Disclosure

NUHS
National University Health System

I have no actual or potential conflict of interest in the relation to this presentation.

Research

Clinical Care

Education

NUH National University Hospital | NUS National University of Singapore | Yong Loo Lin School of Medicine & Faculty of Dentistry

NUHS
National University
Health System

When is an outbreak an outbreak and does it matter?

Salmon S , Guo M , Jureen R, Chang J, Chong L, Ong S, Mahdi R and Fisher D

Research

Clinical Care

Education

Guo Mingming

Senior Staff Nurse
Infection Prevention Team
National University Hospital, Singapore

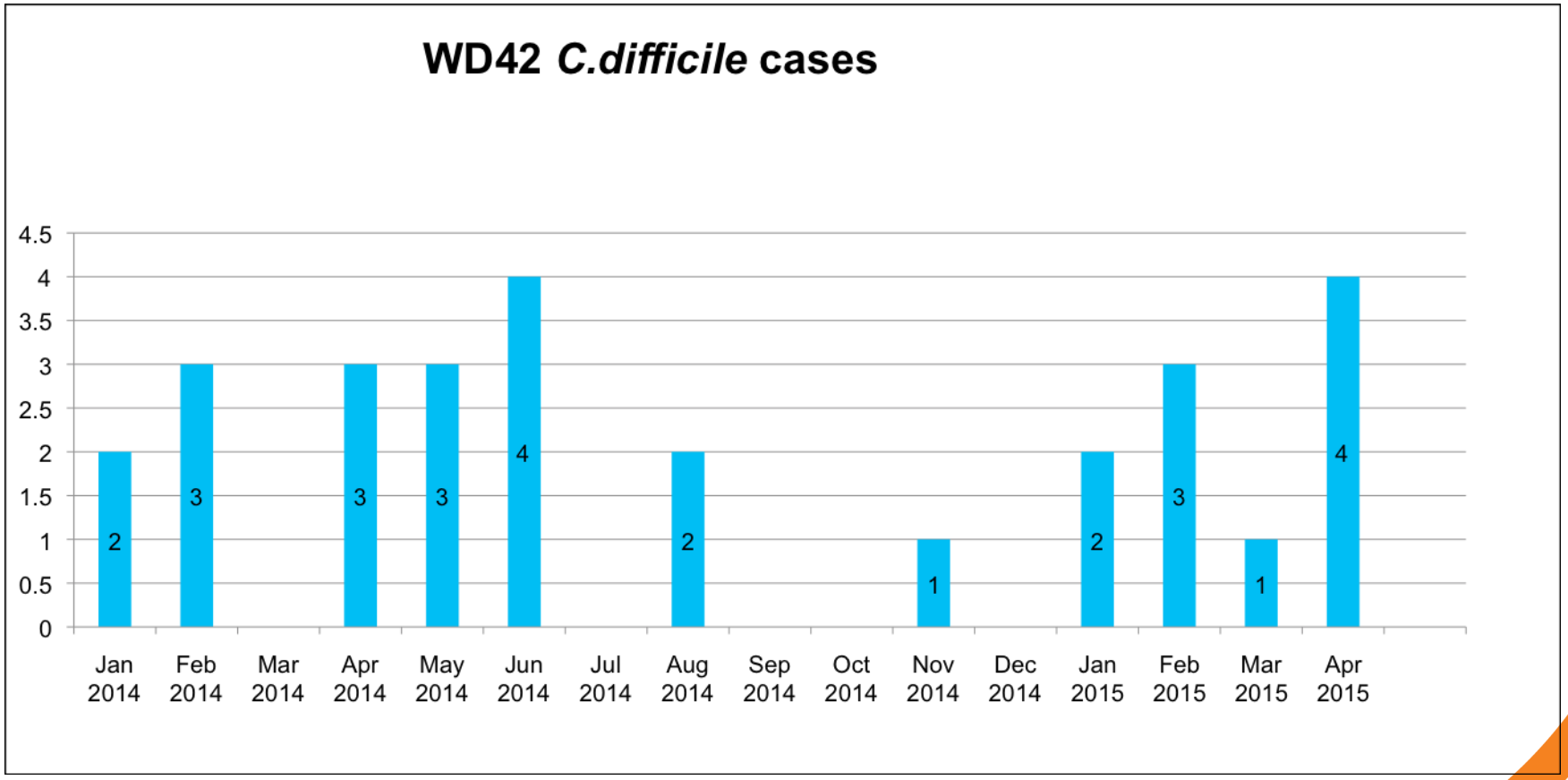
NUH National University Hospital | NUS National University of Singapore | Yong Loo Lin School of Medicine & Faculty of Dentistry

