



TOILET FOR ME



D2.3 Requirements of primary and secondary end-users

A toilet for me envisioned

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Abstract

This document is the deliverable D2.3 "Requirements of primary and secondary end-users" of the Toilet4me2 (Study on supporting active living in (semi-) public environments by suitable toilets) project (short also "T4ME2") within Call 2019 of the AAL Programme. It is an integrated and co-produced document on the requirements and user scenarios, user story from primary and secondary users.

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Toilet4me2 – supporting active living in (semi-) public environments by suitable toilets

A consortium of European partners with different expertises cooperated to reach the goals of Toilet For Me Too.



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1 Executive Summary

This deliverable D2.3 “Requirements of primary and secondary end-users” is the outcome of the task T2.2 “Requirements of primary and secondary end-users” of the “Toilet For Me Too” (T4ME2) project. The DoW describes the T2.2 as follows:

‘T4ME2 will draw on the study developed in Toilet4me, where the wishes and needs of nearly 300 end-users was performed. Based on these outcomes a first set of requirements will be established and presented/commented/discussed by the 2 user partners to 80 primary users and 20-30 secondary for an integrated and co-produced document on requirements and user scenarios D2.3.’

For this purpose, existing commercial sanitary products from the local market were used and tested by primary and secondary users at the user partners’ test sites.

The research was led by the two user partners GD and OSF. User partner HH and technical partner BEIA were involved as additional user partners and support was given by technical partner SAN. This research was carried out at test sites in Poland (OSF), The Netherlands (GD, SAN), Belgium (HH) and Romania (BEIA).

Quantitative and qualitative data were gathered. Users gave their opinions, remarks, suggestions for a Toilet For Me Too system and requirements were ranked. Also, an online poll on public accessible toilets was held in three countries.

The original work plan, methodological approach and time schedule were modified and updated where needed in order to face the various challenges of the Covid-19 situation. Eventually, 61 primary users and 39 secondary users (100 in total) could participate at three user partner sites (OSF, GD and HH) and enabled the consortium to successfully gather a valuable and very rich set of data. Additionally, by carrying out an extra online poll on accessible toilets outside home a total of 154 users could be involved. The outcomes regarding the requirements are presented in the D2.3 at hand.

The user partners were also involved in tasks T2.3 “Organisational models and requirements for tertiary end-users” and T2.4 “Co-design activities” where the results are documented in D2.4 “Organisational models and requirements for tertiary end-users” and D2.5 “Iterative co-design and validation results”. The related reports D2.4 and D2.5 are strongly linked to D2.3 at hand.

2 Introduction

One of the things that keeps people with a disability or elderly people from going out, is the lack of toilets that are publicly available and well accessible and appropriately tailored to the individual needs. The European AAL project Toilet For Me Too (T4ME2, 2020-2023) wants to change this by developing and evaluating a supportive ICT enhanced toilet system capable to adapt to the individual user needs, approachable and clean for use in semi-public space. With the project’s focus on modern functions like motorised stand-up support, adjustable height, a shower-WC, emergency recognition and other ICT supported means etc. it aims to advance standard accessible toilets for a wider range of users.

We base this research on the results of the Toilet4Me study project in 2018/2019 which clearly identified a need for such advanced toilets (see <http://toilet4me-project.eu/>).

With these findings we continued in the current project T4ME2 and started with an awareness raising phase where existing commercial sanitary products were used and tested

by primary and secondary users in order to gauge needs and priorities. This group of target end users consisting of potential users got hands-on experience to be able to actively contribute to the requirements collection. In the awareness raising activities and interviews users gave their opinions, remarks, suggestions for a Toilet For Me Too system. As extra activity an online poll was held in three countries: primary users who use public accessible toilets were asked to share their opinion on these toilets.

Information on the T4ME2 project can be found on the website <http://toiletforme.com>.

3 Involved Partners

This research was led by the two user partners GD and OSF. User partner HH and technical partner BEIA were involved serving as additional user partners (4 user test sites in total). Technical support was given by technical partner Sanmedi (SAN). This research was carried out in 4 countries at test sites in Poland (OSF), The Netherlands (GD, SAN), Belgium (HH) and Romania (BEIA).

3.1 Introduction of partners involved

HH - Sacred Heart is a care group in Kortrijk, **Belgium**, that intends to meet the needs of elderly people and people with a higher need for support, and strives to empower them in their independence. In order to make this possible, HH focuses on both testing innovative solutions already in the market and investing in design and development of innovations. In the T4ME2 project HH runs a user test site.

OSF - On Site Foundation is an NGO based in Warsaw, **Poland**. The goal of the foundation is to develop and strengthen local communities by creating liveable public spaces. OSF specializes in building places and solutions dedicated to elderly people. The foundation's priority is to increase mobility and promote ageing in the place of residence. They combine the potential of sociologists, architects and designers. The team always acts in parallel with the space and its users. The Foundation is a member of the EIP network - European Innovation Partnership for Active and Healthy Ageing and of Placemaking Leadership Council run by Project for Public Spaces. OSF runs a user test site in the T4ME2 project.

SAN - Sanmedi bv is an SME in Uitgeest, the **Netherlands**, offering sanitary solutions for customers to live at home independently and allow for safety, hygiene, functionality and comfort for people with physical disabilities and/or elderly. Sanmedi also operates a showroom. SAN provides technical support to the user test sites.

BEIA - is an SME in Bucharest, **Romania**, and has experience in coordinating and participating in more than 40 R&D and Innovation projects. BEIA has implemented and integrated IoT telemetry applications in the field of smart city (noise, air quality, mobility) and e-health (tele-diagnosis of diabetes, emergency communication systems for patients, nurses and doctors). BEIA is a technical partner but is also providing a smaller user test site in the T4ME2 project.

GD - Golden Days is a charity foundation for the elderly in the **Netherlands** which works together with the network of care homes for elderly. Their mission is to combat growing loneliness amongst the elderly and increase the independence and quality of life of frail elderly people. GD runs a user test site for the T4ME2 project.

4 Involved users

Primary users (elderly and people with disabilities) and secondary users (informal and formal caregivers) were involved in this research (see Fig. 1). User partners presented a supportive toilet with a selection of modern functions like stand-up support, adjustable height, a shower-WC, etc.

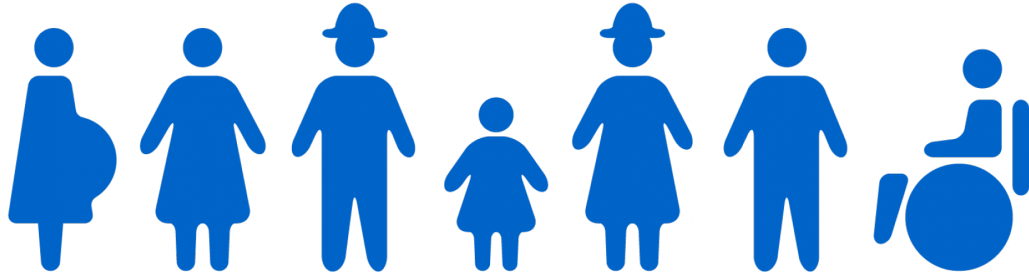


Figure 1: Symbolised involved users

This group of potential users got hands-on experience and actively contributed to the requirements collection, combined with opinions, remarks, suggestions for a Toilet For Me Too system. Due to Covid-19 the user partners faced challenges in recruiting primary users, a vulnerable group in the current pandemic. Therefore, the number of primary users reached is 61, lower than the initially planned 80. However, the number of secondary users (39) is higher than originally planned (20-30). Together this gives us a good insight into the requirements for a Toilet For Me system.

4.1 Primary users

- People of all ages who are limited in their ability to use a standard toilet independently (without assistance) due to physical limitations.
- Difficulty in transfer to / from the toilet (typically stand-up) and/or cleaning with paper (typically reaching back)
- Physical (mobility) challenges in general, e.g. wheelchair, obesity, MS (sclerosis), arthritis
- People in post-operative situations for whom it currently is difficult or impossible to use a not adequately adapted toilet.

Age:

How old are you?
61 antwoorden

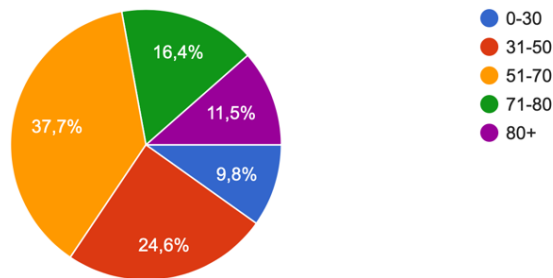


Figure 2: Age primary users

Total respondents: 61 primary users.

Gender: 36 of our respondents are female, 25 of our respondents are male.

Figure 2 shows that the majority of our respondents are between 51-70 years old (37,7 %), almost a quarter (24,6%) is between 31-50 years old, 16,4% are between 71 and 80 years old, 11,5% is 80+ years old, the rest (9,8%) is under 30 years old.

What is your home country?
61 antwoorden

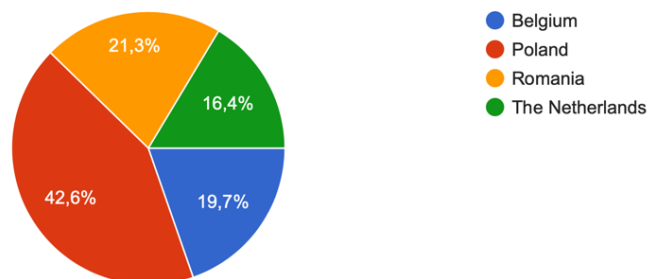


Figure 3: Home country primary users

The study includes 26 primary users from Poland, 12 from Belgium, 13 from Romania and 10 from The Netherlands.

4.2 Secondary users

Secondary users are people caring for a primary end user. Figure 4 shows from which country the interviewees are from. Figure 5 shows an overview of the different care roles.

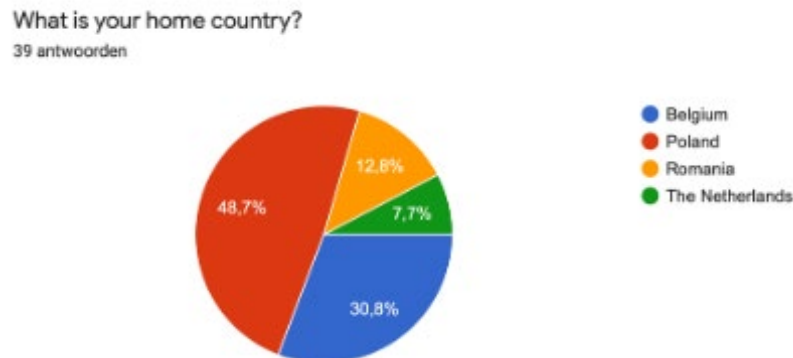


Figure 4: Home country of secondary users involved

The study includes 19 secondary users from Poland, 12 from Belgium, 5 from Romania and 3 from The Netherlands 39 people in total. Figure 5 shows the relationship between the person in need of help and the caregiver. 17 of the surveyed caregivers were informal caregivers followed by 14 formal caregivers.

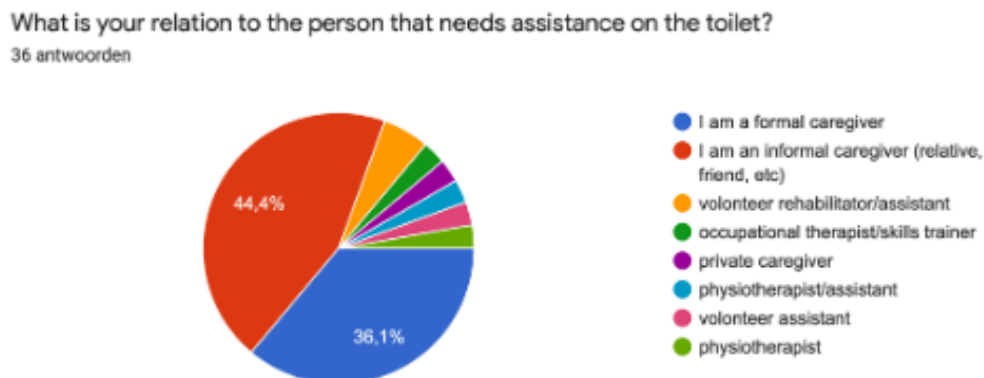


Figure 5: Relation of secondary user to the person that needs assistance on the toilet

5 Test sites

Four test sites in European countries (Belgium, Poland, Romania and The Netherlands) were included in the research. With these test sites we covered a wide range of users in semi-public (care)places. Where not already available the test sites got related commercial toilet products from the market for hands-on experience (see pictures).

All countries participating in the testing have asked for and received ethical clearance in their countries. More information on this can be found in project T4ME2 deliverable D2.1 *"Legal considerations and recommendations on ethical compliance, data collection, privacy and security"*.

When participating in the research all users involved have received information on Toilet For Me. Participants could exit research at any time in the project. Appropriate measures have been taken into account to ensure a correct and safe research process. For this research and awareness raising activities Belgian and Polish user partners asked the users to fill in an informed consent. Other partners did not ask users to do this, for it was not necessary at this stage.

We informed all people involved in the project beforehand about the questions which would be asked, so they were aware of the (sensitive) topic. We explained that they are free not to answer questions at all times. All answers were anonymous. We made sure not to collect personal data (also not for administration, photos were only used if we received an additional agreement) which could allow to identify people.

5.1 Belgium

Testsite 1 : Buda kitchen, a public restaurant in a residential care centre.

Buda Kitchen is an innovative and dynamic restaurant that focuses on the experience of its visitors. It targets a wide variety of clients, ranging from students and occasional visitors to employees, residents of the Budalys Residence and their families. The residents who live in the building consider Buda Kitchen as an extension of their kitchen.

Involved users: Users of Buda Kitchen were planned to be participants in the study. With a focus on older people with a physical disability, visitors, employees, residents of assisted living apartments and their family members. Due to COVID, the restaurant had to close. As a result, we had to adapt our participant group to residents of Heilig Hart residential and care facilities and users of the Day Centre.

Perceived challenges experienced by users when using the toilet: All involved users may face the following difficulties and risk of feeling unsafe, walking, squatting, bending over, bending, reaching and getting up, impaired arm or leg function, problems coordinating hand function, balance reduction.

Here we tested: Toilet with shower and drying function, remote control for lift and shower-WC.

Recruitment procedure:

The research was led by an occupational therapist and a couple of staff members carried out quantitative research (questionnaires) amongst the primary and secondary group. More specifically residents of the residential and care centre and the caregivers received a poster and leaflet about the smart toilet which was installed in Buda kitchen. People who were interested, were invited to test the toilet in the first two weeks of December 2020. Before these participants were surveyed, an informed consent was signed.

Testing procedure:

Once the toilets were installed, the involved research staff members were given a telephone briefing. They contacted the primary users and their caregiver (secondary users) that were willing to test. The caregiver guided the primary user to the toilets. In case the primary user needed support, the caregiver could offer it. Since the caregivers already have a relationship of trust with the users, we experienced few complications in this regard. The secondary users were also asked to test the tool themselves. After testing, a survey and an in-depth interview were conducted with both primary and secondary users by the staff members who had previously been contacted by telephone. A different type of survey was completed for both user groups.



Figure 6: Test site 1 in Belgium: Toilet with bidet (Top right, and bottom left)

Testsite 2: 'Pamele' Day care centre for people with a non-congenital brain injury.

A pleasant daytime activity is provided. Tailor-made therapy and rehabilitation are offered. There is a wide range of leisure activities on offer. Clients can also make use of the various services at the Sacred Hart residential and care hotel. On the next page figure 7 you can see a picture of the test side.

Involved users: All interested clients of the day centre and the staff were foreseen as possible users.

