Last updated on November 1st 2026

A quasi-experimental comparative study of the effect of an educational, pragmatic intervention to improve the quality of continence care in continuing care homes

Structured Utilization of Continence Care Innovations in Nursing Care Trial (SUCCINCT)

Protocol

Background

Incontinence of urine (UI) and feces (FI) is common amongst older residents of continuing care homes, henceforth nursing homes (NH), UI affecting between 60-75% of residents, especially women, who represent the highest proportion of institutionalized older adults (1). FI affects between 30-50% of residents (2). The assessment and management of continence have been the source of much criticism in this setting, with studies noting a lack of knowledge of continence on the part of front-line care providers, an expectation that older residents become incontinent because of entering the NH, a lack of adequate assessment and management, and an over-reliance on containment (3).

Despite the increasingly complex needs of this highly vulnerable population, NH staff levels and skills have not significantly changed over recent years (4, 5), further challenging the ability of the system to adequately manage the care needs of the resident population. Several reports at the international and national levels describe the sub-optimal quality of care in NH settings (6-10). There have been repeated calls to address quality of care in NH (11-14), but we continue to have little evidence of how to support consistent and sustained quality of care (12, 15).

The characteristics of NH residents across many jurisdictions has changed as "aging in place" policies have influenced admissions (16). The medical complexity of NH residents has increased while continence status declines over time (17); those with a diagnosis of dementia lose continence at a more rapid rate than those without dementia (18). Incontinence in this setting is likely to be multifactorial in aetiology. For example, in a systematic review of the prevalence and risk factors for urinary incontinence (UI) in long-term aged care homes, Offerman and colleagues (19) identified 46 risk factors which were grouped into factors involving 1) locomotion, 2) cognitive function and 3) drugs. However, differences in the care process and quality of care can also influence UI and FI prevalence; reasons for a less-than-optimal approach in nursing homes may include inadequate knowledge of and skills for maintaining continence in general, inability to use guidelines for continence care, insufficient staff and poor communication among healthcare professionals.

Last updated on November 1st 2026

Context

As part of the larger European Union-funded ProCon project through the European Commission's Erasmus+ program (Boosting innovation, entrepreneurship and training for PROmoting CONtinence in nursing homes, https://www.proconproject.eu/), this sub study will examine the effects of the ProCon training program on the design and implementation of a continence care intervention in NHs through a multinational pragmatic study conducted in Barcelona (Spain), Alberta (Canada), Leuven (Belgium) and Turku (Finland). NH staff from the participating NHs in Canada, Belgium, Finland and Spain will undertake the courses on continence care, co-created in Work Package 3 of the ProCon Work Plan. As part of these educational courses, participants will work in teams, supported by a Continence Champion from the care units and facilitated by a member of the ProCon research staff to design a continence focused intervention to be tested locally in a pragmatic trial, compared to usual care practices.

The primary research question for SUCCINCT is:

Can an intervention derived from a novel educational course in continence care for NH staff lead to improved delivery of continence care and resident satisfaction with continence care?

The secondary research question for SUCCINCT is:

Can an intervention derived from a novel educational course in continence care for NH staff lead to improvements in workflow and work engagement, and empowerment for NH staff?

The results of this study will inform understanding of whether and how the training works in the healthcare environment. Process evaluation and the Theory of Change will facilitate the understanding of the intervention.

Theoretical framing

The ProCon courses are framed by the Behavior Change Wheel (20), the COM-B model (21) and the Theory of Change, which will be used in the course to carry out a diagnosis of current continence practices. The Behavior Change Wheel (20) will be used as a guiding framework to systematically link the identified behavioral challenges to appropriate intervention strategies, using the COM-B model (Capability, Opportunity, Motivation → Behavior) and the APEASE criteria to ensure that selected techniques are acceptable, practical, effective, affordable, equitable, and have minimal unintended consequences.

Last updated on November 1st 2026

Table 1. **APEASE criteria**

Acceptability	How far is it acceptable to *all* key stakeholders?
Practicability	Can it be implemented as designed within the intended context, material and human resources?
Effectiveness	How effective and cost-effective is it in achieving desired objectives in the target population?
Affordability	How far can it be afforded when delivered at the scale intended?
Side-effects	How far does it lead to unintended adverse or beneficial outcomes?
Equity	How far does it increase or decrease differences between advantaged and disadvantaged sectors of society?

