



Laat technologie de zorg  
helpen

Where  
innovation  
starts

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Technische Universiteit  
Eindhoven  
University of Technology

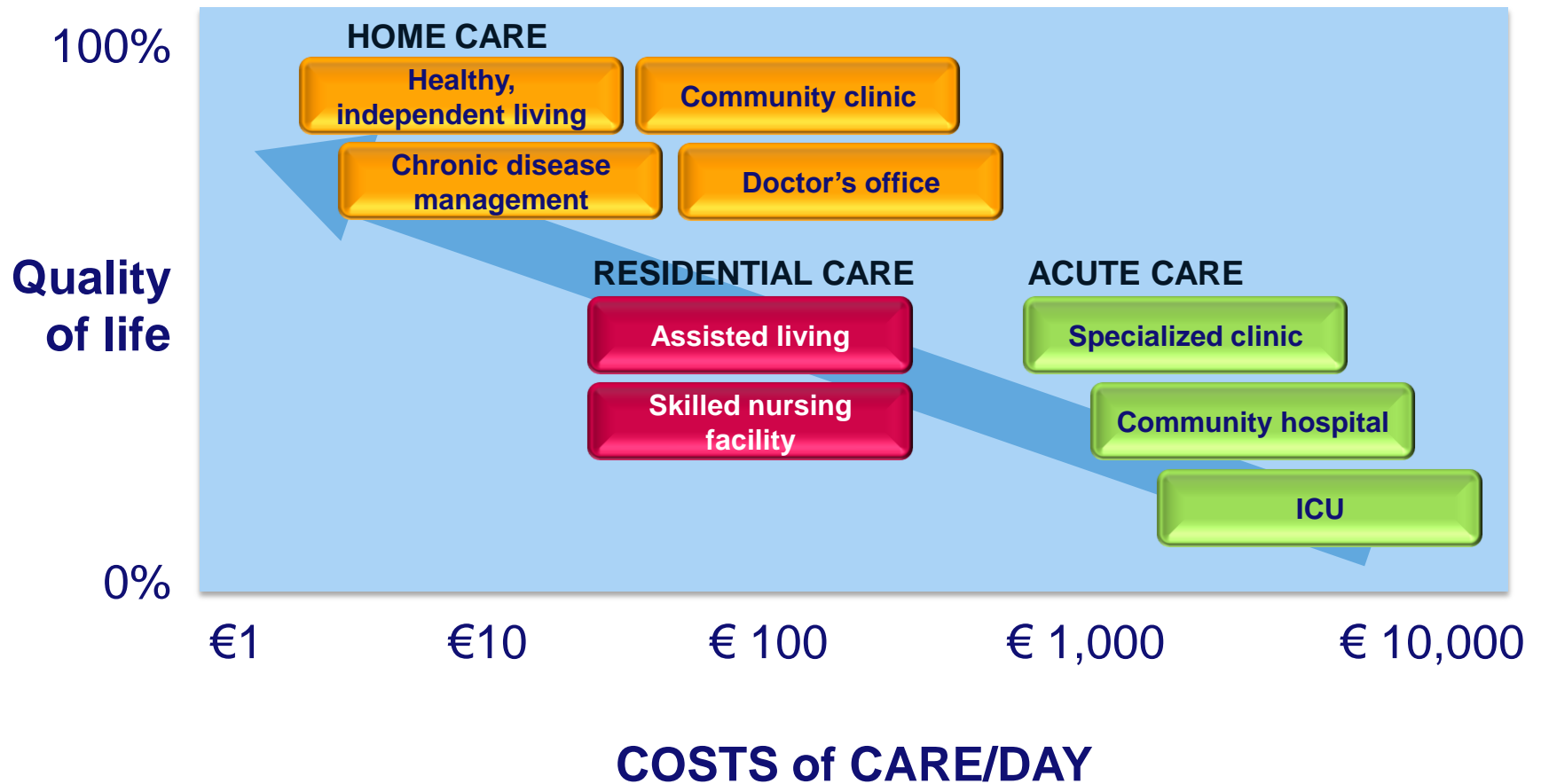


Healthy Solutions  
from Excellent Science

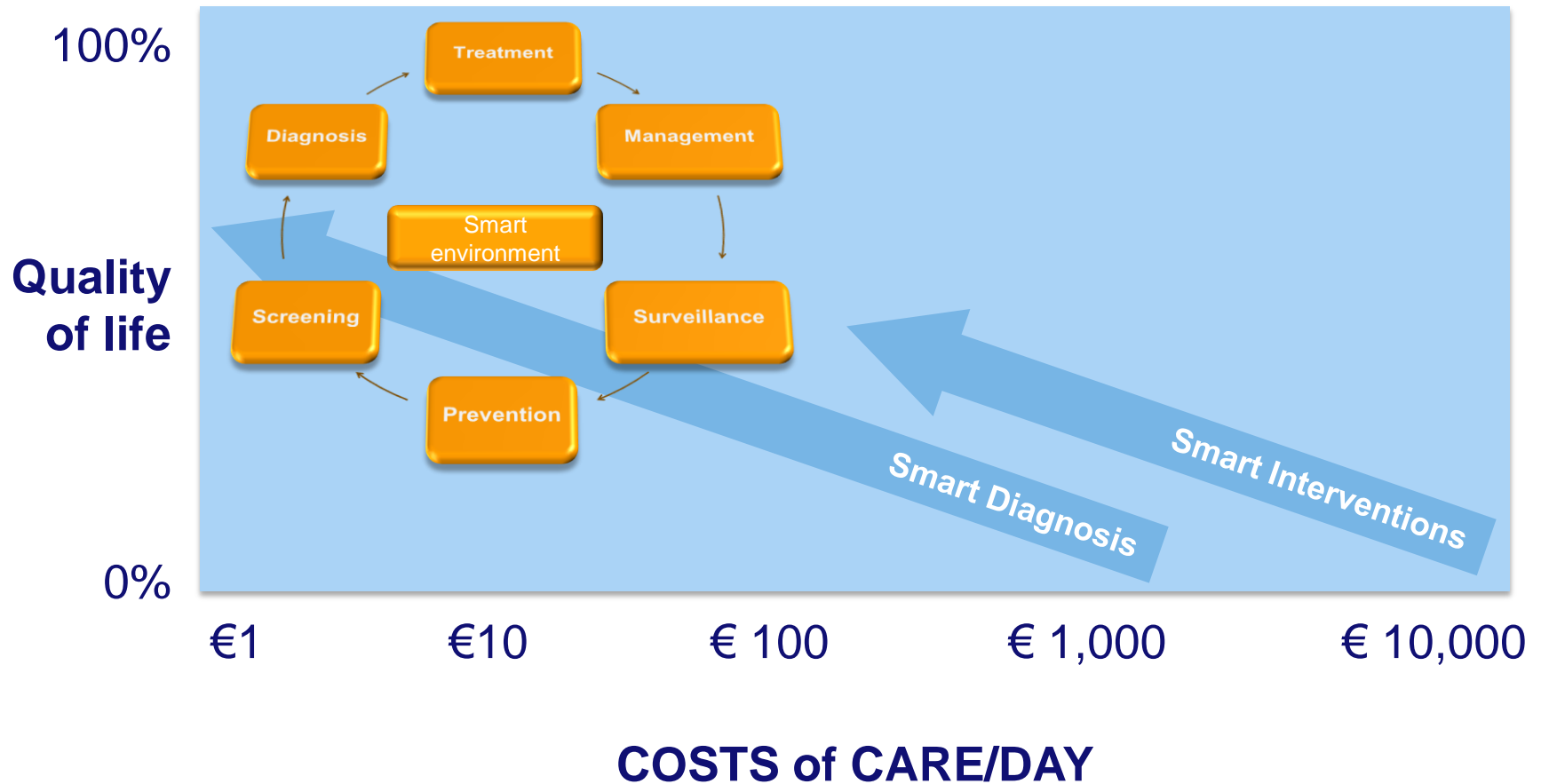
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# Costs of Care and Quality of Life drive Home Healthcare



# Quality of Life and Costs of Care drive Our Innovations



# Laat technologie de zorg helpen

Prof.dr. Guid Oei, gynaecoloog-perinatoloog



**máxima  
medisch centrum**

Zorg met een accent

