

# Exploring the implementation of interventions to reduce catheter-associated urinary tract infections (ENACT)

## Appendices G to N

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## Appendix G: The BCTs, intervention functions, policy categories and TDF domains identified in each of the 37 research interventions

Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
Bell M and others (2016) (13)	Secondary care	Education Environmental restructuring Enablement	Guidelines Service provision	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Adding objects to the environment</li> <li>• Behavioural substitution</li> <li>• Restructuring the physical environment</li> <li>• Feedback on behaviour</li> <li>• Monitoring of behaviour by others without feedback</li> <li>• Self-monitoring of behaviour</li> <li>• Prompts or cues</li> <li>• Social support (practical)</li> </ul>	Skills Environmental Context and Resources Knowledge Memory, Attention and Decision Making Social professional role	Pre-insertion, insertion, maintenance and removal
Carr A and others (2017) (14)	Secondary care	Education Environmental restructuring Enablement Incentivisation	Service provision Communication and marketing Guidelines	<ul style="list-style-type: none"> <li>• Action planning</li> <li>• Social support (practical)</li> <li>• Instruction on how to perform a behaviour</li> <li>• Adding objects to the environment</li> <li>• Feedback on behaviour</li> <li>• Social reward</li> <li>• Social support unspecified</li> </ul>	Memory, Attention, Decision Making Social Influences Skills Environmental Context and Resources Knowledge	Pre-insertion, maintenance
Cartwright A (2018) (15)	Secondary care	Environmental restructuring Training Education	Service provision	<ul style="list-style-type: none"> <li>• Restructuring the physical environment</li> <li>• Instruction on how to perform a behaviour</li> <li>• Behavioural practice or rehearsal</li> </ul>	Environmental Context and Resources Skills	Insertion
Cho H and others (2017) (16)	Secondary care	Education Enablement Persuasion Environmental restructuring	Communication and marketing Service provision	<ul style="list-style-type: none"> <li>• Adding objects to the environment</li> <li>• Feedback on behaviour</li> <li>• Credible source</li> <li>• Instruction on how to perform a behaviour</li> <li>• Information about health consequences</li> <li>• Prompts or cues</li> </ul>	Environmental Context and Resources Skills Beliefs about Consequences Knowledge Memory, Attention Decision Making	Removal

Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
Davies P and others (2018) (17)	Secondary care	Education Enablement	Guidelines Service provision	<ul style="list-style-type: none"> <li>• Feedback on behaviour</li> <li>• Instruction on how to perform a behaviour</li> <li>• Action planning</li> </ul>	Knowledge Skills Memory, Attention, Decision Making	Pre-insertion, insertion, maintenance and removal
Dawson C and others (2017) (18)	Secondary care (NHS Trust)	Training Education Environmental restructuring Enablement	Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Monitoring of behaviour by others without feedback</li> <li>• Behavioural practice or rehearsal</li> <li>• Demonstration of behaviour</li> <li>• Prompts or cues</li> <li>• Adding objects to the environment</li> <li>• Behavioural substitution</li> </ul>	Skills Memory, Attention, Decision Making Environmental Context and Resources	Pre-insertion, removal
Dy S and others (2016) (19)	Secondary care	Education Enablement Training Environmental restructuring	Guidelines Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Demonstration of behaviour</li> <li>• Self-monitoring of behaviour</li> <li>• Social support (practical)</li> <li>• Adding objects to environment</li> <li>• Prompts or cues</li> </ul>	Skills Social professional role or identity Environmental Context and Resources Memory, Attention, Decision Making	Removal
Kachare and others (2014) (22)	Secondary care	Education Training Enablement Environmental restructuring	Guidelines Service provision	<ul style="list-style-type: none"> <li>• Instruction on how to perform the behaviour</li> <li>• Behavioural practical or rehearsal</li> <li>• Demonstration of behaviour</li> <li>• Monitoring of behaviours by others without feedback</li> <li>• Adding objects to the environment</li> </ul>	Skills Environmental Context and Resources	Pre-insertion, maintenance, removal
Halperin and others (2016) (20)	Secondary care	Education Training Environmental restructuring Enablement Incentivisation	Service provision	<ul style="list-style-type: none"> <li>• Instruction on how to perform the behaviour</li> <li>• Monitoring of behaviours by others without feedback</li> <li>• Adding objects to the environment</li> <li>• Demonstration of behaviour</li> <li>• Behavioural practice or rehearsal</li> <li>• Feedback on outcome of behaviour</li> <li>• Action planning</li> </ul>	Skills Environmental Context and Resources Knowledge Memory, Attention, Decision Making Social Influences	Pre-insertion, insertion, maintenance

Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
				<ul style="list-style-type: none"> <li>• Social reward</li> </ul>		
Johnson P and others (2016) (21)	Secondary care	Education Enablement Environmental restructuring	Service provision Guidelines	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Feedback on behaviour</li> <li>• Feedback on outcome of behaviour</li> <li>• Adding objects to the environment</li> <li>• Action planning</li> </ul>	Skills Environmental Context and Resources Knowledge Memory, Attention, Decision Making	Pre-insertion, maintenance, removal
Maxwell M and others (2018) (23)	Secondary care	Education Training Environmental restructuring Incentivisation Enablement	Service provision Enablement	<ul style="list-style-type: none"> <li>• Adding objects to the environment</li> <li>• Social support (practical)</li> <li>• Instruction on how to perform a behaviour</li> <li>• Goal setting (behaviour)</li> <li>• Monitoring of behaviour without others feedback</li> <li>• Monitoring outcomes of behaviour by others without feedback</li> <li>• Demonstration of behaviour</li> <li>• Behavioural practice or rehearsal</li> <li>• Credible source</li> <li>• Social reward</li> <li>• Material reward</li> <li>• Feedback on behaviour</li> <li>• Feedback on outcome of behaviour</li> <li>• Behavioural substitution</li> </ul>	Skills Environmental Context and Resources Knowledge Social Influences Goals Beliefs about Consequences	Pre-insertion, insertion, maintenance removal
McCalla and others (2018) (24)	Secondary care	Education Environmental restructuring	Service provision Guidelines	<ul style="list-style-type: none"> <li>• Adding objects to the environment</li> <li>• Feedback on behaviour</li> <li>• Instruction on how to perform a behaviour</li> </ul>	Environmental Context and Resources Skills Knowledge	Pre-insertion, maintenance and removal
Miller and others (2016) (25)	Secondary care	Education Enablement	Service provision	<ul style="list-style-type: none"> <li>• Feedback on outcome o of behaviour</li> <li>• Instruction on how to perform the behaviour</li> <li>• Problem solving</li> <li>• Feedback on behaviour</li> </ul>	Skills Knowledge Goals	Pre-insertion, maintenance, removal
Mody L and others (2015) (27)	Nursing homes	Education Training	Service provision Communication and	<ul style="list-style-type: none"> <li>• Adding objects to the environment</li> <li>• Feedback on outcome o of behaviour</li> </ul>	Environmental Context and Resources Knowledge	Pre-insertion, maintenance

Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
		Environmental restructuring	marketing	<ul style="list-style-type: none"> <li>• Instruction on how to perform the behaviour</li> <li>• Behavioural practice or rehearsal</li> <li>• Demonstration of behaviour</li> </ul>	Skills	
Mody L and others (2017) (26)	Nursing homes	Education Training Enablement	Service provision Communication and marketing Guidelines	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Behavioural practice or rehearsal</li> <li>• Demonstration of behaviour</li> <li>• Feedback on behaviour</li> <li>• Problem solving</li> <li>• Social support (practical)</li> </ul>	Skills Social Influences Knowledge Goals	Insertion, removal
Mori C (2014) (28)	Secondary care	Education Enablement Environmental restructuring	Service provision Communication and marketing Guidelines	<ul style="list-style-type: none"> <li>• Restructuring the social environment</li> <li>• Instruction on how to perform a behaviour</li> <li>• Behavioural substitution</li> <li>• Feedback on behaviour</li> <li>• Adding objects to the environment</li> <li>• Social support (practical)</li> <li>• Prompts or cues</li> <li>• Self-monitoring of behaviour</li> </ul>	Skills Knowledge Environmental Context and Resources Memory, Attention, Decision Making Social Influences	Pre-insertion, removal
Mullin K and others (2016) (29)	Secondary care	Education Enablement Environmental restructuring	Service provision	<ul style="list-style-type: none"> <li>• Feedback on behaviour</li> <li>• Instruction on how to perform a behaviour</li> <li>• Monitoring of behaviour by others without feedback</li> <li>• Adding objects to the environment</li> <li>• Restructuring the social environment</li> </ul>	Knowledge Skills Environmental Context and Resources	Insertion and maintenance
Nealon S and others (2018) (30)	Secondary care	Education Environmental restructuring	Service provision	<ul style="list-style-type: none"> <li>• Feedback on behaviour</li> <li>• Instruction on how to perform a behaviour</li> <li>• Restructuring the physical environment</li> </ul>	Environmental Context and Resources Skills Knowledge	Pre-insertion and removal
Pashnik B and others (2017) (31)	Secondary care	Training Education Enablement Modelling	Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Credible source</li> <li>• Social support practical</li> <li>• Feedback on behaviour</li> <li>• Behavioural substitution</li> <li>• Behavioural practice or rehearsal</li> <li>• Demonstration of behaviour</li> </ul>	Skills Beliefs about Consequences Social Professional Role and Identity Environmental Context and Resources Social Influences	Pre-insertion, insertion, maintenance and removal

Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
				<ul style="list-style-type: none"> <li>Information about health consequences</li> </ul>	Knowledge	
Purvis S and others (2014) (32)	Secondary care	Education Training Enablement Environmental restructuring	Guidelines Communication and marketing Service provision	<ul style="list-style-type: none"> <li>Instruction on how to perform a behaviour</li> <li>Information about others approval</li> <li>Credible source</li> <li>Adding objects to the environment</li> <li>Social support practical</li> <li>Prompts or cues</li> <li>Feedback on behaviour</li> <li>Behavioural practice or rehearsal</li> <li>Feedback on outcome of behaviour</li> </ul>	Skills Social Influences Beliefs about Consequences Environmental Context and Resources Knowledge Memory, Attention, Decision Making	Pre-insertion, removal
Purvis and others (2017) (33)	Secondary care	Education Enablement	Service provision	<ul style="list-style-type: none"> <li>Problem solving</li> <li>Feedback on behaviour</li> <li>Information about others approval</li> </ul>	Goals Knowledge Social Influences	Unclear
Rhee Ch and others (2016) (35)	Secondary care	Education Environmental restructuring Enablement Training	Guidelines Service provision	<ul style="list-style-type: none"> <li>Instruction on how to perform a behaviour</li> <li>Restructuring the physical environment</li> <li>Prompts or cues</li> <li>Self-monitoring of behaviour</li> <li>Restructuring the social environment</li> <li>Behavioural practice or rehearsal</li> <li>Demonstration of behaviour</li> </ul>	Knowledge Skills Environmental Context and Resources Memory, Attention, Decision Making	Pre-insertion, removal
Rhone C and others (2016) (36)	Secondary care	Education Persuasion Enablement	Service provision Communication and marketing	<ul style="list-style-type: none"> <li>Information about health consequences</li> <li>Restructuring the social environment</li> <li>Instruction on how to perform a behaviour</li> <li>Information about emotional consequences</li> <li>Feedback on behaviour</li> <li>Commitment</li> <li>Social support practical</li> </ul>	Knowledge Skills Social Professional Role and Identity Beliefs about Consequences	Pre-insertion and insertion
Richards B and others (2017) (37)	Secondary care	Training Education Environmental restructuring Enablement Incentivisation	Service provision Communication and marketing	<ul style="list-style-type: none"> <li>Social support (unspecified)</li> <li>Restructuring the social environment</li> <li>Social support emotional</li> <li>Information about emotional consequences</li> <li>Information about health consequences</li> </ul>	Social Influences Knowledge Goals Social Professional Role or Identity Skills	Pre-insertion, removal

Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
				<ul style="list-style-type: none"> <li>• Social support practical</li> <li>• Instruction on how to perform a behaviour</li> <li>• Monitoring of behaviour by others without feedback</li> <li>• Adding physical objects to the environment</li> <li>• Monitoring outcomes of behaviour by others without feedback</li> <li>• Feedback on behaviour</li> <li>• Behavioural practice or rehearsal</li> <li>• Demonstration of behaviour</li> <li>• Material reward</li> <li>• Feedback on outcomes of behaviour</li> <li>• Restructuring the physical environment</li> </ul>	Beliefs about Consequences Environmental Context and Resources	
Saint and others (2016) (38)	Secondary care	Education Training Enablement	Guidelines Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Action planning</li> <li>• Behavioural substitution</li> <li>• Feedback on outcome of behaviour</li> <li>• Feedback on behaviour</li> <li>• Instruction on how to perform the behaviour</li> <li>• Demonstration of behaviour</li> <li>• Behavioural practice or rehearsal</li> <li>• Social support practical</li> <li>• Salience of consequences</li> </ul>	Skills; Knowledge Beliefs about Consequences Social Influences Memory, Attention and Decision Making	Pre-insertion, insertion, maintenance, removal;
Sampathukamar P and others (2016) (39)	Secondary care	Education Training Persuasion Environmental restructuring Enablement	Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Behavioural substitution</li> <li>• Prompts or cues</li> <li>• Instruction on how to perform a behaviour</li> <li>• Social support unspecified</li> <li>• Salience of consequences</li> <li>• Adding objects to the environment</li> <li>• Feedback on behaviour</li> <li>• Self-monitoring of behaviour</li> <li>• Prompts or cues</li> <li>• Credible source</li> <li>• Demonstration of behaviour</li> </ul>	Skills Knowledge Environmental Context and Resources Memory, Attention, Decision Making Beliefs about Consequences Social Influences	Pre-insertion, insertion, maintenance, removal;



Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
Scanlon K and others (2017) (40)	Secondary care	Education Training Environmental restructuring Enablement	Guidelines Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Information about others approval</li> <li>• Information about others approval</li> <li>• Instruction on how to perform a behaviour</li> <li>• Behavioural practice or rehearsal</li> <li>• Demonstration of behaviour</li> <li>• Adding objects to the environment</li> <li>• Feedback on outcome of behaviour</li> <li>• Feedback on behaviour</li> <li>• Prompts or cues</li> <li>• Restructuring the social environment</li> </ul>	Social Influences Skills Environmental Context and Resources Memory, Attention, Decision Making Knowledge	Pre-insertion, maintenance and removal
Sutherland T and others (2016) (41)	Secondary care	Enablement Education Environmental restructuring	Service provision	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Adding objects to the environment</li> <li>• Feedback on behaviour</li> <li>• Feedback on outcome of behaviour</li> <li>• Prompts or cues</li> </ul>	Skills Environmental Context and Resources Memory, Attention, Decision Making Knowledge	Pre-insertion, insertion, maintenance and removal
Ternavasio and others (2016) (42)	Secondary care	Education Training Enablement	Service provision	<ul style="list-style-type: none"> <li>• Instruction on how to perform the behaviour</li> <li>• Demonstration of behaviour</li> <li>• Monitoring of behaviour by others without feedback</li> <li>• Prompts or cues</li> <li>• Feedback on outcome of behaviour</li> </ul>	Skills Knowledge Memory, Attention, Decision Making	Pre-insertion, insertion, maintenance and removal
Thomas K (2016) (43)	Secondary care	Education Training Environmental restructuring Enablement	Service provision	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Demonstration of behaviour</li> <li>• Adding objects to the environment</li> <li>• Action planning</li> <li>• Feedback on behaviour</li> <li>• Feedback on outcome of behaviour</li> </ul>	Skills Environmental Context and Resources Knowledge Memory, Attention, Decision Making	Pre-insertion, insertion, maintenance
Tuttle J (2017) (44)	Secondary care	Education Environmental restructuring Incentivisation Enablement	Guidelines Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Restructuring the social environment</li> <li>• Prompts or cues</li> <li>• Information about others approval</li> <li>• Credible source</li> <li>• Feedback on behaviour</li> </ul>	Skills Memory, Attention, Decision Making Environmental Context and Resources Social Influences	Pre-insertion, removal



Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
				<ul style="list-style-type: none"> <li>Monitoring of behaviour by others without feedback</li> <li>Social reward</li> <li>Material reward</li> <li>Behavioural substitution</li> <li>Information about emotional consequences</li> <li>Restructuring the physical environment</li> <li>Self-monitoring of behaviour</li> <li>Behavioural substitution</li> </ul>	Beliefs about Consequences Knowledge	
Tyson A and others (2018) (45)	Secondary care	Environmental restructuring Education Enablement	Service provision	<ul style="list-style-type: none"> <li>Action planning</li> <li>Feedback on behaviour</li> <li>Instruction on how to perform a behaviour</li> <li>Adding objects to the environment</li> <li>Information about health consequences</li> </ul>	Skills Memory, Attention, Decision Making Beliefs about Consequences Knowledge Environmental Context and Resources	Pre-insertion, maintenance, removal
Umer and others (2016) (46)	Secondary care	Education	Guidelines	<ul style="list-style-type: none"> <li>Instruction on how to perform a behaviour</li> </ul>	Skills	Pre-insertion, maintenance, removal
Quinn P (2016) (34)	Secondary care	Education Training Persuasion Enablement Environmental restructuring	Guidelines Communication and marketing Service provision	<ul style="list-style-type: none"> <li>Instruction on how to perform a behaviour</li> <li>Restructuring the social environment</li> <li>Credible source</li> <li>Adding objects to the environment</li> <li>Self-monitoring of behaviour</li> <li>Action planning</li> <li>Social support practical</li> <li>Prompts or cues</li> <li>Behavioural rehearsal or practice</li> <li>Information about health consequences</li> <li>Demonstration of behaviour</li> <li>Feedback on behaviour</li> <li>Social support (practical)</li> <li>Feedback on outcome of behaviour</li> <li>Feedback on behaviour</li> <li>Information about health consequences</li> </ul>	Skills Beliefs about Consequences Social Influences Environmental Context and Resources Memory, Attention, Decision Making Knowledge Goals Social Professional Role or Identity	Removal

Reference	Setting	Intervention function	Policy categories	Behaviour change techniques (3) identified included:	TDF domain	Behavioural phase
				<ul style="list-style-type: none"> <li>• Problem solving</li> <li>• Information about others approval</li> </ul>		
Youngermann B and others (2018) (47)	Secondary care	Education Enablement Training	Service provision	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Prompts or cues</li> <li>• Self-monitoring of behaviour</li> <li>• Adding objects to the environment</li> <li>• Behavioural substitution</li> <li>• Demonstration of behaviour</li> </ul>	Skills Memory, Attention, Decision Making Environmental Context and Resources	Pre-insertion
Zubkoff L and others (2016) (48)	Secondary care (VA Hospital)	Education Enablement	Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Feedback on behaviour</li> <li>• Feedback on outcome of behaviour</li> <li>• Problem solving</li> <li>• Social support practical</li> </ul>	Skills Knowledge Goals Social Influences	Pre-insertion, insertion, maintenance and removal
Zurmehly J (2018) (49)	Secondary care	Education Enablement Training Environmental restructuring	Guidelines Service provision Communication and marketing	<ul style="list-style-type: none"> <li>• Instruction on how to perform a behaviour</li> <li>• Feedback on behaviour</li> <li>• Prompts or cues</li> <li>• Adding objects to the environment</li> <li>• Information about health consequences</li> <li>• Action planning</li> </ul>	Skills Beliefs about Consequences; Knowledge Memory, Attention, Decision Making Environmental Context and Resources	Pre-insertion, removal

## Appendix H: Frequency of intervention functions, policy categories and BCTs in research and national interventions

**Table 1. The frequency with which each intervention function was identified in the national interventions and the research interventions**

<b>Intervention function</b>	<b>National interventions (maximum possible frequency is 11)</b>	<b>Research interventions (maximum possible frequency is 37)</b>
Education	11	37
Enablement	7	31
Training	4	22
Persuasion	0	6
Incentivisation	1	5
Environmental restructuring	0	25
Modelling	2	3
Coercion	0	0
Restriction	0	0

**Table 2. The frequency with which each policy category was identified in the national interventions and the research interventions**

<b>Policy category</b>	<b>National interventions (maximum possible frequency is 11)</b>	<b>Research interventions (maximum possible frequency is 37)</b>
Guidelines	9	17
Service provision	1	36
Communication and marketing	0	17
Fiscal measures	0	0
Regulation	0	0
Legislation	1	0
Environmental and social planning	0	0