The COM-B model comprises elements necessary to conduct a behavior, namely, Capability (physical and psychological), Opportunity (physical and social) and Motivation (reflective and automatic) (21). Interventions formulated as part of course participation are primed for implementation and sustainment (22) and take into account the local environment, acknowledging that NH care units form a complex adaptive clinical microsystem.

Here, the Theory of Change refers to a theory-driven framework that explains how and why an intervention is expected to produce its intended outcomes by mapping the causal pathway from activities to short-, medium- and long-term results, while making explicit the underlying assumptions and contextual conditions. The Theory of Change is especially useful for complex health and social interventions because it helps clarify mechanisms of action, supports stakeholder engagement, and strengthens evaluation by identifying what should be measured along the pathway to impact. The Theory of Change is a way to improve the design, feasibility testing, implementation, and evaluation of complex interventions (23).

Clinical microsystems are a central element of the quality improvement literature, emphasizing the importance of directing system improvement strategies at the level of clinical (patient or resident care) units rather than at the macro-organizational level. In

general, health care services tend to be organized at this microsystem (clinical unit) level (24). In institutional long-term care, residents receive care in clinical units embedded in NH organizations (25). Targeting improvement strategies/interventions at the level of the unit in these organizations, therefore, has the potential to facilitate home -level transformation (26). The effectiveness of healthcare providers is, in part, mediated by the unit and organizational context (27); clinical microsystems research indicates that positive/favorable contexts are associated with high performing units which, in turn, are associated with better resident outcomes (25). Implementing interventions is reliant upon adequate facilitation, defined as "a technique by which one person [the facilitator] makes things easier for others" (28). Harvey et al. defined it as "the process of enabling the implementation of evidence into practice" (29). Facilitation is therefore both a role and a process (29-31). Here we propose (1) facilitation (as a bundled set of activities) to support literacy in the language and tools of quality improvement, (2) relationship building to develop teams, and (3) interconnectedness of these teams with other care providers on the unit, with senior management leadership and support.

This clinical microsystem and the team within it function as a complex adaptive system within the framework of complexity science. Complexity science describes complex adaptive systems as possessing eight characteristics (32), four of which appear key to all. Complex adaptive systems undergo self-organization and act in a non-linear fashion, such that outputs are not in proportion to inputs. Relationships within the system change over time, generating new structures and dynamics. Systems continuously interact with their environment, leading to new patterns of operating that emerge from interactions between different parts of the system. Systems provide opportunities for higher order learning, changing beliefs and practices rather than simply knowing the rules, promoting creativity and providing positive feedback leading to improved performance (33, 34). Senior leadership support and practices that stimulate open communication are well recognized, facilitating processes that promote self-organization (35, 36). This strategy is acknowledged as useful in improving diffusion of effective healthcare practices. This self-organization is what we hope to engage in the formulation of innovative care practices, resulting from the ProCon courses. Interventions that recognize and consider how individuals use and share information are more effective than those that do not (37, 38). ProCon continence interventions will use social learning processes, and encourage active discussion and co-operation in developing solutions and adaptations (39).

Last updated on November 1st 2026

Design and setting

This pragmatic quasi-experimental, before-after study compared to usual care will be conducted across four sites (NH clinical care units): Barcelona (Spain), Turku (Finland), Alberta (Canada) and Leuven (Belgium). Inter-country comparison of effect is not planned.

Sample and groups

We will recruit a sample of up to 160 NH residents: 40 residents per site, of which 20 will be assigned to the control (usual care) group and 20 to the intervention group (exposed to the intervention devised during the ProCon courses). The sample size is based upon a rule of thumb for exploratory trials; there are no previous data upon which to base a power calculation and derive a sample size. In each country there will be one intervention and one usual care site, ideally in separate homes, or organizationally separate within a single home. The sample size is in line with the recommendations for pilot studies (40).

Selection

Following agreement to participate and unit selection, NH care units, usually one per NH, will be randomized 1:1 to the usual care or intervention group by simple randomization using the Statistical Package for the Social Sciences (SPSS) software. As a pragmatic measure, NHs will be given guidance on selecting clinical units in which to conduct the study, according to the Alberta Context Tool (number of residents likely to be eligible, composition of care aide teams, familiarity with residents for assessments, leadership and culture evaluations) (41). A Continence Champion, usually a member of the clinical team, will be sought to lead the team on each care unit.

Inclusion criteria

Eligible NHs will be registered with the appropriate administrative authority, and have 90% of residents aged 65 or over. The selection of NHs will be done by convenience. Facility operations should be conducted in the language appropriate to their country of location and be located within 100 km of the trial center (University of Alberta in Canada, University of Vic-Central University of Catalonia in Spain, Turku University of Applied Sciences in Finland and KU Leuven in Belgium).

