

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

All articles in alphabetical order

Data charting sheet - for health care professional, patients, relatives	
Study description	
First author	Banfi, Paolo
Title	Home Treatment of Infection-Related Acute Respiratory Failure in Kyphoscoliotic Patients on Long-Term Mechanical Ventilation
Year	2007
Country	France
Study aims	To study the possibility of home treatment of infection-related ARF in kyphoscoliotic patients on long term mechanical ventilation
Methodology/Measures	<p>Study design: prospective cohort study</p> <p>Study period: 1998-2002</p> <p>Study inclusion: Tachypnea >30 breaths/min, Cyanosis, Purulent secretions, Cough, Fever</p> <p>Inclusion process:</p> <ul style="list-style-type: none"> - Chest specialist, GP + nurse examined patient at home: Arterial blood samples, ECG readings + expectorated sputum samples - MV was administered continuously until the morning + pulse oximetry was recorded all night → if patient showed improvement in arterial blood gas values 1 hour after initiating mechanical ventilation + mean nocturnal pulse oximetry was >90%, patient was invited to the home treatment protocol <p>Treatment of included patients:</p> <ul style="list-style-type: none"> - progressively decrease daily duration of MV according to their tolerance of spontaneous breathing under supervision of med. staff → Treatment with antibiotics + Albuterol inhaler (<i>s. cat. "Handling of medication"</i>) <p>Hypothesis:</p> <ul style="list-style-type: none"> - Home care of ARF can be as safe + effective as hospital care <p>Measures:</p> <ul style="list-style-type: none"> - 1x/ week: arterial blood samples were collected after 1 hour of spontaneous breathing without MV

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	- 2 weeks after starting antibiotics: sputum collection + culture
Setting, Participants	
Sample size	7 patients (Background: between 1998-2002 8/195 patients within the program of long-term MV had an infection-related ARF + were therefore eligible for this study; 1 was excluded because he refused treatment at home)
Sex	3 women, 5 men
Age of participation	61 years (mean)
Kind of disease	<ul style="list-style-type: none"> - Idiopathic severe kyphoscoliosis (Cobb angle >70°) - Developed infection-related ARF during a 4 year period
Kind of artificial ventilation (incl. duration)	<p>All patients had mechanical ventilation for 31 months (mean)</p> <ul style="list-style-type: none"> - 7/8 NPPV + commercial mask - 3/8 volume-assist ventilator - 4/8 pressure assist ventilator + circuit that includes an expiratory valve (backup rate of mean 16 breaths/min) - 1/8 invasively ventilated <p>During study:</p> <ul style="list-style-type: none"> - Nearly continuous MV (>20h/d) for the first week with ventilator settings used in their baseline condition - Progressively decreasing daily duration of mechanical ventilation according to tolerance of spontaneous breathing
Family participation	Not specified
Concept of home-based setting/Licensed beds	At the patient's home
Professions/Qualifications involved/Duration professional employment	Staff involved in the study: Nurse, GP + chest specialist evaluated + supervised the patient at home <ul style="list-style-type: none"> - Nurse: visited the patient's home 3x/d - GP: visited patient 2x/week - No emergency visit was necessary
Cooperation (e.g. Lung specialist, Weaning centre)	Not specified
Key Findings - Hygiene management	
Quality management for hygiene, e.g. Infection control practitioner, duration h for infection prevention and control	
... - Training /education (incl. in- outdoor training)	Not specified
... - Staff hygiene (incl. PPE, Hand hygiene)	Not specified
... - Relative/visitors (incl. Physicians/Therapists)	Not specified

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... - Cleaning and disinfection aspects	Not specified
... - Handling of medical devices	
... - Waste management	Not specified
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)	Not specified
... - Caring for persons (prevention and infection control)	Not specified
... - Handling of medication	<p>Antibiotics</p> <ul style="list-style-type: none"> - All patients - Duration: 2 weeks - Dose: Clarithromycin 500mg 2x/d; intramuscular ceftazidime 1g 3x/d <p>Albuterol</p> <ul style="list-style-type: none"> - Metered-dose-inhaler during MV - 4x/d
... - Laundry hygiene	Not specified
... - Kitchen hygiene	Not specified
Conclusion/Limitations	
<p>Conclusions:</p> <ul style="list-style-type: none"> - 7/7 kyphoscoliotic patients on long-term MV suffered from infection-related ARF + were successfully treated at home - Treatment with antibiotics + NPPV (in 6/7 cases) - Increase of daily duration of MV without any change of ventilator settings was well tolerated by patients (familiarity) - Cost-saving treatment at home: average duration of hospitalization of these patients is 2-3 weeks <p>Limitation: no control group</p> <p>Notes for review:</p> <ul style="list-style-type: none"> - No hygiene-management - Specific group of patients - Main outcome: infection-treatment at home is feasible, efficient + cost-effective 	

Abbreviations:

ARF = acute respiratory failure

NPPV = noninvasive positive pressure ventilation

GP = general practitioner

MV = mechanical ventilation

ECG = electrocardiogram

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Data charting sheet - for health care professional, patients, relatives							
Study description							
First author	Cahill, Christine K.						
Title	California Skilled Nursing Facilities – A Survey of Infection Prevention and Control Practices and Educational Needs						
Year	1997						
Country	USA						
Study aims	<ul style="list-style-type: none"> - To assess characteristics of SNF infection prevention + control programs - To determine policies for admitting + placing of MRSA-/ VRE-colonized patients - To determine educational needs of the respondents possible for infection prevention + control programs in SNF 						
Methodology/Measures	<p>Study design: observational/ descriptive study</p> <p>Method: quantitative survey</p> <ul style="list-style-type: none"> - Among ICs in all Californian SNFs - Survey included 3 parts: facility biographical profile, antibiotic resistant microorganism profile + educational needs assessment <p>→ a total of 1.454 surveys were mailed to free-standing + hospital-based SNF (no reminders)</p>						
Setting, Participants							
Sample size	444 SNF (response rate 30.5%) <ul style="list-style-type: none"> - 283 (63.7%) free-standing - 161 (23.2%) hospital-based - 58 (13.1%) other (veterans administration or not specified) 						
Sex	Not specified						
Age of participation	Not specified						
Kind of disease	Not specified						
Kind of artificial ventilation (incl. duration)	Not specified						
Family participation	Not specified						
Concept of home-based setting/Licensed beds	Skilled nursing facilities (SNF) <ul style="list-style-type: none"> - Hospital-based distinct-part (HB) or free-standing (FS) - Licenced beds: 10 to >350; most SNF (68%) < 99 beds <i>(more details s. Tab 1+2)</i>						
Professions/Qualifications involved/Duration professional employment							
		<table border="1"> <thead> <tr> <th></th> <th>Hospital-based SNF</th> <th>Free-standing SNF</th> </tr> </thead> <tbody> <tr> <td>ICPs</td> <td>- 88/102 (86.3%) associate degree or higher in “nursing education”</td> <td>- 203/278 (73%) associate degree or higher in “nursing education”</td> </tr> </tbody> </table>		Hospital-based SNF	Free-standing SNF	ICPs	- 88/102 (86.3%) associate degree or higher in “nursing education”
	Hospital-based SNF	Free-standing SNF					
ICPs	- 88/102 (86.3%) associate degree or higher in “nursing education”	- 203/278 (73%) associate degree or higher in “nursing education”					