National University Hospital (NUH)

- Acute tertiary care – academic hospital
- 1,100 inpatient beds
- ~61,500 discharges per year
- 33 medical specialty services, including- Cardiology, Paediatrics & Oncology
- Robust infection prevention program including active surveillance and hand hygiene

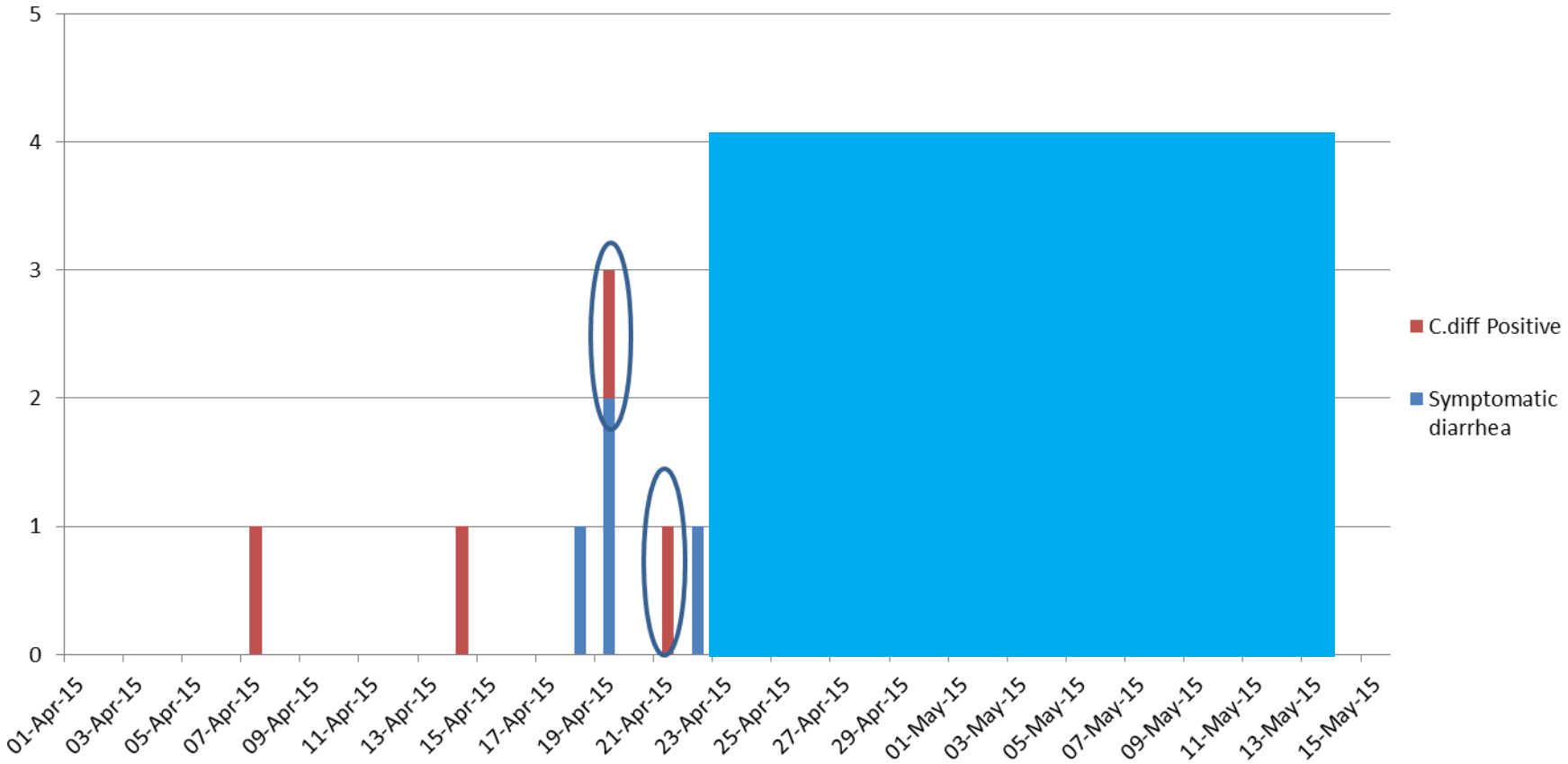
Infection Prevention Team alerted …

- **23 April 2015**
- **Laboratory surveillance detected 4 cases *C.difficile* in Ward 42.**