Eligible older adult residents will be permanent (length of stay longer than four months) residents of the NH, have UI, FI or dual incontinence, require assistance with either toileting or personal care, be willing and able to provide informed consent to participate or, if unable to provide such consent, have a legal representative who is willing and able to provide informed consent on the behalf of the resident.

Last updated on November 1st 2026

Eligible care staff will be all regular front-line care staff working on the clinical care unit for at least three months who have participated in the basic (for teams) and advanced (for Continence Champions) ProCon continence courses. They should be willing and able to provide informed consent to participate. Teams thus formed will comprise a minimum of four staff having taken the basic continence course.

Continence Champions will be volunteers on intervention units willing to lead teams in creation and implementation of their continence innovation, lead Plan-Do-Study-Act cycles, and assist teams in problem-solving, measurement of change, intervention refinement, scale and spread (to suitable residents).

Exclusion criteria

Residents with an indwelling urinary catheter or anuria on renal dialysis, in a coma, in receipt of end-of-life care, with alcohol and/or recreational drugs dependency, or exhibiting responsive behaviors of sufficient severity in the opinion of the care staff to make participation impractical will be excluded.

Care staff who have not taken the ProCon continence courses, who have not been part of the regular clinical care unit team for more than three months, or who are unwilling to consent to participate in the study will be excluded.

The courses

The continence courses were co-created during face-to-face workshops in Turku, Finland in October 2025. Students, experts, lecturers and NH staff participated in the co-creation of the basic and advanced courses.

Course 1 (Continence Care in Long-term Settings) is digital, self-administered and available for free access. It contains fundamental aspects of continence care in long-term settings (especially focusing on nursing homes). The time calculated to complete it is 12 hours (0.5 ECTS - European Credit Transfer and Accumulation System). The online course content has also been designed for in-person, small group delivery in three distinct one-hour workshops, suitable for nursing homes where on-site, in-working hours delivery is required.

Course 2 (Continence Care in Long-term Settings - Advanced) contains more advanced contents, including theoretical content and training scenarios. The course is available both digitally and has been developed for in-person, pragmatic delivery.

Block 4 is dedicated to designing an intervention program for continence care adapted to the needs of the NHs.

Block 5 comprises knowledge application, required competences and skills learned during the previous blocks, including the intervention that was co-designed in block 4.

The courses were piloted, refined based on trainees' feedback, and translated from English to Spanish, Dutch and Finnish for use in this study.

Additional content for co-designing the intervention for continence care in NHs will be provided to Continence Champions and SUCCINCT researchers, (ProCon investigators). Four online Theory of Change workshops (two-hour duration each) were conducted to equip Continence Champions with the necessary theoretical understanding of essential change theory, and principles of knowledge to action and implementation. These Theory of Change workshops aim to collaboratively define long-term outcomes, such as improved continence care and resident well-being, by identifying the behavioral, organizational, and technological changes needed, mapping the activities and inputs to achieve them, and clarifying assumptions and risks that may affect implementation. The Theory of Change provides a structured framework to articulate how and why change is expected to happen, enabling stakeholders to co-create causal pathways that link project interventions to impact.

Measures and outcomes (Table 2)

A) Residents:

Descriptive

a. 1) Demographic information: age, sex (gender, if applicable).

a. 2) Health-related variables: number of chronic conditions (count), number of co-existent medications (count), presence of incontinence associated dermatitis (YES/NO), degree of cognitive impairment determined by the Cognitive Performance Scale (RAI-MDS from 0-intact to 6-very severe impairment), and frailty (measured by Clinical Frailty Scale), assessed upon trial entry.

Feasibility

a. 3) Rate of recruitment: number of residents willing to consent to participate expressed as a proportion of total potentially eligible residents on the care unit. Reasons for non - participation, if given, will be recorded.

a. 4) Rate of retention and data loss: number of residents withdrawing consent to participate, data loss and resident data quality will be assessed for feasibility and acceptability.

