Influence of physical design characteristics on health and wellbeing

Physical environment characteristics affecting health and wellbeing of parents and medical professionals in the neonatal intensive care unit:

a discrete choice experiment

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Voorwoord

Voor u ligt mijn tweede afstudeeronderzoek welke het resultaat is van een onderzoek naar de invloed van ontwerpkenmerken op het welzijn van ouders en medisch personeel op de neonatal intensive care unit (NICU). Het onderzoek is uitgevoerd vanuit de Technische Universiteit Delft, in samenwerking met *pieterse terwel grevink* advies (ptg advies).

Dit afstudeeronderzoek is voor mij een voltooiing van de combinatie bouwkunde en arbeids- en organisatiepsychologie. Deze twee studies heb ik gecombineerd vanuit de overtuiging dat de basis van organisaties mensen zijn, mensen die besturen, richting geven, kennis leveren en daarmee betekenis geven aan een organisatie. Het gebouw is voor de processen in een organisatie een belangrijk aspect en beïnvloed deze processen en het welzijn van de gebruikers in zekere mate. Kennis van de gebruikers en het gebouw is hierbij essentieel.

In dit afstudeeronderzoek wordt gericht op één afdeling in ziekenhuis, de NICU. Een ziekenhuis is bij uitstek een organisatie waarbij het gebouw in belangrijke mate de organisatieprocessen en het welzijn van de gebruikers beïnvloedt. Hoe mooi is het als huisvestingsvraagstukken een bijdrage kunnen leveren aan het welzijn van de patiënt, de zorgprofessional en overige gebruikers, door het optimaliseren of verbeteren van de zorgomgeving/het gebouw? Met dit afstudeeronderzoek wil ik een bijdrage leveren aan het verbeteren van deze afstemming tussen gebouw en gebruiker, om het ziekenhuis tot een betere omgeving te maken om in te werken, te verblijven, te genezen en ziek te zijn.

Vanuit de TU Delft ben ik naar de Rijksuniversiteit Groningen gegaan, om vervolgens weer in Delft uit te komen. In Groningen heb ik veel gekregen maar ook veel verloren. Zo heb ik in Groningen mijn vrouw Nicole en haar liefdevolle familie leren kennen, welke nu de onze is. Met in het achterhoofd de gedachte dat wij elkaar, als mensen, betekenis verlenen in het leven en dat dit leven nu is, wil ik deze scriptie opdragen aan twee mensen die veel voor mij (en Nicole) beteken, twee mensen die elkaar helaas nooit zullen ontmoeten.

aan Sjack & Pepijn

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(Radboudumc), ben ik in het bijzonder dankbaar voor hun inzet en de mogelijkheid om het onderzoek op de afdelingen uit te zetten.

Mijn oprechte dank gaat ook uit naar alle ouders en medisch professionals die de tijd hebben genomen om deel te nemen aan het onderzoek. Waaronder ook de deelnemers aan de expert panels die mij hebben kunnen wijzen op wat er speelt in de NICU en altijd enthousiast meedachten.

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Mario

Delft, maart 2016

Nederlandse samenvatting

Algemeen

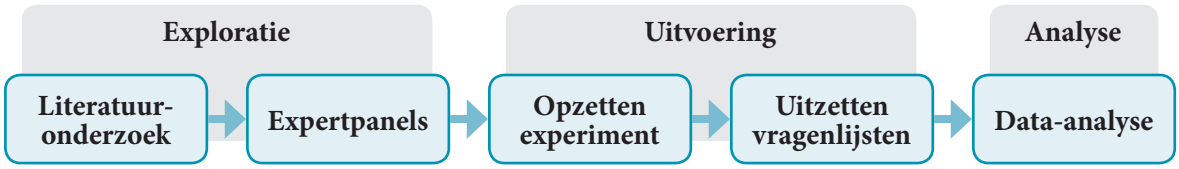
Een ziekenhuis is gemaakt voor en door mensen. Het gebouw is de schil waarin de organisatie haar taken uitvoert. Deze schil behoort de organisatie goed te passen, te voorzien in de wensen van gebruikers en bovendien toekomstbestendig te zijn. In dit onderzoek worden de uitkomsten van onderzoek op de neonatale intensive care unit (NICU) besproken.

De NICU is een intensive-care-afdeling voor de behandeling van ernstig zieke, meestal prematuur geboren, pasgeborenen (neonaten). In Nederland is deze zorg georganiseerd in tien NICU's, waarvan acht worden gehuisvest in academische centra en twee in algemene ziekenhuizen. Voor afdelingen waar intensieve zorg wordt geboden, worden hoge bouwkundige eisen gesteld. Dit heeft te maken met de specialistische aard van deze afdelingen en de behoeften van haar gebruikers (ouders en medische professionals). De NICU is een bijzondere afdeling, omdat daar de kleinste en de jongste patiënten van het ziekenhuis worden behandeld (neonaten) en ook ouders nauw worden betrokken bij de zorg voor hun pasgeboren kind.

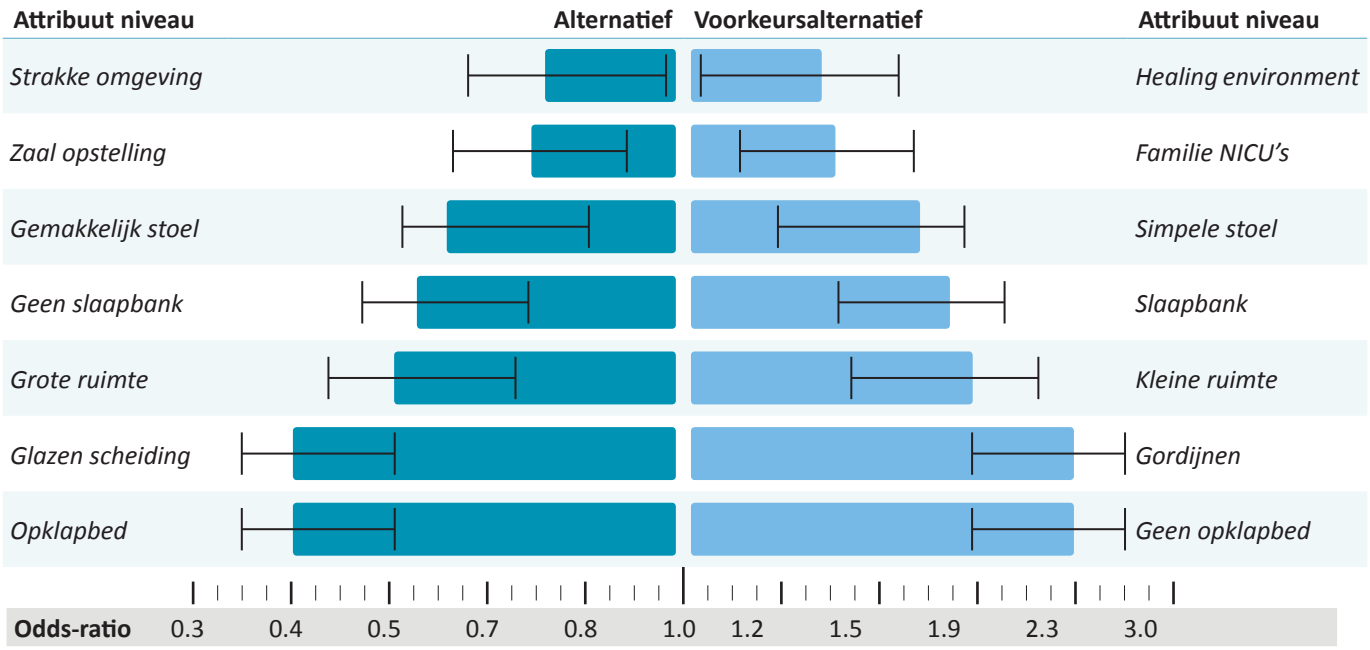
Wanneer een kind in de NICU wordt opgenomen, komen ouders terecht in een hectische omgeving, waarin ze vaak geconfronteerd worden met overweldigende emoties. Hier is de scheidingslijn tussen blijdschap en verdriet vaak flinterdun. Specialisten en verpleegkundigen zetten zich volledig in om de pasgeborenen een goede start in het leven te geven. Door goed onderzoek en nieuwe (technische) ontwikkelingen worden overlevingskansen vergroot en wordt de kwaliteit van leven van de kinderen op lange termijn steeds beter. Toch is de overlevingskans van ernstig te vroeg geboren neonaten (24 tot 30 weken zwangerschap) nog klein waardoor de NICU een emotioneel zware omgeving voor zowel ouders als medische professionals is.

Voor ouders kan het hebben van een ernstig ziek kind grote gevolgen hebben op psychosociaal, sociaal en economisch gebied. Ouders met ernstig zieke kinderen ervaren namelijk sneller psychosociale stress en angst. Ook medische professionals op de NICU ervaaren, meer nog dan op andere afdelingen, de psychologische en fysieke stress van het werken op de NICU. Helaas heeft dit soms als gevolg dat personeel extreme vermoeidheid ervaart en vaker ziek is dan personeel op andere afdelingen.

De fysieke ruimte kan een belangrijke rol spelen in de emotionele, psychische en fysieke stress voor de neonaten, hun ouders en de medische professionals. Wanneer een NICU weinig mogelijkheden heeft om de ouders privacy of rust te bieden kan dit hun welzijn sterk beïnvloeden. Voor ouders is rust belangrijk om te kunnen verwerken wat er (vaak in sneltreinvaart) gebeurt. De meeste ouders zijn namelijk niet voorbereid op een eventuele vroeggeboorte of ernstige ziekte van hun kind. Voor de pasgeborenen is het van belang dat de ruimte rustig en donker is. Daarentegen is licht juist belangrijk voor verantwoord werken van de medische professionals. Al met al een zeer uitdagende omgeving als huisvestingsvraagstuk.



Figuur 1 **Overzicht van onderzoeksfasen**



Opmerking: de odds-ratio geeft de waarschijnlijkheid weer dat een niveau van een attribuut wordt gekozen. Een odds-ratio kleiner dan 1,0 geeft aan dat een niveau juist niet de voorkeur verdient. Een odds-ratio groter dan 1,0 geeft aan dat een niveau de voorkeur verdient.

Voorkeursalternatief

Alternatief

Figuur 2 **Hoofdeffecten (top 7), met een 95% BHI. De keuzen van voorkeur zijn rechts weergegeven, de alternatieven links.**

Figuur 3 **Resultaat van de het samenvoegen van alle voorkeuren uit Figuur 2**

Figuur 4 **Resultaat van de het samenvoegen van alle alternatieven uit Figuur 2**

Doel

Het doel van dit afstudeeronderzoek is om de invloed van de fysieke ontwerpkenmerken op het welzijn van gebruikers (ouders en medische professionals) van de NICU te onderzoeken. Er is specifiek gekeken naar fysieke ontwerpkenmerken die worden beschreven in de wetenschappelijke literatuur. Daarnaast is een relatief nieuwe methode om voorkeuren van gebruikers van een zorgomgeving te onderzoeken (preferentieonderzoek) geëvalueerd. Preferentieonderzoek wordt momenteel voornamelijk uitgevoerd met interviews en vragenlijsten. De uitkomsten die met deze methoden gegenereerd worden hebben een beperkte betrouwbaarheid doordat ze gevoelig zijn voor interpretatieverschillen, zowel voor onderzoekers als de doelgroep. Discrete keuzemodellen, in combinatie met visuele vignetten, is een methode waarbij deelnemers hun antwoorden baseren op visuele plaatjes (vignetten), bieden een mogelijkheid om uitkomsten te kwantificeren en ook grafische weer te geven. Hierdoor lijkt deze methode bijzonder geschikt voor preferentieonderzoek.

Methoden

Het preferentieonderzoek is in drie fasen uitgevoerd: (1) exploratie, (2) uitvoering en (3) analyse (zie Figuur 1). In de exploratiefase is een literatuuronderzoek uitgevoerd. De uitkomsten van het literatuuronderzoek zijn voorgelegd aan de twee expertpanels om te toetsen wat de relevantie van de bevindingen is in de praktijk. In de uitvoeringsfase zijn de uitkomsten van het literatuuronderzoek en de exertpanels gebruikt om het preferentieonderzoek uit te voeren bij de doelgroep. De uitkomsten van dit preferentieonderzoek zijn vervolgens geanalyseerd en beschreven.

Literatuurstudie

De eerste stap in de exploratiefase was een literatuurstudie. In de literatuurstudie zijn wetenschappelijke artikelen met twee hoofdonderwerpen bestudeerd: (1) invloed van ruimtelijke factoren op gebruikers en (2) welzijn van gebruikers in de NICU. De belangrijkste uitkomsten van het literatuuronderzoek zijn samengevat in onderstaande punten:

- Licht heeft een positieve invloed op ouders en personeel in de NICU (Begemann, Van den Beld, & Tenner, 1997; Van Bommel, 2006; Zeitzer et al., 2000; Choi et al., 2012; Mardaljevic, 2013);
- Licht heeft een negatieve invloed op pasgeborenen op de NICU (Freudenthal, van Stuijvenberg, & van Goudoever, 2013; Peng et al., 2013);
- Geluid, voornamelijk van de (alarmen van) pompen en monitoren, is een invloedrijke stressor voor personeel, ouders en patiënten (Altimier et al., 2005);
- Warmte wordt gezien als een invloedrijke stressor voor ouders en personeel (Raeside, 1997);
- Voor de patiënten in de NICU is een temperatuur van 25°C optimaal (Lunze & Hamer, 2012);
- Privacy voor het gezin verbetert door problemen met geluid en licht aan te pakken (Altimier et al., 2005);
- Privacy is een belangrijke positieve voorwaarde voor ouders en stimuleert huid-op-huidcontact tussen ouders en hun pasgeborenen (Cleveland, 2008);
- Een familie-setting op de NICU zorgt voor meer tevredenheid dan een zaalopstelling (Carter, Carter, & Bennett, 2008; Stevens et al., 2011; Shahheidari and Homer, 2012) en stimuleert het geven van borstvoeding (Domanico et al., 2011);

- Visuele scheiding van de patiënten wordt door medische professionals als stressvol ervaren (Shahheidari & Homer, 2012).

Expertpanels

De belangrijkste uitkomsten van het literatuuronderzoek zijn voorgelegd aan twee expertpanels (personeel uit Erasmus MC & Máxima Medisch Centrum), om te toetsen wat de relevantie van de bevindingen is in de praktijk. Voorafgaand aan het samenkomen van de expertpanels zijn er vragenlijsten naar deze expertpanels verstuurd. Deze vragenlijsten bevatten de belangrijkste bevindingen uit het literatuuronderzoek. De resultaten van de vragenlijsten zijn geanalyseerd voorafgaand aan het samenkomen van de expertpanels. Deze uitkomsten werden gebruikt als discussiekaders voor de expertpanels.

De belangrijkste conclusies van de expertpanels zijn samen te vatten in onderstaande punten:

- Warmte lijkt nauwelijks invloed te hebben op het welzijn van de medische professional;
- Geluid wordt ervaren als een sterkere stressor voor de medische professional dan dat de literatuur suggereert;
- Het stimuleren van contact tussen ouders en de patiënten is zeer belangrijk;
- Privacy van ouders is zeer belangrijk;
- Goed licht en daglicht wordt belangrijk gevonden voor zowel personeel en ouders.

Discreet keuze-experiment met vignetten

Er is gebruik gemaakt van een discreet keuze-experiment met vignetten. Een dergelijk experiment houdt in dat het keuzegedrag van mensen wordt geanalyseerd om te achterhalen welke combinatie van factoren de voorkeur heeft. Hierbij worden de deelnemers gevraagd om steeds een keuze te maken tussen twee alternatieven (voorbeeld Figuur 5).

Figuur 5 **Voorbeeld van de gepresenteerde keuzes (vignetten)**

De factoren (attributen) die te zien zijn op de vignetten komen voort uit het literatuuronderzoek en de discussies met de experts (expertpanels). Denk hierbij aan attributen zoals licht temperatuur, afbeeldingen op de muur, wel of geen gordijnen, de grootte van de ramen, etc. De 3D visualisaties zijn gemaakt met het softwarepakket Maya (Autodesk, 2015), waarmee de verschillen tussen de

keuze gemakkelijk gemodelleerd konden worden. Met twee alternatieven per keuze, twaalf vignetten in totaal en zes versies van de vragen, resulteerde dit in 2 × 4 × 12 × 6 = 576 individuele renders (digitale afbeelding uit een 3D model, zie bijv. Figuur 2). De vignetten zijn, samen met aanvullende vragen, in een online vragenlijst verwerkt voor afname bij vijf verschillende ziekenhuizen (waarvan vier in Nederland en één in België). De uitkomsten zijn tenslotte geanalyseerd met de statistische analyse pakketten SAS en SPSS.

Belangrijkste bevindingen

De belangrijkste bevindingen van het discrete keuze-experiment zijn grafisch weergegeven in Figuur 3. Figuur 2 is een samenvatting van de hoofdeffecten. Zie Figuur 41 op pagina 64 voor het volledige figuur. Factoren zoals leeftijd, geslacht, rol in het ziekenhuis en in welk ziekenhuis de vragenlijst is afgenomen, blijken de uitkomsten niet te beïnvloeden. De resultaten lijken zodoende generaliseerbaar te zijn voor ouders en medisch personeel op de NICU. Echter, ook al is de steekproef groot genoeg voor statistisch relevante uitkomsten, een aantal factoren kunnen resultaten beïnvloeden als hetzelfde onderzoek zou worden uitgevoerd met een grotere groep deelnemers. Dit geldt voornamelijk voor de factoren die een relatief kleine effectgrootte hebben (met een odds ratio <1,5).

Figuur 2 is als volgt te interpreteren: Het attribuut aan de rechterzijde van het figuur heeft de voorkeur, het alternatief aan de linkerzijde heeft juist niet de voorkeur. De grootte van de staven geeft aan hoe sterk het effect is. De weergegeven betrouwbaarheidsintervallen (BHI) geven aan waar de waarde van het balkje met 95% zekerheid is. Voorbeeld: De respondenten geven de voorkeur aan geen opklapbed in de NICU, zij hebben 2,3 keer liever geen opklapbed in de NICU. De uitkomst ligt met 95% zekerheid tussen de 1,9 en de 2,7.

Wanneer de uitkomsten van het discrete keuze-experiment worden ingevoerd in het Maya-model, dan volgen Figuur 3 (voorkeur) en Figuur 4 (alternatief). Het voorkeursvignet van ouders betreft een NICU met een familie-setting, waar ouders een eigen ruimte hebben met meer privacy. Het alternatief is een grote zaal waar de ruimte tussen de couveuses relatief groot is. De afdeling (Figuur 4) is groot en diep waardoor het een vrij donkere ruimte is. De grote ramen en het ontbreken van gordijnen in het alternatief draagt negatief bij aan de ergonomie van het personeel door het grote contrast in lichtsterkte tussen de instrumenten en het binnenvallend daglicht (zie bijv. de twee mensen voor de ramen). Het voorkeursvignet heeft elementen uit de healing environment (afbeeldingen van de natuur). Deze attributen zijn afwezig in het alternatief.

Naast keuze in vignetten zijn er ook andere vragen gesteld. Deze vragen zijn gebruikt om de voorkeuren te meten met betrekking tot privacy, geluid en flexibele werkplekken. Vooral de vragen over geluiden lieten interessante uitkomsten zien. Zo gaven ouders aan dat zij op hun gemak zijn bij de geluiden in de NICU. Ouders vonden de geluiden van de medische apparatuur, voetstappen en stemmen van anderen nauwelijks storend, terwijl het ziekenhuispersoneel deze geluiden juist zeer storend vond. Een mogelijke verklaring voor het verschil tussen de ouders en het personeel zou kunnen zijn dat de geluiden van de beademing een gevoel van veiligheid geeft aan de ouders. Voor het personeel blijken deze geluiden juist een grote stressor te zijn, wat mogelijk bijdraagt aan alarmmoeheid. Alarmmoeheid lijkt een bekend probleem te zijn in intensive-care-afdelingen en kan leiden tot het negeren van alarmsignalen door sensorische overbelasting (Cvach, 2012) .

English summary

General

A hospital is an organization and building created for and by people. The building is the shell in which the organization carries out its processes. The shell should fit the organization to meet the needs of users and additionally it should be future proof. In this study, the results of research will be discussed at the neonatal intensive care unit (NICU).

The NICU is an intensive care unit, primarily for the treatment of premature born baby's and critically ill newborns. In the Netherlands, this care is organized in ten NICU's, eight academic centres and two general hospitals. Each department where intensive care is offered, places high demands on the building. Partly this has to do with the specialistic nature of these departments, and on the other hand the high demands and needs of users (parents and medical professionals). In the NICU the smallest and youngest patients are taken care of (neonates). This means that parents are included and are closely involved in the care of their newborn child.

When parents have a child admitted in the NICU, parents are faced with a world not familiar with. In this world, the division between joy and sadness is a paper thin line. Specialists and nurses are fully committed to taking care of the little ones to give up a good start. The survival rate of severely premature babies (24 to 30 weeks gestation) is small. In 2013, 7.7% (12.921) of the 168.991 children born in the Netherlands, were born preterm (PRN, 2014, p.75). This makes the NICU an emotionally tough environment for parents and medical professionals who repeatedly deal with these critically ill neonate.

For parents a seriously ill child can have a major impact on their psychosocial, social and economic state. Parents with seriously ill children experience more psychosocial stress and anxiety. The medical professionals at the NICU experience more psychological and physical stress with fatigue and illness as a result, compared to other departments.

The physical space may play an important role in influencing the emotional, psychological and physical stress for the neonates, parents and the medical professionals. When a NICU has few opportunities to provide the parents, the family, privacy or peace, this can significantly affect their well-being. A break from their current situation is important for parents and gives them room to think about what has happened in recent days at lightning speed. Most parents are in fact not warned and prepared for the event of a premature birth. For the neonates, it is important that the room is quiet and dark. On the other hand, correct lighting is an important factor for good ergonomic working conditions for medical professionals.

Aim

The purpose of this paper is to study the influence of the physical design characteristics on the well-being of users (parents and medical professionals) in the NICU. In addition, a brief consideration of the method used is presented. This is because research on the method used for user preferences (preference research) is relatively new in a care environment. Preference research is normally carried

out with interviews and (textual) questionnaires. The results generated by these methods have limited reliability because they are sensitive for different interpretations, both by researchers and by the participants. Discrete choice models, with vignettes, offers a possibility to quantify the results and has the ability to translate the results as a spatial graphic. As a result, this method appears to be particularly suitable for preference research.

Methods

The preference study was conducted in three phases: (1) exploration, (2) execution and (3) analysis. A literature review is carried out in the exploration phase. The results of the literature review were presented to two expert panels to assess the relevance of the findings from literature in practice. In the execution phase, the results of the literature review and the exert-panels were used to set up the experiment and distributed to the target group. The results of the experiment and the questionnaire were then analysed and described.

Literature

The first step in the exploration phase is a literature study. In this study, scientific articles were studied with two main topics: (1) impact of spatial factors on users and (2) wellbeing of users in the NICU. The key findings from literature can be summarized in the following points:

- Light has a positive impact on parents and medical professionals (Begemann, Van den Beld, and Tenner, 1997; Van Bommel, 2006. Zeitzer et al., 2000; Choi et al, 2012;. Mardaljevic, 2013).
- Light has a negative impact on the neonates (Freudenthal, of Stuijvenberg, & van Goudoever, 2013; Peng et al, 2013.).
- Sound, mainly from the (alarms) pumps and monitors, is a powerful stressor for medical professionals, parents and neonates (Altimier et al., 2005).
- Heat is seen as a powerful stressor for parents and medical professionals (Raeside, 1997)
- For neonates temperature of 25 °C are required in the NICU (Lunze & Hammer, 2012).
- Privacy improves by tackling problems with noise and light (Altimier et al., 2005).
- Privacy is an important positive condition for parents and encourages skin-to-skin contact between parents and children (Cleveland, 2008).
- Family NICUs score higher in satisfaction compared with a hall arrangement (Carter, Carter, & Bennett, 2008; Stevens et al, 2011;. Shahheidari and Homer, 2012) and stimulate lactation (Domanico et al., 2011).
- Visual separation of the neonates is perceived as stressful by medical professionals (Shahheidari & Homer, 2012).

Expert panels

The results of the literature review were presented to two expert panels (Rotterdam Erasmus MC & Máxima Medisch Centrum), to assess the relevance of the findings in practice. Prior to the forming of an expert panel, questionnaires were sent to the participants of the expert panels. These questionnaires contained the main findings from the literature. The results of the questionnaires were analysed prior to the coming together of an expert panel to use as input for the expert panel. These results were therefore used to establish a discussion framework for the expert panels.

The main conclusions of the expert panels are shown in the following points:

- Heat hardly seems to affect the wellbeing of medical professionals;
- Sound is experienced as a more dominant stronger for medical professionals, than suggested by literature;
- Encouraging contact between parents and the neonates is found to be very important;
- Privacy parents found very important;
- Good light and daylight is considered important for medical professionals and parents.

Discrete choice experiment with vignettes

A discrete choice experiment with vignettes has been used. Such an experiment implies that the choice behaviour of people is analysed to find out which combination of factors is the most preferred. The participants were asked to make a choice between two alternatives, with regard to their wellbeing in the given vignettes. See for example Figure 7:

Figure 7 **Example of the presented choices (vignettes)**

The factors (attributes) appearing in the vignettes are a combination of factors from the literature review and the discussions with experts (expert panels). This includes attributes such as light temperature, pictures on the wall, curtains or not, the size of the windows, etc. The 3D visualizations were created with the software package Maya (Autodesk, 2015). This made modelling different variants rather easy. With two alternatives per choice and twelve vignettes in total and six versions,

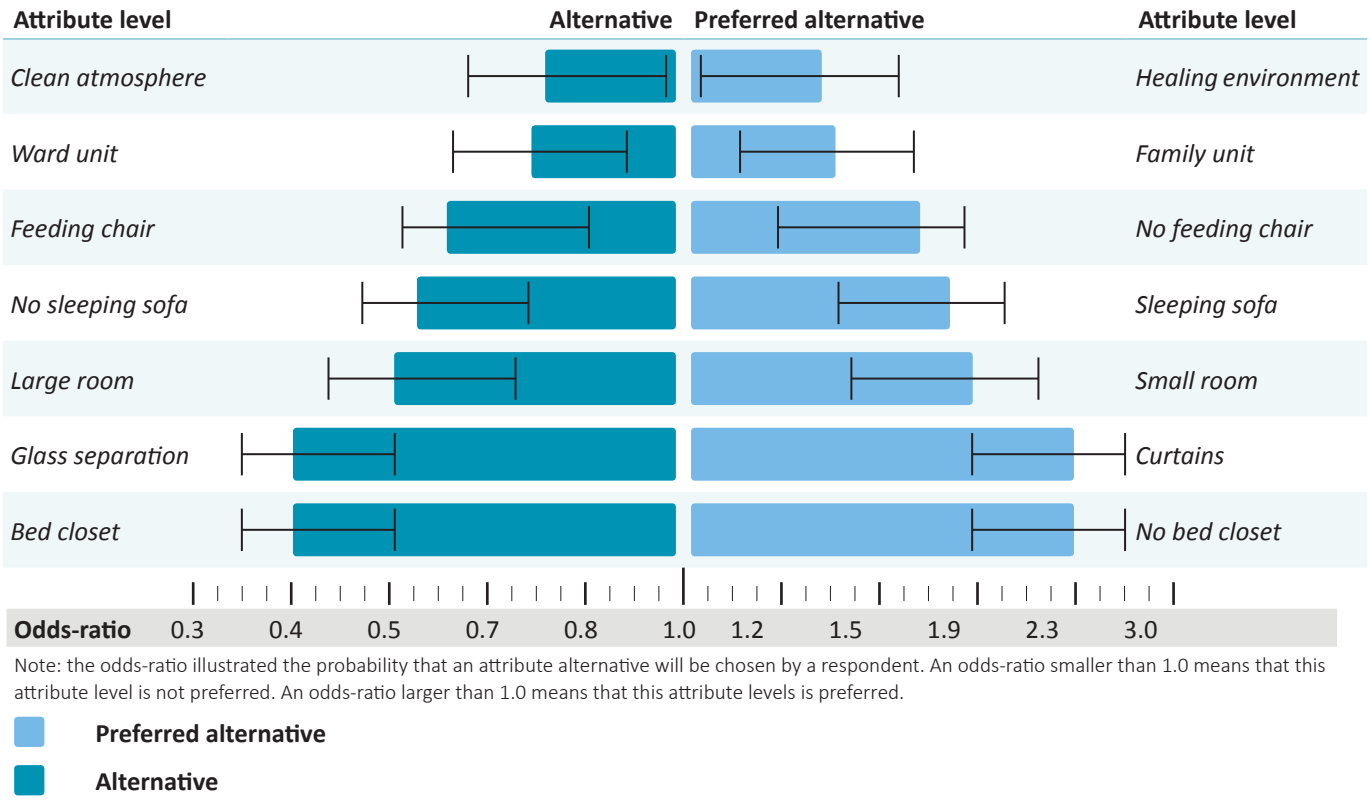


Figure 8 **Main effects (top 7), with a 95% CI. The non-preferred alternatives are depicted on the left side and the preferred alternatives are depicted on the right side.**

Figure 9 **Preferred alternative**

Figure 10 **Least preferred alternative**

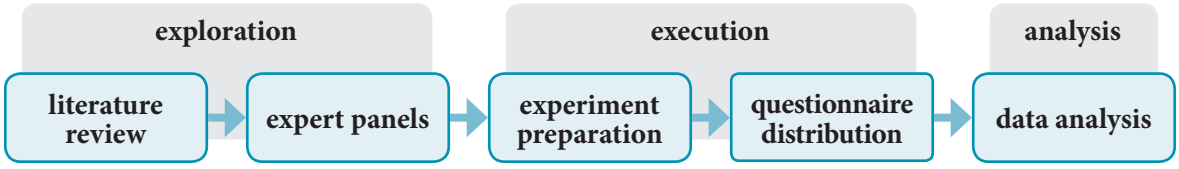


Figure 11 **Overview of research phases**

this resulted in 2 × 4 × 12 × 6 = 576 individual renders. The vignettes are, along with supplementary questions included in an online questionnaire. This questionnaire was conducted at five different hospitals (including four in the Netherlands and one in Belgium). The results are finally analysed using statistical analysis packages SAS and SPSS.

Main findings

The main findings of the discrete choice experiment are shown in Figure 8. Figure 8 is a truncated version of the main effects. See Figure 42 on page 6464 for the full figure. Factors such as age, sex, role in the hospital and which hospital the questionnaire was conducted do not appear to affect the results. The results thus appear to be generalizable to parents and medical professionals in the NICU. Though note that, even-though the sample was large enough to yield statistical relevant findings, several factors could show different preferences with a larger sample size. This especially applies to the factors that have a relative low effect size (with an odds-ratio < 1.5).

Figure 8 should be interpreted as follows: the alternative to the right-hand side of the Figure is preferred, the alternative on the left side is not preferred. The size of the bars indicates how strong the effect is. The displayed 95% confidence intervals (CI) show where the value of the bar lies with 95% certainty. Example. The respondents prefer bed closet in the NICU, they prefer with 2.3 times over 1 the absence of the bed closet. The value 2.3 lies with 95% certainty between 1.9 and 2.7.

When the results of the discrete choice experiment are inserted back in the Maya model, this results in Figure 9 (the preferred alternative) and Figure 10 (least preferred alternative). The preferred alternative is a small family NICU where parents have their own space with more privacy. The least preferred alternative is a large ward unit where the space between the incubators is relatively large. The section (Figure 10) is large and deep, making it a fairly dark room. The large windows and the absence of curtains in the least preferred alternative contributes negatively to the ergonomic working conditions due to the large contrast in brightness between the instruments and the daylight from the windows (see e.g. the two people in front of the windows). The preferred alternative has elements of the healing environment (images of nature). These elements are also absent in the alternative with the least preferred. This makes the department look stark and institutional white.

Besides choice with vignettes, alternative questions were included. These questions were used to measure the preferences in relation to privacy, sound and flexible workplaces. Especially the questions about noises showed interesting results. Parents indicated that they are relatively at ease with the sounds in the NICU. Parents were not disturbed by sounds of the medical equipment, footsteps and voices of others, while the medical professionals found these sounds very disturbing. One possible explanation for the difference between the parents and the medical professionals could be that the sounds provide a sense of security to parents. For the medical professionals, these noises proved to be a major stressor, which may contribute to alarm fatigue. Alarm fatigue appears to be a well known problem in intensive care units, and can lead to the ignoring of alarm signals by sensory overload (Cvach, 2012).

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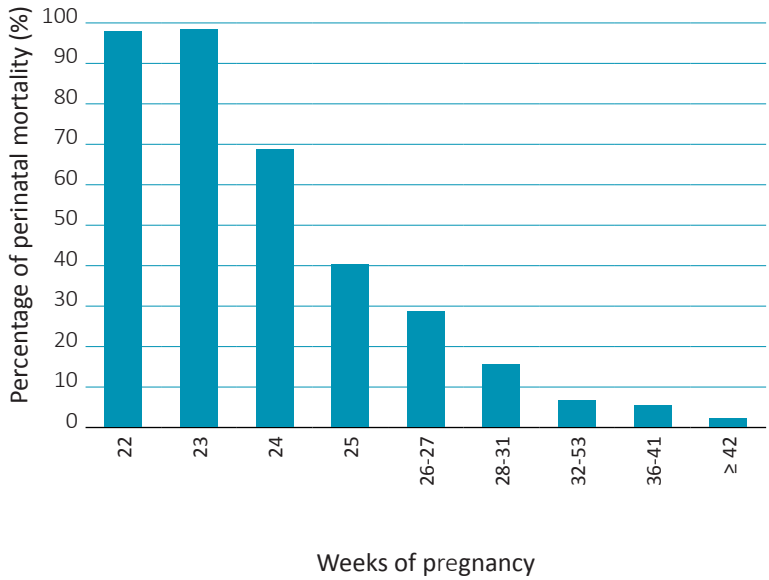


Figure 12 **Perinatal mortality before 28 days after birth, in the Netherlands (PRN, 2014, p.56).**

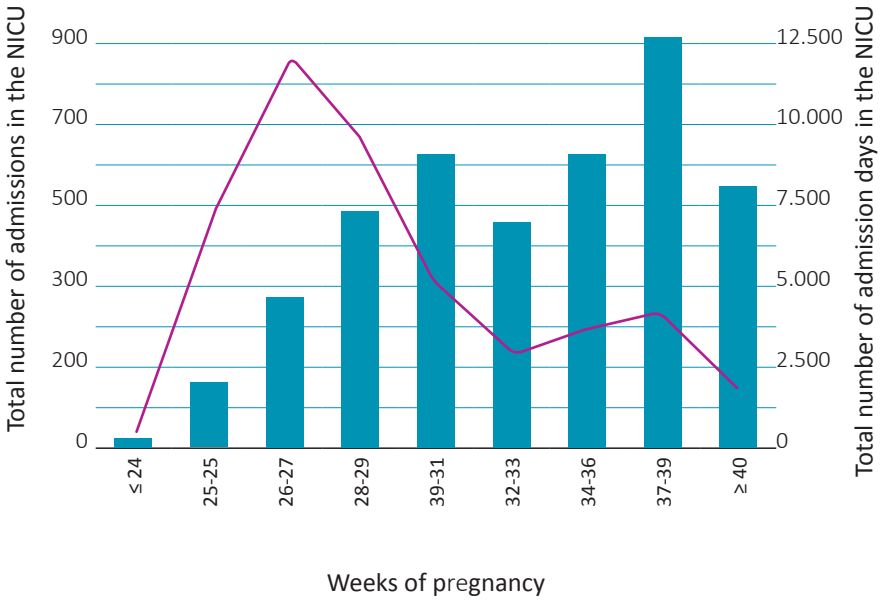


Figure 13 **Admissions based on pregnancy duration in weeks (bars); total number of admission days (line) at NICU's in the Netherlands (PRN, 2014, p.76).**

Introduction

Neonatal intensive care unit

The birth of a child is the most special moment in life. Most parents are fortunate to have their children born 'the regular way,' is they probably have imagined it to be. Others are less fortunate and are confronted with complications during pregnancy. Preterm birth (37 weeks of pregnancy) is an important determinant of adverse outcomes such as a reduced quality of life and has a large psychosocial and emotional impact on the family (Russell et al., 2014). In 2013, 7.7% all children born in the Netherlands, were born premature (PRN, 2014, p.75).

A total of 4.100 children were hospitalized in the NICU in the Netherlands in 2013 (PRN, 2014, p.75). Of the 4.100, 2.632 were preterm, 1.426 were born between 37 and 42 weeks of pregnancy and 24 were post-term, which is a pregnancy of 42 weeks or more (PRN, 2014, p.76). Figure 13 shows that children with a shorter duration of pregnancy (between 24.0 and 29.6) have a longer admission at the NICU.

Very preterm born have a small chance of survival, though chance of survival increases rapidly with every single week the baby stays in the womb (see Figure 12). Newborns in need of intensive care, mostly preterm born, are hospitalized in the neonatal intensive care unit (NICU). The NICU environment is dominated by advanced technology and can be quite overwhelming for parents, with unfamiliar sounds, machines and sights. The NICU is a very emotional place for parents, partly because of their own emotions associated with their child's condition and partly because of what they experience in the NICU. A father described one of these emotions in a newspaper article: 'I've seen how the names of children disappeared from the doors, and this was not because they were going home' (translated from: Aalten, 2016).

Living and working environment

For the time being, the NICU is a living environment for the parents of the hospitalized children and their life in the NICU is dominated by the wellbeing of their newborn. The admission of a preterm born child and the period in the NICU is associated with various negative psychological outcomes such as increased stress levels and other health outcomes for parents (Latour et al., 2011; Treyvaud, 2014) and can have long-term emotional consequences (DeMier, Hynan, Harris, & Manniello, 1996). This stressfull situation requires privacy, a place to rest and facilities to make their stay as comfortable as possible.

The NICU environment cannot be tailored custom for all parents, since the NICU is primarily an healthcare environment to perform intensive care for critically ill newborns. Consequently, the NICU is a working environment for the medical professionals. For the medical professionals, especially for nursing personnel, the NICU environment can be very stressful (Braithwaite, 2008): nurses in the NICU often experience high levels of psychological and physical stress which could lead to burnout symptoms. Moreover, ergonomic factors can influence the physical stress nurses experience (Jonker & Smits-Stassen, 2015; Karin de Vrijer, Angela Jonker, & Smits-Stassen, 2015). The ergonomic design of the workplaces and temperature regulation contributes to a stressful physical working environment when designed incorrectly.

Design of healthcare environments

Needs

The medical professionals and parents needs differ and do not always align. For instance, the medical professionals require an optimal overview to monitor the neonates and communicate with colleagues. This influences the privacy of the parents because privacy for parents partly means blocking visual and auditory connections between parents and the medical professionals. These issues are partly associated with the healthcare environment, which often is regarded as an unfriendly, starkly institutional, stressful environment which is unsuited to the emotional needs of families and healthcare personnel (Ulrich, 1991). His seminal paper stimulated research for improving such environments, resulting in what we now call the healing environment.

Evidence based design

Several hospitals in the Netherlands, such as the Erasmus MC, Maxima Medical Centre Veldhoven and VU Medical Centre, and others, are increasingly interested in the effect of the hospital environment on wellbeing of the neonates, family and medical professionals. Their interest is mainly directed towards the evidence-based design (EBD) practice, in which healthcare design is guided by research linking the physical environment of hospitals to patients and medical professionals outcomes (Hamilton, 2003). *"EBD refers to a process for creating healthcare buildings, informed by the best available evidence, with the goal of improving outcomes and of continuing to monitor the success of designs for subsequent decision-making"* (Zimring, Joseph, & Choudhary, 2004).

Short term outcomes

There are many different NICU configurations. A traditional NICU setting consists of a ward unit with incubators which are surrounded by technical equipment to monitor to physical state of the preterm infants. In the light of the need for better infection prevention in the 1960, new NICU designs, focusing on infant spacing and the nursing environment, emerged (Walsh, McCullough, & White, 2006). This resulted in private or family units.

Family units require a larger floor surface compared to a ward unit, and thus has higher operating costs and reduced overview for medical professionals. These are the most important reasons for constructing a regular ward unit in a new build hospital with a NICU function. Other reasons relate primarily to the available space when renovating or rebuilding the facility.

The family units yielded enhanced clinical outcomes for the preterm infant, compared to the traditional ward unit. Research on environmental characteristics of the family unit showed improved medical outcomes on preterm infants, such as decreasing average length of stay, decreasing hospital costs and improving family needs concerning privacy by reducing noise and light issues in family units (Altimier, Eichel, Warner, Tedeschi, & Brown, 2005).

The family units provided a more controllable environment for preterm infants, which resulted in an improved health progression compared to ward unit (Broom, Brady, Kecskes, & Kildea, 2013; Shahheidari and Homer, 2012). Consequently, this resulted in enhanced parental involvement in family units appeared to minimize hospitalization and re-hospitalisation rates and enabled parents to feel more comfortable and in private.

Parents moving from a ward unit to a family unit perceived their new environment to better fit their

needs with regard to privacy, noise, light, secure space, access to medical professionals, information and support (Carter, Carter & Bennett, 2008). This is also supported by the research of Stevens et al. (2011) who concluded that parents in family units showed higher overall satisfaction (scores) than did parents in a ward unit.

Long term outcomes

The discussed research shows that there are various short-term outcomes for parents and the medical professionals. Relatively few research has been conducted to examine the long-term outcomes of a NICU admission. The process of attachment, between parent and child, is one of the most discussed long term outcomes. Attachment is disrupted after having a preterm baby, which in the long term affects development of the baby and the relationship that is being developed between the parents and the baby (Cockcroft, 2012).

Attachment is connected to one of the NICU design factors: privacy. Privacy is influenced by the spatial configuration of the NICU and, as Flacking and Dykes (2013) illustrate, affects parent-child bonding, infant feeding and the connection with other parents. This makes the realization of NICU environments, in which parents can feel more at home and in which they can control their environment to a certain degree, an important aspect. Domanico, Davis, Coleman, & Davis (2011) found that family-centred care, breastfeeding success and, consequently, infant's medical outcome is better in a family unit, compared to a ward unit.

Other long term outcomes are discussed by DeMier et al. (1996). In their research, they discovered that parents with children in the NICU can suffer from post-traumatic stress symptoms. This was largely dependent of the severity of the complications of their child, gestational age and the length of admission.

Healing environment

The design of healing environments is increasingly done with the use of the concept of evidence-based design (Huisman et al., 2012). They refer to applying evidence-based design as *"smart investments"*. The design influences the wellbeing of the users and could result in reduced length of stay, satisfaction scores and an increased overall wellbeing.

For nearly all discussed design characteristics affecting health or wellbeing, the interpretation is not straightforward due to the unidimensional approach: the influence of design characteristics have been measured separately. It would be desirable to measure the design characteristics with an holistic approach since the design characteristics influence each other and are always present in the context of other design characteristics.

Based on research

When designing new health care facilities by applying evidence-based design this is done with rigorous research to ground the evidence-based (design)statements. Though most research executed to formulate evidence-based design statements use user satisfaction data. User satisfaction research has shown to have validity problems, specifically the external validity of the used instrument. I.e. Sitzia, (1999) looked at the evidence of reliability or validity in patient satisfaction data. They concluded that most authors had a poor understanding of these properties. When other measures are used to

formulate evidence-based design statements, it is done with interviews, questionnaires, case studies, expert opinions or a combination of these methods. These methods deliver very useful information, though the findings are mostly applicable to the specific case hindering the external validity and thus the generalization of the results. Only few experimental or quasi-experimental studies have been reported to assess the effects of environmental factors in the NICU environment on overall user wellbeing (neonate, the parents and the medical professionals).

A useful method seemded to be discrete choice experiments (DCEs) with the addition of visual presentations (vignettes) as discussed by Riccardo, van Oel & de Jong (2010). DCE alone has been used in health care since the 1990s (Ryan & Hughes, 1997) and was mainly used to evaluate the relative importance of health interventions or health services with monetary measures, time, risk and health outcomes (de Bekker-Grob, Ryan, & Gerard, 2012). The DCEs are relatively straightforward and resemble real life decisions to a large extend (de Bekker-Grob, 2009). With the addition of vignettes, the method tests actual choices behaviour (revealed preference). Applied to the wellbeing of parents and the medical professionals, the main advantage of DCEs with vignettes is that allows for joint analysis of multiple environmental factors, resulting in a holistic judgement and thus a better real life estimation of the effects.

Aim of the study

The primary aim of this study was to explore the contribution of the physical characteristics in the NICU environments to the wellbeing of parents and the medical professionals. Clinical outcomes of the newborns were not included in the study because of time-limitations in the scope a of this research.

In addition, the application of the method, discrete choice experiment with the use of visual vignettes in an hospital environment, is discussed in the context of use in practice.

Theoretical framework

The design of a NICU influences general wellbeing of parents and the medical professionals. It is therefore important to identify environmental factors and NICU design features associated with this wellbeing.

This section starts with a definition of general wellbeing, for both parents and medical professionals by operationalization of the concept of quality of life (QoL) for parents and work-related quality of life (WRQoL) for medical professionals. This is followed by an overview of the relevant findings from literature, concerning the influence of NICU physical (design) factors on the general wellbeing of parents and medical professionals.

Measuring wellbeing

Parents

Quality of life is a general and subjective evaluation of one's own perceived general wellbeing. It is a common measure in health care related research. Felce and Perry (1995) distinguished 5 dimensions in quality of life being (1) physical wellbeing, (2) material wellbeing, (3) social wellbeing, (4) emotional wellbeing, and (5) development and activity. This measure is most suitable for parents because the concept relates to their situation: medical professionals require a measure that is more suited to their situation: QoL questionnaires are not designed to measure the broader concept of quality of life that relates to the work setting.

Medical professionals

The concept work-related quality of life (WRQoL) is a variant of the QoL concept, though it is adapted to better relate to the work setting. This is done by adding work related measures affecting general wellbeing such as job satisfaction and stress at work. The concept of WRQoL measures the following six dimensions, as defined by Easton & van Laar (2013):

1. General well-being (GWB);
2. Home-work interface (HWI);
3. Job career satisfaction (JCS);
4. Control at work (CAW);
5. Working conditions (WCS);
6. Stress at work (SAW).

Design characteristics influencing wellbeing

One of the main buildings characteristics of a NICU is immediately visible from the floor plan (see Figure 14 and Figure 15). The incubators are either organized on a ward unit or on a single patient room (referred to as *"family unit"*). In general, one needs 10 m^2 per incubator on a ward unit and 15 m^2 per incubator for a family unit. Other important building characteristics include materialization of walls, floors, blinds, lighting and installations for temperature regulation and air treatment.

There is a lack of research on the influence of architectural building characteristics on the general wellbeing of parents and medical professionals. This research mainly focused on the interior design

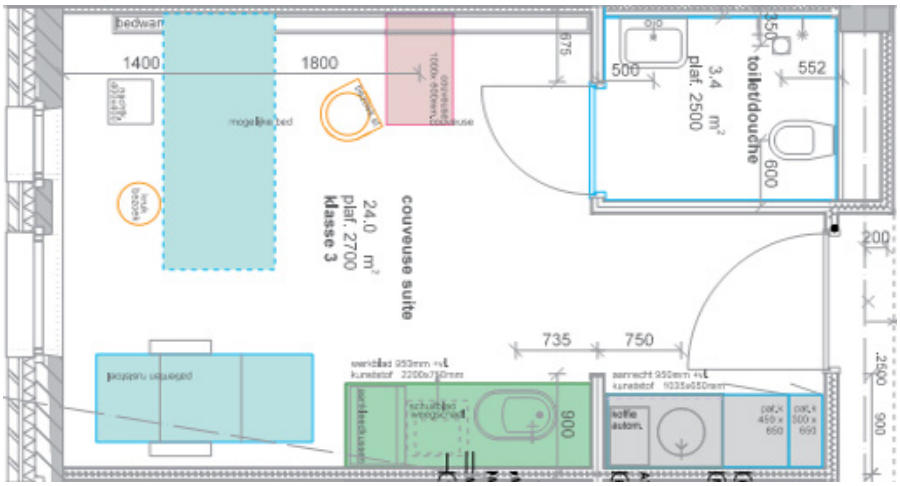


Figure 14 **NICU family unit, Jeroen Bosch Ziekenhuis**

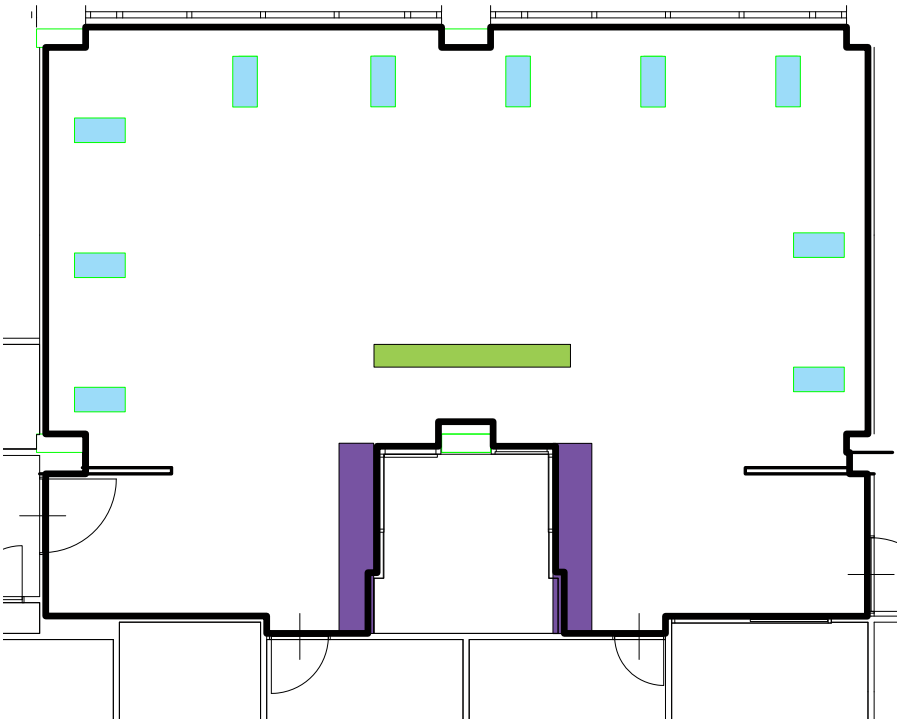


Figure 15 **NICU ward unit, Erasmus MC**

characteristics and the floor plan organization for its influence on general wellbeing.

Architectural characteristics

For parents of the newborns, privacy is one of the most important factors affected by design and layout choices. This directly reveals a discrepancy with the medical professionals who need a good overview of the NICU, directly affecting parent's privacy needs. NICU's with family units are found to provide more privacy for parents, receive higher satisfaction scores from parents and facilitate family-centred care. In contrast, the family units showed more problems with the sense of security of medical professional due to the inability to visually monitor the neonates.

Design

The design elements that facilitate contact between parents and their newborn are among the high priority needs of parents in the NICU, together with facilitating social support (Cleveland, 2008). Contact between parents and their newborn can be stimulated by using design elements that provide enhanced privacy for parents such as: separation screens, separate rooms, specific furniture, specific lighting conditions, curtains, breaking of visual lines, etc. I.e. Altimier et al. (2005) describe the physical renovation of a NICU reducing noise and light issues which improved family needs around privacy.

Family units were found to be more conductive to family-centred care, enhance the medical progress of the newborns and the breastfeeding compared to a NICU with a ward unit (Domanico et al., 2011). Also, family units were found to deliver better patient care and showed an increased parent satisfaction compared to a NICU with a ward unit (Stevens et al., 2011; Shahheidari & Homer, 2012). This is also reported by parents moving from a NICU with a ward unit to family units.

The parents found that privacy, noise, light, sense of security, access to medical professionals and information and support was increased in a family unit (Carter, Carter, & Bennett, 2008). Though this should be interpreted with care since the parents in the research of Carter, Carter, & Bennett (2008) moved from a NICU ward unit to a family unit. In this research the NICU ward unit was the old situation and the family unit was the new situation which could influence the perception of the parents due to factors as: new equipment, new furniture, overstaffed in the first period, etc.

Blocking of visual lines

A NICU ward unit has the advantage of clear visual lines between the newborns and the medical professionals: in general the control post and the incubators are located in the same ward unit (see Figure 15). When medical professionals were providing care in a family unit, they indicated worrisome about the inability to monitor the progress and status of other newborns while performing tasks at another newborn (Shahheidari & Homer, 2012). This visual seperation of incubators, as is the case in most family units, means that nurses do not have constant visual glance of all the incubators they're responsible for. According to (Jonker & Smits-Stassen, 2015) this leads to stress due to the fear of not being in control and the fear of missing something of importance. This makes the visual lines an important aspect influencing the perceived control on a NICU.

In the Maxima Medical Centre, a new system was used to alarms the nurse when a newborn needs attention (Van Daal, 2015). However, the nurses did not trust the new technology at first, resulting in increased visual checks (Jonker & Smits-Stassen, 2015). Van Pul, Mortel, Bogaart, Mohns, and

Figure 17 **Monitor measuring physical body functions (Erasmus MC, 2016)**

Figure 16 **Overview with medical pumps and other medical equipment (Erasmus MC, 2016)**

Andriessen (2015) evaluated the rate, type and management of alarms and the risks of this distributed alarm system in Maxima Medical Centre NICU, with family units. They concluded that *"safe patient monitoring was challenging in a NICU with single family rooms, but possible by employing a distributed alarm system."*

This stresses that the role of technology is becoming increasingly important, especially in an intensive care environment. Technology will play an important role in situations where visual separation between neonate and medical professionals occurs, trust in these systems will need to develop over time.

Walking distance

The two NICU configuration types as Figure 14 (family unit) and Figure 15 (ward unit) directly affect the walking distance for the incubators in Figure 14 are more dispersed compared to Figure 15. Nurses working in a NICU with family units reported that having multiple rooms was physically harder and that the layout of the unit required more walking which adding to their daily workload (Walsh et al., 2006). However, as Van Daal (2015) mentioned, the nurses took the extra walking distances for granted as they acknowledged the benefits for the neonates and the family.

Interior

Sound from various sources (mainly medical equipment) is found to be detrimental for the wellbeing of both parents and medical professionals. For the medical professionals it is paramount that the workplace ergonomically supports them

Sounds

The newborns are connected to various kinds of medical equipment (see Figure 16 and Figure 17) that monitor their vital body functions. The monitors and equipment produce relative loud sounds when functions deviate from the desired value. The sounds from the medical equipment and monitors is found to be a stressor for medical professionals in the NICU (Braithwaite, 2008; Erasmus MC, 2015). Though a potential stressor, the sounds are important to medical professionals for surveillance of the newborns. The monitors are used 24 hours per day and require immediate interventions when the alarm sounds (Chen, Oetomo, & Feijs, 2010).

Though how the alarms are perceived are different for each NICU configuration. Alarms in a family unit are less likely to be heard by medical professionals in adjacent rooms. The resulting stress or distraction from alarms in adjacent rooms is thus lower compared to adjacent alarms in a ward unit. The fact that alarms are less likely to hear in NICU family units (with closed doors) reveals an other type of stress: the fear of missing an alarm (Van Pul et. al., 2015) with potentially dreadful consequences.