In the beginning…

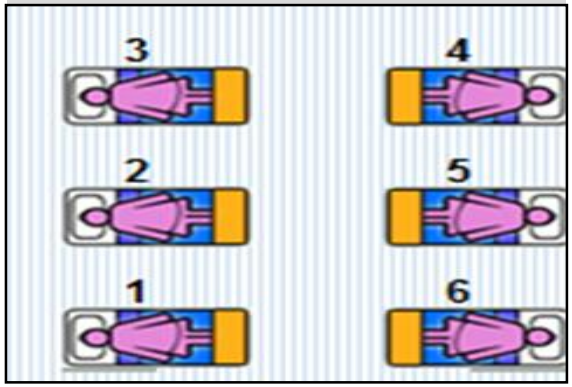
- **2 *C.difficile* positive cases within same shared patient cubicle**
- **The 4 remaining patients were symptomatic with diarrhea**



Ward 42

- Short stay general medical ward
- Bed capacity 44
  - 6 bed cubicles
  - 2 single rooms
- WD42 *C.difficile* incidence rate: ~2 cases per month

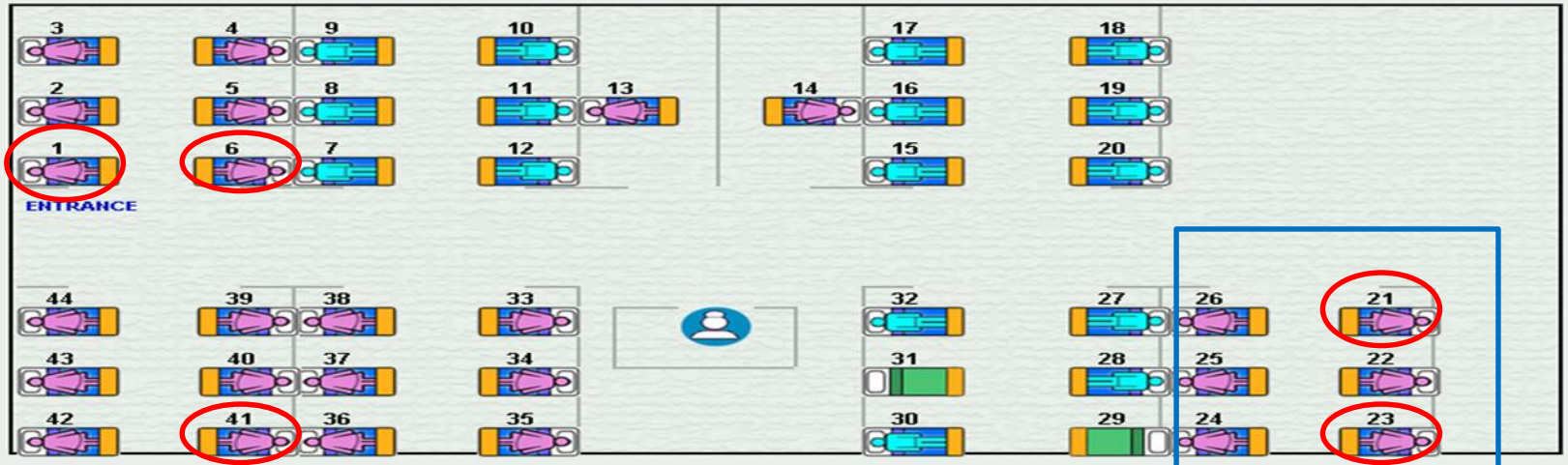
6 bedded room configuration



Outbreak investigation triggered

Day 1 of the Investigation

		Mar-15	Apr-15																																May-15					
No.	Patient Name	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6
1	MMFN	w42/41							X	w42/13								d/c																					
2	NPT												w42/01			X	w42/14								w61/16													
3	GT																		w42/21		X		w62/5															
4	LHF																			w42/23		X	w42/13		w62/8													
5	CSH																					w42/6			X w62/12													



Outbreak Response Team

Objective: To stop the outbreak by identifying the cause and contributing factors, prevent future outbreaks by enhancing infection prevention and control measures.

Outbreak Team:
Ward nursing and medical staff, ID, Epidemiologist, Microbiologist, Housekeeping, Inpatient Operations, IC.