Outcome

a. 5) Continence status: bladder and bowel continence according to part H in the Resident Assessment Instrument (RAI) (https://www.aapacn.org/resources/rai-manual/). The measure at study end will be compared to baseline.

a. 6) Number of urinary incontinence episodes per 24 hours, collected over three days using a simple bladder diary.

a. 7) Number of fecal incontinence episodes per week, collected on a bowel chart for three days (averaged up to one week for analysis and to reduce burden).

a. 8) Satisfaction with continence care: the degree to which residents are satisfied with their continence care (acceptability, degree of disruption, efficiency, degree to which care meets their needs, dignity, autonomy, preservation of self, expectations, staff approach to care) using a 5-point Likert-type scale, and compared at study end to baseline assessment. We will adopt a questionnaire used in a previous study: DISCRETE (https://www.imec-int.com/en/what-we-offer/research-portfolio/discrete).

B) Care staff:

Care staff will answer a 5-point Likert-type scale series of questions ascertaining the degree to which they found the implementation of their created intervention effective for resident care, the degree of improvement associated with their intervention, the utility of the intervention to provide person-centered care, the ability of their intervention to provide dignity preserving care, and the degree of change in care burden associated with implementation of their intervention.

Descriptive

b. 1) Demographic data: age, sex, gender, primary language spoken, years in practice, and formal level of training will be collected to describe the sample.

Outcome

b. 2) Utrecht Work Engagement Scale, adapted for care aides. Collection at baseline and end of study, subjected to both within (intervention group) and between group analyses.

b. 3) Proportion of tasks rushed and tasks left undone per shift (from the 7-item organizational headroom questionnaire). Collection at baseline and end of study, subjected to both within (intervention group) and between group analyses.

C) System outcomes:

A single system outcome: the average number of absorbent products used per 24 hours, for a three-day window, at baseline and end of study will be collected and compared between groups.

Measures (in detail):

Alberta Context Tool: the Alberta Context Tool (ACT) is a validated survey instrument designed to assess organizational contexts within healthcare settings. It examines multiple dimensions such as leadership, organizational culture, and resource availability, providing insights into how these factors influence outcomes (41).

Clinical Frailty Scale: the 9-category Clinical Frailty Scale (CFS) is a validated measure of frailty based on clinical presentation. The assessor judges the level of frailty based on clinical findings and includes physical disability, cognition and co-morbidity (42). It scores between 1 (very fit) to 9 (terminally ill with a life expectancy of <6 months). Each point on the scale corresponds to a picture and written description to assist the clinician in grading the frailty score (a score = or >5 is frail) (43).

Resident Assessment Index-Minimum Dataset: the Resident Assessment Index-Minimum Dataset (version 3.0) (RAI-MDS) (44) is a routinely collected set of variables relating to care, complexity and resident characteristics on admission and quarterly thereafter, or when the clinical state of a resident changes. The single item H3b (bladder continence) and H2 (fecal incontinence) will be collected, ensuring minimal burden for countries where this dataset is not in routine use. A single level of change will be assigned clinical significance.

Satisfaction with continence care: we will use a questionnaire used in a previous study: DISCRETE (https://www.imec-int.com/en/what-we-offer/research-portfolio/discrete).

Likert scales to assess intervention: a series of 5-point Likert-type scale questions will be created according to a standard method (45), and tested for content and face validity with NH staff to ensure sense-making and utility prior to use in the trial.

Utrecht Work Engagement Scale (modified for Care Aides): this validated scale demonstrates good internal consistency and stability with reliable and valid work engagement scores (46-48). The scale measures three core dimensions: vigor, which reflects high levels of energy and mental resilience; dedication, characterized by a strong involvement in one's work and a sense of significance, enthusiasm, and challenge; and absorption, where individuals are fully concentrated and happily engrossed in their tasks.

Organizational Headroom: this validated 7-item questionnaire assesses the degree to which care providers consider their shifts rushed and short of time, and the extent to which tasks are left undone (49).

Process Evaluation (intervention teams only): in accordance with the Medical Research Council (50), we will undertake a parallel process evaluation to explain and examine the feasibility, acceptability, implementation, and impact of the course intervention, as well as its medium-term value. This framework suggests examining three dynamically related areas: (1) implementation—what is implemented and how; (2) mechanisms of impact—how the delivered intervention produces change; and (3) how context affects implementation and outcomes. We will examine indicators of implementation success such as acceptability of the intervention to staff, agreement to adopt the intervention, loyalty to the implementation, and penetration (51) (53). This evaluation will comprise qualitative data from unit team-based focus groups (6-8 members of the NH staff from the implementation team in the intervention units in each of the four countries) analyzed using grounded theory to illustrate how teams implemented the intervention and how it produced change. Process evaluation will aim to: a) determine the fidelity (and adaptation) of receipt and enaction of the intervention components, defined as the parts of the planned intervention that were received and acted upon; b) explore the mechanism of change (i.e. understand how the components of the intervention were enacted, and how and why the program has any impact on the delivery of continence care); c) explore which contextual aspects are key in influencing the success (or otherwise) of the intervention and how. Focus group discussions will be held at approximately week 5-7 (at mid intervention) and week 13-14 (i.e. two weeks following cessation of the intervention) of the study (skeleton interview guides developed by the research team).