**TU / e**

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**Where innovation starts**

- **Wordt de zorg beter van technologie?**
- **Wordt de zorg kosten-effectiever door technologie?**



Smart diagnosis  
Smart intervention  
Smart environment

**TU/e** Technische Universiteit  
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## Probleem

- **12,5% kinderen te vroeg geboren**
- **Vroeggeboorte slecht te voorspellen**
- **Behandeling vaak te laat**

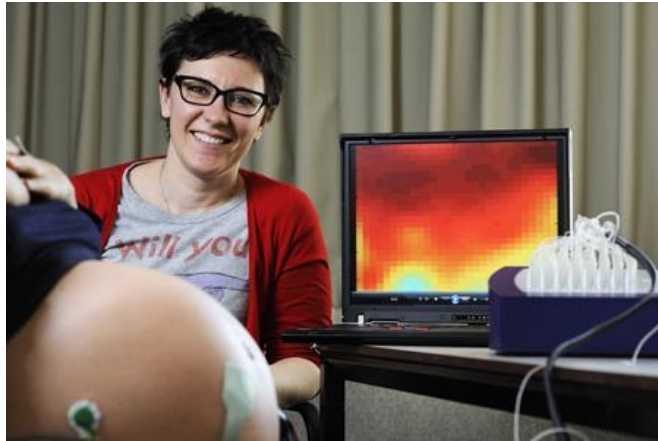
## Kosten vroeggeboorte

- **In V.S. \$26,2 miljard/jaar<sup>1</sup>**
- **In NL geschat 800 miljoen euro per jaar**
- **Bij vroegtijdige diagnose is 50% te voorkomen**