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		- 39/88 (38.2%) bachelor's degree in "nursing" - ??/?? (13.7%) licensed "vocational nurses"	- 79/278 (28.4%) bachelor's degree in "nursing" - 75/278 (27%) licensed "vocational nurses"
	Responsibilities	-79/102 responsible for at least one other non-infection –control-related position (Director Staff Development 27.8%; Employee Health Nurse 16.5%)	- 236/278 responsible for at least one other non-infection –control-related position (Director Staff Development 43.6%; Director Nursing Administration 26.7%)
	ICP-experience (s. Tab. 4)	- 54/96 (56.2%) ICP < 5 years - 19/96 (19.8%) ICP < 1 year	- 184/265 ICP < 5 years - 72/26 ICP < 1 year
	Memberships	- 59/99 membership APIC - 27/59 certified by CBIC	- 41/269 (15%) membership APIC - 7/41 (17%) certified by CBIC
Cooperation (e.g. Lung specialist, Weaning centre)	Not specified		
Key Findings - Hygiene management			
Quality management for hygiene, e.g. Infection control practitioner, duration h for infection prevention and control		Hospital-based SNF	Free-standing SNF
	Average h/week for infection control + prevention activities	- 35/97 (36.1%) < 5h - 22/97 (22.7%) < 2h	- 127/267 (47.7%) < 5h - 58/267 (21.7%) < 2h
	ICPs	Available	
	Programs	Infection Prevention + Control Program (required by Health Care Financing Administration; HCFA) - Staff hygiene - Isolation procedures	
... - Training /education (incl. in- outdoor training)	Educational needs for infection prevention + control rated by ICPs: - New employee + annual education programs: Hand washing (87.3%), pathogens standard (84.6%) + tuberculosis control program (83.6% of ICPs rated 4 = very important) - Employee health: tuberculosis screening (76.7%)		

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	<ul style="list-style-type: none"> - Resident's Health: tuberculosis screening for new admission (76.9%) - Antibiotic-Resistant Microorganisms: admitting patients with MRSA/ VRE (81.4%) - Antibiotic Utilization Program: appropriate use of antibiotics (80.6%) - Microbiology: colonisation vs. infection (75.7%) - Surveillance Program: collecting, analysing + reporting data (74.6%) - Isolation Precautions: standard isolation precautions (80.1%) <p>(topics from APIC-Guideline for infection prevention + control) <i>(for more subtopics s. Tab. 5)</i></p>		
... - Staff hygiene (incl. PPE, Hand hygiene)	Not specified		
... - Relative/visitors (incl. Physicians/Therapists)	Not specified		
... - Cleaning and disinfection aspects	Not specified		
... - Handling of medical devices	Not specified		
... - Waste management	Not specified		
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)		Hospital-based SNF	Free-standing SNF
	Isolation practice	<ul style="list-style-type: none"> - 14/96 (14.6%) no private room (PR) - 38/96 (39.6%) < 3 PR - 44/96 (45.8%) > 4 PR - 90.9% use PR for isolation 	<ul style="list-style-type: none"> - 73/260 (28.1%) no private room (PR) - 107/260 (41.1%) < 3 PR - 80/260 (30.8%) > 4 PR - 74.5% use PR for isolation
	Admissions	- do not culture new admission for MRSA (87.5%) or VRE (90.6%)	- do not culture new admission for MRSA (90.5%) or VRE (93.4%)
... - Caring for persons (prevention and infection control)		Hospital-based SNF	Free-standing SNF
	Dealing with MRSA (VRE) colonised	<ul style="list-style-type: none"> - 58% (73.8%) would place in PR - 71.2% (44.4%) would place with roommate without invasive devices 	<ul style="list-style-type: none"> - 31.9% (47.6%) would place in PR - 87.5% (72.8%) would place with a roommate without invasive devices
	Dealing with MRSA (VRE) infected	<ul style="list-style-type: none"> - 82.4% (94%) would place in PR - 60.3% (39.4%) would place with roommate without invasive devices 	<ul style="list-style-type: none"> - ?? (71%) would place in PR - ?? (68.8%) would place with roommate without invasive devices
... - Handling of medication	Not specified		
... - Laundry hygiene	Not specified		
... - Kitchen hygiene	Not specified		
Conclusion/Limitations			
<p>Conclusions:</p> <ul style="list-style-type: none"> - SNFs are required by HCFA to have infection prevention + control programs - Differences between hospital-based SNF + free-standing SNF with regard to their programs for infection prevention + control - Very few SNFs reported performing surveillance cultures on all new admissions to detect antibiotic-resistant organisms 			
Notes for Review:			

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- No limitations discussed!
- Article was published in 1997! → topic still relevant but importance of dealing with MDRO has changed
- Setting described is not ambulatory intensive care!
- No focus on ventilated patients

Abbreviations:

APIC = Infection Control and Epidemiology, Inc.

CBIC = Certification Board for Infection Control

HCFA = Health Care Financing Administration

ICP = infection control practitioner

PPE = personal protective equipment

SNF = skilled nursing facilities

VRE = vancomycin-resistant enterococcus

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Data charting sheet - for health care professional, patients, relatives									
Study description									
First author	Chenoweth, Carol								
Title	Ventilator-Associated Pneumonia in the Home Care Setting								
Year	2007								
Country	USA								
Study aims	Characterise VAP in HMV-patients <ul style="list-style-type: none"> - Rate + incidence of VAP - Demographic characteristics - Potential risk factors for VAP - Outcomes of VAP in this setting 								
Methodology/Measures	<p>Study design: Retrospective Cohort Study</p> <p>Inclusion criteria:</p> <ul style="list-style-type: none"> - All patients who received HMV through MedEquip + were followed up by MedEquip respiratory therapists - Included patients represent 80% of all patients receiving HMV cared by MedEquip - "Cases" = study patients who developed VAP (cases were ascertained through review of home nursing + respiratory therapy records) <p>Measures:</p> <p>Demographic + clinical variables were extracted from MedEquip + UHMS medical records (standardised sheet) by visiting home nurses + respiratory therapists</p> <ul style="list-style-type: none"> - Respiratory status - Sputum - Oxygen requirements - Suctioning requirements - Infections - Outpatient antibiotic use <p>→ variables were collected up to the time of onset of VAP</p> <p>Analysis: statistical analysis (Chi²-/ Fisher exact-test, student t-test, p-value)</p>								
Setting, Participants									
Sample size	<table border="1"> <thead> <tr> <th>total</th> <th>With VAP</th> <th>Without VAP</th> </tr> </thead> <tbody> <tr> <td>57 patients</td> <td>27</td> <td>30</td> </tr> </tbody> </table>			total	With VAP	Without VAP	57 patients	27	30
total	With VAP	Without VAP							
57 patients	27	30							

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Sex		With VAP	Without VAP
	Male	13 (48%)	13 (43%)
Age of participation		With VAP	Without VAP
	Age	19.3 (mean)	14.3 (mean)
Kind of disease	<p>VAP = ventilator-associated pneumonia</p> <ul style="list-style-type: none"> - Predominant cause of VAP in hospitalized patients: Staph. aureus + Pseudomonas aeruginosa - Hospitalisation: 4-11 days (each episode costs >10,000 USD) - Mortality in ICU: up to 40% - Multiple episodes of VAP separated >1 month/ with different x-ray findings/ new organisms were considered as independently 		
	Study-results		
	VAP-rates	<ul style="list-style-type: none"> - 79 independent episodes in 27/57 (47%) patients - 1.3 VAP-episodes/ patient - 48 (61%) of episodes occurred within the first 500 days of ventilation - 1.55 VAP-infections/ 1000 ventilator-days 	
	Hospitalisation	<ul style="list-style-type: none"> - 69 (87%) of VAP - Mean duration: 7 +/- 9 days 	
Kind of artificial ventilation (incl. duration)	Culture	<ul style="list-style-type: none"> - 17 (35%) Pseudomonas - 11 (22%) Staphylococcus aureus <p>(more detail: Tab. 1)</p>	
		With VAP	Without VAP
	Ventilator types	Bilevel ventilation to tracheotomy tube, standard pressure control ventilation to tracheostomy tube, external negative-pressure, standard pressure support (<i>more details: Tab. 2</i>)	
	Ventilation duration	1,012 +/-673 days	781+/- 572 days
		20/27 (74%) 17-24h/d	14/30 (7%) 17-24h/d
		All 57 patients underwent a total of 50.762 days of ventilation (mean duration of ventilation: 890.6 ventilator-days/ patient)	