Procedure

Following consent to participate on the part of the NH, the Director of Care (leader) in the NH will be invited to select a single care unit for participation in the trial. The SUCCINCT researchers will administer the Alberta Context Tool (41) to measure unit context to guide selection of the care unit. Should the initial selection have unfavorable (subjective) context, then an alternative unit will be selected and the process repeated. The unit will then be randomized to either intervention or usual care.

For intervention units, after gaining informed consent from care staff to participate in the study, a Continence Champion and continence team will be selected. Staff will take the four ProCon continence courses for the creation of a continence care intervention plan for implementation in their respective unit. The courses will be delivered in person or taken individually online over a four-week period prior to the intervention creation and start of implementation. Moreover, Continence Champions will have already participated in four additional workshops designed to equip them with tools for implementation and change.

For usual care units, unit staff and resident recruitment for participation will be delayed for intervention units to first take the ProCon continence courses.

Following completion of the ProCon continence courses and creation of the intervention shortly thereafter, staff in both intervention and usual care arms will identify potentially eligible residents. Consent to participate will be gained from the residents by the SUCCINCT researchers who will then gather baseline data from them and the care staff.

The intervention derived by unit teams following the ProCon continence courses, and facilitated by SUCCINCT researchers and the Continence Champion for the intervention unit will be implemented, adapted, facilitated, and supported by NH staff during a 12-week period, known as the implementation phase.

Intervention

The intervention is created by staff having been exposed to the ProCon continence courses, led by the Continence Champion on the intervention care unit.

Facilitated by the SUCCINCT researchers at each site and aided by the Continence Champion, the unit team will co-create a continence intervention designed to improve the continence care or delivery of continence care to residents on their unit. The implementation plan is modeled on IHI's Breakthrough Series Collaborative Model (52) and a recent care aide-led quality improvement project in nursing homes (53), in which facilitation is a critical element of successful implementation. Characteristics of interventions important in achieving successful implementation will be included (22, 54, 55). These characteristics are listed in **Table 2**.

We will employ education, coaching, team-building, and communication. SUCCINCT researchers will actively work to develop capacity in these activities and work with unit leaders and Continence Champions on how they can support the activities during the intervention (approximately 1-2/week). While teams work on their continence care innovation, we aim to enable the unit staff to work to incorporate new practices, and to increase engagement and empowerment of staff.

Table 2. Characteristics

Characteristic (from reference 22)	**Intervention implementation**
Acknowledge unpredictability	
Allow tailoring of design to local context	✓
Emphasize discovery as key to learning	✓
Design for multiple possible outcomes	✓

Encourage stakeholders to envisage surprises as opportunity	✓
Encourage participants to collectively learn and adapt	✓
Recognise self-organisation	
Develop designs that are flexible and adaptable	✓
Use stakeholders to develop interventions	✓
Conduct pilot studies to observe local organizing patterns	✓
Attend to existing and developing interdependencies	✓
Facilitate sense making	✓
Facilitate interdependence	
Acknowledge interdependency as critical	✓
Develop methods to assess the quality and strength of interdependency	✓
Reinforce existing effective relationships	✓
Foster new relationships where needed	✓
Encourage sense making	
Encourage focused experimentation	✓
Encourage participants to ask questions and deal with uncertainty	✓
Seek different points of view	✓
Provide plentiful opportunity for reflection and conversation	✓

A schematic of the implementation vehicle is shown in Figure 2. In each care unit the care team is coached (facilitated) by the SUCCINCT researchers, at least bi-weekly, over the 12-week implementation period based on Plan-Do-Study-Act (PDSA) cycles. Development and information flow is promoted by feedback of locally derived data for timely action by teams, stimulating relationships and creativity. Local unit-based teams will contain at least four members, including care aides and regulated staff, in addition to the Continence Champion. The unit-based Continence Champion will have taken the advanced ProCon course and lead the team's efforts, supported by the local SUCCINCT researchers. Teams must be supported by Senior Leaders (Directors of Care) within the home, removing barriers to change, supporting time spent on the continence care intervention, and helping when asked.