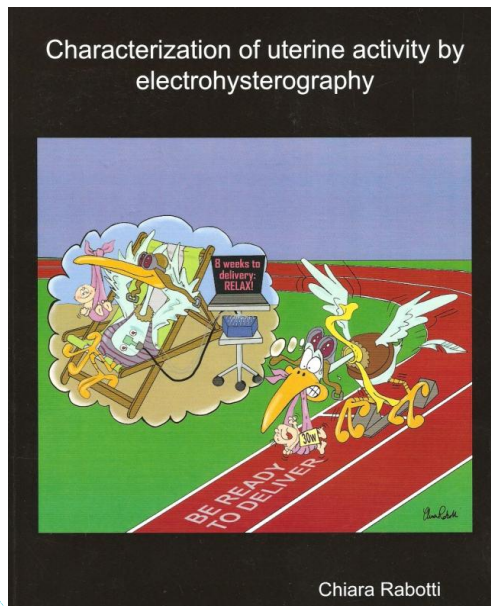
Institute of medicine 2011 <http://national-academies.org>



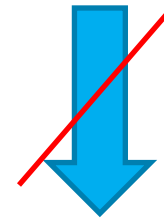
# Early diagnosis of preterm birth



- **Activiteit baarmoeder**
- **Elektrohysterogram**

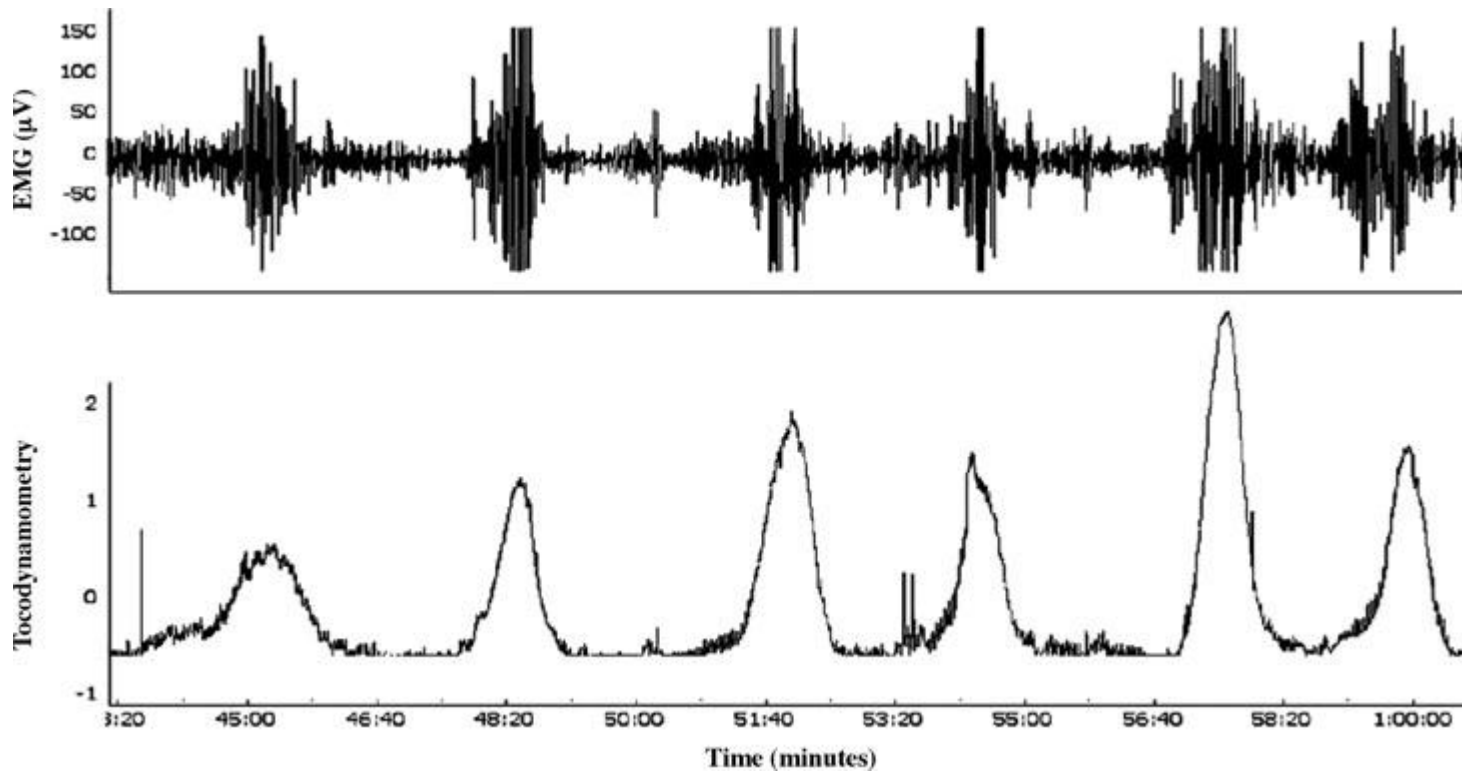


Baarmoeder activiteit



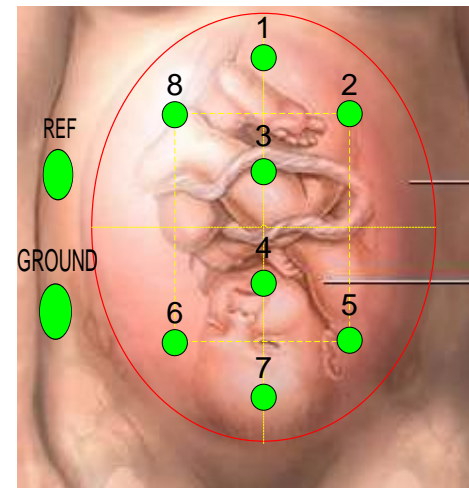
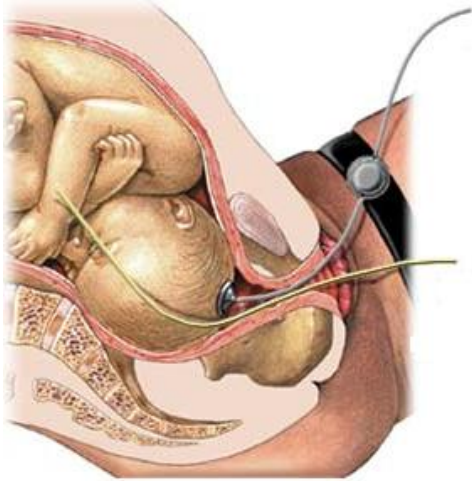
Prematuriteit