For parents the noises in the NICU environment could contribute to a decrease in wellbeing of the parents due to increased anxiety and stress levels (Altimier et al., 2005) as a consequence of the repeated sounds. This is more likely to occur in a ward unit where parents, like the medical professionals, can hear the alarms of all other newborns in the NICU department.

Workplace design

The design of the workplace is actually a notion of designing good ergonomically working conditions. The ergonomics of a workplace can severely affect the wellbeing of employees (Jonker & Smits-

Stassen, 2015; Karin de Vrijer et al., 2015). This is partly due to the location of monitoring systems near the incubator as due to available working space near an incubator.

Climate

Light is found to be a major factor influencing parents and medical professionals. Good lighting conditions stimulate the medical professionals to be more alert and focused while preventing tress-related disorders. The high and needed temperature in the NICU environment is for both parents and medical professionals a source of physical stress.

Light

There is strong evidence showing that (day) light has measurable effects on the human body. One of the mean reasons is the circadian rhythm (Begemann, Van den Beld, & Tenner, 1997; Mardaljevic, 2013). The circadian rhythm is closely linked to the influence light has on the cortisol levels (Vreeburg et al., 2009). Cortisol increases blood sugar levels, with a peak in the morning and decreasing but sufficient for the rest of the day. So cortisol provides the body with more energy and cortisol prepares the body for the day (Van Bommel, 2006). Towards the evening the cortisol level decreases and the melatonin level increases, which gives a sleepy feeling (Van Bommel, 2006). When the cortisol level of persons is compared when they are exposed to a certain level of light, the cortisol levels of persons who were exposed to less daylight were higher than the cortisol levels of persons who were exposed to more light (Vreeburg et al., 2009).

A reduced cortisol level in persons can cause stress-related disorders and thus affect their general wellbeing (Vreeburg et al., 2009; Aries, Aarts, & van Hoof, 2015). This has also been tested in a hospital setting were patients had a shorter hospital stay in a room with plenty of daylight compared to patients in a room with less daylight (Choi, Beltran, and Kim, 2012). This effect was not only caused by the absence of windows. The absence of a view outside and the quantity of light played an unexpected role in these outcomes (Choi et al., 2012).

Recent medical research shows the negative effects of working in an environment where employees hardly come into contact with direct daylight (Zeitzer, Dijk, Kronauer, Brown, & Czeisler, 2000; Dijk & Archer, 2009). Medical professionals could miss a daily adjustment or restart of the internal biological clock so that the circadian rhythm is disrupted, resulting sleep disturbance (Zeitzer et al., 2000; Mardaljevic, 2013). This disruption of the circadian rhythm mainly occurs when traveling between time zones and with shift work, as is regular practice in hospitals and the NICU department. However, this seems less likely in the situation of the medical professionals where shifts are rotating and contact with more intense light is present.

The positive effect of light was described in the prevention of fatigue, specifically the effect on subjective measures as alertness and vitality and objective measures as performance, heart rate and pulse interval variance (Smolders, De Kort, and Cluitmans, 2012). Participants in the condition with higher lighting levels reported that they felt more energetic and less fatigued than those in the condition with lower lighting levels (Smolders, De Kort, and Cluitmans, 2012).

There also seems to be a strong positive relationship between the amount of daylight in the workplace and job satisfaction (Leather et al., 1998). For users, it appeared desirable that the intensity of the daylight could be arranged. A system to control the amount of incoming daylight manually was

preferred (Galasiu & Veitch, 2006). A good lighting situation could yield health benefits and employee performance improvements (Van Bommel, 2006).

Temperature

A high temperature in a NICU environment is perceived as a stressor for mothers with babies in the NICU (Raeside, 1997). Especially fluctuations in temperature are experienced as stressful for parents and neonates (Karin de Vrijer et al., 2015, p. 6). This is probably due to the temperature of the NICU environment which needs to be at least 25°C to avoid hypothermia of the newborns: they are not able to maintain their own body temperature (Lunze & Hamer, 2012). The influence of the relative high temperature could differ between mother and father due to various factors such as acclimatization and changes of the hormonal composition in mothers.

As for the parents, the physical stressful aspect of the warm NICU environment also applies to medical professionals (Raeside, 1997; Karin de Vrijer et al., 2015, p. 6). For medical professionals the high temperatures in the NICU (approximately 26°C) are especially stressful due to the contrasts in temperature with other parts of the hospital (approximately 21°C). This applies to both family units and NICU's with a ward unit. However, the fluctuations should appear more often in NICU's with family units due to separate rooms. In a ward unit, the medical professionals remain longer in an environment with the same (high) temperature.

Conceptual framework

The aforementioned factors and their relationship with wellbeing are summarized in the conceptual model (Figure 18 on page 3232). This conceptual model shows several pathways that describe the relation between important characteristics and the two user groups: parents and medical professionals.

Mothers

For mothers, privacy seems to be an important characteristic as it influences breastfeeding, which in turn influences the bond between mother and child. For the parents, the relationship between wellbeing and parents has only been discussed for the parents in general. The illustrated in the conceptual model (Figure 18) is specifically for mothers. This does not imply that certain relations for fathers do not exist, research on this topic is nearly absent for fathers. In the following parts, the research includes the opinions and views of the fathers as well.

Other design characteristics may influence the mother's wellbeing. She has just delivered a child at a preterm stage and might suffer from medical conditions herself. Whether this is the case or not, she has to recover herself. Therefore, she might be more sensitive to the indoor climate, and for instance the degree of privacy that the architectural design provides. This may negatively impacts her wellbeing.

Medical professionals

The former paragraph made clear that there is a lack of research concerning the influence of architectural and interior design characteristics of the NICU on wellbeing of medical professionals. In addition to the lack of evidence there is the question how to best support wellbeing though architectural and interior design. Existing studies typically investigated the influences of design

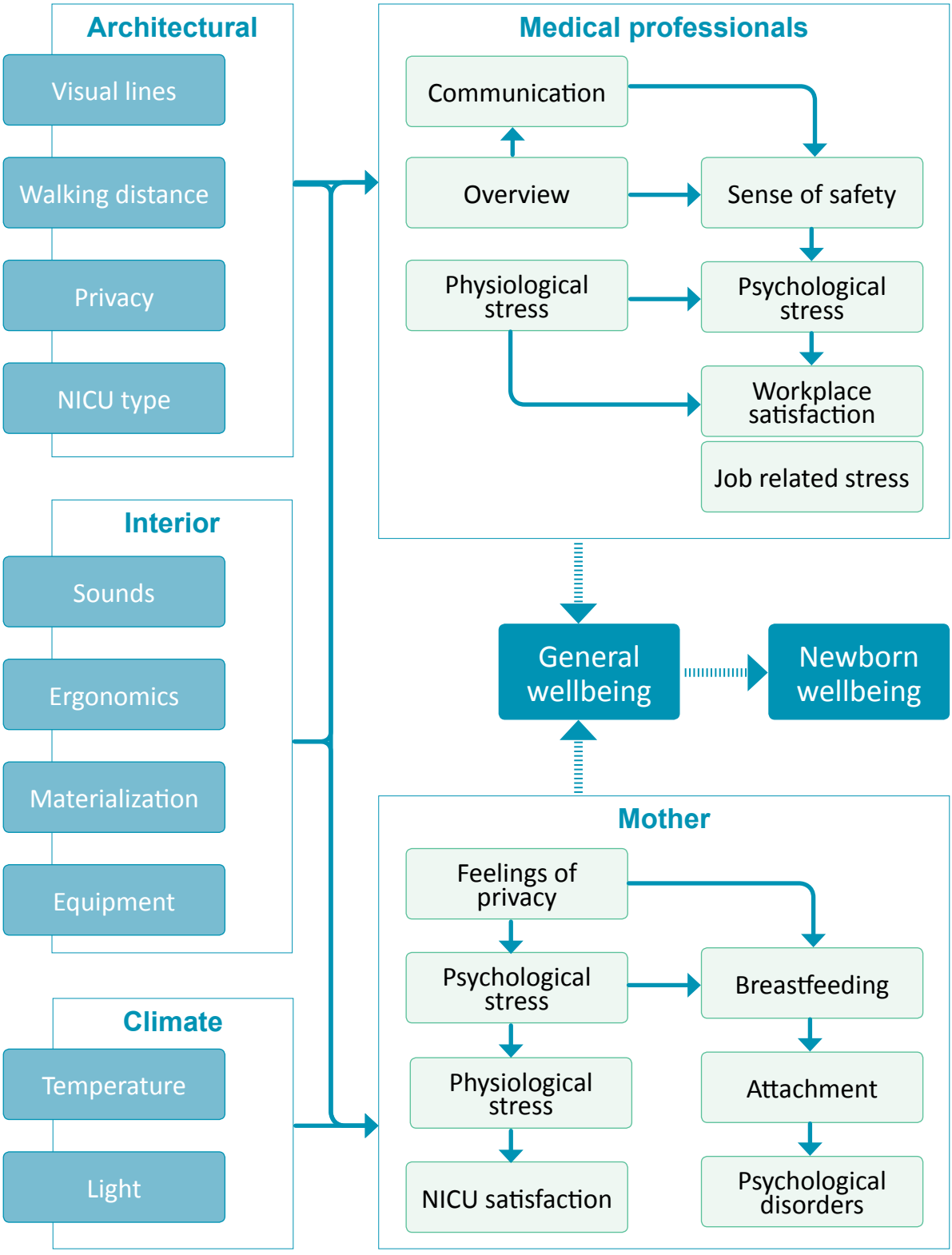


Figure 18 **Conceptual model**

characteristics independent of each other. This study investigates the influence of design factors with vignettes (images) in an holistic manner. This is corroborates with how people process visual images as opposed to textual information: words are processed sequentially and images are processed simultaneously (Jansen et al., 2009), judging the entire composition at the same instance.

As mentioned before, in medical science an evidence based approach is considered important. In (re)designing a medical department, consultants commonly use qualitative approaches such as: interviews, focus groups and site visits to include user preferences into their program of requirements. The consultancy *pieterse terwel grevink* was particularly interested in the application of discrete choice experiments (DCE) in combination with the 3D design software to create the user space (resulting in vignettes). This method has previously been used to develop a visual questionnaire to assess user preferences (see i.e.: Van den Berkhof, 2008; Kroon, 2011; Lootens, 2014) and there are suggestions that DCE's are better at describing choices more preveiling methods such as the contingent valuation method using a referendum approach (Mogas, Riera, & Bennett, 2006; Van Oel, & van den Berkhof, 2013).

The DCE approach, with the uses of vignettes, was considered especially valuable since the approach is holistic: the influence of one attribute (environmental design characteristic) is tested in the presence of all the other attributes. This implies that the method includes the potential influence of the other attributes in assessing the effects, thus resembling an effect which is more likely the represent reality. As Babin et al., 2003 and Babin, Chebat, and Michon (2004) note: the assumption that environmental influences can be studied in isolation does not seem valid.

Because of the expected utility of the method, a research question from practice concerning the usability of such an approach in practice was included as well.

Research question

What is the relative importance of the architectural, interior and climate design features for parents and medical professionals with regard to their impact on the wellbeing of parents and medical professionals in a NICU environment? More particular, the following research objectives were addressed:

1. What is the relative importance of architectural, interior and climate design features for medical professionals and their impact on the wellbeing of medical professionals in the NICU environment?
2. What is the relative importance of architectural, interior and climate design features for parents and their impact on the wellbeing of parents in the NICU environment?
3. What design feature has the largest effect on the wellbeing of parents and medical professionals in the NICU environment?
4. What are the effects of architectural, interior and climate design features on the job satisfaction of medical professionals?
5. To what extent is discrete choice modelling an appropriate method to measure the relative influence of design features on the wellbeing of parents and medical professionals in a care environment?

Table 1 **General population characteristics**

	Sample	Medical professionals	Parents
Female, % (N)	90.1 (146)	92.6 (87)	87.5 (49)
18-24	4.9 (8)	6.4 (6)	3.6 (2)
25-34	38.3 (62)	33.0 (31)	55.4 (31)
35-44	22.8 (37)	18.1 (17)	26.8 (15)
45-54	18.5 (30)	27.7 (26)	1.8 (1)
55-64	5.6 (9)	7.4 (7)	0.0 (0)
Male, % (N)	9.9 (16)	7.4 (7)	12.5 (7)
18-24	0.0 (0)	0.0 (0)	0.0 (0)
25-34	3.7 (6)	2.1 (2)	7.1 (4)
35-44	1.9 (3)	0.0 (0)	5.4 (3)
45-54	1.9 (3)	3.2 (3)	0.0 (0)
55-64	2.5 (4)	2.1 (2)	0.0 (0)
Age, Mean (SD)	37.1 (0.8)	39.6 (1.1)***	32.8 (0.7)***
Country, % (N)	100 (151)	62.3 (94)	37.7 (57)
Belgium	21.2 (32)	19.9 (30)	1.3 (2)
The Netherlands	78.8 (119)	42.4 (64)	36.4 (55)
Educational level, % (N)			
Low	-	-	7.3 (4)
Middle	-	-	30.9 (17)
High	-	-	61.8 (34)
Wellbeing scores, Mean (SD)			
EQ-5D SC	-	-	5.6 (0.1)
EQ-5D VAS	82.2 (1.2)	84.3 (1.3)**	78.4 (2.2)**
WRQoL GWB-6	22.5 (0.4)	23.1 (0.4)**	21.4 (0.8)**
WRQoL	-	79.1 (0.9)	-

Significant difference between medical professionals and parents; statistics: *p < .05, **p < .01, ***p < .001.

Methodology

Population description

Participants were recruited in a total of five medical centres, one in Belgium and four in the Netherlands, with a NICU. The Belgian respondents were recruited in the Antwerp University Hospital (UZA), the Ziekenhuis Oost-Limburg (ZOL) and the Ziekenhuis Netwerk Antwerpen (ZNA Middelheim). In the Netherlands, respondents were recruited in the *Máxima Medical Centre* Veldhoven (MMC Veldhoven), Erasmus MC, Radboud University Medical Center (Radboudumc), and the VU University Medical Center Amsterdam (VUmc).

Of all participants, 90.1% was female (X^2 (1)=106.2, p<.001), (Table 1). The parents were on average 6.7 (*SE*=1.6) years younger than the medical professionals (F(1,148)=18.74, p<.001), who were on average 39.6 (*SD*=10.9) years old. Only 21.2% of the participants were from Belgium, of which the larger part was represented by medical professionals (*N*=30), only two parents from Belgium joined the research.

Parents with previous NICU-experience were recruited through flyers distributed by medical professionals. Parents were also recruited through the Dutch association for parents with premature infants (Vereniging Ouders van Couveuse Kinderen) and the forum of zwangerschapspagina.nl. This resulted in a total sample of 49 participating parents.

Medical professionals were recruited by the head of the department, department managers or colleagues. This resulted in a total sample of 97 participating medical professionals.

Discrete choice experiment

The method in general

Discrete choice experiments are part of choice analyses, which aims to explain variability in a behavioural response in a given population (Hensher, Rose, & Greene, 2005). DCE stem from random utility theory (economics). In economic theorizing, utility generally represents the satisfaction experienced by the consumer of a good. In this research, utility is defined in terms of an individual's wellbeing in a hospital setting. Thus utility represents an individuals perceived wellbeing as a latent continuous variable.

The model

An individual is asked to make a choice (Y_i) out of a number of alternatives (J) to determine which alternative best suits his or her wellbeing. The alternatives have a predefined set of attributes with two or more fixed levels. These attributes are thought to have an influence on the individual's wellbeing (i.e. light; with daylight and artificial light as levels). In this study, a questionnaire was developed using several questions, each consisting of 2 vignettes visualizing the NICU from different perspectives. With each vignette question, the respondents were asked to choose the vignette that best represented his or her wellbeing. U_{ij} then represents the maximum wellbeing (utility) of the chosen alternative (j^{th}) of the i^{th} individual:

$$U_{ij} = \eta_{ij} + \varepsilon_{ij} \qquad [1.0]$$

with ε_{ij} being the residuals, or unexplained variance, with a mean of 0 and a variance of 1:

$$\varepsilon_{ij} \sim EV_1(0,1) \quad [1.1]$$

The probability that an individual *i* will choose alternative *j* is given by:

$$\pi_{ij} = \Pr\left[Y_1 = j\right] = \Pr \quad [1.2]$$

Assumptions

The discrete choice model relies on several assumptions. A discussion about the attributes is not included in this work, refer to Hensher et al. (2005, pp. 62 - 87) for an extensive discussion on the discrete choice model and Kuhfeld (2010) for an explanation with various examples. The mentioned assumptions by Hensher et al. (2005, pp. 62 - 87) are summarized below:

- Alternatives are mutually exclusive;
- Respondents have full knowledge of the factors that influence their decision;
- An individual acts rationally in choosing an alternative;
- The unobserved utility associated with each individual is located on some (unknown) distribution and randomly allocated to each sampled individual;
- Assumption of random error: each alternative has an unobserved component represented by an unknown distribution and is given by: ε_i;
- Assumption of constant variance: errors in measurement (unobserved components ε_i) are independent;
- Assumption of independence of irrelevant alternatives (IIA): everything that is not relevant to the respondents will be chosen at random.

Constructing the discrete choice experiment

The discrete choice experiment has been designed using seven steps in total:

- **Step 1 –** Exploration of literature (see *"Introduction"* on page 21);
- **Step 2 –** Expert panels have been used to define attributes and their levels by discussing with experts about which factors in the NICU might influence parent and the wellbeing of medical professionals (see *"Step 2 – Expert panels"* on page 36)37;
- **Step 3 –** Analysing the results of the expert panels;
- **Step 4 –** Defining the attributes and their levels, see page 16;
- **Step 5 –** Generating the model, see page 16.;
- **Step 6 –** Generating the 3D presentation with the attributes as defined in step 4 and based on the model from step 5, see page 20;
- **Step 7 –** Creating an online questionnaire, see page 24.

Step 2 – Expert panels

A longlist of physical NICU design characteristics, as identified in the literature review, has been used as input for two expert panels. One was held in the *Máxima Medical Centre*, the other in the Erasmus

MC. The physical NICU design characteristics (referred to as attributes hereafter) that were new presented and obtained agreement of other experts for their impact on the wellbeing of parents or professionals were added to the longlist. The goal of the expert panels was to (1) explore additional and potentially missed attributes; (2) to create a shortlist of the most important attributes to be used in the vignette model and (3) to discuss the attributes that were difficult or impossible to include in the intended model. An overview of the longlist; the shortlist; the newly added attributes and the attributes as included in the questionnaire can be found in the appendixsee *"Longlist and shortlist"* on page 92. 96

A total of five (three female, two male) experts from the *Máxima Medical Centre* in Veldhoven and four (three female, one male) from the *Erasmus Medical Centre* in Rotterdam were included in the expert panels. The *Máxima Medical Centre* expert panel was comprised of two neonatologists, one research nurse and two NICU nurses. The *Erasmus Medical Centre* expert panel was comprised of one research nurse and two NICU nurse managers and one consultant from *pieterse terwel grevink* who was at the moment involved with the redevelopment of the Sophia Children's Hospital, the *Erasmus Medical Centre*' children's hospital.

Nominal group method

The expert panels were structured in such a way that the quantity of ideas was stimulated by using nominal groups and the feasibility of the ideas was increased by employing interactive groups as described by Rietzschel, Nijstad, and Stroebe (2006). A nominal group means that individuals write down their ideas individually prior to a group discussion. In alignment with this method the expert panel first completed a small survey (task 1), prior to the actual session. The session had three tasks in which the experts discussed their ideas in pairs (task 2), followed by a feedback moment in which the results of the survey were summarized (task 3). The session ended with a group brainstorm (task 4) which was directed towards consensus between the participating experts.

By employing an online pre-survey (task 1), the experts were asked to rank attributes in the NICU environment, according to their perceived influence on the wellbeing of parents and medical professionals (see appendix *"Expertpanel questionnaire"* on page 949696). The included attributes were either derived from literature or deemed plausible by the researchers to influence the wellbeing of parents and medical professionals in the NICU.

The experts were asked to score to what extent wellbeing of parents and medical professionals in the NICU was influenced by the attributes. These could be scored on a 6-point Likert scale (from very negative to very positive, excluding a neutral answer). Only the attributes that scored positive, very positive, negative and very negative were included in the next round.

Participants were then asked to rank the resulting attributes: which factor is most important for the wellbeing of parents and medical professionals in the NICU? Rank the factors according to their relevance for their wellbeing by placing the important factors on top and the least important at the bottom.

Group brainstorm (task 2)

Approximately one week after the pre-survey, the actual expert panel meetings were conducted.

Table 2 **Expert panel results (n=11), with median (*Mdn*), first and third quartiles and ranks with first and third quartiles**

	Parents						Medical professionals					
	Importance			Ranking			Importance			Ranking		
Factor	***Mdn*#**	***Q1***	***Q3***	***Rk***	***Q1***	***Q3***	***Mdn*#**	***Q1***	***Q3***	***Rk***	***Q1***	***Q3***
Healing environment												
Quiet environment	2.0	2.0	2.0	1.0	1.0	1.0	2.0	1.0	2.0	1.0	1.0	1.5
Daylight	1.0*	1.0	2.0	2.5	2.0	3.0	2.0*	1.0	2.0	2.0	2.0	3.0
View on nature	1.0	0.0	1.0	6.5*	6.0	7.3	1.0	1.0	1.0	5.5*	4.0	6.0
View outside	1.0	0.0	1.0	5.0	4.0	6.0	1.0	0.0	2.0	5.0	5.0	6.5
Clean air	1.0	1.0	2.0	3.0	2.8	4.0	2.0	1.0	2.0	3.0	2.0	3.0
Plants	0.0	0.0	1.0	5.0	4.8	6.3	0.0	0.0	1.0	6.5	5.8	7.3
Presence of art	0.0	0.0	0.0	5.5	5.0	0.0	0.0	0.0	0.0	8.0	8.0	8.0
Temperature	0.0	0.0	0.0	5.0	4.3	5.8	0.0	0.0	1.0	4.0	4.0	6.5
Sounds	-1.0	-2.0	0.0	3.0*	2.0	3.5	-1.0	-1.0	0.0	5.0*	3.0	6.5
Ergonomics												
Stimulating contact parents and children	2.0	1.0	2.0	1.0**	1.0	1.0	1.0	1.0	2.0	2.5**	1.0	3.0
Acoustical privacy	2.0	1.0	2.0	3.0	2.0	3.0	1.0	0.0	1.0	3.0	1.0	4.0
Visual privacy	1.0	1.0	2.0	2.0	2.0	3.0	1.0	0.0	1.0	3.0	2.0	4.5
Short walking distance	1.0	0.0	1.0	4.0	4.0	5.0	1.0	1.0	1.0	4.5	2.3	5.0
Medical equipment	0.0	-1.0	0.0	4.0	4.0	4.0	0.0	0.0	1.0	2.5	1.3	3.8
Overview	0.0***	0.0	1.0	5.0**	4.0	5.0	1.0***	1.0	2.0	2.0**	1.0	3.3
Presence of facilities												
pantry	1.0	1.0	1.0	2.0*	2.0	3.5	1.0	0.0	1.0	4.0*	3.0	6.0
kitchen	1.0	1.0	2.0	4.0	3.0	5.5	1.0	1.0	1.0	4.0	2.0	5.0
play area	1.0	1.0	1.0	4.0*	3.5	5.5	0.0	0.0	1.0	6.0*	5.0	7.0
lockable family room	1.0	1.0	1.0	2.0	1.0	5.5	1.0	1.0	1.0	4.0	2.0	6.0
open family room	1.0	0.0	1.0	2.0*	1.0	3.0	1.0	0.0	1.0	4.0*	4.0	5.0
TV/computer area	0.0	0.0	2.0	5.0	3.5	6.0	0.0	0.0	1.0	6.0	5.0	7.0
lockable staffroom	0.0*	0.0	1.0	4.0	1.5	5.5	2.0*	1.0	2.0	1.0	1.0	3.0
open staffroom	0.0	-1.0	1.0	6.0	3.0	6.0	1.0	0.0	1.0	3.0	2.0	7.0
Patient room elements												
Sleep possibility parents	2.0	1.0	2.0	2.0	2.0	2.0	1.0	1.0	2.0	2.5	1.8	3.3
Family unit	2.0	1.0	2.0	6.0*	4.0	7.0	1.0	1.0	2.0	3.0*	1.0	5.0
Use of colour	1.0	1.0	2.0	3.0	3.0	5.0	1.0	0.0	2.0	3.5	2.3	4.8
Use of materials	1.0	0.0	1.0	5.0	4.0	6.0	1.0	0.0	2.0	5.0	2.5	9.5
Way finding	1.0	1.0	2.0	7.0	6.0	8.0	1.0	0.0	1.0	7.0	7.0	7.0
Daylight	1.0*	1.0	2.0	8.0	6.5	9.0	1.0*	0.0	1.0	9.0	8.0	10.0
Incubator partitions	1.0**	0.0	1.0	10.0	9.5	11.0	-1.0**	-2.0	0.0	10.0	8.0	11.0
Personal arrangement of patient rooms	1.0	1.0	2.0	1.0	1.0	3.0	2.0	1.0	2.0	2.0	1.0	3.3
Sleep possibility father	1.0	1.0	2.0	7.5	4.0	9.3	1.0	0.0	2.0	5.0	3.0	9.0
Domestic arrangement	1.0	1.0	1.0	7.0	5.0	9.0	1.0	0.0	1.0	5.0	4.0	6.0
Artificial lighting	0.0**	0.0	0.0	7.0	6.0	9.0	1.0**	1.0	1.0	7.0	5.8	8.0
NICU ward unit	-1.0*	-2.0	-1.0	5.0	5.0	5.0	0.0*	-1.0	0.0	9.0	5.5	10.5

Note 1: Difference between parents and medical professionals. Wilcoxon signed-ranks (exact sig.): *p < .05. **p < .01. ***p < .001.
Note 2: Rank scores (Rk) in blue show ranks < 4.0.
Importance of attributes: Very negative (-2). Negative (-1). Neutral (0). Positive (1) Very positive (2).

The sessions started with an introduction by the researcher about the topic, his motivation and the content of the session.

The questions the experts discussed were: (1) *"which attributes in the NICU environment affect your wellbeing at work"* and (2) *"which attributes in the NICU environment affect the wellbeing of the parents during the admission of their child?"* For both questions, the experts were asked to provide their personal opinion, based on daily practice. The aim here was to name as much attributes as possible, with plausibility being of less importance. Small groups of two or three persons worked together, depending on the total experts in the larger expert panel.

After task 2, the researcher presented the conclusion of the results derived from the pre-survey. In doing so, attributes were presented by the researcher as ranked by the experts. Here, the aim was to obtain feedback whether or not the individually attributes were ranked in the same order by the brainstorm groups as they were in the pre-survey. One of the experts took notes during the discussions of the dissimilarities between the pre-survey and the brainstorm in small groups.

In the next step, all subgroup results were discussed in the larger expert panel. Here, the aim of the group brainstorm was to discuss the defined attributes and obtain consensus.

Table 3 **Attributes and their levels**

Nr.	Attribute	Code	Level 1	Level 2	Level 3
1	Type of NICU	Type	Family	Ward unit	-
2	Size	Size	Small (17 m^2)* Small (100 m^2)**	Large (24 m^2)* Large(141 m^2)**	
3	Privacy	Priv	Curtains	Glass & Curtains	-
4	Illumination	Lumi	4500k	7500k	-
5	Windows	Wind	Medium	Large	-
6	Atmosphere A	AtmA	Home	Clean	-
7	Atmosphere B	AtmB	Healing environment	Clean	-
8	Furniture A	FurA	Sleeping sofa	No sofa	-
9	Furniture B	FurB	Bed-closet	No closet	-
10	Furniture C	FurC	Normal chair	Feeding chair	-
11	NICU door	Door	Semi transparent	Open	-
12	Working area	Area	Blue zone	Red zone	Green zone

*Family unit, with 41% differences in size. ** Ward unit with 10 beds, with 41% differences in size.

Table 4 **Short description of the macros used in generating a choice design**

Macro	Short description
%MktRuns	This macro suggests design sizes in which perfect balance and orthogonality can occur, or at least sizes in which violations of orthogonality and balance are minimized.
%MktEx	This macro generates designs for linear models and has been used to generate candidate sets for the discrete choice model.
%ChoicEff	Used to analyse the efficiency of the design
%MktKey	Provided a key table describing how the design is processed
%MktRoll	Rolls (transposes) the dataset from a linear arrangement into the choice design
%MktMerge	Merges keyed and rolled data.
%MktBlock	Splits the generated design in multiple blocks
%MktLab	Assigns the variable names to variables

Note: based on the work of Kuhfeld (2010)

Step 3 – Expert panels results

The results from the two expert panels are summarized in Table 2. Table 2 shows the appreciation of the experts for certain attributes and how important they find these attributes expressed by a rank. The experts have given their appreciation for medical professionals and parents. Thus, these results are not representative for parents, but express the opinion (based on experience) from the experts about parents.

Appreciation scores (median) in green represent a positive appreciation for the attribute, appreciation scores in red represent a negative appreciation for the attribute. The spread of the median is indicated by using the first and third quartile. The rank scores (Rk) show the rank of the attribute relative to the other attributes with the same theme (i.e.: *"healing environment"*). The scores in blue show the top 3 (<4.0).

Healing environment

The experts valued 'a quiet environment' for the wellbeing of medical professionals (*Mdn*=2, IQR[1,2]) and parents (*Mdn*=2, IQR[2,2]) as having very positive effect. This is also shown in the ranks given to the attribute: 'a quiet environment' was ranked as being the most important for both parents and medical professionals. This also resulted from the expert panel discussion, in which a quiet environment was mentioned as one of the most important factors for the medical professionals when working in a NICU.

'Daylight' was ranked a being the second most important for both parents (*Mdn*=2.5, IQR[2,3]) and medical professionals (*Mdn*=2.0, IQR[2,3]). The experts valued the effect of daylight as positive for parents (*Mdn*=1, IQR[1,2]) and very positive for medical professionals (*Mdn*=2, IQR[1,2]), with a more positive effect for medical professionals compared to parents (Z=-2.3, *p*=.048). The expert panels mentioned that, as it is their working area, a good lighting condition is highly appreciated.

'Sounds in the NICU environment' were appreciated as having a negative influence on the wellbeing of medical professionals (*Mdn*=-1, IQR[-1,0]) and parents (*Mdn*=-1, IQR[-2,0]). The rank of the attribute 'sounds' showed a third ranking of importance for parents (*Mdn*=3, IQR[2,3.5]) and a fifth ranking for medical professionals (*Mdn*=5, IQR[3,6.5], Z=-2.0, *p*=.022).

Ergonomics

During the discussions, 'stimulating the contact between parents and children' was deemed as very important by the experts. This translates in the results with a first rank (*Mdn*=1, IQR[1,1]) and a very positive effect for parents' wellbeing (*Mdn*=2, IQR[1,2]). For the medical professionals, this aspect was ranked lower (Z=-2.9, *p*=.005). 'Acoustical' (*Mdn*=2, IQR[1,2]) and 'visual privacy' (*Mdn*=1, IQR[1,2]) were found important for parents and were ranked as being second and third most important.

For the wellbeing of medical professionals, the most important aspect appeared to be 'overview in the NICU' (*Mdn*=2, IQR[1,2]). Also interesting is the difference in overview between parents and medical professionals (Z=-2.9, *p*=.004). The expert panels rated 'overview' as most important factor for medical professionals (*Mdn*=2, IQR[1,3.3]) and as least important factor for parents (*Mdn*=5, IQR[4,5]). Also, 'overview' is assumed to have a more positive effect on medical professionals compared to parents (Z=-3.3, *p*=.001).

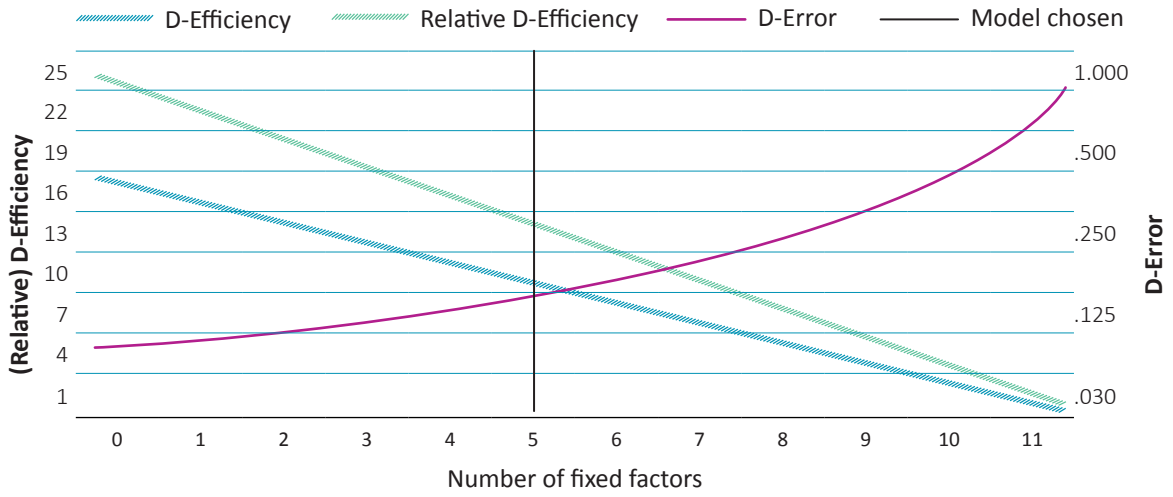


Figure 19 **D-Efficiency and Relative D-Efficiency of the statistical model (choice set design) with the D-Error**

Table 5 **SAS output (using the %ChoicEff macro)**

Variables	Value
Fixed factors	5
Design	17
Choice Sets	72
Alternatives	2
Parameters	13
Maximum Parameters	72
D-Efficiency	9.8134
Relative D-Eff	13.6297
Max Relative D-eff	58.3333
D-Error	0.1019
1 / Choice Sets	0.0139

Table 6 **Variance, degrees of freedom and standard errors of the final choice design**

n	Variable Name	Label	Variance	df	SE
1	Type of NICU	Ward unit or Family unit	0.09014	1	0.30024
2	Size	Small or large	0.09812	1	0.31324
3	Privacy	Curtains or Curtains with glass separation	0.10615	1	0.32580
4	Illumination	Illumination 4500k or 7500k	0.09922	1	0.31500
5	Windows	Medium or large surface	0.10671	1	0.32667
6	Atmosphere A	Clean appearance or Home (lamps and window curtains)	0.10913	1	0.33035
7	Atmosphere B	Clean appearance or Healing (green)	0.10947	1	0.33087
8	Furniture A	Yes or no sleeping sofa	0.08747	1	0.29574
9	Furniture B	Yes or no sleeping closet	0.10595	1	0.32551
10	Furniture C	Normal chair or feeding chair	0.09847	1	0.31379
11	NICU door	Semi or full transparent door	0.11166	1	0.33416
12	Working area	Red or blue working zone	0.11641	1	0.34119
13	Working area	Green working zone, no red or blue working zone	0.12513	1	0.35373

Presence of facilities

'The presence of a lockable staffroom' was expected to have a very positive effect on the medical professionals (*Mdn*=2, IQR[1,2]) and was ranked as being most important (*Mdn*=1, IQR[1,3]). In the discussion, the experts mentioned that a room where discussions where sensitive information will be discussed is necessary. They also recognized the possible importance for open staff rooms which makes the medical professionals more accessible to parents.

Patient room elements

The experts valued the 'presence of a sleeping possibility for parents' with having a very positive effect on the wellbeing of parents (*Mdn*=2, IQR[1,2]) and ranked them as the second most important attribute. According to the experts, a 'sleeping possibility' would also have a positive effect on the medical professionals (*Mdn*=1, IQR[1,2]).

A 'NICU with family units' was also valued as having a very positive effect on the wellbeing of parents (*Mdn*=2, IQR[1,2]). Also 'NICU family units' were expected to have a positive effect on the medical professionals (*Mdn*=1, IQR[1,2]). The experts ranked the 'NICU with family units' lower for parents than for medical professionals (Z=-2.1, *p*=.040). In contrast to a 'NICU with a ward unit', which is valued neutral (*Mdn*=0, IQR[-1,0]) for the wellbeing of medical professionals and negative (*Mdn*=-1, IQR[-2,-1]) for the wellbeing of parents (Z=-2.56, *p*=.016).

Step 4 – Attributes and attribute levels

Identifying the attributes relevant to the stated research question, and then assigning levels for each of these attributes (Ryan, Bate, Eastmond, & Ludbrook, 2001), is a crucial step in the DCE. The attributes for the study were determined by reviewing the literature on NICU design, family centred care and environmental psychology and the results of the expert panels, resulting in the attributes given in Table 3.

Step 5 – Model generation, with SAS

A total of twelve attributes (eleven with two levels and one with three levels) $(2\ 2\ 2\ 2\ 2\ 2\ 2\ 2\ 2\ 2\ 3)^2 = (2^{11} \cdot 3^1)^2 = 4{,}206{,}601$ possible combinations when a full factorial model will be used. To eliminate order effects, distribute the large amount of possible combinations across respondents and to eliminate bias introduced by the used statistical design, the use of an advanced software package is necessary.

SAS (2011) was used to create the statistical choice design for presenting the attributes (Table 3) to the respondents. Working with SAS (2011) also allowed creating multiple designs, including the twelve attributes but with different parameter characteristics. The design needed to satisfy a relative high design efficiency, meaning close to orthogonality with a relative high D-Efficiency (given the set of attributes). Prevention of respondent fatigue was also an important aspect.

Used macros

To create a reasonable orthogonal and balanced design, several macro's described by Kuhfeld (2010) in his chapter 'MR-2010F' about discrete choice analysis in SAS, have been used. The macros and their function are briefly described in Table 3, please refer to Kuhfeld (2010) for an extensive explanation of the macros.

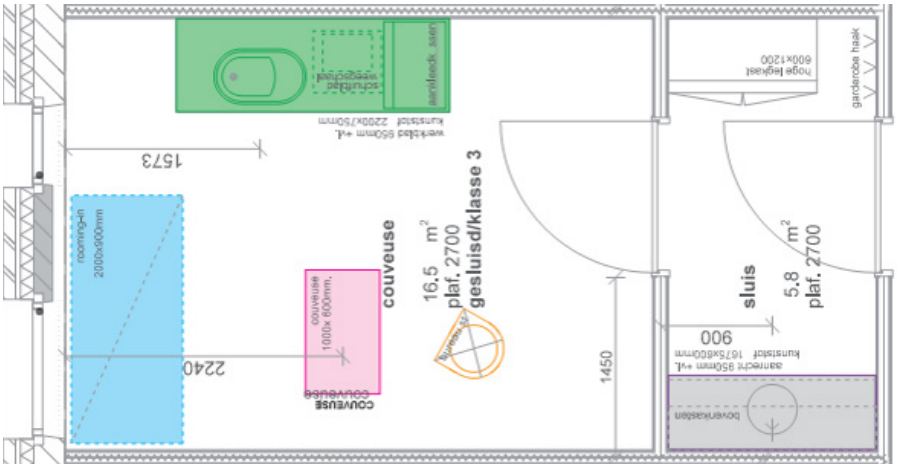


Figure 20 **NICU family unit, Jeroen Bosch Ziekenhuis**

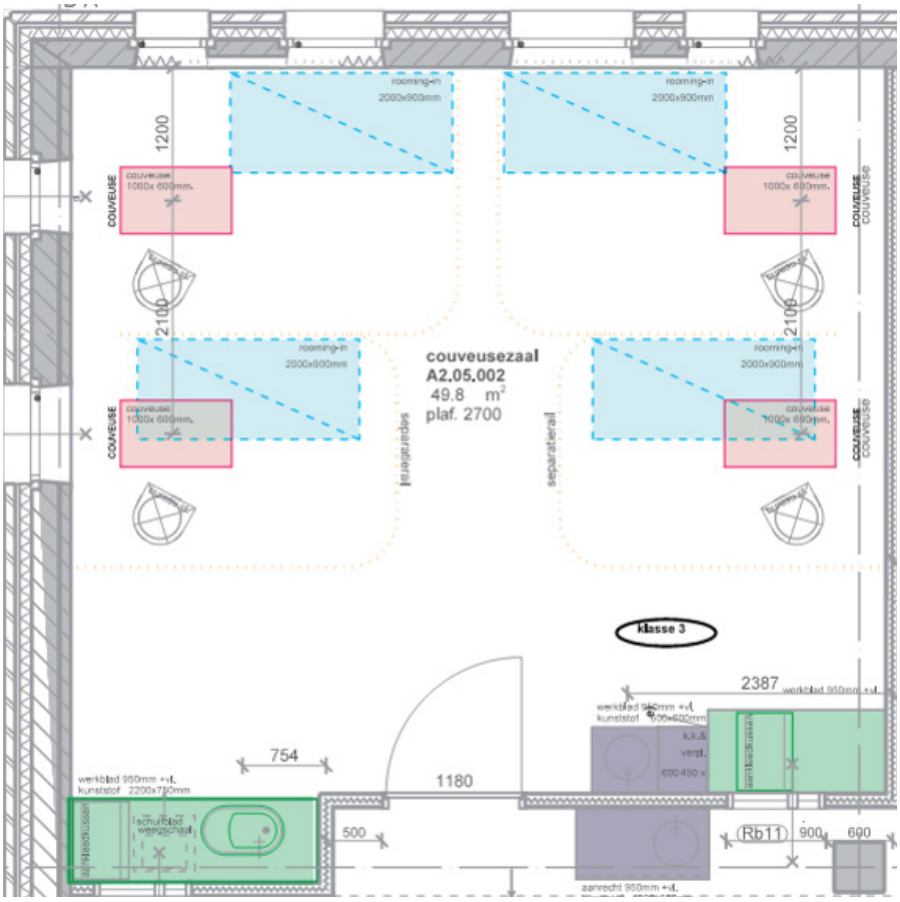


Figure 21 **NICU ward unit, Jeroen Bosch Ziekenhuis**

Design efficiency

Some deviations from an (statistical) ideal design were made. These deviations could still result, as Johnson et al. (2013) notes in satisfying results and actually yield more precise estimates compared to a perfect orthogonal designs.

Efficiency trade-off. Perfectly orthogonal designs are balanced, meaning that *"each pair of levels appears equally often across all pairs of attributes within the design"* (Johnson et al., 2013). However, a perfect statistical design comes with trade-offs because it means asking large numbers of questions to the respondents which could have a detrimental effect on attention. This could lead to early closure of the questionnaire or confusion about the questions resulting in reduced response efficiency (Johnson et al., 2013). According to the authors, response efficiency can be increased by asking a smaller number of relative easy to interpret questions to respondents. When questions are easy or difficult depends largely on the target population.

Blocking. Blocks can be used to partition the design into smaller blocks with the same size. Blocking of the design is introduced to increase the number of total questions asked while distributing them in blocks over the sample population. This results in increased statistical efficiency and, by keeping the numbers of questions asked per respondent relative low, in acceptable response efficiency. The respondents were randomly assigned to a block by using the Qualtrics randomiser in the survey flow (see randomization, on page 24). In the model, a total of 6 blocks has been used. With a total of 72 choice sets, this results in 6 blocks with 12 attributes per respondent.

Fixed factors. A design with 5 fixed attributes (factors) out of 12 attributes in total was chosen to maximize response efficiency while maintaining an adequate statistical efficiency. This resulted in a design

D-Efficiency. D-efficiency and D-error are regular measures that give an idea about the quality of the design and can thus be used in design selection. Relative D-efficiency of the statistical choice model is 13.6297 (see Figure 19 (red line), 5 fixed factors). The largest it could be under optimal circumstances is 58. 3333 since 7 out of the 12 attributes (58.3%) can vary.

Note that these measures only apply to the D-efficiency and relative D-Efficiency of this particular model (Kuhfeld, 2010) . Given a set of attributes with a given number of levels, the D-efficiency and D-error are dependent on the number of fixed variables used in each set. D-efficiency and D-error are computed on a scale with an unknown maximum and not on a scale from 0 to 100 as with the %mktex procedure (Kuhfeld, 2010).

SAS can produce a measure, relative D-efficiency, to view the D-Efficiency on a scale from 0 to 100. However relative D-efficiency is computed relative to the value you would get for an unrestricted design (Kuhfeld, 2010, p. 318), which means that all alternatives must vary to obtain 100% relative D-efficiency. When using fixed factors, relative D-efficiency is thus giving a pessimistic view of the goodness of fit, of the design and 100% is not attainable (Kuhfeld, 2010, p. 318).

Final design. A final design with the design specifications given in Table 5 has been selected to be used for constructing the DCE.

Evaluation of the Choice Design

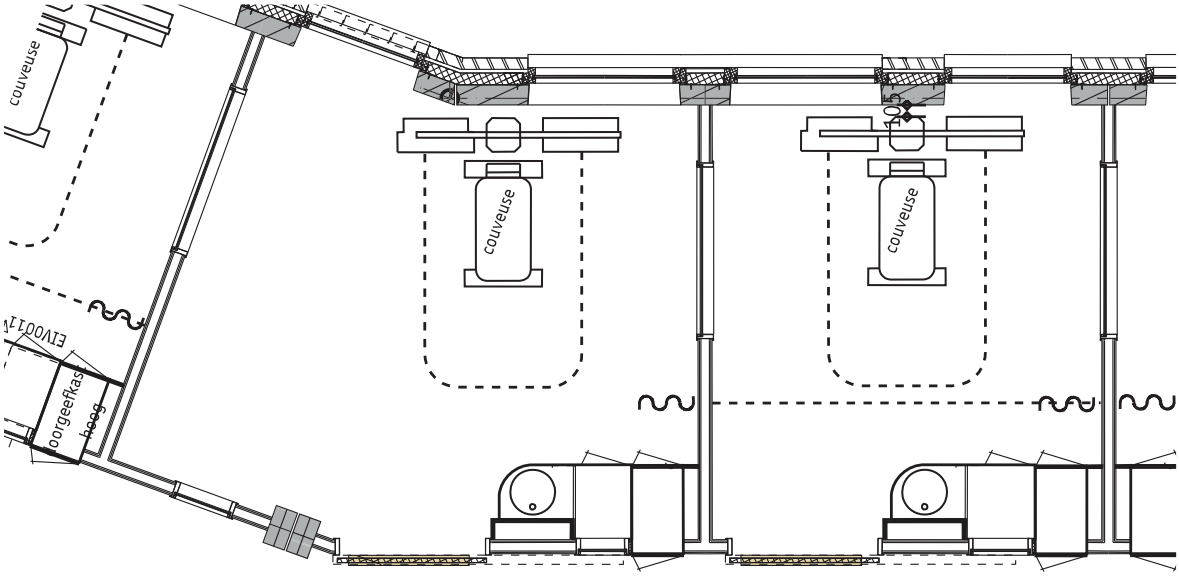


Figure 22 **Floorplan family unit, Máxima Medical Centre**

Figure 23 **Screenshot of light settings in Maya (Autodesk, 2016)**

The relative D-efficiency of the final design is 13.6297, the maximum relative D-efficiency attainable is 58.3% since 7 out of 12 attributes can vary. This seems reasonable but not very high. Increasing or decreasing the number of choice sets did not increase the (relative) D-efficiency.

The quality of the design can also be assessed by looking at the parameter variances. High and varying variances are often a sign of designs in need for further optimization (Kuhfeld, 2010, p. 631). Table 6 shows the variables included in the final choice design and the variance, df and standard errors (*SE*). The variances are relative small and uniform, with roughly the same variance and standard errors. The deviations are all in approximately the same order of magnitude; the design looks reasonable good.

Step 6 – Generating a 3D representation

To create a visual representation of the discrete choice alternatives various NICU designs have been used to generate a somewhat general model covering multiple NICU settings (from a family unit to a ward unit). The floor-plans used to create a generic design are from Jeroen Bosch Hospital (Figure 14 on page 2626, Figure 20 and Figure 21 on page 4444, *Máxima Medical Centre* (Figure 22 on page 4646), and the *Erasmus Medical Centre* (Figure 15 on page 2626).

The 3D model is created using Maya 2016 SP2 (Autodesk, 2016) with the addition production-quality rendering application mental ray version 3.13.1.8 (NVIDIA, 2015).

Materials

For creating realistic and physically accurate materials, *mia_material_x materials* were used. This type of material is part of the mental ray rendering application. Mental ray *mia_material_x* is a monolithic material shader (Autodesk, 2015) and can be used to materials such as metal, wood and glass (with the help of several presents).

Lights

Maya area lights were used to create ceiling lights. These lights have the advantage of having scalable dimensions. However, only the shape characteristics of the area lights were used.

A custom light shader, *physical_light*, was added to the area lights. This *physical_light* shader is developed to physically model correct light sources. This light shader has an intensity falls off equal to $\frac{1}{e^d}$ with d being distance (mental images GmbH, 2008). This is in accordance with how the intensity of light is inversely proportional to the square of the distance from the source.

The mental ray light *mib_cie_d* was used to set the colour and intensity of the shader *physical_light*. With the mental ray *light mib_cie_d* the colour temperature of *physical_light* was adjusted to either 4500k or 7500k. Figure 23 gives an overview of the light network as it is defined in the model for the small family unit.

Characters

3D characters were created to fit in the model. The characters were scaled to dimensions similar to average people. The only purpose is to associate the model with the human scale for a more intuitive interpretation of the modelled environment. The Character Generator (Autodesk, 2015) was used to generate these 3D characters.

Figure 24 **Example of the presented choices (vignettes)**

Figure 25 **Example of light measurements (Grinwis, Van Oel &De Bruin-Hordijk, 2015)**

Rendering

A total of 4 cameras (render views) was used to create (render) a good overview of the possible combinations and the two types of settings (family unit and ward unit). The camera focal length (value=25), lens squeeze ratio (value=1), F-stop (value =5.6), the focus distance (value=5) and the camera height (value=160cm) were kept constant in the model. The only variables that varied slightly, across the two types of settings (family unit and ward unit) and the two sizes (large and small), were the horizontal and vertical direction of the camera. To make sure that the specific attributes were rendered with the correct levels, the model generated in SAS was exported to Excel using the code below:

```
proc export
data    = Generated_model
dbms    = xlsx
outfile  = "E:Export_name.xlsx"
replace;
run;
```

This resulted in a row of strings containing the block number, set number, alternative number and the level for all 12 attributes. Excel was used to give names to the string values and convert the strings into usable MEL syntax (see below) for import in Maya. Note that all blocks are given an individual name and all attributes are individually identified (A_m) with their a specified attribute level (L_n).

```
createRenderLayer –name Block1_Set1_Image1-number 1 "-noRecurse" A_1 L_2  … A_m L_n  ;

…

createRenderLayer –name Block_X_Set_Y_Image_Z-number 1 "-noRecurse" A_M L_N  … A_M L_N  ;
```

The *createRenderLayer* command is used to create a new render layer in Maya. A render layer is a layer that can be used to render specified model content such as: materials, colours or objects. By using the command *"-noRecurse"* the created render layer only makes the specified materials, colours or objects visible specified after the command. This enables relative fast creation of minor variations in one large model.

Maya was set to render images in RAW format with a resolution of 700x560 (72ppi), allowing better post-processing capabilities compared to rendering in compressed (lossy) formats such as .jpeg. Rendering of the images has been done using the Technisch Ontwerp en Informatica (TOI) render-farm , comprising of 84 processor cores at a combined speed of 392 GHz and 352 Gigabytes of memory. Communication between Maya 2016 SP2 and the render-farm was established using the render-farm script from the TOI Maya Toolbox 6.6.1 (TOI, 2015).

Render processing

The resulting images were rendered per types (family unit and ward unit), size (large and small) and camera (camera 1 to 4). With 2 alternatives per choice, 12 vignettes in total and 6 blocks, this resulted in 2×4×12×6=576 renders. The generated renders were processed using the data merge function of InDesign (Adobe, 2012), resulting in the discrete choice vignettes as depicted in Figure 24. Please refer to Appendix III for a full overview of all the generated vignettes on page 79.

Light measurements

To construct vignettes with high fidelity, light measurements have been used to assess the resulting renders with actual situations. Figure 25 provides an example of the resulting luminance images in the Erasmus MC and Máxima Medisch Centrum. The remaining captured images and the location where they were captured can be inspected in the enclosure (see Appendix I on page 63).

The images have been shot with a Canon EOS 350D body, combined with a Sigma 18-50mm f/2.8 EX DC lens and a Sigma 8mm F3.5 EX DG Fisheye lens. Analysis of the images was done with Luminance image capture and analysis software LMK 2000 of Technoteam (2005).

Measurement protocol. Images have been captured at each corner of the NICU room (both family unit and ward unit). Images of the hall and other spaces have captured bidirectional. In the family unit, images were captured with sunscreens up and sunscreens lowered halfway. With all images a lux measurement has been done (see Appendix I on page 63).

Conclusion. The (light) exposure of vignettes appeared to provide a valuable and important part of the contextual information. A by-product of the images is a view in the working conditions of the facilities.

Step 7 – Creating an online questionnaire

A online questionnaire was developed in Qualtrics (2002) to present the generated vignettes, include additional questions resulting from the expert panels and quality of life questions. The questionnaire consisted of 6 blocks which will be discussed briefly. For the entire questionnaire, please refer to Appendix IV on page 103.

Block 1. Block one presents the informed consent. Participants whom did not want participate received a question about their motivation for aborting the questionnaire. Respondents assenting with the research received questions about their location (which hospital and which country) and their role in the hospital (related to parents and medical professionals, or other). By filling in their role the variable role is set to either parent or non-parent. Finally the respondents were asked about their age and gender.

Block 2. Parents were asked about their previous experiences with the NICU and, if any, how many children are or have been hospitalized in the NICU. The remaining participants (*r*ole = non-parent) were asked about their previous working experiences in (other) hospitals.

Block 3. The discrete choice experiment is carried out in block three. The block begins with an introduction about the kind of questions the respondents can expect and what is asked from them. All respondents see block 3 the same. However, the design is blocked (see Blocking on page 45) in 6 blocks. Qualtrics evenly distributes one block, containing 12 choices to each participant.

Block 4. Block four contains relevant additional questions concerning safety, noise, working places, privacy, etc.

Block 5. Block five is conditional based on the variable role. For parents block five contains the EQ-5D self-classifier and the EQ VAS as described by Rabin and Charro (2001). There are, in addition, 6 items included from the Quality of Working Life (QoWL) scale by Easton and Van Laar (2013). The selected

six items are aimed to measure general wellbeing.

For non-parents, the entire QoWL scale (Easton & Van Laar, 2013) is included as is the EQ VAS (Rabin & Charro, 2001). The EQ-5D self-classifier is not included because the QoWL scale is more specific for the (non-parent) target group. Keeping the number of questions as low as possible was also a consideration for not including the EQ-5D self-classifier.

Block 6. In block six the participants are asked is they would like to be informed about the results and if they are willing to participate in future research concerning this topic. Finally they are thanked for their time and effort.

Additional variables

Quality of life

Quality of life may affect perceived wellbeing scores and should therefore be included as a covariate. The EQ-5D self-classifier and the EQ VAS as described by Rabin and Charro (2001) is used because these scales offer a generic measure of health status which can be used *"in the clinical and economic evaluation of health care and in population health surveys"*.

Nationality

Nationality could influence the preference for a certain vignette or have a different quality of life. The latter should be mediated by employing the EQ-5D, a self-reported scale which makes it possible to have cross national comparisons of subjective wellbeing.

Prior experiences

Parents or medical professionals having prior experiences in a different type of NICU (ward unit or family unit) could influence the perceived wellbeing scores. Also to prior experience when it comes to giving birth to a child could prove to be a mediating variable.