SUCCINCT implementation has three main components:

1. Getting started: establishing baseline performance and knowledge

Each unit team, their senior leader and the Continence Champion will receive a Getting Started Kit. The goal of this kit is to provide data to give a clear picture of current continence care on the unit.

2. Facilitative actions: ongoing developmental support and small bursts of teaching

Actual facilitative actions (e.g., coaching, guiding, mentoring, supporting) occur in combination with small teaching bursts, largely during telephone conferences, but also in visits, which occur as needed (up to weekly). In addition, formal meetings take place with each team as they begin to master the change process, simple measurement and feedback of progress. SUCCINCT researchers are involved as needed.

3. PDSA: action periods

Action periods are the times when teams carry out series of small tests of change and attempt to improve care delivery. During action period 1, teams implement their continence intervention and undertake local small-scale measurement. They report tests of change that they have tried, the level of team functioning, success at measurement, and barriers to implementing their intervention. SUCCINCT researchers will provide support with measurement and ideas for change tested. Subsequent action periods follow the same format: feedback will provide direction and guidance to both team members and senior leadership.

Resident and care staff data will be gathered at pre-intervention and post-implementation of the intervention (i.e. at weeks 13-14). At week 14 SUCCINCT researchers will conduct a focus group discussion with the care staff in the intervention unit. Collection of usual care data will be conducted in parallel.

Analysis plan

Quantitative data analysis: descriptive statistics will be used to summarize and present the participants' (residents and care staff) sociodemographic and health-related characteristics. Normality of quantitative data will be tested with the Kolmogorov-Smirnov test. A comparison of all the variables at baseline and post-intervention assessments will be made between the intervention and usual groups using chi square - or Fisher's exact test, if needed - and the t Student test (or Mann-Whitney, if quantitative data do not follow normality). A within-group comparison between two time points will also be conducted using repeated-measures t-test (or the Wilcoxon signed-rank test if quantitative data do not follow normality). All statistical tests will be set as two-sided, and a p value of less than 0.05 will be considered statistically significant.

An intention-to-treat analysis will be used and missing data in the outcome variables will be replaced with the mean values for that variable.

Qualitative data analysis: each country will undertake its own qualitative analysis of focus group data. Data analysis will be framed by the study theoretical framing. Qualitative data will be recorded at the time of the focus group discussions. The recording of each focus group discussion will be transcribed verbatim in the native language of each site and de-identified. All transcripts will be translated to English and uploaded to the central dataset to allow a single qualitative analysis. No recordings will be shared with international participating centers. Additionally, field notes will be gathered for context during the focus group discussions. All field notes will be translated to English. Each country will conduct a thematic analysis using the steps of Braun & Clarke (56). When the themes and sub-themes are obtained on a national level, all data will be put together in English, re-synthesized by ProCon researchers and illustrated with literally translated quotes for final reporting. The Behavior Change Wheel and Theory of Change will be used as an analytical lens. Tracing the implementation of the innovation to the exposure to the educational resource will be a core component of the analysis.

Data handling: All research data will be securely stored using RedCap, the secure research database hosted by the University of Vic – Central University of Catalonia. All relevant local data protection and retention laws and policies will be complied with, and relevant data sharing agreements will be in place at the time of ethical committee approval. Data will be identified at source and encrypted prior to transfer. Data transfer will adhere to PRoCon data security and transfer policies. Data retention, including links to identifiable data, will comply with local institutional requirements.

Last updated on November 1st 2026

Figure 1. Behavior Change Wheel (from Michie S, Atkins L, West R. (2014)). The Behaviour Change Wheel: A Guide to Designing Interventions. London: Silverback Publishing)