# Het elektrohysterogram

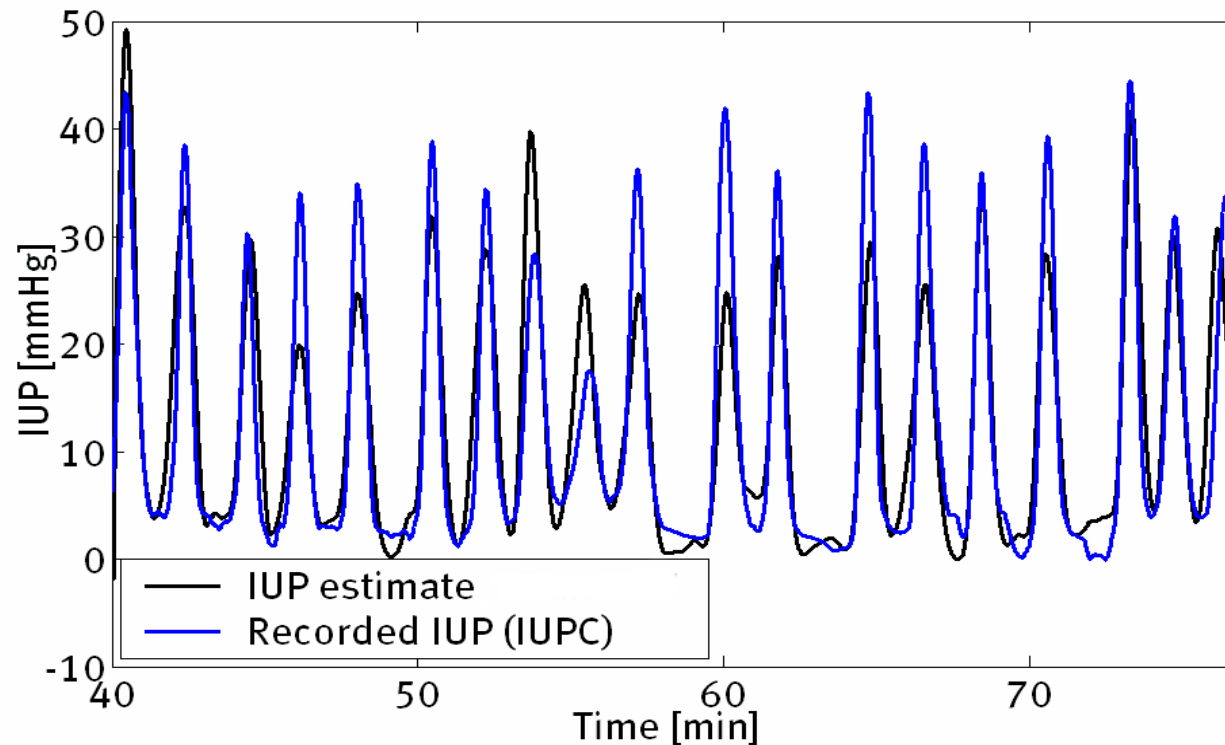


## Voordeel

- Niet-invasief
- Patiëntvriendelijk
- Continue meting



- **Correlatie tussen elektrohysterogram en drukmeting in de baarmoeder**



Rabotti, Oei et al. *Physiol Meas* 2008;29:829-841