Statistical analysis

The analysis of the factorial survey design will be executed using multinomial logistic regression in SPSS version 22 and SAS 9.3. The work Kuhfeld (2010) and Hensher et al. (2005) has been used as manual for the analysis of the results.

Table 7 **General wellbeing scores**

Group	Scale	N	M	SD	Min	Max	α[1]
Parents	EQ-5D SC	47	5.62	0.90	5.00	8	.27
	EQ-5D VAS**	45	78.45	14.98	31.70	100	-
	WRQoL GWB-6**	46	21.43	5.18	6.00	28	.87
Medical professionals	EQ-5D VAS**	80	84.33	11.75	48.50	100	-
	WRQoL GWB-6**	83	23.10	3.32	14.00	29	.81
	WRQoL	96	80.30	8.43	49.00	99	.86
Parents & medical professionals	WRQoL GWB-6	137	22.77	4.08	6.00	29	.84
	EQ-5D VAS	138	82.74	13.13	32.00	100	-

Table 8 **Correlation between general wellbeing scales**

Scale	EQ-5D VAS	EQ-5D	WRQoL GWB-6	WRQoL
EQ-5D VAS	1.000	-.634***	.643***	.563***
EQ-5D	-.634***	1.000	.562***	#
WRQoL GWB-6	.643***	-.562***	1.000	.744***
WRQoL	.563***	#	.744***	1.000

Significance of correlation: *p < .05, **p < .01, ***p < .001. #: The WRQoL was only completed by medical professionals and the EQ-5D was only completed by parents.

Table 9 **Statistics on items related to privacy, sound nuisance and flexible working space, per group**

	Parents				Medical professionals			
Question	**N**	**Median**	**Q1**	**Q3**	**N**	**Median**	**Q1**	**Q3**
Privacy: How important is…[1]								
… silence in the NICU?	47	4.00*	3.00	4.00	85	4.00*	4.00	5.00
… not being heard by others	47	3.00	2.00	4.00	85	4.00	3.00	4.00
… being out of sight of others	47	4.00***	3.00	4.00	85	2.00***	2.00	3.00
… the ability to rearrange the room	47	2.00*	2.00	4.00	84	3.00*	2.00	4.00
… the ability to place personal stuff	47	4.00*	3.00	4.00	85	3.00*	2.00	4.00
Sound nuisance: How disturbing do you find…[2]								
… the sounds of monitor alarms in the NICU?	46	3.00	2.00	4.00	84	3.00	2.00	4.00
... the sounds of medical pumps in the NICU?	46	4.00***	3.00	5.00	84	3.00***	2.00	4.00
... the sounds of respirator in the NICU?	46	4.00***	3.00	5.00	83	2.00***	1.00	3.00
... voice sounds from others?	46	4.00***	3.00	5.00	84	3.00***	2.00	4.00
... the sounds from the hall in the NICU?	46	4.00	2.00	4.25	84	3.00	2.00	4.00
... the sounds from footsteps in the NICU?	46	5.00***	4.00	5.00	84	2.00***	1.00	4.00
Flexible workplace: How well does a flexible workplace fit in…[3]								
… the Ronald MC Donald house?	46	4.00	4.00	5.00	56	4.00	4.00	5.00
... a patient room?	46	2.00	1.75	4.00	83	2.00	2.00	4.00
... the department?	47	4.00	3.00	4.00	83	4.00	2.00	4.00
... the family room?	47	3.00	2.00	4.00	82	3.00	2.00	4.00
... the restaurant?	46	4.00	2.75	4.00	82	3.00	1.00	4.00

Significant difference ($\chi 2$, df=4): *p < .05, **p < .01, ***p < .001.
1 Scale 1=Not at all important, 2=Slightly important, 3=Moderately important, 4=Very important, 5=Extremely important.
2 Scale 1=Poor, 2=Fair, 3=Moderate, 4=Good, 5=Very good.
3 Scale 1=Extremely disturbing, 2=Very disturbing, 3=Moderately disturbing, 4=A little disturbing, 5=Totally not disturbing.

Results

Additional variables

General wellbeing

Three scales were used to assess the general wellbeing of respondents. The general wellbeing of parents was assessed with the EQ-5D self-classifier, the EQ-5D visual analogue scale from Rabin and Charro (2001) and five items aimed to measure general wellbeing in the WRQoL Scale from Easton and Van Laar (2013). The general wellbeing of medical professionals was assessed with the EQ-5D visual analogue scale from Rabin and Charro (2001) and the entire WRQoL Scale from Easton and Van Laar (2013).

Table 7 shows the scale statistics of the used general wellbeing scales for parents and medical professionals. The internal consistency of the EQ-5D self-classifier is only completed by parents and had a poor internal consistency with a Cronbach's alfa of .27 (N=47). Table 8 shows the correlations between the used questionnaires. The EQ-5D self-classifier correlated strongly with the EQ-5D VAS (r=-.63, p<.001) and the 6 item questionnaire WRQoL GWB-6 (r=.56, p<.001).

The WRQoL questionnaire was only completed by medical professionals (N=96) and had a good internal consistency (α=.86). The WRQoL questionnaire was strongly correlated with the EQ-5D VAS (r=.56, p<.001) and the 6 item questionnaire WRQoL GWB-6 (r=.74, p<.001).

The WRQoL GWB-6 had a good internal consistency with a Cronbach's alfa of .87 for parents (N=46), and .81 for medical professionals (N=83). The WRQoL GWB-6 questionnaire was strongly associated with the EQ-5D VAS (r=.64,p<.001), the EQ-5D (r=-.56, p<.001) and the 6 item questionnaire WRQoL (r=.74, p<.001).

Privacy, sound nuisance and working space

Table 9 and Table 10 provide an overview of the item statistics related to privacy, sound nuisance and flexible working space. Table 9 distinguishes between parents and medical professionals and Table 10 distinguishes between Belgium and the Netherlands. The statistics are reported with the median (Mdn) and the interquartile range (IQR) of quartile 1 (Q1) and quartile 3 (Q3).

Privacy

Privacy was identified as an important factor which proved difficult to include in the DCE (see Table 9 and Table 10). Therefore several questions about privacy related issues have been included separately in the questionnaire. The results are compared by groups and country since both factors are expected to influence privacy related judgements. The privacy questions were comprised of 5 items and yielded a moderate internal consistency with a Cronbach's alpha of α=.52 (N=144).

Silence in the NICU

Silence in the NICU (Figure 26) is scored as very important for both parents (Mdn=4, IQR[3,4]) and medical professionals (Mdn=4, IQR[4,5]), with medical professionals valuing the silence in the NICU higher compared to parents (X^2 (4)=9.2, p=.041). There is not enough evidence to suggest a difference between the Belgium hospital and the Dutch hospitals (X^2 (4)=7.4, NS).

Table 10 **Statistics on items related to privacy, sound nuisance and flexible working space, per country**

	Belgium				Netherlands			
Question	**N**	**Median**	**Q1**	**Q3**	**N**	**Median**	**Q1**	**Q3**
Privacy: How important is…[1]								
… silence in the NICU?	28	4.00	4.00	5.00	117	4.00	3.00	5.00
… not being heard by others	28	3.50	3.00	4.00	117	4.00	3.00	4.00
… being out of sight of others	28	2.00**	1.00	3.00	117	3.00**	2.00	4.00
… the ability to rearrange the room	28	3.00	2.25	4.00	116	3.00	2.00	4.00
… the ability to place personal stuff	28	3.00	3.00	4.00	117	3.00	2.00	4.00
Sound nuisance: How disturbing do you find…[2]								
… the sounds of monitor alarms in the NICU?	28	3.00	3.00	4.00	115	3.00	2.00	4.00
… the sounds of medical pumps in the NICU?	28	4.00	3.00	4.00	115	3.00	2.00	4.00
… the sounds of respirator in the NICU?	28	3.00**	2.00	3.75	114	3.00**	2.00	4.00
… voice sounds from others?	28	3.00	2.00	4.00	115	3.00	2.00	4.00
… the sounds from the hall in the NICU?	28	4.00	3.00	4.00	115	3.00	2.00	4.00
… the sounds from footsteps in the NICU?	28	3.00**	2.25	4.00	115	3.00**	2.00	5.00
Flexible workplace: How well does a flexible workplace fit in…[3]								
… the Ronald MC Donald house?	-	-	-	-	114	4.00	4.00	5.00
… a patient room?	28	3.50*	2.00	4.00	113	2.00*	1.00	3.00
… the department?	28	3.50	2.00	4.00	114	4.00	3.00	4.00
… the family room?	28	3.00	2.00	4.00	113	3.00	2.00	4.00
… the restaurant?	28	2.00*	1.00	4.00	112	3.00*	2.00	4.00

Significant difference ($\chi 2$, df=4): *p < .05, **p < .01, ***p < .001.
1 Scale 1=Not at all important, 2=Slightly important, 3=Moderately important, 4=Very important, 5=Extremely important.
2 Scale 1=Poor, 2=Fair, 3=Moderate, 4=Good, 5=Very good.
3 Scale 1=Extremely disturbing, 2=Very disturbing, 3=Moderately disturbing, 4=A little disturbing, 5=Totally not disturbing.

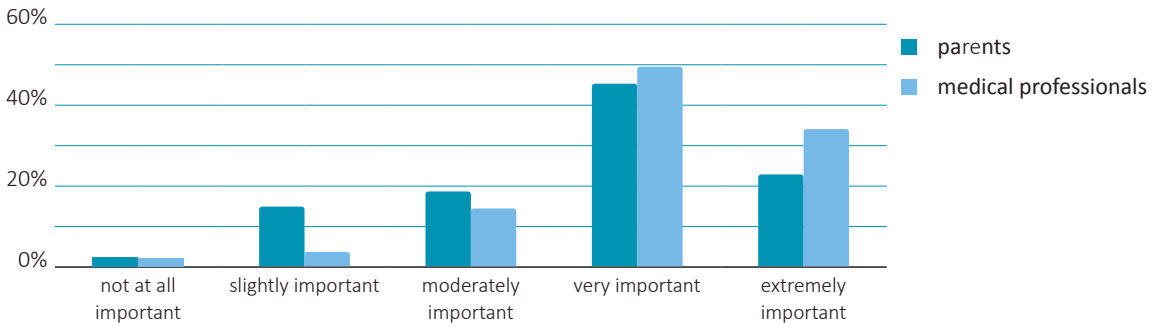


Figure 26 **Distribution of the response values on item 4.3: "How important is silence in the NICU?"**

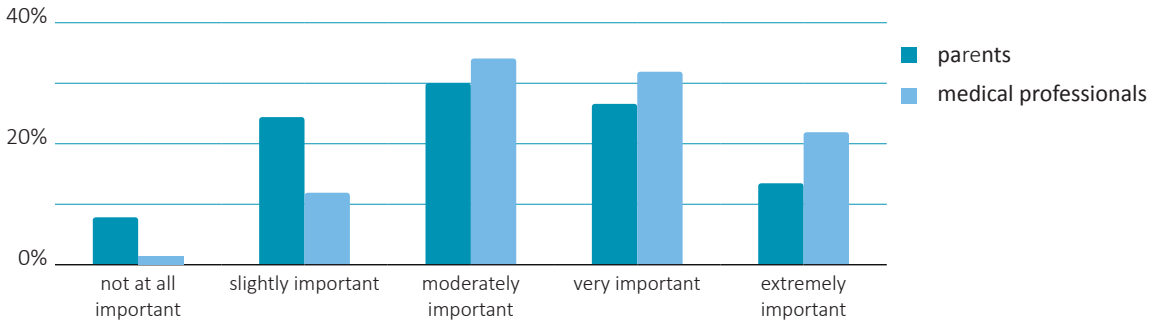


Figure 27 **Distribution of the response values on item 4.3: "How important is not being heard by others?"**

Being heard by others

It was hypothesized that not being heard by others may be an important factor for parents who prefer privacy while they are with their child or children. Parents indicated (Figure 27) that they find this moderately important (*Mdn*=3, IQR[2,4]) and medical professionals reported not being heard as a very important (*Mdn*=4, IQR[3,4]) factor attributing to their wellbeing. There was not enough evidence to suggest that the two groups differed significantly (X^2 (4)=6.6, NS) nor to suggest differences between Belgium and the Netherlands (X^2 (4)=6.3, NS).

Being out of sight of others?

Being out of sight was being hypothesised as a possible important factor for parents and medical professionals, though from a different perspective. Parents might want privacy to be with their child or children and their spouse. Medical professionals might want to have a moment to work on specific tasks that need constant attention. A difference between the importance for being out of sight (Figure 28) was found between parents and medical professionals (X^2 (4)=28.0, ***p***<.001). Parents reported that they find it very important (*Mdn*=4, IQR[3,4]) to be out of sight of others. The medical professionals on the other hand find it less important (*Mdn*=2, IQR[2,3]). The two countries differ on this notion (X^2 (4)=14.0, ***p***<.007). The Belgian respondents report being out of sight of others as slightly important (*Mdn*=2, IQR[1,3]) while the respondents from the Netherlands report it as moderately important (*Mdn*=3, IQR[2,4]).

Rearranging the patient room

Parents and medical professionals reported different views on the importance of being able to rearrange the patient room to their wishes (Figure 29). Parents found this notion slightly important (*Mdn*=2, IQR[2,4]) while the medical professionals found this more important (*Mdn*=3, IQR[2,4], X^2 (4)=12.7, ***p***<.013). There was not enough evidence to suggest that the difference also existed between the Netherlands and Belgium hospitals (X^2 (4)=2.8, NS).

Placing personal belongings

Parents and medical professionals reported different views on the importance of being able to place personal belongings in the patient room (Figure 30). Parents found this very important (*Mdn*=4, IQR[3,4]) while the medical professionals attributed a lower importance (X^2 (4)=10.7, ***p***<.029) and found it moderately important (*Mdn*=3, IQR[2,4]). There was not enough evidence to suggest differences between the two participating countries (X^2 (4)=7.5, NS).

Flexible working places

Flexible working places were hypothesised as a potential important factor for parents (see Table 9 and Table 10). Since neonates stay relative long in the hospital and the presence of parents is beneficial for them. The presence of parents might be stimulated by providing flexible working places. This working place does not necessarily mean that they need to work, it can serve as a place for reflection, keeping in touch with relatives or other ICT related tasks parents might want to undertake while staying close to their child.

The results are compared by group (parents and medical professionals) and country (Belgium and the Netherlands), since both groups are expected to influence judgements. The questions about flexible working places were asked with 5 items which yielded a moderate internal consistency with a Cronbach's alpha of α=.54 (*N*=110).

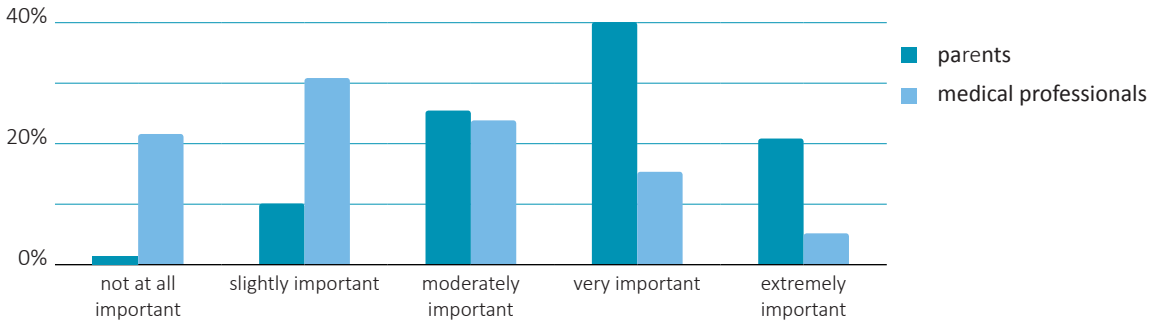


Figure 28 **Distribution of the response values on item 4.3: "How important is being out of sight of others for you?"**

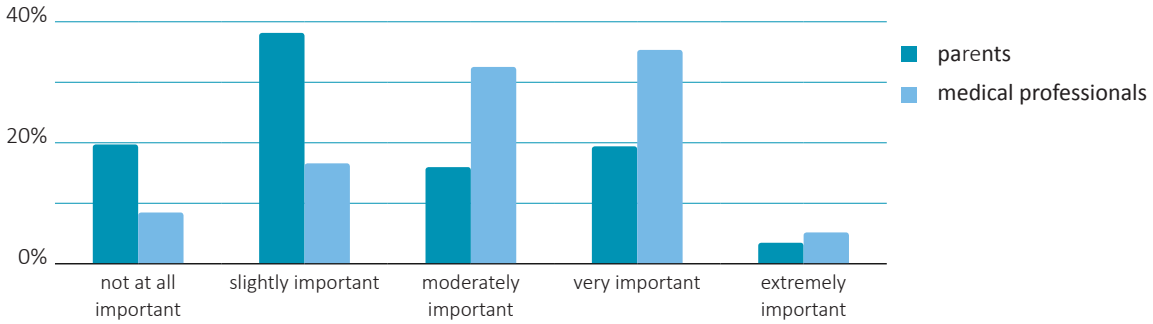


Figure 29 **Distribution of the response values on item 4.3: "How important is it for you to be able to rearrange the patient room?"**

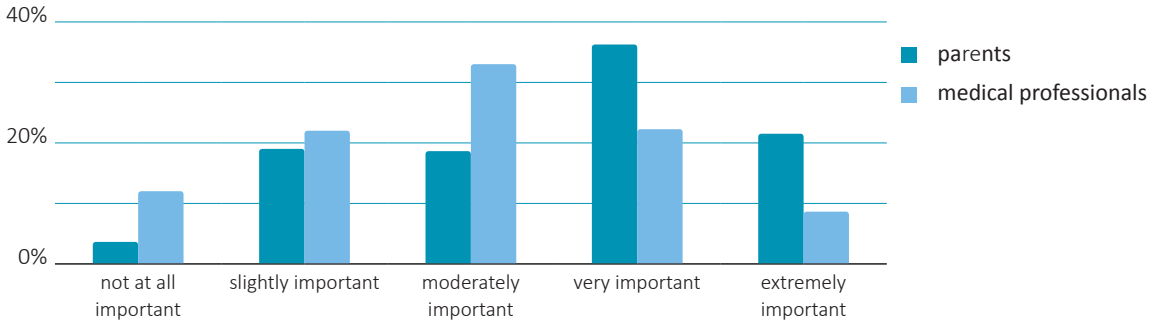


Figure 30 **Distribution of the response values on item 4.3: "How important is it for you to place personal belongings in the patient room?"**

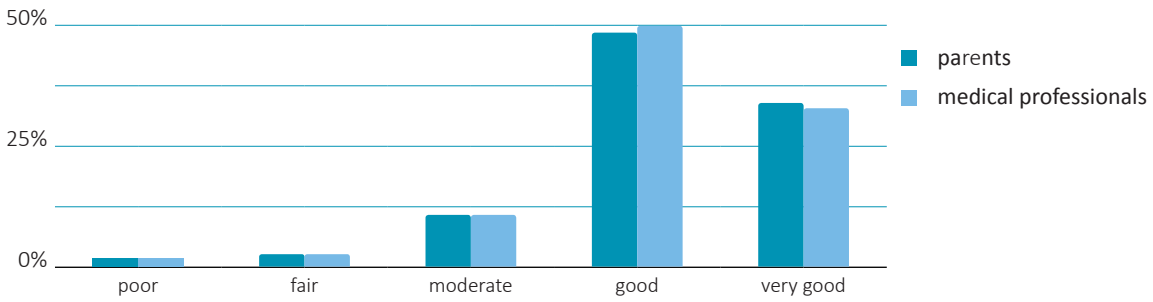


Figure 31 **Distribution of the response values on item 4.6: "How well does a flexible workplace fit in the Ronald MC Donald house?"**

Working place in Ronald MC Donald house

This question has only been asked to participants in the Netherlands since the Ronald MC Donald house, or similar, is unknown in Belgium. Both parents and medical professionals seem to agree that a flexible working place fits 'good' (*Mdn*=4, IQR[4,5]) in the Ronald MC Donald house (Figure 31).

Workplace in a patient room

Parents were asked how well a flexible workplace may fit in the patient room (Figure 32). Both parents (*Mdn*=2, IQR[1.8,4]) and medical professionals (*Mdn*=2, IQR[2,4]) seem to find this slightly important (X^2 (4)=.3, NS). In Belgium, a flexible workplace may fit moderately to good in a patient room (*Mdn*=3.5, IQR[2,4]), in contrast to the Netherlands (X^2 (4)=11.9,p=.017) where the fit is labelled as slightly important (*Mdn*=2, IQR[1,3]). In general a working place in the patient room might not be a good idea since a large part of the respondents (24% parents and 23% medical professionals) find the fit poor.

Workplace on the department

Placing a flexible working place in the department seems better compared to accommodating it in the patient room (Figure 33). Both parents (*Mdn*=4, IQR[3,4]) and medical professionals (*Mdn*=4, IQR[2,4]) indicate that this is a good place for a flexible working place (Figure 33). There is not enough evidence to suggest that the views of the parents and the medical professionals differ on this item (X^2 (4)=3.3, NS). Respondents from the hospitals in Belgium (*Mdn*=3.5, IQR[2,4]) and the Netherlands (*Mdn*=4, IQR[3,4]) share the same view and indicate the department as a good location for the working space.

Workplace in the family unit.

Al groups indicate that a flexible working space will fit good in the family unit (Figure 34). Parents (*Mdn*=3, IQR[2,4]) and medical professionals (*Mdn*=3, IQR[2,4]) don't seem to disagree (X^2 (4)=2.4, NS) on how well a flexible working space will fit in the family unit. The same applies to the two countries, respondents from both Belgium (*Mdn*=3, IQR[2,4]) and the Netherlands (*Mdn*=3, IQR[2,4]) don't seem to disagree either (X^2 (4)=.4, NS).

Working place in the restaurant

Both parents (*Mdn*=4,IQR[2.8,4]) and medical professionals (*Mdn*=3,IQR[1,4]) indicate that a flexible working place would fit well in the restaurant (Figure 35). Parents and medical professionals don't seem to different on this statement (X^2 (4)=9.3,NS). In Belgium, placing a flexible working space is less preferred and is regarded as fair (*Mdn*=2,IQR[1,4]) opposed to the respondents in the Netherlands (*Mdn*=3,IQR[2,4]). The difference between the two countries is just significant (X^2 (4)=10.3,p=.035).

Sounds in the NICU

Sounds were identified as an important factor which proved difficult to include in the DCE (Table 9 and Table 10). Therefore several questions about sound related issues have been included in the questionnaire. The results are compared by groups (parents and medical professionals) and country (Belgium and the Netherlands). The sound related questions were comprised of 6 items and yielded a high internal consistency with a Cronbach's alpha of α=.84 (*N*=142).

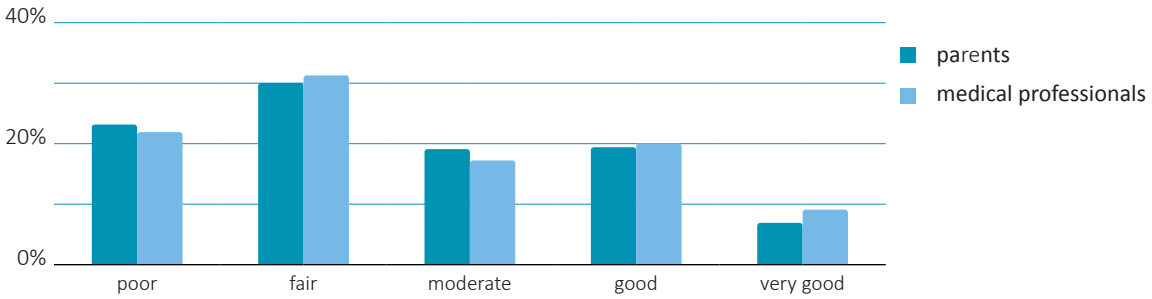


Figure 32 **Distribution of the response values on item 4.6: "How well does a flexible workplace fit in a patient room?"**

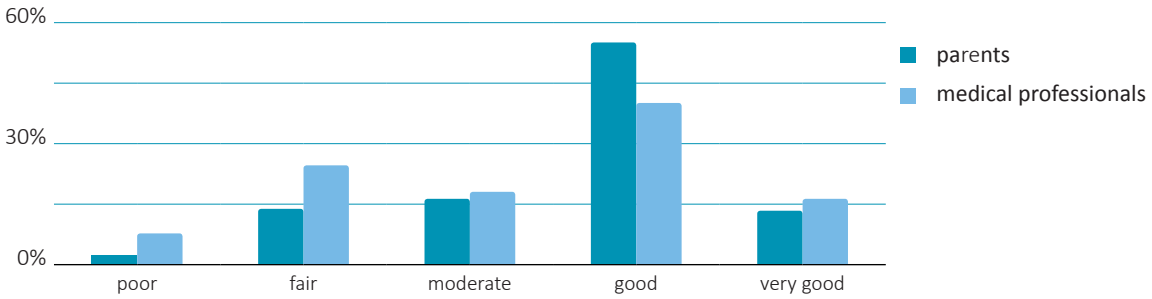


Figure 33 **Distribution of the response values on item 4.6: "How well does a flexible workplace fit in the department?"**

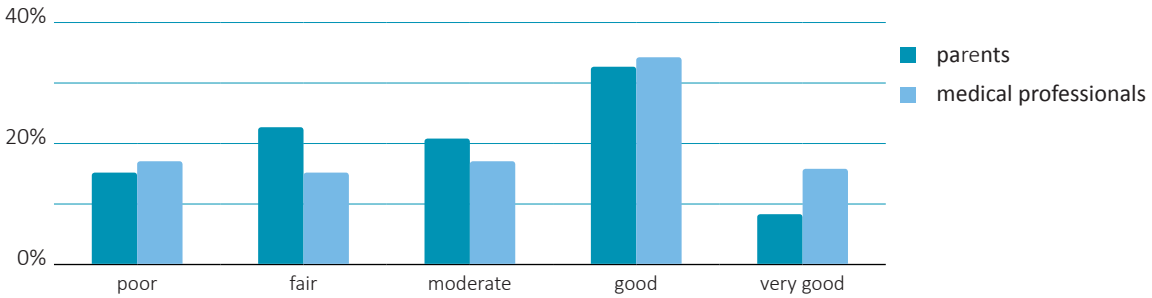


Figure 34 **Distribution of the response values on item 4.6: "How well does a flexible workplace fit in the family room?"**

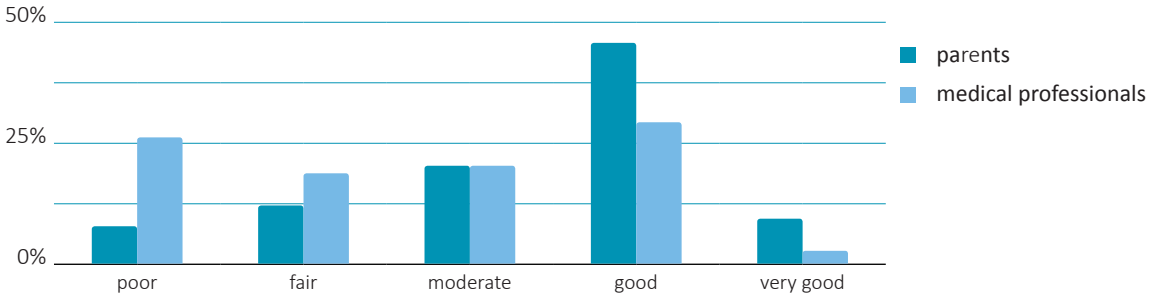


Figure 35 **Distribution of the response values on item 4.6: "How well does a flexible workplace fit in the restaurant?"**

Disturbance by monitor alarms

Both parents and medical professionals seem to agree upon the disturbance of the monitor alarms (Figure 36) and found them moderately disturbing (*Mdn*=3, IQR[2,4], X^2 (4)=7.5, NS), there was also not enough evidence to suggest differences between the Belgian responses and those from the Netherlands (X^2 (4)=5.0, NS).

Disturbance by medical pumps

The sounds that medical pumps produce were reported as a little disturbing (*Mdn*=4, IQR[3,5]). Surprisingly there was a large group of parents (43%) who found the sounds from medical pumps totally not disturbing (Figure 37). The valuation of the medical professionals differed from the parents (X^2 (4)=5.0, NS), they found the sounds from medical pumps moderately disturbing (*Mdn*=3, IQR[2,4]). There was not enough evidence to suggest that the difference also existed between the Netherlands and Belgium hospitals (X^2 (4)=9.0, NS).

Respirator sounds

The sounds produced by the respirator in the NICU were reported (Figure 38) as a little disturbing (*Mdn*=4,IQR[3,5]). Surprisingly there was a large group of parents who did not find the respirator sounds disturbing (33%). This differed significantly from the medical professionals (X^2 (4)=54.8, ***p***<.001) who reported the respirator sounds as very disturbing (*Mdn*=2,IQR[1,3]). Comparing Belgium to the Netherlands, there were minor differences. The Belgian respondents reported the respirator sounds as a moderately disturbing (*Mdn*=3,IQR[2,3.8]), the respondents from the Netherlands also reported the sounds as a moderately disturbing (*Mdn*=3,IQR[2,4]), though with a slight different distribution (X^2 (4)=13.6,p=.008).

Voice sounds from others

Sound from voices were reported (Figure 39) as a little disturbing by parents (*Mdn*=4, IQR[3,5]). Medical professionals found voices from others more disturbing (X^2 (4)=22.6, ***p***<.001) and reported voices from others as moderately disturbing (*Mdn*=3,IQR[2,4]). Interestingly, there is a large group (36%) of medical professionals who reports the voices from others as very disturbing. There was not enough evidence to suggest that this pattern was different between the Belgian hospital the hospitals in the Netherlands (X^2 (4)6.6,NS).

Sounds from the hall

Sound from the hall were reported (Figure 40) as a little disturbing by parents (*Mdn*=4, IQR[2,4.3]) and as moderately disturbing by medical professionals (*Mdn*=3, IQR[2,4]). There however was not enough evidence to claim differences between parents and medical professionals X^2 (4)=4.3,NS), the same applies to comparing the Belgian and the Hospitals in the Netherlands (X^2 (4)=1.8,NS).

Disturbing footsteps

When asking the responding parents how disturbing footsteps in the NICU are (Figure 41), they indicate footsteps as totally not disturbing (*Mdn*=5, IQR[4,5]). This in sharp contrast with the medical professionals (X^2 (4)=47.5, ***p***<.001) who report the footsteps as very disturbing with (*Mdn*=2, IQR[1,4]). There also appears to be a difference between Belgium and the Netherlands (X^2 (4)=17.5,p=.001), though this difference could be attributed to the view of parents from the Netherlands who shift

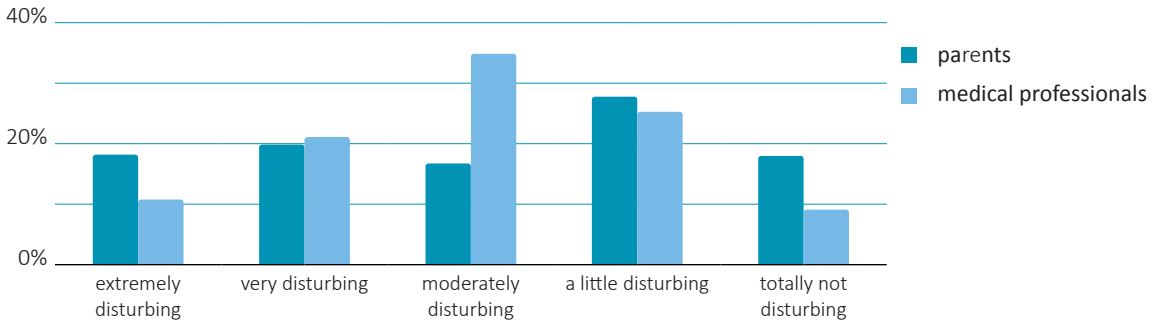


Figure 36 **Distribution of the response values on item 4.7: "How disturbing do you find the sounds of monitor alarms in the NICU"**

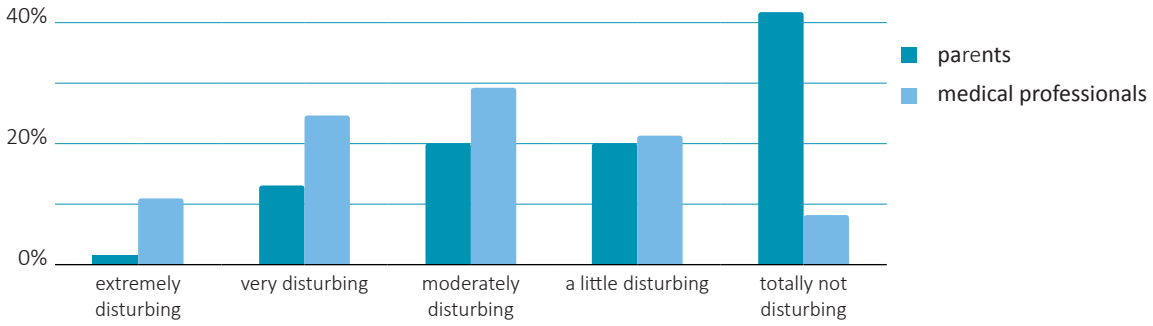


Figure 37 **Distribution of the response values on item 4.7: "How disturbing do you find sounds of medical pumps in the NICU"**

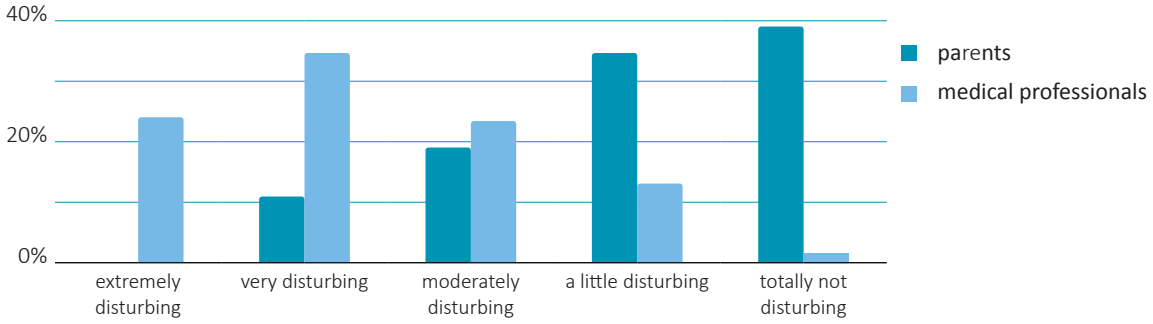


Figure 38 **Distribution of the response values on item 4.7: "How disturbing do you find the sounds of respirator in the NICU?"**

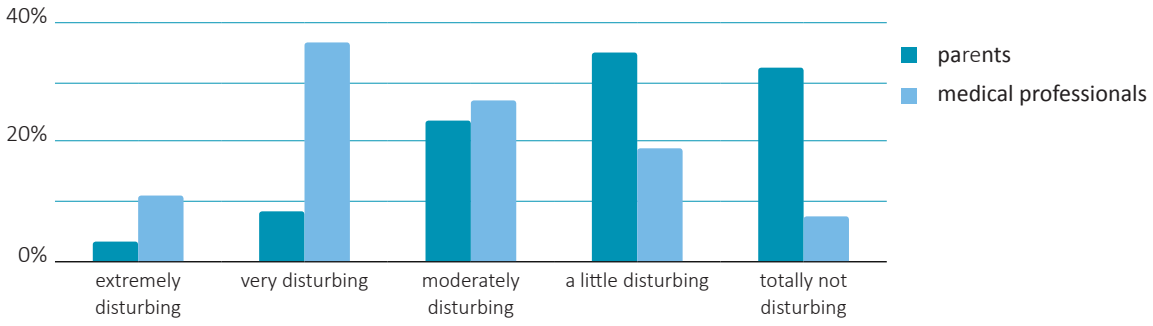


Figure 39 **Distribution of the response values on item 4.7: "How disturbing do you find vocal sounds from others?"**

the distribution of the Netherlands to totally not disturbing. Further analysis of with only the group medical professionals, in the Netherlands and Belgium, shows that there indeed is a significant difference between the medical professionals in both countries (X^2 (4)=17.5,p=.001). The Belgian medical professionals reports the footsteps as moderately disturbing (*Mdn*=3, IQR[2,4]) and medical professionals from the Netherlands reports the footsteps as very disturbing (*Mdn*=2, IQR[1,3]).

Analysis of parent's form the Netherlands versus parents from Belgium were not conducted since population of participating Belgium parents was too low (*N*=2).

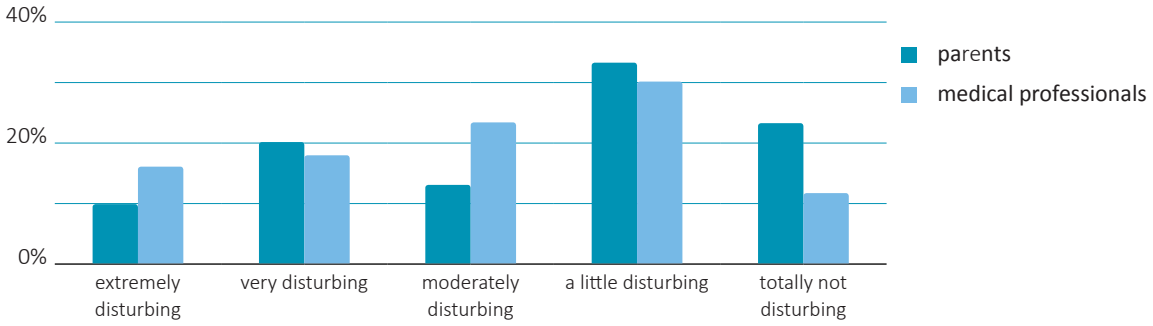


Figure 40 **Distribution of the response values on item 4.7: "How disturbing do you find the sounds from the hall in the NICU?"**

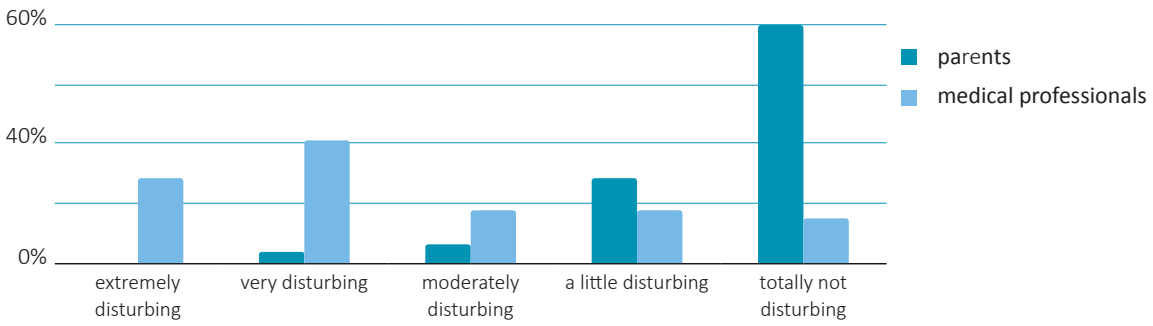


Figure 41 **Distribution of the response values on item 4.7: "How disturbing do you find the sounds from footsteps in the NICU?"**

Table 11 **Likelihood Ratio Tests**

Type	Effect	-2 Log Likelihood	*X2*	*df*	*p*
Intercept	Intercept	2191.56	-	-	
Confounders	Role	2192.56	1.00	1	.32
	EQ.5D VAS	2191.59	.03	1	.87
	WRQoL GWB	2191.88	.32	1	.57
	Experience	2191.56	.00	1	1.00
	Gender	2191.69	.13	1	.72
	Response Hospital	2191.56	.65	1	.42
	Age group	2198.24	6.68	1	.01
Attributes	Type	2200.52	8.96	1	.00
	Size	2229.16	37.60	1	.00
	Privacy	2255.26	63.70	1	.00
	Window orientation	2196.98	5.42	1	.02
	Atmosphere A	2191.78	.21	1	.64
	Atmosphere B	2195.76	4.20	1	.04
	Furniture A	2213.67	22.11	1	.00
	Furniture B	2254.50	62.94	1	.00
	Furniture C	2207.37	15.81	1	.00
	Door	2197.22	5.66	1	.02
	Illumination	2193.00	1.44	1	.23
	Working zone	2196.44	4.88	2	.09

Table 12 **Parameter Estimates for the discrete choices (stepwise analysis)**

								95% CI	
Attribute	**Level**	***B***	***SE***	***Wald***	***df***	***p***	***Odds***	**Low**	**Up**
	Intercept	-.79	.20	15.14	1	.000			
Age group*	18-24 years	.32	.29	1.21	1	.272	1.37	.78	2.42
	25-34 years	.36	.19	3.68	1	.055	1.44	.99	2.08
	35-44 years	.30	.20	2.23	1	.135	1.35	.91	1.99
	45-54 years	-.04	.20	.04	1	.836	.96	.64	1.43
NICU type	Family unit	.30	.10	8.26	1	.004	1.35	1.10	1.66
NICU size	Small	.66	.10	40.45	1	.000	1.93	1.58	2.37
Privacy	Curtains	.81	.10	60.76	1	.000	2.25	1.83	2.75
Window size	Medium	.23	.10	4.92	1	.026	1.26	1.03	1.54
Atmosphere A	Home environment	.04	.10	.18	1	.672	1.04	.85	1.28
Atmosphere B	Healing environment	.22	.11	4.59	1	.032	1.25	1.02	1.54
Furniture A	Sleeping sofa	.53	.11	25.41	1	.000	1.71	1.39	2.10
Furniture B	Bed-closet	-.82	.10	62.06	1	.000	.44	.36	.54
Furniture C	Feeding chair	-.40	.10	15.18	1	.000	.67	.55	.82
Door	Medium glass door	-.25	.10	5.85	1	.016	.78	.64	.95
Colour temperature	4500k	.12	.10	1.36	1	.244	1.13	.92	1.38
Working zone	Blue	.26	.13	4.25	1	.039	1.29	1.01	1.65
	Red	.21	.13	2.76	1	.097	1.23	.96	1.58

Note: reference categories (=level 2) are not displayed, they are equal to zero. * Age group is the only covariate included in the model, but excluded from the parameter estimates of the 12 attributes.

Analysis of discrete choice experiment

Table 11 provides an overview of the main effects in the multinomial regression model with the -2 Log Likelihood ratio tests. This gives a good overview of the contributions of specific attributes in the model. The individual parameter estimates are given in Table 12 and provide a more detailed view of contribution of each single attribute level.

Confounders

The model includes anticipated disturbing variables (confounders): role (parent or medical professional), wellbeing scales (EQ.5D VAS and WRQoL 6-GWB), the experience of medical professionals, gender, the response hospital and the age group of the participants. The potentially disturbing variables were added to the model as a covariate. By looking at the-2 Log Likelihood ratio tests in Table 11, the contribution of the disturbing variables to the entire model (deviations from 2229.5) is marginal. Age group was the only variable that showed a potentially confounding effect (X^2 (1)=6.8,p=.010). All other disturbing variables do not explain additional variance given the set of included variables. Thus there is not enough evidence to suggest that these disturbing variables have an influence on the responses of the respondents.

Since age group could be a potential confounder, age group was added to the DCE model, explaining the contribution of each single attribute level. By adding the variable age group (as a covariate), parameter estimates were adjusted by including the variance contribution of age group. Table 12 illustrates the contribution of the separate levels of age group. For all levels of age group there does not seem to be enough evidence to suggest a significant contribution of age group. Thus the variable is regarded as not confounding the results.

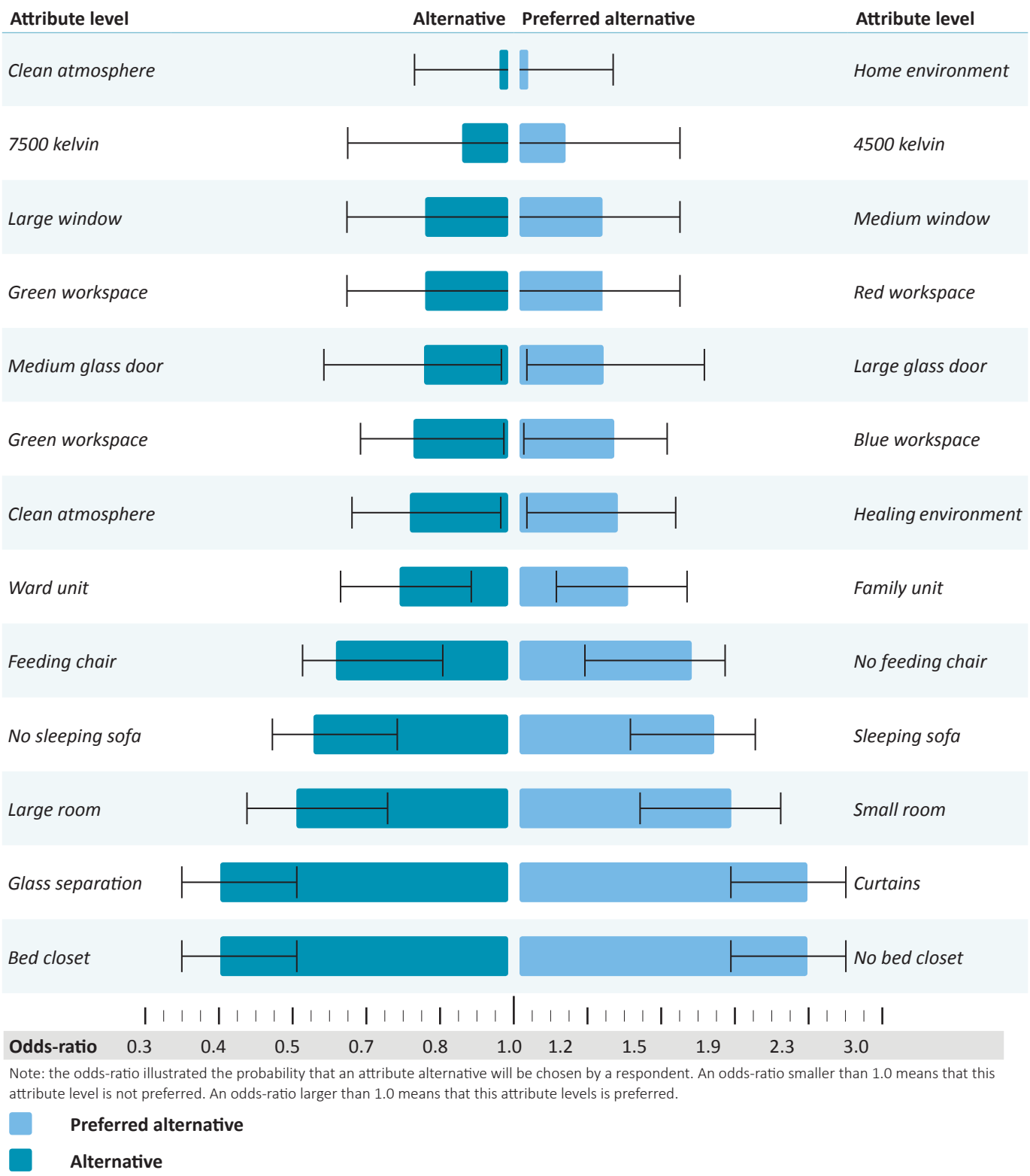
Interpretation

The parameters in Table 12 can be used to predict the preferences for the attributes with regard to wellbeing (utility). The beta-coefficients (regression weights) provide information about the attribute for both levels. However, with logistic regression analysis the depended variable is transformed with the log-odds. Thus beta-coefficients are given in log-odds which makes the interpretation less straightforward. However, this transformation makes it possible that a binary variable can take every possible value instead of only binary values, making it possible to conduct simple linear regression with the 'logit transformed' dependent variable (see equation [1.3]). By transforming the log-odds with equation [1.4], the probability that vignette 1 is chosen over vignette 2 is given.

$$log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \ldots \beta_n X_n \qquad [1.3]$$

$$p\left(\frac{e^{\beta_0+\beta_1 X_1+\ldots\beta_n X_n}}{1+e^{\beta_0+\beta_1 X_1+\ldots\beta_n X_n}}\right) \qquad [1.4]$$

A simple rule of thumb can be applied to judge the significance of both the odds-ratio and probabilities using the 95% confidence intervals. For the odds-ratio a 95% confidence interval including 1 means that there is no significant difference: (1/(1+1))×100%=50%, meaning the probability for either choice is equal.



Note: the odds-ratio illustrated the probability that an attribute alternative will be chosen by a respondent. An odds-ratio smaller than 1.0 means that this attribute level is not preferred. An odds-ratio larger than 1.0 means that this attribute levels is preferred.

Figure 42 **Main effects, with a 95% CI. Non-preferred alternatives are on the left and preferred alternatives on the right.**

Main effects

The main effects are illustrated in Figure 42 and ordered by the odds-ratio. This figure illustrates the preference for the attributes given the complete set of 12 attributes. These attributes cannot be regarded as a separate entity. Values with an odds-ratio below 1.0 have a probability of being chosen by less than 50% of the respondents. Values above an odds ratio of 1.0 have the probability of being chosen by more than 50% of the respondents.

The main effects will be discussed below per attribute. The consideration of these attributes is done with all the other attributes included in the model.

NICU type. Participants valued a family unit setting over a ward unit with regard to wellbeing (X^2 (1)=8.3, p=.004). With the ward unit as the reference category (level 2), respondents preferred the situation with a family unit (level 1) over the ward unit, with an odds-ratio of 1.35 (95% CI[1.10, 1.66]).

NICU size. Participants valued a smaller room setting over a larger setting with regard to wellbeing (X^2 (1)=40.5, p<.001). With the larger room as the reference category (level 2), respondents preferred the situation with a smaller room (level 1), with an odds-ratio of 1.93 (95% CI[1.58,2.37]).

Privacy. The privacy attribute was comprised of curtains (level 1) or curtains and a glass panel (level 2, reference), separating the incubators. The participants valued the situation with only the curtains over the situation with curtains and a glass separation panel (X^2 (1)=60.8, p<.001) with an odds-ratio of 2.25 (95% CI[1.83,2.75]).

Window size. The window size attribute was comprised of medium (level 1) and large (level 2) windows in the façade. The participants valued the situation with the medium windows higher than the situations with large windows (X^2 (1)=4.9, p=.027) with an odds-ratio of 1.26 (95% CI[1.03,1.54]).

Atmosphere A. The attribute atmosphere A includes curtains in front of the inner side of the facade windows, standing lamps in the NICU (level 1) and a clean white environment (level 2, reference category). There was not enough evidence to suggest that the two attribute levels differed (X^2 (1)=.2, NS).

Atmosphere B. The attribute atmosphere B includes elements referred to as the healing environment (level 1) versus a clean white environment (level 2, reference category). The participants valued the situation with the healing environment elements over the situation with the clean environment (X^2 (1)=4.5, p=.033) with an odds-ratio of 1.25 (95% CI [1.03,1.54]).

Furniture A. Furniture A is one of the three attributes including furniture. Furniture A includes the presence of a sleeping sofa (level 1) versus no sleeping sofa present (level 2, reference category). The presence of the sleeping sofa is preferred over the absence of the sleeping sofa (X^2 (1)=24.9, p<.001) with an odds-ratio of 1.70 (95% CI [1.38,2.09]).

Furniture B. Furniture B is the attribute including the presence of a bed-closet (level 1) versus no bed-closet present (level 2, reference category). The presence of the bed-closet is preferred over the absence of the bed-closet (X^2 (1)=63.3, p<.001) with an odds-ratio of 0.44 (95% CI [0.36,0.54]).

Table 13 **Likelihood Ratio Tests**

Effect	*-2 Log Likelihood*	X^2	*df*	*p*
Type * Size	2211.715	4.914	1	.027
Type * Privacy	2215.288	8.487	1	.004
Type * Colour temperature	2208.231	1.430	1	.232
Size * Privacy	2208.137	1.336	1	.248
Size * Colour temperature	2211.663	4.862	1	.027
Privacy * Colour temperature	2215.124	8.323	1	.004
Type * door	2206.801	10.178	1	.001

Table 14 **Parameter Estimates for the discrete choices (stepwise analysis)**

Attribute interaction	Interaction levels	*B*	*SE*	*Wald*	*df*	*p*	*Odds*	*95% CI* Low	Up
NICU type x size	Family unit x small	.48	.22	4.90	1	.027	1.61	1.06	2.46
	Family unit x large	-.39	.22	2.99	1	.084	.68	.44	1.03
	Ward unit x small	.46	.22	4.44	1	.035	1.59	1.04	2.42
	Ward unit x large*	.00	-	-	-	-	1.00	.65	1.53
NICU type x privacy	Family unit x curtains	.64	.22	8.46	1	.004	1.89	1.23	2.91
	Family unit x curtains + glass	-.39	.22	2.99	1	.084	.68	.44	1.04
	Ward unit x curtains	.60	.22	7.31	1	.007	1.82	1.18	2.79
	Ward unit x Curtains + glass *	.00	-	-	-	-	1.00	.65	1.54
NICU type x colour temperature	Family unit x 4500k	.26	.22	1.43	1	.232	1.30	.84	2.01
	Family unit x 7500k	-.39	.22	2.99	1	.084	.68	.44	1.04
	Ward unit x 4500k	.54	.22	5.31	1	.021	1.71	1.11	2.65
	Ward unit x 7500k*	.00	-	-	-	-	1.00	.65	1.54
Privacy x colour temperature	Curtains x 4500k	-.64	.22	8.28	1	.004	.53	.34	.82
	Curtains x 7500k	.60	.22	7.31	1	.007	1.82	1.18	2.81
	Curtains + glass x 4500k	.54	.22	5.31	1	.021	1.71	1.11	2.65
	Curtains + glass x 7500k*	.00	-	-	-	-	1.00	.65	1.54
Size x privacy	Small x Curtains	.25	.22	1.33	1	.248	1.28	.84	1.96
	Small x Curtains + glass	.46	.22	4.44	1	.035	1.59	1.04	2.42
	Large x Curtains	.60	.22	7.31	1	.007	1.82	1.19	2.77
	Large x Curtains + glass*	.00	-	-	-	-	1.00	.65	1.53
Size x colour temperature	Small x 4500k	-.46	.21	4.85	1	.028	.63	.42	.95
	Small x 7500k	.46	.21	4.44	1	.035	1.59	1.05	2.39
	Large x 4500k	.54	.21	5.31	1	.021	1.71	1.14	2.59
	Large x 7500k*	.00	-	-	-	-	1.00	.66	1.51
NICU type x door	Family unit x semi transparent.	.70	0.22	10.12	1	<.00	2.02	1.31	3.12
	Family unit x transparent	-.69	0.22	7.85	1	.01	0.50	0.33	0.78
	Ward unit x semi transparent	-.61	0.22	12.85	1	<.00	0.55	0.35	0.84
	Ward unit x transparent	.00	0.22	-	-	-	1.00	0.65	1.54

* Reference categories (= level 2 x level 2).
Note: (1) the same attributes, as given in Table 12, are included but not displayed for overview purpose. (2) the variable age group is not included in this model.

Furniture C. The attribute Furniture C includes the presence of a feeding chair (level 1) versus the presence of a normal chair (level 2, reference category). The presence of the normal chair is preferred over the presence of the feeding chair (X^2 (1)=15.3,p<.001) with an odds-ratio of 0.67 (95% CI [0.55,0.82]).