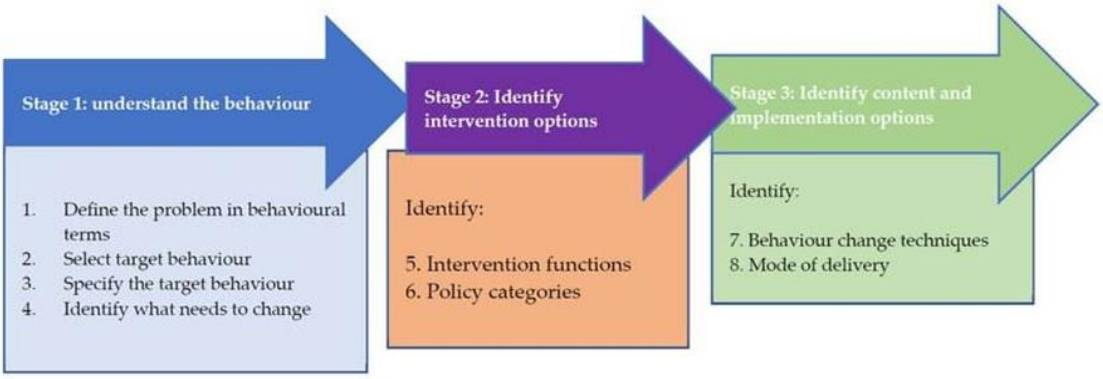


Figure 2. SUCCINCT trial schematic

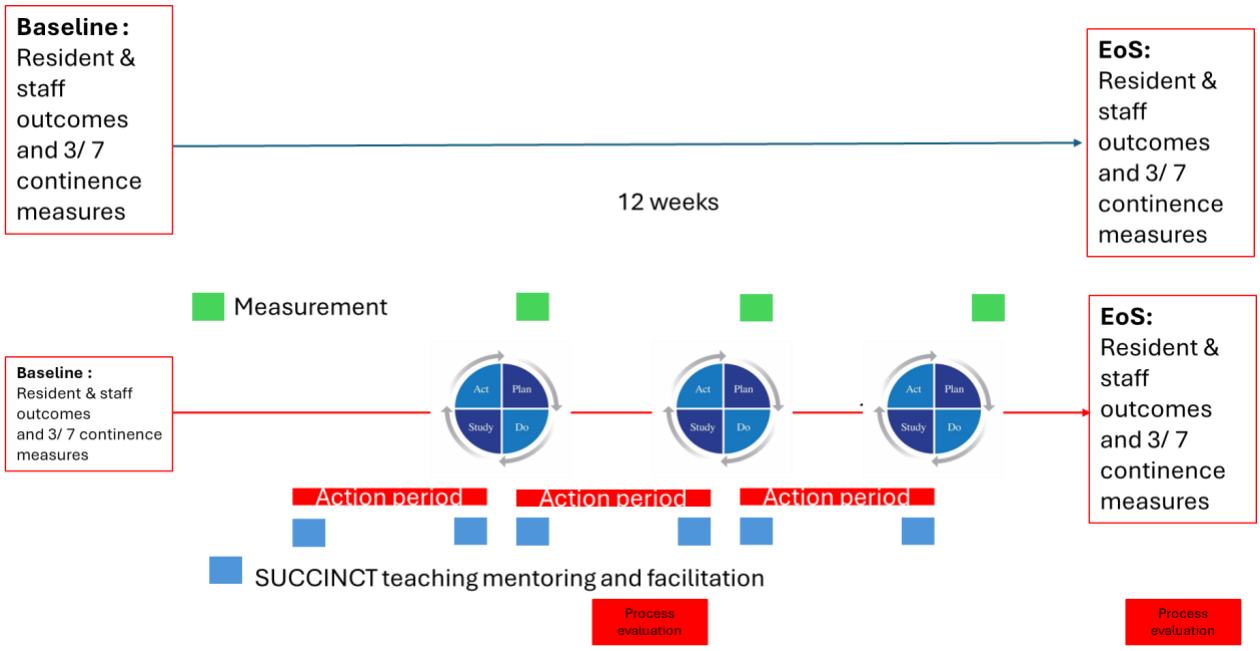


Table 3. Timeline of procedures

	Pre-baseline	
Nursing Home Consent	X	
Unit selection	X	
Alberta Context Tool	X	
Randomization	X	
Staff	**Baseline**	**End of study**
Consent	X	
Demographics	X	
Courses and workshops (intervention sites only)	X	
Utrecht Work engagement Scale (adapted for Care Aides)	X	X
Organizational Headroom	X	X
Continence Care Likert Scales	X	X
Adverse events		X