**Table 3. The frequency with which each behaviour change technique (BCT) was identified in the national interventions and the research interventions**

<b>BCT</b>	<b>National interventions (maximum possible frequency is 11)</b>	<b>Research interventions (maximum possible frequency is 37)</b>
Instruction on how to perform a behaviour	10	36
Information about health consequences	9	7
Self-monitoring of behaviour	5	8
Social support practical	4	13
Information about social environmental consequences	4	0
Goal setting behaviour	4	1
Monitoring of behaviour by others without feedback	3	9
Feedback on behaviour	3	27
Feedback on outcome of behaviour	3	13
Self-monitoring of outcome of behaviour	3	0
Credible source	3	7
Behavioural practice or rehearsal	2	14
Demonstration of behaviour	2	17
Discrepancy between current behaviour and goals	2	0
Prompts or cues	1	15
Action planning	1	9
Information about emotional consequences	1	3

<b>BCT</b>	<b>National interventions (maximum possible frequency is 11)</b>	<b>Research interventions (maximum possible frequency is 37)</b>
Restructuring the social environment	1	8
Monitoring outcomes of behaviour by others without feedback	1	3
Social comparison	1	0
Identification of self as a role model	1	0
Goal setting outcome	1	0
Review behaviour goals	1	0
Reward (outcome)	1	0
Adding objects to the environment	0	22
Behavioural substitution	0	9
Restructuring the physical environment	0	6
Information about others approval	0	5
Problem solving	0	5
Social reward	0	4
Material reward	0	3
Social support unspecified	0	3
Salience of consequences	0	2
Commitment	0	1
Social support emotional	0	1



## Appendix I: Theoretical congruence between BCTs in the 37 research interventions and TDF domains

Green = high theoretical congruence. Orange = medium theoretical congruence. Pink = low theoretical congruence.

BCT	Frequency (maximum possible frequency is 37)	Linked TDF domains according to integrated mapping matrix, with domain importance ranking	Theoretical congruence between BCT and domain
Feedback on behaviour	27	<ul style="list-style-type: none"> <li>• Knowledge [key], rank 2</li> <li>• Beliefs about consequences [key] rank 3</li> <li>• Beliefs about capabilities, rank 8</li> <li>• Goals, rank 9 to 10</li> </ul>	High
Prompts or cues	15	<ul style="list-style-type: none"> <li>• Memory, attention, decision making [key], rank 5</li> <li>• Environmental context and resources [key], rank 1</li> <li>• Behavioural regulation, rank 7</li> </ul>	High
Social support practical	13	<ul style="list-style-type: none"> <li>• Social influences [key], rank 4</li> <li>• Beliefs about capabilities, rank 8</li> <li>• Social professional role and identity [key], rank 6</li> <li>• Intentions, rank 11 to 14</li> <li>• Goals, rank 9 to 10</li> </ul>	High

<b>BCT</b>	<b>Frequency (maximum possible frequency is 37)</b>	<b>Linked TDF domains according to integrated mapping matrix, with domain importance ranking</b>	<b>Theoretical congruence between BCT and domain</b>
Feedback on outcome of behaviour	13	<ul style="list-style-type: none"> <li>• Knowledge [key], rank 2</li> <li>• Beliefs about consequences [key], rank 3</li> <li>• Beliefs about capabilities, rank 8</li> <li>• Goals, rank 10</li> </ul>	High
Restructuring the social environment	8	<ul style="list-style-type: none"> <li>• Social influences [key], rank 4</li> <li>• Environmental context and resources [key], rank 1</li> </ul>	High
Self-monitoring of behaviour	8	<ul style="list-style-type: none"> <li>• Memory, attention, decision making [key], rank 5</li> <li>• Behavioural regulation, rank 7</li> <li>• Skills, rank 9 to 10</li> <li>• Beliefs about consequences [key], rank 3</li> <li>• Beliefs about capabilities, rank 8</li> </ul>	High
Information about health consequences	7	<ul style="list-style-type: none"> <li>• Knowledge [key], rank 2</li> <li>• Beliefs about consequences [key], rank 3</li> </ul>	High
Social support unspecified	3	<ul style="list-style-type: none"> <li>• Social influences [key], rank 4</li> <li>• Social professional role and identity [key], rank 6</li> </ul>	High
Salience of consequences	2	<ul style="list-style-type: none"> <li>• Knowledge [key], rank 2</li> <li>• Beliefs about consequences [key], rank 3</li> </ul>	High
Social support emotional	1	<ul style="list-style-type: none"> <li>• Social influences [key], rank 4</li> <li>• Social professional role and identity [key], rank 6</li> </ul>	High

<b>BCT</b>	<b>Frequency (maximum possible frequency is 37)</b>	<b>Linked TDF domains according to integrated mapping matrix, with domain importance ranking</b>	<b>Theoretical congruence between BCT and domain</b>
Adding objects to the environment	22	<ul style="list-style-type: none"> <li>• Environmental context and resources [key], rank 1</li> </ul>	Medium
Demonstration of behaviour	17	<ul style="list-style-type: none"> <li>• Social influences [key], rank 4</li> <li>• Skills, rank 9 to 10</li> </ul>	Medium
Action planning	9	<ul style="list-style-type: none"> <li>• Goals, rank 9 to 10</li> <li>• Intentions, rank 11 to 14</li> <li>• Memory, attention, decision making [key], rank 5</li> <li>• Behavioural regulation, rank 7</li> </ul>	Medium
Credible source	7	<ul style="list-style-type: none"> <li>• Beliefs about consequences [key], rank 3</li> <li>• Goals, rank 9 to 10</li> <li>• Intentions, rank 11 to 14</li> </ul>	Medium
Restructuring the physical environment	6	<ul style="list-style-type: none"> <li>• Environmental context and resources [key], rank 1</li> </ul>	Medium
Information about others approval	5	<ul style="list-style-type: none"> <li>• Social influences [key], rank 4</li> </ul>	Medium
Social reward	4	<ul style="list-style-type: none"> <li>• Social influences [key], rank 6</li> </ul>	Medium
Information about emotional consequences	3	<ul style="list-style-type: none"> <li>• Knowledge [key], rank 2</li> <li>• Emotions, rank 11 to 14</li> </ul>	Medium
Behavioural substitution	9	<ul style="list-style-type: none"> <li>• Behavioural regulation, rank 7</li> </ul>	Low