Door. The attribute door includes two types of door. One door with small glass surface (semi-transparent, level 1) and one with a large glass surface (transparent, level 2, reference category). The transparent door is preferred over the semi-transparent door (X^2 (1)=5.7, p=.018) with an odds-ratio of 0.78 (95% CI [0.64,0.96]).

Colour temperature. The attribute colour temperature includes two types of colour temperature: 4500k (level 1) and 7500k (level 2, reference category). There appears not to be a significant main effect of colour temperature (X^2 (1)=1.44,NS).

Working zone. The attribute working zone includes three colours given to the working zone of nurses and medical specialists: blue (level 1), red (level 2) and green (level 3, reference category). The blue working zone is just preferred over the green working zone (X^2 (1)=4.3, p=.039), there does not appear to be a difference between the red and the green zone (X^2 (1)=2.9, NS).

Interaction effects

The interaction effects were analysed to see if there are interaction between attributes. Specifically whether there are specific preferences (probability for choosing) for an attribute or attribute level, given a second attribute or attribute level. These type of interactions are two-way interactions and are derived from literature or prior hypothesised. Type (family unit or ward unit), privacy (curtains + glass separation) and colour temperature are added to the model to see if there are significant interactions between per level.

Privacy x Colour temperature. The interaction between privacy and colour temperature (see Table 13) is a significant one (X^2 (1)=8.3, p=.004) with curtains + glass separation and 7500k as the reference category. A closer look at the parameter estimates (Table 14) reveals the way the interaction behaves. The parameter estimates indicate that there is a significant difference in preference. There appears to be a difference between 4500k and 7500k for curtains + glass separation (X^2 (1)=5.3, p=.021), in which the curtains + glass separation alternative is preferred more when a 4500k lighting situation is present. 63% of the respondents chose this alternative when the 4500k light condition was shown, with an odds-ratio of 1.71 (95% CI [1.11,2.65]).

A reversed relation was observed for the curtains only situation. Curtains were more preferred when a 7500k lighting situation was presented (X^2 (1)=7.3, p=.007), with an odds-ratio of 1.71 (95% CI [1.19,2.77]).

Size x Colour temperature. The interaction between size and colour (Table 13) appears to be moderate significant (X^2 (1)=4.9, p=.027) with large and 7500k as the reference category. A closer look at the parameter estimates (Table 14) reveals the way the interaction behaves. In the presented smaller NICU spaces, a higher colour temperature of 7500k is preferred. This situation is favoured with an odds-ratio of 1.59 (95% CI [1.05,2.39]), over the situation with a lower colour temperature

of 4500k. For the presented larger NICU spaces, the effect is the other way around. In larger NICU spaces, a lower colour temperature of 4500k seems to be preferred with an odds-ratio of 1.71 (95% CI [1.14,2.59]).

Type x Colour temperature. The interaction between type and colour temperature (Table 13) appears to be not significant (X^2 (1)=1.4, NS). Only in ward units, the 4500k lighting situation is preferred with an odds-ratio of 1.71 (95% CI [1.14,2.59]). Other interactions are non-significant.

Type x Size. The interaction between type and colour temperature (Table 13) is moderately significant (X^2 (1)=4.9*, p*=.027). A closer look at the parameter estimates (Table 14) shows that both levels of type (family unit and ward unit) have a higher preference when the units are smaller, with an odds-ratio of 1.61 for family units (95% CI [1.06,2.46]) and 1.59 for ward units (95% CI [1.04,2.42]). There does not seem to be a difference in preference when the units are large

Type x Privacy. The interaction between type and privacy (Table 13) is significant (X^2 (1)=8.5*, p*=.004). A closer look at the parameter estimates (Table 14) shows that when family units are shown, curtains are preferred with and an odds-ratio of 1.89 for family units (95% CI [1.23,2.91) and 1.82 for ward units (95% CI [1.18,2.79]). There does not seem to be a significant difference in preference when glass separations are used in combination with curtains.

Type x Door. The interaction between type and door seems very strong. In the family units, semi transparent door (a door with a smaller glass surface compared to the transparent door) is strongly preferred with an odds-ratio of 2.02 (95% CI [1.31,3.12). In the family units, the transparent door is strongly rejected with an odds-ratio of 0.50 (95% CI [0.33,0.78). Interestingly, in the ward unit, the semi transparent door is strongly rejected with an odds-ratio of 0.55 (95% CI [0.35,0.84).

Discussion

The aim of this study was to investigate the relative importance of important design features for parents and medical professionals with regard to the impact of these design features on the wellbeing of parents and medical professionals in a NICU. This main question has been explored with expert panels and the resulting questionnaire with DCE in five hospitals, four in the Netherlands and one in Belgium.

The main findings of the study showed that the environmental design characteristics significantly influenced the wellbeing of both parents and medical professionals, as they were asked to choose the situation that best supported their wellbeing. Especially the presence of curtains and the absence of a bed closet seems to contribute to the wellbeing of the parents and medical professionals. Other important findings were the differences between parents and medical professionals they were asked about their experiences with noises in the NICU. Parents showed to be relative little bothered by sounds in the NICU, while medical professionals showed to be rather disturbed by the sounds in the NICU. Also the judgement of medical professionals (the expert panels) about parents' noise perception in the NICU does not seem to match the actual perception of the parents: the expert thought that parents were more disturbed by the sounds then the medical professionals.

The choices of both parents and medical professionals were found to be independent of other factors such as age, gender, nationality, current well being and Qo(W)L. Interestingly, no differences were found between parents and medical professionals in the DCE with vignettes. This seems to corroborate findings of de Boer-Lootens (2014, p.101) who found that medical professionals and family caregivers showed the same preferences, even though her study was underpowered.

Feelings of comfort, warmth and security

The results seem to suggest that design characteristics that supports restorative effects and reduce stress are valued by both parents and medical professionals. Respondents choose for a small NICU with a family unit configuration, with large glass doors, a blue workspace marking (on the floor), with healing environment elements, no feeding chair, a sleeping sofa, curtains and without a bed closet.

The findings corroborates with those of Domanico et al. (2011), showing that a quieter and more controllable environment fostered more contact opportunities between parents and infants, resulting in positive wellbeing outcomes parents and positive health outcomes for the newborns. This is also supported by the findings of Carter, Carter & Bennett, 2008 who studied the transfer from an ward unit to a family unit. They found that a family unit better fitted the needs of parents with regard to privacy, noise, light, secure space. The advantage of the current study is that it is the first study that addressed the architectural, and interior design characteristics using a quantitative and holistic approach with the aid of visualisation.

Family units are also found to facilitate family-centred care, enhance infant medical progress and breastfeeding success, when compared to NICU's with ward units (Domanico et al., 2011). Flacking and Dykes (2013) illustrated that the spatial configuration of NICUs affects parent-child bonding, infant feeding and the connection with other parents. This makes the development of an environment

in which the parents can feel more at home and which they can control to a certain extent important, especially when living in an emotional roller coaster.

Sense of security

Sense of security is closely linked with privacy because it requires visual lines between the medical professionals and the neonates. The expert panels indicated that overview over the department was an important aspect for them. The urgency for a good overview increased when family units were discussed because the configuration limits the ability for visual contact between medical professionals and neonates. The results from the DCE indicated that a NICU with family units would be preferred based on the wellbeing of both parents and medical professionals. This corroborates with findings from literature as mentioned by Shahheidari and Homer (2012), the sense of security and control experienced by medical professionals in family units was lower compared to a NICU ward unit.

This reveals an important discussion with, on the one side the parents, who require feelings of comfort, warmth and security and on the other side the medical professionals who require maximal overview of the NICU. Since the results of the DCE reveal that both parents and medical professionals prefer family units, this makes stresses the role of technology. Technology will play an important role in situations where visual separation between neonate and medical professionals occurs as mentioned by Van Pul, et al. (2015). Better monitoring technologies will allow blocking of visual lines and thus enhancing feelings of comfort, warmth and security while guaranteeing a needed level for medical professionals to monitor the neonates.

The most preferred alternative (Figure 43) and the least preferred alternative (Figure 44) are the

Figure 43 **Most preferred alternative**

Figure 44 **Least preferred alternative**

opposite of each other. The preferred alternative is a small family unit, allowing people to have a private space with their family. The least preferred alternative is a large ward unit where space between the incubators is relative large. The ward unit (Figure 44) is large and deep, making it a rather dark room. The large windows and the absence of curtains in the least preferred alternative are detrimental for the visual ergonomic conditions because of the large contrast in light between instruments and the outside light (see the two people in front of the windows). The standing lamp, present in Figure 43, is also absent in Figure 44, making it an ever darker room. The most preferred

alternative has elements from the healing environment (posters of nature). These elements are also absent in the least preferred alternative which gives the ward unit a starkly and institutional appearance.

Apart from the choices in the DCE, alternative questions were also used to assess preferences about the NICU environment. These were related to privacy, sound and flexible working spaces. Especially the questions about sounds revealed interesting responses. Parents seemed to be a lot more at ease with the sounds in the NICU. Parents found the sounds from the medical equipment, footsteps and voices from others hardly disturbing, while the medical professionals reported that they found these sounds quite disturbing. For the infants, it is evident that these sounds are minimized while they influence their heart rate, indicating that they hear and respond to sounds in the NICU (Williams, Sanderson, Lai, Selwyn, & Lasky, 2009). A possible explanation for the difference between parents and medical professionals could be that the sounds from the respirator give a reassuring feeling to the parents: the equipment works as it should and it keeps my child or children safe. While for medical professionals, these sounds might prove to be a high environmental stressor possible leading to alarm fatigue. Alarm fatigue seems to be a well-known problem in the intensive care environment which could lead to ignoring alarm signals due to sensory overload (Cvach, 2012).

A total of three wellbeing scales were used the EQ-5D is specifically intended for use by patients (not being neonates) to measure health status (Rabin & Charro, 2001). This questionnaire was therefore not presented to medical professionals. Instead the VAS (visual analogue scale) version of the EQ-5D was presented to the medical professionals to be able to compare the general health state between parents and medical professionals. The two questionnaires have proven to yield similar results (Rabin & Charro, 2001). For medical professionals assessing their perceived quality of working life was more useful and was predicted to tell more about their current state of wellbeing compared to a general wellbeing questionnaire. This was done using the QoWL questionnaire (Easton & Van Laar, 2013). The QoWL questionnaire also included a general wellbeing scale, consisting of 6 items (hence QoWL GWB-6). The latter was used as a second cross-over questionnaire to compare the general health state between parents and medical professionals.

The correlations of between the questionnaires were high, though the internal consistency of the EQ-5D was very low sample of parents (with a Cronbach alpha of 0.27). This low internal consistency seems to agree with an in depth analysis of the questionnaire by Khanna, Jariwala, and Bentley (2013). However, the inter-item correlations were found to be very low. This could indicate that the used scale was not appropriate for the target population. This is supported by the results from the six item QoWL GWB-6, used for both parents and medical professionals. This scale reported both a high internal consistency (with a Cronbach alpha of 0.84) and high inter-item correlations and is constructed to measure the same construct.

Interior

Three attributes were used to assess the preferences for different types of furniture in the modelled NICU environment. The attribute ‘Furniture A’ either sows or hides a sleeping sofa and ‘Furniture B’ either sows or hides a bed-closet. Both Furniture A and B are used to assess the preference for rooming-in and to test if there are differences between them (which one is preferred more) and to

see if they might co-exist in the NICU environment to facilitate rooming-in of both parents. Furniture C shows a feeding chair or a regular chair and is used to see if there is a higher preference for a comfortable chair, which takes up more space, versus a regular chair which is less fit for breastfeeding or kangarooing. Analysis shows that, with regard to the wellbeing of the respondents, a sleeping sofa (Furniture A), regular chair (Furniture C) and the absence of a bed-closet (Furniture B) is preferred.

The presence of either a sleeping sofa or a bed-closet was expected since A. B. Smith, Hefley, and Anand (2007) demonstrated with their study that parents had reduced stress levels when they had the ability for rooming-in. These stress levels were particularly with regard to the role of the parents in their child's and about the appearance of their child. The rejection of the bed-closet might be related to the sense of security parents are looking for. Both parents and medical professionals in general preferred a family unit (NICU type) and a smaller room opposed to a larger room (NICU size). Another possible explanation for the rejection of the feeding chair and the bed-closet is the presence of the sleeping sofa which can be used for feeding, kangarooing and sleeping. When the sleeping sofa is present in a room, the feeding chair and bed-closet might become obsolete.

Window and door size

The perceived wellbeing of participants in the situation with the medium windows was higher than the situations with large windows. This could suggest that participants prefer a certain degree of privacy. This is also expressed in the additional questions about privacy. Parents, reported that they found it very important to be out of sight of others. Though larger windows do not directly imply being in sight, it could foster a certain degree of intimacy.

In the door attribute a different response is seen: the door with the large glass surface is preferred over the door with a medium glass surface. This might be related to the feeling of security where parents and medical professionals might find it reassuring to have a door with a smaller glass surface to stimulate the sense of security. Analysis of the interaction effect between the attributes NICU type and door indeed showed a difference in door preference, dependent of the type of NICU. In the ward unit, there was a strong rejection of the door with a medium glass surface. However, this door was strongly preferred in a family unit.

Colour temperature

At first glance, the colour temperature did not seem to have a relevant preference. The interaction effects show that in smaller NICU spaces (which seemed to be preferred in this sample), a higher colour temperature of 7500k is preferred. In larger NICU spaces, a lower colour temperature of 4500k seemed to be preferred. This could indicate that the larger NICU spaces are preferred when they have an enhanced sense of security which is being stimulated by a more warmer colour temperature (citation needed).

Assessing environment preferences with DCE

The used assessment method, discrete choices with visualized vignettes, proved to be valuable in multiple ways for describing user preferences. Current means for assessing user preferences in care settings are done by employing interviews or questionnaires asking about preferences with directive or open-ended questions. The major disadvantage of such methods is the experience of the respondents, resulting in interpretation differences and consequently in answers that are hard to

interpret due to error.

Discrete choices with visualized vignettes provides the respondents with the background information. Though, with the NICU as environment, knowledge of a NICU (as a parent or medical professional) is necessary to correctly judge the presented vignettes. Providing users with graphical information makes that their choices are more based on the situation they see, rather than on the situation they know by heart. The real power of the visualized vignettes is that it allows researchers to experiment with variants unknown to the user which is very hard to do with regular questionnaires and interviews.

Prior to the experiment, a difference between hospitals with different types of NICU (family or ward unit) was expected. There was no effect found which suggested possible differences in choice behaviour due to prior experiences and other measured variables such as role, age, experience etc.

A possible explanation could be found in the usage of visual combinations of the defined attributes in a given context. The expected interpretation of the vignettes is based on the theory of accordances which refers actions of the perceiver in relation to the perceived context.

Limitations

The sample size is relative small. This implies that effects, with a small effect are hard to identify. A smaller effect size needs a large study sample to be identified. As a consequence, there could be differences between medical professionals and parents though sample size could be to small to identify these differences. This also applies to the measured DCE effects. Some attributes (i.e. curtains and bed closet) show a large preference, while others are more ambiguous. Sample size could cause these differences, though this could also be a result of differences in effect size or actual choice preferences.

The proportion of participating parents (*N*=2) and medical professionals (*N*=30) is very small compared to the participating parents (*N*=55) and medical professionals (*N*=64) from the Netherlands. This means that it is impossible to correct for cultural differences between Belgium and the Netherlands. Investigating (cultural) differences between Belgium and the Netherlands was not an a-priori stated research aim. Though, if they are present, the differences are interesting to include in follow-up research. This could provide interesting insights in the generalizability of the application of DCE with vignettes across countries.

Application of DCE with vignettes is tricky because the complexity needs to fit the intended respondents. The vignettes should not be to complex because this could result in task depletion and lose of attention. However, more complex tasks allow for better discrimination between the included attributes. This is thus a delicate line where the complexity of the vignettes, measured by the number of dimensions, significantly influences the judgments of respondents (Auspurg, Hinz, and Liebig, 2009). This means that the vignettes need to include sufficient factors to make claims about what the researcher wants to measure while keeping the vignettes simple enough. This notion was met by (1) reducing the number of varying variables by defining a fixed set of variables per set, (2) reducing the number of vignettes by dividing them over six blocks and (3) visualization of the questions instead of textual configuration of the questions. The latter is an important notion because processing of visual (or configural) information has a reduced cognitive load compared to textual processing, resulting in

the ability to process more complex visual vignettes. This is in accordance with Jansen et al. (2009). who found that images performed better than verbal descriptions.

As a main effect, there seems to be no preference in colour temperature (light). An effect from light can be expected, based on multiple studies using DCE and finding an effect of light (i.e.: Kroon, 2011; van Oel & van den Berkhof, 2013; de Boer-Lootens, 2014). There are several explanations for the absence of a main effect of colour temperature. The used method to model the lighting conditions is aimed to approach reality as close as possible by using a shader in Maya (Autodesk, 2016). This shader is used to control the lighting situation across all alternatives, keeping the intensity equal, and only varying the colour temperature. A potentials explanation could be that the contrast between the two situations was to low (4500k vs. 7500k) while in other studies the modelled differences seemed to be larger.

Method

Sub-question 5 on page 33 was posed to discuss the used method, discrete choice modelling. Specifically the interest is in discussing the appropriateness of method to measure the relative influence of design features on the well-being of parents and medical professionals in a care environment. In this experiment, discrete choice modelling, with the uses of vignettes, seems to be a useful method for assessing effects of various environment variables in a care environment. This is mainly due to (1) relative low effort for the users, (2) the seemingly large generalization of the outcomes and (3) the ability to discriminate rather well between the different attributes (see *"Main effects"* on page 65).

There are however several limitations to this claim. First the environment variables need to have characteristics that can be translated in to visual images. In other words, environment variables that generate sounds, heat or cold, movement of air, odours, or other characteristics that cannot be captured visually, are very hard and if not impossible to include in the vignettes.

The method also requires a lot of time, knowledge of 3D visualisation techniques and a vast amount of computing power. The latter is, in opinion of the author, a necessity since renders with a regular workstation can only achieve a moderate quality in a reasonable time. For example, rendering with a high-end machine (quad-core i7, 3 GHz) it takes for the renders used in this research 26 minutes per render. With 4 camera's and 144 choices, this translates into 14.400 minutes (10 days) of continuous rendering. Keep in mind that there is no room for error in this calculation. In practice things will go wrong. With the aid of the BK render-farm (TU-Delft), the rendering was kept to a minimum of one working day.

Camera angles

Previous scholars employing the same method (i.e. Van den Berkhof, 2013; Kroon, 2011; van Oel & van den Berkhof, 2013; de Boer-Lootens, 2014) used vignettes comprised of one single image. This resulted in a choice between two images (vignettes). Using one single image to assess the preference of users is straightforward and leaves little for interpretation. In this research, each vignette was comprised of 4 small images of the same space. This made the interpretation, and thus the choices required from the respondents, less straightforward.

This was confirmed by the expert panels, when asked about the questionnaire after completion of

the research. The experts reported answering the questions as complex, though they acknowledged the added value of multiple camera angles. They agreed that a NICU ward is very hard, yet impossible to grasp in one single image per vignette. This was the exact reason to use multiple camera angles: the included attributes could not be captured in one or two camera angles without creating very complex and unrealistic visual representations.

Expert panels

Members of the expert panels were approached after the research had been conducted to ask about their experiences with the research and discuss the results with them. Some of the members expressed that they had difficulties with the amount of information presented in the vignettes, though they acknowledged the necessity of using multiple camera angles for the NICU. Since the entire NICU, especially the ward unit, is hard to capture in one or two images.

The experts were surprised by results concerning the experience of sounds by parents. The experts mentioned that a possible explanation could be the level of care the child of a parent has received. Meaning that children receiving more intense care have more equipment, resulting in more sounds being produced by the equipment. Unfortunately, the level of care has not been assessed in this research, other than the inclusion criteria that the children of the participating parents are or were admitted to the NICU om recent years. The level of care is thus an important aspect to include in future research, though with caution. The level of care should be included with caution because the level of care changes over time which could change perception of the situation by the respondents. Second, the level of care differs per hospital and per country.

Recommendations

Application in practice

Architects use the programming criteria for comparing their designs during a design process (Barekati, Clayton & Yan, 2015). Interaction with the intended users is, especially for hospital design, important since the users have very specific demands about the space to be designed or redeveloped. A simplified discrete choice experiment with vignettes could have added value, especially with redevelopment when there is a building which delivers the boundaries for the model. This implies that in more recent projects, the chances are that there is a Building Information Model (BIM) present containing 3D information. This model can than be used to create a small DCE with vignettes in a fraction of the time needed to build an entire new model. The latter also stresses the importance of building and maintaining model libraries containing standard building blocks for the DCE's. This will allow practitioners to quickly setup a DCE by combining existing BIM models and building blocks in stock.

A DCE with vignettes seems useful in the (re)design process of a redevelopment. When using a DCE with vignettes for new build, some design difficulties arise. For instance, when a DCE will be modelled with a concept design, the outcomes will probably suggest alterations which have a severe impact on the building process in terms of time and thus building costs. When executing a DCE prior to the design process, the boundary conditions might be to vague to build an accurate model. The relative low amount of information available will result in a model that is: (1) less precise and (2) costs more time to create. Hence DCE seems a more useful technique to employ in redevelopment processes when boundaries are present.

Implementation of the DCE in a redevelopment process will be made more feasible with a further standardization of the various BIM protocols allowing for improved collaboration between software packages, which is currently not the case. The challenge is to develop a universal format for an architectural program of requirements (UFPOR) that can be used by all BIM packages (Barekati, Clayton & Yan, 2015).

Further research

The results of this research should be submitted to parents in interviews to receive feedback and to better interpret certain results. For instance the rejection of the feeding chair and the bed-closet, which facilitate rooming-in, kangarooing and breastfeeding.

Future research should also focus on testing what the difference are between using vignettes with one, two or three pictures. And, eventually, whether virtual reality or the application of video's proves to be a better mean to use with DCE's.

There still is a lot to win on the process side: the researcher needs to employ many steps, with various programs to combine create images en set-up a DCE with visual vignettes. A lot can be gained in automation or integration of the process steps. The most obvious step lies in using actual architect designs (3D BIM) to generate alternatives with.

Finally, this research focused on one hospital setting, the reliability and validity could be enhanced by using the method in more hospital or healthcare settings, with the combination of a before- and after-study.

Reflection

Methodology

This research on which this thesis has been based is comprised of 4 distinct parts: (1) literature review, (2) expert panels, (3) experiment design and (4) statistical analysis.

The literature provided insight in the neonatal intensive care unit, several health concepts such as family cantered care and healing environment. The main aim of the literature research was to identify which factors, referred to as attributes, were found to contribute to the wellbeing of parents and medical professionals. Because the author loves to go deep in the study matter, the first straw of the literature research was rather extensive.

The literature study was first focused on three relevant groups: the parents, medical professionals and their children. The latter is was regarded as very import though infeasible within the scope of a master thesis. Inclusion of the newborns meant including means and measures to estimate the relative wellbeing of the newborns. These measures are currently under debate and require access to medical data for which the approval of the medical ethical committee of each hospital is required. Simple admissions were deemed feasible, as shown in this work. Though an full blown medical approval requires at least several months to compose, followed by revisions, etc. The realization of this aspect lead to the drop of the newborns as one of the groups to be included in this research.

The expert panels were held in two hospitals and yielded new insights for the author. Especially the realization that results from literature are not necessarily shared by the medical professionals. The big picture corroborated with the findings from literature, though there were various deviations from the experts in how they experienced certain attributes. The main observation of the author was that the situation in literature was depicted more negatively compared to the experts experiences. Thus this proved to be a good test for the literature review and the authors overall view of the NICU. Interviews with parents would have been a valuable addition to view of the literature and the medical professionals. Interviews with parents were always intended to include when this was allowed by the amount of time. Unfortunately the long approval process of the medical ethical committees required more time than initially intended and interviews with parents were skipped. The experience of parents concerning birth has been experienced by the author during the process of this thesis. Fortunately, situations as experienced by parents from newborns in the NICU did not occur and a healthy young boy was born.

Designing of the experiment was done using SAS to generate a choice set design, Excel to translate the choices to Maya code, for import in SPSS and as input for merge in InDesign. Generate a choice set design was done by following Kuhfeld's (2010) manual and by examining syntaxes. Building the syntax in SAS was now and then a challenge for one mistake can grind the whole process to a hold. Altogether it provided a good insight in how the choice set generation works and how it can be customized.

Transferring the SAS output to Maya proved to be a challenge because there was no documentation on how to do this with ease. Maya was the intended software because this allowed the usage of the

BK-renderfarm. The BK-renderfarm allows rendering of multiple Maya scenes simultaneously which was an a priori requirement. Unfortunately rendering with the BK-renderfarm did not go as expected: the render process stopped when 4 to 5 images were rendered. The solution proved to be rendering camera's separately. The process of generating a choice set design and integrating the design in Maya, so the vignettes correspond with the choice set design, was genuine trial and error. Though a hassle, the process gave rise to the idea that SAS could be bypassed by Maya. Since Maya works with MEL and python, creating a script that generates a choice set design should be feasible. This would be a huge time investment but it would also be a major contribution to DCE with vignettes. It will save a lot of time and errors arising from half-baked solutions. This will also make execution of pilot studies prior to a full blown study much more feasible, contributing to the overall quality of vignettes based DCE's.

Previous students have used SAS to do the statistical analysis. This was a good alternative given the robustness and versatility of SAS. Aside from the benefits SAS has, it is a rather inaccessible and complex statistical package. This means that most students at the faculty of Architecture need to learn how to use the package (including the author), which takes some time. SPSS, on the other hand, is a more user friendly package which allows quick calculations. When DCE were first executed at the faculty of architecture, SPSS was not capable of analysing DCE. Now, SPSS is capable and thus offers a more easy way into analysing DCE's. Unfortunately, the generation of complex choice sets is still not possible in SPSS. To compare the results, the analysis has been done both in SPSS and in SAS, which yielded reasonable similar results.

Site visits

The site visits were, next to functional, very fun to do. The visits showed how various NICU's operate, how the medical professionals work and how the NICU atmosphere is. The site visits had one main goal: introducing the research to the responsible medical professionals and asking if they were willing to participate in the research. The additional conversations showed the author how dedicated the medical professionals are in their work and how much they value the wellbeing of the parents and neonates. The contact with the medical professionals has been experienced as very positive and pleasant. These kinds of visits are necessary when executing any research in an hospital setting. Such environments, and especially an intensive care environment, need human attention. People in these settings deal with sever emotions every day, leaving very little room for students entering this environment to make errors.

Ethics

Hospitals value and respect the privacy of their employees and patients. Hospitals, and especially university medical centres, also value research. Since in (medical) research the privacy and interests of the patients and other participants need to be covered, hospitals have independent committees in charge of judging the quality of the research and whether the research meets all the (legal) demands. A second incentive for hospitals is that the hospitals are only insured when the research meet the legal conditions set to research with humans. A medical ethics committee (MEC) thus assesses and evaluates medical research involving human subjects. In the Netherlands the MEC assesses and

evaluates according to the act *"Wet medisch-wetenschappelijk onderzoek met mensen"* or WMO (act medical scientific research with human beings). Please refer to the Ministry of Public health, Welfare and Sport (VWS, 2015). A similar legal basis is used in Belgium.

At first the assumption was made that there was no approval needed for a research that did not include any medical interventions or manipulations with humans. This was based on conversations with various medical professionals and thus approval by an MEC was deemed not necessary. Eventually, in the Netherlands, some hospitals required approval and others did not. In Belgium, all four required approval. This meant that request for approval needed to be written in a hurry: the questionnaire was nearing completion. The approval in the Netherlands came down to an assessment of the act WMO. When an MEC concluded that the act WMO was not applicable to this research this meant a green light and the research could start. This process of writing the proposal, submitting the proposal and receiving the verdict took about 6 weeks for hospitals in the Netherlands.

For hospitals in Belgium, the demands were stricter and required a complete proposal. The same procedure in Belgium, with stricter demands, took about 9 weeks before a verdict was given for one of the four hospitals. The others were still in the process of the verdict, eventually leading to just one participating hospital in Belgium.

This is a major learned lesson for the author and a warming for future students wanting to do any research in a medical setting, regardless of the nature of the research. When doing research in a medical setting, especially in an university medical centre, prepare for MEC admissions in time. An admission requires at least the following key elements:

- Accurate description of the research .
  - » What are you going to do?
  - » Rationale behind the research.
  - » How do you intend to approach respondents?
- Overview of the methodology.
- Intended start and stop dates as the number of respondents.
- Informed consent and detailed respondent information.
- Privacy regulation (how will you deal with sensitive information).
- Final questionnaires used in the research (all versions).
- Other materials needed for respondent inclusion.

This short overview illustrates that you cannot start the MEC application procedure prior to completing the operationalization of your research. The questionnaire(s), and thus the methodology and all that underlies the questionnaire(s), needs to be finished. Also prepare for refusal of your admission. In short: take at least 3 weeks to write a simple proposal (when only tested against the act WMO) and prepare for at least 4 weeks before the verdict is given.

Literature

Aalten, T. (2016). Veel te vroeg. Parool.

Adobe. (2012). InDesign (Version 8.0).

Altimier, L. B., Eichel, M., Warner, B., Tedeschi, L., & Brown, B. (2005). Developmental care: changing the NICU physically and behaviorally to promote patient outcomes and contain costs. Neonatal Intensive Care, 18(4), 12-16.

Aries, M., Aarts, M., & van Hoof, J. (2015). Daylight and health: A review of the evidence and consequences for the built environment. Lighting Research and Technology, 47(1), 6-27.

Auspurg, K., Hinz, T., & Liebig, S. (2009). Complexity, learning effects, and plausibility of vignettes in factorial surveys.

Autodesk. (2015). Character Generator. Retrieved from https://charactergenerator.autodesk.com/

Autodesk, I. (2015). Architectural Material, What is the mia_material? Retrieved from http://docs.autodesk.com/MENTALRAY/2013/ENU/mental-ray-help//files/shaders/architectural/arch_mtl.html.

Autodesk. (2016). Autodesk Maya 2016 (Version Autodesk Maya SP2).

Babin, B. J., Hardesty, D. M., & Suter, T. A. (2003). Color and shopping intentions: The intervening effect

Babin, B. J., Chebat, J.-C., & Michon, R. (2004). Perceived appropriateness and its effect on quality, affect and behavior. Journal of Retailing and Consumer Services, 11, 287-298.

Barekati, E., Clayton, M. J., & Yan, W. (2015). A BIM-Compatible Schema for Architectural Programming Information. In G. Celani, M. D. Sperling, & S. J. M. Franco (Eds.), Computer-Aided Architectural Design Futures. The Next City - New Technologies and the Future of the Built Environment: 16th International Conference, CAAD Futures 2015, São Paulo, Brazil, July 8-10, 2015. Selected Papers (pp. 311-328). Berlin, Heidelberg: Springer Berlin Heidelberg.

Begemann, S., Van den Beld, G., & Tenner, A. (1997). Daylight, artificial light and people in an office environment, overview of visual and biological responses. International Journal of Industrial Ergonomics, 20(3), 231-239.

de Bekker-Grob, E. W. (2009). Discrete Choice Experiments in Health Care (Doctorate), Erasmus University Rotterdam, Rotterdam. .

de Bekker-Grob, E. W., Ryan, M., & Gerard, K. (2012). Discrete choice experiments in health economics: a review of the literature. Health Economics, 21(2), 145-172. doi:10.1002/hec.1697.

Van den Berkhof, F. W. (2008). Beleving van lounges op Amsterdam Airport Schiphol, vormgevingsvoorkeuren van reizigers. (Master), Technical University of Delft, Delft.

de Boer-Lootens, M. I. (2014). Wonen voor ouderen met dementie: Onderzoek naar de optimale fysieke vormgeving voor de gebruiker. (Master), Technical University of Delft, Delft.

Braithwaite, M. (2008). Nurse burnout and stress in the NICU. Advances in Neonatal Care, 8(6), 343-

347.

Brett, K. M., Strogatz, D. S., & Savitz, D. A. (1997). Employment, job strain, and preterm delivery among women in North Carolina. American Journal of Public Health, 87(2), 199-204.

Broom, M., Brady, B., Kecskes, Z., & Kildea, S. (2013). World Café Methodology engages stakeholders in designing a Neonatal Intensive Care Unit. Journal of Neonatal Nursing, 19(5), 253-258.

Carter, B., Carter, A., & Bennett, S. (2008). Families' views upon experiencing change in the neonatal intensive care unit environment: from the 'baby barn'to the private room. Journal of Perinatology, 28(12), 827-829.

Chen, W., Oetomo, S. B., & Feijs, L. (2010). Neonatal monitoring–current practice and future trends. Handbook of Research on Developments in e-Health and Telemedicine: Technological and Social Perspectives, 939-961.

Choi, J.-H., Beltran, L. O., & Kim, H.-S. (2012). Impacts of indoor daylight environments on patient average length of stay (ALOS) in a healthcare facility. Building and Environment, 50, 65-75.

Cleveland, L. M. (2008). Parenting in the neonatal intensive care unit. Journal of Obstetric, Gynecologic, & Neonatal Nursing, 37(6), 666-691.

Cormier, P., & Lewis, K. (2015). An affordance-based approach for generating user-specific design specifications. Artificial Intelligence for Engineering Design, Analysis and Manufacturing, 29(03), 281-295.

Cockcroft, S. (2012). How can family centred care be improved to meet the needs of parents with a premature baby in neonatal intensive care? Journal of Neonatal Nursing 2012, 18:105–110.

Cvach, M. (2012). Monitor alarm fatigue: an integrative review. Biomedical Instrumentation & Technology, 46(4), 268-277.

DeMier, R. L., Hynan, M. T., Harris, H. B., & Manniello, R. L. (1996). Perinatal stressors as predictors of symptoms of posttraumatic stress in mothers of infants at high risk. Journal of perinatology : official journal of the California Perinatal Association, 16(4), 276-280. Retrieved from http://europepmc.org/abstract/MED/8866297

Dijk, D.-J., & Archer, S. N. (2009). Light, sleep, and circadian rhythms: together again. PLoS biology, 7(6), 1221.

Domanico, R., Davis, D. K., Coleman, F., & Davis, B. O. (2011). Documenting the NICU design dilemma: comparative patient progress in open-ward and single family room units. Journal of Perinatology, 31(4), 281-288.

Erasmus MC. (2015). Personal communication, Expert panel Erasmus Medical Centre of Rotterdam, 27-07-2015.

Erasmus MC. (2016). Het Sophia in beeld. Rotterdam: Erasmus MC.

Easton, S., & Van Laar, D. (2013). QoWL (Quality of Working Life): what, how, and why? Psychology Research, 3(10), 596-605.

Felce, D., & Perry, J. (1995). Quality of life: Its definition and measurement. Research in Developmental Disabilities, 16(1), 51-74. doi:http://dx.doi.org/10.1016/0891-4222(94)00028-8

Flacking, R., & Dykes, F. (2013). 'Being in a womb'or 'playing musical chairs': the impact of place and space on infant feeding in NICUs. BMC pregnancy and childbirth, 13(1), 179.

Freudenthal, A., van Stuijvenberg, M., & van Goudoever, J. B. (2013). A quiet NICU for improved infants' health, development and well-being: a systems approach to reducing noise and auditory alarms. Cognition, Technology & Work, 15(3), 329-345. doi:10.1007/s10111-012-0235-6

Galasiu, A. D., & Veitch, J. A. (2006). Occupant preferences and satisfaction with the luminous environment and control systems in daylit offices: a literature review. Energy and Buildings, 38(7), 728-742.

Goldenberg, R. L., Culhane, J. F., Iams, J. D., & Romero, R. (2008). Epidemiology and causes of preterm birth. The Lancet, 371(9606), 75-84. doi:http://dx.doi.org/10.1016/S0140-6736(08)60074-4

Grinwis, M., Van Oel, C., & De Bruin-Hordijk, G., J., Truus,. (2015). Lichtmetingen.

Hamilton, D. K. (2003). The four levels of evidence-based practice. Healthcare Design, 3(4), 18-26.

Hensher, D. A., Rose, J. M., & Greene, W. H. (2005). Applied choice analysis: a primer: Cambridge University Press.

Jansen, S., Boumeester, H., Coolen, H., Goetgeluk, R., & Molin, E. (2009). The impact of including images in a conjoint measurement task: evidence from two small-scale studies. Journal of Housing and the Built Environment, 24(3), 271-297. doi:10.1007/s10901-009-9149-x

Johnson, R. F., Lancsar, E., Marshall, D., Kilambi, V., Mühlbacher, A., Regier, D. A., . . . Bridges, J. F. P. (2013). Constructing Experimental Designs for Discrete-Choice Experiments: Report of the ISPOR Conjoint Analysis Experimental Design Good Research Practices Task Force. Value in Health, 16(1), 3-13. doi:http://dx.doi.org/10.1016/j.jval.2012.08.2223

Jonker, A., & Smits-Stassen, K. (2015). [Personal communication].

Joye, Y. (2007). Architectural lessons from environmental psychology: The case of biophilic architecture. Review of General Psychology, 11(4), 305-328. doi:10.1037/1089-2680.11.4.305

Karin de Vrijer, Angela Jonker, & Smits-Stassen, K. (2015). Van Ergenis naar Ergonomie (concept). NMCU & NICU. Maxima Medisch Centrum. Veldhoven.

Khanna, R., Jariwala, K., & Bentley, J. P. (2013). Psychometric properties of the EuroQol Five Dimensional Questionnaire (EQ-5D-3L) in caregivers of autistic children. Qual Life Res, 22(10), 2909-2920. doi:10.1007/s11136-013-0423-8

Kroon, S. (2011). Communicating the retail brand through design: Case study sports shops. (Master), Technical University of Delft, Delft.

Kuhfeld, W. F. (2010). Discrete Choice.

Latour, J., M., Van Goudoever, J., B., Schuurman, B., Elink,, Albers, M., J. I. J., Van Dam, N., A. M., Dullaart, E., . . . Hazelzet, J., A. (2011). A qualitative study exploring the experiences of parents of children admitted to seven Dutch pediatric intensive care units. Intensive Care Medicine, 37(2), 319-325. doi:10.1007/s00134-010-2074-3

Lunze, K., & Hamer, D. H. (2012). Thermal protection of the newborn in resource-limited environments.

J Perinatol, 32(5), 317-324. Retrieved from http://dx.doi.org/10.1038/jp.2012.11

Maier, J. R. A., & Fadel, G. M. (2009). Affordance-based design methods for innovative design, redesign and reverse engineering. Research in Engineering Design, 20(4), 225-239. doi:10.1007/s00163-009-0064-7

Mardaljevic, J. (2013). Rethinking daylighting and compliance.

Mendlowicz, M. V., & Stein, M. B. (2000). Quality of Life in Individuals With Anxiety Disorders. American Journal of Psychiatry, 157(5), 669-682. doi:doi:10.1176/appi.ajp.157.5.669

mental images GmbH. (2008). Physical Light. Retrieved from http://download.autodesk.com/us/maya/2009help/mr/shaders/node19.html#mi_shader__physical_light

Mogas, J., Riera, P., & Bennett, J. (2006). A comparison of contingent valuation and choice modelling with second-order interactions. Journal of Forest Economics, 12, 5-30.

NVIDIA. (2015). mental ray (Version 3.13.1.8).

Pavalache-Ilie, M., & Rioux, L. (2013). Workplace attachment and organizational commitment-are they predictors of organizational citizenship behavior? Analele Ştiinţifice ale Universităţii" Alexandru Ioan Cuza" din Iaşi. Psihologie(1), 5-18.

Peng, N.-H., Chen, L.-L., Li, T.-C., Smith, M., Chang, Y.-S., & Huang, L.-C. (2013). The effect of positioning on preterm infants' sleep–wake states and stress behaviours during exposure to environmental stressors. Journal of Child Health Care. doi:10.1177/1367493513496665

Qualtrics. (2002). Qualtrics Research Software. Utah, Provo: Qualtrics.

Rabin, R., & Charro, F. d. (2001). EQ-SD: a measure of health status from the EuroQol Group. Annals of medicine, 33(5), 337-343.

Raeside, L. (1997). Perceptions of environmental stressors in the neonatal unit. British Journal of Nursing, 6(16), 914-923.

Riccardo, F., van Oel, C., & de Jong, P. (2010). Redesign Of Affordable Housing Facades. Preparation Of A Visual Experiment. Paper presented at the 2010 ERES Conference, June 23-26.

Rietzschel, E. F., Nijstad, B. A., & Stroebe, W. (2006). Productivity is not enough: A comparison of interactive and nominal brainstorming groups on idea generation and selection. Journal of Experimental Social Psychology, 42(2), 244-251. doi:10.1016/j.jesp.2005.04.005

Ryan M, Hughes M (1997). Using conjoint analysis to assess women's preferences for miscarriage management. Health Econ 6(3):261-273.

Ryan, M., Bate, A., Eastmond, C., & Ludbrook, A. (2001). Use of discrete choice experiments to elicit preferences. Quality in Health Care : QHC, 10(Suppl 1), i55-i60. doi:10.1136/qhc.0100055..

PRN. (2014). Stichting Perinatale Registratie Nederland. Perinatale zorg in Nederland 2013. Utrecht: Stichting PRN, 2014.

Salonen, H., Lahtinen, M., Lappalainen, S., Nevala, N., Knibbs, L. D., Morawska, L., & Reijula, K. (2013). Physical characteristics of the indoor environment that affect health and wellbeing in healthcare facilities: a review. Intelligent Buildings International, 5(1), 3-25. doi:10.1080/17508975.2013.764838

SAS. (2011). SAS 9.3. Cary, NC 27513-2414, USA: SAS Institute Inc.

Scrima, F. (2015). The convergent-discriminant validity of the Workplace Attachment Scale (WAS). Journal of Environmental Psychology, 43, 24-29. doi:10.1016/j.jenvp.2015.05.009

Shahheidari, M., & Homer, C. (2012). Impact of the design of neonatal intensive care units on neonates, staff, and families: a systematic literature review. The Journal of perinatal & neonatal nursing, 26(3), 260-266.

Smith, A. B., Hefley, G. C., & Anand, K. J. (2007). Parent bed spaces in the PICU: effect on parental stress. Pediatr Nurs, 33(3), 215-221.

Smith, L. K., Draper, E. S., Manktelow, B. N., Dorling, J. S., & Field, D. J. (2007). Socioeconomic inequalities in very preterm birth rates. Archives of Disease in Childhood-Fetal and Neonatal Edition, 92(1), F11-F14.

Smolders, K. C., De Kort, Y. A., & Cluitmans, P. (2012). A higher illuminance induces alertness even during office hours: Findings on subjective measures, task performance and heart rate measures. Physiology & Behavior, 107(1), 7-16.

Stevens, D., C.,, Helseth, C., C.,, Thompson, P., A.,, Pottala, J., V.,, Khan, M., Akram.,, & Munson, D., P.,. (2011). A Comprehensive Comparison of Open-Bay and Single-Family-Room Neonatal Intensive Care Units at Sanford Children's Hospital. Herd, 5(4), 23-39.

Technoteam. (2005). LMK 2000 (Version 3.7.4.0).

Thompson, J., Irgens, L. M., Rasmussen, S., & Daltveit, A. K. (2006). Secular trends in socio-economic status and the implications for preterm birth. Paediatric and perinatal epidemiology, 20(3), 182-187.

TOI. (2015). TOI Maya Toolbox. Retrieved from http://toi.bk.tudelft.nl/?p=download-general

Treyvaud, K. (2014). Parent and family outcomes following very preterm or very low birth weight birth: a review. Paper presented at the Seminars in Fetal and Neonatal Medicine.

Ulrich, R. S. (1991). Effects of interior design on wellness: theory and recent scientific research. Journal of health care interior design : proceedings from the . Symposium on Health Care Interior Design. Symposium on Health Care Interior Design, 3, 97-109. Retrieved from http://www.scopus.com/inward/record.url?eid=2-s2.0-0026362921&partnerID=40&md5=71d492d87b26c92900515976f3f39a27

Van Bommel, W. J. (2006). Non-visual biological effect of lighting and the practical meaning for lighting for work. Applied ergonomics, 37(4), 461-466.

Van Daal, F. (2015). [Gesprek in Medisch Centrum Veldhoven].

Van Oel, C. J., & van den Berkhof, F. D. (2013). Consumer preferences in the design of airport passenger areas. Journal of Environmental Psychology, 36, 280-290.

Van Pul, C., Mortel, H. v. d., Bogaart, J. v. d., Mohns, T., & Andriessen, P. (2015). Safe patient monitoring is challenging but still feasible in a neonatal intensive care unit with single family rooms. Acta Paediatrica, n/a-n/a. doi:10.1111/apa.12907

Vreeburg, S. A., Kruijtzer, B. P., van Pelt, J., van Dyck, R., DeRijk, R. H., Hoogendijk, W. J., . . . Penninx, B. W. (2009). Associations between sociodemographic, sampling and health

factors and various salivary cortisol indicators in a large sample without psychopathology. Psychoneuroendocrinology, 34(8), 1109-1120.

VWS. (2015). Wet medisch-wetenschappelijk onderzoek met mensen. Ministry of Public health Welfare and Sport. BWBR0009408.

Walsh, W. F., McCullough, K. L., & White, R. D. (2006). Room for improvement: nurses' perceptions of providing care in a single room newborn intensive care setting. Advances in Neonatal Care, 6(5), 261-270.

Williams, A. L., Sanderson, M., Lai, D., Selwyn, B. J., & Lasky, R. E. (2009). Intensive care noise and mean arterial blood pressure in extremely low-birth-weight neonates. American journal of perinatology, 26(5), 323-329.

Zeitzer, J. M., Dijk, D. J., Kronauer, R. E., Brown, E. N., & Czeisler, C. A. (2000). Sensitivity of the human circadian pacemaker to nocturnal light: melatonin phase resetting and suppression. The Journal of physiology, 526(3), 695-702.

Zimring, C., Joseph, A., & Choudhary, R. (2004). The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity. Concord, CA: The Center for Health Design.

Appendix

Creating the statistical model

Syntax	Discription
%let factors= 5; *%let* attributes= 12; *%let* alternatives= 2;	Number of fixed factors with 12 attributes, this results in 12-5=7 factors that varay randomly in sets. The number of attributes used is 12 and the number of alternatives per set is 2
%mktbsize(nattrs=&attributes, setsize=2 to &attributes+1, options=ubd) *%mktruns*(2**11 3 2**11 3, *%let* n= 72;	Number of attributes times 2 for a 100% saturated design is possiblility based on mktruns.
%MktEx(2**11 3 2**11 3, n=&n, seed=673);	Request of discrete choise design with 11 atributes with 2 levels and 1 with 3 levels divided in two blocks

title 'mgrinwis_Attribute_design';
%macro partprof;
sum=0;
do k=1 to &attributes;
sum=sum + (x[k+&attributes]=x[k]);
end;
bad=abs(sum- &factors);
if sum < &factors then do;
if x[j1] ^=x[mod(j1-1,&attributes)+1] then bad=bad+1000;
if x[j2] ^=x[mod(j2-1,&attributes)+1] then bad=bad+1000;
end;
%mend;
	Creating partial profiles

%mktex(2**11 3 2**11 3, n=144, optiter=0, tabiter=0, maxtime=720, order=random=&attributes, out=exdataset, restrictions=partprof, seed=34562, exchange=&alternatives, maxstages=1, options=nosort resrep quickr nox)	Number of atributes times 2, devisable by 72 (722=11). Refer to the number of attributes (=12) Partial profilins is set to active Random seed Refer to the number of alternatives (=2)
%MktEx(2**11 3 2**11 3, n=144, init=exdataset, options=check, examine= i v);	Check of the generated designs
%mktkey(&alternatives &attributes)	
%mktroll(design=exdataset, key=key, out=rolldataset) proc print; by set; id set; var:; where set le 5;run;	2 alternatives and12 attributes in key file

```
%mktdups(generic, data=rolldataset, out=dupsdataset,
factors=x1-x&attributes, nalts=&alternatives)
proc print data=dupsdataset(obs=&attributes);
id set;
by set;
run;
```

Find duplicate choice sets and duplicate alternatives within generic choice set

obs value = cut off
Creating variables to the candidate designs

Numbers in the label are not permitted

```
title "Labels and values";
proc format;
value Type 1 = 'Family' 2 = 'Ward';
value Size 1 = 'Small' 2 = 'Large';
value Priv 1 = 'Curt' 2 = 'GlasCurt';
value Wind 1 = 'Medium' 2 = 'Large';
value AtmA 1 = 'Home' 2 = 'Clean';
value AtmB 1 = 'Healing' 2 = 'Clean';
value FurA 1 = 'SleepSof' 2 = 'NoSofa';
value FurB 1 = 'Bedcloset' 2 = 'NoCloset';
value FurC 1 = 'FeedChair' 2 = 'NormalChair';
value Door 1 = 'SemiOpen' 2 = 'Open';
value Lumi 1 = '4000k' 2 = '6500k';
value Zone 1 = 'BlueZone' 2 = 'RedZone' 3 = 'GreenZone';
run;
```

```
%mktlab(data=dupsdataset,
        vars=
        Type
        Size
        Privacy
        Window_orientation
        Atmosphere_A
        Atmosphere_B
        Furniture_A
        Furniture_B
        Furniture_C
        Door
        Illumination
        Working_zone,
out=editdupsdataset,
stmts=format
        Type Type.
        Size Size.
        Privacy Priv.
        Window_orientation Wind.
        Atmosphere_A AtmA.
        Atmosphere_B AtmB.
        Furniture_A FurA.
        Furniture_B FurB.
        Furniture_C FurC.
        Door Door.
        Illumination Lumi.
        Working_zone Zone.)
```

Attatching labels to variables candidate set of choice sets

```
%choiceff(data=editdupsdataset, model=class(Type
Size Privacy Window_orientation Atmosphere_A Atmos-
phere_B Furniture_A Furniture_B Furniture_C Door Illumi-
nation Working_zone /zero=first),
        seed=65242,
        maxiter=25,
        nsets=&n,
        options=nodups relative,
        beta=zero);
proc print data=best;
        id set;
        by notsorted set;
        var
                Type
                Size
                Privacy
                Window_orientation
                Atmosphere_A
                Atmosphere_B
                Furniture_A
                Furniture_B
                Furniture_C
                Door
                Illumination
                Working_zone;
        run;
```

Search for efficient experimental designs

Random seed
Maximum number of designs to make
Number of choice sets to make

```
%mktblock(data=best,
        nalts=&alternatives,
        nblocks=6,
        factors=
                Type
                Size
                Privacy
                Window_orientation
                Atmosphere_A
                Atmosphere_B
                Furniture_A
                Furniture_B
                Furniture_C
                Door
                Illumination
                Working_zone,
        print=design, seed=472);
```

Blocking of the design with 2 alternatives (choices) in six blocks. With 12 attributes this results in 12*2*6=144 alternatives that will be presented to respondentes. (With 4 renders per alternative, this results in 144*4=576 renders to generate.)

```
proc export
        data=mgrinwis_Attribute_final_design
        dbms=xlsx
        outfile="E:\FOLDER\Attributes_FINAL.xlsx"
        replace;
run;
```

Exporting the generated design to an excel file for easy editing and render layer creation with Maya.
Output to file

Analysing the results in SAS

Syntax	Discription
data results; infile “C:\INPUT\Choice_data_matched.txt” delimiter=”,”; input Block Set Choice Type Size Privacy Window_orientation Atmosphere_A Atmosphere_B Furniture_A Furniture_B Furniture_C Door Illumination Working_zone; datalines; run;	Import the choices made. The choices are exported by SPSS in a text file for easy and error free import in SAS.

proc catmod data=WORK.RESULTS;
direct Privacy Window_orientation Atmosphere_A Atmosphere_B Furniture_A Furniture_B Furniture_C Door Illumination Working_zone;
model Choice= Size Type Privacy Window_orientation Atmosphere_A Atmosphere_B Furniture_A Furniture_B Furniture_C Door Illumination Working_zone;
title ‘main effects Multinomial logit Model Using Catmod’;
run;
	A quick analysis with catmod performs categorical data modeling of the data. This is just for quick results.

proc transreg design=5000 data=results nozeroconstant norestoremissing;
model class(Type Size Privacy Window_orientation Atmosphere_A Atmosphere_B Furniture_A Furniture_B Furniture_C Door Illumination Working_zone
/ zero=none order=data) /
lprefix=0;
output out=coded(drop=_type_ _name_ intercept Type Size Privacy Window_orientation Atmosphere_A Atmosphere_B Furniture_A Furniture_B Furniture_C Door Illumination Working_zone);
id Block Set Choice;
run;
	Prepare the input data set with classification variables for the LOGISTIC (proc phreg) procedure.

%phchoice(on) ods path show;	

proc phreg data=coded;
model Choice*Choice(2) = &_trgind / ties=breslow;
strata Block Set;
run;
	Fit the multinomial logit choice model.

proc print data=coded(obs=50); run;	Print the results.

Longlist and shortlist

This list gives an overview of the included and excluded variables.

Themes	Longlist	Shortlist, attribute included in:	
	Attribute	DCE	Questionnaire
NICU type	Ward unit	X	
	Family unit	X	
Size of the NICU unit	Small	X	
	Large	X	
Privacy Curtains	Blinds	X	
	Seeing of other people		X
	Hearing other people		X
	Transparency of the door	X	
Atmosphere	Home environment	X	
	Clean environment	X	
	Healing environment	X	
Furniture	Sleeping sofa	X	
	Bed closet	X	
	Normal chair	X	
Satisfaction	Parent satisfaction		
	Medical professional satisfaction		
Areas for family	Flex-working area in patient room		X
	Flex-working area in Ronald MC-Donald house		X
	Flex-working area in restaurant		X
	Flex-working area in NICU unit		X
	Flex-working area in the family room		X
Areas for staff	Centralized nursing station	X	
	Working zone (colour) on floor	X	
Temperature	Temperature in patient room		
	Temperature in NICU unit		
	Thermal comfort		
Visual environment	Appropriate lighting		
	Light colour temperature	X	
	Light intensity	X	
	Daylight		
	Window size	X	
	Bright artificial light		
	Control over lighting		
	Views of nature	X	
	Well-designed gardens		
	Plants in the patient room		
	Positive art		

Themes	Longlist	Shortlist, attribute included in:	
	Attribute	DCE	Questionnaire
Wayfinding	Easy wayfinding		
	Visual aids		
Sounds	Sounds from medical pumps		X
	Sounds from respirators		X
	Voices		X
	Sounds from monitors		X
	Sounds from the hall		X
	Sounds from footsteps		X
Wellbeing (QoL)	QoL parents		X
	QoL medical professionals		X
	Wellbeing neonates		
	QoWL medical professionals		X
Materialization	Type of floor covering		
	Colour of floor covering	X	
	Colour of walls		
	Material of the wall		
	Material of the furniture		
Shading	Curtains	X	
	Vertical louvres		
	Horizontal louvres		
	Inside facade shading	X	
	Outside facade shading		
Room configurations	Twin/triplet family units		
	Family unit + care mother		
	Small wards (i.e. 4 incubators)		

Expertpanel questionnaire

Introductie
Een groot aantal onderzoeken heeft een sterke relatie aangetoond tussen omgevingseigenschappen en het welzijn van patiënten in een medische setting. Begrip van de bijdrage van omgevingseigenschappen, die het welzijn van ouders, medisch- en verzorgend personeel in een neonatale intensive care omgeving beïnvloeden, is een belangrijke voorwaarde om tot een gedegen ontwerp van een NICU omgeving te komen. Hierbij is evident dat deze omgeving ruimte bied aan de zorgprofessional en het zorgproces van de neonaat. In deze vragenlijst wordt een aantal ruimtelijke aspecten genoemd die, vanuit de literatuur, in een bepaalde mate zou bijdragen aan het welzijn van ouders, medisch- en verzorgend personeel op een NICU afdeling. Tevens zijn enkele ruimtelijke aspecten toegevoegd die mogelijk zouden bijdragen aan het welzijn van ouders, medisch- en verzorgend personeel op een NICU afdeling.