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	<p>Indication for ventilation:</p> <ul style="list-style-type: none"> - Congenital respiratory disease - Obstructive respiratory disorders - Nervous system disease - Myopathies
Family participation	Provide patients' primary care (if not: home nursing facilities)
Concept of home-based setting/Licensed beds	<p>MedEquip Home Care Services department at the UMHS</p> <p>Background:</p> <ul style="list-style-type: none"> - Respiratory services: provision of oxygen for home use, aerosol therapies, tracheostomy supplies, HMV services - Provided services for 12000 respiratory patients since company was found in 1995
Professions/Qualifications involved/Duration professional employment	<p>Staff involved in the study:</p> <ul style="list-style-type: none"> - 4 respiratory therapists (follow up) - 1 nurse - 15 technicians <p>Primary care for patients:</p> <ul style="list-style-type: none"> - Nursing services (if not: family members)
Cooperation (e.g. Lung specialist, Weaning centre)	Not specified
Key Findings - Hygiene management	
Quality management for hygiene, e.g. Infection control practitioner, duration h for infection prevention and control	Not specified
... - Training /education (incl. in- outdoor training)	Not specified
... - Staff hygiene (incl. PPE, Hand hygiene)	Not specified
... - Relative/visitors (incl. Physicians/Therapists)	Not specified
... - Cleaning and disinfection aspects	Not specified
... - Handling of medical devices	Ventilator tubing was changed weekly for all patients
... - Waste management	Not specified
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)	Tracheostomy suctioning (clean technique)
... - Caring for persons (prevention and infection control)	Not specified
... - Handling of medication	Not specified
... - Laundry hygiene	Not specified
... - Kitchen hygiene	Not specified

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Conclusion/Limitations
<p>Conclusions:</p> <ul style="list-style-type: none">- VAP-rates + mortality rates are much lower in HMV vs. ICU population- VAP was likely to occur during the first 100 days of HMV (caregiver learning curve for providing ventilator care?) → reducing risk of VAP should be focused on patients who require ventilation for longer daily durations/ who are new to receiving HMV- No association of VAP with age, sex, underlying disease, reason for/ type of ventilation, antacid therapy, steroid use <p>Limitations:</p> <ul style="list-style-type: none">- Cohort from a homogeneous population from a university-affiliated single home care service- Very young patients (less comorbidities than patients in ICU)- Only 33/ 79 (42%) VAP-episodes had culture results available <p>Notes for review:</p> <ul style="list-style-type: none">- no hygiene management, but infection control + home treatment of VAP- young patients (doesn't meet our inclusion criteria)

Abbreviations:

HMV = home mechanical ventilation

ICU = intensive care unit

UMHS = University of Michigan Health System

VAP = ventilator associated pneumonia

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Data charting sheet - for health care professional, patients, relatives	
Study description	
First author	Horvath, Leila
Title	Surveillance of Supervised Flat-Sharing Communities Requiring Intensive Home Care: Results and Conclusions
Year	2018
Country	Germany
Study aims	<ul style="list-style-type: none"> - Overview of the type of care provided in outpatient IC-FSC in Munich - Review implementation of hygiene + emergency management - Advice + support if necessary
Methodology/Measures	<p>Study Design: Observational/ descriptive study</p> <p>Method:</p> <ul style="list-style-type: none"> a. Structure Analysis (Audit in nursing services' offices) b. Inspection of outpatient FSC (standardised checklists prepared by RGU) c. Final discussion with care services + review report (defects, complaints + recommendations) <p>Contents of inspection: Structural data, organisation, client profiles, hygiene management, handling of medical devices/ medication/ narcotics, medical care, emergency management, client safety</p> <p>Review period: April 2015 - August 2016</p> <p>Data Analysis: descriptive (excel)</p>
Setting, Participants	
Sample size	<p>18/20 outpatient IC- FSC in Munich (*)</p> <ul style="list-style-type: none"> - A total of 136 care places, of which 85 (62.5%) were occupied at the time of the review <p>(*) exclusion criteria for 2 facilities: Renovation or new opening</p>
Sex	Not specified
Age of participation	Not specified
Kind of disease	Not specified
Kind of artificial ventilation (incl. duration)	Not specified
Family participation	Not specified
Concept of home-based setting/Licensed beds	In general:

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	<ul style="list-style-type: none"> - Self-determined FSC - Max. 12 residents - Nursing services are freely selectable + have guest status <p>Present study:</p> <ul style="list-style-type: none"> - 9 nursing services took care of 20 FSC for outpatient IC in Munich 				
Professions/Qualifications involved/Duration professional employment	<ul style="list-style-type: none"> - 7/9 Nursing specialist with further training for intensive care in a leading position - 1/9 Nursing service management with home respiration course 				
Cooperation (e.g. Lung specialist, Weaning centre)	<ul style="list-style-type: none"> - 2/9 care provider: connected to Weaning-Centre - 3/9 cooperation with external hygiene specialist 				
Key Findings - Hygiene management					
Quality management for hygiene, eg Infection control practitioner, duration h for infection prevention and control	<ul style="list-style-type: none"> - 8/9 care provider: hygiene representative - 18/18 FSC: hygiene plans on site - 14/18 hygiene plans available for employees - 10/10 hygiene plans complete - 17/18 standard for endotracheal suctioning + handling of tracheal cannulas 				
... - Training /education (incl. in- outdoor training)	<ul style="list-style-type: none"> - 9/9 care providers: proven annual hygiene training - 8/9 training documents in hygiene 				
... - Staff hygiene (incl. PPE, Hand hygiene)	<table border="1"> <tr> <td>Hand hygiene</td> <td> <ul style="list-style-type: none"> - 18/18 FSC: VAH-listed hand disinfectants + wall-mounted hand disinfectant dispensers in client rooms - 14/18 correct hand hygiene (4/18 complaints: jewellery, watches, painted nails) - 15/18 Hand disinfectant dispensers in rooms in which reprocessing of tracheal cannulas + suction is performed </td> </tr> <tr> <td>PPE</td> <td> <ul style="list-style-type: none"> - 18/18 wearing PPE - 18/18 keeping PPE </td> </tr> </table>	Hand hygiene	<ul style="list-style-type: none"> - 18/18 FSC: VAH-listed hand disinfectants + wall-mounted hand disinfectant dispensers in client rooms - 14/18 correct hand hygiene (4/18 complaints: jewellery, watches, painted nails) - 15/18 Hand disinfectant dispensers in rooms in which reprocessing of tracheal cannulas + suction is performed 	PPE	<ul style="list-style-type: none"> - 18/18 wearing PPE - 18/18 keeping PPE
	Hand hygiene	<ul style="list-style-type: none"> - 18/18 FSC: VAH-listed hand disinfectants + wall-mounted hand disinfectant dispensers in client rooms - 14/18 correct hand hygiene (4/18 complaints: jewellery, watches, painted nails) - 15/18 Hand disinfectant dispensers in rooms in which reprocessing of tracheal cannulas + suction is performed 			
PPE	<ul style="list-style-type: none"> - 18/18 wearing PPE - 18/18 keeping PPE 				
... - Relative/visitors (incl. Physicians/Therapists)	Not specified				
... - Cleaning and disinfection aspects	<ul style="list-style-type: none"> - 18/18 FSC: VAH-listed surface disinfectants (8/18 correct dosage) - 7/18 VAH-listed fast disinfectant - 1/18 exclusively alcoholic products for surface disinfection - 8/18 tissue dispenser systems (handling correct in 2/8) 				
... - Handling of medical devices	<ul style="list-style-type: none"> - 4/18 FSC: proper preparation of the tracheal cannulae - 18/18 tube + filter change interval according to manufacturer's instructions 				