Perceived challenges: All involved users may face the following difficulties. Feeling unsafe: walking, squatting, bending over, bending, reaching and getting up. Impaired arm or leg function. Problems coordinating hand function. Balance reduction using active or passive lift.

Here we tested: Shower and drying function in combination with a diagonal lift, remote control for lift and shower-WC.

Recruitment procedure:

The research was led by an occupational therapist, and a couple of staff members carried out quantitative research (questionnaires) amongst the primary and secondary group. More specifically users of the Pamele day centre and carers/volunteers/carers received a poster and leaflet about the smart toilet which was installed in Pamele day care centre. People who were interested were invited to test the toilet in the first two weeks of December 2020.

Testing procedure:

Once the toilets were installed, the involved research staff were given a briefing. Then professionals guided the users to the toilets. In case the user needed support, the professionals could offer it. Since the professionals already have a relationship of trust with the user, we experienced few complications in this regard. The physical test was followed by a combination of an online survey and in-depth interviews, and regular intensive communication. Afterwards, the professionals and volunteers were also questioned with the same method. Before these participants were surveyed, an informed consent was signed.



Figure 7: Test site 2 Pamele in Belgium: Toilet after installing the smart toilet: lift and shower WC. (above left) Toilet before (above right), building (bottom left) and living room (bottom right)

5.2 Poland

Test site: Model senior apartment in Warsaw:

This is a showroom for home furnishing products dedicated to elderly people with restricted mobility and mobility impairments (www.mimowieku.pl).

The entire bathroom (see Fig.8) is designed to ensure comfort and safety of use for an elderly person. It is equipped with non-slip flooring, adequate light intensity, a washbasin and shower suitable for people with mobility impairments and a washing toilet.



Figure 8: Test site in Poland - Model Senior Apartment in Warsaw - a living room and kitchen (top), a restroom where the testing was organised (bottom).

Involved users:

Older people with reduced mobility, people with mobility impairments, carers of older and disabled people (primary and secondary users)

Perceived challenges:

Problem with reaching the button for the shower function, lack of trust in the lift device, fear of falling, problems with bending the knees, hygienic fear of the device in the shower function

Here we tested:

Shower and drying function, lift function, remote control for the lift, armrests, wall holder.

The GEBERIT AquaClean toilet (<https://www.geberit.pl/produkty/produkty-do-lazienek/geberit-aquaclean/>) installed in the Model Senior Apartment was used for testing. Toilet has a shower and dryer function.

The toilet does not have a lifting function, so an additional setting PW GAMA (<https://gamareha.pl/podnosniki/podnosnik-toaletowy-pw-gama>) with a lifting function was used. This function is activated by the remote control included with the unit (cable remote control with two up-down buttons).

Recruitment procedure:

Recruitment was carried out with the help of organisations working on a daily basis for older people and their carers (Syntonia) and people with physical disabilities (Active Rehabilitation Forum). The organisers of the study employed a coordinator who watched over the safe arrival and participation of each person. Each participant was informed about the project and the research details received an explanation sheet on the privacy protection and GDPR regulations. Each person was asked to sign the informed consent document.

Testing procedure:

Once the toilet was equipped with additional devices and prepared for testing, the research team members were given an online training on how to use the research tools and on how to run meetings during COVID. Most of the participants took part in on-site testing in person. There was a team member (a researcher) and a research coordinator in the flat during the study. Individuals familiarised themselves with the toilet facilities and could ask questions or get some instructions from the researcher. The physical testing was followed by the questionnaire interview and an individual in-depth interview.



Figure 9: The testing in Poland. GEBERIT AquaClean 8000 with an additional PW GAMA lift next to it (top left) and installed on the existing toilet (bottom left). Participants of the testing - a primary user during the interview with the OSF team member (top right) and caregiver visiting the restroom (bottom right).

5.3 Romania

Test site: BEIA office

Public toilet which can be used by employees and visitors. The testing of the toilet was organized after a workshop related to the project in which representatives from elders' centres, hotels, universities were invited.

Involved users: Elderly, mainly clients and users of daily social activities.

They agreed to participate in this experiment because they are aware that during their daily activities the need to use a toilet might appear and as such the need for a smart toilet in close proximity is given.

Perceived challenges:

Feeling unsafe, walking difficulties

Here we tested:

Toilet with electric bidet, indoor sensors for measuring the air quality, UV lamp and support bars.

Recruitment procedures:

The recruitment procedure consisted of organizing workshops related to the project in which representatives from elders' centres, hotels, universities were invited. The project and the toilet were presented.

Testing procedure:

The elderly were invited to test the smart toilet at the BEIA headquarters. At the end of the test, each participant completed a feedback questionnaire in which they expressed their opinion about the toilet used.



Figure 10: Test site in Romania: Box with electronics for air quality measurement (left), toilet with bidet seat and support bar (upper right) and toilet with UV lamp (bottom right)

5.4 The Netherlands

Testsite 1: Physiotherapist Groenhuysen:

This is a physiotherapist located in an elderly care centre in Roosendaal, The Netherlands. The clients are internal residents and external visitors: elderly who live independently at home but come in for sessions with a physiotherapist. They give physiotherapy for general reasons and in case of rehabilitation after for example a surgery or fall. There is a publicly available toilet to the visitors of physiotherapists (both internal and external clients).

Involved users:

Elderly people who need general physiotherapy and therapy because of rehabilitation.

Perceived challenges:

Require lift-system (difficulty with sitting and standing up) and shower-WC: difficulty with bending or reaching / coordination of hand function.

Here we tested:

Shower-WC, height lift, flush with buttons pushed by elbows, remote control for lift and shower-WC.

Recruitment procedure:

Internal residents and external people (clients) were informed on the new toilet and the possibilities to test it and give their feedback with a leaflet, poster and by local staff. They were actively invited to the interactive live kick-off meeting we organised on this site to introduce the new toilet.

Testing procedure:

Users were invited to test the toilet on the day of the kick-off meeting and in the weeks that followed. The toilet is open to all clients. The nurse and physiotherapist helped users testing the toilet and proceeded with the interviews. The interviews were one on one interviews, users could fill in the questionnaire after having tested the toilet. The nurse could assist when needed, for example to write down the answers or explain the questions.

Staff members, the secondary users, also filled in questionnaires after having assisted clients.



Figure 11: Physiotherapist Groenhuysen, one of the test sites in The Netherlands.

During the kick-off meeting there was a lot of interaction between the elderly clients, local staff members and the researcher. Users shared their thoughts on a smart toilet system, we discussed questions, concerns, opportunities.

People were carefully and respectfully approached. Only people clearly interested in answering questions on this (sensitive) topic were asked. We recruited people limited in their ability to use a regular toilet.

Testsite 2: Sanmedi showroom:

This is the showroom and office of Sanmedi where all products are exhibited. The publicly available toilet can be used by visitors of the Sanmedi showroom.

Involved users:

Visitors of Sanmedi showroom: disabled end-users, their family members, buyers (of organisations that need a special toilet/shower/etc.) like hotels, elderly-care, hospitals.

Perceived challenges:

Vertical lift: no leg function / difficulty with stretching legs, diagonal lift: difficulty with stand-up (hip function), shower toilet: difficulty with bending or reaching / coordination of hand-function



Figure 12: Showroom Sanmedi, second test site in The Netherlands with different modern supportive toilets. The toilet below-right is a wall mounted toilet with integrated tilt-lift, height-lift and shower-WC.

Here we tested:

Here the Toilet4me system is installed which is a wall mounted toilet with a tilt-lift, height-lift and shower-WC. All these functions are integrated together and can be operated by one remote control.

Recruitment procedure:

Customers from Sanmedi have been actively invited to give their feedback in this research. By one on one contact, the newsletter, social media or when visiting the showroom. They have a supportive toilet from Sanmedi at home or they are considering this. People were carefully and respectfully approached. Only people clearly interested in answering questions on this (sensitive) topic are asked. We recruited people limited in their ability to use a regular toilet.

Testing procedure:

Users who have a supportive toilet from Sanmedi at home or are considering this were invited to test the toilet in the Sanmedi showroom or based on their experience in the showroom or of the supportive toilet they have at home. Users filled in the questionnaires online, on paper or were interviewed in the showroom or by phone.

6 Method of data collection

6.1 Questionnaire

In order to collect data for this research we used a one-time survey (questionnaire) that could be filled-in on paper, online, or via a live interview by a researcher and a user on the test sites or by a phone / video call interview.

One part of the survey was a table for rating requirements. Both primary users and secondary users rated the different functions of the smart toilet and rated the importance of the functions using the table below.

	Function	Discription	Essential	Important	Not so important but handy to have	Not at all important
1	Arm support	Support next to the toilet. Removable for wheelchair user. Wide enough for bariatric users.				
2	Safety grab bar	Grab bars on the wall to provide assistance when using the toilet or standing up.				
3	Height Lift (vertical)	Vertical adjustment of toiletseat which makes both stand-up and bowel movement easier.				
4	Tilt lift (diagonal)	Stand-up function that helps sitting down on the toilet and standing up from the toilet.				
5	Shower WC	Bidet function that provides a (warm) spray of cleansing water from a nozzle underneath the toilet seat followed by a (warm) air dryer.				
6	Remote contol	To start bidet function, move up en down. Buttons adapted for older user				
7	Voice control	Voice controlled by giving commands.				
8	Personalized setting	The smart toilet adjusts to your prepered setting: height, tilt.				
9	Emergency detection	Smart 3D sensor which then can sense an emergency (like falling) and send an alarm to the call system in order to receive quick help.				
10	Alarm system	Emergency button , call system				
11	Automatic light and door lock	The light is switched on automatically and the door is locked automatically				
12	Clean	1. Self cleaning seat 2. Airquality 3. Autoflush: The toilet flushes automaticly after use				
13	Beautiful/Nice design	The look and feel of the toilet, how it is designed.				

Figure 13: The ranking table for users

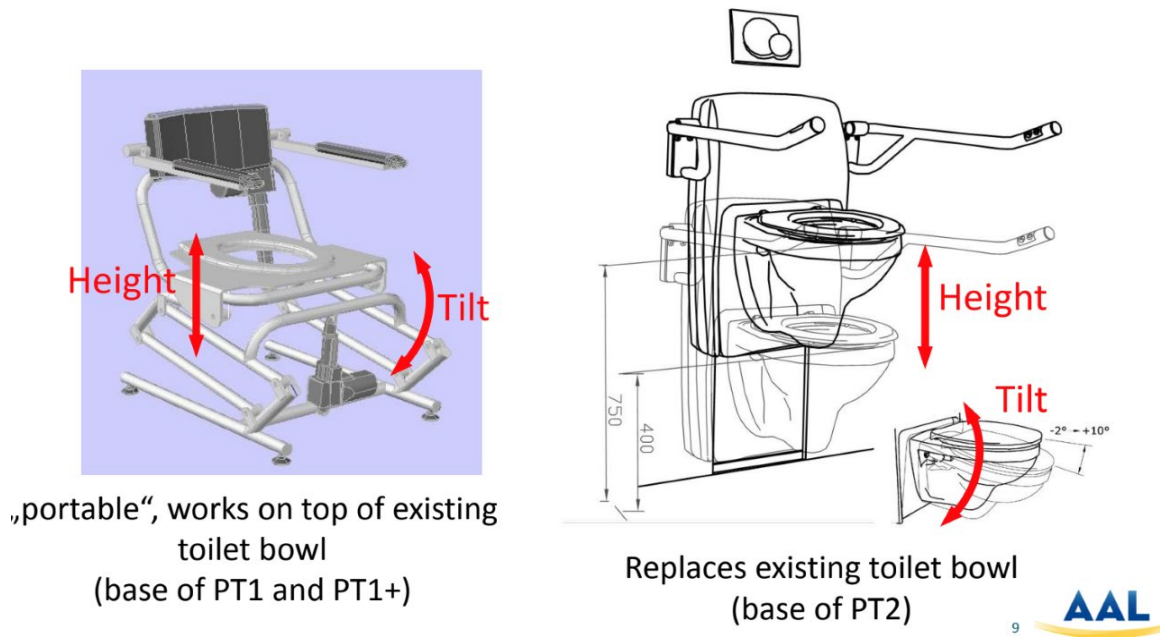


Figure 14: Impression of the two types of a Toilet For Me system. Source: T4ME project 2019. Users tested actual test toilets, they referred to their own supportive toilet or they were shown videos of a modern toilet.

Part of the questionnaire consists of open questions. Primary users and secondary users answered open questions on what they missed and gave suggestions, observations, and remarks to improve the smart toilet. Primary and secondary users also had the opportunity to give direct feedback on the smart functions tested: Height Lift, Tilt Lift and Shower-WC.

We combined the results of the different countries and analysed the results per users group: primary users and secondary users.

The questionnaires (see annex) were prepared in English and then translated to the individual site languages by the user partners to make sure research was carried out consistently.

All user partners collected their data in the most suitable way (online, on paper, face-to-face interview reports), and delivered all answers in English by adding them into the online questionnaire so all the data was collected in the same manner.

Some user partners combined the one-time survey with a longer, in-depth interview with a focus on co-design. The reason to combine these interviews is to limit the time asked for this research from the primary users during the current pandemic.

Users could not yet experience and assess the planned project specific improvements like height independent tilt, intelligent adaptation and flexible use. Many of the primary users also had no prior experience with existing commercial functions like height lifts or shower WCs. Therefore, one of the main intents of the first phase was to raise awareness and to confirm and extend the knowledge on user requirements we already had from early Toilet4me study by gathering additional user feedback. In the following project phase, it is planned to intensify co-design based on hands-on evaluation of first prototypes which already implement the proposed advanced functions.

6.2 Researchers from countries

The research in **Belgium** is led by user partner Sacred Heart first by Leentje De Wachtere later by Justine Asselman and supervised by Dave Dewachtere. Arend Roos is involved as an external consultant.

The research in **Poland** is led and supervised by user partner On-site Foundation by Marta Trakul-Masłowska and Magda Kubecka. There are two researchers recruited to conduct interviews and observations Anna Podsiadły and Andrzej Dębowski.

The research in **The Netherlands** is led by user partner GD by Merel Verburgt and supervised by Liesbeth Gaasbeek. Technical partner SAN, Marjolein Schouten is providing technical, practical and theoretical support by preparing the questionnaires and local test sites, opening their showroom as one of the test sites, finding and asking respondents and sharing their knowledge and network.

The research in **Romania** is led by technical partner BEIA by Christina Balaceanu.

6.3 Online poll

In an additional online poll, we asked primary users who use publicly accessible toilets to share their opinion with us. We held the poll in The Netherlands, Belgium and Austria. The poll was spread via newsletters, Social Media and local partners.

7 Covid-19 impact on testing

The project started in March 2020, right when the world was surprised by Covid-19. As user partners we nevertheless started preparing for testing. Updates of the original plans for user involvement were discussed, elaborated and agreed on in order to cope with the situation and to ensure that despite limitations the main goals could be reached.

And after the first lockdowns in different countries we were able to start testing in the summer of 2020 with alternatives, adaptations and safety measures and could continue in autumn. Delays occurred due to test sites temporarily closing down. Sometimes user partners combined the one-time survey with a longer, in-depth interview with a focus on co-design. The reason to combine these interviews was to limit the time asked for this research from the primary users during the current pandemic.

7.1 Belgium

Testsite 1. Buda Kitchen:

The initial aim was to interview visitors, residents, carers and volunteers of the restaurant, but due to the Covid outbreak, we were forced to take measures. The restaurant was closed, volunteers were not allowed to enter the building and residents could no longer leave their residential floors. The group of interviewees was therefore changed to interested residents of the day centre (elderly care).