Doel
De resultaten zullen worden geanalyseerd vóór aanvang van de meeting op 27-07-2015 en dient voornamelijk als input voor de gezamenlijke discussie.

Mening
De vragenlijst bestaat uit twee delen met elk 8 vragen. In het eerste deel wordt gevraagd om uzelf in te leven in de ouders die de NICU bezoeken en hoe verschillende factoren hun welzijn kunnen beïnvloeden. Het tweede deel heeft betrekking op uw situatie als medewerker in de NICU. Voor het invullen van deze vragenlijst is uw mening, met betrekking tot de NICU als werkomgeving, relevant. Er zijn geen goede of foute antwoorden.

Duur
Het invullen van de vragenlijst neemt ongeveer 15 minuten in beslag. Alvast bedankt voor het invullen van deze vragenlijst!

Fijn weekend en tot a.s. maandag in de Shelten zaal om 13:30 Mario Grinwis

Welzijn van ouders.
De volgende vragen hebben allen betrekking op het welzijn van de ouders op de NICU afdeling. Leef u zo goed mogelijk in de situatie van de ouders in, om de volgende vragen te beantwoorden.

Q2.1 Vraag 1

In welke mate (positief of negatief) wordt het welzijn van ouders in een NICU volgens u beïnvloedt door de hieronder genoemde factoren?	Zeer negatief	Negatief	Enigszins negatief	Enigszins positief	Positief	Zeer positief
Planten op de afdeling (1)						
Daglicht (2)						
Geluiden (bv. van apparatuur) (3)						
Zicht op natuur (4)						
Uitzicht (5)						
Rustige omgeving (6)						
Verse en schone lucht (7)						
Aanwezigheid van kunst (8)						
Temperatuurverschil tussen NICU kamers en gang (9)						

Q2.2 Vraag 2
Welke factor is volgens u de belangrijkste voor het welzijn van ouders in de NICU? Rangschik de factoren op relevantie door de belangrijkste factoren bovenaan te plaatsen en de minst belangrijke onderaan.

If Vraag 1 Planten op de afdeling Is Not Equal to 0
_____ Planten op de afdeling (1)
If Vraag 1 Daglichttoetreding Is Not Equal to 0
_____ Daglicht (2)
If Vraag 1 Geluid reducerende maatregelen Is Not Equal to 0
_____ Geluiden (bv. van apparatuur) (3)
If Vraag 1 Zicht op natuur Is Not Equal to 0
_____ Zicht op natuur (4)
If Vraag 1 Zicht uit het raam Is Not Equal to 0
_____ Uitzicht (5)
If Vraag 1 Rustgevende omgeving Is Not Equal to 0
_____ Rustige omgeving (6)
If Vraag 1 Verse en schone lucht Is Not Equal to 0
_____ Verse en schone lucht (7)
If Vraag 1 Aanwezigheid van kunst Is Not Equal to 0
_____ Aanwezigheid van kunst (8)
If Vraag 1 Omgevingstemperatuur van 26 C Is Not Equal to 0
_____ Temperatuurverschil tussen NICU kamers en gang (9)

Q2.3 Vraag 3

In welke mate (positief of negatief) wordt het welzijn van ouders in een NICU volgens u beïnvloedt door de hieronder genoemde factoren?	Zeer negatief	Negatief	Enigszins negatief	Enigszins positief	Positief	Zeer positief
Medische apparatuur in de NICU (1)						
Inrichting waardoor het contact tussen ouders en kind wordt gestimuleerd (2)						
Overzicht over de afdeling (3)						
Visuele privacy (4)						
Akoestische privacy (5)						
Korte loopafstanden (6)						

Q2.4 Vraag 4
Welke factor is volgens u de belangrijkste voor het welzijn van ouders in de NICU? Rangschik de factoren op relevantie door de belangrijkste factoren bovenaan te plaatsen en de minst belangrijke onderaan.

If Vraag 3 Integratie van medische apparatuur (schoon, compact en overzichtelijk) Is Not Equal to 0
_____ Medische apparatuur in de NICU (1)
If Vraag 3 Inrichting waardoor het contact tussen ouders en kind wordt gestimuleerd Is Not Equal to 0
_____ Inrichting waardoor het contact tussen ouders en kind wordt gestimuleerd (2)
If Vraag 3 Overzien van de afdeling Is Not Equal to 0
_____ Overzicht over de afdeling (3)
If Vraag 3 Visuele privacy Is Not Equal to 0
_____ Visuele privacy (4)
If Vraag 3 Akoestische privacy Is Not Equal to 0
_____ Akoestische privacy (5)
If Vraag 3 Korte loopafstand Is Not Equal to 0
_____ Korte loopafstanden (6)

Q2.5 Vraag 5

In welke mate (positief of negatief) wordt het welzijn van ouders in een NICU volgens u beïnvloedt door de hieronder genoemde factoren? De aanwezigheid van een ...	Zeer negatief	Negatief	Enigszins negatief	Enigszins positief	Positief	Zeer positief
... pantry (1)						
... keuken (2)						
... speelhoek (3)						
... TV/ computerhoek (4)						
... afsluitbare stafruimte (5)						
... open stafruimte (6)						
... afsluitbare familieruimte (7)						
... open familieruimte (8)						

Q2.6 Vraag 6
Welke factor is volgens u de belangrijkste voor het welzijn van ouders op een NICU afdeling? Rangschik de factoren op relevantie door de belangrijkste factoren bovenaan te plaatsen en de minst belangrijke onderaan. De aanwezigheid van een ...

If Vraag 5 Aanwezigheid van een pantry Is Not Equal to 0
_____ ... pantry (1)
If Vraag 5 Aanwezigheid van een keuken Is Not Equal to 0
_____ ... keuken (2)
If Vraag 5 Aanwezigheid van een speelhoek Is Not Equal to 0
_____ ... speelhoek (3)
If Vraag 5 Aanwezigheid van een TV/ computer hoek Is Not Equal to 0
_____ ... TV/ computerhoek (4)
If Vraag 5 Aanwezigheid van een afgesloten stafruimte Is Not Equal to 0
_____ ... afsluitbare stafruimte (5)
If Vraag 5 Aanwezigheid van een open stafruimte Is Not Equal to 0
_____ ... open stafruimte (6)
If Vraag 5 Aanwezigheid van een familieruimte Is Not Equal to 0
_____ ... afsluitbare familieruimte (7)
If Vraag 5 open familieruimte Is Not Equal to 0
_____ ... open familieruimte (8)

Q2.7 Vraag 7

In welke mate (positief of negatief) wordt het welzijn van ouders in een NICU volgens u beïnvloed door de hieronder genoemde factoren?	Zeer negatief	Negatief	Enigszins negatief	Enigszins positief	Positief	Zeer positief
Slaapmogelijkheid voor moeder (1)						
Slaapmogelijkheid voor vader (2)						
Persoonlijke inrichting van de patiëntenkamer (3)						
Huiselijke inrichting van de afdeling (4)						
Kleurgebruik (5)						
Materiaalgebruik (6)						
Bewegwijzering (7)						
Verlichting met kunstlicht (8)						
Verlichting met daglicht (9)						
NICU met een zaal opstelling (10)						
NICU met een gezinsopstelling (11)						
Scheidingswanden tussen couveuses (12)						

Q2.8 Vraag 8
Welke factor is volgens u de belangrijkste voor het welzijn van ouders op een NICU afdeling? Rangschik de factoren op relevantie door de belangrijkste factoren bovenaan te plaatsen en de minst belangrijke onderaan.

If Vraag 7 Slaapmogelijkheid voor moeder Is Not Equal to 0
_____ Slaapmogelijkheid voor moeder (1)
If Vraag 7 Slaapmogelijkheid voor vader Is Not Equal to 0
_____ Slaapmogelijkheid voor vader (2)
If Vraag 7 Mogelijkheid voor persoonlijke inrichting van de patiëntenkamer Is Not Equal to 0
_____ Persoonlijke inrichting van de patiëntenkamer (3)
If Vraag 7 Vraag 7 Kleurgebruik Is Not Equal to 0
_____ Kleurgebruik (4)
If Vraag 7 Materiaalgebruik Is Not Equal to 0
_____ Materiaalgebruik (5)
If Vraag 7 Bewegwijzering Is Not Equal to 0
_____ Bewegwijzering (6)
If Vraag 7 Verlichting met kunstlicht Is Not Equal to 0
_____ Verlichting met kunstlicht (7)
If Vraag 7 Verlichting met daglicht Is Not Equal to 0
_____ Verlichting met daglicht (8)
If Vraag 7 NICU met een zaal opstelling Is Not Equal to 0
_____ NICU met een zaal opstelling (9)
If Vraag 7 NICU met een gezinsopstelling Is Not Equal to 0
_____ NICU met een gezinsopstelling (10)
If Vraag 7 Scheidingswanden tussen couveuses Is Not Equal to 0
_____ Scheidingswanden tussen couveuses (11)
If Vraag 7 Huiselijke inrichting van de patiëntenkamers Is Not Equal to 0
_____ Huiselijke inrichting van de afdeling (12)

Q3.1 Welzijn van medisch en verzorgend personeel
De volgende vragen hebben allen betrekking op het welzijn van het medisch en verzorgend personeel op een NICU afdeling. Hierbij is het belangrijk dat u zo goed mogelijk aan uw eigen situatie denkt en de antwoorden baseert op uw eigen mening en ervaring.

Vraag 9

In welke mate (positief of negatief) wordt het welzijn van het medisch en verzorgend personeel op een NICU afdeling volgens u beïnvloed door de hieronder genoemde factoren?	Zeer negatief	Negatief	Enigszins negatief	Enigszins positief	Positief	Zeer positief
Planten op de afdeling (1)						
Daglicht (2)						
Geluiden (bv. van apparatuur) (3)						
Zicht op natuur (4)						
Uitzicht (5)						
Rustige omgeving (6)						
Verse en schone lucht (7)						
Aanwezigheid van kunst (8)						
Temperatuurverschil tussen NICU kamers en gang (9)						

Q3.2 Vraag 10
Welke factor is volgens u de belangrijkste voor het welzijn van het medisch en verzorgend personeel op een NICU afdeling? Rangschik de factoren op relevantie door de belangrijkste factoren bovenaan te plaatsen en de minst belangrijke onderaan.

If Vraag 9 Planten op de afdeling Is Not Equal to 0
_____ Planten op de afdeling (1)

If Vraag 9 Daglicht Is Not Equal to 0
_____ Daglicht (2)
If Vraag 9 Geluiden (bv. van apparatuur) Is Not Equal to 0
_____ Geluiden (bv. van apparatuur) (3)
If Vraag 9 Zicht op natuur Is Not Equal to 0
_____ Zicht op natuur (4)
If Vraag 9 Uitzicht Is Not Equal to 0
_____ Uitzicht (5)
If Vraag 9 Rustige omgeving Is Not Equal to 0
_____ Rustige omgeving (6)
If Vraag 9 Verse en schone lucht Is Not Equal to 0
_____ Verse en schone lucht (7)
If Vraag 9 Aanwezigheid van kunst Is Not Equal to 0
_____ Aanwezigheid van kunst (8)
If Vraag 9 Temperatuurverschil tussen NICU kamers en gang Is Not Equal to 0
_____ Temperatuurverschil tussen NICU kamers en gang (9)

Q3.3 Vraag 11

In welke mate (positief of negatief) wordt het welzijn van het medisch en verzorgend personeel op een NICU afdeling volgens u beïnvloed door de hieronder genoemde factoren?	Zeer negatief	Negatief	Enigszins negatief	Enigszins positief	Positief	Zeer positief
Medische apparatuur in de NICU (1)						
Inrichting waardoor het contact tussen ouders en kind wordt gestimuleerd (2)						
Overzicht over de afdeling (3)						
Visuele privacy (4)						
Akoestische privacy (5)						
Korte loopafstanden (6)						

Q3.4 Vraag 12
Welke factor is volgens u de belangrijkste voor het welzijn van het medisch en verzorgend personeel op een NICU afdeling? Rangschik de factoren op relevantie door de belangrijkste factoren bovenaan te plaatsen en de minst belangrijke onderaan.
If Vraag 11 Integratie van medische apparatuur (schoon, compact en overzichtelijk) Is Not Equal to 0
_____ Medische apparatuur in de NICU (1)
If Vraag 11 Inrichting voor het stimuleren van contact tussen ouders en kind Is Not Equal to 0
_____ Inrichting waardoor het contact tussen ouders en kind wordt gestimuleerd (2)
If Vraag 11 Overzien van de afdeling Is Not Equal to 0
_____ Overzicht over de afdeling (3)
If Vraag 11 Visuele privacy Is Not Equal to 0
_____ Visuele privacy (4)
If Vraag 11 Akoestische privacy Is Not Equal to 0
_____ Akoestische privacy (5)
If Vraag 11 Korte loopafstand Is Not Equal to 0
_____ Korte loopafstanden (6)

Q3.5 Vraag 13

In welke mate (positief of negatief) wordt het welzijn van het medisch en verzorgend personeel op een NICU afdeling volgens u beïnvloed door de hieronder genoemde factoren? De aanwezigheid van een ...	Zeer negatief	Negatief	Enigszins negatief	Enigszins positief	Positief	Zeer positief
... pantry (8)						
... keuken (9)						
... speelhoek (10)						

... TV/ computerhoek (11)
... afsluitbare stafruimte (12)
... open stafruimte (13)
... afsluitbare familieruimte (14)
... open familieruimte (15)

Q3.6 Vraag 14
Welke factor is volgens u de belangrijkste voor het welzijn van het medisch en verzorgend personeel op een NICU afdeling? Rangschik de factoren op relevantie door de belangrijkste factoren bovenaan te plaatsen en de minst belangrijke onderaan.

If Vraag 13 Aanwezigheid van een pantry Is Not Equal to 0
_____ ... pantry (1)
If Vraag 13 Aanwezigheid van een keuken Is Not Equal to 0
_____ ... keuken (2)
If Vraag 13 Aanwezigheid van een speelhoek Is Not Equal to 0
_____ ... speelhoek (3)
If Vraag 13 Aanwezigheid van een TV/ computer hoek Is Not Equal to 0
_____ ... TV/ computerhoek (4)
If Vraag 13 Aanwezigheid van een afgesloten stafruimte Is Not Equal to 0
_____ ... afsluitbare stafruimte (5)
If Vraag 13 Aanwezigheid van een open stafruimte Is Not Equal to 0
_____ ... open stafruimte (6)
If Vraag 13 Aanwezigheid van een familieruimte Is Not Equal to 0
_____ ... afsluitbare familieruimte (7)
If Vraag 13In welke mate (positief of negatief) wordt het welzijn van het medisch en verzorgend personeel op een NICU afdeling volgens u beïnvloed door de hieronder genoemde factoren? D...
... open familieruimte (8) Is Not Equal to 0
_____ ... open familieruimte (8)

Q3.7 Vraag 15
In welke mate (positief of negatief) wordt het welzijn van het medisch en verzorgend personeel op een NICU afdeling volgens u beïnvloed door de hieronder genoemde factoren?

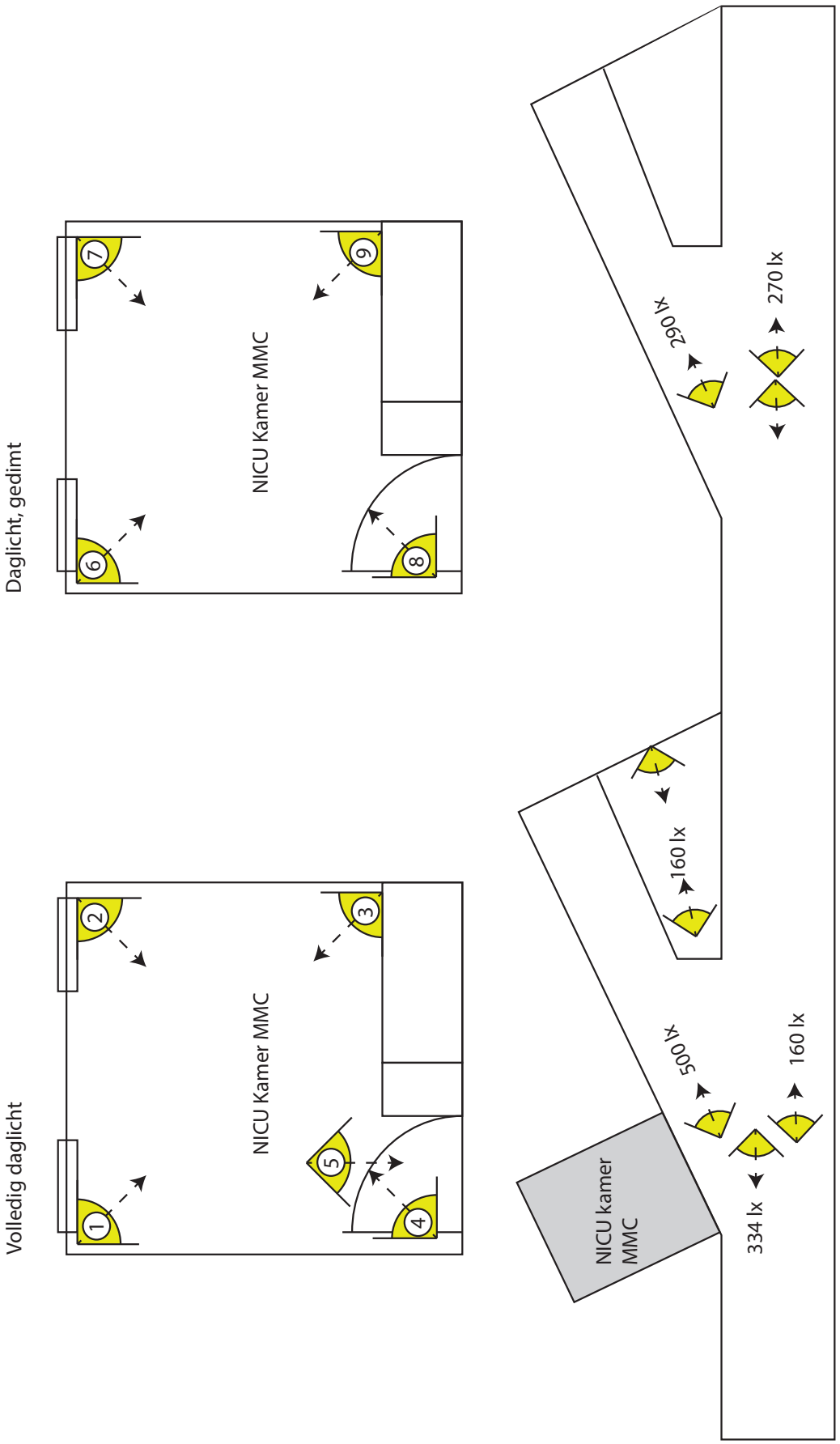
In welke mate (positief of negatief) wordt het welzijn van het medisch en verzorgend personeel op een NICU afdeling volgens u beïnvloed door de hieronder genoemde factoren? De aanwezigheid van een ...	Zeer negatief	Negatief	Enigszins negatief	Enigszins positief	Positief	Zeer positief
Slaapmogelijkheid voor moeder (1)						
Slaapmogelijkheid voor vader (2)						
Persoonlijke inrichting van de patiëntenkamer (3)						
Huiselijke inrichting van de afdeling (14)						
Kleurgebruik (4)						
Materiaalgebruik (5)						
Bewegwijzering (6)						
Verlichting met kunstlicht (7)						
Verlichting met daglicht (8)						
NICU met een zaal opstelling (9)						
NICU met een gezinskameropstelling (10)						
Scheidingswanden tussen couveuses (11)						

Q3.8 Vraag 16
Welke factor is volgens u de belangrijkste voor het welzijn van het medisch en verzorgend personeel op een NICU afdeling? Rangschik de factoren op relevantie door de belangrijkste factoren bovenaan te plaat-

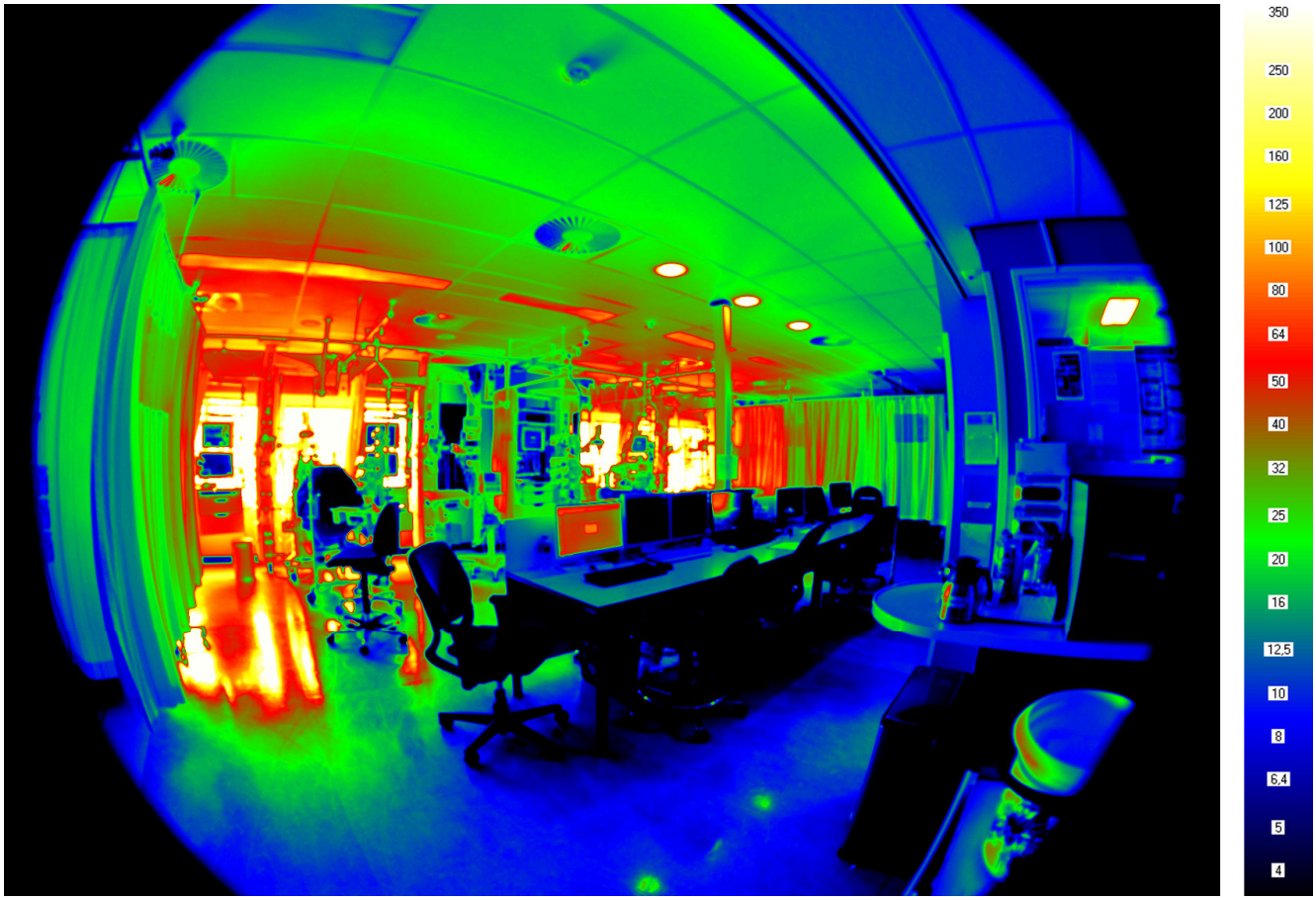
sen en de minst belangrijke onderaan.

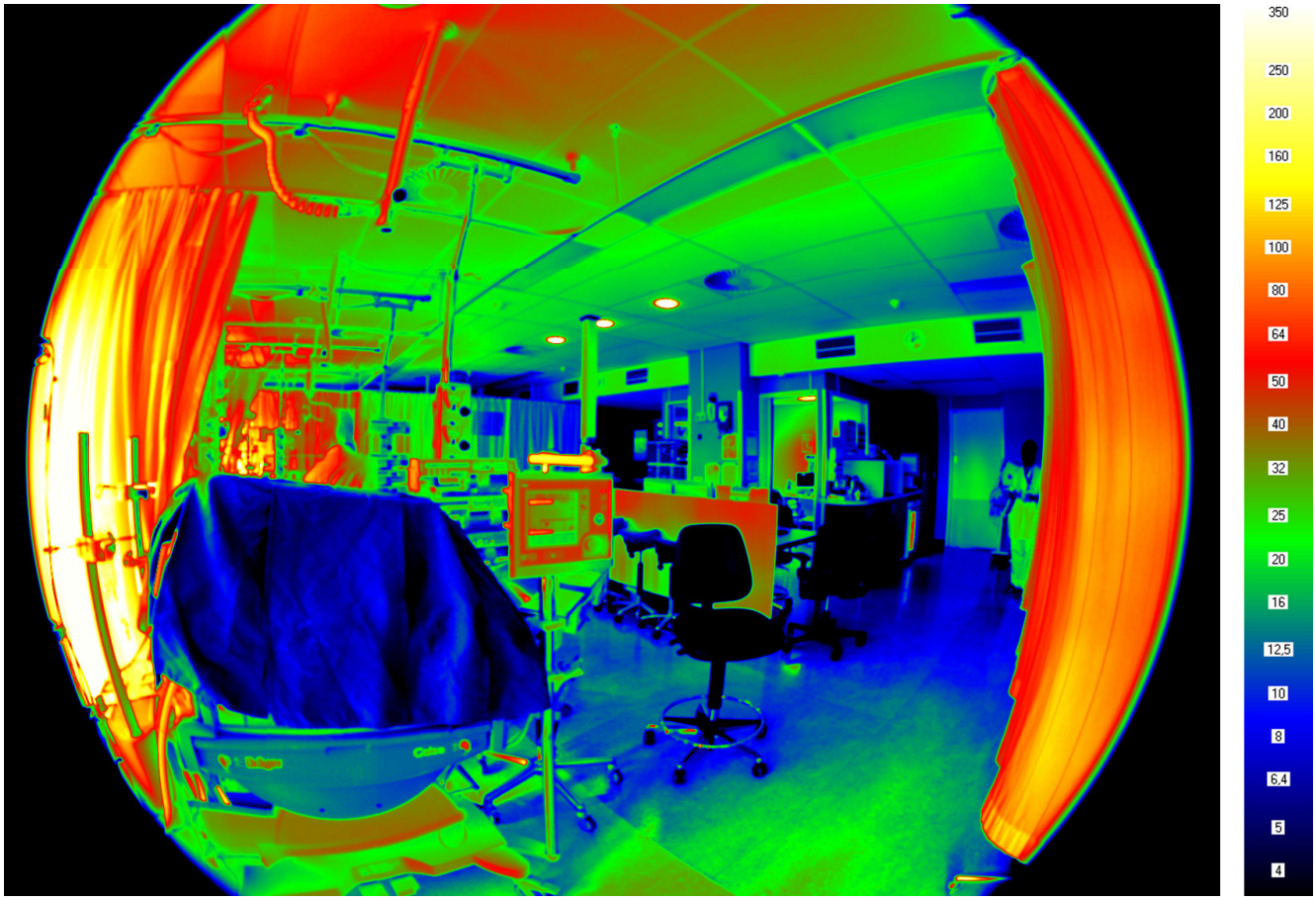
If Vraag 15 Slaapmogelijkheid voor moeder Is Not Equal to 0
_____ Slaapmogelijkheid voor moeder (1)
If Vraag 15 Slaapmogelijkheid voor vader Is Not Equal to 0
_____ Slaapmogelijkheid voor vader (2)
If Vraag 15 Mogelijkheid voor persoonlijke inrichting van de patiëntenkamer Is Not Equal to 0
_____ Persoonlijke inrichting van de patiëntenkamer (3)
If Vraag 15 Kleurgebruik Is Not Equal to 0
_____ Kleurgebruik (4)
If Vraag 15 Materiaalgebruik Is Not Equal to 0
_____ Materiaalgebruik (5)
If Vraag 15 Bewegwijzering Is Not Equal to 0
_____ Bewegwijzering (6)
If Vraag 15 Verlichting met kunstlicht Is Not Equal to 0
_____ Verlichting met kunstlicht (7)
If Vraag 15 Verlichting met daglicht Is Not Equal to 0
_____ Verlichting met daglicht (8)
If Vraag 15 NICU met een zaal opstelling Is Not Equal to 0
_____ NICU met een zaal opstelling (9)
If Vraag 15 NICU met een gezinsopstelling Is Not Equal to 0
_____ NICU met een gezinskameropstelling (10)
If Vraag 15 Scheidingswanden tussen couveuses Is Not Equal to 0
_____ Scheidingswanden tussen couveuses (11)
If Vraag 15 Huiselijke inrichting van de patiëntenkamers Is Not Equal to 0
_____ Huiselijke inrichting van de afdeling (12)

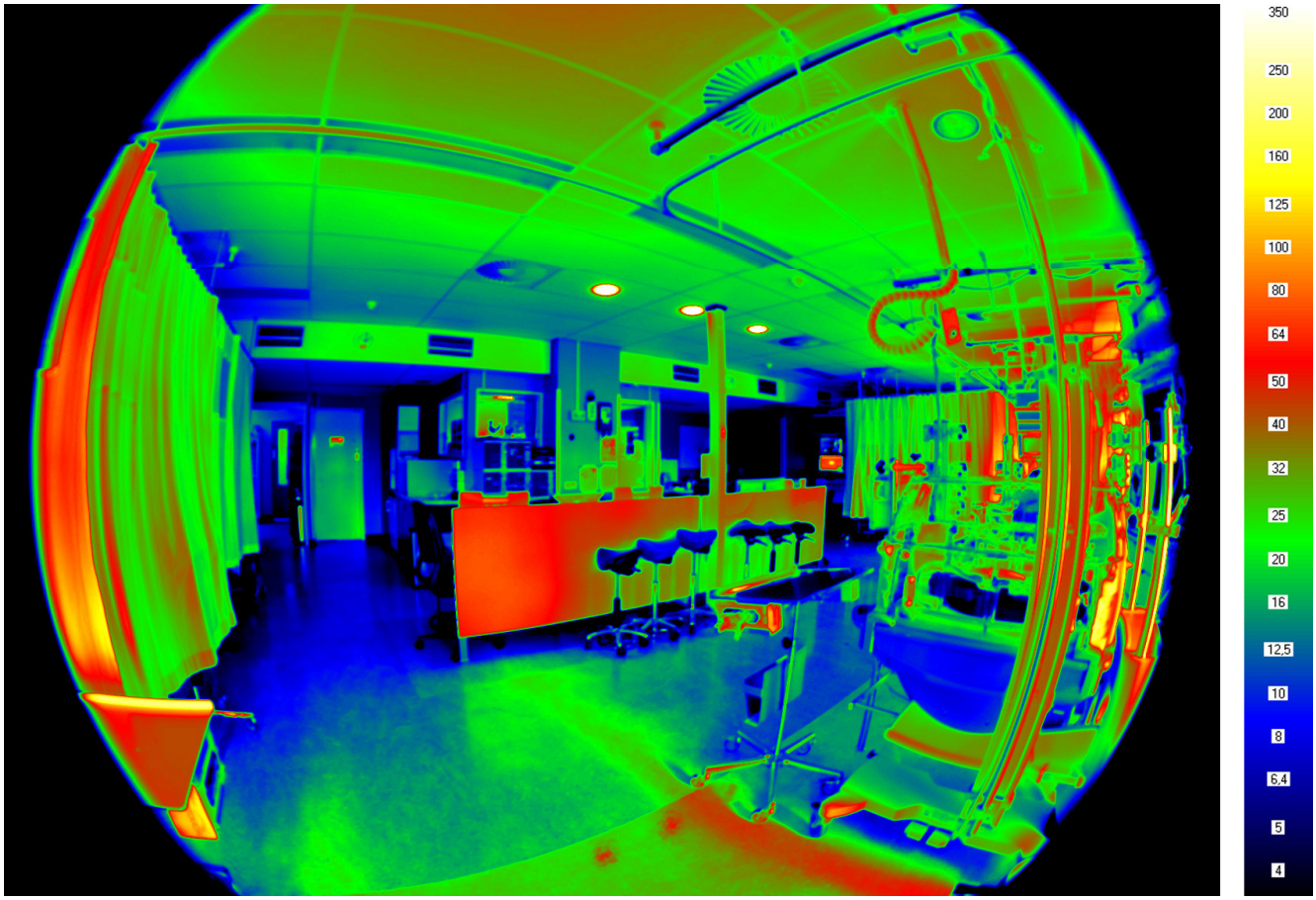
Overview of light measurements, MMC



Light measurements Erasmus MC



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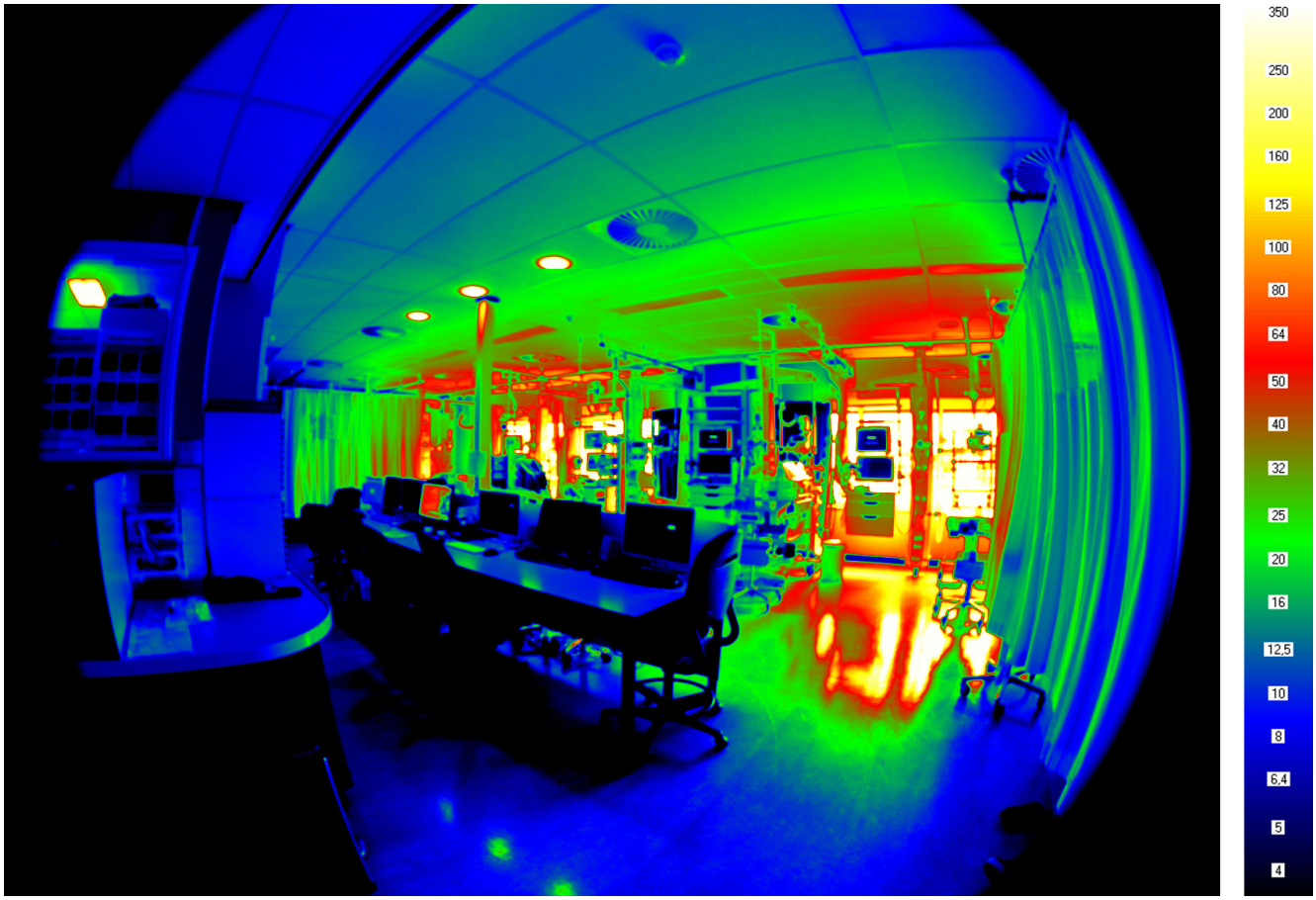
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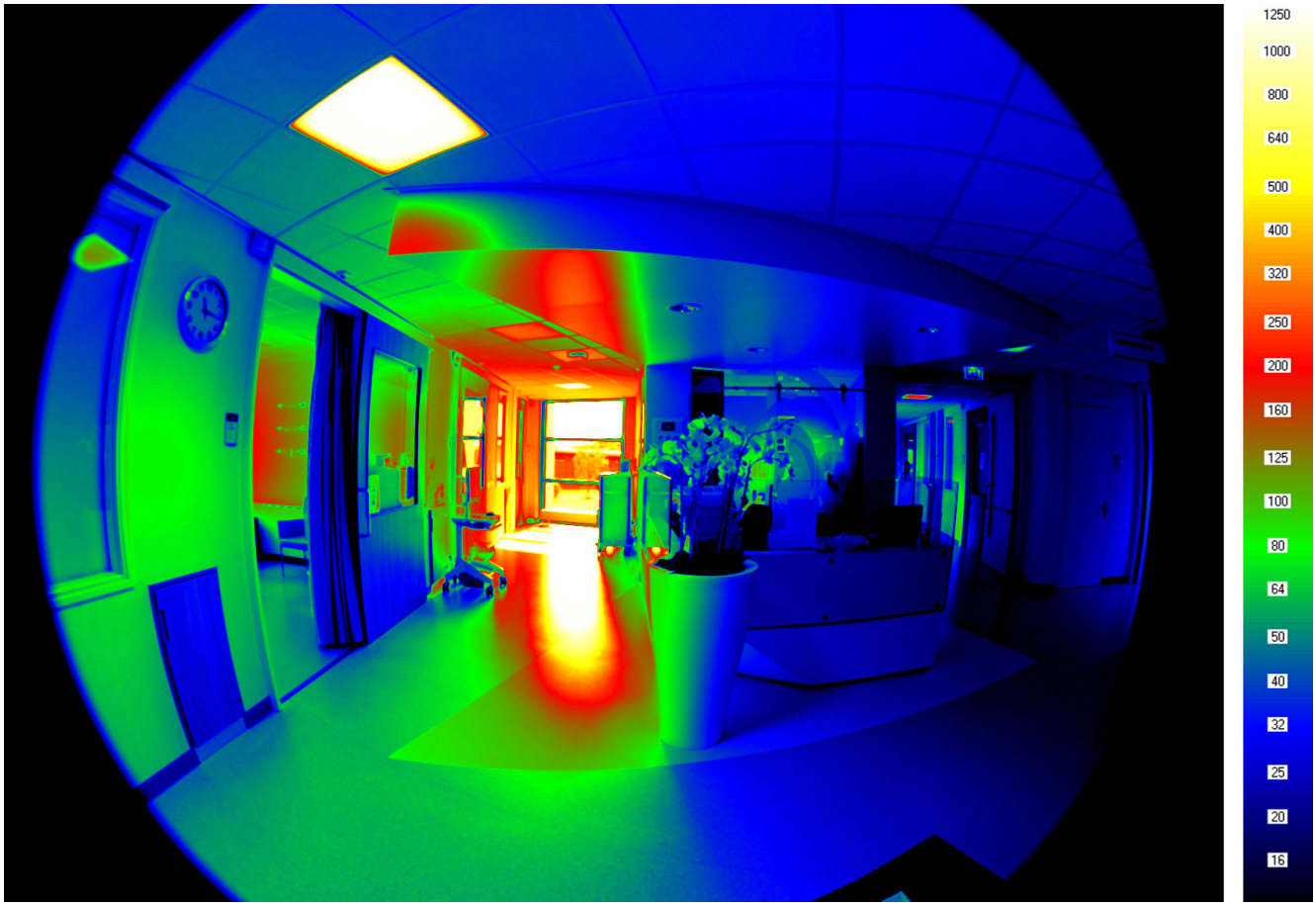
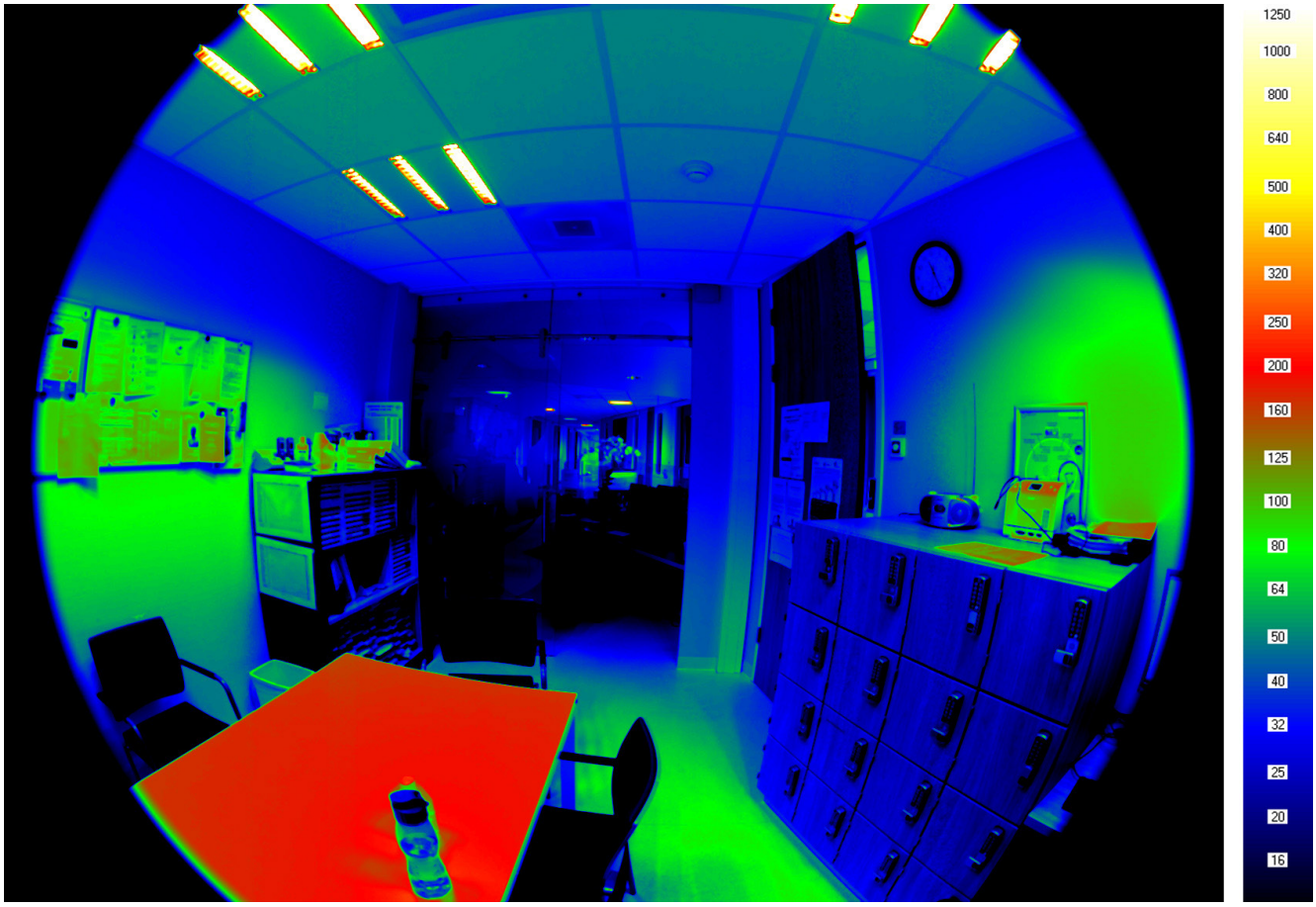
Light measurements Máxima medical centre