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	- 14/18 daily functional test of all active medical devices
... - Waste management	Not specified
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)	Not specified
... - Caring for persons (prevention and infection control)	- 14/18 FSC standard to MRSA - 11/18 standard to MRGN - 13/18 standard to Norovirus
... - Handling of medication	Not specified
... - Laundry hygiene	- 18/18 FSC: own laundry - 13/18 industrial washing machines - 18/18 disinfectant detergent - 9/18 work instructions for laundry preparation - 16/18 disinfecting treatment + storage of work clothes - 9/18 improper preparation, drying, storage of cleaning utensils
... - Kitchen hygiene	Not specified
Conclusion/Limitations	
<p>Conclusions in general: regular consultations, continuing education + hygiene inspections by public health department have positive effects on hygiene + emergency management</p> <p>Personal qualification: Professional background + continuing education of nurses very different</p> <p>Hygiene Management</p> <ul style="list-style-type: none"> - All care providers had hygiene representatives, but certificates of qualification with different information on scope + duration of the courses - None of the hygiene representatives had a qualification according to the DGKH guidelines - Hygiene plans: standards on MRE, MRSA, MDRO were partially missing - Hand hygiene: well implemented - Laundry preparation: need for advice; use of small industrial washing machines recommended - Complaints in handling PPE, reprocessing of tracheal cannulae, respiratory/aspiration accessories + when handling surface disinfectants <p>→ good test result regarding organisational structures + hygienic equipment</p> <p>→ So far, there are no binding regulations on the form of care in FSC, even if they are an integral part of outpatient medical care</p> <p>Notes for review:</p> <ul style="list-style-type: none"> - Setting FSC applies to our research topic 	

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- Limited data (only Munich)
- No limitations discussed by authors
- Consider new IPEG

Abbreviations:

DGKH = Deutsche Gesellschaft für Krankenhaushygiene

IC = intensive care

RGU = Referat für Gesundheit + Umwelt

VAH = Verbund für Angewandte Hygiene e.V.

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Data charting sheet - for health care professional, patients, relatives								
Study description								
First author	Leonhard, Matthias							
Title	Microbiological evaluation of different reprocessing methods for cuffed and un-cuffed tracheostomy tubes in home-care and hospital setting							
Year	2016							
Country	Austria/ Great Britain (remains unclear)							
Study aims	<ul style="list-style-type: none"> - To evaluate different reprocessing methods - To determine mechanical integrity + functionality of tracheostomy tubes following reprocessing 							
Methodology/Measures	<p>Study design: Experimental study (randomised)</p> <p>Method: Examination of un-cuffed + cuffed tubes:</p> <ul style="list-style-type: none"> - Un-cuffed tubes were changed + collected after minimum of 1 day of use - Cuffed tubes were changed + collected after minimum of 3 days of use <p>1. Microbiological assessment</p> <ul style="list-style-type: none"> - Microbial concentration on the inner surface of the tubes was assessed BEFORE + AFTER manual cleaning: <ul style="list-style-type: none"> • Procedure method A + D: Tube's lumen was rinsed with 10mL of sterile 0.9% saline solution • Procedure method B + C: Tube's lumen was rinsed with validated neutralizers - Microbial concentration of rinsing solution was determined by using the standard microbiological serial dilution method + planting on different cultures <p>2. Tubes were assigned to 3 additional (!) cleaning procedures randomly</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">Cleaning Methods</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; width: 10%;">A</td> <td style="width: 50%;">Manual cleaning</td> <td style="width: 40%;"> <ul style="list-style-type: none"> - Brushing with a new tube brush (available from tube manufacturers) - Rinsing with tap-water - Until macroscopically clean result was achieved </td> </tr> </tbody> </table>		Cleaning Methods			A	Manual cleaning	<ul style="list-style-type: none"> - Brushing with a new tube brush (available from tube manufacturers) - Rinsing with tap-water - Until macroscopically clean result was achieved
Cleaning Methods								
A	Manual cleaning	<ul style="list-style-type: none"> - Brushing with a new tube brush (available from tube manufacturers) - Rinsing with tap-water - Until macroscopically clean result was achieved 						

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

	<table border="1"> <tr> <td>B</td> <td>Manual pre-cleaning + chemical disinfection</td> <td> <ul style="list-style-type: none"> - Complete submersion of the cleansed tubes in a commercially available + by manufacturer recommended disinfection solution - For 1h at room temperature - Rinsing with tap-water </td> </tr> <tr> <td>C</td> <td>Manual pre-cleaning + machine-based thermal disinfection in dishwasher</td> <td> <ul style="list-style-type: none"> - Tubes were placed vertically in dishwasher - Peak process temp. 65°, standard washing program (48min), no additional cleaning agents </td> </tr> <tr> <td>D</td> <td>Manual pre-cleaning + ultrasound sonification</td> <td> <ul style="list-style-type: none"> - US-cleaning in a commercially available US-household device - Rinsing with tap-water </td> </tr> </table>	B	Manual pre-cleaning + chemical disinfection	<ul style="list-style-type: none"> - Complete submersion of the cleansed tubes in a commercially available + by manufacturer recommended disinfection solution - For 1h at room temperature - Rinsing with tap-water 	C	Manual pre-cleaning + machine-based thermal disinfection in dishwasher	<ul style="list-style-type: none"> - Tubes were placed vertically in dishwasher - Peak process temp. 65°, standard washing program (48min), no additional cleaning agents 	D	Manual pre-cleaning + ultrasound sonification	<ul style="list-style-type: none"> - US-cleaning in a commercially available US-household device - Rinsing with tap-water
B	Manual pre-cleaning + chemical disinfection	<ul style="list-style-type: none"> - Complete submersion of the cleansed tubes in a commercially available + by manufacturer recommended disinfection solution - For 1h at room temperature - Rinsing with tap-water 								
C	Manual pre-cleaning + machine-based thermal disinfection in dishwasher	<ul style="list-style-type: none"> - Tubes were placed vertically in dishwasher - Peak process temp. 65°, standard washing program (48min), no additional cleaning agents 								
D	Manual pre-cleaning + ultrasound sonification	<ul style="list-style-type: none"> - US-cleaning in a commercially available US-household device - Rinsing with tap-water 								
	<p>3. Evaluating material integrity</p> <ul style="list-style-type: none"> - Cleaned + reprocessed tracheostomy tubes were examined for visible signs of material alteration including colour changes, deformation or other causes for loss of tube-function - Cuff integrity was tested by inflation at 25mmHg of air + documentation of the maintenance of pressure during 20min with a cuff pressure manometer 									
Setting, Participants										
Sample size	16 polymer tracheostomy tubes (8 cuffed + 8 un-cuffed) from hospital in-patients									
Sex	Not specified									
Age of participation	Not specified									
Kind of disease	Not specified									
Kind of artificial ventilation (incl. duration)	Not specified									
Family participation	Not specified									
Concept of home-based setting/Licensed beds	Not specified									
Professions/Qualifications involved/Duration professional employment	Not specified									
Cooperation (e. g. Lung specialist, Weaning centre)	Not specified									
Key Findings - Hygiene management										
Quality management for hygiene, e. g. Infection control practitioner, duration h for infection prevention and control	Not specified									
... - Training /education (incl. in- outdoor training)	Not specified									
... - Staff hygiene (incl. PPE, Hand hygiene)	Not specified									
... - Relative/visitors (incl. Physicians/Therapists)	Not specified									
... - Cleaning and disinfection aspects	<table border="1"> <tr> <td colspan="2">Cleaning Methods</td> </tr> <tr> <td>A</td> <td>microbial reduction, but poor reliability + reproducibility</td> </tr> </table>	Cleaning Methods		A	microbial reduction, but poor reliability + reproducibility					
Cleaning Methods										
A	microbial reduction, but poor reliability + reproducibility									