Testsite 2. Pamele:

Due to the Covid outbreak, the day-care centre was temporarily closed and we could not start testing until later. Part of the clients did not return to Pamele yet, because of fear of being infected. Therefore, we could barely meet our quota of interviewees.

Complex conditions for both pilot sites:

The original deadline for the survey was the end of December 2020. HH could not meet this deadline because:

1. The toilets were ordered from Sanmedi (Netherlands). Because the borders were closed, we had to wait longer for the delivery of the toilets, and our technical department had to install them themselves.
2. Test sites 1 and 2 were closed for some time.

Adapted way of questioning:

The Co-design one-on-one interview was conducted together with a questionnaire, so that we could limit the contact moments. All interviews took place physically.

The interview/co-design was carried out by known care staff, the researchers were present at a distance to make sure the interview went well with accompanying safety measures. Such as mouth masks, continuous ventilation. The results of the co-design interview will be reported in a separate deliverable.

- The questioning of the tertiary users could (for D2.4) not take place physically, and was held via teams. Unfortunately, this group could not test the toilet. In order to visualise the toilet, we used a video, prepared by subcontractor CDC (Caritas Diocesana de Coimbra).

7.2 Poland

The pandemic situation prompted us to change the location and methods of collecting data for this phase of the research.

The presentation of toilet solutions took place in a model apartment (showroom) with a specially equipped toilet. There was also the possibility of remote participation - the presentation was carried out with the use of multimedia materials, and the online interview took place via one of the communicators - depending on the preferences and health situation of the study participants.

Due to the pandemic situation and a particularly vulnerable group of elderly and disabled people, we decided to make individual presentations and questionnaire interviews with all precautions and procedures approved by the Ethics Board of the project. We took all precautions - the presentation and interview were held at a distance, the researchers and respondents were wearing masks, the rooms were aired and disinfected after each visit. We provided the participants with comfortable and safe transportation to the place of the test (special cab for seniors, where the driver is separated from the passenger by a plexiglass window).

7.3 Romania

Due to the pandemic situation, we managed in October-November a series of questionnaires for primary users and secondary users. It was not possible to make another series or to go to an old people's home because many old people got sick of COVID and currently the centre is closed.

7.4 The Netherlands

Testsite 1. Groenhuysen (Rehabilitation centre):

This site has a supportive toilet installed by Sanmedi and the staff is instructed on the interviews. We had a co-design & awareness raising meeting here and spoke to 10 elders and 5 staff members and learned a lot in a co-design session. Unfortunately, this department has been affected by Covid-19 heavily and therefore testing was not a priority to the staff. This was on hold till further notice. In February 2021 they could continue the testing.

Testsite 2: Sanmedi showroom

The showroom has had no (or very limited) visitors during COVID-19 lock downs. Some live interviews in the showroom were possible. Alternatively interviews with primary users were held by phone, online, or users filled in the answers at home and sent it to us.

Testsite 3: Golden Days care:

This facility was not used as a test location. Due to the lock-down(s) in The Netherlands all extra activities are stopped and the restaurant is closed. They cancelled the installation of the Sanmedi test toilet in the semi-public toilet till further notice.

Alternatives and solutions:

- We organized an awareness raising & co-design kick-off in a big room where all were at least 1.5 meters apart.
- We did one on one in depth interviews (outside with good weather or spacious offices) and by phone.
- We created an (extra) short online poll on the accessibility of toilets outside own home (in semi-public spaces), shared in online and have 101 responses that give us good insight.
- As an alternative we found primary users familiar with smart toilets via our networks. We did interviews by phone, online, or users filled in the answers at home and sent it to us.

7.5 Summary

The impact of the pandemic on working with users in the project was significant. Nevertheless, appropriate modifications of the work plan with alternatives such as online surveys and extra safety measures such as keeping distance, mouth masks, glass panels etc.), combining survey and in-depth interviews and regular intensive communication among user partners and high flexibility in the partners' local work activities allowed to reach the intended goals.

8 Results of research

This chapter describes the outcomes of the research carried out. First the findings from the online survey targeting the experiences with current accessible public toilets are presented. The second part of the chapter is the findings from the requirements gathering activities carried out at the different test sites involving primary and secondary end-users in the Netherlands, Belgium, Poland and Romania.

8.1 Online poll: Opinion on accessible public toilets as indicator

An accessible toilet out of home is important to go out without worries. Are there enough disabled toilets out of home? Are they clean? And do they meet the practical requirements of users? We asked primary users in three countries who use public accessible toilets in an online poll to share their opinion with us. We did this in the phase where we could not start testing yet, to already get insight to the use, presence, hygiene and desired functionalities of accessible public toilets.

The results of the online poll give some exemplary indication of the current situation. This poll was anonymous. Details of these results can be found in the figures below and in the annex.

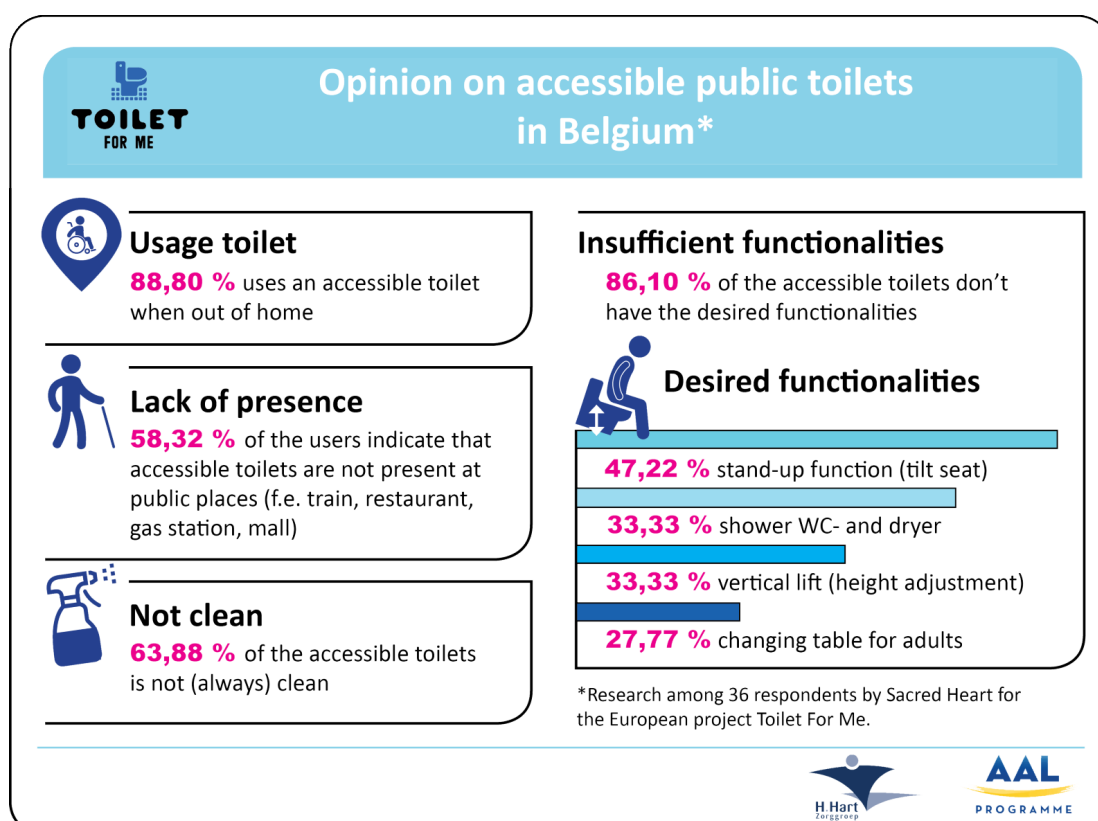


Figure 15: Opinion on accessible public toilets Belgium

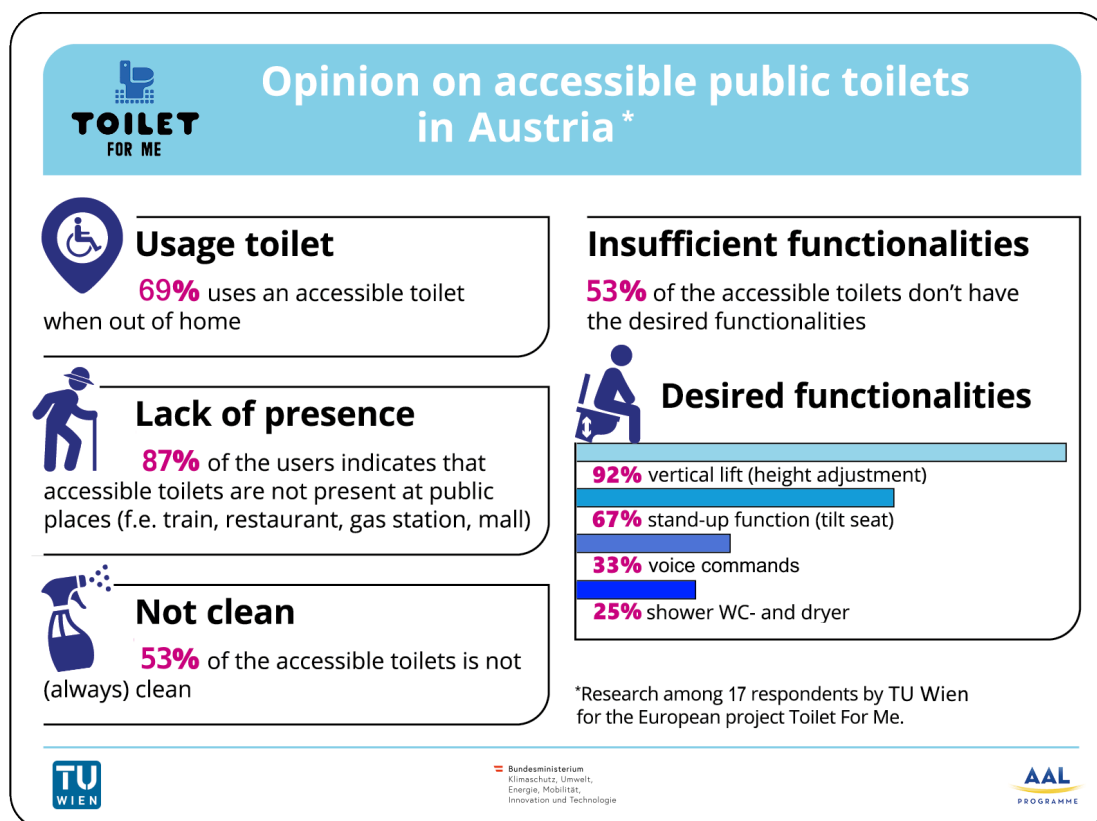


Figure 16: Opinion on accessible public toilets Austria



Figure 17: Opinion on accessible public toilets The Netherlands

8.2 Requirements ranked by user interviews

In the interviews carried out at the test sites users were asked to rank the requirements (functionalities based on T4ME research in 2019) for a Toilet For Me system. Users were also asked about functionalities they miss and suggestions they have for the smart toilet system. Users were happy to share suggestions and their concerns. As user partners we were overwhelmed by their enthusiasm and their willingness to share their opinion on a rather private subject: going to the toilet.

Users could not yet experience and assess the planned project specific improvements like height independent tilt, intelligent adaptation and flexible use. Many of the primary users also had no prior experience with existing commercial functions like height lifts or shower WC's. Therefore, one of the main intents of the first phase was to raise awareness. In the following project phase, it is planned to intensify co-design based on hands-on evaluation of first prototypes which already implement the proposed advanced functions.

For each function feedback from primary users and secondary users is presented below. The results of the tests with both user groups show that overall most of the selected requirements for this research are considered important.

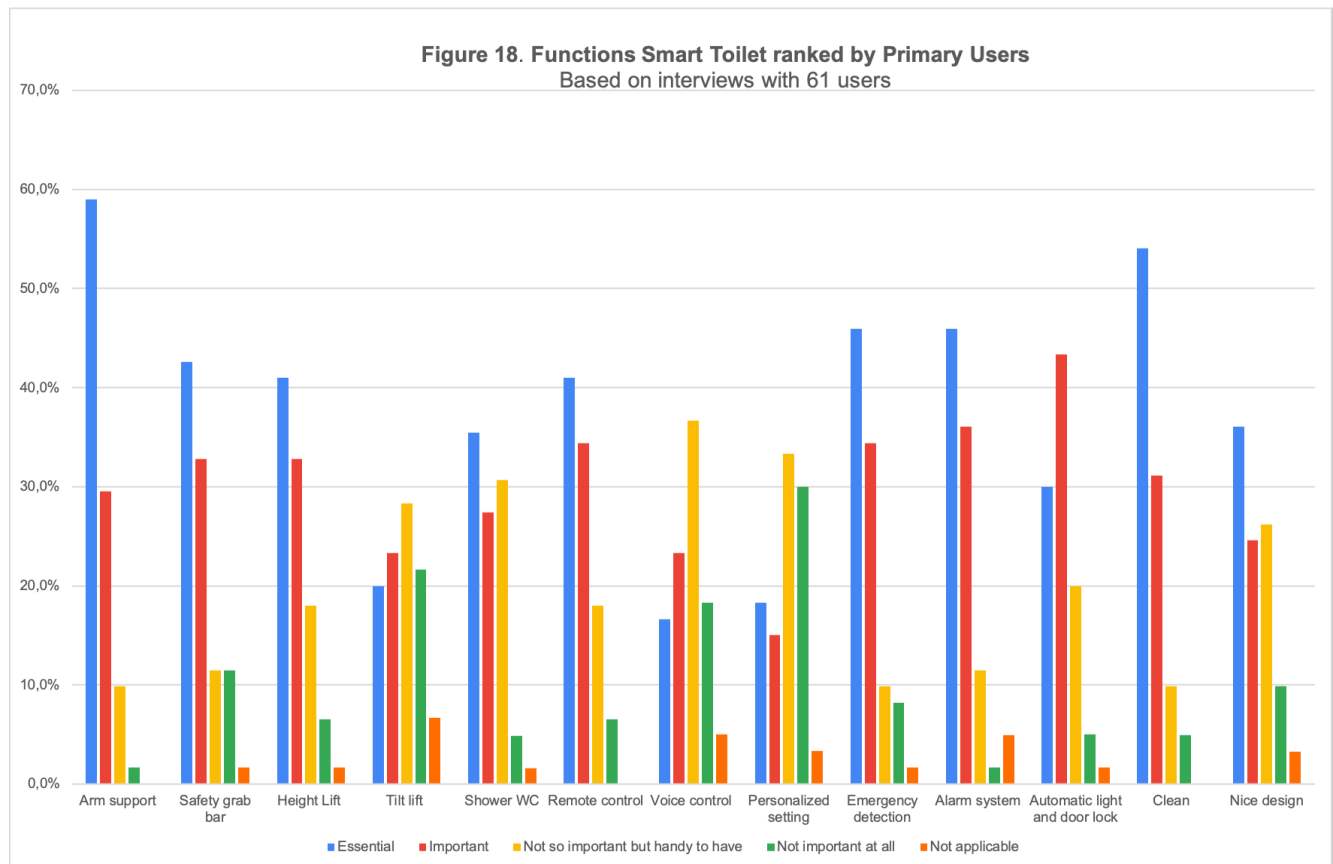


Figure 18: The functions ranked by primary users.