**Heeft het EHG extra waarde bij de  
voorspelling van vroeggeboorte?**

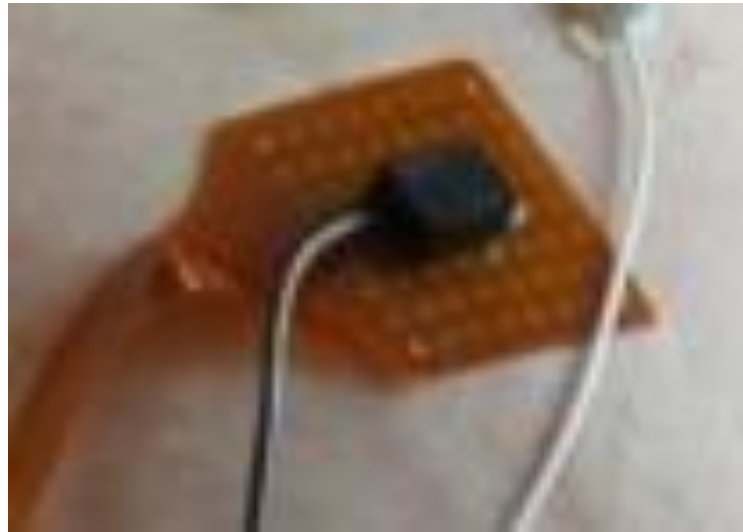




# High density electrode



# High density electrode

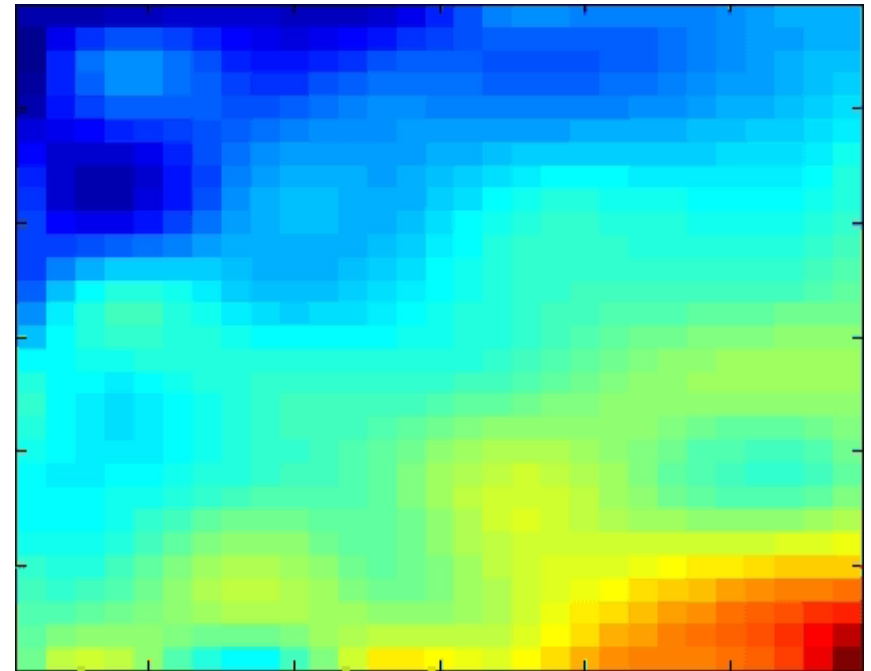
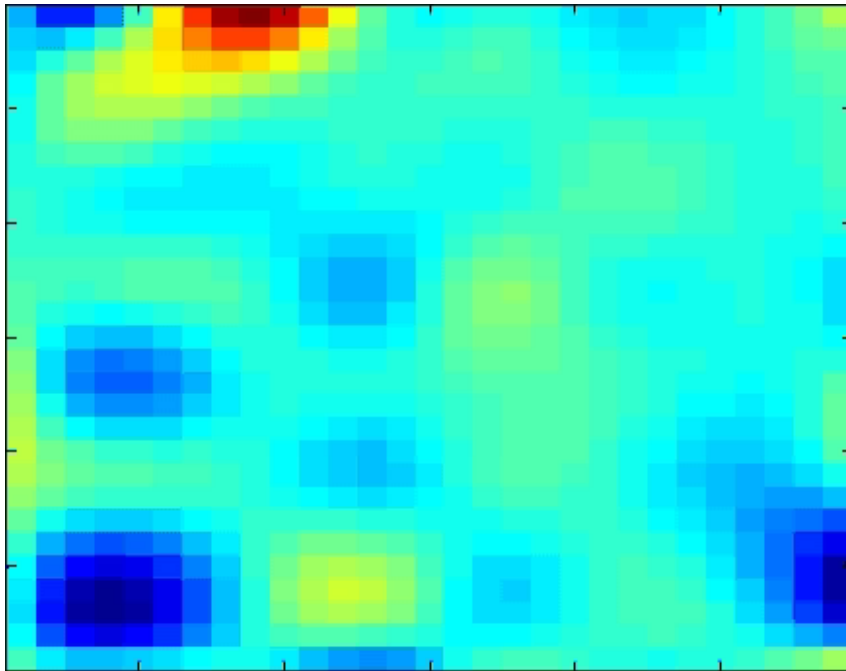