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

	<table border="1"> <tr> <td>B</td> <td>complete microbial elimination in all tested samples</td> </tr> <tr> <td>C</td> <td>reduced microbial burden, if secure fixation in a vertical position in dishwasher</td> </tr> <tr> <td>D</td> <td>did not improve results of manual pre-cleaning</td> </tr> </table>	B	complete microbial elimination in all tested samples	C	reduced microbial burden, if secure fixation in a vertical position in dishwasher	D	did not improve results of manual pre-cleaning
B	complete microbial elimination in all tested samples						
C	reduced microbial burden, if secure fixation in a vertical position in dishwasher						
D	did not improve results of manual pre-cleaning						
	<i>(more details: s. Tab. 2)</i>						
... - Handling of medical devices	<i>s. cleaning and disinfection aspects</i>						
... - Waste management	Not specified						
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)	Not specified						
... - Caring for persons (prevention and infection control)	Not specified						
... - Handling of medication	Not specified						
... - Laundry hygiene	Not specified						
... - Kitchen hygiene	Not specified						
Conclusion/Limitations							
<p>Conclusion:</p> <ul style="list-style-type: none"> - No standardized cleaning procedures or management policies on use + reuse of tracheostomy tubes exist - Inner lumen of tracheostomy tubes is colonised by Staph. aureus, Staph. epidermis, Pseudomonas aeruginosa + Candida spp. most frequently - Recommendation: manual cleaning + chemical or thermal disinfection (dishwasher seems to be optimal method for regular cleansing + disinfecting tracheostomy tubes, if tubes are placed in secure fixation) - No signs of material alteration - Cuff functionality after the single reprocessing regiments remained intact in all but one cuffed tubes <p>Limitations:</p> <ul style="list-style-type: none"> - No investigation on microbial reduction which can be achieved by using a dishwasher alone - Only one single reprocessing step <p>Notes for review:</p> <ul style="list-style-type: none"> - Some aspects remain unclear (e.g. setting + country) - No limitations discussed 							

Abbreviations:

US = ultrasound

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

Data charting sheet - for health care professional, patients, relatives	
Study description	
First author	Neumann, Nadja
Title	Multidrug-resistant organisms (MDRO) in patients in outpatient care in Rhine-Mine region, Germany, in 2014. Prevalence and risk factors
Year	2015
Country	Germany
Study aims	<ul style="list-style-type: none"> - Prevalence of MDRO - Identification of risk factors for MDRO - Finding differences in IC nursing services vs. other nursing services with regard to the colonisation of MRSA/ MDRO
Methodology/Measures	<p>Study design: observational/ descriptive study</p> <p>Period data collection: Oct – Dec 2014</p> <p>Recruitment: 40/nursing services in Rhein-Main area were asked to take part (10/40 agreed to participate)</p> <p>Measures:</p> <p>a. Anamnesis</p> <ul style="list-style-type: none"> - HALT-questionnaire: survey instrument to investigate infections + antibiotic use in nursing homes in Europe <p>b. Swabs (nose, throat, anal)</p> <ul style="list-style-type: none"> - Laboratory analysis of swabs (MRSA + MDRO) <p>Statistical Analysis:</p> <ul style="list-style-type: none"> - Differences nursing services with IC vs. without IC (Mann-Whitney, Odds Ratios, regression)
Setting, Participants	
Sample size	486 patients (=10 nursing services in Rhine-Main area) <ul style="list-style-type: none"> - All patients anamnestic survey - 269 (55,3%) throat and/or nasal swab - 132 (27,3%) anal swab
Sex	32,9% of all patients male sex (50% male sex in IC group)
Age of participation	36,9% (0% IC) >85 years
Kind of disease	Significant differences between nursing services:

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

		Nursing services without IC	Nursing services with IC						
	Incontinence	27%	70%						
	Disorientation	20%	40%						
	Level of care dependency >3	11%	55%						
	Wheelchair assisted	16%	55%						
	Urinary catheter	6%	55%						
	Tracheostomy	0%	75%						
	Invasive ventilation	0%	70%						
	PEG-Sonde	2%	70%						
	<i>(more detail: Tab. 1)</i>								
Kind of artificial ventilation (incl. duration)	No patient without IC had tracheostomy vs. 75% (15/20) patients of IC - Invasively ventilated: 70% (14/20) of IC-patients								
Family participation	Not specified								
Concept of home-based setting/Licensed beds	10 nursing services in Rhine-Main area - 9 "normal" nursing service - 1 IC service								
Professions/Qualifications involved/Duration professional employment	Ambulatory nursing services (normal + intensive)								
Cooperation (e.g. Lung specialist, Weaning centre)	Not specified								
Key Findings - Hygiene management									
Quality management for hygiene, e. g. Infection control practitioner, duration h for infection prevention and control	Not specified								
... - Training /education (incl. in- outdoor training)	Not specified								
... - Staff hygiene (incl. PPE, Hand hygiene)	Not specified								
... - Relative/visitors (incl. Physicians/Therapists)	Not specified								
... - Cleaning and disinfection aspects	In case of MRSA-detection, requesting a free sanitation kit was possible								
... - Handling of medical devices	Not specified								
... - Waste management	Not specified								
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)	<table border="1"> <thead> <tr> <th>Colonisation</th> <th>Significant risk factors</th> </tr> </thead> <tbody> <tr> <td>MRSA</td> <td>- Level of care dependency >3 - Hospitalisation < 6 months</td> </tr> <tr> <td>ESBL</td> <td>- Disorientation - Hospitalisation < 6 months</td> </tr> </tbody> </table>			Colonisation	Significant risk factors	MRSA	- Level of care dependency >3 - Hospitalisation < 6 months	ESBL	- Disorientation - Hospitalisation < 6 months
Colonisation	Significant risk factors								
MRSA	- Level of care dependency >3 - Hospitalisation < 6 months								
ESBL	- Disorientation - Hospitalisation < 6 months								

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

	MDRO	<ul style="list-style-type: none"> - Catheter/ stomata - Level of care dependency >3 - Positive history for MRSA 	
... - Caring for persons (prevention and infection control)	Not specified		
... - Handling of medication	1% of patients received an antibiotic on the day the smear was taken		
... - Laundry hygiene	Not specified		
... - Kitchen hygiene	Not specified		
Microbiological findings			
Significant differences between nursing services:			
	"normal" nursing services	IC-nursing services	All services
MRSA colonisation	12.5%	3.2%	3.7%
3MRGN and/or ESBL	13.1%	30%	14.4.%
3MRGN	30%	5.7	7.6%
4MRGN	0	0	0
Conclusion/Limitations			
<p>Conclusion:</p> <ul style="list-style-type: none"> - High prevalence of MRSA + MDRO-colonisation in outpatient care <ul style="list-style-type: none"> → 3MRGN-colonisation 3x as high as in normal population → essential: good hygiene procedures (hand hygiene, wound management, punctures/ injections, catheters, stomata, artificial respiratory) → hospital hygiene + infection prevention to be applied in outpatient care (KRINKO) - Significant risk factors for MRSA/ MDRO colonisation: hospitalisation < 6 months, level of care dependency > 3, disorientation, catheter/ stomata, positive history for MRSA <p>Notes for ScR:</p> <ul style="list-style-type: none"> - No limitations discussed 			