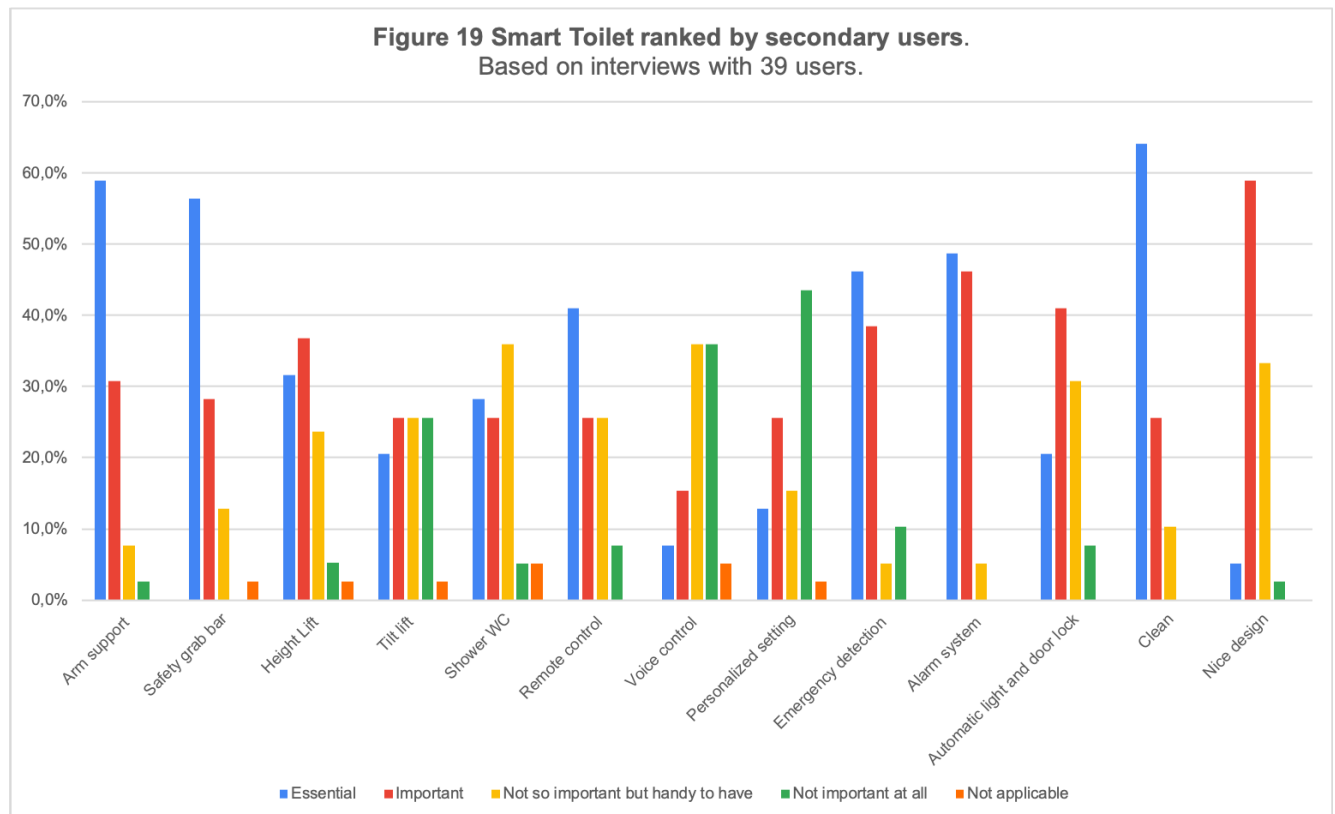


Figure 19: Functions ranked by secondary users.

8.2.1 Feedback from users on general functions

The suggestions and quotes here are all from one person unless otherwise stated.

8.2.1.1 Arm support

Description: Support next to the toilet. Removable for wheelchair users. Wide enough for bariatric users.

Feedback Primary users

'Arm support is important for me, because it helps me maintain balance and feel safe.'

Feedback Secondary users

'The armrests are essential because they provide stability for the toilet user. It is also useful when standing up from the toilet, because the resident must also help him or herself to stand up and the carer needs to apply less force to help the resident up.'

8.2.1.2 Safety grab bar

Description: Grab bars on the wall to provide assistance when using the toilet for standing up

Feedback Primary users

'Safety grab bar enables me to feel independent and comfortable.'

Feedback Secondary users

'Safety grab bar helps maintain balance and increases independence of person I am caring for.'

Suggestions

- Safety bar that can be folded down in front of the toilet to help users pull themselves up.

8.2.1.3 Alarm system

Description: Emergency button, call system

Feedback Primary users

'You need clear instructions on how this system works.'

Concerns

- With automatic pushing I can't imagine much.
- Alarm system at your fingertips? Reminiscent of person alarm/ the ability to push the button yourself does not give you a sense of security.
- Alarm system: I miss clarity about the alarm system and how it will work. What happens when I pull the string or press the button? Provide information about this on the spot. This is extremely important for a feeling of safety, but only gives that feeling when it is clear that the right thing is happening.

Feedback Secondary users

'Alarm system is important, because in case of emergency a person can get needed help.'

8.2.1.4 Automatic light and door lock

Description: The light is switched on automatically and the door is locked automatically

Feedback Primary users

Suggestions

- The light should stay on long enough, possibly turn on when you close the door and turn off when you open the door.
- Light that stays on as long as the door is closed.
- The light must stay on all the time

Concerns

- No automatic door lock in the toilet.

Feedback Secondary users

*'Automatic light: should certainly **not go out if you sit** on the toilet a bit longer.'*

Suggestions

- It would be nice if the light stayed on as long as the door was locked.
- Lighting in the form of smart fall detection NOBI: <https://nobi.life/nobi-at-your-place/>

8.2.2 Feedback from users on special functions (Toilet For Me System)

8.2.2.1 Height Lift

Description: Vertical adjustment of toilet seat which makes both stand-up and bowel movement easier.

Feedback Primary users

73,8 % find this essential or important.

'Height lift is important, because it enables me to adjust height of a toilet for my individual need and makes it easier to sit down on the toilet.'

Concerns

- I'm afraid that people may use it just for fun.

Suggestions

- It should have very wide range of lifting.
- Accessible buttons
- Simple instructions
- Very heavy max. lift needed
- Toilet seat should be extended to the front side
- It needs some pictographic guide.

Feedback Secondary users

Almost 70% find this essential or important.

'Best thing ever!'

'Height lift enables caregiver to adjust toilet height for the person he is caring for and enables elderly people to stand up on their own.'

Concerns

- It needs to be very robust (5x)

Suggestions

- The height lift also seems essential to me to make it easier to get up. As a carer, you often find yourself twisting your back trying to get up.
- Lift with braces/ harnesses.

8.2.2.2 Tilt lift

Description: Stand-up function/diagonal lift that helps sitting down on the toilet and standing up from the toilet

Feedback Primary users

'Needing less help is really an advantage of this functionality'

'By using this lift, the person who assists me needs less physical strength to support me.'

Suggestions

- Important that you can stop it during the movement.
- Clear symbols are important
- It can be used, it needs a good explanation and it is essential that the user can resist the diagonal positioning. You then have to be able to keep the resistance and pressure on your legs and not slip.

Feedback Secondary user

'Lift use is not obvious, so a clear explanation is needed. .'

Concerns

- Falls can occur by the incorrect use of a hoist, remote control, etc. (3x)

Suggestions

- Easy to use, intuitive buttons
- Good for short people.
- Good for people with hip endoprosthesis
- There must be a **simple instruction manual**
- **Simplicity** of use is very important here.

8.2.2.3 Shower WC

Description: Bidet function that provides a (warm) spray of cleansing water from a nozzle underneath the toilet seat followed by a (warm) air dryer.

Feedback Primary users

'This is essential to me, because the user can serve himself, he maintains the self-esteem that everyone wants in life. There is also no need to perform acrobatics to clean someone. Often it is not easy at all to reach it when someone is on the toilet. Space is limited and the user must have a lot of balance and dexterity to be able to lean forward so that the assistant can reach it (and in the right place too).'

Concerns

- I'm afraid of lack of **cleanliness**.
- It's kind of a luxury...
- Not in public WC.
- I am concerned about **hygiene** of the shower WC device, how it will be kept clean after each usage.
- I wash myself every morning, so for me it doesn't seem necessary to use so much water while going to the toilet.
- It sounds futuristic. But it doesn't scare me, if there is no other choice I would use this

toilet otherwise I prefer a "normal" toilet.

- I choose for what I know. Rather negative experience: with wet glasses, water that starts spraying automatically or after a stumble at a button.
- Anything but hand shower!

Suggestions

- Launching buttons should be placed on armrests.
- Nozzles of the WC shower should be set in other direction.
- It would like to have a button to start this device placed somewhere in front of me, close to my hands, so I do not have to turn around.
- It is important to have optimal temperature and delicate drying.
- It should have contained some instructions for use.
- The little hand shower is much better and more hygienic.
- There should be a proper control of water pressure, simple manual, and wet tissues in addition nearby.
- Important: keep controls for pressure and water temperature.
- The main button should be placed in plain sight.
- I would like to have a button that starts this function to be placed on the wall next to the toilet, it has to be easily accessible. It would be important to add a sensor, that will adjust the WC shower to an individual person, so that water will be distributed in the right place.
- It is important to have a button that starts the shower WC to be easily accessible.
- Clear signs/symbols on how to use this is essential

I will use this function again when present at a toilet
50 antwoorden

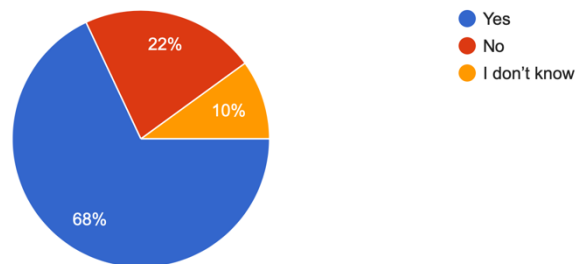


Figure 20: Opinion primary users on Shower-WC after testing

Figure 20 shows that 34 of the primary users that tested the Shower-WC wants to use it again.

Feedback Secondary users

'When using the shower function, the location of the spraying should be well coordinated. The sample must not be too hard, otherwise it will start to irritate.'

*'The Shower WC first of all helps the resident's hygiene, because everything is **cleaned better**. Perhaps this could also **reduce** the chance of a bladder **infection**, because it is more hygienic.'*

Concerns

- What with people with **obesity** and large folds of skin, will they be clean?
- **Clear instructions** poster: people do not know this type of toilet and may not use its functions as they should

- **Difficult** to use.
- Not sure, who would like to use it. Maybe separate WC shower would be better?
- The front shower should be better focused
- Functions take a long time, no patience enough to wait until they are ready for use.
- The upper part of the buttock was still wet, and the front part **was still wet**.
- For incontinent people: less good feeling when urinating. More dribbling, automatic urination, stopping what changes by continuously feeling
- No loose tubes (4x)
- **Warm water** is important, but dryer could create some discomfort. Conventional WC shower is better.
- The functions take too long, this may be set shorter than the current program
- Promotes autonomy and privacy
- Rinsing and blowing took a very **long time** also it was not immediately clear whether this happened automatically or you had to search for the buttons: find + explain buttons.

Suggestions

- As a nurse, I experience back strain when bending down to clean the backside. The shower toilet partially takes over this task. But in order to do this smoothly, there must be an easy-to-handle remote control.
- The location of the sprinkler was not in the right place; it might be possible to adjust the location individually; however, the remote control should be as simple as possible

I will use this function again when present at a toilet
34 antwoorden

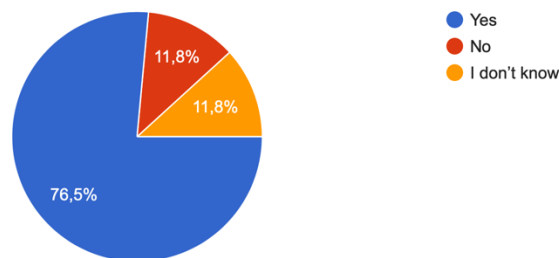


Figure 21: Secondary users who would like to use the toilet again.

In figure 21 shows that most of the secondary users (26) would use a shower WC again, when assisting someone going to the toilet.

8.2.2.4 Remote control

Description: To start the bidet function or move up and down. Buttons adapted for older users.

Feedback Primary users

'Remote control enables me to start a function without uncomfortable movement.'

Suggestions

- Extra hand disinfection for remote control, and being able to wash your hands afterwards.

Feedback Secondary users

'It would be useful if the remote control could be attached to a movable arm so that it could be turned in front of the user. (A stable remote control within arm's reach, which can be pushed aside during transfer). This with very simple symbols.'

Concerns

- Making the remote control **more accessible** for people who have difficulties with fine motor skills

Suggestions

- **Intuitive** buttons descriptions
- Control button close to back
- **Easy to use** for both carer and resident (not too many functions, simple remote controls).
- Very **simple clear remote** control that is self-cleaning
- clear simple symbols/ buttons
- The remote control is extremely necessary. The buttons next to the toilet are not very important.
- Very simple icons, this one I found difficult to understand, small.

8.2.2.5 Voice control

Description: Voice controlled for giving commands

Voice control is considered as not so important by both user groups. This function has not been tested in this phase, so users were not aware of the possibilities. This needs more research which is planned for the next project phases.

Feedback Primary users

'Voice control is essential for those with no hand function.'

Concerns

- Voice control, this is the first one that will break down.

Feedback Secondary users

Concerns

- Voice control is difficult to apply for people with a speech impediment

8.2.2.6 Personalized settings

Description: The smart toilet adjusts to your preferred setting: height, tilt

Over 30% consider personalized setting not important at all, more than 40% of caregivers say so and 30% of primary users. The same number of users say it is important. However, in

the testing we did not test these functions (because the commercial devices do not have them) so users could not experience them themselves. This needs more research which is planned for the next project phases.

Feedback Primary users

'Personalized settings would be wonderful, especially when one uses the toilet more often.'

Feedback Secondary users

'Personalized setting would save time for caregivers.'

8.2.2.7 Emergency detection

Description: Smart 3D sensor which can sense an emergency (like falling) and send an alarm to the call system in order to receive quick help

Feedback Primary users

'Emergency sensor very important. If you don't feel well you may not be able to push the alarm system yourself.'

Suggestions

- Important that someone is coming to help when the alarm button is pressed.
- The combination of an emergency fall detection and alarm system will be very convenient.

Feedback Secondary users

'Is very important, because it ensures users will get quick help in emergency situations.'

Concerns

- It is important to ensure people get help in emergency situations.

Suggestions

- The call button is also essential in my opinion; if something is wrong, you can get to the resident faster. In addition, the chance that a fall-prone resident will try to get up / put his clothes back on is smaller because the threshold for asking for help is now within reach.

8.2.2.8 Hygiene/Clean

Description: Self-cleaning seat, air quality, Autoflush: The toilet flushes automatically after use.

Feedback Primary users

'Self-cleaning toilet seat is very important for me, because it ensures toilet is clean and I can sit down on it without worrying about getting dirty or coming into contact with bacteria.'

Concerns

- Automatic cleaning: if you come soon after the person in front of you, the glasses may be damp.
- Automatic cleaning: once experienced that the water kept steaming, it wet the room.
- The automatic cleaning but also drying of the seat is important.
- Automatic flushing: toilet flushing really should not happen early because then you are soaking wet.

Suggestions

- My suggestion is to use an ultraviolet lamp
- There should also be a device that would clean the toilet inside after every person.
- I miss the disinfection of the cover and room.
- Disinfectant liquid is available in the toilet.
- Hygiene and cared for/ beautiful toilet are essential
- Disinfectants ("just like in Carrefour in Targówek district")

Feedback Secondary users

*'All of the devices in the toilet should be **easy to clean, or be cleaned automatically.**'*

Concerns

- Air freshener: not automatic, can take the breath away
- Not too many loose items that need to be cleaned separately. "How to keep it clean all the time?"