Case definition

A confirmed case must meet the criteria below:

- Patients from WD42 with active diarrhea (loose or watery stool).
- Patient must have a positive *C. difficile* toxin assay or a positive *C.difficile* molecular assay result.

Healthcare facility–onset (HO)

Specimen collected >3 days after admission to the facilty(i.e., on or after day4)

Community-onset Health care Facility-Associated (CO-HCFA):

Specimen collected from a patient who was discharged from the facility ≤4 weeks prior to current date of stool specimen collection.

Community-Onset (CO):

Specimen collected as an outpatient or an inpatient ≤ 3 days after admission to the facility (i.e., days 1, 2, or 3 of admission).

- USCDC *C.difficile* case definition

Infection Prevention Measures

Day 1- 14 of the Investigation

Prompt Isolation

- Confirmed cases
- Symptomatic cases

Hand Hygiene

- Hand washing
- Additional Hand Hygiene signs
- Hand washing followed by Hand rub

Contact precautions

- PPE for confirmed and symptomatic cases
- Dedicated medical equipment

Environmental Cleaning

- Whole ward bleach cleaning
- Bleach based solution for high-touch and general cleaning

Equipment Cleaning

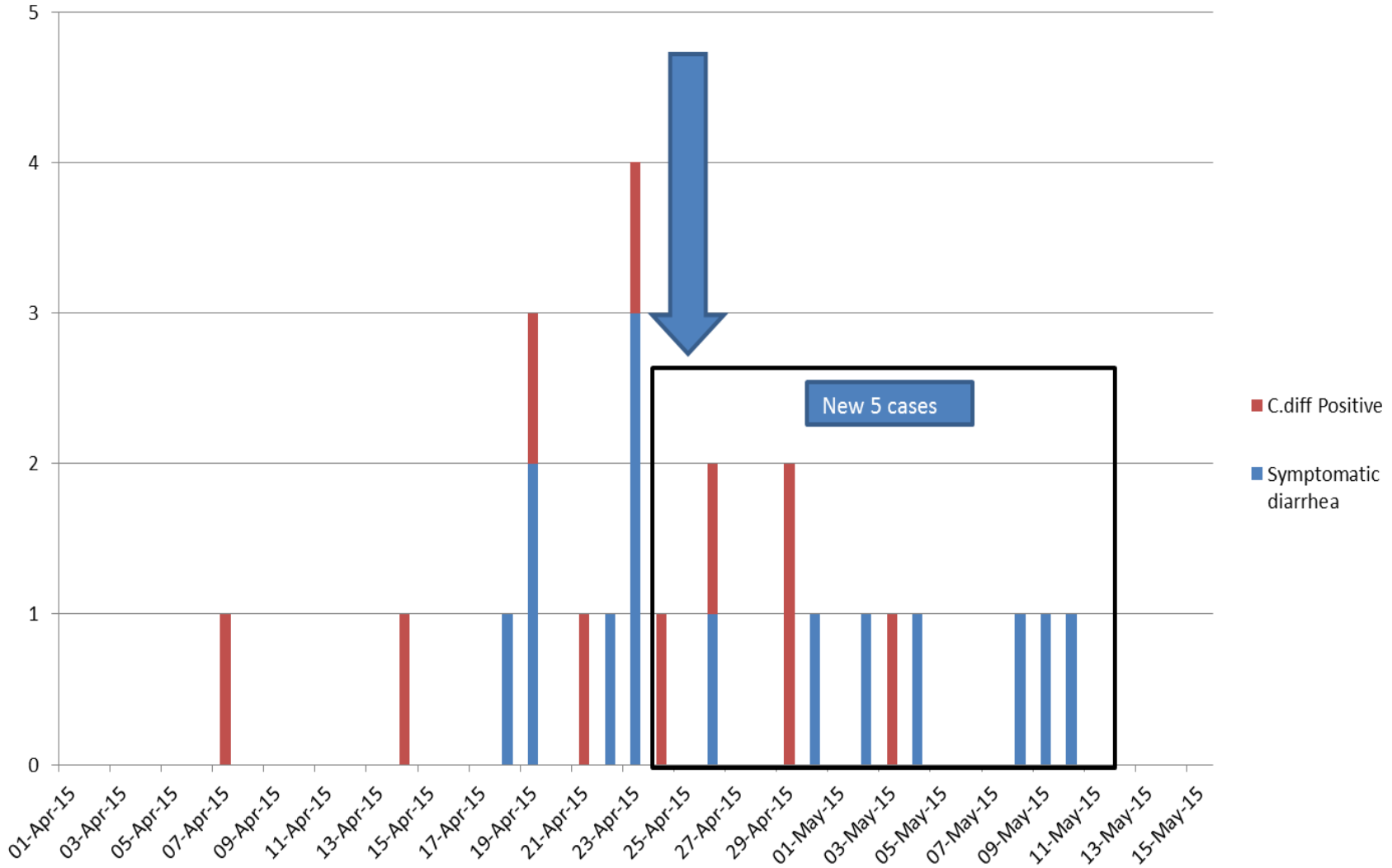
- Hydrogen Peroxide Vapor for shared equipment
- Bleach and disposable cloths