High density elektrodepleister

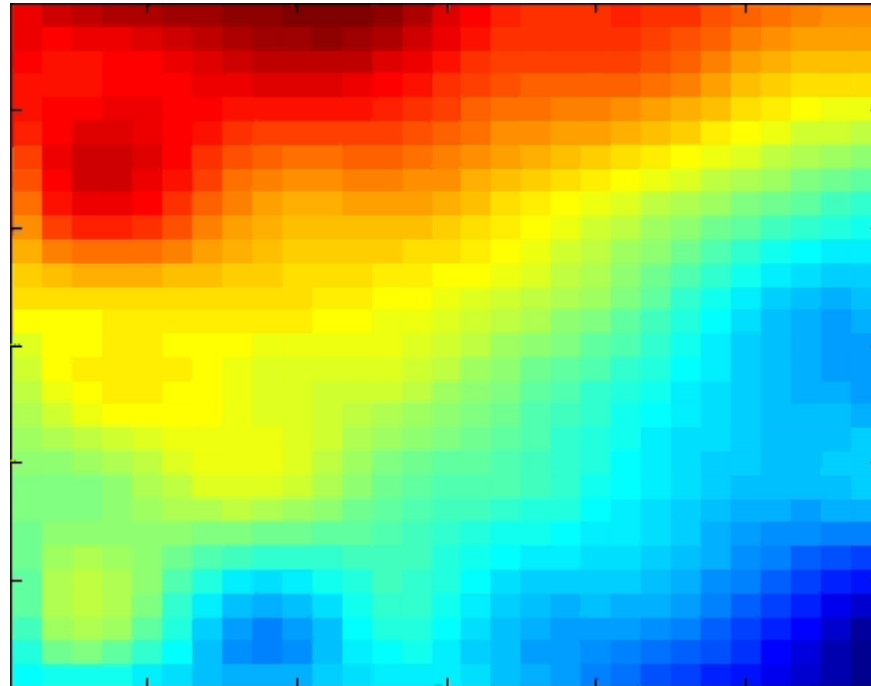


# Propagatiesnelheid

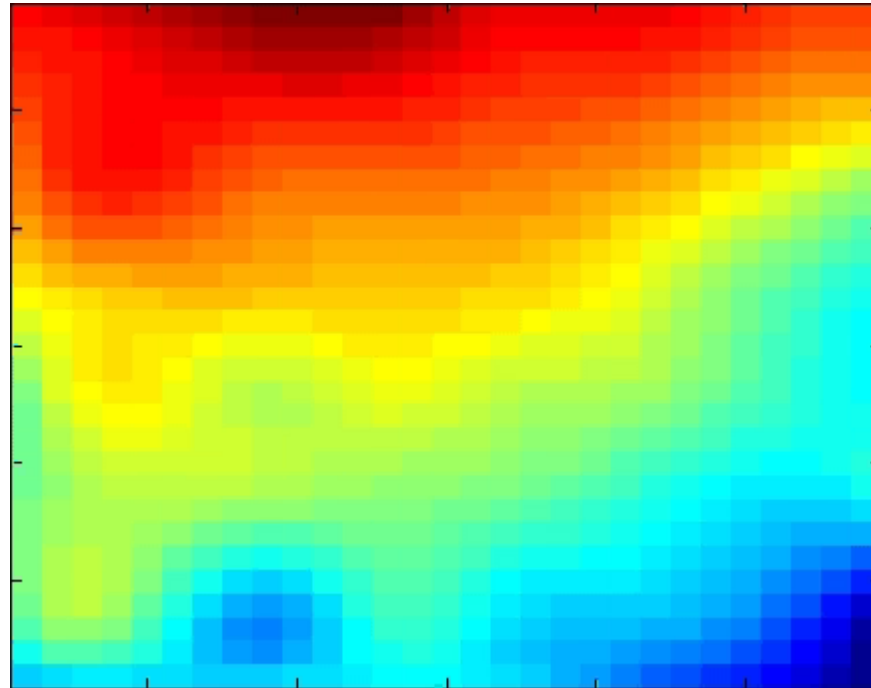
- Not in labour
- Not synchronized
- In labour
- Synchronized