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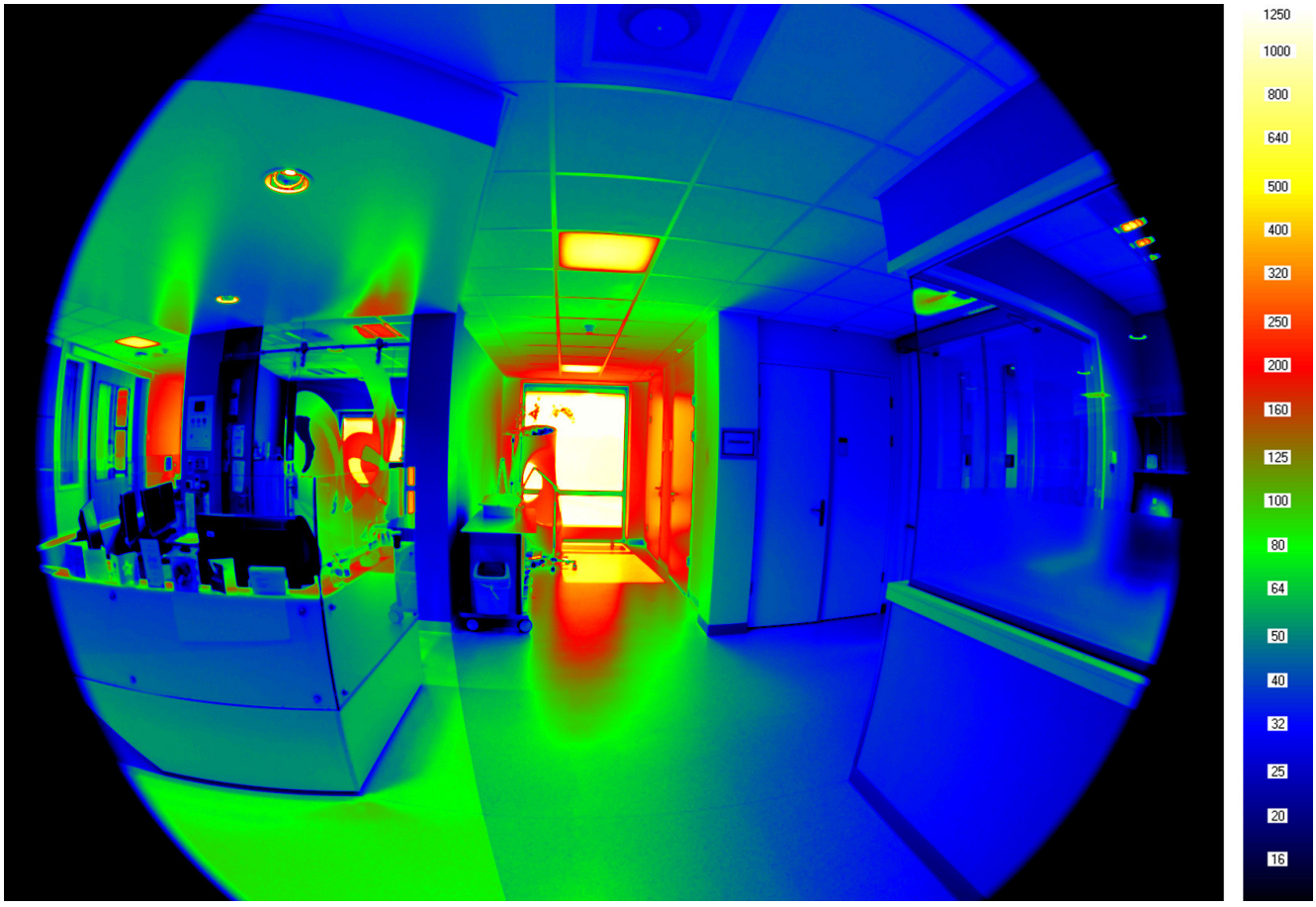
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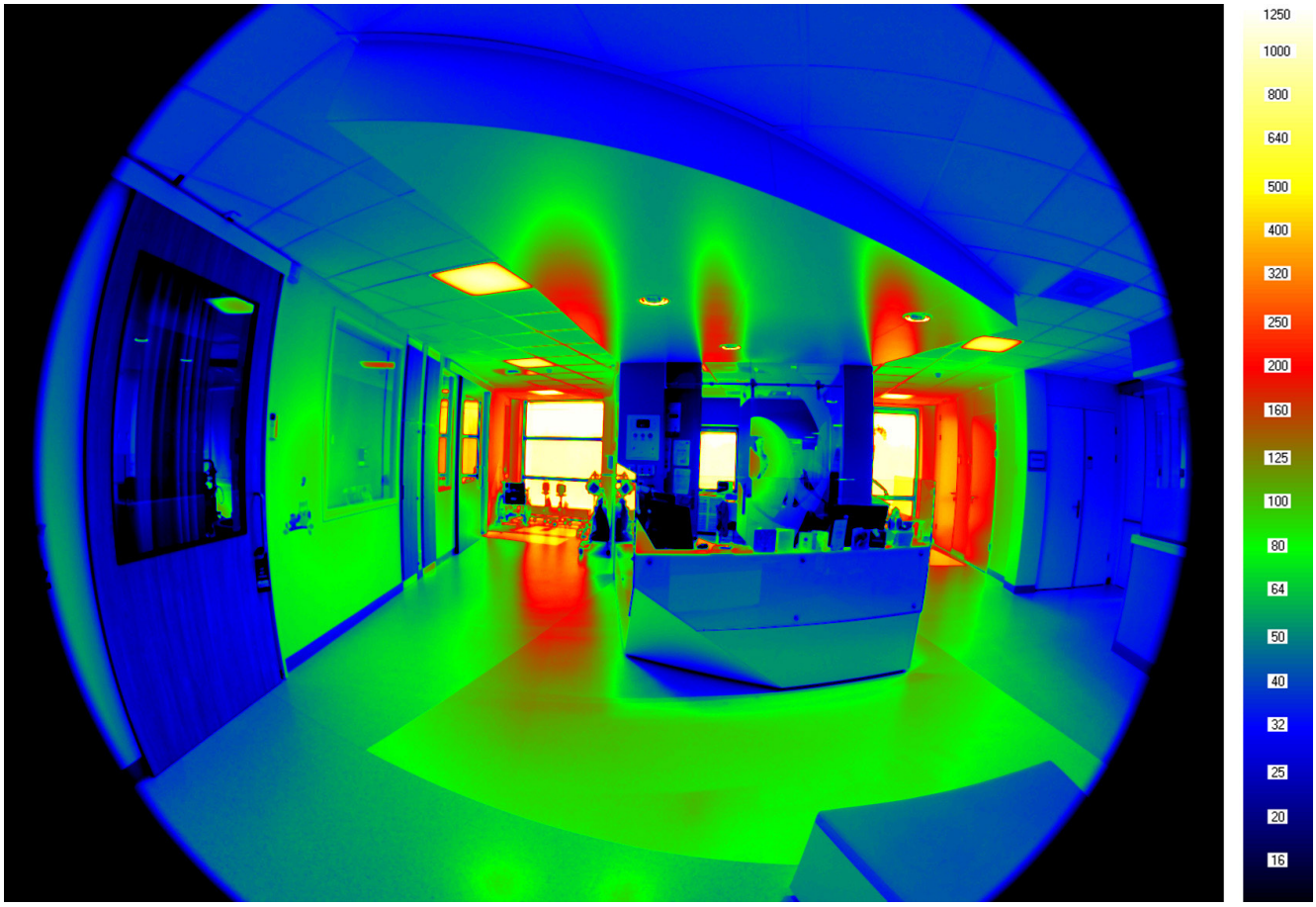
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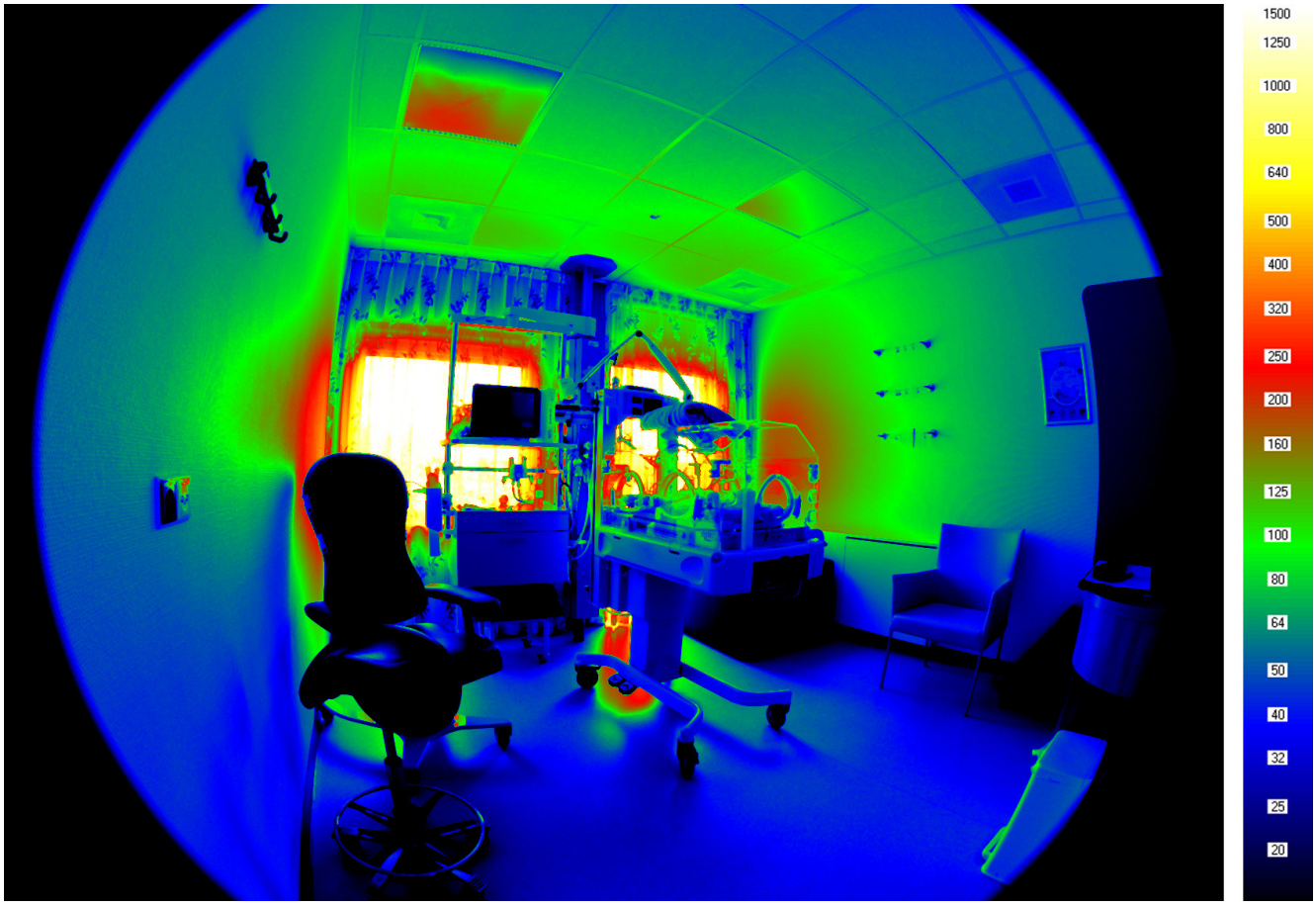
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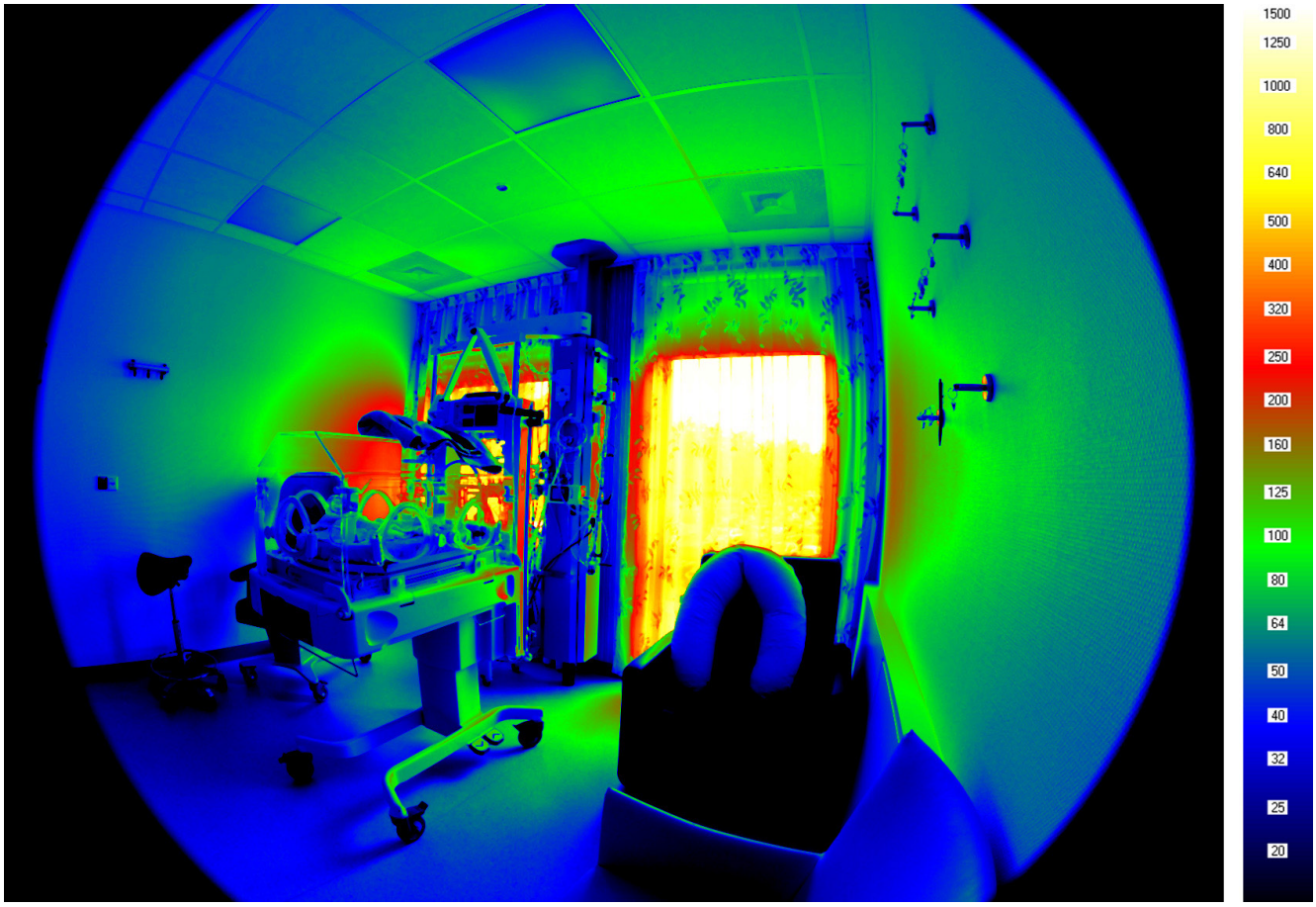
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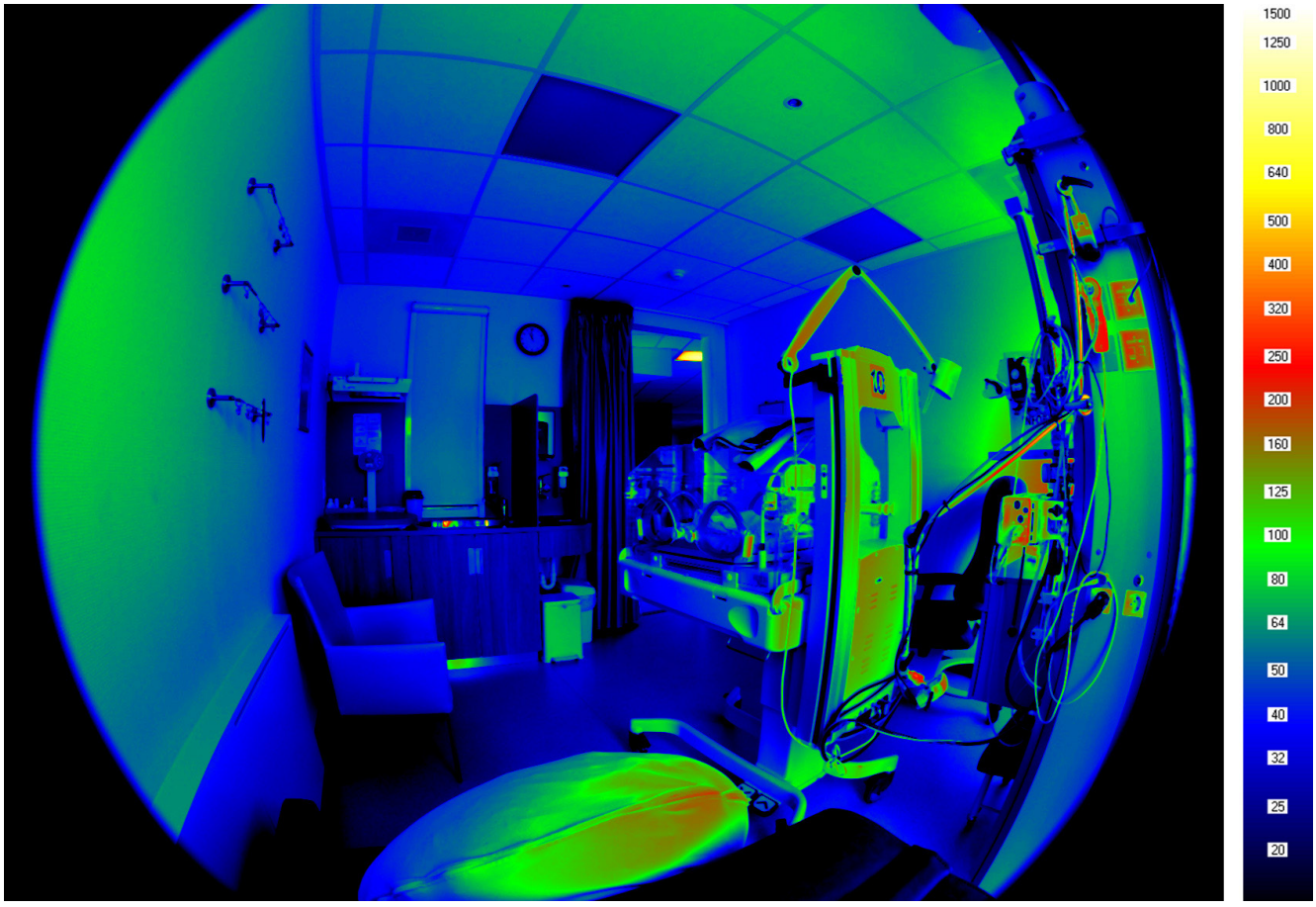
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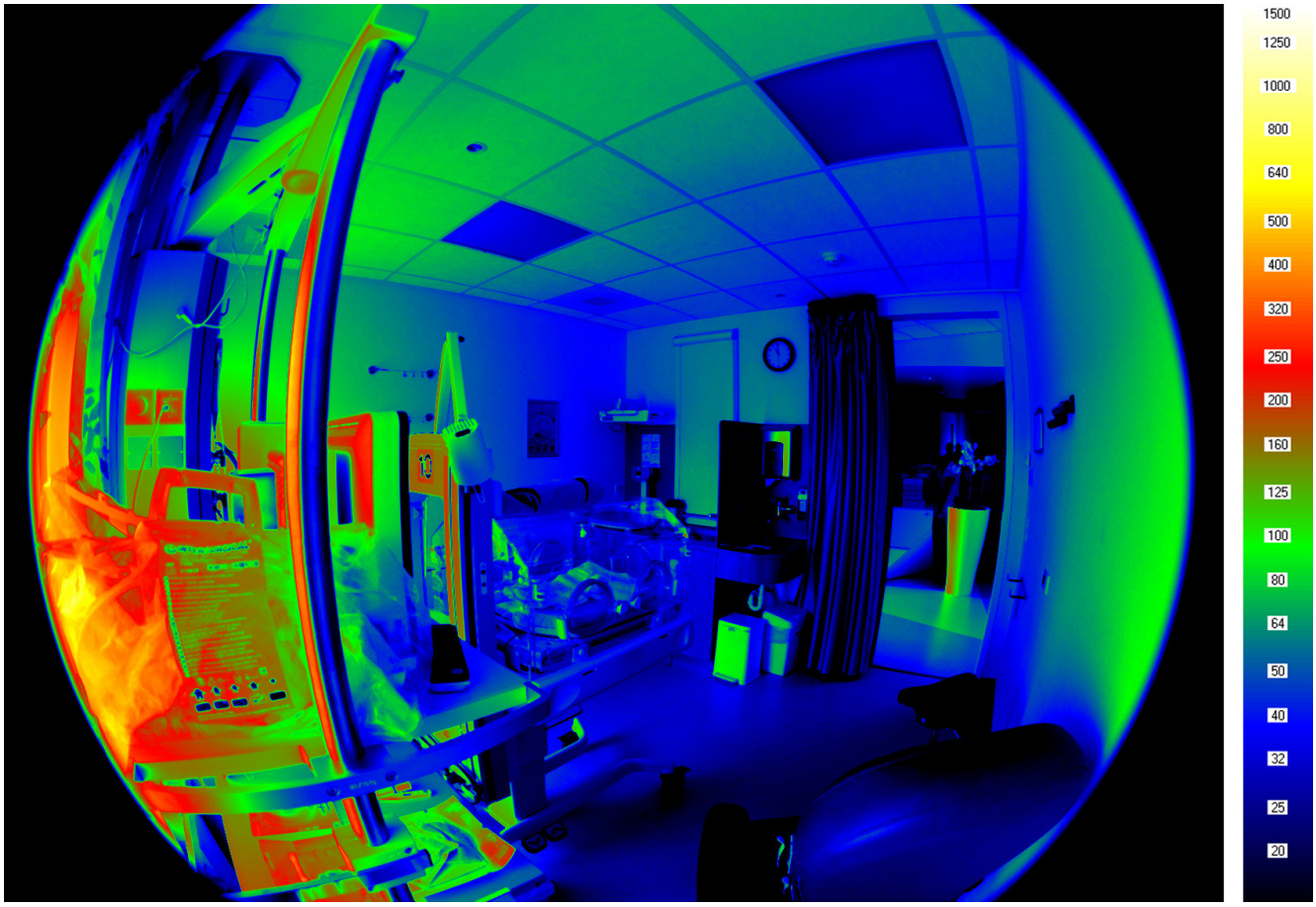
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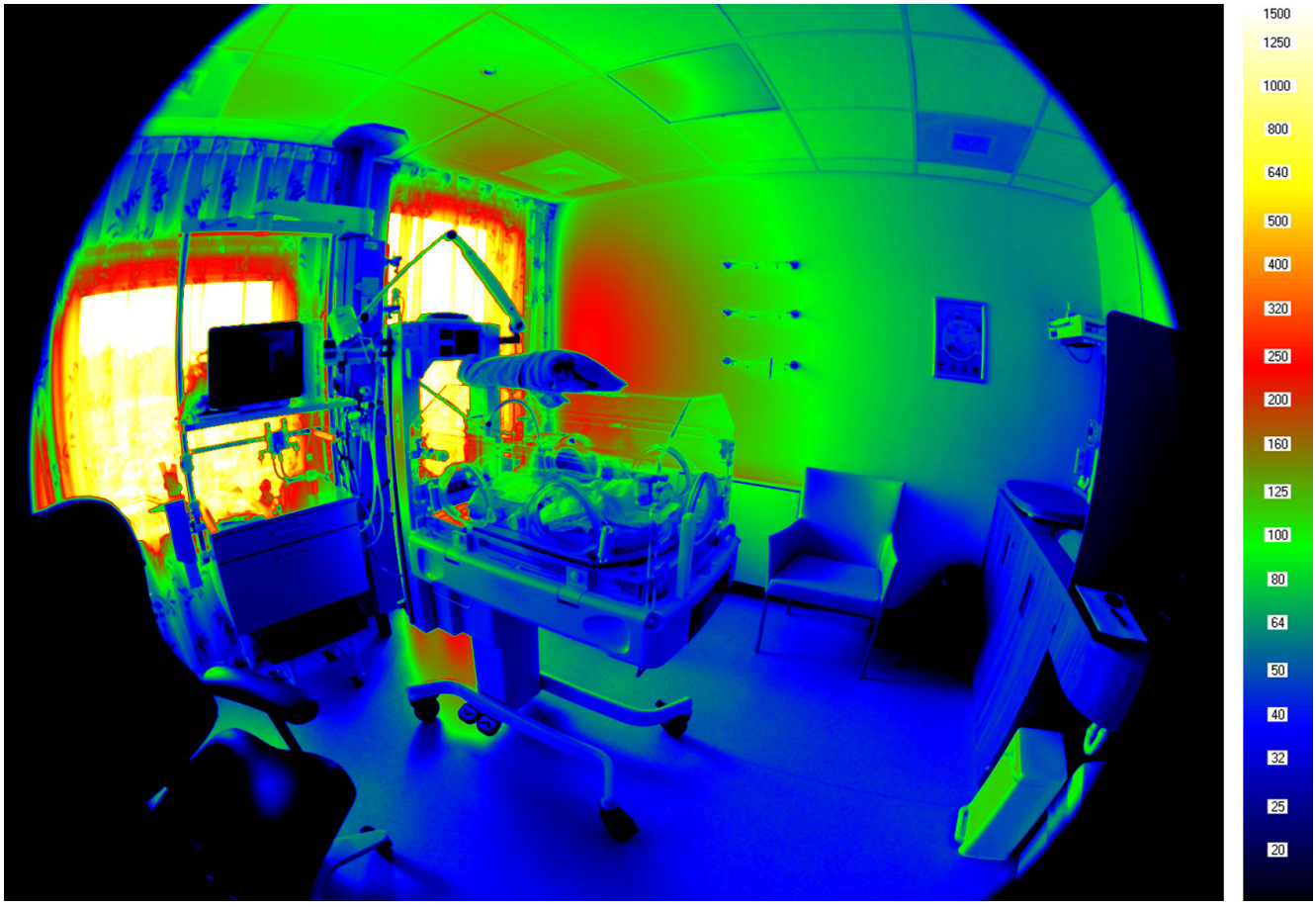
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Final questionnaire - parents

Version 8, 28-10-2015

Q1.1 Beste ouder, arts of verpleegkundige,

Zoals u ongetwijfeld weet is de Neonatale Intensive Care Unit (NICU) een emotioneel beladen afdeling van het ziekenhuis. Dit geldt voor ouders, maar zeker ook voor het medisch en verplegend personeel. Blijdschap en verdriet liggen hier dicht bij elkaar en dat zorgt onvermijdelijk voor spanning.

Tussen ziekenhuizen bestaan grote verschillen in de manier waarop de NICU eruit ziet. Er zijn bijvoorbeeld NICU's die uitsluitend (eenpersoons) gezinskamers hebben en NICU's waar alle kinderen op één zaal liggen.

Er zijn allerlei manieren om de NICU-omgeving prettiger te maken. Voorbeelden zijn posters van de natuur, aanwezigheid van planten en meer aandacht voor daglicht. Veel van dit soort initiatieven zijn bedacht zonder gebruik te maken van de ervaringen van ouders en het personeel. De inbreng van ouders en personeel is dermate belangrijk omdat het óók gaat om het welzijn van ouders en personeel.

Met dit onderzoek wil ik inzicht te krijgen in welke omgevingsfactoren het welzijn van ouders en personeel op de NICU beïnvloeden. Hiermee wil ik een goed onderbouwd advies geven voor de bouw en verbouw van NICU's.

Over het onderzoek
Dit onderzoek wordt uitgevoerd door Mario Grinwis, student aan de Technische Universiteit in Delft. De toetsingscommissies van VUmc, Erasmus MC en UZA-Antwerpen hebben beoordeeld dat dit onderzoek niet onder de Wet medisch-wetenschappelijk onderzoek met mensen (WMO) valt.

Doel van het onderzoek
Het doel van dit onderzoek is om advies te kunnen geven over hoe NICU-omgevingen beter het welzijn van ouders en personeel kunnen ondersteunen.

Wat meedoen inhoudt
Deelname aan deze studie komt neer op het invullen van deze vragenlijst. U kunt aan het einde van deze vragenlijst aangeven of u mee zou willen doen met vervolgonderzoek. Het vervolgonderzoek is een interview. Mogelijk wordt niet iedereen die mee wil doen hiervoor benaderd.

Het invullen van de vragenlijst zal ongeveer 15 minuten in beslag nemen. De vragenlijst kan gepauzeerd worden wanneer het niet lukt om alles in één keer door te lopen. Het pauzeren gebeurt automatisch wanneer u de vragenlijst sluit.

U beslist zelf of u meedoet aan het onderzoek. Deelname is vrijwillig.

Doet u mee aan het onderzoek? Dan kunt u zich altijd bedenken. U mag tijdens het onderzoek stoppen. U hoeft niet te zeggen waarom u stopt en u hoeft dit niet te melden aan de onderzoeker. De gegevens die tot dat moment zijn verzameld, worden gebruikt voor het onderzoek. U kunt binnen 2 weken ook vragen om uw gegevens te verwijderen, Uw gegevens kunnen mogelijk niet achteraf verwijderd worden, omdat er geen unieke gegevens worden opgeslagen als u die niet heeft ingevuld.

Uw gegevens
Al uw gegevens blijven vertrouwelijk. De onderzoeksgegevens zijn bij publicatie in een (wetenschappelijk) tijdschrift en bij de TU-Delft niet te herleiden naar u.

U kunt op de hoogte worden gehouden van de resultaten van het onderzoek. Dit kunt u doen door aan het einde van de vragenlijst uw e-mailadres in te vullen.

Als u hieronder aangeeft mee te willen doen met het onderzoek, geeft u toestemming voor het verzamelen,

bewaren en inzien van de door u verstrekte gegevens.

De Technische Universiteit Delft (dr. C.J. van Oel) bewaart uw gegevens tot 5 jaar na publicatie. Daarna worden de persoonsgegevens vernietigd.

Heeft u vragen?
Voor vragen over dit onderzoek kunt u mij bereiken per mail m.grinwis@student.tudelft.nl.

Om mee te doen aan het onderzoek is wel uw goedkeuring nodig, deze kunt u geven door hieronder aan te geven of u mee zou willen doen aan dit onderzoek.

Hartelijk dank voor uw tijd, Mario Grinwis, MSc (student Management in the Built Environment)

□ Ja, ik doe graag mee met het onderzoek
□ Nee, ik doe liever niet mee met het onderzoek

Geef weer als Q1.1 = Ja
Q1.2 Kunt u aangeven waarom u liever niet mee wilt doen aan het onderzoek?
Ga naar het einde van de vragenlijst Q1.1 = Nee

Q1.3 Deel 1 - Algemene vragen

Vanuit welk land doet u mee aan dit onderzoek?
□ Nederland
□ België

Geef weer als Q1.3 = Nederland
Q1.5 Vanuit welk ziekenhuis doet u mee aan dit onderzoek?
□ Erasmus MC, Rotterdam
□ Máxima Medisch Centrum, Veldhoven
□ Radboudumc, Nijmegen
□ VUmc, Amsterdam
□ Een ander ziekenhuis in Nederland, namelijk: _____

Geef weer als Q1.3 = België
Q1.6 Vanuit welk ziekenhuis doet u mee aan dit onderzoek?
□ UZA, Antwerpen
□ ZNA, Antwerpen
□ ZOL, Genk
□ Een ander ziekenhuis in België, namelijk: _____

Q1.7 Op welke manier bent u betrokken bij de Neonatale Intensive Care Unit (NICU)? Als...
□ ... ouder
□ ... medisch specialist
□ ... arts-assistent
□ ... verpleegkundige
□ Anders, namelijk ... _____

Q1.7 Wat is uw geslacht?
□ Man
□ Vrouw

Q1.8 Wat is uw leeftijd?

Q2.1 Hoeveel kinderen heeft u op dit moment op de NICU?
- □ Geen
- □ Eén
- □ Twee
- □ Drie of meer

Q2.2 Heeft u eerder kinderen gehad die op de NICU zijn opgenomen?
- □ Ja
- □ Nee

Geef weer als Q2.1 ≠ Geen
Q2.3 Hoe lang ligt uw kind momenteel op de NICU? (in dagen en of weken)
Aantal dagen
Aantal weken

Geef weer als Q2.1 = Ja
Q2.4 Hoe lang is uw andere kind of zijn uw andere kinderen opgenomen geweest op de NICU?(in dagen en of weken)

	Eerste kind	Tweede kind	Derde kind
Aantal dagen			
Aantal weken			

Geef weer als Q1.3 = Nederland
Q2.5 In welk ziekenhuis zijn één of meerdere kinderen op de NICU opgenomen? (er zijn meerdere antwoorden mogelijk)
- □ Erasmus MC, Rotterdam
- □ Máxima Medisch Centrum, Veldhoven
- □ Radboudumc, Nijmegen
- □ VUmc, Amsterdam
- □ AMC, Amsterdam
- □ UMCG, Groningen
- □ UMCU, Utrecht
- □ LUMC, Leiden
- □ Isala, Zwolle
- □ Maastricht UMC+, Maastricht
- □ Anders, namelijk … _____

Geef weer als Q1.3 = België
Q2.6 In welk ziekenhuis zijn één of meerdere kinderen op de NICU opgenomen? (er zijn meerdere antwoorden mogelijk)
- □ AZ, Brugge
- □ ZOL, Genk
- □ ZNA, Antwerpen
- □ AZ, Antwerpen
- □ UZA Antwerpen
- □ UZ, Gent
- □ UZ, Leuven
- □ AZ -VUB, Jette
- □ ULB, Brussel
- □ UCL, Brussel
- □ CHIREC, Brussel
- □ ULB, Brussel
- □ UMC, Brussel
- □ CHUM, Charleroi
- □ CHU, Charleroi
- □ CHC, Luik
- □ CHR, Luik

- ◻ CHU, La Louvière
- ◻ CHRU, Namen
- ◻ Anders, namelijk: _____

Geef weer als Q1.3 = Nederland
Q2.7 Wat is uw hoogst afgeronde opleiding?
- ◻ Geen onderwijs / basisonderwijs
- ◻ LBO / VBO / VMBO
- ◻ MAVO / HAVO en VWO
- ◻ MBO
- ◻ HBO
- ◻ WO-doctoraal of master

Geef weer als Q1.3 = België
Q2.8 Wat is uw hoogst afgeronde opleiding?
- ◻ Geen onderwijs / basisonderwijs
- ◻ BSO / ASBO
- ◻ ASO 2º / 3º graad
- ◻ TSO 3º graad / KSO 3º graad
- ◻ HOBU
- ◻ Universiteit

Q3.1 Deel 2 – vragen over uw voorkeur

In de volgende 12 vragen krijgt u twee afbeeldingen te zien. Elke afbeelding – ook wel vignet genoemd – bestaat uit vier kleine plaatjes. Deze vier plaatjes geven een beeld van één ruimte op de NICU.

De vraag is telkens welke ruimte u het prettigst vindt. Ga hierbij af op uw gevoel en blijf niet te lang stil staan bij uw keuze.

De opbouw van de vignetten is steeds het zelfde. Elk plaatje laat de ruimte vanuit een andere positie zien, zoals hieronder is aangegeven in de gele vlakken.

De vragen starten zodra u op knop volgende klikt.

Opmerking: in vraag Q3.2 tot en met Q3.13 worden de vignetten getoond. De volgorde van de vignetten verschilt alleen tussen blokken en niet in een blok zelf. Welk blok een deelnemer te zijn krijg wordt door het toeval bepaald. Onderstaande vraag is een voorbeel van hoe de vraag is opgebouwd.

Q3.2 tot en met Q3.13

Vignet 1

Vignet 2

Welke ruimte vindt u het prettigst?

- ◻ Vignet 1
- ◻ Vignet 2

Q4.1 Deel 3 - aanvullende vragen

Nu volgen een aantal aanvullende over belangrijke elementen in de NICU. Met name hoe u de ruimte ervaart en hoe belangrijk u de verschillende elementen vindt.

Q4.2 De (ervaren) veiligheid op een ziekenhuisafdeling is deels afhankelijk van de indeling hiervan. Een voorbeeld hiervan is direct zicht van verplegend personeel op de kinderen. In een zaalopstelling is het direct zicht optimaal. Een nadeel van deze indeling is dat het zorgt voor minder privacy en rust. Om meer privacy en rust te brengen hebben sommige ziekenhuizen NICU's met eenpersoonskamers. Hier houdt de verpleging de kinderen o.a. in de gaten via digitale monitoring.

Hoe belangrijk is direct zicht voor u als ouder op de NICU?

- ◻ Totaal niet belangrijk
- ◻ Een beetje belangrijk
- ◻ Tamelijk belangrijk
- ◻ Erg belangrijk
- ◻ Ontzettend belangrijk

Q4.3 Verschillende soorten privacy zijn van belang op de NICU. Hoe belangrijk vindt u de volgende vormen van privacy, denkend aan de behoefte van u als ouder op de NICU?

Hoe belangrijk vindt u…	Totaal niet belangrijk	Een beetje belangrijk	Tamelijk belangrijk	Erg belangrijk	Ontzettend belangrijk
… stilte op de afdeling?					
… het dat anderen u niet kunnen horen?					
… het om uit het zicht te kunnen zijn van anderen?					
… het om de inrichting aan te kunnen passen?					
… het om persoonlijke spullen neer te kunnen zetten?					

Q4.4 Sommige mensen vinden het fijn om (werk-) mail te controleren terwijl ze toch in de buurt van hun kind zijn. Bij een flexwerkplek kunt u denken aan een tafel of een klein bureau dat geschikt is gemaakt voor laptop/tablet gebruik (stroom en Wifi zijn aanwezig).

Hoe belangrijk vindt u het dat er een flexwerkplek is voor ouders op de NICU?
- □ Totaal niet belangrijk
- □ Een beetje belangrijk
- □ Tamelijk belangrijk
- □ Erg belangrijk
- □ Ontzettend belangrijk

Q4.5 Kunt u aangeven waarom u een flexwerkplek [antwoord Q4.4] vindt?

_____

_____

Q4.6 Hoe goed vindt u een flexwerkplek passen in...

	Slecht	Matig	Redelijk	Goed	Zeer goed
... de patiëntenkamer					
... een aparte ruimte op de afdeling					
... de familiekamer (op de afdeling)					
... het Ronald MC Donald huis					
... het restaurant					

Q4.7 Geluiden van medische apparatuur en omgevingsgeluiden kunnen zowel geruststellend werken als ergernissen oproepen. Naast de positieven of negatieve invloed op de uw kind, kunnen deze geluiden ook invloed hebben op u als ouder.

Hoe storend vindt u de onderstaande geluiden op de NICU?	Totaal niet storend	Een beetje storend	Tamelijk storend	Erg storend	Ontzettend storend
Monitor alarmen					
Geluid van pompen					
Geluid van beademing					
Stemgeluid					
Geluiden van de gang					
Geluid van voetstappen in de NICU					

Q5.1 Deel 4
De volgende vragen hebben betrekking op uzelf. Voor ons zijn uw antwoorden belangrijk voor de interpretatie van de resultaten. Mocht u de vragen te persoonlijk vinden, dan hoeft u uiteraard geen antwoord te geven. Klik dan op ‘volgende’.

Q5.2 Wat is op dit moment voor u van toepassing?
- □ Ik heb geen moeite om rond te lopen
- □ Ik heb moeite om rond te lopen
- □ Ik ben aan bed gebonden

Q5.3 Wat is op dit moment voor u van toepassing?
- □ Ik heb geen problemen om voor mijzelf te zorgen

□ Ik heb enkele problemen om mijzelf te wassen en aan te kleden
□ Ik kan mijzelf niet wassen of aankleden

Q5.4 Wat is op dit moment voor u van toepassing bij uw dagelijkse activiteiten zoals werk, studie, huiswerk, familie of vrijetijdsactiviteiten?
□ Ik heb geen problemen met het uitvoeren van mijn dagelijkse activiteiten
□ Ik heb enkele problemen met het uitvoeren van mijn dagelijkse activiteiten
□ Ik ben niet in staat om mijn dagelijkse activiteiten uit te voeren

Q5.5 Wat is op dit moment voor u van toepassing?
□ Ik heb geen pijn of ongemakken
□ Ik heb gemiddelde pijn en ongemakken
□ Ik heb extreme pijn en ongemakken

Q5.6 Wat is op dit moment voor u van toepassing?
□ Ik ben niet angstig of depressief
□ Ik ben enigszins angstig of depressief
□ Ik ben extreem angstig of depressief

Q5.7 Om aan te geven hoe goed uw gezondheidstoestand is vragen we om op een schaal van 0 tot 100 aan te geven hoe goed of slecht uw gezondheidstoestand vandaag is. 0 staat voor de slechtst denkbare gezondheidstoestand en 100 staat voor de best denkbare gezondheidstoestand. Plaats de schuif op de plek die het beste overeenkomt met uw gevoel.

0 ----------|---------- 100

Q5.8 Geef aan in hoeverre u het eens bent met onderstaande stellingen.

Hoe storend vindt u de onderstaande geluiden op de NICU?	Volledig mee oneens	Oneens	Mee eens en niet mee oneens	Mee eens	Volledig mee eens
Ik voel mij goed op dit moment.					
Onlangs heb ik me ongelukkig en depressief gevoeld.					
Ik ben tevreden met mijn leven.					
In de meeste opzichten is mijn leven vrijwel perfect.					
Dingen pakken over het algemeen goed voor mij uit.					
Onlangs voelde ik me redelijk gelukkig					

Q6.1 Zou u eventueel mee willen doen aan vervolgonderzoek? Het vervolgonderzoek bestaat uit een interview. Het is bedoeld om de resultaten beter te kunnen begrijpen.
□ Ja, ik doe graag mee aan vervolgonderzoek.
□ Nee, liever niet.

Q6.2 Wilt u een samenvatting van het onderzoek ontvangen?
□ Ja, graag
□ Nee, liever niet.

Geef weer als Q6.1 = Nee & Q6.2 = Ja
Q6.3 Om u een samenvatting te kunnen toesturen hebben wij uw e-mailadres nodig. Zou u deze hieronder willen invullen?

e-mailadres _____

Geef weer als Q6.1 = Ja & Q6.2 = Nee
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e-mailadres _____

Einde vragenlijst bericht
Beste ouder, arts of verpleegkundige,

Hartelijk dank dat u heeft gehopen bij mijn onderzoek en voor het invullen van deze vragenlijst.

Uw antwoorden zullen worden gebruikt om te onderzoeken wat de bijdrage is van verschillende omgevings-factoren op uw welzijn.

Indien u heeft aangegeven om geïnformeerd te willen worden over de resultaten zult u eind januari 2016 hierover bericht worden.

Final questionnaire - medical professionals

Version 8, 28-10-2015

Q1.1 Beste ouder, arts of verpleegkundige,

Zoals u ongetwijfeld weet is de Neonatale Intensive Care Unit (NICU) een emotioneel beladen afdeling van het ziekenhuis. Dit geldt voor ouders, maar zeker ook voor het medisch en verplegend personeel. Blijdschap en verdriet liggen hier dicht bij elkaar en dat zorgt onvermijdelijk voor spanning.

Tussen ziekenhuizen bestaan grote verschillen in de manier waarop de NICU eruit ziet. Er zijn bijvoorbeeld NICU's die uitsluitend (eenpersoons) gezinskamers hebben en NICU's waar alle kinderen op één zaal liggen.

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Uw gegevens
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Als u hieronder aangeeft mee te willen doen met het onderzoek, geeft u toestemming voor het verzamelen,

bewaren en inzien van de door u verstrekte gegevens.

De Technische Universiteit Delft (dr. C.J. van Oel) bewaart uw gegevens tot 5 jaar na publicatie. Daarna worden de persoonsgegevens vernietigd.

Heeft u vragen?
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Om mee te doen aan het onderzoek is wel uw goedkeuring nodig, deze kunt u geven door hieronder aan te geven of u mee zou willen doen aan dit onderzoek.

Hartelijk dank voor uw tijd, Mario Grinwis, MSc (student Management in the Built Environment)

□ Ja, ik doe graag mee met het onderzoek
□ Nee, ik doe liever niet mee met het onderzoek

Geef weer als Q1.1 = Ja
Q1.2 Kunt u aangeven waarom u liever niet mee wilt doen aan het onderzoek?
Ga naar het einde van de vragenlijst Q1.1 = Nee

Q1.3 Deel 1 - Algemene vragen

Geef weer als Q1.3 = Nederland
Q1.5 Vanuit welk ziekenhuis doet u mee aan dit onderzoek?
□ Erasmus MC, Rotterdam
□ Máxima Medisch Centrum, Veldhoven
□ Radboudumc, Nijmegen
□ VUmc, Amsterdam
□ Een ander ziekenhuis in Nederland, namelijk: _____

Geef weer als Q1.3 = België
Q1.6 Vanuit welk ziekenhuis doet u mee aan dit onderzoek?
□ UZA, Antwerpen
□ ZNA, Antwerpen
□ ZOL, Genk
□ Een ander ziekenhuis in België, namelijk: _____

Q1.5 Wat is uw geslacht?
□ Man
□ Vrouw

Q1.6 Wat is uw leeftijd?

Q2.1 Hoeveel jaar bent u momenteel werkzaam op de NICU? (inclusief eerdere werkzaamheden op NICU's in andere ziekenhuizen)

Geef weer als Q1.3 = Nederland
Q2.2 In welke ziekenhuis of ziekenhuizen heeft u eerder op een neonatale afdeling gewerkt (medium-, high- of intensive care)? (er zijn meerdere antwoorden mogelijk)
□ Erasmus MC, Rotterdam
□ Máxima Medisch Centrum, Veldhoven
□ Radboudumc, Nijmegen
□ VUmc, Amsterdam
□ AMC, Amsterdam
□ UMCG, Groningen
□ UMCU, Utrecht
□ LUMC, Leiden

□ Isala, Zwolle
□ Maastricht UMC+, Maastricht
□ Anders, namelijk … _____

Geef weer als Q1.3 = België
Q2.3 In welke ziekenhuis of ziekenhuizen heeft u eerder op een neonatale afdeling gewerkt (medium-, high- of intensive care)? (er zijn meerdere antwoorden mogelijk)

□	AZ, Brugge	□	CHIREC, Brussel
□	ZOL, Genk	□	ULB, Brussel
□	ZNA, Antwerpen	□	UMC, Brussel
□	AZ, Antwerpen	□	CHUM, Charleroi
□	UZA Antwerpen	□	CHU, Charleroi
□	UZ, Gent	□	CHC, Luik
□	UZ, Leuven	□	CHR, Luik
□	AZ -VUB, Jette	□	CHU, La Louvière
□	ULB, Brussel	□	CHRU, Namen
□	UCL, Brussel	□	Anders, namelijk: _____

Q3.1 Deel 2 – vragen over uw voorkeur

In de volgende 12 vragen krijgt u twee afbeeldingen te zien. Elke afbeelding – ook wel vignet genoemd – bestaat uit vier kleine plaatjes. Deze vier plaatjes geven een beeld van één ruimte op de NICU.

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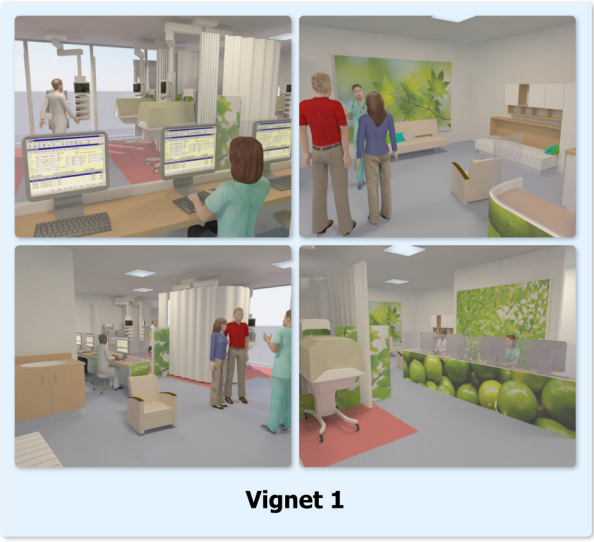
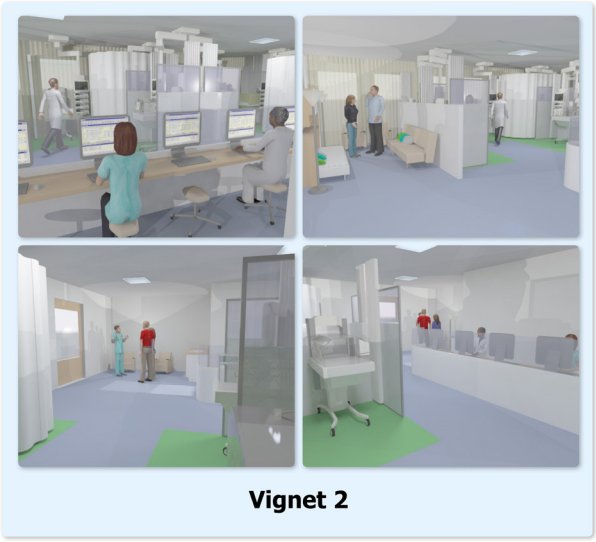
De vragen starten zodra u op knop volgende klikt.

Opmerking: in vraag Q3.2 tot en met Q3.13 worden de vignetten getoond. De volgorde van de vignetten verschilt alleen tussen blokken en niet in een blok zelf. Welk blok een deelnemer te zijn krijg wordt door het toeval bepaald. Onderstaande vraag is een voorbeel van hoe de vraag is opgebouwd.

Q3.2 tot en met Q3.13



Vignet 1



Vignet 2

Q4.1 Deel 3 - aanvullende vragen

Nu volgt een aantal aanvullende over belangrijke elementen in de NICU. Met name hoe u de ruimte ervaart en hoe belangrijk u de verschillende elementen vindt.

Q4.2 De (ervaren) veiligheid op een ziekenhuisafdeling is deels afhankelijk van de indeling hiervan. Een voorbeeld hiervan is direct zicht van verplegend personeel op de patiënten. In een zaalopstelling is het direct zicht optimaal. Een nadeel van deze indeling is dat het zorgt voor minder privacy en rust. Om meer privacy en rust te brengen hebben sommige ziekenhuizen NICU's met eenpersoonskamers. Hier houdt de verpleging de patiënten o.a. in de gaten via digitale monitoring.

Hoe belangrijk is direct zicht voor u als medewerker op de NICU?

- ◻ Totaal niet belangrijk
- ◻ Een beetje belangrijk
- ◻ Tamelijk belangrijk
- ◻ Erg belangrijk
- ◻ Ontzettend belangrijk

Q4.3 Verschillende soorten privacy zijn van belang tijdens de opname van neonaten op de NICU. Hoe belangrijk vindt u de volgende vormen van privacy voor ouders, denkend aan de behoefte van u als medewerker op de NICU?

Hoe belangrijk vindt u…	Totaal niet belangrijk	Een beetje belangrijk	Tamelijk belangrijk	Erg belangrijk	Ontzettend belangrijk
… stilte op de afdeling?					
… het dat anderen u niet kunnen horen?					
… het om uit het zicht te kunnen zijn van anderen?					
… het om de inrichting aan te kunnen passen?					
… het om persoonlijke spullen neer te kunnen zetten?					

Q4.4 Sommige ouders vinden het fijn om (werk-) mail te controleren terwijl ze toch in de buurt van hun kind zijn. Bij een flexwerkplek kunt u denken aan een tafel of een klein bureau dat geschikt is gemaakt voor laptop/tablet gebruik (stroom en Wifi zijn aanwezig).

Hoe belangrijk vindt u het dat er een flexwerkplek is voor ouders op de NICU?

- □ Totaal niet belangrijk
- □ Een beetje belangrijk
- □ Tamelijk belangrijk
- □ Erg belangrijk
- □ Ontzettend belangrijk

Q4.5 Kunt u aangeven waarom u een flexwerkplek [antwoord Q4.4] vindt?

_____

_____

Q4.6 Hoe goed vindt u een flexwerkplek passen in...

	Slecht	Matig	Redelijk	Goed	Zeer goed
... de patiëntenkamer					
... een aparte ruimte op de afdeling					
... de familiekamer (op de afdeling)					
(Voorwaarde: niet als land = België) ... het Ronald MC Donald huis					
... het restaurant					

Q4.7 Geluiden van medische apparatuur en omgevingsgeluiden kunnen zowel geruststellend werken als ergernissen oproepen. Naast de positieven of negatieve invloed op de patiënt, kunnen deze geluiden ook invloed hebben op u als zorgprofessional.

Hoe storend vindt u de onderstaande geluiden op de NICU?	Totaal niet storend	Een beetje storend	Tamelijk storend	Erg storend	Ontzettend storend
Monitor alarmen					
Geluid van pompen					
Geluid van beademing					
Stemgeluid					
Geluiden van de gang					
Geluid van voetstappen in de NICU					

Q5.1 Deel 4 - Tevredenheid met de werkomgeving

De volgende vragen hebben betrekking op uw tevredenheid met de omgeving waarin u werkzaam bent als zorgprofessional. Voor ons zijn uw antwoorden belangrijk voor de interpretatie van de resultaten. Mocht u de vragen te persoonlijk vinden, dan hoeft u uiteraard geen antwoord te geven. Klik dan op ‘volgende’.

Q5.2 Om aan te geven hoe goed uw gezondheidstoestand is vragen we om op een schaal van 0 tot 100 aan te geven hoe goed of slecht uw gezondheidstoestand vandaag is. 0 staat voor de slechtst denkbare gezondheidstoestand en 100 staat voor de best denkbare gezondheidstoestand. Plaats de schuif op de plek die het beste overeenkomt met uw gevoel.

0 ----------|---------- 100

Q5.3 Geef aan in hoeverre u het eens bent met onderstaande stellingen.

	Volledig mee oneens	Oneens	Mee eens en niet mee oneens	Mee eens	Volledig mee eens
Ik heb duidelijke doelen waarmee ik mijn werk goed kan uitvoeren.					
Ik heb het gevoel dat ik mijn mening kan ventileren en veranderingen kan initiëren op mijn werk.					
Ik heb de mogelijkheid om mijn vaardigheden in mijn werk te gebruiken.					
Ik voel mij goed op dit moment.					
Mijn werkgever biedt mij voldoende faciliteiten en flexibiliteit om mijn werk naast mijn familieleven te organiseren.					

Q5.4 Geef aan in hoeverre u het eens bent met onderstaande stellingen.

	Volledig mee oneens	Oneens	Mee eens en niet mee oneens	Mee eens	Volledig mee eens
Mijn huidige werktijden sluiten goed aan op mijn persoonlijke omstandigheden.					
Ik voel vaak dat ik onder druk sta op mijn werk.					
Wanneer ik goede werkzaamheden heb verricht wordt dit door mijn meerdere erkend.					
Onlangs heb ik me ongelukkig en depressief gevoeld.					
Ik ben tevreden met mijn leven.					

Q5.5 Geef aan in hoeverre u het eens bent met onderstaande stellingen.

	Volledig mee oneens	Oneens	Mee eens en niet mee oneens	Mee eens	Volledig mee eens
Ik word aangemoedigd om nieuwe vaardigheden te leren.					
Ik ben betrokken bij beslissingen die op mij betrekking hebben, in mijn eigen specialisme.					
Mijn werkgever verschaft mij wat ik nodig heb om mijn werk goed uit te kunnen voeren.					
Mijn meerdere stimuleert actief flexibele werktijden.					
In de meeste opzichten is mijn leven vrijwel perfect.					

Q5.6 Geef aan in hoeverre u het eens bent met onderstaande stellingen.

	Volledig mee oneens	Oneens	Mee eens en niet mee oneens	Mee eens	Volledig mee eens
Ik werk in een veilige omgeving.					
Dingen pakken over het algemeen goed voor mij uit.					
Ik ben tevreden met de carrièremogelijkheden die mij hier worden geboden.					
Ik ervaar regelmatig een te hoog stress niveau op mijn werk.					
Ik ben tevreden met de trainingen die ik ontvang om mijn huidige werk goed uit te kunnen voeren.					

Q5.7 Geef aan in hoeverre u het eens bent met onderstaande stellingen.

	Volledig mee oneens	Oneens	Mee eens en niet mee oneens	Mee eens	Volledig mee eens
Onlangs voelde ik me redelijk gelukkig.					
De huidige werkomstandigheden zijn voldoende.					
Ik ben betrokken bij beslissingen die het algemene publiek aangaan in mijn eigen specialisme.					

Q6.1 Zou u eventueel mee willen doen aan vervolgonderzoek? Het vervolgonderzoek bestaat uit een interview. Het is bedoeld om de resultaten beter te kunnen begrijpen.

□ Ja, ik doe graag mee aan vervolgonderzoek.
□ Nee, liever niet.

Q6.2 Wilt u een samenvatting van het onderzoek ontvangen?

□ Ja, graag
□ Nee, liever niet.

Geef weer als Q6.1 = Nee & Q6.2 = Ja
Q6.3 Om u een samenvatting te kunnen toesturen hebben wij uw e-mailadres nodig. Zou u deze hieronder willen invullen?

e-mailadres _____

Geef weer als Q6.1 = Ja & Q6.2 = Nee
Q6.4 Om u voor vervolgonderzoek te benaderen hebben wij uw e-mailadres nodig. Zou u deze hieronder willen invullen?

e-mailadres _____

Geef weer als Q6.1 = Ja & Q6.2 = Ja
Q6.5 Om u een samenvatting te kunnen toesturen en u voor vervolgonderzoek te benaderen hebben wij uw e-mailadres nodig. Zou u deze hieronder willen invullen?

e-mailadres _____

Einde van de vragenlijst
Beste ouder, arts of verpleegkundige,

Hartelijk dank dat u heeft gehopen bij mijn onderzoek en voor het invullen van deze vragenlijst.

Uw antwoorden zullen worden gebruikt om te onderzoeken wat de bijdrage is van verschillende omgevingsfactoren op uw welzijn.

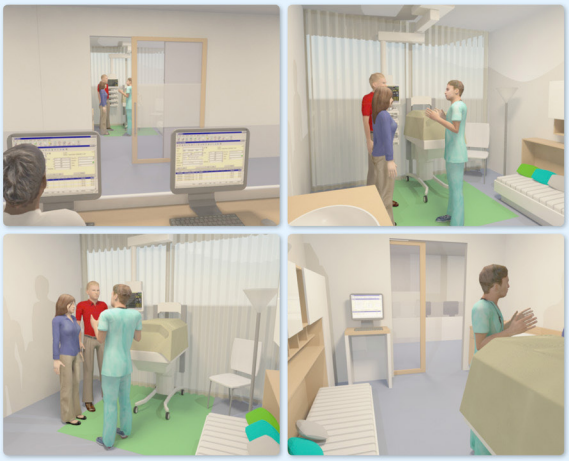
Indien u heeft aangegeven om geïnformeerd te willen worden over de resultaten zult u eind januari 2016 hierover bericht worden.