Abbreviations:

ESBL = Erreger mit erweiterter Resistenz gegen Beta-Laktamantibiotika

HALT = healthcare-associated infections in long-term care facilities

IC = intensive care

MDRO = MRGN/ MRE = multiresistente (gramnegative) Erreger (3MRGN/ 4MRGN = Resistenz gegen Leitantibiotika aus drei/vier Antibiotikagruppen)

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

Data charting sheet - for health care professional, patients, relatives	
Study description	
First author	Prasad, Nishant
Title	Asymptomatic rectal colonization with carbapenem-resistant <i>Enterobacteriaceae</i> and <i>Clostridium difficile</i> among residents of a long-term care facility in New York City
Year	2016
Country	USA
Study aims	To determine prevalence of asymptomatic rectal colonisation with CDI or CRE in LTCF
Methodology/Measures	<p>Study design: cross-sectional study</p> <p>Method: Rectal swabs over a 17-week period</p> <ul style="list-style-type: none"> - Molecular analysis in laboratory - Analysis of risk factors or CRE + CDI <p>Exclusion criteria:</p> <ul style="list-style-type: none"> - Signs + symptoms of diarrhea - Documented CDI-associated infection/ treatment of CDI-infection - Residents on short-term rehabilitation floor <p>Data analysis:</p> <ul style="list-style-type: none"> - Statistical analysis using SAS - Independent t-test, fisher exact-test, logistic regression, p-values
Setting, Participants	
Sample size	301 patients
Sex	63% female
Age of participation	75 years (median age); only adult patients
Kind of disease	<p>Comorbid conditions:</p> <ul style="list-style-type: none"> - 84% hypertension - 56% hyperlipidemia - 49% diabetes mellitus - 43% dementia - 37% coronary heart disease - 34% congestive heart failure - 26% COPD
Kind of artificial ventilation (incl. duration)	Ventilated patients:

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

	<ul style="list-style-type: none"> - Represented 41% of cohort - Over 90% external feeding - >30% had prior CDI-infection - 53% PPI within the last 60 days
Family participation	Not specified
Concept of home-based setting/Licensed beds	80 bed ventilator unit (in a 320-bed medical centre-affiliated LTCF)
Professions/Qualifications involved/Duration professional employment	Not specified
Cooperation (e. g. Lung specialist, Weaning centre)	Not specified
Key Findings - Hygiene management	
Quality management for hygiene, e. g. Infection control practitioner, duration h for infection prevention and control	Infection control isolation policies (not further described)
... - Training /education (incl. in- outdoor training)	Not specified
... - Staff hygiene (incl. PPE, Hand hygiene)	Not specified
... - Relative/visitors (incl. Physicians/Therapists)	Not specified
... - Cleaning and disinfection aspects	Not specified
... - Handling of medical devices	Not specified
... - Waste management	Not specified
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)	<i>S. microbiological findings above</i>
... - Caring for persons (prevention and infection control)	Not specified
... - Handling of medication	Not specified
... - Laundry hygiene	Not specified
... - Kitchen hygiene	Not specified
Microbiological findings	
Colonisation rates	<ul style="list-style-type: none"> - 19% asymptomatic CDI-colonisation - 19% CRE-colonisation
Colonisation with CRE was associated with	<ul style="list-style-type: none"> - 19% history of CDI -infection (median 240 days since prior episode) - 45% history of CDI -infection + asymptomatic colonisation with CDI - 26% history of CDI -infection + colonisation of CRE - 17% history of CDI -infection + colonisation with CRE + CDI
Factors associated with CDI, CRE + concurrent CDI/ CRE	<ul style="list-style-type: none"> - Tracheostomy collar - Location on respiratory floor - Colonisation with CRE

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

	<ul style="list-style-type: none"> - Colonisation with CRE was associated with: MV, enteral feeds, PPI in the last 60 days, location on respiratory floors, hyperlipidaemia, COPD, colonisation with CDI - for patients with prior CDI-infection: lower number of days since prior CDI-infection was significantly associated with an increased risk of CDI-colonisation + concurrent CDI/CRE-colonisation
Conclusion/Limitations	
<p>Conclusion:</p> <ul style="list-style-type: none"> - strong association of colonisation with CDI/ CRE with disruption of normal flora (by MV/ enteral feeds) + prior CDI-infection <p>Limitations:</p> <ul style="list-style-type: none"> - retrospective analysis - multiple persons collected swabs + tabulated data - study was conducted in a single LTCF → results may not be generalizable to others with different characteristics - no data on antibiotic use available <p>Notes for review:</p> <ul style="list-style-type: none"> - Setting: stationary hospital, not outpatient care - No hygiene management 	

Abbreviations:

CDI = Clostridium difficile

CRE = carbapenem-resistant Enterobacteriaceae

LTCF = long-term care facility

MV = mechanical ventilation

PPI = proton pump inhibitor

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

Data charting sheet - for health care professional, patients, relatives									
Study description									
First author	Schwerdtner, Nora-Lynn								
Title	Herausforderungen im Umgang mit MRE in außerklinischen Intensivpflege-Wohngemeinschaften Erfahrungsbericht und Ergebnisse einer Prävalenzerhebung zu multiresistenten Erregern im Stadtgebiet Jena								
Year	2020								
Country	Germany								
Study aims	Prevalence of MDRO + evaluation of hygiene management in AKI-flat-sharing community in Jena								
Methodology/Measures	<p>Study design: observational/ descriptive</p> <p>Background: Reported evidence of MDRO-infection for initially 3 residents in 1 FSC</p> <p>→ Occasional inspection + prevalence survey (MDRO-screening) of affected FSC → Additional survey of 3 providers of IC-FSC</p> <p>Data Collection:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Occasional, unannounced inspection + prevalence survey</th> <th style="text-align: center;">MDRO-prevalence survey</th> </tr> </thead> <tbody> <tr> <td>In affected FSC</td> <td>In all 3 FSC</td> </tr> <tr> <td> <ul style="list-style-type: none"> - Screening for MDRO + MRSA: nose/throat, groin, rectal swabs + on devices - Inspection: Evaluation of practiced hygiene management </td> <td> <ul style="list-style-type: none"> - standardized questionnaires for structural data (number + qualification of med. staff, number of clients cared for, number of beds, type + number of devices) - Anamnestic data: MDRO colonisation rates </td> </tr> <tr> <td>Repeated screening after implementation of hygiene management requirements</td> <td></td> </tr> </tbody> </table> <p>Data Analysis: Descriptive</p>	Occasional, unannounced inspection + prevalence survey	MDRO-prevalence survey	In affected FSC	In all 3 FSC	<ul style="list-style-type: none"> - Screening for MDRO + MRSA: nose/throat, groin, rectal swabs + on devices - Inspection: Evaluation of practiced hygiene management 	<ul style="list-style-type: none"> - standardized questionnaires for structural data (number + qualification of med. staff, number of clients cared for, number of beds, type + number of devices) - Anamnestic data: MDRO colonisation rates 	Repeated screening after implementation of hygiene management requirements	
Occasional, unannounced inspection + prevalence survey	MDRO-prevalence survey								
In affected FSC	In all 3 FSC								
<ul style="list-style-type: none"> - Screening for MDRO + MRSA: nose/throat, groin, rectal swabs + on devices - Inspection: Evaluation of practiced hygiene management 	<ul style="list-style-type: none"> - standardized questionnaires for structural data (number + qualification of med. staff, number of clients cared for, number of beds, type + number of devices) - Anamnestic data: MDRO colonisation rates 								
Repeated screening after implementation of hygiene management requirements									