Suggestions

- Effective **ventilation**.
- Hand dryer/towels
- Disinfection gel next to the toilet and outside of the toilet
- Washbasin in the toilet
- Self-cleaning seat is also very important. It improves the hygiene of the toilets, which can reduce the risk of infections
- Ultra-violet light is present in the toilet, when nobody is present this light can be switched on and disinfect the entire room.

8.2.3 Feedback from users on toilet room

Feedback users gave on answering the open questions in the questionnaire.

8.2.3.1 Toilet seat

Feedback Primary users

- Toilet seat made of very durable, long-lasting material
- I would like toilet seat to be soft.
- Thicker toilet seat.

Feedback Secondary users

Concerns

- I would worried about durability, if the seat is the only lifted part of the toilet
- Diameter of the bowl and seat is often too long for children. (Adjustable seat?)

Suggestions

- For people using the catheter: **toilet seat expanding to the front**
- The toilet has **heated seats**, I find this very pleasant

8.2.3.2 Accessories

Feedback Primary users

- Introduce background music.
- Lightweight **door** - easy to open for a person with disabilities.
- Door: can be opened from the outside, handle on the inside. Easy to use itself, it must be easy and quick to open and someone must be able to reach you.
- Reachable sink, soap dispenser, water and towels soap. They are often inaccessible, too high, too far away (5x)
- Mirror: That it is adjustable in height or can be used for any height (5x)
- Clothes hangers (3x)
- Stands for graces or crutches
- Reachable large trash bin next to the toilet (4x)
- Extendible footstool
- Retractable shelf next to the toilet, pull-out (3x)
- Pull-through button may be in the wall, but you must be able to reach it with your hand. Sometimes it is too far away so that you cannot reach it over the toilet

Feedback Secondary users

Concerns

- The person I assist can only be helped / cared for in lying down position so all in this questionnaire mentioned functionalities are great but not an option for me.
- Toilet **door** should not be too **heavy** (hard to push/pull)
- **Automatic** door **block** is a bad idea, because it can cause a person to feel trapped.

Suggestions

- Adjustable mirror (4x)
- Large trash bin with flap or hiding somewhere. For used catheters + etc. (2x)
 - catheter bags
 - trash bags for diapers
 - large trash can (2x)
- There should be a handle for a rod.

8.2.3.3 Space

Feedback Primary users

'It should be spacious' (9x)

Suggestions

- Enough space but not too far (arm range).
- Enough room for 2 people (user and assistant).
- More space than common 1.5m.
- More space around toilet seat, it is important for a catheter.
- An additional seat in the toilet with regulated height and a movable wash basin.
- Toilet should be spacious with a lot of space in front of it.

Feedback Secondary users

'Toilet should be accessible from both sides for people on wheelchairs, without any obstacles.'

Suggestions

- **Enough space** (3x): is key for easiness of use, for two persons on a wheelchair
- I should be spacious and have **additional place** to keep **walking frames**.
- Toilet should be spacious to enable people to **move inside easily**.
- **Music** (3x)
- My suggestion is that such smart toilets be implemented in parks, in nursing homes.
- There has to be enough space for the person in a **wheelchair** and for another one.
- a lot of space
- More than 1,5 m space for wheelchair
- Not install any unnecessary cabinets/shelves etc.
- Not very deep siphon less sink placed on proper height +adjustable in height / installed at a "wheelchair height". (3x)

8.2.3.4 Floor

Feedback Primary users

Suggestions

- There should be an anti-slip floor in the toilet (7x)

Feedback Secondary users

Suggestions

- Non-slip floor (7x)
- No doorsteps
- Flat floor

8.2.3.5 Ceiling lift, stretcher

Feedback Primary users

- A ceiling lift for people who cannot walk and stand. (3x) Including a (washable) lifting bag in different sizes
- Hoist (lifting system to get on the toilet)
- Tilling-lift
- A **lounger** or stretcher on which people can be dressed. One that adults and disabled children can use 4x

8.2.3.6 Symbols

Feedback Primary users

Suggestions

- Symbols are very important. They should speak for themselves.
- Simple guides for every function

8.2.4 Feedback from users on other topics

8.2.4.1 Design

Description: The look and feel of the toilet, how it is designed

Feedback Primary users

'A nice design of a toilet makes me feel better about myself, my self-esteem.'

Feedback Secondary users

'The design of the toilet is essential, if the toilet looks robust and clumsy people will not want to use it.'

*'A pleasant design makes the toilet **attractive** to test out for clients.'*

Concerns

- The toilet looks robust and bulky, so some residents do not want to use it.
- Please, design it with one simple button.

Suggestions

- Handy to make a design that has everything in it, **no loss thing**. Remote control with **images**
- It should be **easy** to use even for persons with mental disabilities
- Clear design what should be used for what
- Handy to make a **design** that has everything in it.

8.2.4.2 Criticism/keep it simple

Feedback Primary users

- This is not yet for everyone, very futuristic, I cannot imagine that it will be available everywhere.
- It sounds a tool for the rich, less for the 'common man'.
- At the moment this use is not for me. It is a long way from my bed show, I don't need much help to go to the toilet and using this toilet makes me feel I need more help.
- The toilet should **not have too many complicated functions and devices**, because then it is difficult to be used for elderly people.
- My suggestion is to **keep it realistic**. A public toilet is never as well adapted as your adapted toilet at home. Accepting this is also welcome.
- Equipping a toilet with all kinds of technical gadgets makes a toilet vulnerable to defects. The use of this can also be seen as an obstacle for many people because people already have problems with operating a smartphone, let alone with a toilet where everything is different than at home.
- Will children be able to deal with this? (play with buttons,)

Feedback Secondary users

Concerns

- It could be too difficult to use for older person
- Elderly people have difficulties with learning new things. It could be one of them. Also adjustable water temperature and power of water stream
- There has to be a manual somewhere nearby.

Suggestions

- Whole mechanism should be hidden
- User manual

8.2.5 Other remarks

Feedback Primary users

- It is important to **educate users** of this kind of toilets.
- It has to be **divided by gender**. In many toilets our gender is stolen from us.
- Idea: send local disability platforms and organizations a questionnaire, so that they can sit down with local experts and answer it to give you insight.
- My suggestion is that there should be **a standard for disabled toilets**. I was recently in the fairly new town hall of the municipality of The Hague and the disabled toilet is a design of the category "locking posts"=no money . There was too little space (you can hardly get into the toilet room with your wheelchair).
- **Location**: My suggestion is to implement such smart toilets in nursing homes, hospitals, but also in public places such as parks or green areas, and to have online platforms for monitoring them (defective / non-defective condition, free / busy, etc.).

Feedback Secondary users

Concerns

- It could be too difficult to use for older person
- Elderly people have difficulties with learning new things. It could be one of them. Also, adjustable water temperature and power of water stream
- There has to be a manual somewhere nearby.

Suggestions

- Make it intuitive
- Stick some **instruction manuals** for every function.
- There should be a **separate toilet** for men and women with disabilities.
- The toilet should be **FREE!**
- See www.changingplaces.org for standards. A **changing table** and a tilting-lift (at ceiling f.e.) are necessary (2x)
- Be sure to pay attention to colour contrasts and fonts.
- The toilet should be based on the standards of "changing places toilet" (see www.changingplaces.org) and especially a changing table for adults that allows for changing and cleaning while lying down.

8.2.6 Feedback for technical suggestions

Feedback Primary users

- If the toilet is mounted a little higher on the wall, a lift would not be necessary.
- Ergonomics is important for me.
- What is important is that toilets are easy to maintain.
- Some kind of intercom for contact with assistant, toilet staff etc.
- It has to be very very very solid, stable and durable.
- It should be ecological.
- A mobile application to quickly detect such a smart toilet in the public space and to be free when I need to use it
- Hand rests should protrude enough from the toilet (6 inches) and be close enough together

Feedback Secondary users

*'To many, **complicated devices** in the toilet could be challenging for elderly people and make them feel irritated.'*

Suggestions

- Information from colour/mass/shape
- All of the devices in the toilet should be **durable**.
- Maybe a **music** player to chill out

8.3 Considerations in relation to the earlier study Toilet4me

The current research is based on the work which was done in the earlier study project Toilet4me (2018-2019), documented in the deliverable D1.1 "User Perspective Report - List of priorities and concerns seen from user perspective" (June 2019)

The previous study focused on the Dutch and Portuguese situation, while the current research covered the Netherlands, Belgium, Poland and Romania, and the online survey on public toilets also covered Austria.

Deliverable D1.1 „User Perspective Report - List of priorities and concerns seen from user perspective" from the earlier Toilet4Me study also summed up the results on prioritised functions from questionnaires with 185 primary users plus 40 in-depth interviews with primary users and 40 with secondary users in The Netherlands and Portugal as follows:

- PT primary users: support (arm rests, hand grips), easy stand-up (height and tilt adjust-ability)
- PT secondary users: height adjust-ability, tilt and emergency functionalities/fall detection
- NL primary users: support (arm rests, hand grips), height adjusting, tilt and bidet function
- NL secondary users: height adjustable, tilt and to lesser extent bidet function

The findings from the current research and from the previous study are in line regarding the most preferred / prioritised functions for the envisaged new toilet system for semi-public use. Also, the more general findings from the online survey regarding public accessible toilets brought similar results as the so-called toilet landscape analyses carried out by the earlier study project. There are differences from country to country but generally there is a need for more adapted toilet systems in the semi-public space. Currently there is a lack of such toilets and if available they do not have the needed functions or are not as clean as needed. Also,

the need for awareness raising is confirmed and the potential is emphasised that the availability of more adaptable and more inclusive toilets will enable a larger part of the old population and/or people with disabilities to leave home for taking part in societal activities outside their own living area.

9 Selected User stories

In *Toilet For Me Too* we got the opportunity to interview elderly, people with disabilities, formal and informal caregivers about a Toilet For Me system. What is important? What is the impact on daily life? The user stories described here, answer these questions. This is based on the findings from the research, real stories but anonymised.

Charlotte (Belgium)

Charlotte, 28 years old, is a **care giver** at the Pamele day care centre. She supervises people who live with a complex care situation and she cares for residents with physical and/or cognitive problems.

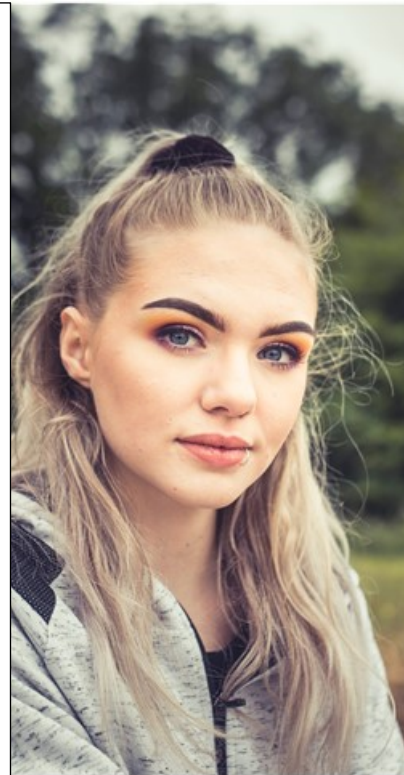
'I can work more ergonomically, because my back does not have to undergo torsion to clean the user with paper.'

She believes that using the shower toilet helps with the resident's hygiene because everything is cleaned better. Perhaps it can also reduce the chance of a bladder infection, because it is more hygienic. What was noted is that the buttocks are not always dry after blowing, this is associated with aiming the nozzle. The vaginal and anal nozzles spray at the same location, which creates an unpleasant sensation.

'By supporting users during the use of a diagonal lift, I save time because I don't have to use an external lift.'

Not all users use both supports, some only use the lift, others only the shower toilet. However, it can be said that some of our users can now go to the toilet without or with minimal support.

In addition, it can be noted that some did not want to use the toilet because it looks robust and bulky.



Susan (The Netherlands)

Susan, a Dutch lady in her forties, was born with a muscle disease and is therefore in a wheelchair. Due to her illness she had limited energy. She works 4 hours per week as a volunteer.

Susan just moved to a new apartment together with her partner in a large city in the Netherlands. The toilet has a shower-WC in the toilet and she is super happy with that. Next to this there are grab bars. In her old apartment she had a toilet with a height lift. She ordered a height lift for her new apartment too. This is paid by the city council (Dutch WMO law).

'If a toilet is not wheelchair accessible, then I cannot use it independently. When I am out and about there is always a quest for a good toilet. This is stressful. Also it makes me avoid going to the toilet: I don't eat and drink.'

The ideal toilet for Susan is spacious (sufficient space in the room and 80 cm on both sides next to the toilet) clean and equipped with a shower-WC, height lift and has a nice design.

'If a Toilet For Me system was available in The Netherlands and I could easily find it, it means that I can go out and about carelessly to go shopping, meet friends, visit museums, the theatre and even eat and drink when I am out of home.'



Julan (The Netherlands)

Julan, 76 year old, retired, lives independently in a small village in The Netherlands.

*"I use handles at the toilet, a toilet with a Shower-WC and a dryer function, the toilet has sensor for flushing, and a hoist that I can operate independently. There is also an extra sturdy toilet seat that cannot move when taking a seat. In practice, this means that **I can only use the toilet in my own home**. This means when I am out-of-home I have to be helped by someone with a lot of strength to be able to place me on the toilet, etcetera."*

The use of the toilet itself is often also problematic for example the door is often difficult to open and close, barely or impossible to lock or the light suddenly goes out.

*"I often cannot stand close to the toilet because of a trash can or something like that. It is also often too small or poorly laid out. If a Toilet For Me system would be available in The Netherlands and I can use it by myself, this means I can go to the places in the near proximity of this toilet. It means I don't have to ask family members or friends to accompany to the toilet. **It would bring me freedom.**"*



Helena (Poland)

Helena is 52 years old. She looks after her 80-year-old mother who suffers from MS and moves around with a walker.

She enjoys walks and outdoor activities in a nearby park where there is no toilet. Due to care needs, she is rarely able to go there when she feels like it. Assisting her mother to the toilet - especially supporting and lifting - is very physically demanding for her. Even in the toilet at home, where there are rods mounted on the walls, it is very tiring.

"Spending time out of the house is very important for my mother's mental condition. Contact with nature and observing people has a huge impact on her mood and consequently her ability to relate and think. Observing people, children and animals is like medicine for her."

Sensitive points: Suffers when mother gets impatient and reprimands her. Doesn't like to get dirty by cleaning her mother's body.

What Toilet for me would change for her: She will have more time for herself. She will be less burdened with helping her mother and mother will be more active.

If mum could use the toilet in the park on her own, there will be recovery time for me. It would be a relief to body and mind.



Mihai (Romania)

Mihai is a family friend and is 78 years old.

Recently, due to his advanced age, which brings with it weakness and difficulty travelling, the caregiver has had to offer help when performing certain activities, for example when going to the toilet. The big problem was when he had to go to the toilet, both for Mihai and for the caregiver. Sometimes it takes 30-40 minutes to solve everything that needs to be done for such situations. One day, the caregiver heard about the innovative idea of the Toilet4me2 project and decided to test together with Mr. Mihai the functionalities of smart toilets within it.

"I am very satisfied with the toilet functions, such as the vertical or diagonal lifting functions, but also the bidet function. This toilet makes me feel clean and safe," said Mr. Mihai.

"Going to the toilet is no longer a problem, since Mr. Mihai uses the smart toilet. Everything takes much less than before and my work is much easier," said the caregiver.



10 Conclusions

Before we draw any conclusions, we want to note that the impact of the Covid-19 pandemic on working with users was significant at this stage of the project. Nevertheless, appropriate modifications of the work plan with alternatives such as online surveys and extra safety measures (such as keeping distance, mouth masks, glass panels etc.), combining online survey and in-depth interviews and regular intensive communication among user partners with high flexibility in the partners' local work activities allowed to successfully reach the intended goals and to gain a rich set of information regarding user requirements.

