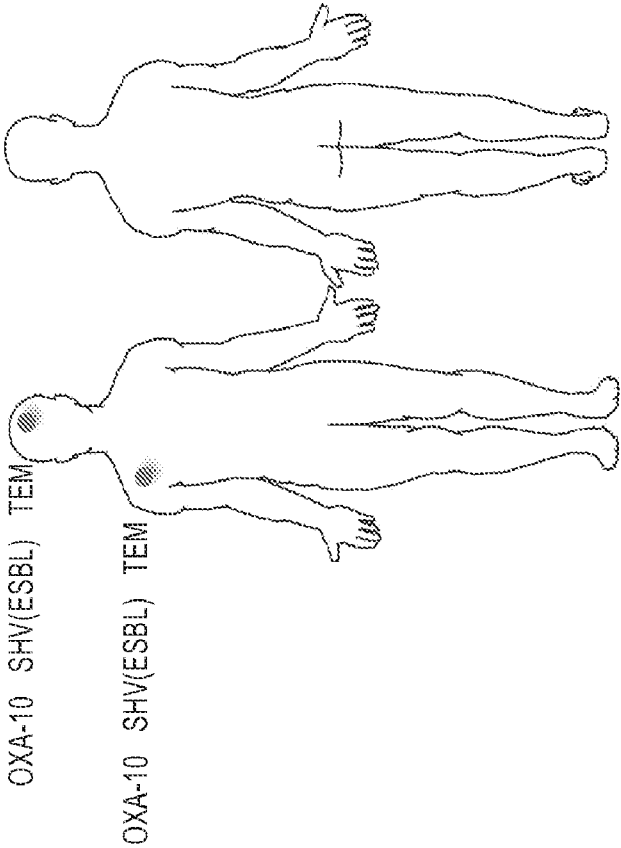
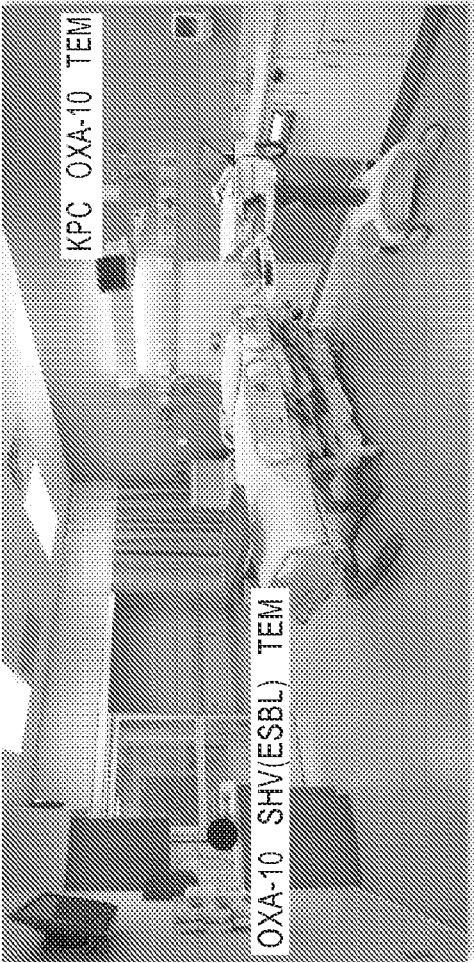


FIG. 8

Resistome Test Patient Map: Hypothetical Example- Baumanii Bay Hospital

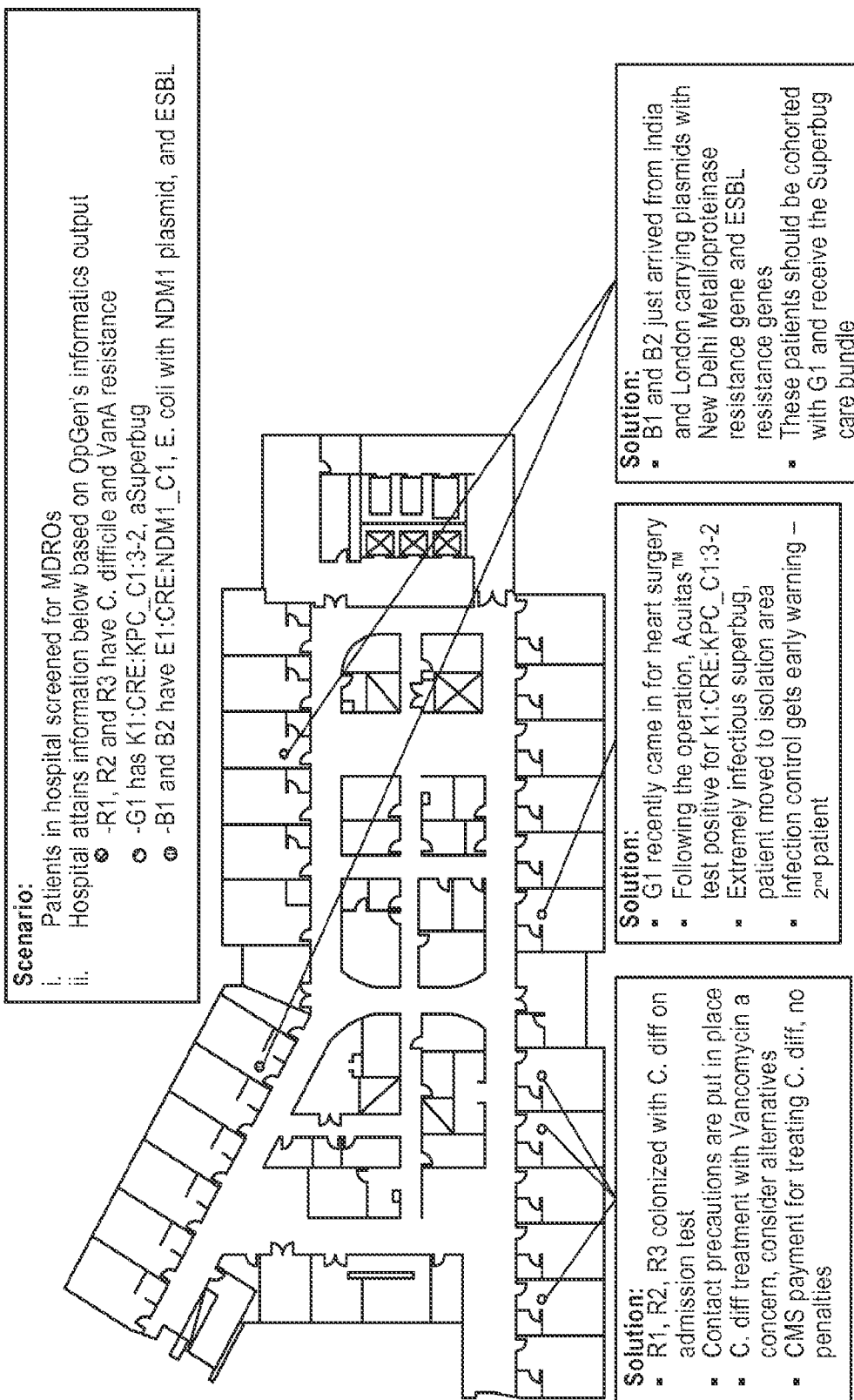


FIG. 9