Training and Sharing

- Hand washing technique
- *C.difficile* transmission
- Cleaning methods
- Hand hygiene audits

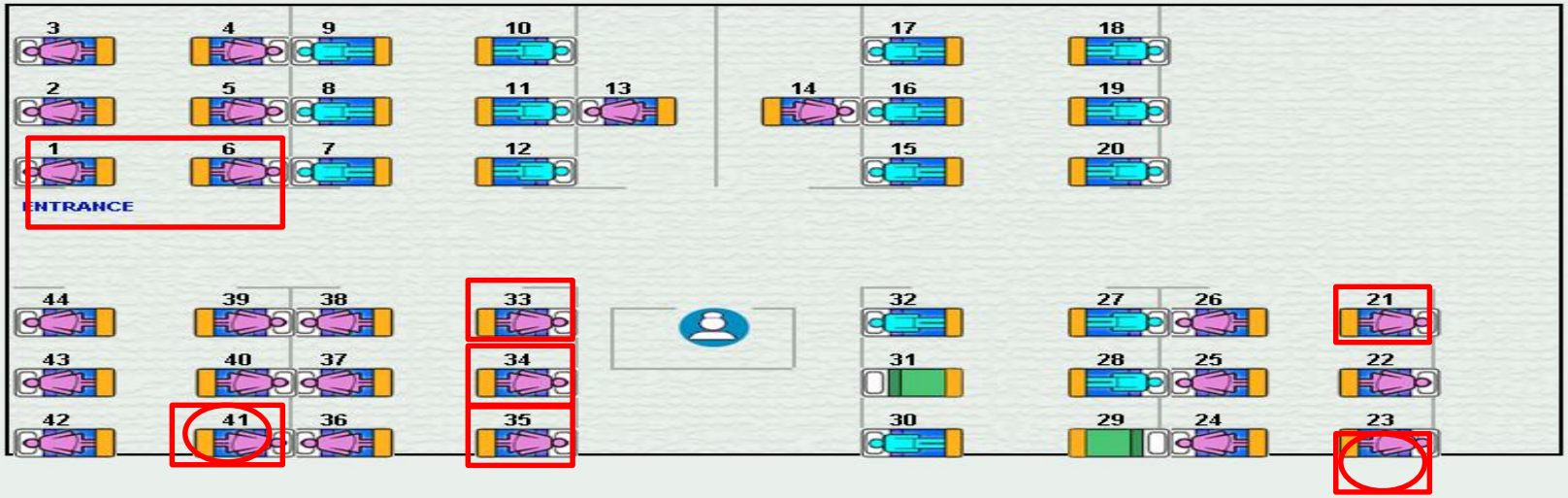
More cases ….

Day 14 of the Investigation



Line listing and Land Map

		Mar-15	Apr-15																													May-15					
No.	Patient Name	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6
1	MMFN	w 42/41							X	w 42/13								d/c																				
2	NPT												w 42/01			X	w 42/14								w 61/16													
3	GT																		w 42/21		X		w 62/5															
4	LHF																			w 42/23		X	w 42/13		w 62/8													
5	CSH																					w 42/6			X w 62/12													
6	RBS															w 42/33											X	w 62/8										
7	LAK																										w 42/35 X		w 26/8									
8	KMW																										w 42/21			w 42/34X								
9	CGY																											w 42/23			X		w 62/5					
10	ROT																								w 42/41			w 42/13						X			w 55/4	