<b>BCT</b>	<b>Frequency (maximum possible frequency is 37)</b>	<b>Linked TDF domains according to integrated mapping matrix, with domain importance ranking</b>	<b>Theoretical congruence between BCT and domain</b>
Monitoring of behaviour by others without feedback	9	<ul style="list-style-type: none"> <li>• Skills, rank 9 to 10</li> </ul>	Low
Problem solving	5	<ul style="list-style-type: none"> <li>• Goals, rank 9 to 10</li> <li>• Beliefs about capabilities, rank 8</li> </ul>	Low
Material reward	3	<ul style="list-style-type: none"> <li>• Skills, rank 9 to 10</li> <li>• Reinforcement, rank 11 to 14</li> </ul>	Low
Monitoring outcomes of behaviour by others without feedback	3	<ul style="list-style-type: none"> <li>• Skills, rank 9 to 10</li> </ul>	Low
Instruction on how to perform a behaviour	36	<ul style="list-style-type: none"> <li>• Skills, rank 9 to 10</li> </ul>	Low
Goal setting behaviour	1	<ul style="list-style-type: none"> <li>• Behavioural regulation, rank 7</li> <li>• Skills, rank 9 to 10</li> <li>• Beliefs about capabilities, rank 8</li> <li>• Goals, rank 9 to 10</li> <li>• Intentions, rank 11 to 14</li> </ul>	Low
Behavioural practice or rehearsal	14	<ul style="list-style-type: none"> <li>• Skills, rank 9 to 10</li> <li>• Beliefs about capabilities, rank 8</li> </ul>	Low
Commitment	1	<ul style="list-style-type: none"> <li>• Goals, rank 9 to 10</li> </ul>	Low
		<ul style="list-style-type: none"> <li>• Intentions, rank 11 to 14</li> </ul>	

## Appendix J: Seized and missed opportunities for research interventions by intervention function according to the matrix

Green (GRN) = opportunity seized.

Red (R) = opportunity missed.

White (W) = domains not paired.

Grey (GRY) = not relevant (intervention function not used in the research intervention).

	Intervention functions (number of interventions serving each function)								
Key TDF domain	Education (37)	Persuasion (6)	Incentivisation (5)	Coercion (0)	Training (22)	Restriction (0)	Environmental restructuring (25)	Modelling (3)	Enablement (31)
Environmental context and resources	W	W	W	W	GRN	R	GRN	W	GRN
Knowledge	GRN	W	W	W	W	W	W	W	W
Beliefs about Consequences	GRN	GRN	W	W	W	W	W	GRN	W
Social Influences	W	W	W	W	W	R	GRN	GRN	GRN
Memory, Attention, Decision Making	W	W	W	W	GRN	W	GRN	W	GRN
Social Professional Role and Identity	GRN	GRN	W	W	W	W	W	GRN	W

## Appendix K: Seized and missed opportunities for research interventions by policy category according to the matrix (12)

Green (GRN) = opportunity seized.

Red (R) = opportunity missed.

White (W) = domains not paired.

Grey (GRY) = not relevant (intervention function not used in the research interventions).

	Policy categories (number of interventions delivered through policy categories)						
	Communication and Marketing (17)	Guidelines (17)	Fiscal measures (0)	Regulation (0)	Legislation (0)	Environmental Social planning (0)	Service Provision (36)
Education (37)	GRN	GRN	W	R	R	W	GRN
Persuasion (6)	GRN	GRN	W	R	R	W	GRN
Incentivisation (5)	GRN	GRN	R	R	R	W	GRN
Coercion (0)	GRY	GRY	GRY	GRY	GRY	W	GRY
Training (22)	W	GRN	R	R	R	W	GRN
Restriction (0)	W	GRY	W	GRY	GRY	W	W
Environmental restructuring (25)	W	GRN	R	R	R	R	W
Modelling (3)	GRN	W	W	W	W	W	GRN
Enablement (31)	W	GRN	R	R	R	R	GRN



## Appendix L: Intervention components presented to stakeholders during the workshop (based on the previous CAUTI work and rapid review)

Theme or barrier (based on CAUTI report)	TDF domains	Intervention component	BCTs delivered	Based on
Limited and inconsistent documentation and records	Environmental Context and Resources	Creating standardised computer-based documentation requiring staff to enter reason for catheterisation, date of insertion and so on (that is, not circumvent system by leaving fields blank).	Restructuring the physical environment; Prompts and cues	Previous CAUTI report and rapid review
Limited and inconsistent documentation and records	Environmental Context and Resources	Changes in medical records including checklists set as default	Restructuring the physical environment; Adding objects to the environment; Prompts and cues	Rapid review
Transitions of care	Environmental Context and Resources	Creating the rule that ward staff transferring patients to another ward check with the staff receiving the patient whether catheterisation is necessary (this rule could be prompted by a checklist for transfer of patients to another ward or hospital or home where staff checks if the catheter is needed).	Restructuring the social environment	Previous CAUTI report
Transitions of care, pre-emptively deciding to	Environmental Context and	Intensive care unit team working with Emergency Department to encourage them	Restructuring the social environment	Rapid review

<b>Theme or barrier (based on CAUTI report)</b>	<b>TDF domains</b>	<b>Intervention component</b>	<b>BCTs delivered</b>	<b>Based on</b>
insert catheters due to likely subsequent catheterisation	Resources; Memory, Attention and Decision Making	to delay catheter placement until person was assessed in the ICU or IMCU		
Transitions of care	Environmental Context and Resources	Working with other departments to ensure that other departments directly related to the ICU followed the same procedure as the ICU.	Restructuring the social environment	Rapid review
Lack of time to perform alternatives to urinary catheterisation	Environmental Context and Resources	Recognition of the need for additional support staffing to take patients to the bathroom	Restructuring the social environment	Previous CAUTI report
Unavailability of medical alternatives to urinary catheterisation	Environmental Context and Resources	Access to bladder scanners	Adding objects to the environment	Rapid review
Unavailability of medical alternatives to urinary catheterisation	Environmental Context and Resources	Creating bath kits and placing them strategically on the ward	Adding objects to the environment	Rapid review
Unavailability of medical alternatives to urinary catheterisation	Environmental Context and Resources	Access to female urinals and male urinary devices	Adding objects to the environment	Rapid review
Issues related to having an epidemiologist in post	Social Professional Role and Identity	No suggestion		
Acceptance of responsibility for urinary	Social Professional Role and Identity	Creating nurse-driven protocols	Restructuring the social environment;	Rapid review

<b>Theme or barrier (based on CAUTI report)</b>	<b>TDF domains</b>	<b>Intervention component</b>	<b>BCTs delivered</b>	<b>Based on</b>
catheterisation decision making			Instruction on how to perform a behaviour	
CAUTI guidelines not perceived as relevant across hospital departments or settings	Social Professional Role and Identity	Creating hospital-specific guidelines	Adding objects to the environment; Instruction on how to perform a behaviour	Rapid review
Empowering nurses to champion change in CAUTI practice; Physicians dictate nurses' practice	Social Professional Role and Identity	Quality champions (nurses) responsible for educating their peers as well as offering reassurance to staff nurses and addressing their concerns about deficits in care	Social support practical; Social support emotional; Demonstration of behaviour	Rapid review
Empowering nurses to champion change in CAUTI practice	Social Professional Role and Identity	Nurse-driven protocols set as default in medical records	Restructuring the social environment	Rapid review
Lack of peer support and buy-in	Social Influences	Informing staff engagement with CAUTI-reducing practices is encouraged by peers and senior staff.	Information about others approval	Previous CAUTI report
Lack of peer support and buy-in	Social Influences	Having Quality Champion (often nurse champion) co-ordinating education of staff and leading on staff education; initiative endorsed by senior management	Information about others approval; Social support practical;	Rapid review