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

Setting, Participants	
Sample size	3/4 known FSC in Jena 24 patients
Sex	Not specified
Age of participation	3 patients < 18 years old
Kind of disease	<ul style="list-style-type: none"> - 18/24 (75%) level of care dependency 4 + 5 - 4/24 (17%) mobile on their own <p>In total 75 devices:</p> <ul style="list-style-type: none"> - 21/24 (88%) PEG-Sonde - 11/24 (46%) urinary catheter - 4/24 (17%) suprapubic catheter - 7/24 (29%) wounds
Kind of artificial ventilation (incl. duration)	<ul style="list-style-type: none"> - 4/24 (17%) permanent respirator - 7/24 (29%) <24h respirator - 21/24 (88%) Tracheal cannula
Family participation	Not specified
Concept of home-based setting/Licensed beds	<ul style="list-style-type: none"> - 3 FSC (supervised by 2/3 nursing services in Jena) - 24/40 (60%) occupied beds
Professions/Qualifications involved/Duration professional employment	<p>In total 60 employees in 3 FSC</p> <ul style="list-style-type: none"> - 14 geriatric nurses (Altenpfleger) - 17 certified nurse (Krankenpfleger) - 3 nursing assistant (Pflegehelfer) - 4 other
Cooperation (e. g. Lung specialist, Weaning centre)	Not specified
Key Findings - Hygiene management	
Quality management for hygiene, e. g. Infection control practitioner, duration h for infection prevention and control	<p>Occasional inspection in affected FSC:</p> <ul style="list-style-type: none"> - Desolate hygiene management (e.g. hygiene plan not available, incorrect/ missing information on disinfection, contamination on surfaces + medical equipment) - Insufficient structural + technical requirements
... - Training /education (incl. in- outdoor training)	Occasional inspection: knowledge deficits regarding basic hygiene despite annual training
... - Staff hygiene (incl. PPE, Hand hygiene)	1/3 FSC: missing hygiene equipment such as hand disinfectant dispensers and washbasins in nursing staff' dressing rooms
... - Relative/visitors (incl. Physicians/Therapists)	Not specified
... - Cleaning and disinfection aspects	Not specified

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

... - Handling of medical devices	Not specified				
... - Waste management	Not specified				
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)	- 1/3 FSC admission screening by GP				
... - Caring for persons (prevention and infection control)	Not specified				
... - Handling of medication	- 18/24 (75%) patients received antibiotics < 6 months				
... - Laundry hygiene	Not specified				
... - Kitchen hygiene	Not specified				
Microbiological findings					
<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Anamnestic MRE evidence in 3 WG</th> <th style="width: 50%;">Occasional Screening in 1 AKI</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> - 54% positive MRE-evidence - 29% 3MRGN - 23% 4MRGN - 21% MRSA </td> <td> <ul style="list-style-type: none"> - 6/6 patients with multiple colonisation (14 positive MDRO- evidences) - 3MRGN + 4MRGN were found both on medical devices (tracheal cannulae, catheter + PEG-Sonde) + patients themselves - MRSA detection on tracheal cannulae <p><i>(for more details s. p. 7, Tab. 2)</i></p> </td> </tr> </tbody> </table>		Anamnestic MRE evidence in 3 WG	Occasional Screening in 1 AKI	<ul style="list-style-type: none"> - 54% positive MRE-evidence - 29% 3MRGN - 23% 4MRGN - 21% MRSA 	<ul style="list-style-type: none"> - 6/6 patients with multiple colonisation (14 positive MDRO- evidences) - 3MRGN + 4MRGN were found both on medical devices (tracheal cannulae, catheter + PEG-Sonde) + patients themselves - MRSA detection on tracheal cannulae <p><i>(for more details s. p. 7, Tab. 2)</i></p>
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Conclusion/Limitations					
<p>Conclusion:</p> <ul style="list-style-type: none"> - Multiple colonisations in 1 FSC is attributed to desolate hygiene management - High device application rate in all 3 FSC (75 devices for 24 patients) <p>Limitation:</p> <ul style="list-style-type: none"> - Anamnestic survey was verified by screening only in 1 FSC - City of Jena only: small database <p>Notes for Review:</p> <ul style="list-style-type: none"> - Desolate hygiene management only described as an example with experts from the inspection report - Hygiene management of other 2 FSC not described at all 					

Abbreviations:

AKI = außerklinische Intensivpflege

MDRO = multidrug resistant organisms (MRE, MRGN)

FSC = flat-sharing community

GP = general practitioner

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

Data charting sheet - for health care professional, patients, relatives																	
Study description																	
First author	Toussaint, Michel																
Title	Is disinfection of mechanical ventilation tubing needed at home?																
Year	2006																
Country	Belgium																
Study aims	<ul style="list-style-type: none"> - To determine the HVC cleanliness + sterility of HVC used by home ventilated patients - To determine efficiency of tubing cleaning + decontamination protocols recommended to patients 																
Methodology/Measures	<p>Study design: Prospective Cohort Study</p> <p>Method:</p> <ul style="list-style-type: none"> - Prior to the study: Patients had received “Low Level Decontamination + Cleaning”-Protocol (written + taught); used for > 12 months (<i>s. category “Training”</i>) - 39 used + 7 new EVAs (as control) were examined in 2 different experiments: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Experiment 1</th> <th style="text-align: center;">Experiment 2</th> </tr> </thead> <tbody> <tr> <td>Where</td> <td colspan="2">During hospitalization OR during patient consultations in the centre for MV</td> </tr> <tr> <td>When</td> <td>After the patient arrived</td> <td> <ul style="list-style-type: none"> - The day after Exp. 1 - After cleaning done by investigators </td> </tr> <tr> <td>Who</td> <td colspan="2">Exp. 1 + 2 by the same investigator</td> </tr> <tr> <td>What</td> <td> <p>Analysis:</p> <p>1. Visual (EVA + complete circuit):</p> <ul style="list-style-type: none"> - 10-point scale (judged “dirty” = 2/10 or lower) + 4 criteria (*) of severity of visual dirtiness - 10 points maximum was also given for the full circuit with averaging of the mean score of the individual tubing parts <p>(*) colour (1 point = light; 3 points = dark); (2) incrustation (0 = disappears; 2 = stays); (3) extent (1 = particle; 2 =</p> </td> <td> <p>a. Cleaning by investigators (decided at random):</p> <ul style="list-style-type: none"> - Sequence A: HAC-cleaning (decontamination by 15min submersion in a chemical 5% HAC-bath) - Sequence B: dishwasher (90min programme at a temperature >65°C + classical dishwasher powder) <p>b. Analysis</p> <ul style="list-style-type: none"> - s. Exp. 1 </td> </tr> </tbody> </table>			Experiment 1	Experiment 2	Where	During hospitalization OR during patient consultations in the centre for MV		When	After the patient arrived	<ul style="list-style-type: none"> - The day after Exp. 1 - After cleaning done by investigators 	Who	Exp. 1 + 2 by the same investigator		What	<p>Analysis:</p> <p>1. Visual (EVA + complete circuit):</p> <ul style="list-style-type: none"> - 10-point scale (judged “dirty” = 2/10 or lower) + 4 criteria (*) of severity of visual dirtiness - 10 points maximum was also given for the full circuit with averaging of the mean score of the individual tubing parts <p>(*) colour (1 point = light; 3 points = dark); (2) incrustation (0 = disappears; 2 = stays); (3) extent (1 = particle; 2 =</p>	<p>a. Cleaning by investigators (decided at random):</p> <ul style="list-style-type: none"> - Sequence A: HAC-cleaning (decontamination by 15min submersion in a chemical 5% HAC-bath) - Sequence B: dishwasher (90min programme at a temperature >65°C + classical dishwasher powder) <p>b. Analysis</p> <ul style="list-style-type: none"> - s. Exp. 1
	Experiment 1	Experiment 2															
Where	During hospitalization OR during patient consultations in the centre for MV																
When	After the patient arrived	<ul style="list-style-type: none"> - The day after Exp. 1 - After cleaning done by investigators 															
Who	Exp. 1 + 2 by the same investigator																
What	<p>Analysis:</p> <p>1. Visual (EVA + complete circuit):</p> <ul style="list-style-type: none"> - 10-point scale (judged “dirty” = 2/10 or lower) + 4 criteria (*) of severity of visual dirtiness - 10 points maximum was also given for the full circuit with averaging of the mean score of the individual tubing parts <p>(*) colour (1 point = light; 3 points = dark); (2) incrustation (0 = disappears; 2 = stays); (3) extent (1 = particle; 2 =</p>	<p>a. Cleaning by investigators (decided at random):</p> <ul style="list-style-type: none"> - Sequence A: HAC-cleaning (decontamination by 15min submersion in a chemical 5% HAC-bath) - Sequence B: dishwasher (90min programme at a temperature >65°C + classical dishwasher powder) <p>b. Analysis</p> <ul style="list-style-type: none"> - s. Exp. 1 															