While the research focused on the project specific questions, plenty of general information on the situation with current accessible toilets was collected.

The current research is based on the work which was done in the earlier study project Toilet4me (2018-2019), documented in the deliverable D1.1 "User Perspective Report - List of priorities and concerns seen from user perspective" (June 2019)

Most of the functions that were selected in the research, tested and ranked were considered essential or important by both user groups. So, the findings from the current research and from the previous study are in line regarding the most preferred / prioritised functions for the envisaged new toilet system for semi-public use.

Also, the more general findings from the online survey regarding public accessible toilets brought similar results as the so-called toilet landscape analyses carried out by the earlier study. Generally, there is a need for more adapted toilet systems in the semi-public space. And currently there is a lack of such toilets and if available they do not have the needed functions or are not as clean as needed. Also, the need for awareness raising is confirmed and the potential that more adaptable and more inclusive toilets will enable a larger part of the old population and/or people with disabilities to leave home for taking part in societal activities outside the own living area.

In this phase of the project the users could not yet experience and assess the planned project specific improvements like height independent tilt, intelligent adaptation (personalised setting, voice control) and flexible use. One of the main intents of the first phase was to raise awareness and to confirm and extend the user requirements already known from the previous study project. In the following project phase, it is planned to intensify co-design based on hands-on evaluation of first prototypes which already implement the proposed advanced function.

10.1 Most important results

10.1.1 Accessible toilets in public space

Research among our target group in an online poll showed that primary users and their carers often use the accessible public toilets / disabled public toilets. However, there is a lack of such toilets in (semi) public spaces like gas stations, restaurants, hotels, trains, libraries, shopping malls. The disabled public toilets are often not clean and have insufficient functionalities. Desired functionalities most mentioned in our online polls are a shower-WC, stand-up function (tilt seat), a changing table for adults and vertical lift (height adjustment).

10.1.2 General functions of accessible toilets

Functions ranked important or essential by primary users (61)		Functions ranked important or essential by secondary users (39)	
Type	%	Type	%
Arm Support	88.5	Alarm system	94.9
Alarm System	82.0	Arm support	89.7
Safety grab bar	75.4	Safety grab bars	84.6
Automatic light and door lock	73.3	Nice design	64.1
Nice design	60.7	Automatic light and door lock	61.5

10.1.3 Special functions (Toilet For Me System)

The results of the interviews with both user groups (primary and secondary end-users) show that overall most of the modern requirements for a Toilet For Me System are considered important. Users stated that **clear instructions** on how to use the functions are important, with simple symbols. Both primary users and secondary users have concerns about a complex system and many users told us spontaneously **to keep it simple**.

It can be concluded that for the design of the toilet system it is of paramount importance to offer an intuitive way of interaction between user and system. Any kind of overload of the user must be avoided.

Primary users consider the height lift important, however they have concerns on reliability of the height lift and suggest clear instructions. They are concerned about their **personal hygiene** when using a Toilet For Me system, the seat, the Shower-WC, the remote control. Will this be clean after being used by several people? Primary users would mostly use the Shower-WC again. However, there are some barriers to use this modern functions and concerns such as hygiene, water pressure and temperature.

85% of the secondary users consider emergency detection essential or important and indispensable to ensure safety. They believe that the user's **personal hygiene is increased** by the **Shower WC**. Others believe that the height lift allows users to go to the toilet more independently, provided that there are clear instructions on how to use it.

Some advanced functions e.g. personal settings (approx. 33% or 13 users rated "essential" or "important") were clearly lower rated than above mentioned features. Here it can be assumed that this group of features should only be available for those users who consider them beneficial and should remain inactive and hidden for other user groups. One reason for lower ratings may also be the current lack of prototypes able to demonstrate these features. It is likely that this made it more difficult for the users to judge potential benefits.

Functions ranked important or essential by primary users (61)		Functions ranked important or essential by secondary users (39)	
Type	%	Type	%
Hygiene (Self-cleaning seat, Air quality, Autoflush)	85.2	Hygiene (Self-cleaning seat, Air quality, Autoflush)	89.7
Emergency detection	80.3	Emergency detection	84.6
Remote control	75.4	Height Lift	68.4
Height Lift	73.8	Remote control	66.7
Shower WC	62.9	Automatic doors	64.1
Tilt lift	43.3	Nice design	61.5
Voice control	40.0	Shower WC	53.8
Personalised settings	33.0	Tilt lift	46.2

10.1.4 Toilet room

Users (primary and secondary) also commented about toilet rooms in general, they missed adjustable mirror, trash bin, disinfection spray, hangers for clothes. All reachable. A **non-slippery floor** is often mentioned. The toilet room has to be spacious. The door has to be easy to open from both sides. A ceiling lift and a changing table for adults were mentioned by primary and secondary users. Other things that were missed: UV-C cleaner for disinfection of the entire room, automatic odour freshener, lights that stay on as long as the door is locked.

10.1.5 Other suggestions

For both user groups the design is important ('nice, 'normal' design'). For primary users a nice design has a positive impact on self-esteem.

Primary users suggest:

Educate users of this kind of toilet, divide it by gender, get insight from local disability platforms and organizations, a standard for disabled toilets, and implement such smart toilets in nursing homes, hospitals, parks and forest, online platforms for monitoring them.

Secondary users suggest:

It is important to have a nice elegant design, without loose tubes and annoying corners, so that it is easy to maintain. Pay attention to degenerative changes and mind colour contrasts and fonts. Another suggestion is music to relax.

10.1.6 Technical suggestions

The technical suggestions are on robustness, maintenance should be easy, the toilet should be ergonomically, easy to find by the use of an app.

10.2 Advice for upcoming research

In this research existing commercial sanitary products from the local market were used and tested by primary and secondary users at the user partners' test sites. However, users could **not yet experience** and assess the planned project specific improvements like height independent tilt, intelligent adaptation and flexible use at this stage of the project. For the next project phase, it is planned to intensify co-design based on hands-on evaluation of first prototypes which already implement (part of) the proposed advanced functions.

Advice:

- Overall: **Keep it simple**, the user needs to understand the different functions. Symbols are very important. They should speak for themselves.
- Offer a simple, clear manual/user guide for every function.
- Test whether users **understand** the different functions.
- WC Shower: people are not yet familiar with using this function, sometimes they are even scared. Thus, clear signs/symbols on how to use this function are essential.
- Test voice control for giving commands with both user groups so they are aware of the **possibilities**.
- Test personalized settings with both users groups where the smart toilet adjusts to your preferred setting: height, tilt,...
- Test the Smart 3D sensor/alarm call system with both user groups.
- Test the cleaning: Self-cleaning seat, air quality, Autoflush. Test how to **combine** all the cleaning activities.
- Test how all the different functions work together in an integrated system and an easy to understand user interface.
- Write an **advice for accessible toilets in general** based on all the suggestions we gathered on the room, the accessories. When installing a Toilet For Me system also those suggestions should be taken into account.

Possible extras to test:

- Ultraviolet lamp
- Light that stays on all the time

11 Definitions, Acronyms and Abbreviations

11.1 Definition of end-users in the AAL Programme:

(Source: <http://www.aal-europe.eu/ageing-well-universe/i-am-a-user-2/>)

Primary end-user is the person who actually is using an AAL product or service, a single individual, “the well-being person”. This group directly benefits from AAL by the increased quality of life;

Secondary end-users are persons or organisations directly being in contact with a primary end-user, such as formal and informal care persons, family members, friends, neighbours, care organisations and their representatives. This group benefits from AAL directly when using AAL products and services (at a primary end user’s home or remote) and indirectly when the care needs of primary end-users are reduced;

Tertiary end-users are such institutions and private or public organisations that are not directly in contact with AAL products and services, but who somehow contribute in organising, paying or enabling them. This group includes the public sector service organisers, social security systems, insurance companies. Common to these is that their benefit from AAL comes from increased efficiency and effectiveness which result in saving expenses or by not having to increase expenses in the mid and long term.

11.2 Acronyms and Abbreviations

AAL	Active and Assisted Living / Ambient Assisted Living
BEIA	BEIA Consult International, partner in T4ME2 project
CCS	CareCenter Software GmbH, partner in T4ME2 project
CA	Consortium Agreement
CDC	Caritas de Coimbra, subcontractor of OSF
CMU	Central Management Unit
COG	cogvis software & consulting GmbH, partner in T4ME2 project
DoW	Description of Work, proposal, work description of T4ME2 project
GD	Stichting Gouden Dagen, partner in T4ME2 project
GDPR	EU General Data Protection Regulation (GDPR)
HH	Zorggroep Heilig Hart, partner in T4ME2 project
ICT	Information and Communications Technologies
iToilet	previous AAL project iToilet (supportive ICT enhanced toilet for the home market, http://www.itoilet-project.eu/)
OSF	On Site Foundation, partner in T4ME2 project
PU	Primary Users (e.g. old person, person with physical limitation)
PrM	Project Month. Starting month is PrM01 i.e. March 2020
QoL	Quality of Life
SAN	Sanmedi bv, partner in T4ME2 project
STR	Sanitronics International B.V., partner in T4ME2 project
SIS	Santis Kft, partner in T4ME2 project, partner in T4ME2 project
SU	Secondary Users (e.g. care person)
Toilet4me2, T4ME2	Toilet for me too, supporting active living in (semi-) public environments by suitable toilets (AAL project at hand, website: http://toiletforme.com/)

Toilet4me	previous AAL project Toilet4me (was a Small Collaborative Project (SCP) as preparation for T4ME2 for semi-public area, http://toilet4me-project.eu/)
TU	Tertiary Users (e.g. manager of day care organisation)
TUW	TU Wien (Vienna Univ. of Technology), partner and co-ordinator in T4ME2 project
WP	Work Package

12 References and Literature

12.1 References to T4ME2 project documents and deliverables

Toilet4me2 Description of Work (DoW)

D2.1 Legal considerations and recommendations on ethical compliance, data collection, privacy and security, Toilet4me2 project deliverable, 2020

D2.2 Ethical documentation and approvals (under construction), Toilet4me2 project deliverable, 2021

D2.4 Organisational models and requirements for tertiary end-users, Toilet4me2 project deliverable, 2020

D2.5 Iterative co-design and validation results (under construction), Toilet4me2 project deliverable, 2021

D3.1 Evaluation protocol and test plans, Toilet4me2 project deliverable, 2020

12.2 References to earlier T4ME study project documents

(T4ME study project was a previously completed SCP (Small Collaborative Project) which has studied 2018-2019 the feasibility of the current T4ME2 project 2020-2023)

Final review Toilet4me (2019)

D1.1 User Perspective Report - List of priorities and concerns seen from user perspective (both end user and stakeholder), Toilet4me consortium, project deliverable, Version 7.0+, 17 June 2019

D2.1 Report on Feasibility (incl. safety and privacy issues) and suggested approach to implementation, Toilet4me consortium, project deliverable, April 2019

12.3 Literature

Dantas C, Rodrigues F, Ortet S, Mayer P, Panek P (2019) User perspective on smart toilets extra in semi-public spaces for older adults: priorities and concerns, in: abstract book, 1st Intern Congr in ageing communities & development challenges, Escola Superior Agrária, Instituto Politécnico Castelo Branco, Portugal, ISBN: 978-989-8196-94-1, p. 68.

Mayer P, Güldenpfennig F, Panek P. (2019) Towards Smart Adaptive Care Toilets. Stud Health Technol Inform. 2019;260:9-16. PMID: 31118313.

Molenbroek JFM, Mantas J, de Bruin R (Eds) (2011) A Friendly Rest Room: Developing Toilets of the Future for Disabled and Elderly People, Assistive Technology Research Series, Vol 27, IOS press, Amsterdam, open access: <https://ebooks.iospress.nl/volume/a-friendly-rest-room-developing-toilets-of-the-future-for-disabled-and-elderly-people>

Pilissy T, et al. (2017) Towards a situation-and-user-aware multi-modal motorized toilet system to assist older adults with disabilities: A user requirements study, Intern. Conf. on Rehabilitation Robotics (ICORR), London, pp. 959-964, doi: 10.1109/ICORR.2017.8009373.

13 Annex

13.1 Interview data

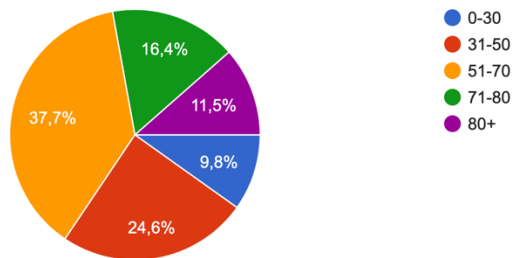
This section contains the data of the interviews. Collected by a one-time survey (questionnaire) that could be filled in paper, online or via a live interview by a researcher and a user on the test sites or by an interview by phone/video call.

To get consistent results all partners translated these answers into English and inserted them in an online tool.

13.1.1 Results from primary users

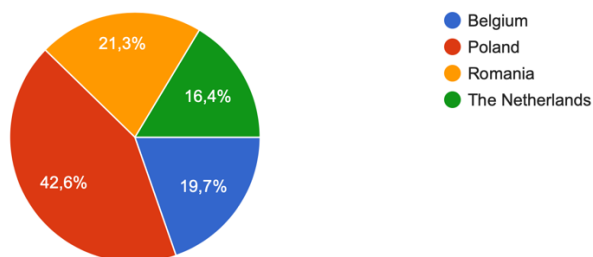
How old are you?

61 antwoorden



What is your home country?

61 antwoorden



What is your gender?