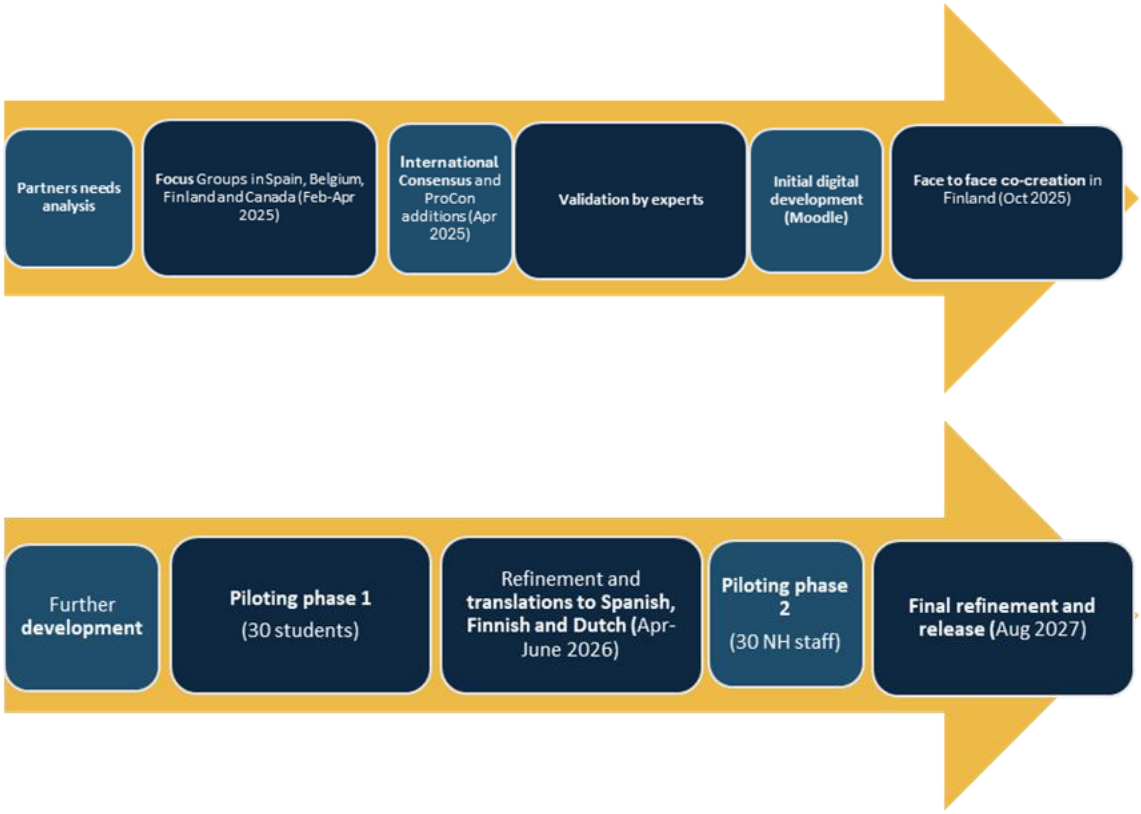
Last updated on November 1st 2026

Resident		
Consent	X	
Demographics	X	
RAI-MDS H3b	X	X
Concomitant conditions	X	
Coexistent medications	X	
Continence Care Likert type Scales	X	X
3-day bladder diary for UI episodes	X	X
System		
3-day average number of pads/24h	X	X
Study		
Recruited / Eligible	ongoing	
Withdrawals / Recruits	ongoing	
Data quality	ongoing	
Process evaluation (intervention sites only)	At weeks 5-7 and 12-14	

Last updated on November 1st 2026

Appendix A. Course development

ProCon Work Package 3 courses were co-created with experts, students and NH staff. The phases of the co-creation process are depicted below.



1. Needs Assessment and initial Focus Groups

Following an initial partner needs analysis (focusing on what contents are needed and what contents can be provided to the courses), focus group discussions were conducted in early 2025 to capture the views of potential trainees (NH staff and students of higher education institutions as well as vocational and educational training providers). These explored both course topics ("what") and preferred pedagogical approaches ("how"). Six FG were conducted (Feb–Mar 2025) in Spain, Belgium, and Finland with 48 participants.

2. Analysis and Consensus

FG reports were analyzed qualitatively to extract key topics and methods, refined by course leaders. This draft structure (basic + advanced courses) was reviewed during an international online workshop (April 2025) with focus group representatives and ProCon members, ensuring collective agreement on the topics to be covered and the preferred pedagogical methods.

3. Validation Results

A digital questionnaire was completed by **50 respondents** (60% ProCon members; roles:

48% teachers/researchers, 20% students, 14% NH staff, 18% others). In summary, all proposed topics which raised in the initial FGs were mostly ranked as mostly or highly relevant (4-5 responses in a 5-point Likert scale), with range between 78% and 98%. The quantitative results were considered for weighting the duration dedicated for each topic (course block). The qualitative results (comments) were useful for building the course contents.



Last updated on November 1st 2026

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