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

	<p>surface > 1 qcm); (4) relative humidity (0 = dry; 3 0 = humid)</p> <p>2. Bacteriological (EVA only): dry swab on the EVA balloon + evaluation in laboratory</p>
Statistics	Exp. 1 + 2 results for visual + bacteriological analysis were compared (paired + unpaired t-tests; correlations), p value 0.01
Setting, Participants	
Sample size	39 severe restrictive ventilated patients
Sex	Not specified
Age of participation	Not specified
Kind of disease	<ul style="list-style-type: none"> - All patients: functional tetraplegy with chronic alveolar hypoventilation - 24/39 Duchenne muscular dystrophies - 4/39 congenital myopathies - 4/39 spinal muscular atrophies - 4/39 tetraplegics - 2/39 polyneuropathies - 1/39 limb girdle dystrophy
Kind of artificial ventilation (incl. duration)	<ul style="list-style-type: none"> - All respirators volumetric - All patients ventilated at home with EVA for >12 months (mean time ventilated: 7.7 years) - All patients: ventilation + tubing with valve between 6-12 months - Group (T): 16/39 tracheostomy (circuits connected to humidifier + water trap) - Group (N): 23/39 noninvasively with nasal mask (13 silicone custom made mask; 10 commercial mask) - 24/39 continuously ventilated (16 by tracheostomy; 8 by mouthpiece during the day/ nasal mask at night)
Family participation	Not specified
Concept of home-based setting/Licensed beds	<ul style="list-style-type: none"> - 11/39 lived in institution - 28/39 lived at home
Professions/Qualifications involved/Duration professional employment	Not specified
Cooperation (e. g. Lung specialist, Weaning centre)	Not specified
Key Findings - Hygiene management	

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Quality management for hygiene, e. g. Infection control practitioner, duration h for infection prevention and control	Not specified
... - Training /education (incl. in- outdoor training)	<p>Patients:</p> <ul style="list-style-type: none"> - Maintenance advice for HVC (*) is not well adhered to (even taught + written) - Need to be taught in hospital + repetition at regular intervals with short trainings - 10-point scale could be used to send feedbacks to patients <p>(*) “Low-Level Decontamination + Cleaning”-Protocol:</p> <ul style="list-style-type: none"> - To clean macroscopic spots with detergent + hot water followed by a 15min HAC-bath (diluted to 5%) - 2x per month: circuit, tubing + interfaces decontamination by HAC - To clean cannulae of tracheostomy with hydrogen peroxides (oxygen water) <p>Professionals:</p> <ul style="list-style-type: none"> - Clearly need additional training sessions to improve their expertise in respiratory equipment
... - Staff hygiene (incl. PPE, Hand hygiene)	Not specified
... - Relative/visitors (incl. Physicians/Therapists)	Not specified
... - Cleaning and disinfection aspects	<p>2 different cleanings are described in the study:</p> <ul style="list-style-type: none"> - “Low-Level Decontamination + Cleaning”-Protocol (<i>s. category “training” above</i>) - Cleaning by investigator during Exp. 2 (<i>s. category “methodology” above</i>) <p>ICU-hygiene protocols are not appropriate for home use, because they only recommend inadequate disinfection + fail in advising simple washing → need for maintenance protocols aiming for cleanliness, not for sterility → Recommendation by authors: low-level-disinfection in dishwasher</p> <ul style="list-style-type: none"> - All pieces of the circuit (masks, EVAs...) at 70°C + 90min - Available in most families + institutions - Easy of use
... - Handling of medical devices	(<i>s. “cleaning + disinfection aspects” above</i>)
... - Waste management	Not specified
... - Infectious critical activities (incl. MRSA, Screening, Surveillance)	Not specified
... - Caring for persons (prevention and infection control)	Not specified
... - Handling of medication	Not specified
... - Laundry hygiene	Not specified
... - Kitchen hygiene	Not specified

Appendix 3: Data Charting Sheets. Hygiene Management for Long-term Ventilated Persons in the Home Health Care Setting: A Scoping Review

Microbiological findings	
<p>Experiment 1:</p> <ul style="list-style-type: none"> - Dirtiness was worse in (T) than in (N) - EVA in (T) were more contaminated than in (N) - Contamination rates (N): 22% (no presence of PPO) - Contamination rate (T): 81% (19% were PPO) - Significant correlation was found between the dirtiness of the complete tube + EVA - 69% of EVA + 56% of circuits were visually dirty - Circuits from patients living at home were visually cleaner than those from patients living in institutions - 46% of the valves were contaminated by microorganisms + 22% by fungi (seldom contaminated by potentially pathogenic organisms) <p>Experiment 2:</p> <ul style="list-style-type: none"> - Remained dirty after dishwasher cleaning (HAC bath): 14% (64%) of dirty EVA → EVA cleanliness was significantly better after dishwasher cleaning with similar bacteriological decontamination - choice of the dishwasher did not play any role in the quality of cleaning because all recent machines are equivalent 	
Conclusion/Limitations	
<p>Conclusion:</p> <ul style="list-style-type: none"> - Circuits from patients living at home were visually cleaner than those from patients living in institutions → nurses in institutions need additional training sessions to improve their expertise in respirator equipment maintenance - Maintenance advice for HVC is not well adhered to → patients + their families need trainings in hospital to demonstrate the utility of simple basic hygiene - Dishwasher cleaning is more efficient than chemical HAC-bath → low-level disinfection is efficient + possible for families, patients + institutions <p>Notes for Review:</p> <ul style="list-style-type: none"> - There are no limitations discussed!! - Method of visual assessment remains unclear (10 point scale + 4 criteria of severity) + why < 2/10 decelerated as “dirty”? 	

Abbreviations:

EVA = expiratory valves

HAC = Hospital Antiseptic Concentrate

HVC = home ventilation circuits

ICU = intensive care unit

MV = mechanical ventilation