59 antwoorden

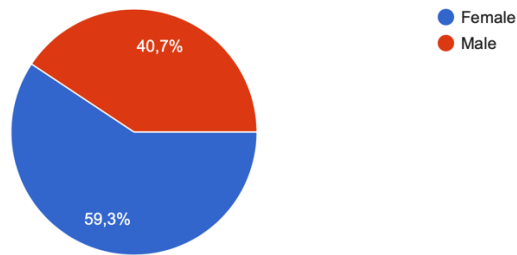
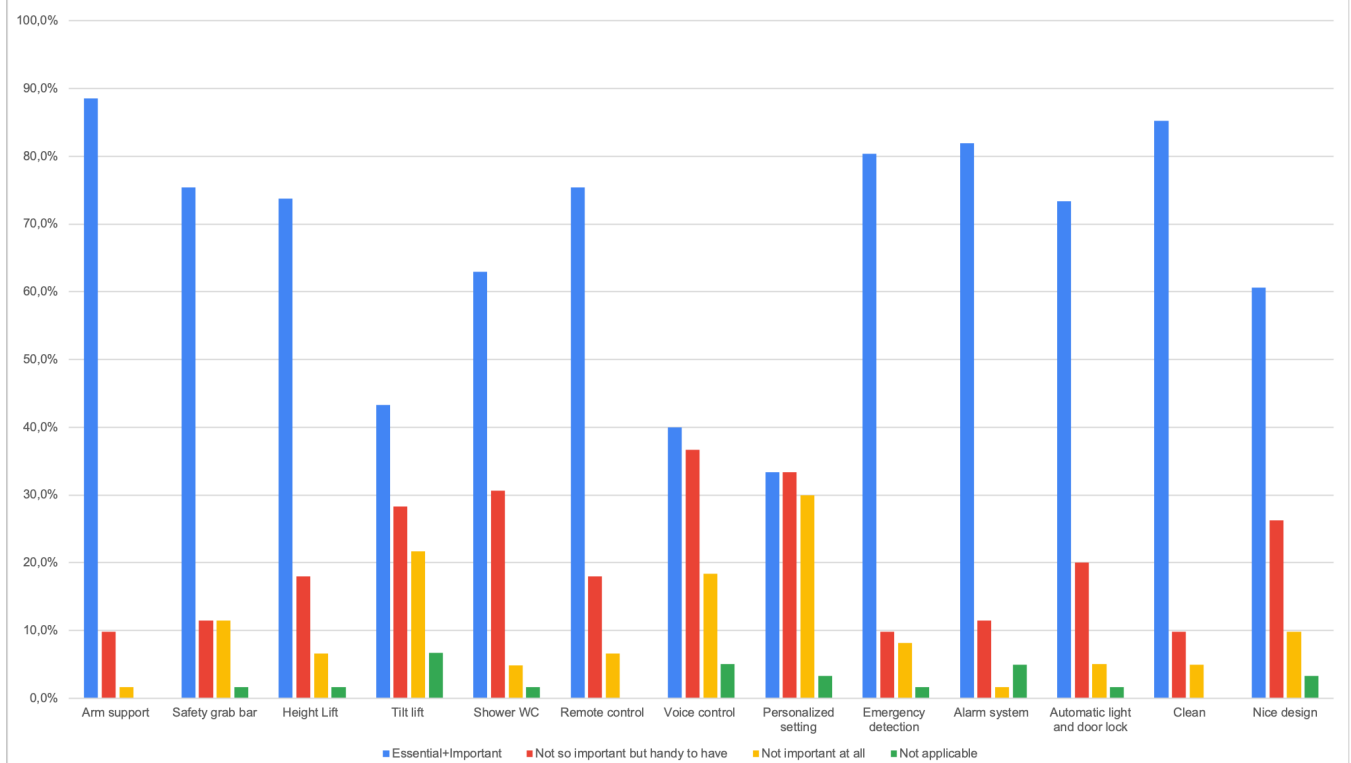
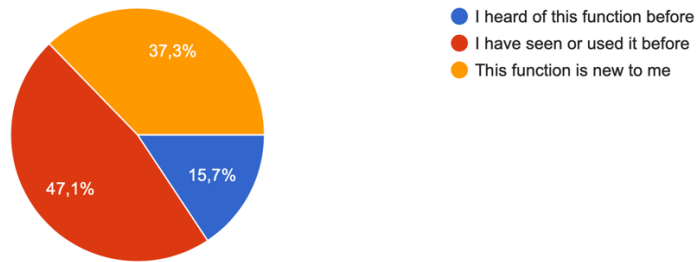


Figure 1.1 Functions Smart Toilet ranked by Primary Users
Based on interviews with 61 users



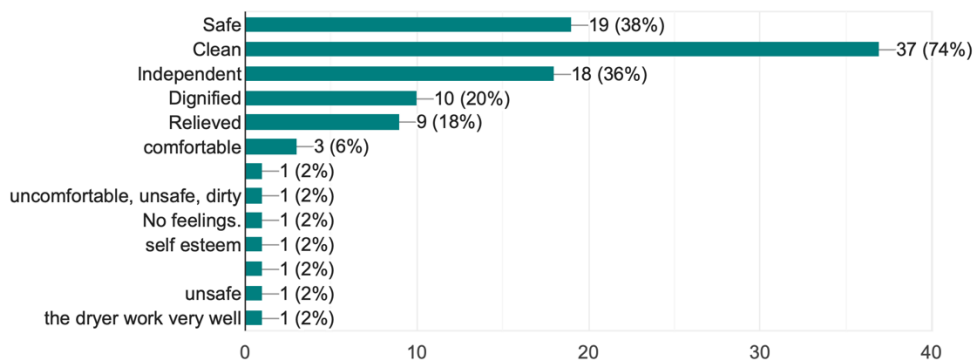
Are you familiar with the shower WC?

51 antwoorden



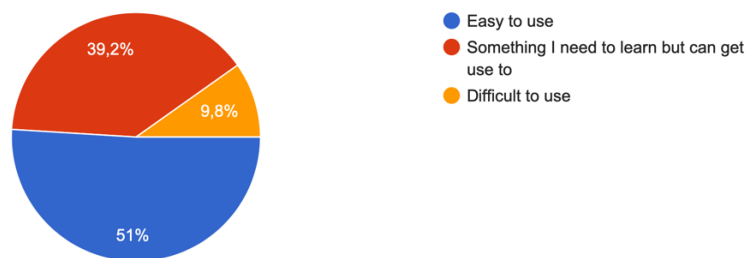
The shower WC function makes me feel

50 antwoorden



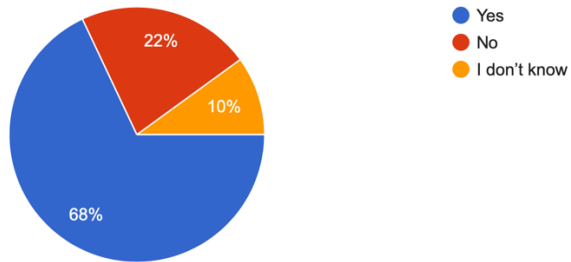
What is your experience of the shower WC? I found it

51 antwoorden



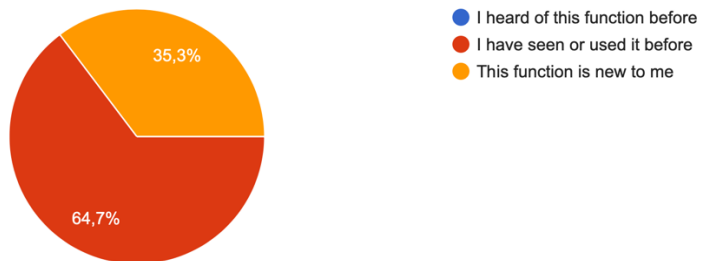
I will use this function again when present at a toilet

50 antwoorden



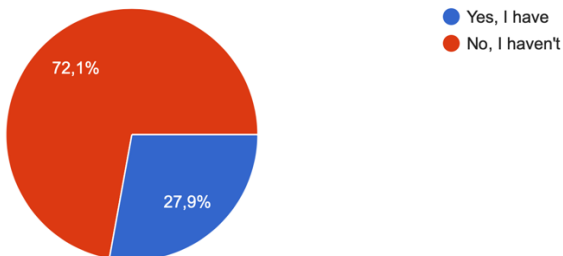
Are you familiar with the tilt lift?

17 antwoorden



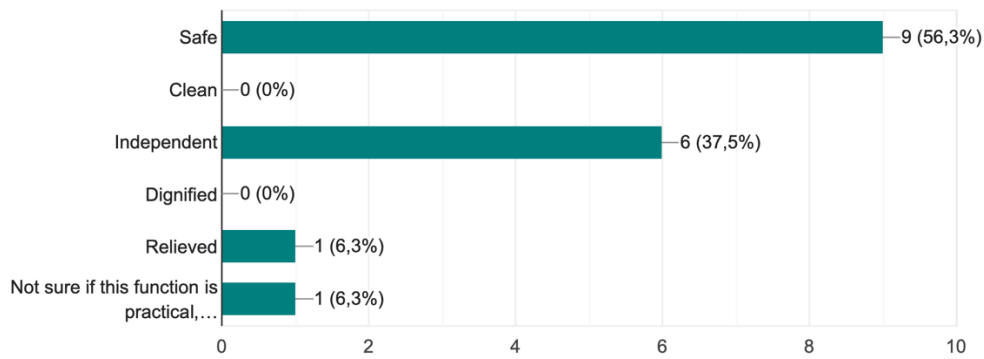
Have you tested a tilt lift (diagonal) function?

61 antwoorden



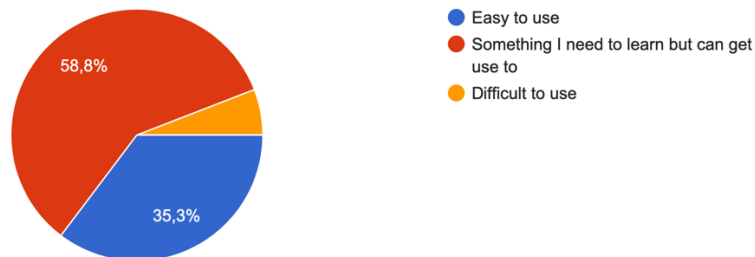
The tilt lift function makes me feel

16 antwoorden



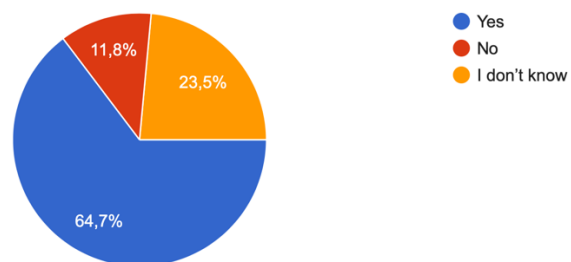
What is your experience of the tilt lift? I found it

17 antwoorden



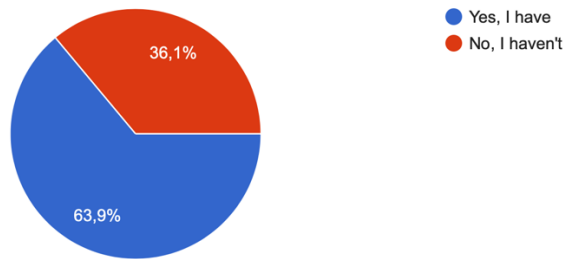
I will use this function again when present at a toilet

17 antwoorden



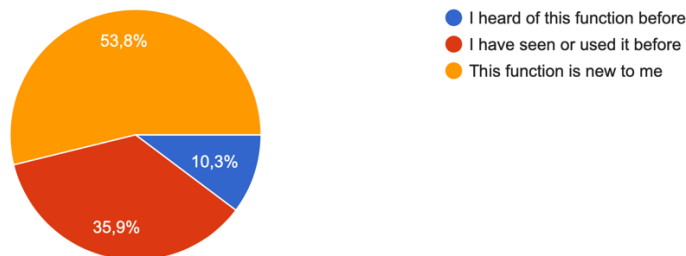
Have you tested a height lift (vertical) function?

61 antwoorden



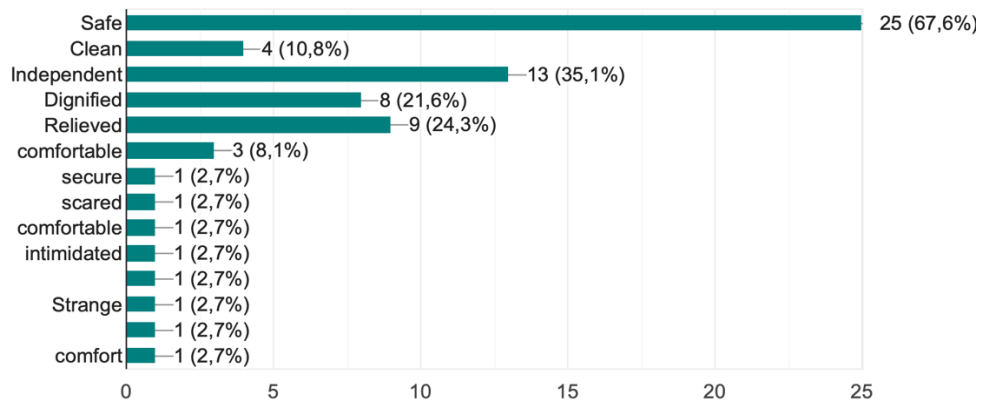
Are you familiar with the height lift?

39 antwoorden



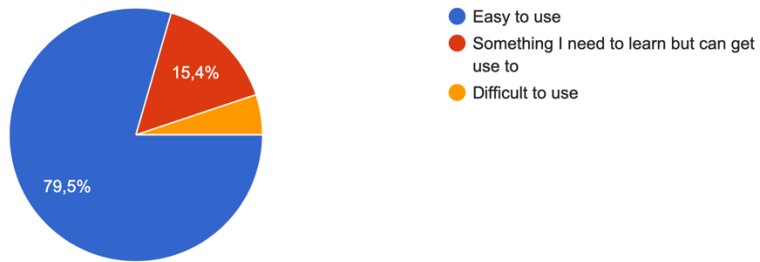
The height lift function makes me feel

37 antwoorden



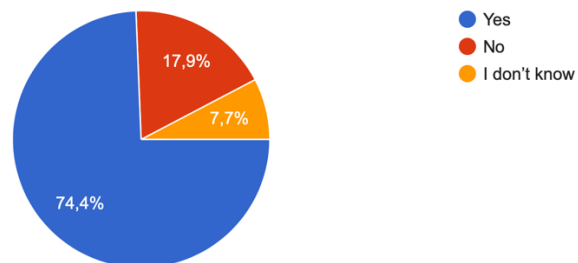
What is your experience of the height lift? I found it

39 antwoorden



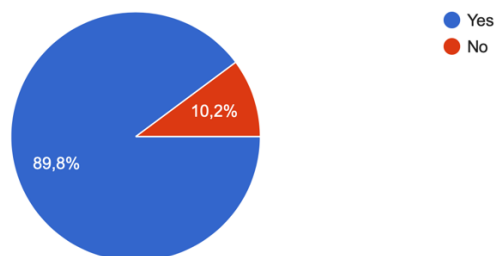
I will use this function again when present at a toilet

39 antwoorden



Would you like to participate also in later test phases in co-creating activities?

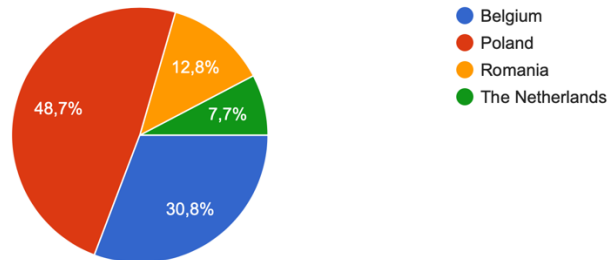
59 antwoorden



13.1.2 Results from secondary users

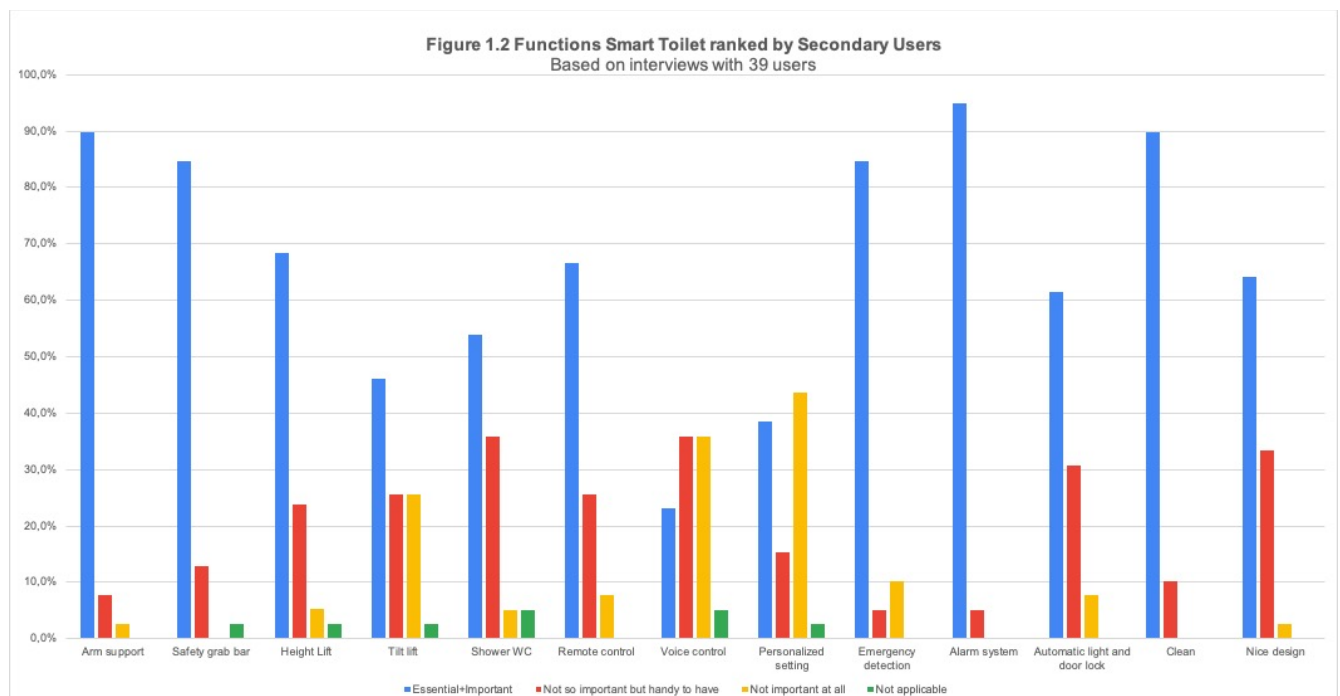
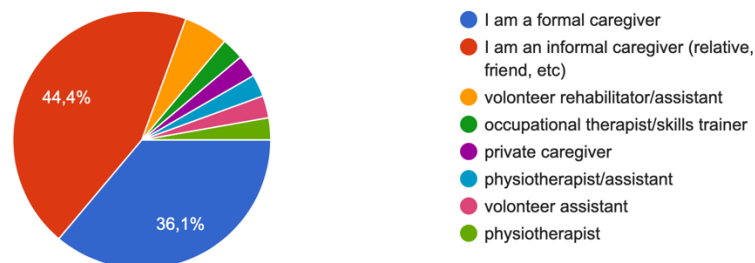
What is your home country?