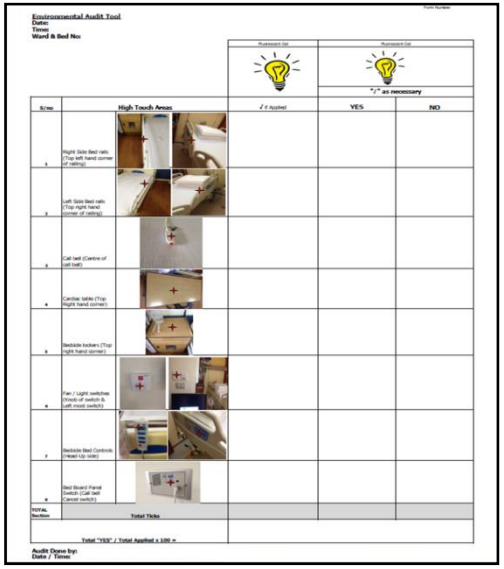
Confirmed Cases Summary

Patient initials	Demo	DOA	Onset date of diarrhoea	C. diff	Bed No	CA / HA	IC Measures
MFN	83 yo Female	31-Mar-15	07-Apr-15	07-Apr-15	41	HA	Strict contact precaution hand washing. Stat terminal cleaning and daily HT cleaning.
NPT	77 yo Female Previous h/o C.diff diarrhoea	11-Apr-15	14-Apr-15	14-Apr-15	1	HA	Strict Isolation ASAP. Terminal cleaning upon transfer and discharge.
GT	88 yo Female	17-Apr-15	18-Apr-15	19-Apr-15	21	CO-HA	Stool samples were sent for C.diff for all symptomatic diarrheal patients.
LHF	83 yo Female; NH resident	16-Apr-15	19-Apr-15	21-Apr-15	23	HA	IC measures reinforced to ward staff (roll call, HH, cleaning…)
CSH	95 yo Female	20-Apr-15	19-Apr-15	23-Apr-15	6	CA	Strict Isolation ASAP.
RBS	59 yo Female; NH resident	14-Apr-15	23-Apr-15	24-Apr-15	33	HA	Confirmed C.diff outbreak in WD42. Terminal cleaning of the whole ward.
LAK	82 yo Female	25-Apr-15	26-Apr-15	26-Apr-15	35	CA	Enhanced IC procedures. Review audit results
KMW	45 yo Female	25-Apr-15	25-Apr-15	29-Apr-15	34	HA	Usage of Sporicidal wipes for equipment cleaning
CGY	95 yo Female	24-Apr-15	24-Apr-15	29-Apr-15	23	HA	ES to conduct environmental cleaning audit and review result weekly.
ROT	87 yo Female	23-Apr-15	03-May-15	03-May-15	41	HA	Review IC intervenes.

Review infection prevention practices

Day 14 of the Investigation

- Interview staff (Nurses, Environmental services)
- Conduct audit and observations (hand hygiene, PPE & cleaning)



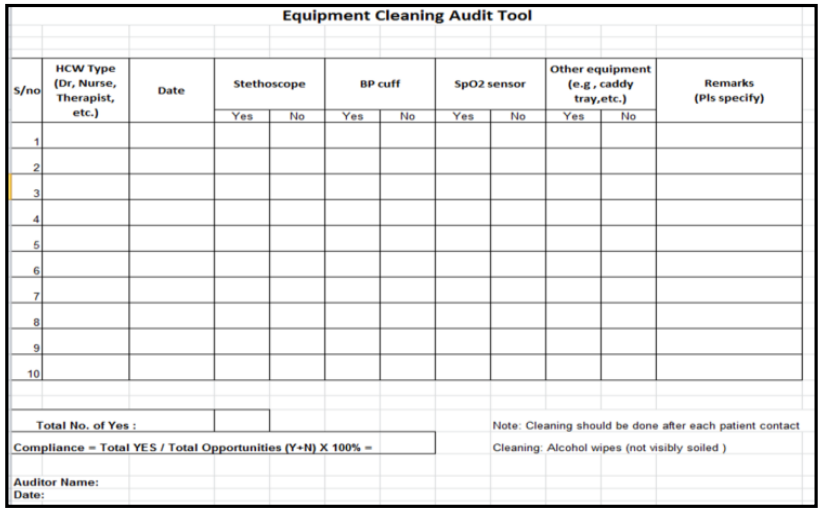
Environmental Audit Tool

Date:
Time:
Ward & Bed No:

S/no	High Touch Areas	✓ if Applied	YES	NO
1	Right Side Bed rails (Top left hand corner of railing)			
2	Left Side Bed rails (Top right hand corner of railing)			
3	Call bell (Centre of call bell)			
4	Cardiac table (Top right hand corner)			
5	Bedside lockers (Top right hand corner)			
6	Fan / Light switches (Knob of switch & Left most switch)			
7	Bedside Bed Controls (Head Up side)			
8	Bed Board Panel Switch (Call bell Cancel switch)			
TOTAL Section	Total Ticks			