Presented vignettes - block 1

Vignet 1

Vignet 2

Vignet 1



Vignet 2

Vignet 1

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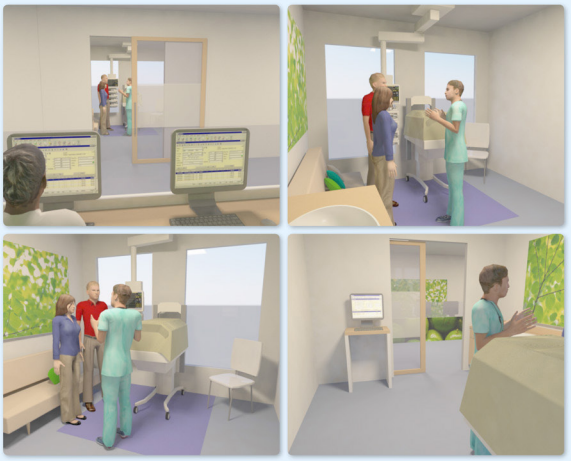

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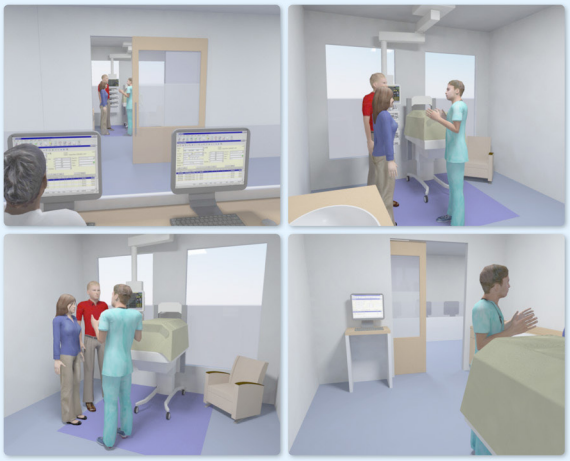
Vignet 2



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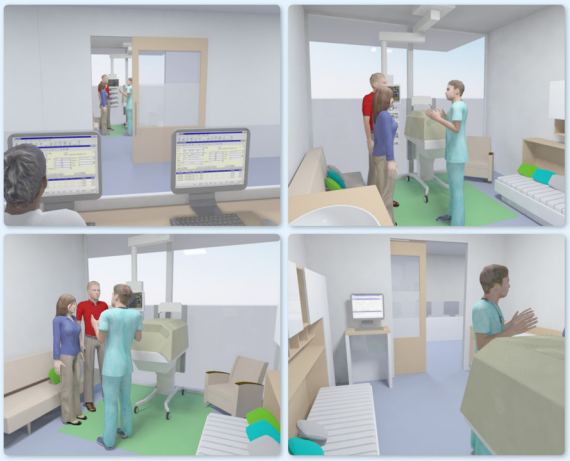

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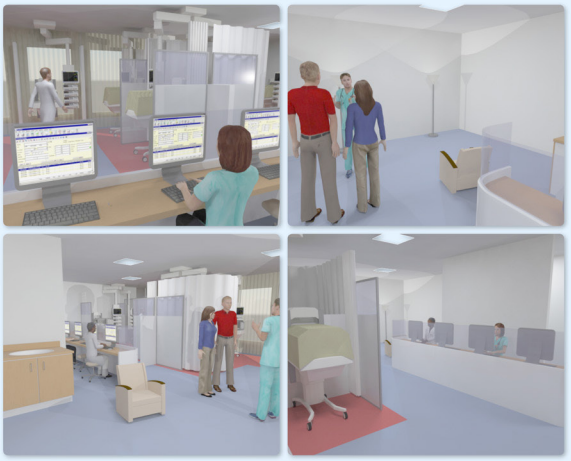

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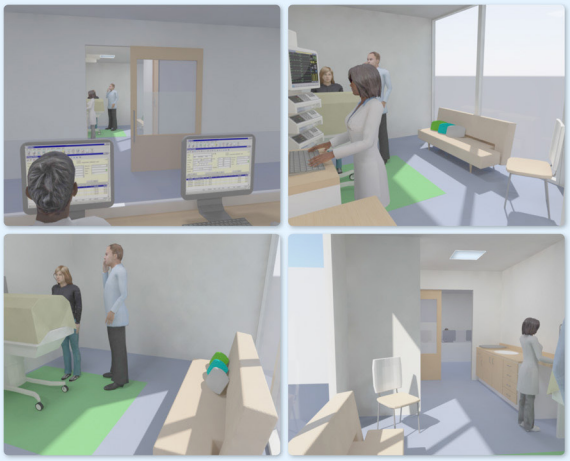

Vignet 1

Vignet 2

Presented vignettes - block 2

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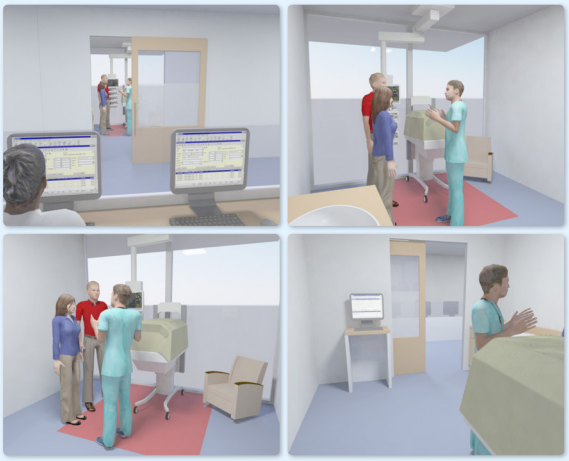

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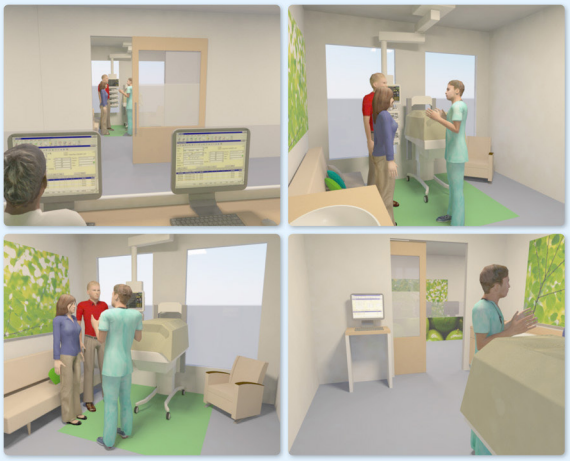

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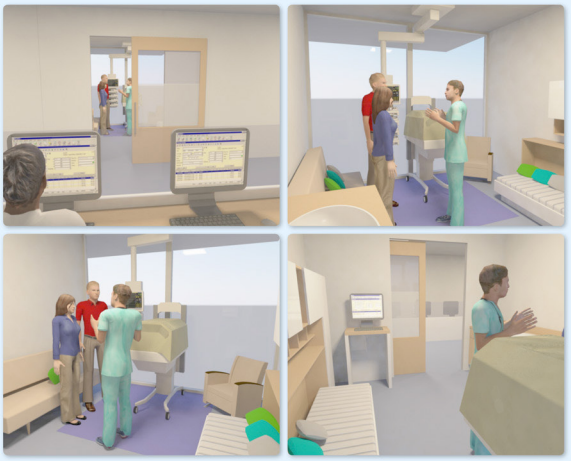

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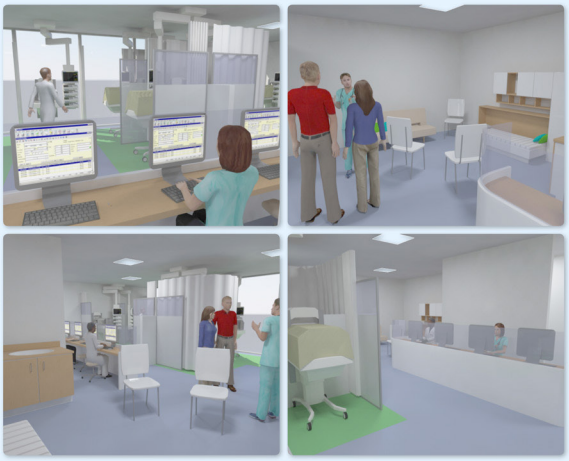

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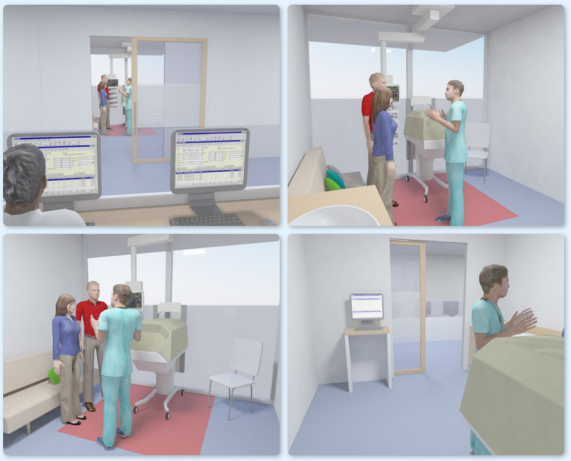

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Vignet 1

Vignet 2

Presented vignettes - block 3

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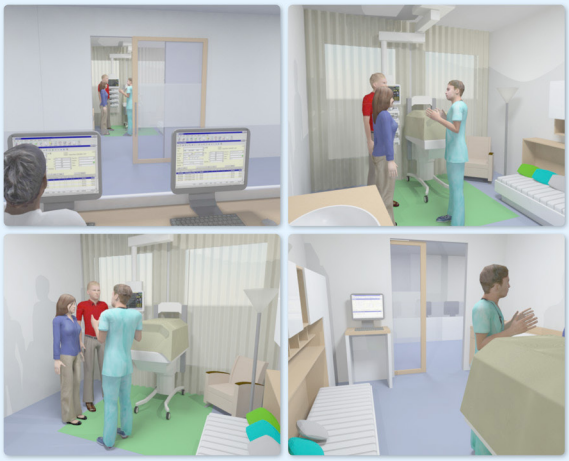
Vignet 2



Vignet 1

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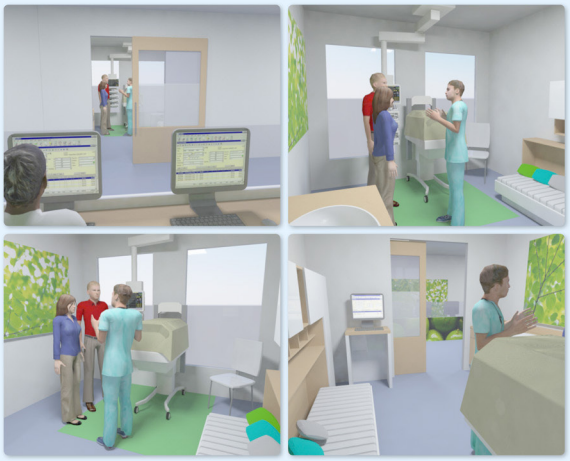

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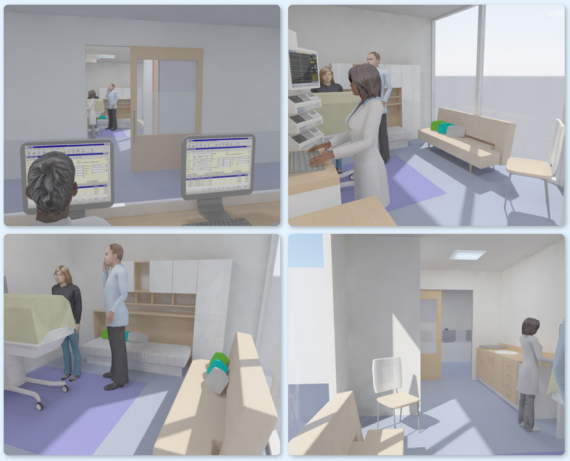

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Presented vignettes - block 4

Vignet 1

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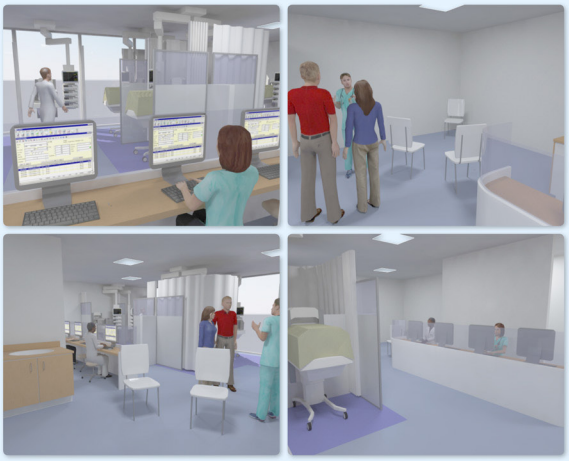

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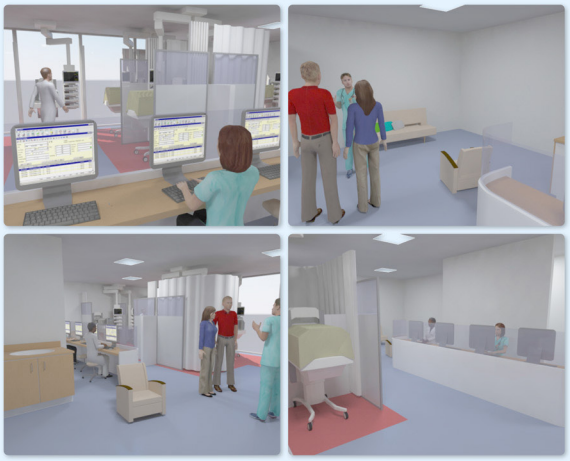

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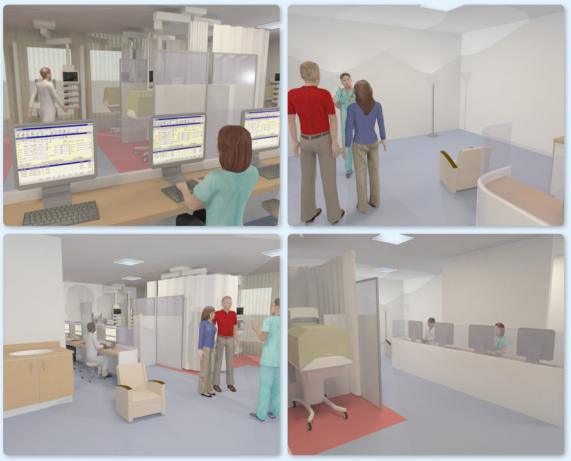

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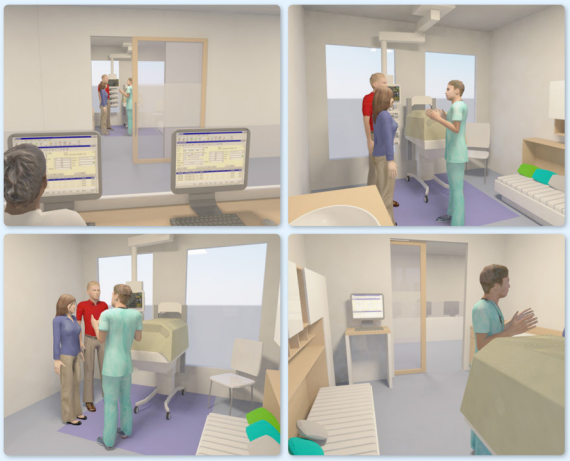

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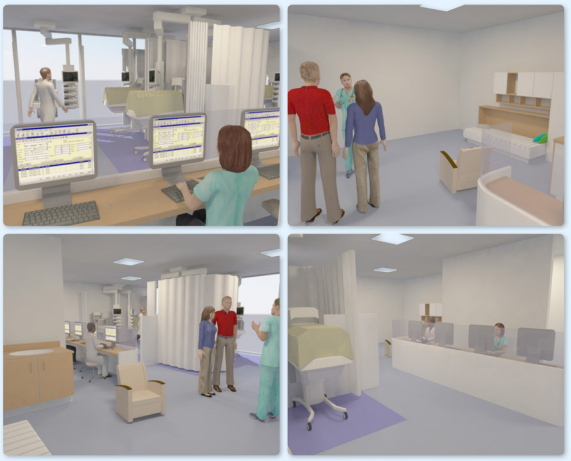

Vignet 2

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Presented vignettes - block 5

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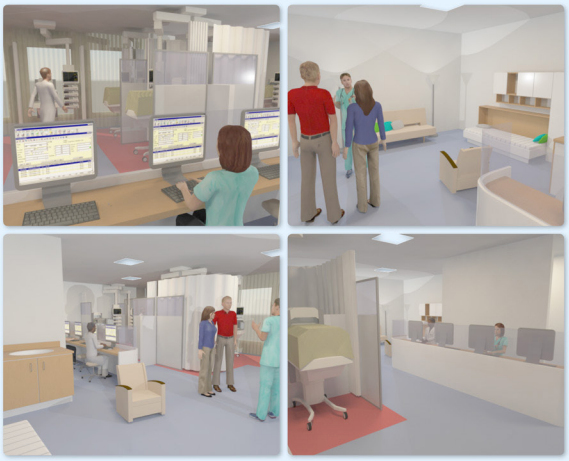

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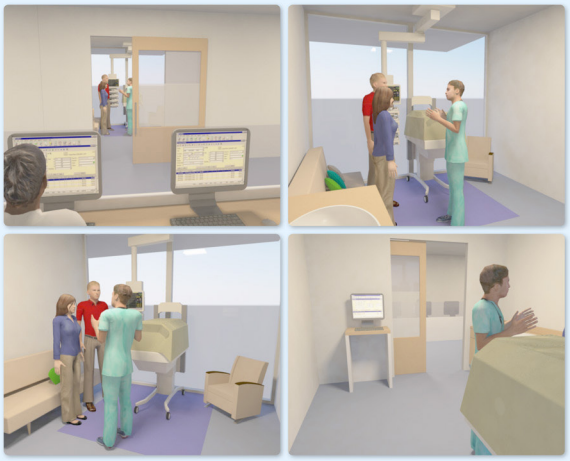

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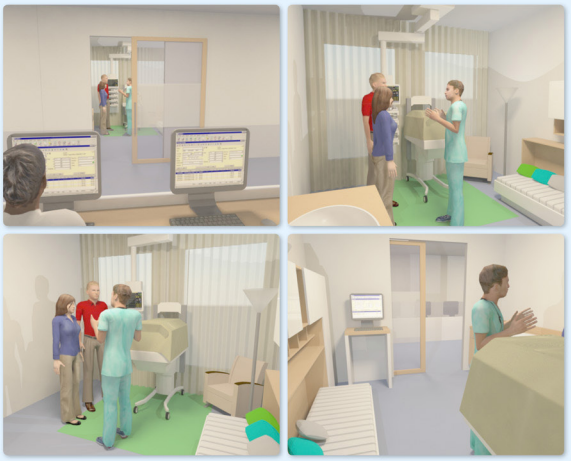

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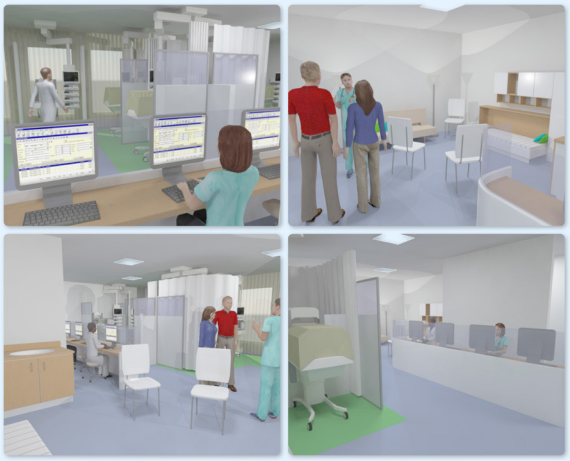

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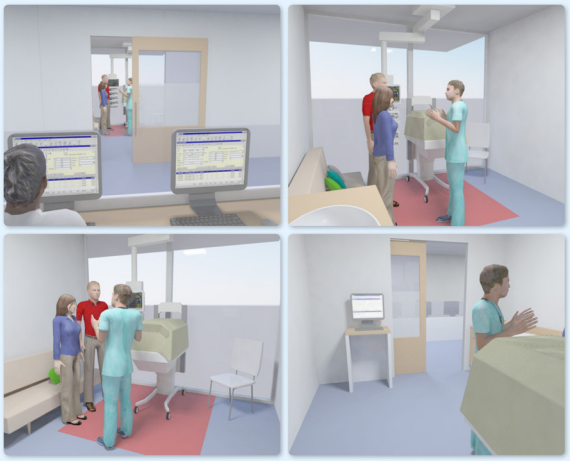
Presented vignettes - block 6



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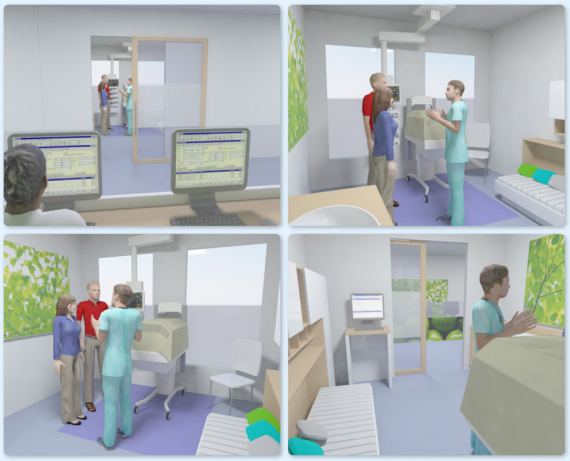

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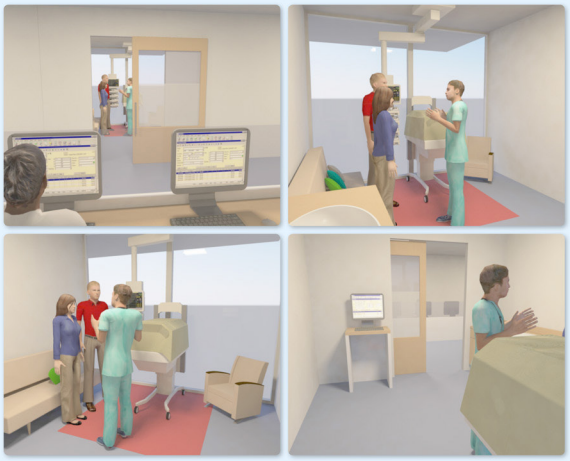

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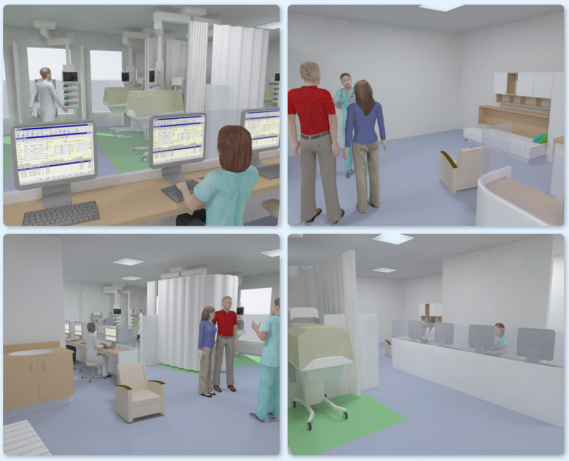

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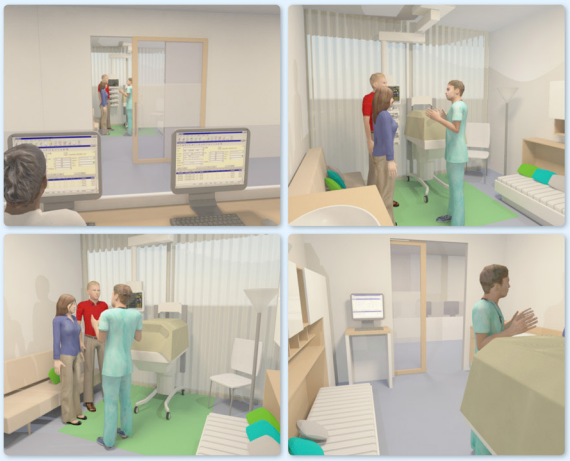

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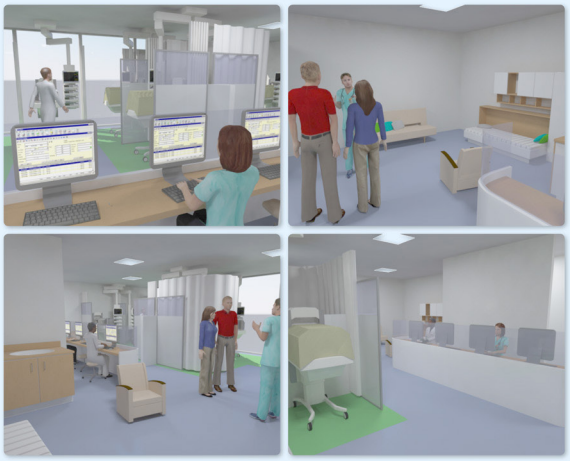

Vignet 1

Vignet 2

Vignet 1

Vignet 2

SPSS syntax file 1

General processing of the data

```
*WORKING DIRECTORY.
*Specify the below directory with the directory where your files are located. In order to use this syntax, the folder structure needs to remain the same, otherwise the references to the files will fail.

* ----------------------ptg advies laptop --------------------.
cd 'C:\Users\mgrinwis\RUG_Drive\01 ptg-advies\08 Analyse'.

*---------------------- home workstation --------------------.
cd 'D:\User_files\Mario\RUG Drive\01 ptg-advies\08 Analyse'.

*---------------------- OUTPUT OPTIONS ----------------.
SET TLook='Other data\APAtable.stt' TABLERENDER=light SUMMARY=None ROWSBREAK=100 TOLERANCE=1 TFit=Both CELLSBREAK=10000.
SET CTemplate='Other data\chart_style(AndyUpdate).sgt'.

*----------------------- Get RAW files ----------------------.
GET
  FILE='RAW/Final_Questionnaire.sav'.
DATASET NAME RAW_data WINDOW=ASIS.

*Save a temporary file of the current dataset.
SAVE OUTFILE='TEMP/Workingfile.sav'.
DATASET NAME Workingfile WINDOW=FRONT.

*---------------------- Defining scales ----------------------.
*Importance scale.
DEFINE Importance_scale ()
-2 'Not at all important'
-1 'Slightly important'
0 'Moderately important'
1 'Very important'
2 'Extremely important'
!ENDDEFINE.
*Appropriateness_scale.
DEFINE Appropriateness_scale ()
-2 'Poor'
-1 'Fair'
0 'Moderate'
1 'Good'
2 'Very good'
!ENDDEFINE.
*Noise_scale.
DEFINE Noise_scale ()
-2 'Extremely disturbing'
-1 'Very disturbing'
0 'Moderately disturbing'
1 'A little disturbing'
2 'Totally not disturbing'
!ENDDEFINE.
*Agreement_scale.
DEFINE Agreement_scale ()
1 'Strongly disagree'
2 'Disagree'
3 'Neither agree or disagree'
4 'Agree'
5 'Strongly agree'
!ENDDEFINE.

*Agreement_scale_reverse.
DEFINE Agreement_scale_reverse ()
5 'Strongly disagree'
4 'Disagree'
3 'Neither agree or disagree'
2 'Agree'
1 'Strongly agree'
!ENDDEFINE.

*----------------------Processing BLOCK1 ----------------.
RENAME VARIABLES
V1 = Resp_ID
V3 = Start
V4 = End
V5 = Compl
ADD_1_TEXT = BrowserT
ADD_2_TEXT = BrowserV
ADD_3_TEXT = OS
ADD_4_TEXT = Screen
ADD_5_TEXT = FlashV
ADD_6_TEXT = Java
ADD_7_TEXT = UA
Q1.1 = Consent
Q1.2 = Rejection
Q1.3 = Country
Q1.6 = Role
Q1.6_TEXT = Role_T
Q1.7 = Sexe
Q1.8 = Age.

VARIABLE LABELS
BrowserT "Browser Meta Info-Browser"
BrowserV "Browser Meta Info-Version"
OS "Browser Meta Info-Operating System"
Screen "Browser Meta Info-Screen Resolution"
FlashV "Browser Meta Info-Flash Version"
Java "Browser Meta Info-Java Support"
UA "Browser Meta Info-User Agent"
Consent "Do you want to participate in this research?"
Rejection "Reason for none agreement with informed consent"
Country "Rospondent country"
Role "Role in the hospital"
Role_T "Role in the hospital text input"
Sexe "Gender"
Age "Age in years"
ID "Alternative referer".

VALUE LABELS
/Consent
  0 'No'
  1 'Yes'
/Country
  0 'Netherlands'
  1 'Belgium'
/Sexe
  0 'Female'
  1 'Male'.

*Recoding the block variable, from string to numeric.
RECODE Block ('Block1'='1') ('Block2'='2') ('Block3'='3') ('Block4'='4') ('Block5'='5') ('Block6'='6').
ALTER TYPE Block (f1.0).
```

```
EXECUTE.
VALUE LABELS Block
1 'Block 1'
2 'Block 2'
3 'Block 3'
4 'Block 4'
5 'Block 5'
6 'Block 6'.

VALUE LABELS Role
0 'Other'
1 'Parent'
2 'Medical specialist'
3 'Assistant doctor'
4 'Nurse'.

do if Role=1.
Compute RoleNew=0.
ELSE IF Role > 1.
Compute RoleNew=1.
end if.

VALUE LABELS RoleNew
0 'Parent'
1 'Staff'.
RECODE RoleNew (MISSING=-99).
MISSING VALUES RoleNew (-99).
EXECUTE.

*Recoding the hospital joined to one variable.
NUMERIC RespH (f1.0).
COMPUTE RespH = SUM (Q1.4, Q1.5).
RECODE RespH (0=0) (1=1) (2=2) (3=3) (4=4) (5=5)
(6=6) (7=7)  (MISSING=-99).
VARIABLE LABELS RespH 'Respondent hospital'.
MISSING VALUES RespH (-99).
EXECUTE.
VALUE LABELS RespH
0 'Other'
1 'Erasmus MC, Rotterdam'
2 'Máxima Medisch Centrum, Veldhoven'
3 'Radboudumc, Nijmegen'
4 'VUmc, Amsterdam'
5 'UZA, Antwerpen'
6 'ZNA, Antwerpen '
7 'ZOL, Genk'.
EXECUTE.
*Recoding the text input of hospital joined to one string
variable.
STRING RespH_T (A20).
COMPUTE RespH_T = CONCAT (Q1.4_TEXT, Q1.5_
TEXT).
VARIABLE LABELS RespH_T 'Respondent hospital text
input'.
EXECUTE.
*Variables to delete in clean dataset.
DEFINE Delete_block1 ()
V2 Width VignetQ Q1.4 Q1.4_TEXT Q1.5 Q1.5_TEXT
!ENDDEFINE.

*---------------------- Processing BLOCK2 ----------------.
RENAME VARIABLES
Q2.1 = Children
Q2.2 = Admis
Q2.3_1_TEXT = AdMdd
Q2.3_2_TEXT = AdMwk
Q2.4_1_1_TEXT = PA1dd
Q2.4_1_2_TEXT = PA1wk
Q2.4_1_3_TEXT = PA2dd
Q2.4_2_1_TEXT = PA2wk
Q2.4_2_2_TEXT = PA3dd
Q2.4_2_3_TEXT = PA3wk.

VARIABLE LABELS
Children "Children in the NICU"
Admis "Previous admissions of children in the NICU?"
AdMdd "Current admission in days"
AdMwk "Current admission in weeks"
PA1dd "Child one, previous admission in days"
PA1wk "Child one, previous admission in weeks"
PA2dd "Child two, previous admission in days"
PA2wk "Child two, previous admission in weeks"
PA3dd "Child three, previous admission in days"
PA3wk "Child three, previous admission in weeks".

ALTER TYPE PA1dd to PA3wk (f1.0).
*Defining education level (combination of BE and NL).
NUMERIC EducL (f1.0).
VARIABLE LABELS EducL 'Education level'.
COMPUTE EducL = SUM (Q2.7, Q2.8).
RECODE EducL (MISSING=-99).
MISSING VALUES EducL (-99).
VALUE LABELS
/EducL
  0 "No education / Basic education"
  1 "LBO / VBO / VMBO"
  2 "MAVO / HAVO and VWO"
  3 "MBO"
  4 "HBO"
  5 "WO-doctoral or master"
/Children
  0 'None'
  1 'One'
  2 'Two'
  3 'Three or more'
/Admis
  0 'No'
  1 'Yes'.

EXECUTE.
   *Defining previous work and admissions.
DEFINE previous_admissions_NL () Q2.5_12 to Q2.5_22
!ENDDEFINE.
DEFINE previous_admissions_BE () Q2.6_75 to Q2.6_94
!ENDDEFINE.
RECODE previous_admissions_NL previous_admis-
sions_BE (MISSING=-99).
MISSING VALUES previous_admissions_NL previous_
admissions_BE (-99).
NUMERIC PAdmi (f1.0).
COMPUTE PAdmi = SUM (previous_admissions_NL,
previous_admissions_BE).
RECODE  PAdmi (MISSING=-99).
VARIABLE LABELS PAdmi "Total previous admissions
of children to a NICU".
MISSING VALUES  PAdmi (-99).
EXECUTE.
   *Defining previous admissions text.
STRING PA_T (A50).
COMPUTE PA_T = CONCAT (Q2.5_22_TEXT, Q2.6_94_
TEXT).
VARIABLE LABELS PA_T 'Previous admissions of chil-
dren to a NICU, text input'.
EXECUTE.
*Variables to delete in clean dataset.
DEFINE Delete_block2 ()
Q2.7 Q2.8
Q2.5_12 to Q2.5_22
Q2.6_75 to Q2.6_94
Q2.5_22_TEXT Q2.6_94_TEXT
```

```
!ENDDEFINE.


*----------------Processing BLOCK3 ---------------------.
RENAME VARIABLES
Q3.1 = Exper
Q3.2_11_TEXT  = PWNL11_T
Q3.3_65_TEXT  =        PWBE20_T.
VARIABLE LABELS Exper 'Amount of working years in a
comparable a comparable setting'.
RECODE Exper (MISSING=-99).
MISSING VALUES Exper (-99).

DEFINE previous_work_NL () Q3.2_1 to Q3.2_11 !END-
DEFINE.
DEFINE previous_work_BE () Q3.3_46 to Q3.3_65
!ENDDEFINE.
RECODE previous_work_NL previous_work_BE (MISS-
ING=-99).
MISSING VALUES previous_work_NL previous_work_
BE (-99).
NUMERIC PWork (f1.0).
COMPUTE PWork = SUM (previous_work_NL, previ-
ous_work_BE).
RECODE PWork (MISSING=-99).
VARIABLE LABELS PWork "Total hospitals worked in
similar settings".
MISSING VALUES PWork (-99).
EXECUTE.
    *Defining previous work text.
STRING PWork_T (A50).
COMPUTE PWork_T = CONCAT (PWNL11_T, PW-
BE20_T).
VARIABLE LABELS PWork_T 'Previous hospitals
worked in, text input'.
EXECUTE.
*Variables to delete in clean dataset.
DEFINE Delete_block3 ()
Q3.2_1 to Q3.2_11
Q3.3_46 to Q3.3_65
PWNL11_T PWBE20_T
!ENDDEFINE.


*----------------Processing BLOCK4 ---------------------.
RENAME VARIABLES
Q4.2    =       DiCh1
Q4.3    =       DiCh2
Q4.4    =       DiCh3
Q4.5    =       DiCh4
Q4.6    =       DiCh5
Q4.7    =       DiCh6
Q4.8    =       DiCh7
Q4.9    =       DiCh8
Q4.10   =       DiCh9
Q4.11   =       DiCh10
Q4.12   =       DiCh11
Q4.13   =       DiCh12.

VARIABLE LABELS
DiCh1 "Discrete choice, vignet 1"
DiCh2 "Discrete choice, vignet 2"
DiCh3 "Discrete choice, vignet 3"
DiCh4 "Discrete choice, vignet 4"
DiCh5 "Discrete choice, vignet 5"
DiCh6 "Discrete choice, vignet 6"
DiCh7 "Discrete choice, vignet 7"
DiCh8 "Discrete choice, vignet 8"
DiCh9 "Discrete choice, vignet 9"
DiCh10 "Discrete choice, vignet 10"
DiCh11 "Discrete choice, vignet 11"
DiCh12 "Discrete choice, vignet 12".
VALUE LABELS DiCh1 to DiCh12
1 'Vignet 1'
2 'Vignet 2'.
RECODE DiCh1 to DiCh12 (MISSING=-99).
MISSING VALUES DiCh1 to DiCh12 (-99).
EXECUTE.
*Variables to delete in clean dataset.
DEFINE Delete_block4 ()
Q4.1
!ENDDEFINE.


*----------------Processing BLOCK5 ---------------------.
*Recoding the direct view variable.
NUMERIC Dview (f1.0).
COMPUTE Dview = SUM (Q5.2, Q5.3).
VARIABLE LABELS Dview 'How important is direct view
in the NICU?'.
VALUE LABELS Dview Importance_scale.
RECODE Dview (MISSING=-99).
MISSING VALUES Dview (-99).
EXECUTE.
*Combining the privacy scores.
NUMERIC Priv1 Priv2 Priv3 Priv4 Priv5 PrivS (f1.0).
COMPUTE Priv1 = SUM (Q5.4_1, Q5.5_1).
COMPUTE Priv2 = SUM (Q5.4_2, Q5.5_2).
COMPUTE Priv3 = SUM (Q5.4_3, Q5.5_3).
COMPUTE Priv4 = SUM (Q5.4_4, Q5.5_4).
COMPUTE Priv5 = SUM (Q5.4_5, Q5.5_5).
COMPUTE PrivS = SUM (Priv1 to Priv5).
RECODE Priv1 to PrivS (MISSING=-99).
MISSING VALUES Priv1 to PrivS (-99).
VARIABLE LABELS
Priv1 'How important is silance in the NICU?'
Priv2 'How important is not being heared by others'
Priv3 'How important is being out of sight of others'
Priv4 'How important is the ability to rearange the room'
Priv5 'How important is the ability to place personal stuff'
PrivS 'Privacy score'.
VALUE LABELS Priv1 to Priv5 Importance_scale.
EXECUTE.
*Recoding the Felxible working space variable.
NUMERIC FlexW (f1.0).
COMPUTE FlexW = SUM (Q5.6NL, Q5.6_7BE, Q5.7).
VARIABLE LABELS FlexW 'How important is  the availa-
bility of a flexible working place?'.
VALUE LABELS FlexW Importance_scale.
RECODE FlexW (MISSING=-99).
MISSING VALUES FlexW (-99).
EXECUTE.
*Recoding the Felxible working space variable (TEXT).
STRING FlexW_T (A50).
COMPUTE FlexW_T = CONCAT (Q5.8NL, Q5.8BE).
EXECUTE.
*Renaming the flex workingplace variables and combin-
ing Flex NL with BE.
RENAME VARIABLES
Q5.9_4 = Flex4.
NUMERIC Flex1 (f1.0)
/Flex2 (f1.0)
/Flex3 (f1.0)
/Flex5 (f1.0).
COMPUTE Flex1 = SUM (Q5.9_1, Q5.9_1.0).
COMPUTE Flex2 = SUM (Q5.9_2, Q5.9_2.0).
COMPUTE Flex3 = SUM (Q5.9_3, Q5.9_3.0).
COMPUTE Flex5 = SUM (Q5.9_5, Q5.9_5.0).
VARIABLE LABELS
FlexW_T "How important is the availability of a flexible
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workplace, open question?"
Flex1 "How well does a flexible workplace fit in a patient room?"
Flex2 "How well does a flexible workplace fit in the department?"
Flex3 "How well does a flexible workplace fit in the familyroom?"
Flex4 "How well does a flexible workplace fit in the Ronald MC Donald house?"
Flex5 "How well does a flexible workplace fit in the restaurant?".
VALUE LABELS Flex1 to Flex5 Appropriateness_scale.
RECODE Flex1 to Flex5 (MISSING=-99).
MISSING VALUES Flex1 to Flex5 (-99).
EXECUTE.
*Combining the noise scores.
NUMERIC Nois1 Nois2 Nois3 Nois4 Nois5 Nois6 NoisS (f1.0).
COMPUTE Nois1 = SUM (Q5.10_1, Q5.11_1).
COMPUTE Nois2 = SUM (Q5.10_2, Q5.11_2).
COMPUTE Nois3 = SUM (Q5.10_3, Q5.11_3).
COMPUTE Nois4 = SUM (Q5.10_4, Q5.11_4).
COMPUTE Nois5 = SUM (Q5.10_5, Q5.11_5).
COMPUTE Nois6 = SUM (Q5.10_6, Q5.11_6).
COMPUTE NoisS = SUM (Nois1 to Nois5).
RECODE Nois1 to NoisS (MISSING=-99).
MISSING VALUES Nois1 to NoisS (-99).
VARIABLE LABELS
Nois1 'How disturbing do you find the sounds of monitor alarms in the NICU?'
Nois2 'How disturbing do you find the sounds of medical pumps in the NICU?'
Nois3 'How disturbing do you find the sounds of respirator in the NICU?'
Nois4 'How disturbing do you find voice sounds from others?'
Nois5 'How disturbing do you find the sounds from the hall in the NICU?'
Nois6 'How disturbing do you find the sounds from footsteps in the NICU?'
NoisS 'Noise disturbance score'.
VALUE LABELS Nois1 to Nois6
Noise_scale.
EXECUTE.
*Variables to delete in clean dataset.
DEFINE Delete_block5 ()
Q5.1 Q5.2 Q5.3 Q5.4_1 Q5.4_2 Q5.4_3 Q5.4_4
Q5.4_5 Q5.5_1 Q5.5_2 Q5.5_3 Q5.5_4 Q5.5_5 Q5.6NL
Q5.6_7BE Q5.7 Q5.8NL Q5.8BE
Q5.9_1 Q5.9_2 Q5.9_3 Q5.9_5 Q5.9_1.0 Q5.9_2.0
Q5.9_3.0 Q5.9_5.0
Q5.10_1 Q5.10_2 Q5.10_3 Q5.10_4 Q5.10_5 Q5.10_6
Q5.11_1 Q5.11_2 Q5.11_3 Q5.11_4 Q5.11_5 Q5.11_6
!ENDDEFINE.


*----------Processing BLOCK6 and BLOCK7 ----------.
*EuroQol 5-dimensions questionaire. Based on: Rabin, R. and F. d. Charro (2001). "EQ-SD: a measure of health status from the EuroQol Group." Annals of medicine 33(5): 337-343.
RENAME VARIABLES
Q6.2 = EQ.5D_1
Q6.3 = EQ.5D_2
Q6.4 = EQ.5D_3
Q6.5 = EQ.5D_4
Q6.6 = EQ.5D_5.
VARIABLE LABELS
EQ.5D_1 'EQ-5D Mobility'
EQ.5D_2 'EQ-5D Self-care'
EQ.5D_3 'EQ-5D Usual activities'
EQ.5D_4 'EQ-5D Painldiscomfort'
EQ.5D_5 'EQ-5D Anxiety/depression'.
VALUE LABELS EQ.5D_1
1 'I have no problems in walking about'
2 'I have some problems in walking about'
3 'lam confined to bed'.
VALUE LABELS EQ.5D_2
1 'I have no problems with self-care'
2 'I have some problems washing or dressing myself'
3 'lam unable to wash or dress myself'.
VALUE LABELS EQ.5D_3
1 'I have no problems with performing my usualactivities'
2 'I have some problems with performing my usual activities'
3 'lam unable to perform my usual activities'.
VALUE LABELS EQ.5D_4
1 'I have no pain or discomfort'
2 'I have moderate pain or discomfort'
3 'I have extreme pain or discomfort'.
VALUE LABELS EQ.5D_5
1 'lam not anxious or depressed'
2 'lam moderately anxious or depressed'
3 'lam extremely anxious or depressed'.
COMPUTE EQ.5D_S = SUM (EQ.5D_1, EQ.5D_2, EQ.5D_3, EQ.5D_4, EQ.5D_5).
VARIABLE LABELS EQ.5D_S "EuroQol 5D score".
RECODE EQ.5D_1 EQ.5D_2 EQ.5D_3 EQ.5D_4 EQ.5D_5 EQ.5D_S (MISSING=-99).
MISSING VALUES EQ.5D_1 EQ.5D_2 EQ.5D_3 EQ.5D_4 EQ.5D_5 EQ.5D_S (-99).
FORMATS EQ.5D_1 EQ.5D_2 EQ.5D_3 EQ.5D_4 EQ.5D_5 (f1.0)
/EQ.5D_S (f2.0).
EXECUTE.

*EuroQol visual analogue scales. Based on: Rabin, R. and F. d. Charro (2001). "EQ-SD: a measure of health status from the EuroQol Group." Annals of medicine 33(5): 337-343.
COMPUTE EQ.5D_VAS = SUM (Q6.7_1, Q7.2_1).
FORMATS EQ.5D_VAS (f3.0).
VARIABLE LABELS EQ.5D_VAS 'EuroQol Visual Analogue Scale'.
RECODE EQ.5D_VAS (MISSING=-99).
MISSING VALUES EQ.5D_VAS (-99).
EXECUTE.

*Work Related Quality of Life questionnaire. Based on Easton, S. and D. Van Laar (2013). "QoWL (Quality of Working Life): what, how, and why?" Psychology Research 3(10): 596-605.
RECODE Q7.4_2 Q6.8_2 Q7.4_4 Q7.6_4 (1=5) (2=4) (3=3) (4=2) (5=1).
EXECUTE.
RENAME VARIABLES
Q7.3_1 = WRQoL_1
Q7.3_2 = WRQoL_2
Q7.3_3 = WRQoL_3
Q7.3_5 = WRQoL_5
Q7.4_1 = WRQoL_6
Q7.4_2 = WRQoL_7
Q7.4_3 = WRQoL_8
Q7.5_1 = WRQoL_11
Q7.5_2 = WRQoL_12
Q7.5_3 = WRQoL_13
Q7.5_4 = WRQoL_14
Q7.6_1 = WRQoL_16
Q7.6_3 = WRQoL_18
Q7.6_4 = WRQoL_19
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Q7.6_5 = WRQoL_20
Q7.7_2 = WRQoL_22
Q7.7_3 = WRQoL_23.
COMPUTE WRQoL_4 = SUM (Q6.8_1, Q7.3_4).
COMPUTE WRQoL_9 = SUM (Q6.8_2, Q7.4_4).
COMPUTE WRQoL_10 = SUM (Q6.8_3, Q7.4_5).
COMPUTE WRQoL_15 = SUM (Q6.8_4, Q7.5_5).
COMPUTE WRQoL_17 = SUM (Q6.8_5, Q7.6_2).
COMPUTE WRQoL_21 = SUM (Q6.8_6, Q7.7_1).
FORMATS WRQoL_1 WRQoL_2 WRQoL_3 WRQoL_4
WRQoL_5 WRQoL_6 WRQoL_7 WRQoL_8 WRQoL_9
WRQoL_10 WRQoL_11 WRQoL_12 WRQoL_13
WRQoL_14 WRQoL_15 WRQoL_16 WRQoL_17
WRQoL_18 WRQoL_19 WRQoL_20 WRQoL_21
WRQoL_22 WRQoL_23 (f1.0).
RECODE WRQoL_1 WRQoL_2 WRQoL_3 WRQoL_4
WRQoL_5 WRQoL_6 WRQoL_7 WRQoL_8 WRQoL_9
WRQoL_10 WRQoL_11 WRQoL_12 WRQoL_13
WRQoL_14 WRQoL_15 WRQoL_16 WRQoL_17
WRQoL_18 WRQoL_19 WRQoL_20 WRQoL_21
WRQoL_22 WRQoL_23 (MISSING=-99).
MISSING VALUES WRQoL_1 WRQoL_2 WRQoL_3
WRQoL_4 WRQoL_5 WRQoL_6 WRQoL_7 WRQoL_8
WRQoL_9 WRQoL_10 WRQoL_11 WRQoL_12
WRQoL_13 WRQoL_14 WRQoL_15 WRQoL_16
WRQoL_17 WRQoL_18 WRQoL_19 WRQoL_20
WRQoL_21 WRQoL_22 WRQoL_23 (-99).
VALUE LABELS  WRQoL_1 WRQoL_2 WRQoL_3
WRQoL_4 WRQoL_5 WRQoL_6 WRQoL_8 WRQoL_10
WRQoL_11 WRQoL_12 WRQoL_13 WRQoL_14
WRQoL_15 WRQoL_16 WRQoL_17 WRQoL_18
WRQoL_20 WRQoL_21 WRQoL_22 WRQoL_23
Agreement_scale.
VALUE LABELS  WRQoL_9  WRQoL_7 WRQoL_19
Agreement_scale_reverse.
EXECUTE.

VARIABLE LABELS
WRQoL_1 'I have a clear set of goals and aims to enable
me to do my job'
WRQoL_2 'I feel able to voice opinions and influence
changes in my area of work'
WRQoL_3 'I have the opportunity to use my abilities at
work'
WRQoL_4 'I feel well at the moment'
WRQoL_5 'My employer provides adequate facilities and
flexibility for me to fit work in around my family life'
WRQoL_6 'My current working hours / patterns suit my
personal circumstances'
WRQoL_7 'I often feel under pressure at work*'
WRQoL_8 'When I have done a good job it is acknowl-
edged by my line manager'
WRQoL_9 'Recently, I have been feeling unhappy and
depressed*'
WRQoL_10 'I am satisfied with my life'
WRQoL_11 'I am encouraged to develop new skills'
WRQoL_12 'I am involved in decisions that affect me in
my own area of work'
WRQoL_13 'My employer provides me with what I need
to do my job effectively'
WRQoL_14 'My line manager actively promotes flexible
working hours / patterns'
WRQoL_15 'In most ways my life is close to ideal'
WRQoL_16 'I work in a safe environment'
WRQoL_17 'Generally things work out well for me'
WRQoL_18 'I am satisfied with the career opportunities
available for me here'
WRQoL_19 'I often feel excessive levels of stress at
work*'
WRQoL_20 'I am satisfied with the training I receive in
order to perform my present job'
WRQoL_21 'Recently, I have been feeling reasonably
happy all things considered'
WRQoL_22 'The working conditions are satisfactory'
WRQoL_23 'I am involved in decisions that affect mem-
bers of the public in my own area of work'.

*Computing combined scale scores.
COMPUTE WRQoL_GWB = SUM (WRQoL_4,
WRQoL_9, WRQoL_10, WRQoL_15, WRQoL_17,
WRQoL_21).
COMPUTE WRQoL_HWI = SUM (WRQoL_5, WRQoL_6,
WRQoL_14).
COMPUTE WRQoL_JCS = SUM (WRQoL_1, WRQoL_3,
WRQoL_8, WRQoL_11, WRQoL_18, WRQoL_20).
COMPUTE WRQoL_CAW = SUM (WRQoL_12,
WRQoL_23).
COMPUTE WRQoL_WCS = SUM (WRQoL_13,
WRQoL_16, WRQoL_22).
COMPUTE WRQoL_SAW = SUM (WRQoL_7,
WRQoL_19).
FORMATS WRQoL_GWB  WRQoL_HWI WRQoL_JCS
WRQoL_CAW WRQoL_WCS WRQoL_SAW (f1.0).
RECODE  WRQoL_GWB  WRQoL_HWI WRQoL_JCS
WRQoL_CAW WRQoL_WCS WRQoL_SAW (MISS-
ING=-99).
MISSING VALUES  WRQoL_GWB  WRQoL_HWI
WRQoL_JCS WRQoL_CAW WRQoL_WCS WRQoL_
SAW (-99).
EXECUTE.

VARIABLE LABELS
WRQoL_GWB "General well-being"
WRQoL_HWI "Home-work interface"
WRQoL_JCS "Job career satisfaction"
WRQoL_CAW "Control at work"
WRQoL_WCS "Working conditions"
WRQoL_SAW "Stress at work".
*Compute combined WRQoL score (only for not parents).
IF Role ~= 1 WRQoL_Score = SUM (WRQoL_GWB,
WRQoL_HWI, WRQoL_JCS, WRQoL_CAW, WRQoL_
WCS, WRQoL_SAW).
VARIABLE LABELS WRQoL_Score 'Combined WRQoL
score'.
RECODE  WRQoL_Score (MISSING=-99).
MISSING VALUES WRQoL_Score  (-99).
FORMATS WRQoL_Score (f2.0).
EXECUTE.

DEFINE Delete_block6_7 ()
Q6.1 Q6.7_1 Q6.8_1 Q6.8_2 Q6.8_3 Q6.8_4 Q6.8_5
Q6.8_6
Q7.1 Q7.2_1 Q7.3_4 Q7.4_4 Q7.4_5 Q7.5_5 Q7.6_2
Q7.7_1
!ENDDEFINE.

*---------- Processing BLOCK8 ----------.
RENAME VARIABLES Q8.1 = JoinR Q8.2 = FeedB.
FORMATS JoinR FeedB (f1.0).
VARIABLE LABELS  JoinR "Participant is willing to join
future research" FeedB "Participant would like to receive
a summery of the report".
VALUE LABELS JoinR FeedB
0 'No'
1 'Yes'.
RECODE  JoinR FeedB (MISSING=-99).
MISSING VALUES JoinR FeedB (-99).

*Recoding the text input of email addresses joined to one
string variable.
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STRING Email (A100).
COMPUTE Email = CONCAT (Q8.3_1_TEXT, Q8.4_1_
TEXT, Q8.5_1_TEXT).
VARIABLE LABELS EMail 'Respondent email address'.
RECODE Email (MISSING='-99').
EXECUTE.

DEFINE Delete_block8()
Q8.3_1_TEXT Q8.4_1_TEXT Q8.5_1_TEXT
!ENDDEFINE.


*----------------Adjusting formats -------------------------.
FORMATS
Consent Sexe Age Children Admis DiCh1 DiCh2 DiCh3
DiCh4 DiCh5 DiCh6 DiCh7 DiCh8 DiCh9 DiCh10 DiCh11
DiCh12 (F1.0)
Flex1 Flex2 Flex3 Flex4 Flex5 (F1.0)
AdMdd AdMwk Exper (F2.0).

ALTER TYPE BrowserV BrowserT
OS
Screen
FlashV
Java
UA
Rejection
Role_T (A30).

* Cleaning up.
*Creating a clean dataset with questionnaire data.
SAVE OUTFILE='Processed/Questionnaire_data.sav'
/DROP= Delete_block1 Delete_block2 Delete_block3
Delete_block4 Delete_block5 Delete_block6_7 Delete_
block8.

* Exporting data .
GET FILE='Processed/Questionnaire_data.sav'.
DATASET NAME Questionnaire_data WINDOW=ASIS.

*Creating a clean dataset with the choice data.
SAVE OUTFILE='TEMP/Choice_data.sav'
/KEEP= DiCh1 DiCh2 DiCh3 DiCh4 DiCh5 DiCh6 DiCh7
DiCh8 DiCh9 DiCh10 DiCh11 DiCh12 Age RespH Block
Sexe Exper PrivS EQ.5D_S EQ.5D_VAS WRQoL_GWB
WRQoL_Score RoleNew.

GET
  FILE='TEMP/Choice_data.sav'.
DATASET NAME Workingfile_choice WINDOW=ASIS.
DATASET ACTIVATE Workingfile_choice.
DATASET CLOSE Questionnaire_data.
DATASET CLOSE Workingfile.

*Create subj.
COMPUTE subj=$casenum.
format subj (F4.0).
EXECUTE.

VARSTOCASES
  /MAKE Choice FROM DiCh1 DiCh2 DiCh3 DiCh4 DiCh5
DiCh6 DiCh7 DiCh8 DiCh9 DiCh10 DiCh11 DiCh12
  /INDEX=Set(12)
  /KEEP=subj Age RespH Block Sexe Exper PrivS
EQ.5D_S EQ.5D_VAS WRQoL_GWB WRQoL_Score
RoleNew
  /NULL=KEEP.


* Processing choice data .

*Join the responses with the discrete choice model.
STAR JOIN
  /SELECT t0.RoleNew, t0.subj, t0.RespH, t0.Age,
t0.Sexe, t0.Exper, t0.PrivS, t0.EQ.5D_S, t0.EQ.5D_VAS,
t0.WRQoL_GWB,
    t0.WRQoL_Score, t1.Type, t1.Size, t1.Privacy, t1.Win-
dow_orientation, t1.Atmosphere_A,
    t1.Atmosphere_B, t1.Furniture_A, t1.Furniture_B,
t1.Furniture_C, t1.Door, t1.Illumination,
    t1.Working_zone
/FROM * AS t0
  /JOIN 'RAW/mgrinwis_Attributes_FINAL.sav' AS t1
    ON t0.Block=t1.Block AND t0.Set=t1.Set AND
t0.Choice=t1.Choice
  /OUTFILE FILE= 'TEMP/Choice_data_matched.sav'.

GET
  FILE= 'TEMP/Choice_data_matched.sav'.
DATASET NAME Workingfile_choice_matched WIN-
DOW=ASIS.
SELECT IF NOT (Choice=-99).
EXECUTE.

*Workaround: SPSS fails to join BLOCK 6, Set 11 and
Set 12.
*I have no idea why, though this does work :-).

do if Block=6 and Set=11 and Choice=1.
COMPUTE        Type=2.
COMPUTE        Size=1.
COMPUTE        Privacy=2.
COMPUTE        Window_orientation=1.
COMPUTE        Atmosphere_A=2.
COMPUTE        Atmosphere_B=1.
COMPUTE        Furniture_A=1.
COMPUTE        Furniture_B=1.
COMPUTE        Furniture_C=2.
COMPUTE        Door=1.
COMPUTE        Illumination=1.
COMPUTE        Working_zone=1.
end if.

do if Block=6 and Set=11 and Choice=2.
COMPUTE        Type=1.
COMPUTE        Size=2.
COMPUTE        Privacy=1.
COMPUTE        Window_orientation=2.
COMPUTE        Atmosphere_A=1.
COMPUTE        Atmosphere_B=1.
COMPUTE        Furniture_A=1.
COMPUTE        Furniture_B=1.
COMPUTE        Furniture_C=1.
COMPUTE        Door=1.
COMPUTE        Illumination=1.
COMPUTE        Working_zone=2.
end if.

do if Block=6 and Set=12 and Choice=1.
COMPUTE        Type=2.
COMPUTE        Size=2.
COMPUTE        Privacy=1.
COMPUTE        Window_orientation=2.
COMPUTE        Atmosphere_A=1.
COMPUTE        Atmosphere_B=1.
COMPUTE        Furniture_A=2.
COMPUTE        Furniture_B=2.
COMPUTE        Furniture_C=2.
COMPUTE        Door=2.
COMPUTE        Illumination=2.
COMPUTE        Working_zone=1.
```

```
end if.

do if Block=6 and Set=12 and Choice=2.
COMPUTE        Type=1.
COMPUTE        Size=2.
COMPUTE        Privacy=2.
COMPUTE        Window_orientation=2.
COMPUTE        Atmosphere_A=2.
COMPUTE        Atmosphere_B=2.
COMPUTE        Furniture_A=1.
COMPUTE        Furniture_B=1.
COMPUTE        Furniture_C=2.
COMPUTE        Door=2.
COMPUTE        Illumination=2.
COMPUTE        Working_zone=2.
end if.
EXECUTE.


*Save the final result of the choce data.
SAVE OUTFILE='Processed/Choice_data_matched.sav'.
*Save the final result of the choce data as text file (com-
ma seperated) for imprt in SAS.
SAVE TRANSLATE OUTFILE='Processed/Choice_data_
matched.txt'
  /TYPE=CSV
  /ENCODING='UTF8'
  /MAP
  /REPLACE
  /CELLS=VALUES
  /KEEP=
Block
Set
Choice
Type
Size
Privacy
Window_orientation
Atmosphere_A
Atmosphere_B
Furniture_A
Furniture_B
Furniture_C
Door
Illumination
Working_zone.
  EXECUTE.
*END.
```