Theme or barrier (based on CAUTI report)	TDF domains	Intervention component	BCTs delivered	Based on
			Restructuring the social environment	
Lack of peer support and buy-in	Social Influences	Brainstorming sessions with front-line staff in order to choose interventions readily accepted	Problem solving; Social support practical	Rapid review
Requests from patients and their carers	Social Influences	Staff convey to patients and carers that most patients and carers don't request catheters and explain the reason why this is;	Social comparison	Previous CAUTI report
Requests from patients and their carers	Social Influences	Staff role modelling challenging patient and carer requests	Demonstration of behaviour	Previous CAUTI report
Physicians dictate nurses' practice	Social Influences	Strategies to empower nurses to lead on catheter decision-making (delivered through peers and senior team members).	Restructuring the social environment; Social support unspecified	Previous CAUTI report
Physicians dictate nurses' practice	Social Influences	Introduction of nurse-driven protocol not requiring additional physician order in the majority of cases	Restructuring the social environment	Rapid review
Physicians dictate nurses' practice	Social Influences	The Critical Care physicians supporting the ICU and IMCU nurses when requesting primary care physician removal of the indwelling urinary catheter if no valid indication found	Social support practical	Rapid review

<b>Theme or barrier (based on CAUTI report)</b>	<b>TDF domains</b>	<b>Intervention component</b>	<b>BCTs delivered</b>	<b>Based on</b>
Physicians dictate nurses' practice	Social Influences	Provide examples of where the HOUDINI protocol has been effectively implemented	Social comparison	Previous CAUTI report
Physicians dictate nurses' practice	Social Influences	Gaining buy-in from physician leaders and creating and distributing educational materials to all physicians	Social support practical; Information about others approval	Rapid review
Cultural norms regarding standard catheterisation practice for specific patient groups	Social Influences	Compare rates of catheterisation across wards or hospitals and corresponding rates of infection	Social comparison	Previous CAUTI report
Cultural norms regarding standard catheterisation practice for specific patient groups	Social Influences	Hospital leadership fostering culture and empowering staff to intervene if non-compliance observed;	Restructuring the social environment; Social support unspecified; Persuasive communication (credible source)	Rapid review
Cultural norms regarding standard catheterisation practice for specific patient groups	Social Influences	Providing feedback on CAUTI rates and catheter use (for example, interdisciplinary rounds)	Feedback on behaviour; Feedback on outcome of behaviour	Rapid review

<b>Theme or barrier (based on CAUTI report)</b>	<b>TDF domains</b>	<b>Intervention component</b>	<b>BCTs delivered</b>	<b>Based on</b>
Convenience and ease of monitoring	Beliefs about Consequences	Asking staff to list the benefits and disadvantages of catheterising for convenience compared with catheterising for medical reasons	Pros and cons	Previous CAUTI report
Convenience and ease of monitoring	Beliefs about Consequences	Asking staff how they would feel if a patient was diagnosed with CAUTI after they had catheterised them for non-medical reasons.	Anticipated regret	Previous CAUTI report
Convenience and ease of monitoring	Beliefs about Consequences	[There may be images which could emphasise the severity of CAUTI]	Salience of consequences	Previous CAUTI report
Convenience and ease of monitoring	Beliefs about Consequences	Senior members of staff endorsing not catheterising for convenience	Persuasive communication (credible source)	Previous CAUTI report
Convenience and ease of monitoring	Beliefs about Consequences	Each nurse involved in care of patients who developed CAUTI sent a letter from a director of nursing, asking them to a root analysis meeting.	Feedback on outcome of behaviour; Information about others approval	Rapid review
Pre-emptively deciding to insert catheters due to likely subsequent catheterisation	Memory, Attention and Decision Making	Plan who will assess the patient for catheterisation and where this will happen	Action planning	Previous CAUTI report
Pre-emptively deciding to insert catheters due to	Memory, Attention and Decision Making	Document the action plan (see above) so there is agreement between staff on different wards whether the patient being	Self-monitoring of behaviour	Previous CAUTI report



<b>Theme or barrier (based on CAUTI report)</b>	<b>TDF domains</b>	<b>Intervention component</b>	<b>BCTs delivered</b>	<b>Based on</b>
likely subsequent catheterisation		transferred requires a catheter and if so, who will insert the catheter		
Lack of knowledge of how to manage patients without catheters	Knowledge	Information to consider including in guidelines or local procedural documents focusing on alternatives to catheterisation	Instruction on how to perform a behaviour	Previous CAUTI report
Lack of knowledge of how to manage patients without catheters	Knowledge	Promoting the use of condom catheters, bladder scanners and intermittent straight catheterisation (all in lieu of indwelling urinary catheters); Development of evidence-based protocols for bladder scanners	Instruction on how to perform a behaviour; Behavioural substitution; Adding objects to the environment	Rapid review
Lack of knowledge of how to manage patients without catheters	Knowledge	Review of indication for catheter use and alternatives with all nursing staff	Instruction on how to perform a behaviour; Behavioural substitution	Rapid review
Lack of knowledge of how to manage patients without catheters	Knowledge	Staff encouraged to consider alternatives to catheters each day	Instruction on how to perform a behaviour	Rapid review
Lack of knowledge of how to manage patients without catheters	Knowledge	Implementation of a new catheter order requiring physician to consider alternative to catheter	Behavioural substitution	Rapid review

## Appendix M: Intervention components suggested or endorsed by the stakeholders

Theme or barrier (based on CAUTI report)	TDF domains	Intervention component	BCTs delivered
<p>Limited and inconsistent documentation and records; Transitions of care</p>	<p>Environmental Context and Resources</p>	<p>Standardised nationwide computer-based documentation, accessible across all setting, requiring person initiating catheterisation to insert relevant details and be responsible for catheter. This documentation would be included when transferring patients across settings and would include details about date of catheter insertion, reason and action plan for catheter insertion and details of difficult catheterisation.</p>	<p>Restructuring the physical environment; Prompts and cues; Action planning; Restructuring the social environment</p>
<p>Unavailability of medical alternatives to urinary catheterisation; Lack of knowledge of how to manage patients without catheters</p>	<p>Environmental Context and Resources; Knowledge</p>	<p>Investment in bladder scanners, complemented by training on how to use them to aid decision making process.</p>	<p>Adding objects to the environment; Behavioural substitution; Instruction on how to perform a behaviour; Behavioural practice or rehearsal</p>