Total "YES" / Total Applied x 100 =

Audit Done by:
Date / Time:



Equipment Cleaning Audit Tool

S/no	HCW Type (Dr, Nurse, Therapist, etc.)	Date	Stethoscope		BP cuff		SpO2 sensor		Other equipment (e.g , caddy tray,etc.)		Remarks (Pls specify)
			Yes	No	Yes	No	Yes	No	Yes	No	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

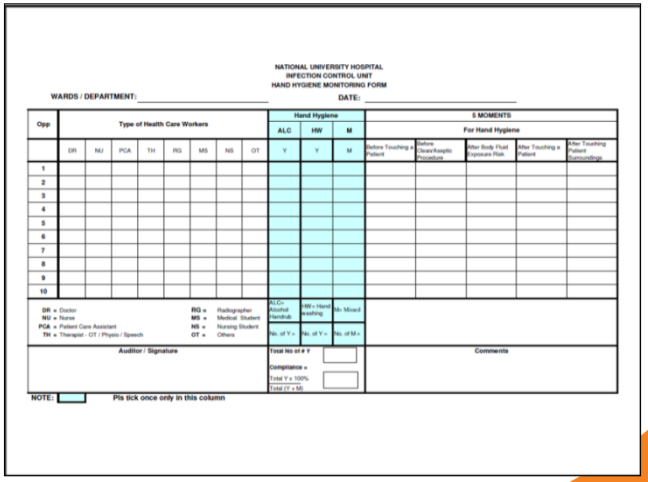
Total No. of Yes :

Note: Cleaning should be done after each patient contact

Compliance = Total YES / Total Opportunities (Y+N) X 100% =

Cleaning: Alcohol wipes (not visibly soiled)

Auditor Name:
Date:



NATIONAL UNIVERSITY HOSPITAL
INFECTION CONTROL UNIT
HAND HYGIENE MONITORING FORM

WARDS / DEPARTMENT: DATE:

Opp	Type of Health Care Workers								Hand Hygiene			5 MOMENTS For Hand Hygiene				
	DR	NU	PCA	TH	RG	MS	NS	OT	ALC Y	HW Y	M	Before Touching a Patient	Before Clean/Aseptic Procedure	After Body Fluid Exposure Risk	After Touching a Patient	After Touching Patient Surroundings
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																

DR = Doctor
NU = Nurse
PCA = Patient Care Assistant
TH = Therapist - OT / Physio / Speech
RG = Radiographer
MS = Medical Student
NS = Nursing Student
OT = Others

ALC= Alcohol Handrub
HW= Hand washing
M= Mixed

No. of Y =
No. of Y =
No. of M =

Auditor / Signature

Total No of # Y

Compliance =

Total Y x 100%
Total (Y + M)