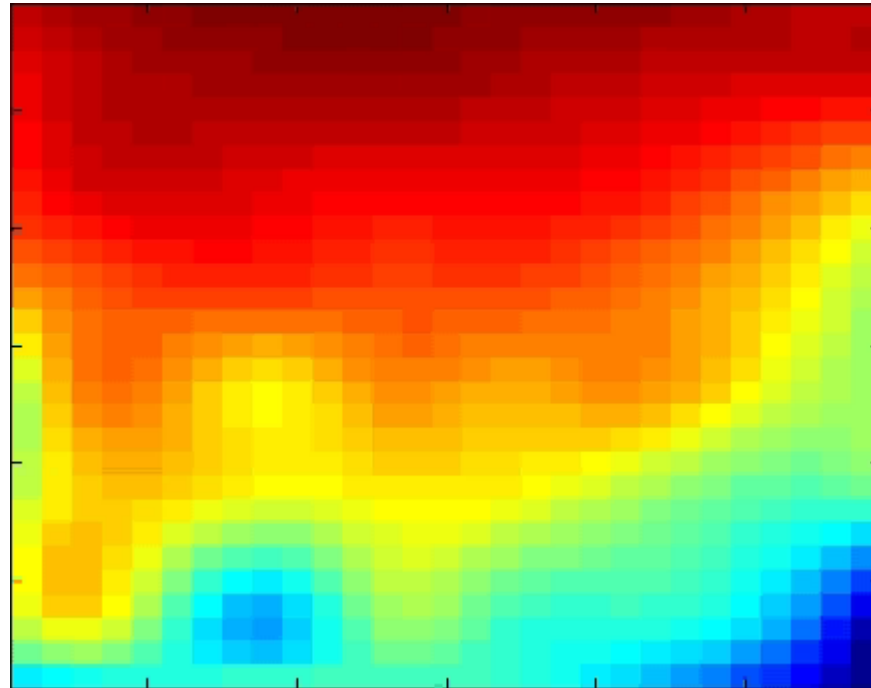
# Propagatiesnelheid



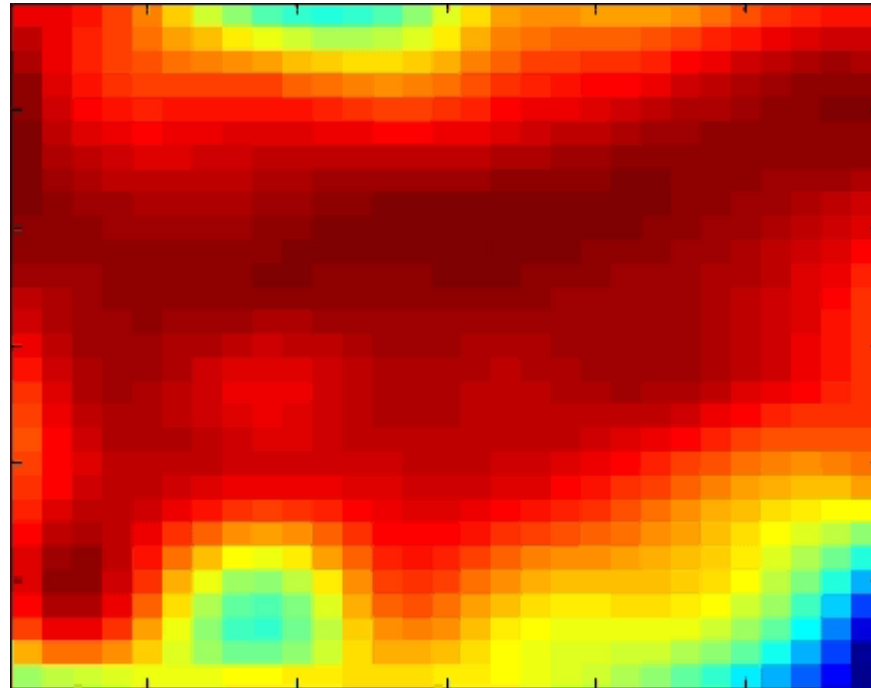
# Propagatiesnelheid



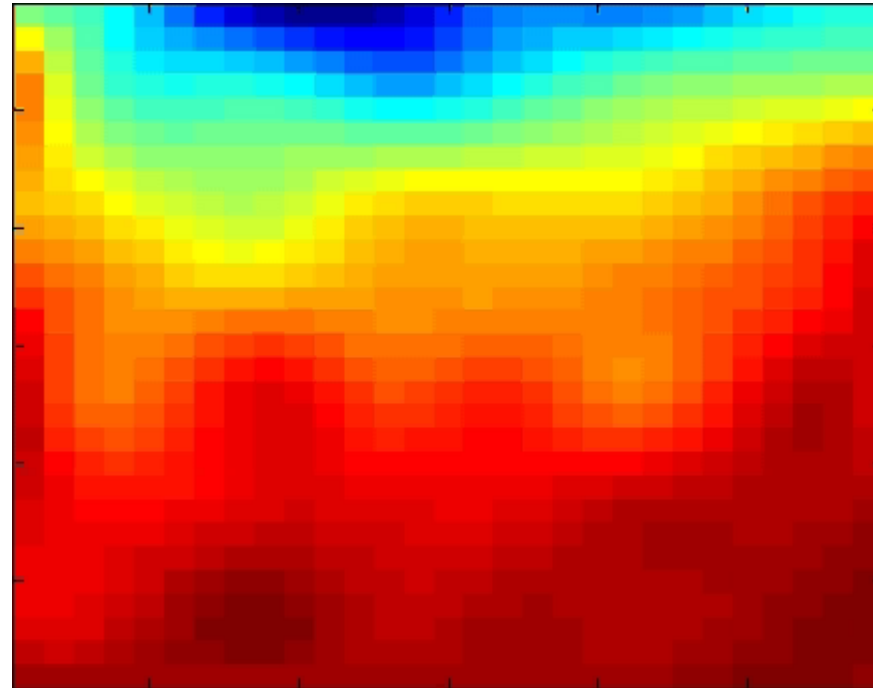
# Propagatiesnelheid



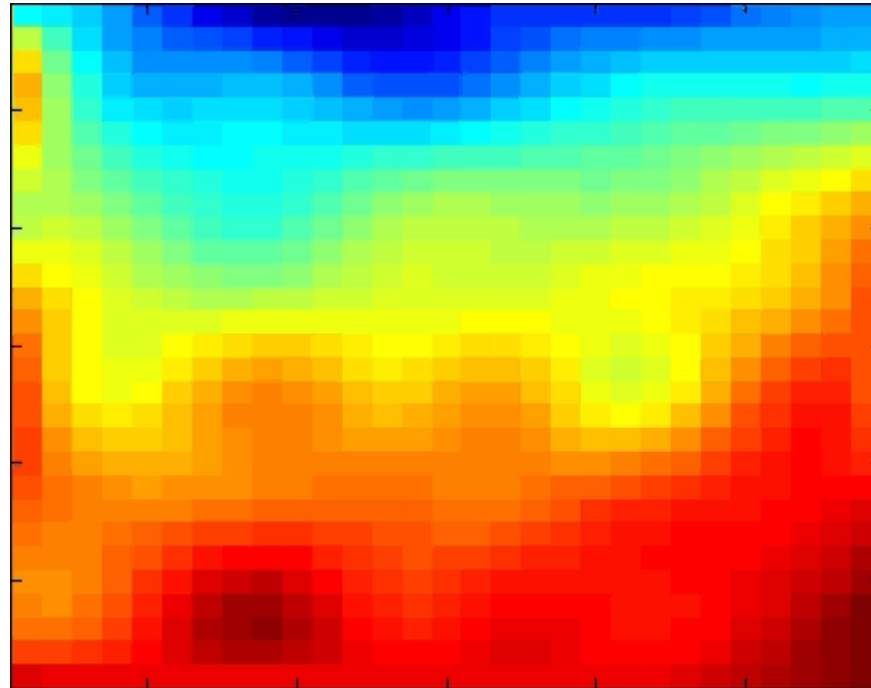