<b>Theme or barrier (based on CAUTI report)</b>	<b>TDF domains</b>	<b>Intervention component</b>	<b>BCTs delivered</b>
<p>Unavailability of medical alternatives to urinary catheterisation; Lack of knowledge of how to manage patients without catheters</p>	<p>Environmental Context and Resources; Knowledge</p>	<p>Promotion or wider implementation of intermittent catheterisation as an alternative to indwelling catheters complemented by staff training on clinical indications and appropriate use.</p>	<p>Adding objects to the environment; Behavioural substitution; Instruction on how to perform a behaviour; Behavioural practice or rehearsal</p>
<p>Unavailability of medical alternatives to urinary catheterisation; Lack of knowledge of how to manage patients without catheters</p>	<p>Environmental Context and Resources; Knowledge</p>	<p>Better provision of continence care in the community to support alternatives to catheterisation focusing on tackling problems with pads allocation and staff shortages, supplemented by education of staff and provision of clear action plans for catheters already inserted.</p>	<p>Restructuring the physical environment; Behavioural substitution; Action planning; Instruction on how to perform a behaviour,</p>
<p>Unavailability of medical alternatives to urinary catheterisation; Lack of knowledge of how to manage patients without catheters</p>	<p>Environmental Context and Resources; Knowledge</p>	<p>Wider implementation and use of the TWOC clinics</p>	<p>Behavioural substitution; Restructuring the physical environment</p>
<p>Unavailability of medical alternatives to urinary catheterisation;</p>	<p>Environmental Context and Resources; Knowledge;</p>	<p>Review of indication of catheter need and catheter alternatives, supported by reminder systems and complemented by</p>	<p>Behavioural substitution; Action planning; Prompts or cues;</p>

<b>Theme or barrier (based on CAUTI report)</b>	<b>TDF domains</b>	<b>Intervention component</b>	<b>BCTs delivered</b>
Lack of knowledge of how to manage patients without catheters; Catheterisation based on non-medical criteria.	Memory, Attention and Decision Making	education of staff in relation to skills in catheter use and knowledge about catheter-associated risks.	Information about health consequences; Instruction on how to perform a behaviour
Acceptance of responsibility for urinary catheterisation decision making; Physicians dictate nurses' practice	Social Professional Role and Identity; Social Influences;	Implementation of protocols utilising a national template that can be tailored to local contexts allowing sharing responsibility for appropriate and timely catheter insertion and removal between medical and nursing staff and be supplemented by education	Adding objects to the environment; Instruction on how to perform a behaviour; Restructuring the social environment
Physicians dictate nurses' practice; Lack of peer support and buy-in	Social Professional Role and Identity	Guidelines that are transferable across settings and provide the same message about use of catheters to all staff, utilising a national template that could be tailored to the local context; implementation of guidelines supported by ensuring senior management buy-in and staff knowledge of the guidelines.	Adding objects to the environment; Restructuring the physical environment; Instruction on how to perform a behaviour; Information about others approval
Physicians dictate nurses' practice;	Social Influences	Introduction of CAUTI Champions across all settings and representing all staff groups, leading on staff education;	Restructuring the social environment; Material reward;

Theme or barrier (based on CAUTI report)	TDF domains	Intervention component	BCTs delivered
Lack of peer support and buy-in		supported by senior management and financially rewarded for their additional responsibilities.	Information about others approval; Social support practical
Requests from patients and their carers	Social Influences	Education of patients and relatives focusing on empowering patients and relatives to question the need for catheter use (perhaps in the form of a leaflet or national campaign); including information about pros and cons of catheters and risks associated with its use, including sepsis and antibiotics resistance; including information how to look after catheters and the importance of hydration; including patient's perceptive.	Information about health consequences; Salience of consequences; Pros and cons; Credible source; Social comparison
Cultural norms regarding standard catheterisation practice for specific patient groups	Social Influences	Provision of feedback on CAUTI rates and catheter use delivered nationally, used as measurement for improvement and linked to antibiotic prescribing.	Feedback on behaviour; Feedback on outcome of behaviour
Convenience and ease of monitoring; Catheterisation based on non-medical criteria;	Beliefs about Consequences; Social Influences; Skills; Knowledge	Education of all staff across all settings including information on benefits of not using catheters for both patient and staff, pros and cons for catheter use, reassurance that not using catheters does not lead to suboptimal care, clear	Information about health consequences; Instruction on how to perform a behaviour;

Theme or barrier (based on CAUTI report)	TDF domains	Intervention component	BCTs delivered
<p>Requests from patients and their carers;</p> <p>Poor urinary catheter insertion technique;</p> <p>Lack of awareness of the risks associated with use of urinary catheters</p>		<p>indications for their use and when they should be removed, providing staff with practical skills on how to convey information about catheters to patients and relatives and training of nurses in catheter insertion, maintenance and removal.</p>	<p>Information about emotional consequences;</p> <p>Behavioural practice or rehearsal;</p> <p>Social support (unspecified)</p>
<p>Transitions of care;</p> <p>Pre-emptively deciding to insert catheters due to likely subsequent catheterisation</p>	<p>Environmental Context and Resources;</p> <p>Memory, Attention and Decision Making</p>	<p>Creating the rule that ward staff transferring patients to another ward check with the staff receiving the patient whether catheterisation is necessary (this rule could be prompted by a checklist for transfer of patients to another ward or hospital or home where staff check if the catheter is needed</p>	<p>Restructuring the social environment;</p> <p>Prompts and Cues;</p> <p>Action planning</p>
<p>Poor urinary catheter insertion technique</p>	<p>Skills</p>	<p>Provision of face-to-face training for nurses in catheter insertion, maintenance and removal</p>	<p>Instruction on how to perform a behaviour;</p> <p>Behavioural demonstration</p>

## Appendix N: Summary of notes from the stakeholder focus groups

The following pages present notes taken during the stakeholder focus groups. Comments have been grouped by theme. Participants commented that:

### Key behavioural phases

- removal - seems to be the key; timely removal and removal of unnecessary catheters will make the biggest difference
- pre-insertion - preventing inserting catheters as a default; looking for alternatives (for example, intermittent catheterisation)
- post-insertion maintenance – little discussion on maintenance of catheters and preventing infections
- insertion – mainly discussed in the context of nurses lacking practical skills to re-insert catheter if needed

### Overall barriers

- it's hard to keep CAUTI on the agenda – competing with other priorities
- there's a lack of understanding how different settings work
- there are differences in how different organisations and CCGs work – hard to communicate and document
- it's difficult to make decisions about removing catheters when information is lacking; everyone has to be informed not just the first person who started caring for that patient- continuity of care; even senior people may make it difficult to make a decision about catheter removal as they don't have the information what was the reason for it and when it should be removed
- patients don't feel confident and able to request reviews of catheters; lack of awareness among patients that catheters have risks and to speak up?
- patients think having catheter is ok because so many people have them
- staff don't know the risks of catheters either

### Nursing homes

#### Barriers

- rates of catheterisation are linked to culture of nursing home

## Facilitators

- nursing home staff are more likely to remove catheters because you can insert another one if you need to