Comments

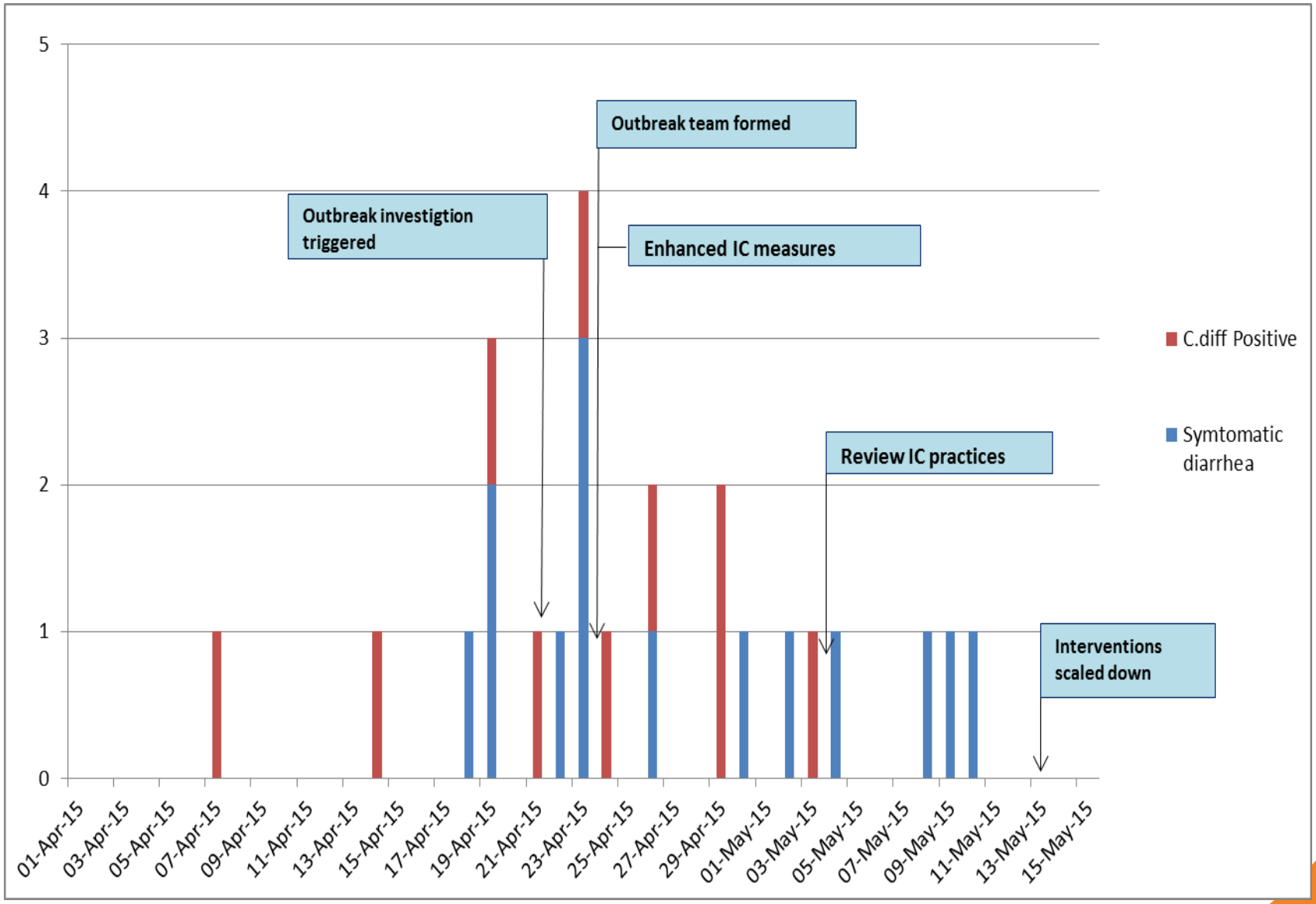
NOTE: Pls tick once only in this column

Review infection prevention practices

- Suboptimal Cleaning Processes
- Ineffective Cleaning Solutions e.g. alcohol wipes used for equipment cleaning
- Inaccurate hand hygiene auditing
- Knowledge gaps (PPE & stool collection)

- Review cleaning processes
- Ready-to-use sporicidal wipes
- Conduct re-training for hand hygiene audits
- Education (sample collection & transmission precautions)

Events Timeline



Laboratory results

Patient name (Age, gender)	Collection Date	NPHL STOOL no	CDI no	Organism	Toxigenic profile	Ribotype
N.P.T. (77, F)	14/04/2015	STOOL15042401	**CDI*1081**	*Clostridium difficile*	tcdB (+), tcdA truncated,	17
L.H.F. (83, F)	20/04/2015	STOOL15042402	**CDI*1062**	*Clostridium difficile*	tcdB (-), tcdA (-), cdtAB (-)	442
M.F.N. (83, F)	07/04/2015	STOOL15042403	**CDI*1063**	*Clostridium difficile*	tcdB (+), tcdA (+), cdtAB (-)	PR02349
G.T. (88, F)	19/04/2015	STOOL15042404	**CDI*1064**	*Clostridium difficile*	tcdB (+), tcdA (+), cdtAB (-)	26
O.B.K. (68, M)	15/04/2015	STOOL15042901	**CDI*1079**	*Clostridium difficile*	tcdB (+), tcdA (+), cdtAB (-)	202

Lessons learnt

- ❖Review cleaning workflows and processes
- ❖Ready-to-use wipes are easy to use and facilitate staff work processes
- ❖Open and honest communication
- ❖Ongoing training and education

Acknowledgements

Ward 42 nursing and medical Team

Environmental Services Team

Microbiologist

Hospital Operation

Infection Prevention Team

NUHS
National University
Health System

Thank you
for your attention

Research

Clinical Care

Education

NUH National University Hospital

NUS National University of Singapore

Yong Loo Lin School of Medicine
Faculty of Dentistry
Saw Swee Hock School of Public Health