SPSS syntax file 2

Processing of the Questionnaire data (syntax file 2)

```
* WORKING DIRECTORY .
*Specify the below directory with the directory where your files are located
In order to use this syntax, the folder structure needs to remain the same, otherwise the references to the files will fail!.

*------------------ptg advies laptop --------------------------.
cd 'C:\Users\mgrinwis\RUG_Drive\01 ptg-advies\08 Analyse'.

*------------------home workstation --------------------------.
cd 'D:\User_files\Mario\RUG Drive\01 ptg-advies\08 Analyse'.

* OUTPUT OPTIONS .
SET TLook='C:\Users\mgrinwis\RUG_Drive\01 ptg-advies\08 Analyse\Other data\APAtable.stt' TABLERENDER=light SUMMARY=None ROWSBREAK=100 TOLERANCE=1 TFit=Both CELLSBREAK=10000.
SET CTemplate='C:\Users\mgrinwis\RUG_Drive\01 ptg-advies\08 Analyse\Other data\chart_style(AndyUpdate).sgt'.

GET
FILE='Processed\Questionnaire_data.sav'.
DATASET NAME Questionnaire_dataset WINDOW=FRONT.

*GENERAL.
RECODE Priv1 Priv2 Priv3 Priv4 Priv5 (-2=1) (-1=2) (0=3)(1=4)(2=5).
VALUE LABELS Priv1 Priv2 Priv3 Priv4 Priv5
1 'Not at all important'
2 'Slightly important'
3 'Moderately important'
4 'Very important'
5 'Extremely important'.
EXECUTE.

RECODE Flex4 Flex1 Flex2 Flex3 Flex5 (-2=1) (-1=2) (0=3)(1=4)(2=5).
VALUE LABELS Flex4 Flex1 Flex2 Flex3 Flex5
1 'Poor'
2 'Fair'
3 'Moderate'
4 'Good'
5 'Very good'.
EXECUTE.

RECODE Nois1 Nois2 Nois3 Nois4 Nois5 Nois6 (-2=1) (-1=2) (0=3)(1=4)(2=5).
VALUE LABELS Nois1 Nois2 Nois3 Nois4 Nois5 Nois6
1 'Extremely disturbing'
2 'Very disturbing'
3 'Moderately disturbing'
4 'A little disturbing'
5 'Totally not disturbing'.
EXECUTE.

*------------------Population description --------------------.
CTABLES
/VLABELS VARIABLES=Role Role_T Sexe Country DISPLAY=DEFAULT
/TABLE Role [C] + Role_T [C] BY Sexe [C][COUNT F40.0, TABLEPCT.TOTALN PCT40.1] + Country [C][COUNT F40.0, TABLEPCT.TOTALN PCT40.1]
/CATEGORIES VARIABLES=Role Sexe Country ORDER=A KEY=VALUE EMPTY=INCLUDE
/CATEGORIES VARIABLES=Role_T ORDER=A KEY=VALUE EMPTY=EXCLUDE.

CROSSTABS
/TABLES=Role Role_T BY Sexe
/FORMAT=AVALUE TABLES
/CELLS=COUNTTOTAL
/STATISTICS CHISQ
/COUNT ROUND CELL.

CROSSTABS
/TABLES=Role Role_T BY Country
/FORMAT=AVALUE TABLES
/CELLS=COUNT TOTAL
/STATISTICS CHISQ
/COUNT ROUND CELL.

*------------------Age-----------------------------------------.
 *AGE.
 RECODE Age (18 thru 24=0) (25 thru 34=1) (35 thru 44=2) (45 thru 54=3) (55 thru 64=4) (65 thru 74=5) INTO Age_group.
 VARIABLE LABELSAge_group 'Age groupping variable'.
 EXECUTE.
 VALUE LABELS Age_group
 0 '18-24'
 1 '25-34'
 2 '35-44'
 3 '45-54'
 4 '55-64'.
EXECUTE.

ONEWAY Age BY RoleNew
/CONTRAST=-1 1
/STATISTICS DESCRIPTIVES EFFECTS HOMOGENEITY
/PLOT MEANS
/MISSING ANALYSIS.

* Custom Tables.
CTABLES
/VLABELS VARIABLES=Age RoleNew DISPLAY=DEFAULT
/TABLE Age [S][MEAN, SEMEAN] BY RoleNew [C]
/CATEGORIES VARIABLES=RoleNew [.00, 1.00, OTHERNM] EMPTY=INCLUDE TOTAL=YES POSITION=AFTER.

* Custom Tables.
CTABLES
/VLABELS VARIABLES=Country RoleNew DISPLAY=DEFAULT
/TABLE Country BY RoleNew [C][COUNT F40.0]
/CATEGORIES VARIABLES=Country ORDER=A KEY=VALUE EMPTY=INCLUDE
/CATEGORIES VARIABLES=RoleNew [.00, 1.00, OTHERNM] EMPTY=INCLUDE TOTAL=YES POSITION=AFTER.
```

```
* Custom Tables.
CTABLES
/VLABELS VARIABLES=Sexe Age_group RoleNew DIS-
PLAY=DEFAULT
/TABLE Sexe > Age_group [COUNT F40.0] BY RoleNew
/CATEGORIES VARIABLES=Sexe Age_group RoleNew
ORDER=A KEY=VALUE EMPTY=INCLUDE.

NPAR TESTS
/CHISQUARE=Sexe
/EXPECTED=EQUAL
/STATISTICS DESCRIPTIVES
/MISSING ANALYSIS
/METHOD=EXACT TIMER(5).

 *Education.
 RECODE EducL (0 thru 2=0) (3 = 1) (4 thru 5 = 2)
(MISSING=-99) INTO EducL_group.
 VARIABLE LABELSEducL_group 'Education groupping
variable'.
MISSING VALUES EducL_group (-99).
 EXECUTE.
 VALUE LABELS EducL_group
 0 'Low'
 1 'Middle'
 2 'High'.
EXECUTE.

* Custom Tables.
CTABLES
/VLABELS VARIABLES=EQ.5D_S EQ.5D_VAS WRQoL_
GWB WRQoL_Score RoleNew DISPLAY=DEFAULT
/TABLE EQ.5D_S [MEAN, SEMEAN] + EQ.5D_VAS
[MEAN, SEMEAN] + WRQoL_GWB [MEAN, SEMEAN] +
WRQoL_Score
[S][MEAN, SEMEAN] BY RoleNew [C]
/CATEGORIES VARIABLES=RoleNew [.00, 1.00,
OTHERNM] EMPTY=INCLUDE TOTAL=YES POSI-
TION=AFTER.

*ANALYSIS.
*----------------------------Privacy ------------------------------.
EXAMINE VARIABLES=Priv1 Priv2 Priv3 Priv4 Priv5 BY
RoleNew
/PLOT NPPLOT
/COMPARE GROUPS
/STATISTICS NONE
/CINTERVAL 95
/MISSING LISTWISE
/NOTOTAL.

* Custom Tables.
CTABLES
/VLABELS VARIABLES=Priv1 Priv2 Priv3 Priv4 Priv5
RoleNew DISPLAY=DEFAULT
/TABLE Priv1 + Priv2 + Priv3 + Priv4 + Priv5 BY RoleNew
[C][COUNT F40.0]
/CATEGORIES VARIABLES=Priv1 Priv2 Priv3 Priv4
Priv5 ORDER=A KEY=VALUE EMPTY=INCLUDE
/CATEGORIES VARIABLES=RoleNew [.00, 1.00,
OTHERNM] EMPTY=INCLUDE TOTAL=YES POSI-
TION=AFTER.

USE ALL.
COMPUTE filter_$=(RoleNew=0).
VARIABLE LABELS filter_$ 'RoleNew=0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
FREQUENCIES VARIABLES=Priv1 Priv2 Priv3 Priv4
Priv5
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.

USE ALL.
COMPUTE filter_$=(RoleNew=1).
VARIABLE LABELS filter_$ 'RoleNew=1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
FREQUENCIES VARIABLES=Priv1 Priv2 Priv3 Priv4
Priv5
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.

USE ALL.
COMPUTE filter_$=(Country=0).
VARIABLE LABELS filter_$ 'Country=0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
FREQUENCIES VARIABLES=Priv1 Priv2 Priv3 Priv4
Priv5
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.

USE ALL.
COMPUTE filter_$=(Country=1).
VARIABLE LABELS filter_$ 'Country=1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
FREQUENCIES VARIABLES=Priv1 Priv2 Priv3 Priv4
Priv5
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.
USE ALL.

CROSSTABS
/TABLES=Priv1 Priv2 Priv3 Priv4 Priv5 BY Country Role-
New
/FORMAT=AVALUE TABLES
/STATISTICS=CHISQ
/CELLS=COUNT
/COUNT ROUND CELL
/METHOD=EXACT TIMER(5).

RELIABILITY
/VARIABLES=Priv1 Priv2 Priv3 Priv4 Priv5
/SCALE('Privacy') ALL
/MODEL=ALPHA
/STATISTICS= SCALE
/SUMMARY=TOTAL.
*----------------------------Flex working ------------------.
EXAMINE VARIABLES=Flex4 Flex1 Flex2 Flex3 Flex5
/PLOT NPPLOT
/COMPARE GROUPS
```

```
/STATISTICS NONE
/CINTERVAL 95
/MISSING LISTWISE
/NOTOTAL.

USE ALL.
COMPUTE filter_$=(RoleNew=0).
VARIABLE LABELS filter_$ 'RoleNew=0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

FREQUENCIES VARIABLES=Flex4 Flex1 Flex2 Flex3
Flex5
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.

USE ALL.
COMPUTE filter_$=(RoleNew=1).
VARIABLE LABELS filter_$ 'RoleNew=1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

FREQUENCIES VARIABLES=Flex4 Flex1 Flex2 Flex3
Flex5
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.
USE ALL.

USE ALL.
COMPUTE filter_$=(Country=0).
VARIABLE LABELS filter_$ 'Country=0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

FREQUENCIES VARIABLES=Flex4 Flex1 Flex2 Flex3
Flex5
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.

USE ALL.
COMPUTE filter_$=(Country=1).
VARIABLE LABELS filter_$ 'Country=1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

FREQUENCIES VARIABLES=Flex4 Flex1 Flex2 Flex3
Flex5
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.
USE ALL.

CROSSTABS
/TABLES=Flex4 Flex1 Flex2 Flex3 Flex5 BY Country
RoleNew
/FORMAT=AVALUE TABLES
/STATISTICS=CHISQ
/CELLS=COUNT
/COUNT ROUND CELL
/METHOD=EXACT TIMER(5).

RELIABILITY
/VARIABLES=Flex4 Flex1 Flex2 Flex3 Flex5
/SCALE('Flex') ALL
/MODEL=ALPHA
/STATISTICS= SCALE
/SUMMARY=TOTAL.

*----------------------------Noise ----------------------------.
EXAMINE VARIABLES=Nois1 Nois2 Nois3 Nois4 Nois5
Nois6
/PLOT NPPLOT
/COMPARE GROUPS
/STATISTICS NONE
/CINTERVAL 95
/MISSING LISTWISE
/NOTOTAL.

USE ALL.
COMPUTE filter_$=(RoleNew=0).
VARIABLE LABELS filter_$ 'RoleNew=0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

FREQUENCIES VARIABLES=Nois1 Nois2 Nois3 Nois4
Nois5 Nois6
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.

USE ALL.
COMPUTE filter_$=(RoleNew=1).
VARIABLE LABELS filter_$ 'RoleNew=1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

FREQUENCIES VARIABLES=Nois1 Nois2 Nois3 Nois4
Nois5 Nois6
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.

*Custom analysis for the footsteps in the NICU, excluding
the view of parents.
EXAMINE VARIABLES=Nois6 BY Country
/PLOT NONE
/PERCENTILES(5,10,25,50,75,90,95) HAVERAGE
/STATISTICS DESCRIPTIVES
/CINTERVAL 95
/MISSING LISTWISE
/NOTOTAL.

CROSSTABS
/TABLES=Nois6 BY Country
/FORMAT=AVALUE TABLES
/STATISTICS=CHISQ
/CELLS=COUNT
/COUNT ROUND CELL
/METHOD=EXACT TIMER(5).
```

```
*Resume normal analysis.
USE ALL.
COMPUTE filter_$=(Country=0).
VARIABLE LABELS filter_$ 'Country=0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

FREQUENCIES VARIABLES=Nois1 Nois2 Nois3 Nois4
Nois5 Nois6
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.

USE ALL.
COMPUTE filter_$=(Country=1).
VARIABLE LABELS filter_$ 'Country=1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

FREQUENCIES VARIABLES=Nois1 Nois2 Nois3 Nois4
Nois5 Nois6
/FORMAT=NOTABLE
/NTILES=4
/STATISTICS=MEDIAN
/ORDER=ANALYSIS.
USE ALL.

CROSSTABS
/TABLES=Nois1 Nois2 Nois3 Nois4 Nois5 Nois6 BY
Country RoleNew
/FORMAT=AVALUE TABLES
/STATISTICS=CHISQ
/CELLS=COUNT
/COUNT ROUND CELL
/METHOD=EXACT TIMER(5).

RELIABILITY
/VARIABLES=Nois1 Nois2 Nois3 Nois4 Nois5 Nois6
/SCALE('Noise') ALL
/MODEL=ALPHA
/STATISTICS= SCALE
/SUMMARY=TOTAL.

*---------- General Wellbeing EQ.5D ----------.
RELIABILITY
/VARIABLES=EQ.5D_1 EQ.5D_2 EQ.5D_3 EQ.5D_4
EQ.5D_5
/SCALE('EQ.5D General Wellbeing') ALL
/MODEL=ALPHA
/STATISTICS= SCALE
/SUMMARY=TOTAL.

*Work related Quality of life 6 item general wellbeing.
EXAMINE VARIABLES=WRQoL_GWB BY RoleNew
/PLOT NPPLOT
/COMPARE GROUPS
/STATISTICS DESCRIPTIVES
/CINTERVAL 95
/MISSING LISTWISE
/NOTOTAL.

CROSSTABS
/TABLES=WRQoL_GWB BY RoleNew
/FORMAT=AVALUE TABLES
/STATISTICS=CHISQ
/CELLS=COUNT
/COUNT ROUND CELL
/METHOD=EXACT TIMER(5).

RELIABILITY
/VARIABLES= WRQoL_4 WRQoL_9 WRQoL_10
WRQoL_15 WRQoL_17 WRQoL_21
/SCALE('WRQoL_6.GWB') ALL
/MODEL=ALPHA
/STATISTICS= SCALE
/SUMMARY=TOTAL.

*-----------------------------------------------------------
-- Work related Quality of life ----------------------------
-------------------------------------------.
EXAMINE VARIABLES=WRQoL_Score
/PLOT NPPLOT
/STATISTICS DESCRIPTIVES
/CINTERVAL 95
/MISSING LISTWISE
/NOTOTAL.

RELIABILITY
/VARIABLES=WRQoL_1 WRQoL_2 WRQoL_3
WRQoL_5 WRQoL_6 WRQoL_7 WRQoL_8 WRQoL_11
WRQoL_12 WRQoL_13
WRQoL_14 WRQoL_16 WRQoL_18 WRQoL_19
WRQoL_20 WRQoL_22 WRQoL_23 WRQoL_4
WRQoL_9 WRQoL_10 WRQoL_15
WRQoL_17 WRQoL_21
/SCALE('WRQoL') ALL
/MODEL=ALPHA
/STATISTICS= SCALE
/SUMMARY=TOTAL.

*----------General Wellbeing Corrolations --------------.
CORRELATIONS
/VARIABLES=EQ.5D_VAS EQ.5D_S WRQoL_GWB
/PRINT=TWOTAIL NOSIG
/STATISTICS DESCRIPTIVES
/MISSING=PAIRWISE.

* Chart Builder.
GGRAPH
/GRAPHDATASET NAME="graphdataset" VARIA-
BLES=EQ.5D_VAS[name="EQ_5D_VAS"] WRQoL_
GWB RoleNew
MISSING=LISTWISE REPORTMISSING=NO
/GRAPHSPEC SOURCE=INLINE.
BEGIN GPL
SOURCE: s=userSource(id("graphdataset"))
DATA: EQ_5D_VAS=col(source(s), name("EQ_5D_
VAS"))
DATA: WRQoL_GWB=col(source(s), name("WRQoL_
GWB"))
DATA: RoleNew=col(source(s), name("RoleNew"), unit.
category())
GUIDE: axis(dim(1), label("EuroQol Visual Analogue
Scale"))
GUIDE: axis(dim(2), label("General well-being"))
GUIDE: legend(aesthetic(aesthetic.color.exterior), la-
bel("RoleNew"))
GUIDE: text.title(label("Correlation EQ.5D VAS with
WRQoL.6GWB"))
SCALE: cat(aesthetic(aesthetic.color.exterior), in-
clude(".00", "1.00"))
ELEMENT: point(position(EQ_5D_VAS*WRQoL_GWB),
color.exterior(RoleNew))
END GPL.
```

SPSS syntax file 3

Processing of the discrete choice experiment

```
* WORKING DIRECTORY .
*Specify the below directory with the directory where your files are located
In order to use this syntax, the folder structure needs to remain the same, otherwise the references to the files will fail!.

*----------------ptg advies laptop ---------------------------.
cd 'C:\Users\mgrinwis\RUG_Drive\01 ptg-advies\08 Analyse'.

*----------------home workstation ----------------------.
cd 'D:\User_files\Mario\RUG Drive\01 ptg-advies\08 Analyse'.

* OUTPUT OPTIONS .
SET TLook='Other data\APAtable.stt' TABLEREN-
DER=light SUMMARY=None ROWSBREAK=100 TOL-
ERANCE=1 TFit=Both CELLSBREAK=10000.
SET CTemplate='Other data\chart_style(AndyUpdate).
sgt'.


GET
FILE='Processed\Choice_data_matched.sav'.
DATASET NAME DataSet10 WINDOW=FRONT.

* Used to create dummies to test if this made a difference with regard to the analysis, this was not the case
SPSSINC CREATE DUMMIES VARIABLE=Choice Type
Size Privacy Window_orientation Atmosphere_A Atmos-
phere_B
Furniture_A Furniture_B Furniture_C Door Illumination
Working_zone
ROOTNAME1=Choice Type Size Privacy Window_orien-
tation Atmosphere_A Atmosphere_B
Furniture_A Furniture_B Furniture_C Door Illumination
Working_zone
/OPTIONS ORDER=A USEVALUELABELS=YES
USEML=YES OMITFIRST=YES.
*ANALYSIS.
 *AGE.
 RECODE Age (18 thru 24=0) (25 thru 34=1) (35 thru
44=2) (45 thru 54=3) (55 thru 64=4) (65 thru 74=5) INTO
Age_group.
 VARIABLE LABELSAge_group 'Age groupping varia-
ble'.
 EXECUTE.
 VALUE LABELS Age_group
 0 '18-24'
 1 '25-34'
 2 '35-44'
 3 '45-54'
 4 '55-64'.
EXECUTE.

*----------------Correlations --------------------------------.
CORRELATIONS
/VARIABLES=Type Size Privacy Window_orientation
Atmosphere_A Atmosphere_B Furniture_A Furniture_B
Furniture_C Door Illumination Working_zone
/PRINT=TWOTAIL NOSIG
/STATISTICS XPROD
/MISSING=PAIRWISE.
NONPAR CORR
/VARIABLES=Type Size Privacy Window_orientation
Atmosphere_A Atmosphere_B Furniture_A Furniture_B
Furniture_C Door Illumination Working_zone
/PRINT=KENDALL TWOTAIL NOSIG
/MISSING=PAIRWISE.

*-------------Discrete choice analysis----------------------.
*Testing influence of covariates, by adding role, gender and experience EQ.5D_VAS and WRQoL_GWB as a covariate.
NOMREG Choice (BASE=LAST ORDER=ASCENDING)
BY Type Size Privacy Window_orientation Atmosphere_A
Atmosphere_B Furniture_A Furniture_B Furniture_C Door
Illumination Working_zone WITH RoleNew EQ.5D_VAS
WRQoL_GWB Exper Sexe Age_group RespH
/CRITERIA CIN(95) DELTA(0) MXITER(100) MXSTEP(5)
CHKSEP(20) LCONVERGE(0) PCONVERGE(0.000001)
SINGULAR(0.00000001)
/MODEL=
/STEPWISE=PIN(.05) POUT(0.1) MINEFFECT(0)
RULE(SINGLE) ENTRYMETHOD(LR) REMOVAL-
METHOD(LR)
/INTERCEPT=INCLUDE
/PRINT=PARAMETER SUMMARY LRT CPS STEP MFI
 /MISSING=INCLUDE
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Atmosphere_B Furniture_A Furniture_B Furniture_C Door
Illumination Working_zone Age_group
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METHOD(LR)
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 *Main effects only.
NOMREG Choice (BASE=LAST ORDER=ASCENDING)
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Atmosphere_B Furniture_A Furniture_B Furniture_C Door
Illumination Working_zone
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*Testing alltwo-way interactions possible with Type.
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BY Type Size Privacy Window_orientation Atmosphere_A
Atmosphere_B Furniture_A Furniture_B Furniture_C Door
Illumination Working_zone
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ture_C Door Illumination Working_zone
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Type*Privacy
Type*Illumination
Size*Privacy
Size*Illumination
Illumination*Privacy
Door*Type
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Statistical model, DCE

Block	Set	Alt	Type	Size	Privacy	Window_ orientation	Atmosphere_A	Atmosphere_B	Furniture_A	Furniture_B	Furniture_C	Door	Illumination	Working_zone
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Block	Set	Alt	Type	Size	Privacy	Window_ orientation	Atmosphere_A	Atmosphere_B	Furniture_A	Furniture_B	Furniture_C	Door	Illumination	Working_zone
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Block	Set	Alt	Type	Size	Privacy	Window_ orientation	Atmosphere_A	Atmosphere_B	Furniture_A	Furniture_B	Furniture_C	Door	Illumination	Working_zone
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Block	Set	Alt	Type	Size	Privacy	Window_ orientation	Atmosphere_A	Atmosphere_B	Furniture_A	Furniture_B	Furniture_C	Door	Illumination	Working_zone
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Submission letter, Erasmus MC

Medisch Ethische Toetsings Commissie Erasmus MC
Postbus 2040
3000 CA Rotterdam
T.a.v. het secretariaat
Kamer Z 744

Datum: 02-11-2015

Betreft: Aanbieding onderzoeksvoorstel voor beoordeling van de WMO-plichtigheid

Geachte heer/mevrouw,

Hierbij doe ik u toekomen het onderzoeksvoorstel getiteld: *Invloed van omgevingsfactoren op het welzijn van ouders en personeel in de NICU* voor beoordeling van de WMO-plichtigheid door de METC.

Dit onderzoek valt ons inziens niet onder de reikwijdte van de Wet medisch-wetenschappelijk onderzoek met mensen (WMO), omdat het onderzoek betreft waarbij:

☐ retrospectief gegevens worden verzameld en verwerkt (statusonderzoek).
☐ prospectief gegevens worden verzameld en verwerkt.
☐ weefsel wordt gebruikt dat reeds tijdens normale diagnostiek of zorg is verzameld (restweefsel).
☒ 1 keer 1 vragenlijst wordt afgenomen (zie bijgevoegde vragenlijsten).
☐ eenmalig een urinemonster wordt verzameld.
☐ het onderzoek valt niet onder bovenstaande categorieën, maar omvat <<*beschrijf de aard van het onderzoek*>>.

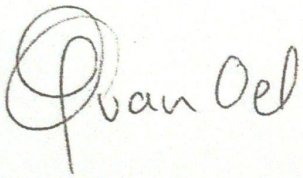
Ondergetekenden verklaren, dat:

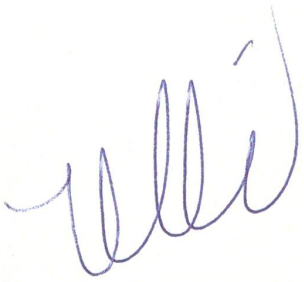
1. de bij dit onderzoek betrokken artsen, onderzoekers en ondersteunend personeel deskundig en bekwaam zijn om dit onderzoek uit te voeren;
2. alle personen die beroepsmatig een bijdrage moeten leveren voldoende zijn ingelicht over het onderzoek;
3. de infrastructuur in het Erasmus MC c.q. van de afdeling geschikt is voor een gedegen uitvoering van het onderzoek;
4. niet gelijktijdig andere onderzoeken op c.q. met medewerking van de afdeling worden uitgevoerd, waardoor het welslagen van het onderzoek en van andere onderzoeken bemoeilijkt kan worden; en
5. het aantal proefpersonen dat naar verwachting in het Erasmus MC geïncludeerd zal worden, haalbaar is.

Aanbiedingsbrief onderzoeksvoorstel toets WMO-plichtigheid, versie 1 maart 2015

Ondergetekenden verklaren hiermee akkoord te gaan met de indiening van bovenvermeld onderzoeksvoorstel bij de METC.

Met vriendelijke groet,





Dr. C.J. van Oel

Prof. dr. I. Reiss

Hoofdonderzoeker

Afdelingshoofd Sector Neonatologie

(Verplicht in te vullen en te ondertekenen door beide partijen)

Bijlagen:

C1. Onderzoeksprotocol versie 3 dd 02-11-2015

F1. Vragenlijst [Ouders] versie 8 dd 02-11-2015

F2. Vragenlijst [Personeel] versie 8 dd 02-11-2015

K1. Reactie A.M. Den Hertog - de Visser dd 02-11-2015

K2. Flyer_Erasmus_MC dd 02-11-2015

Submission letter, ZNA

UNIVERSITAIR ZIEKENHUIS ANTWERPEN
UNIVERSITEIT ANTWERPEN
ETHISCH COMITE

Verzoek tot advies gericht aan de Commissie voor Medische Ethiek betreffende een voorstel tot klinische studie.

EC NR	EUDRACT NR	UNIEK BELG. NR
……/……/……	…….-……-…….	……

TITEL: Invloed van omgevingsfactoren op het welzijn van ouders en personeel in de NICU

INLICHTINGEN IN VERBAND MET DE STUDIEGROEP

Hieronder zijn de betrokken leden van het onderzoeksteam weergegeven.

Woordvoerder in het UZA

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Waar wordt de studie uitgevoerd? **Neonatal intensive care unit (NICU) van het UZA.**

Betreft het een multicentrisch experiment? **JA**

De centra waarbij het onderzoek wordt uitgezet hebben alleen verschillende voorwaarden hieronder wordt kort aangegeven welke andere centra hebben toegezegd deel te nemen, wat de voorwaarden zijn en wat de huidige stand van zaken is.

Centrum	Voorwaarde	Status
ZNA te Antwerpen	Aanvraag bij Ethisch Comité UZA	Aangevraagd
ZOL te Genk,	Aanvraag bij Ethisch Comité UZA	Aangevraagd
Erasmus MC, Rotterdam	Toetsing WMO-plichtigheid	Aangevraagd
Máxima Medisch Centrum, Veldhoven	Geen toetsing	Afname vragenlijst gestart
Radboudumc te Nijmegen	Geen toetsing	Afname vragenlijst gestart
VUmc, Amsterdam	Toetsing WMO-plichtigheid	Aangevraagd

Contactpersonen van centra die hebben toegezegd deel te nemen aan de studie

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Werd het Ethisch Comité door u geselecteerd om als Centraal Ethisch Comité te fungeren? **JA**

Betreft het een commercieel experiment? **NEEN**

Wie is de initiatiefnemer van de studie? *(schrappen wat niet past).* **Studiegroep zelf**

NOODZAKELIJKE BIJLAGEN TER BEOORDELING VAN DE STUDIE

	Aanwezig
- Inlichtingenblad CME	●
- Protocol van de studie	●
- Inlichtingenblad voor de patiënt en/of familie *Onderdeel van Toestemmingsformulier*	●
- Toestemmingsformulier voor de patiënt	●
- Farmacologisch & Toxicologisch dossier (enkel bij geneesmiddelenonderzoek)	n.v.t.
- Alle dagboeken of vragenlijsten die aan de proefpersoon worden voorgelegd	●
- Middelen die worden toegepast om de recrutering te bevorderen	●
- Verzekeringscontract	n.v.t.
- Facturatieschema	n.v.t.
- Contract tussen opdrachtgever en onderzoeker	n.v.t.
- CV van de deelnemende arts(en)	n.v.t.
- Lijst van de lokale ethische comités en lokale onderzoekers (indien van toepassing)	●

Gelieve alle documenten in tweevoud in te dienen!

BUDGET EN FINANCIERING VAN DE STUDIE

Hoe zal de studie gefinancierd worden?

- Industrie
- Overheid (IWT, FWO, …)
- Eigen middelen
- **Andere: deze studie is het afsluitend onderdeel van de masteropleinding Management in the Built Environment aan de Technische Universiteit in Delft.**
  Zodoende is financiering niet van toepassing.

Is de vergoeding die u als onderzoeker ontvangt redelijk en in verhouding met uw prestaties? (Gelieve het bedrag te vermelden a.u.b.)

Voor de deze studie ontvangt de onderzoeker geen vergoeding.

Hoe is dit bedrag samengesteld? **n.v.t.**

Worden onderzoeken in deze studie op het RIZIV verhaald? Zo ja, waarom? **Nee**

Worden de deelnemers vergoed? Zo ja, hoeveel en wat houdt deze vergoeding juist in? **Nee**

BUDGET EN FINANCIERING VAN DE STUDIE IN GEVAL VAN FWO/BOF/IWT/EU

Financieringsbron / financierende instantie (FWO, BOF, IWT, EU): **n.v.t.**

Financieringsprogramma + jaartal (vb. DOCPRO BOF 2012, FWO-postdoc 2013, IWT-SB 2013, EU-ERC): **n.v.t.**

Naam mandaathouder (*indien van toepassing*): **n.v.t.**

Titel project (*indien verschillend van aanvraag bij het Ethisch Comité*): **n.v.t.**

ProjectID Peoplesoft onderzoeksdatabank (*beschikbaar voor alle onderzoeksovereenkomsten gesloten met Universiteit Antwerpen*): **n.v.t.**

En/Of projectnummer departement Financiën UA (ADFIN): **n.v.t.**

ProjectID externe kredietverlener (*indien beschikbaar, vb. FWO-nummer*): **n.v.t.**

Verwant ethisch advies: **n.v.t.**

Verlenging / wijziging (*indien van toepassing*): **n.v.t.**

Nota: indien dit EC advies van toepassing is op meerdere financieringsbronnen, dient bovenstaande informatie voor elk van deze bronnen vermeld te worden.

INLICHTINGEN IN VERBAND MET DE STUDIEOPZET

Fase van het onderzoek

I – II – III – IV – **andere** : het onderzoek betreft niet een specifieke fase maar richt zich op de inrichting (bouw) van een neonatal intensive care unit (NICU).

Studieperiode:

- aanvang: 1 december 2015
- einde: 3 januari 2016

Versie van het protocol (datum en evt. versie nummer): Versie 2, 27-10-2015

Versie van de investigator's brochure (datum en evt. versie nummer) **n.v.t.**

Versie van het informed consent (datum en evt. versie nummer): Versie 2 dd 02-11-2015

Opmerking: de informed consent wordt online afgenomen. Deze gaat vooraf aan de afname van de vragenlijst. De informed consent vindt u dan ook terug in de twee bijgevoegde vragenlijsten.

Ter verduidelijking is de infromed consent tevens als bijlage toegevoegd.

Doel van de studie

Het doel van dit onderzoek is om advies te kunnen geven over hoe NICU-omgevingen beter het welzijn van ouders en personeel kunnen ondersteunen.

Korte samenvatting van het project

De onderzoeker stuurt flyers (zie bijlage K1. Flyer_UZA.pdf) naar de deelnemende centra, met een begeleidende brief. Het medische diensthoofd en of de verpleegkundig manager van de dienst vraagt aan het verpleegkundig en medisch personeel om de vragenlijst in te vullen. Deelname is geheel vrijwillig.

Ook wordt het verpleegkundig en medisch personeel gevraagd om het onderzoek onder de aandacht van de ouders van patiënten op de dienst te brengen door het overhandigen van de flyers. De ouders worden gevraagd of zij mee zouden willen doen aan het onderzoek. Verdere handelingen zijn niet nodig.

Wetenschappelijke fundering van de studie

De neonatal intensive care unit (NICU) is een bijzonder stressvolle ziekenhuisomgeving, zowel voor ouders als voor de zorgverleners. Het is belangrijk dat de omgeving waarin zij zich bevinden een omgeving is die bij voorkeur bijdraagt aan het welzijn van de ouders en de zorgverleners.

De aanwezigheid van verschillende omgevingsfactoren beïnvloedt het welzijn van ouders en de zorgverleners. Van factoren zoals licht en geluid is bekend dat deze het welzijn beïnvloeden. Welke andere factoren ook het welzijn van ouders en het medisch personeel beïnvloeden is niet duidelijk.

Naar aanleiding van vergaderingen met experts (medisch specialisten, verpleegkundigen en verpleegkundig managers) en het bestuderen van de literatuur zijn een aantal ontwerpfactoren

geïdentificeerd die mogelijk van invloed zijn op het welzijn van ouders en medisch personeel. Hieronder wordt zeer kort de belangrijkste factoren besproken die mee worden genomen in het onderzoek:

Licht – verstoring van het circadiaans ritme door afwezigheid van daglicht. (Zie o.a. Choi, J.-H., Beltran, L. O., & Kim, H.-S. (2012). Impacts of indoor daylight environments on patient average length of stay (ALOS) in a healthcare facility. Building and Environment, 50, 65-75.)

Geluid op de afdeling – blijkt een storende factor voor personeel en het welzijn van de patiënten te beïnvloeden. (zie o.a. Braithwaite, M. (2008). Nurse burnout and stress in the NICU. Advances in Neonatal Care, 8(6), 343-347 en Chen, W., Oetomo, S. B., & Feijs, L. (2010). Neonatal monitoring–current practice and future trends. Handbook of Research on Developments in e-Health and Telemedicine: Technological and Social Perspectives, 939-961.)

Ontwerp – Invloed van verschillende manieren waarop de afdeling is ontworpen. (Zie o.a. Altimier, L. B., Eichel, M., Warner, B., Tedeschi, L., & Brown, B. (2005). Developmental care: changing the NICU physically and behaviorally to promote patient outcomes and contain costs. Neonatal Intensive Care, 18(4), 12-16.)

Visuele scheiding – Visuele scheiding van personeel en de couveuse heeft invloed op het welzijn van de verpleging en de familie. (Zie o.a. Shahheidari, M., & Homer, C. (2012). Impact of the design of neonatal intensive care units on neonates, staff, and families: a systematic literature review. The Journal of perinatal & neonatal nursing, 26(3), 260-266.)

Veiligheid – Visuele scheiding van personeel en de couveuse beïnvloed de ervaren veiligheid van de verpleging en vraagt om andere systemen dan gebruikelijk in een zaal opstelling. (Zie o.a. Van Pul, C., Mortel, H. v. d., Bogaart, J. v. d., Mohns, T., & Andriessen, P. (2015). Safe patient monitoring is challenging but still feasible in a neonatal intensive care unit with single family rooms. Acta Paediatrica, n/a-n/a. doi: 10.1111/apa.12907)

Privacy – Privacy wordt als zeer belangrijk ervaren door de ouders (Zie o.a. Carter, B., Carter, A., & Bennett, S. (2008). Families' views upon experiencing change in the neonatal intensive care unit environment: from the 'baby barn'to the private room. Journal of Perinatology, 28(12), 827-829.)

Indien er een placebo-arm is, verantwoording hiervan: **n.v.t.**

De studie is (schrappen wat niet past):

- ~~diagnostisch~~
- ~~fysiologisch~~
- ~~epidemiologisch~~
- ~~therapeutisch~~
- ~~fysiopathologisch~~

Werd de studie reeds elders uitgevoerd, hetzij in zijn geheel, hetzij gedeeltelijk ? **NEEN**

Zijn er in diezelfde periode andere competitieve studies in de dienst? **NEEN**

Zo ja, hoe zullen de patiënten dan gerekruteerd worden in de verschillende studies? **n.v.t**

INLICHTINGEN IN VERBAND MET DE DEELNEMERS

Aantal te recruteren deelnemers:

- **in de ganse studie**
  - 50 ouders
  - 50 zorgverleners (verpleegkundig en medisch personeel)
- **in het eigen centrum**
  - 15 ouders
  - 15 zorgverleners (verpleegkundig en medisch personeel)

Op welke manier worden de deelnemers gerecruteerd en welke middelen worden daartoe aangewend?

De onderzoeker stuurt, voorafgaand aan de lancering van de onlinevragenlijst, flyers naar de afdeling met een begeleidende brief. Personeel op de NICU wordt gevraagd om de flyers onder de aandacht van de ouders te brengen en ook zelf de onlinevragenlijst in te vullen.

Inclusiecriteria

- gezonde deelnemers:
  - **Medisch specialisten, werkzaam op de NICU.**
  - **Arts assistenten, werkzaam op de NICU.**
  - **Verpleegkundigen, werkzaam op de NICU.**
  - **Ouders met één of meer opgenomen kinderen op de NICU tot twee jaar geleden.**
  - **Ouders van patiënten op de NICU van wie het kind op de NICU tenminste 21 dagen oud is.**
- deelnemers lijdend aan: **n.v.t.**
- leeftijd: **ouder dan of gelijk aan 18 jaar**
- geslacht M/V: **zowel mannen als vrouwen**
- zwangere vrouwen of vrouwen die tijdens het onderzoek zwanger kunnen worden? **n.v.t.**

Is er een controlegroep ? **n.v.t.**

Welke investigaties dienen de deelnemers te ondergaan ?

- Andere: **de deelnemers dienen enkel een vragenlijst in te vullen**

Zijn er bijzondere onderzoeken die buiten de klinische praktijk vallen? **Neen**

Risico's

Rekening houdend met de huidige gegevens van de wetenschap, meent U dat het onderzoek:
a) geen enkele mogelijke verwikkeling zal hebben.

Het onderzoek zal geen enkele mogelijke verwikkeling hebben.

b) een mogelijk risico inhoudt: **n.v.t.**

c) zeer waarschijnlijk een risico inhoudt: **n.v.t.**

Informed Consent

Indien er een standaardbehandeling onthouden wordt, staat dit dan vermeld in het Informed Consent?

n.v.t.

Wordt de toestemming bekomen na een klare en objectieve uiteenzetting van het doel en de risico's van het onderzoek ?

Ja

Is het inlichtingenblad volledig, vermeldt het eventuele alternatieve behandelingen, werden alle bijzondere onderzoeken in de studie vermeld, evenals alle risico's die kunnen optreden, is het in eenvoudige taal gesteld en worden de gebruikte afkortingen verduidelijkt ?

Ja

Bevat het inlichtingenblad een paragraaf waarin de patiënt gewezen wordt op het recht de deelname aan de studie op elk moment te onderbreken, zonder dat dit een weerslag heeft op zijn behandeling?

Ja

In geval de gegevens van de patiënt in een gegevensbestand worden opgenomen, vraagt het inlichtingenblad dan de toestemming van de patiënt, bevat het de melding dat de patiënt hierin inzage heeft en eventuele aanpassingen kan vragen?

Ja

Staat er in het Informed Consent duidelijk vermeld dat de arts/onderzoeker geremunereerd wordt?

De arts/onderzoeker wordt niet geremunereerd

Schriftelijk informed consent met Nederlandstalig inlichtingenblad?

NEEN, er wordt gebruik gemaakt van online informed consent

Indien er geen schriftelijke toestemming kan bekomen worden wegens hoogdringendheid, wordt de toestemming gevraagd aan de deelnemer of wettelijke vertegenwoordiger zodra mogelijk?

NEEN, dergelijke deelnemers worden niet benaderd.

In geval van onderzoek bij kinderen, wordt de toestemming aan de wettelijke vertegenwoordigers gevraagd ? **n.v.t.**

TOEZICHT OP DEELNEMERS

Voortdurend medische toezicht tijdens de studie ?
n.v.t.

Toezicht na de uren volgend op het experiment ?
n.v.t.

AANDACHTSPUNTEN VERZEKERING

Zijn alle betrokken personen bij het experiment verzekerd?

Verzekering is voor het invullen van een onlinevragenlijst niet van toepassing

Is het verzekeringsdocument geldig voor de ganse duur van de studie?

n.v.t.

Datum: 12-11-2015

Woordvoerder (naam + handtekening) Diensthoofd (naam + handtekening)

Addendum bij het onderzoeksprotocol 'Invloed van omgevingsfactoren op het welzijn van ouders en personeel in de NICU'.

In de vragenlijst voor Nederland komt het begrip 'flexwerkplek' voor. Omdat dit voor België geen gangbaar taalgebruik betreft, wordt middels dit addendum aangegeven dat in de vragenlijst voor België in onderstaande vragen het woord 'flexwerkplek' vervangen is door 'bureau welke door ouders gebruikt kan worden om tussendoor te kunnen werken'.

Q4.4 Sommige mensen vinden het fijn om (werk-) mail te controleren terwijl ze toch in de buurt van hun kind zijn. Bij een bureau welke door ouders gebruikt kan worden om tussendoor te kunnen werken, kunt u denken aan een tafel of een klein bureau dat geschikt is gemaakt voor laptop/tablet gebruik (stroom en Wifi zijn aanwezig).

Hoe belangrijk vindt u het dat er op de NICU een bureau is welke door ouders gebruikt kan worden om tussendoor te kunnen werken?

- ❍ Totaal niet belangrijk
- ❍ Een beetje belangrijk
- ❍ Tamelijk belangrijk
- ❍ Erg belangrijk
- ❍ Ontzettend belangrijk

Q4.5 Kunt u aangeven waarom u het *[antwoord Q4.4]* vindt dat er een bureau is welke door ouders gebruikt kan worden om tussendoor te kunnen werken?

_____
_____

Q4.6 Hoe goed vindt u een bureau welke door ouders gebruikt kan worden om tussendoor te kunnen werken, passen in...

	Slecht	Matig	Redelijk	Goed	Zeer goed
... de patiëntenkamer	❍	❍	❍	❍	❍
... een aparte ruimte op de afdeling	❍	❍	❍	❍	❍
... de familiekamer (op de afdeling)	❍	❍	❍	❍	❍
... het Ronald MC Donald huis	❍	❍	❍	❍	❍
... het restaurant	❍	❍	❍	❍	❍

Research protocol

Onderzoeksprotocol

Algemene gegevens

Titel	Invloed van omgevingsfactoren op het welzijn van ouders en personeel in de NICU.
Datum	02-11-2015
Versienummer	3
Indiener	Mario Grinwis
Coördinerend onderzoeker	Dr. C.J. van Oel
Hoofdonderzoeker(s)	Dr. C.J. van Oel
Opdrachtgever (verrichter)	Technische Universiteit Delft

Onderzoekgegevens

Rationale	De Neonatale Intensive Care Unit (NICU) is een bijzonder stressvolle ziekenhuisomgeving, zowel voor ouders als voor het medisch personeel. Het is belangrijk dat de omgeving waarin zij zich bevinden een prettige omgeving is die bij voorkeur bijdraagt aan het welzijn van de ouders en het medisch personeel. De aanwezigheid van verschillende omgevingsfactoren beïnvloedt het welzijn van ouders en het medisch personeel. Van factoren zoals licht en geluid is bekend dat deze het welzijn beïnvloeden. Welke andere factoren ook het welzijn van ouders en het medisch personeel beïnvloeden is niet duidelijk. Naar aanleiding van vergaderingen met experts (medisch specialisten, verpleegkundigen en verpleegkundig managers) en het bestuderen van de literatuur zijn een aantal ontwerpfactoren geïdentificeerd die mogelijk van invloed zijn op het welzijn van ouders en medisch

	personeel. Hieronder wordt zeer kort de belangrijkste factoren besproken die mee worden genomen in het onderzoek: **Licht** – verstoring van het circadiaans ritme door afwezigheid van daglicht. (Zie o.a. Choi, J.-H., Beltran, L. O., & Kim, H.-S. (2012). Impacts of indoor daylight environments on patient average length of stay (ALOS) in a healthcare facility. Building and Environment, 50, 65-75.) **Geluid op de afdeling** – blijkt een storende factor voor personeel en het welzijn van de patiënten te beïnvloeden. (zie o.a. Braithwaite, M. (2008). Nurse burnout and stress in the NICU. Advances in Neonatal Care, 8(6), 343-347 en Chen, W., Oetomo, S. B., & Feijs, L. (2010). Neonatal monitoring–current practice and future trends. Handbook of Research on Developments in e-Health and Telemedicine: Technological and Social Perspectives, 939-961.) **Ontwerp** – Invloed van verschillende manieren waarop de afdeling is ontworpen. (Zie o.a. Altimier, L. B., Eichel, M., Warner, B., Tedeschi, L., & Brown, B. (2005). Developmental care: changing the NICU physically and behaviorally to promote patient outcomes and contain costs. Neonatal Intensive Care, 18(4), 12-16.) **Visuele scheiding** – Visuele scheiding van personeel en de couveuse heeft invloed op het welzijn van de verpleging en de familie. (Zie o.a. Shahheidari, M., & Homer, C. (2012). Impact of the design of neonatal intensive care units on neonates, staff, and families: a systematic literature review. The Journal of perinatal & neonatal nursing, 26(3), 260-266.) **Veiligheid** – Visuele scheiding van personeel en de couveuse beïnvloed de ervaren veiligheid van de verpleging en vraagt om andere systemen dan gebruikelijk in een zaal opstelling. (Zie o.a. Van Pul, C., Mortel, H. v. d., Bogaart, J. v. d., Mohns, T., & Andriessen, P. (2015). Safe patient monitoring is challenging but still feasible in a neonatal intensive care

	unit with single family rooms. Acta Paediatrica, n/a-n/a. doi: 10.1111/apa.12907) **Privacy** – Privacy wordt als zeer belangrijk ervaren door de ouders (Zie o.a. Carter, B., Carter, A., & Bennett, S. (2008). Families' views upon experiencing change in the neonatal intensive care unit environment: from the 'baby barn'to the private room. Journal of Perinatology, 28(12), 827-829.)
Doel	Evidence-based advies voor inrichting van de NICU.
Studie design	Vragenlijst onderzoek met het vignetten-keuzemodel (discrete choice experiments). Deelnemers krijgen 12 dichotome keuzes voorgelegd van mogelijke NICU inrichtingen. De keuzes die zij maken geven inzicht in welke combinatie van factoren de meeste voorkeur verdient.
Studie populatie	Ouders met een kind dat op de NICU ligt of heeft gelegen en personeel dat werkzaam is op de NICU (belangrijk is dat men ervaringsdeskundige is).
Inclusie criteria	• Ouders van patiënten op de NICU van wie het kind op de NICU tenminste 21 dagen oud is. • Ouders met één of meer opgenomen kinderen op de NICU tot twee jaar geleden. • Medisch specialisten, werkzaam op de NICU. • Arts assistenten, werkzaam op de NICU. • Verpleegkundigen, werkzaam op de NICU.
Exclusie criteria	< >
Aantal proefpersonen/ sample grootte	15 ouders en 15 personeel. Er is een studiepopulatie van ten minste n=100 nodig. Gegeven het aantal centra dat (op dit moment) zeker deelneemt in de studie is het minimum aantal deelnemers op 15 per groep bepaald.
Werving proefpersonen	De ouders worden benaderd door de verpleegkundige met een verzoek tot deelname (flyer) die naar de afdeling is verstuurd. Het personeel wordt benaderd door afdelingsmanagers om deel te nemen wordt door de afdelingsmanagers gevraagd om ouders te benaderen voor het onderzoek.
Interventie	Er vindt geen interventie plaats.

Studie eindpunten	Waardering (utiliteit) van bepaalde omgevingsfactoren (inrichtings- en ontwerpfactoren) van personeel en ouders op de NICU.
Studie parameters	• Kwaliteit van leven (QoL) voor ouders • Kwaliteit van werkend leven (QoWL) voor werknemers • Perceptie met betrekking tot privacy, en geluid op de NICU • Ensemble van ontwerp- en inrichtingsfactoren NICU zoals gepresenteerd in 3D-visualisaties
Statistische analyses	Er worden multinomial logit modellen met SAS 9.3 uitgevoerd. Beschrijvende statistiek in SPSS versie 22
Belasting voor de proefpersoon	1 x invullen van een onlinevragenlijst met een duur van 15 min
Risico voor de proefpersoon	Geen
Voordelen deelname aan het onderzoek	Geen direct voordeel, mogelijk gevoel van verhoogde betrokkenheid bij de afdeling.
Nadelen deelname aan het onderzoek	Het onderzoek kost 15 minuten om in te vullen
Vergoeding voor proefpersoon	Geen
Administratieve aspecten	De antwoorden van de deelnemers worden verzameld m.b.v. Qualtrics (online vragenlijst software). Dit is een beveiligd account waartoe alleen dhr. M. Grinwis toegang heeft. Na verzameling worden de gegevens versleuteld opgeslagen in GoogleDrive van Google Apps for Education van de Rijksuniversiteit Groningen. Deze dienst heeft een SAS70 type II certificering. Daarnaast worden de geanonimiseerde gegevens bewaard op de beveiligde server van de TU Delft ten behoeve van verdere statistische analyses. Informed consent wordt ook online afgenomen. Voor de haalbaarheid van online informed consent is contact opgenomen met de afdeling juridische zaken van het Erasmus MC (mevr. A.M den Hertog- de Visser). *"Zoals zojuist telefonisch besproken kan toestemming voor deelname aan een vragenlijstonderzoek dat niet onder de WMO valt ook digitaal gevraagd worden (er is geen wettelijke eis voor een schriftelijke handtekening op papier)."*

Publicatiebeleid en amendementen	Over de resultaten van het onderzoek wordt op geaggregeerd niveau gerapporteerd in de afstudeerscriptie van dhr. M. Grinwis, in internationale tijdschriften als Journal of Environmental Psychology en op wetenschappelijke congressen. Rapportages aan deelnemende instellingen zullen ook altijd uitsluitend op geaggregeerd niveau plaatsvinden, om te voorkomen dat resultaten tot individuen herleidbaar zijn. Er wordt niet gepubliceerd over vergelijkingen van de resultaten tussen de deelnemende centra.
Overige	< >

Legal advice online questionnaire

Mario Grinwis

Van: A.M. Den Hertog - de Visser <a.denhertog-devisser@erasmusmc.nl>
Verzonden: dinsdag 27 oktober 2015 16:36
Aan: Mario Grinwis
Onderwerp: toestemming deelname onderzoek

Beste Mario,

Zoals zojuist telefonisch besproken kan toestemming voor deelname aan een vragenlijstonderzoek dat niet onder de WMO valt ook digitaal gevraagd worden (er is geen wettelijke eis voor een schriftelijke handtekening op papier). Voor nader advies over evt ICT security risico's bij dit soort online onderzoek verwijs ik u naar Jan Willem Schoemaker.

Met vriendelijke groet,

Anne-Marleen den Hertog- de Visser
advocaat
Juridische Zaken

Erasmus MC
Universitair Medisch Centrum Rotterdam

Postbus 2040, 3000 CA Rotterdam, intern postadres afdeling juridische zaken
Bezoekadres: kamer Z-719, s-Gravendijkwal 230, 3015 CE Rotterdam
E-mail a.denhertog-devisser@erasmusmc.nl | Telefoon 010 703 49 86 | Fax 010 703 45 28
www.erasmusmc.nl

Decission letter, Erasmus MC

Erasmus MC
Universitair Medisch Centrum Rotterdam

Medische Ethische Toetsings Commissie
Erasmus MC
www.erasmusmc.nl/commissies/metc/

Dr. C.J. van Oel (c.j.vanoel@tudelft.nl)
Faculteit Bouwkunde
Julianalaan 134, kamer Bk01, West 700
2628 BL Delft

Doorkiesnummer +31 10 7033625/34428
Faxnummer
Kamernummer Z 744
E-mail metc@erasmusmc.nl
Ons kenmerk FMS /ss/METC258755
Datum 23 november 2015

Betreft: MEC-2015-703, Besluit onderzoek is niet WMO-plichtig
Multicenter, TU Delft initieert

Protocol titel:
'Invloed van omgevingsfactoren op het welzijn van ouders en personeel in de NICU'

Protocol versie: versie 3 d.d. 2 november 2015

Geachte heer Van Oel,

De Medisch Ethische Toetsings Commissie Erasmus MC heeft het door u ingediende bovenvermeld onderzoeksvoorstel, ontvangen op 5 november 2015 ter beoordeling van de WMO-plichtigheid.

Het dagelijks bestuur van de commissie heeft beoordeeld of dit onderzoek al dan niet binnen de reikwijdte van de WMO valt. In verband hiermee is het dagelijks bestuur tot de conclusie gekomen dat:

- er geen sprake is van een medisch–wetenschappelijke vraagstelling in dit protocol;
- de proefpersonen niet aan een handeling worden onderworpen en er wordt hen geen gedragswijze opgelegd, beide zoals bedoeld in de WMO.

Omdat aan geen van beide voorwaarden voor WMO-plichtigheid niet is voldaan, heeft het dagelijks bestuur van de commissie d.d. 17 november 2015 besloten dat bovenvermeld onderzoek niet WMO-plichtig is. U mag dit onderzoek uitvoeren in het Erasmus MC en u kunt de resultaten te zijner tijd voor publicatie aanbieden aan een wetenschappelijk tijdschrift.

De commissie attendeert u op de volgende punten

- De commissie heeft alleen de WMO-plichtigheid beoordeeld. Er heeft verder geen inhoudelijke toets van het onderzoek plaatsgevonden.

- U en uw afdeling zijn verantwoordelijk voor de correcte uitvoering van het onderzoek volgens de geldende wet– en regelgeving. Hierbij vestigen wij uw aandacht op het volgende:

    - Voor prospectief onderzoek, waarbij gegevens van proefpersonen worden verzameld en verwerkt, is toestemming van de proefpersonen nodig. U vindt

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Postbus 2040
3000 CA Rotterdam

Bezoekadres
's-Gravendijkwal 230
3015 CE Rotterdam

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een voorbeeld patiënteninformatie- en toestemmingsformulier voor niet WMO-plichtig onderzoek op de site van de METC.
(www.erasmusmc.nl /commissies/metc/)

- Voor retrospectief onderzoek, waarbij gegevens van proefpersonen gecodeerd worden verzameld en verwerkt is toestemming van de proefpersonen nodig. U vindt een voorbeeld patiënteninformatie- en toestemmingsformulier voor niet WMO-plichtig onderzoek op de site van de METC (www.erasmusmc.nl /commissies/metc/).
(Bij retrospectief *anoniem* onderzoek is toestemming niet verplicht, hierbij zijn de gegevens nooit meer herleidbaar tot de proefpersonen.)

- Wanneer in een onderzoek gegevens worden verzameld van proefpersonen, dient hiermee correct te worden omgegaan zoals bepaald in de Gedragscode Gezondheidsonderzoek (Code Goed Gedrag), het Privacy Reglement Erasmus MC, en de Wet bescherming persoonsgegevens.
U vindt hierover meer informatie op de website van de METC (www.erasmusmc.nl /commissies/metc/) en op de website van FEDERA (www.federa.org).

- Wanneer in een onderzoek (lichaams)materiaal van proefpersonen wordt verzameld en verwerkt dient hiermee correct te worden omgegaan zoals bepaald in de Code Goed Gebruik. U vindt hierover meer informatie op de website van FEDERA (www.federa.org).

- Vergunningplichtig bevolkingsonderzoek moet worden ingediend bij de Commissie Bevolkingsonderzoek ter toetsing conform de Wet bevolkingsonderzoek. U vindt hierover meer informatie op de website van de CCMO (www.ccmo.nl).

- Niet WMO-plichtig Fase IV Geneesmiddelen onderzoek dat wordt geïnitieerd door de farmaceutische industrie dient te worden getoetst en uitgevoerd conform de Gedragscode Geneesmiddelenreclame. U vindt hierover meer informatie op de site van de stichting code geneesmiddelen reclame (www.cgr.nl).

- Amendementen en/of addenda bij dit onderzoek dienen aan de commissie ter beoordeling te worden voorgelegd zodat kan worden beoordeeld of het onderzoek nog steeds buiten de reikwijdte van de WMO blijft, of dat er door het amendement/addendum sprake is van WMO-plichtig onderzoek.

- Onderzoekers in het Erasmus MC dienen zich te houden aan de research codes, zoals vastgelegd in de uitgave 'Research Codes' van de afdeling Onderzoeksbeleid, te vinden op Intranet.

- Voor ethische toetsing van Onderwijsonderzoek verwijst de commissie u naar de website van de NVMO-ERB (www.nvmo.nl).

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- De commissie verzoekt u haar op de hoogte te brengen van de volgende gegevens betreffende dit onderzoek:
    - Startdatum (datum inclusie eerste proefpersoon) en/of start gegevens onderzoek
    - einddatum (datum stop studie laatste proefpersoon) en/of stop gegevens onderzoek
    - publicaties en/of eindrapport

Wanneer u vragen heeft over het opzetten, financieren, of uitvoeren van wetenschappelijk onderzoek, kunt u terecht bij het Consultatiecentrum Patiëntgebonden Onderzoek (CPO) voor advies en hulp. Het CPO organiseert ook meerdere keren per jaar de BROK cursus (Basiscursus Regelgeving en Organisatie van Klinisch Onderzoek), die door de commissie van harte wordt aanbevolen. Het volgen van de BROK cursus is, conform landelijke afspraken, alleen verplicht bij WMO-plichtig onderzoek. Voor informatie over de BROK-cursusdata kunt u contact opnemen met het Congresbureau, intern tel.nr. 43584.

Op de site van de METC kunt u links terugvinden naar de hierboven vermelde wet- en regelgeving. Wanneer u vragen heeft over dit METC besluit, kunt u contact opnemen met het secretariaat van de METC.

Met vriendelijke groet,
namens de Medisch Ethische Toetsings Commissie Erasmus MC,

i. o.

Mw.dr. F.M. Spoelstra
Secretaris

Erasmus MC
Universitair Medisch Centrum Rotterdam

To whom it may concern,

The Daily Board of the Medical Ethics Committee Erasmus MC (hereafter the Committee) of Rotterdam, The Netherlands, has reviewed the above mentioned research proposal. As a result of this review, the Committee informs you that the rules laid down in the Medical Research Involving Human Subjects Act (also known by its Dutch abbreviation WMO), do not apply to this research proposal.

Please indicate the above MEC-number in every correspondence on this study

Yours sincerely,
On behalf of the Medical Ethics Committee Erasmus MC,

Mrs.dr. F.M. Spoelstra
Secretary of the Committee

C.c. **Digitale verzending:**
Prof.dr. I.K.M. Reiss