## Community

### Barriers

- most catheters are inserted in secondary care- tackling transition from hospital to community care is key
- numbers of patients wanting catheters is linked to paucity of continence nurses – lack of support in the community so people being catheterised to increase their mobility so there is lack of knowledge related to risks to using the catheters
- staff are afraid to talk to relatives
- we don't know what the patient perspective on catheters is
- most of the people discharged to community from acute care do not have a management plan
- it's unclear whose responsibility it is to make decisions about catheters in patients in community when discharged from the acute care; so who should make a decision whether to TWOC and when?
- We need to tackle hydration in the community as this is linked to UTIs; patients are anxious about continence though and that causes problems

## Primary care

### Barriers

- there is poor communication across secondary, primary and community care; linked with
- there's a lack of pathways for information transfer: for example, patient coming to A&E via ambulance without passport
- GPs don't know why the patient got a catheter, when to remove it, and so on
- there's anxiety that you will cause an unnecessary hospital admission with your decision (so less likely to decide to remove a catheter).
- GPs and practice staff are not likely to remove catheter as they don't know whether this was for example a difficult catheterisation
- people living on their own are at risk
- people who live on their own may not tell GP that they catheters
- it is difficult to make changes to prescriptions as district nurses assume that GPs know why the catheter is in and GPs think they know



## Secondary care

### Barriers

- most catheters are inserted in secondary care - tackling transition from hospital to community care is key
- there's poor communication across secondary, primary and community care; linked with lack of pathways for information transfer
- there's a lack of information about why catheters were inserted, who put it in, and for how long
- the patient and their relatives are a key factor - wanting to be catheterised as they do not understand the risk
- most of the people discharged to community from acute care do not have a management plan – catheters staying in for longer than necessary
- there are difficulties in accessing documentation at the point of transfer from acute to community care – there is an assumption that if the information is recorded in secondary care that that information is transferred across; this is usually not the case
- some areas in the secondary care especially problematic: the vast proportion of people are having catheters inserted in operating rooms and A&E; A&E is especially problematic as no catheter passport is initiated at that point and the burden is then on a discharge nurse to fill it in – but they don't have the information on why it was inserted and why
- junior people don't question why not to use catheters
- nurses don't feel empowered to do anything against doctors; they also don't have practical skills
- it's difficult to get support from senior management
- there's a problem with nurses not having practical skills in catheters - not taking ownership of catheters

## Solutions and interventions

- the target for intervention should be the person who talks to patient
- we need a whole economy approach - everyone needs to be involved
- we need to ask staff in primary, secondary and care home settings what they think the barriers are and what intervention will work

### 1. Catheter passport

- there's research showing that people who have catheter passports are more likely to have some management plan
- a catheter passport alongside an information leaflet could work very well

- a national catheter passport work is currently under way
- there are practical problems with passports as there's no evidence they work: "The assumption often is that if a patient had a passport, all will be well"
- often even district nurses and patients don't know where their passports are
- there's a problem with primary care not having much experience with catheter passports
- A&E is especially problematic as no catheter passport is initiated at that point and the burden is then on a discharge nurse to fill it in – but they don't have the information on why it was inserted and why
- there may not be a way forward if we are moving to electronic records

## 2. National database of resources

- a patient info leaflet is important – available to health care professionals and based on the latest evidence to give it to a patient together with the passport; or perhaps a link to it; educational for patients and family members; and a passport which would be useful for HCP
- there should be a national resource for public and HCP

## 3. TWOC clinics

- some places set up TWOC clinics where patients can go and get catheters removed and they can be managed, similar to day centres; you have enough people to make an informed decision
- an example of TWOC clinic working: if you come to the A& E for retention and they make a decision to put a catheter in and not admit you, you get an appointment to come back to the TWOC clinic and then if you fail your TWOC, then they make an action plan and you may either be referred back to your GP or their follow-up might be in the hospital; GP is written to; Jennie W - this is a gold standard

## 4. Reviewing catheters

- it would be great to require a review of catheters similar to antibiotics, for example, you have to prescribe a review date when the catheter was put in
- reviewing removal date sometimes can be a tick box exercise; even if you review it every shift, you need to have a confidence to be able to make that decision rather than just do it as a tick box exercise
- perhaps it would be a good idea to have a target of how much you need to reduce CAUTI in a year and that you will be penalised if you don't meet the target
- naming and shaming might work? Personal and joint or group responsibility
- there should be a structured way of recording why you put in the catheter with your name to get some personal responsibility and commitment

- once it becomes only one group-led, for example nurse-led, it does not work; needs to be a joint responsibility
- it would be a good idea to try to monitor prescriptions and order for catheters
- there should be a yearly follow-up of patients with catheters in primary care?

## 5. Education of staff

- staff need to be educated about risks of catheters
- there's a need for practical training of nurses to be able to insert catheter
- there's a need to educate staff on reasons why not putting catheters might be good thing to do
- information about trust policy in relation to catheters as part of the induction
- need baseline education for all clinical staff including why catheters should be used, is catheter necessary, when should it be removed, what the alternatives are and how to look after it
- the message should be conveyed to health care professionals that a catheter should be the last option; this needs to be also part of university training
- we need to educate both doctors and nurses - perhaps mandatory training?
- think catheter - think long-term
- we need to make staff aware of severe consequences of UTI, especially increased resistance in CAUTI vs. Individual
- education of staff should focus more on facilitators and why it is good for them

## 6. Helping staff in the community

- we should be helping staff in community to make decisions about catheters
- there should be an action plan at the point of discharge which says something more than "Review catheter every 3 months"
- information about management plan for catheters are not included in the discharge letter

## 7. PHE Campaign

- there should be a campaign to promote hydration to reduce the risk of patients with catheters going on to develop a UTI
- visiting primary care is symptomatic – hydration information is provided in primary care

## 8. Education of patients, relatives and general public

- there's a need for central resources, for example, patient leaflets that are accessible and implemented nationally
- leaflets need to be aimed at the appropriate reading age

- we need to empower patients to ask staff: “Do I need this catheter?”
- that the consequences of having catheter need to resonate with patients - perhaps links with work on SEPSIS?
- we need to empower patients to understand more about catheters and giving them a voice to question if they still need it and if it being cared for appropriately
- we need more patient voices
- think catheter – think long-term
- making patients aware of severe consequences of UTI, especially increased resistance in CAUTI versus Individual
- education of patients should focus more on facilitators and why it is good for them

## 9. Alternatives to catheters

- we should be avoiding long-term catheters by using intermittent catheterisation – sometimes intermittent catheters would be good value and beneficial for patients but this is difficult to put into practice, especially when transferring from hospital to community

## 10. Ownership or responsibility

- perhaps a virtual clinic would work well if there was a clear responsibility and communication with GPs and district nurses

## 11. Standardised computer-based documentation

- this would be feasible if it included review date, indications for catheter removal, who inserted the catheter, difficult catheterisation details, a plan for the removal
- perhaps allowing to have a ‘pick list’ and other reason
- it should be accessible across all settings
- but it would more difficult to access in a nursing home setting

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