39 antwoorden



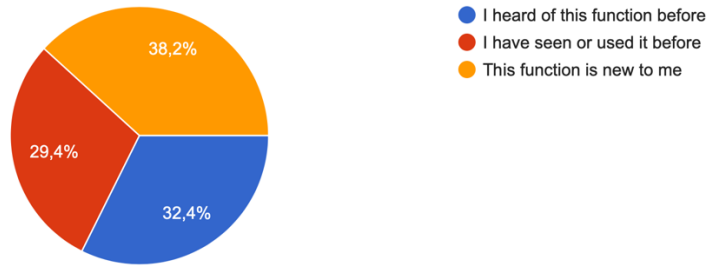
What is your relation to the person that needs assistance on the toilet?

36 antwoorden



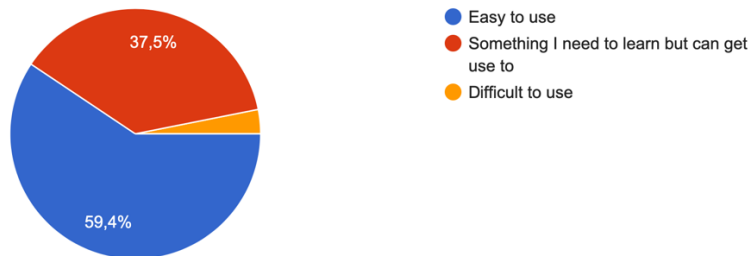
Are you familiar with the shower WC?

34 antwoorden



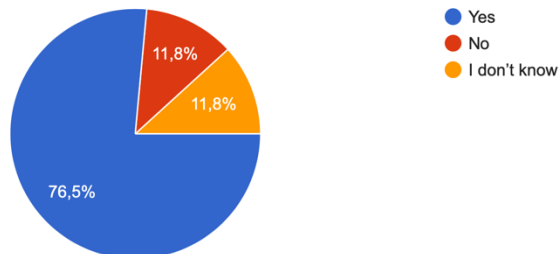
What is your experience of the shower WC? I found it...

32 antwoorden



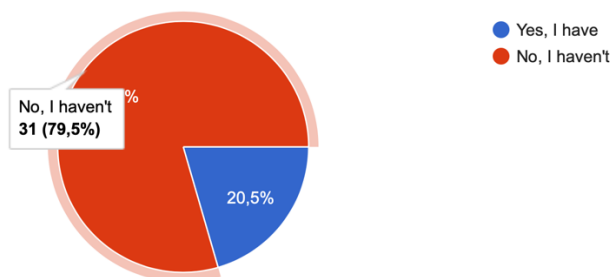
I will use this function again when present at a toilet

34 antwoorden



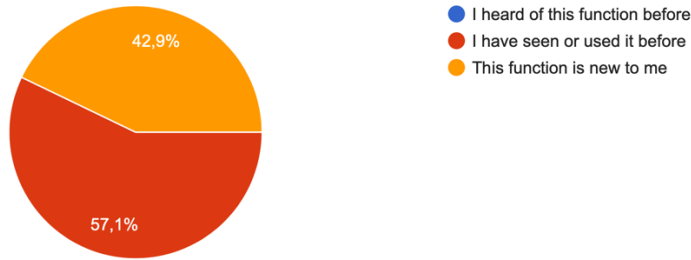
Have you tested a tilt lift (diagonal) function?

39 antwoorden



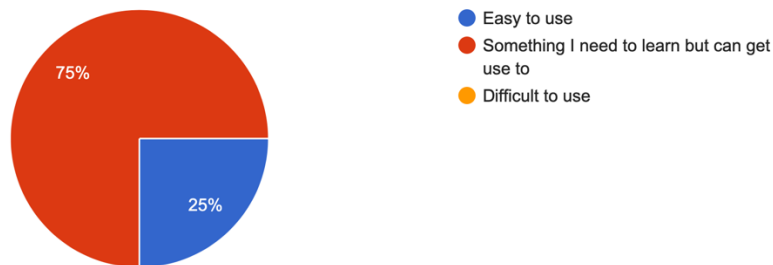
Are you familiar with the tilt lift?

7 antwoorden



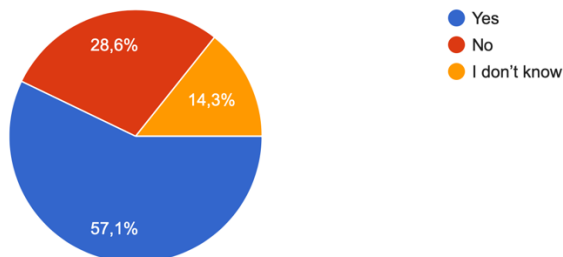
What is your experience of the tilt lift? I found it

8 antwoorden



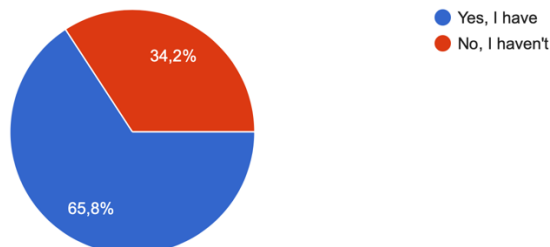
I will use this function again when present at a toilet

7 antwoorden



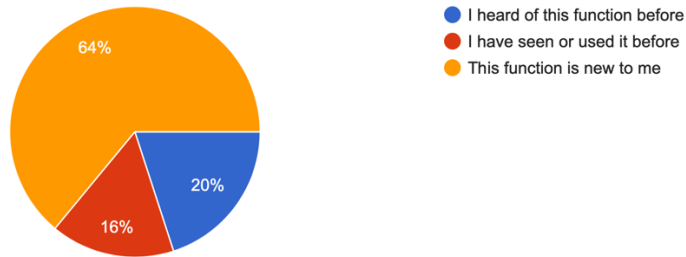
Have you tested a height lift (vertical) function?

38 antwoorden



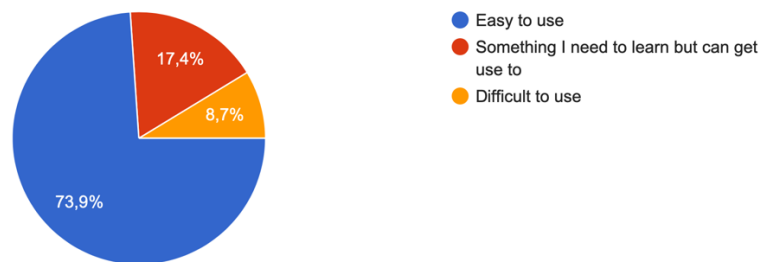
Are you familiar with the height lift?

25 antwoorden



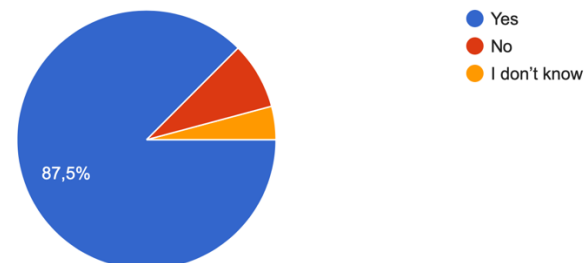
What is your experience of the height lift? I found it

23 antwoorden



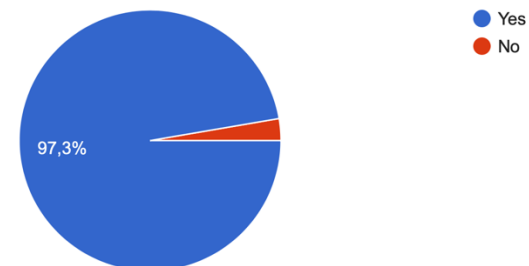
I will use this function again when present at a toilet

24 antwoorden



Would you like to participate also in later test phases in co-creating activities?

37 antwoorden



13.2 Extra Online poll on accessible toilets outside home

This section describes the design of the anonymous online poll, presents the results from 3 countries (Belgium, The Netherlands and Austria) and shows as an example a screenshot of the Dutch version of the online poll.

13.2.1 Questions and design of the online survey

The survey was designed using Google forms and contained the following questions and set of possible answers.

How are the things with the quality and presence of disabled toilets out of home?

A disabled toilet out of home is important to go abroad without worries. Are there enough disabled toilets out of home? Are they clean? And do they meet the practical requirements of users? Are you a user of disabled toilet when you are abroad, then we are interested in your opinion and experience?

1. When I'm abroad I make use of a toilet out of home, at for example a restaurant, gas station, shopping mall or train.

Always
Most of the time
Sometimes
Rarely
Never

2. If present, I make use of a disabled toilet then.

Yes
No
Sometimes

3. A disabled toilet is always present out of home, at for example a restaurant, gas station, shopping mall or train.

Always
Most of the time
Sometimes
Rarely
Never

4. A disabled toilet out of home is clean

Always
Most of the time
Sometimes
Rarely
Never

5. A disabled toilet out of home has the functionalities I need to use the toilet in a good way

Yes
No
Sometimes

6.A disabled toilet out of home would be better for me to use as it has (one of) the following functionalities:

Shower- and dryer

Diagonal lift (tilt)




Vertical lift (height adjustment)

Voice control

Changing table for adults

13.2.2 Dutch Online Poll Template (Example)

As example the Dutch version of the anonymous online survey (using Google forms) is presented below.



Hoe is het gesteld met toegankelijke toiletten onderweg in Nederland?

Een toilet onderweg is van belang om zorgeloos op pad te gaan. Zijn er onderweg genoeg toegankelijke (miva) toiletten? Zijn ze schoon? En voldoen ze aan de praktische wensen van gebruikers? Maakt u of een naaste gebruik van een miva-toilet, dan zijn Stichting Gouden Dagen en Sanmedi benieuwd naar uw ervaring.

Als ik op pad ga maak ik gebruik van een toilet onderweg, bij bijv. een hotel, restaurant, benzinepomp, winkelcentrum, trein.

☐ Altijd

☐ Meestal

☐ Soms

☐ Zelden

☐ Nooit

Indien aanwezig, maak ik gebruik van een toegankelijk (miva) toilet

☐ Ja

☐ Nee

☐ Soms

Een toegankelijk toilet is aanwezig, bij bijv. een hotel, restaurant, benzinepomp, winkelcentrum, trein.

☐ Altijd

☐ Meestal

☐ Soms

☐ Zelden

☐ Nooit

Een toegankelijk toilet onderweg is schoon.

☐ Altijd

☐ Meestal

☐ Soms

☐ Zelden

☐ Nooit

Bij een toegankelijk toilet zijn de voorzieningen aanwezig die ik nodig heb om prettig naar de wc te kunnen.

☐ Ja

☐ Nee

☐ Soms

Een toegankelijk toilet zou nog beter bruikbaar zijn als een (of meerdere) van onderstaande extra voorzieningen aanwezig zijn.

☐ Douche- en droogfunctie (waarmee onderlichaam gereinigd en gedroogd wordt)

☐ Sta-op functie (bril kantelt waardoor zitten en opstaan makkelijker gaat)

☐ In hoogte verstelbaar (verticale lift)

☐ Bediening door stem (spraakgestuurd)

☐ Verschoontafel voor volwassenen

Submit

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Google Forms

13.2.3 Results per country

13.2.3.1 Results Belgium

What is the situation with accessible toilets on the road in Belgium? Survey among 36 people.

Summary results to questions:

- usage: 2.7% always, 55.55% most of the time 30.55 sometimes 8.33% seldom, 2.7% never = 88.80% usage
- Available: 30.55% always, 5.75% most of the time, 55.55% sometimes, seldom 8.33% = 63.88% Lack
- Cleanliness: 11.11 always, 33.33 most of the time , 41.66% sometimes, 11.11% seldom, 2.7% never = 55.47 % not clean
- Functionalities: 36.14 yes, 55.55 % sometime, 8.33 % no = 63.88 % missing functions
- Shower-WC: 33.33%, tilt 47.22 %, height: 33.33%, changing table: 27.77%

The interviewees had the opportunity to leave suggestions:

In France, you have the toilet blocks that clean themselves after each visit, a good example of a pleasant publicly accessible toilet

- *enough toilet paper, dispenser with sanitary towels and tampax, automatic seat wipe,*
- *Coat racks to hang up your things so you don't have to put them on the floor.*
- *for cleanliness and replenish where necessary.*
- *The extra functions that might be present are more a luxury for me!*
- *I'm happy if there's a public toilet somewhere, because they're not always easy to find.*

13.2.3.2 Results Austria

17 people answered in Google form, questions translated to German from English text of Dutch google form. Information was sent out via Austrian Disability Council and AAL Austria newsletters plus websites of Austrian partners but response was low.

Summary results to questions:

- usage: 6.3% always, 43.8% most of the time, 18.8% sometimes, 31.3% seldom = **68,9% usage**
- available: 13.3% most of the time, 40% sometimes, 46.7% seldom, = **86.7% lack**
- cleanliness: 6.7% always, 40% most of the time, 46.7% sometimes, 6.7% seldom, = **not clean 53.4%**
- functionalities: 46.7% yes, 40% sometimes, 13.3% no = **53.3% missing functions**
- shower: 25%, tilt: 66.7%, height: 91.7%, speech: 33.3%, changing table: 0%
Note: changing places in Austria are almost unknown

13.2.3.3 Results The Netherlands

101 people answered in Dutch Google form. Users were urged to participated via social media, press release from SAN, GD and their local partners

Summary results to questions:

- usage: 23% no, 63 % yes, sometimes 14% = **77% usage**
- lack: 4% always, 27% most of the time 22 % seldom, 45% sometimes, never 2%= **69 % lack**
- cleanliness: 1% always, 23% most of the time, 29 % seldom, 43% sometimes, never 4% = **76% not clean**
- functionalities: 26% yes, 23 % no, 51 % sometimes, = **74% missing functions**
- shower-WC: 45%, tilt 38 %, height: 24%, changing table: 32%