# Propagatiesnelheid



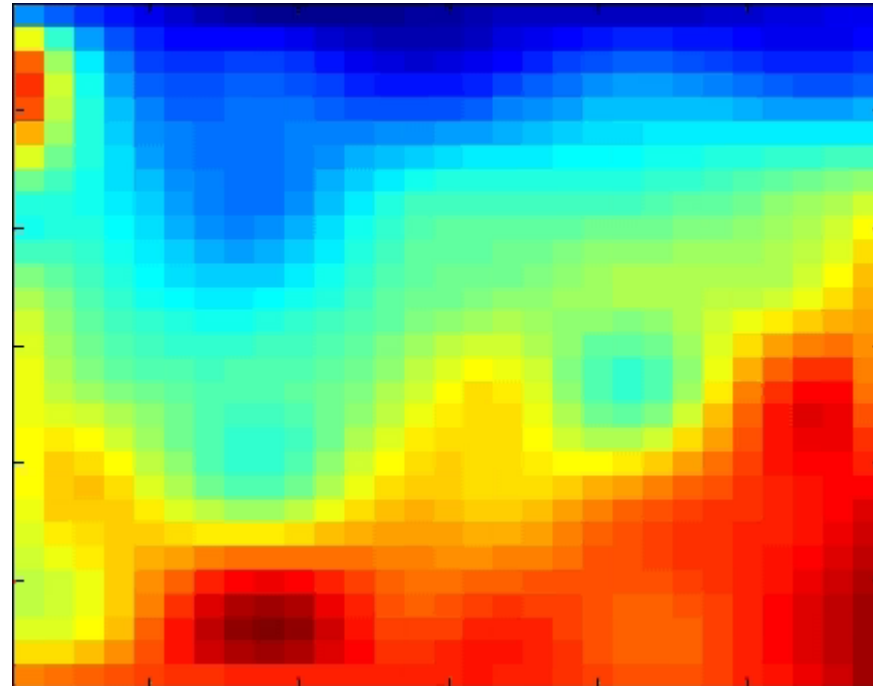
# Propagatiesnelheid



# Propagatiesnelheid

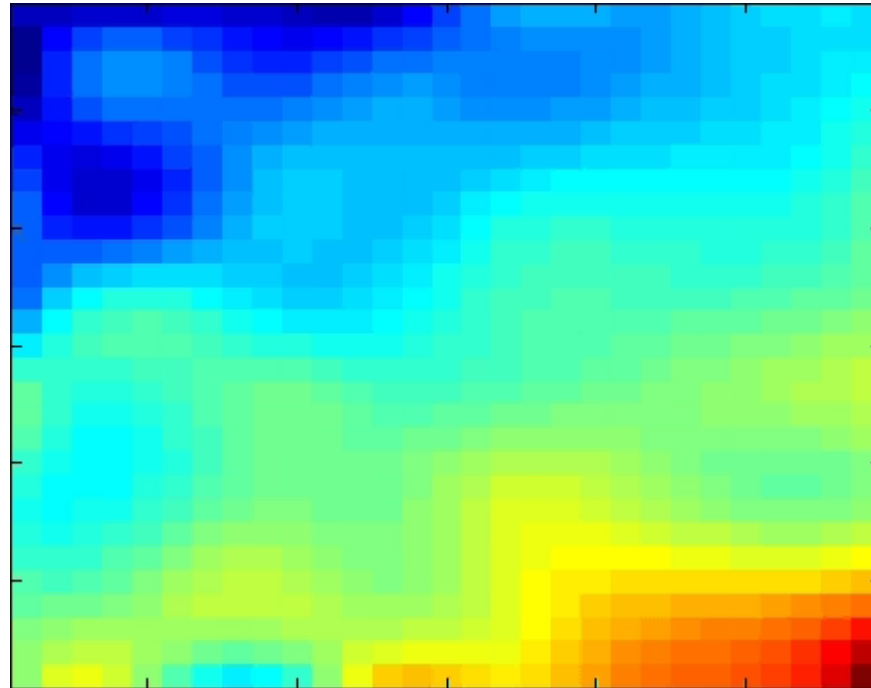


# Propagatiesnelheid



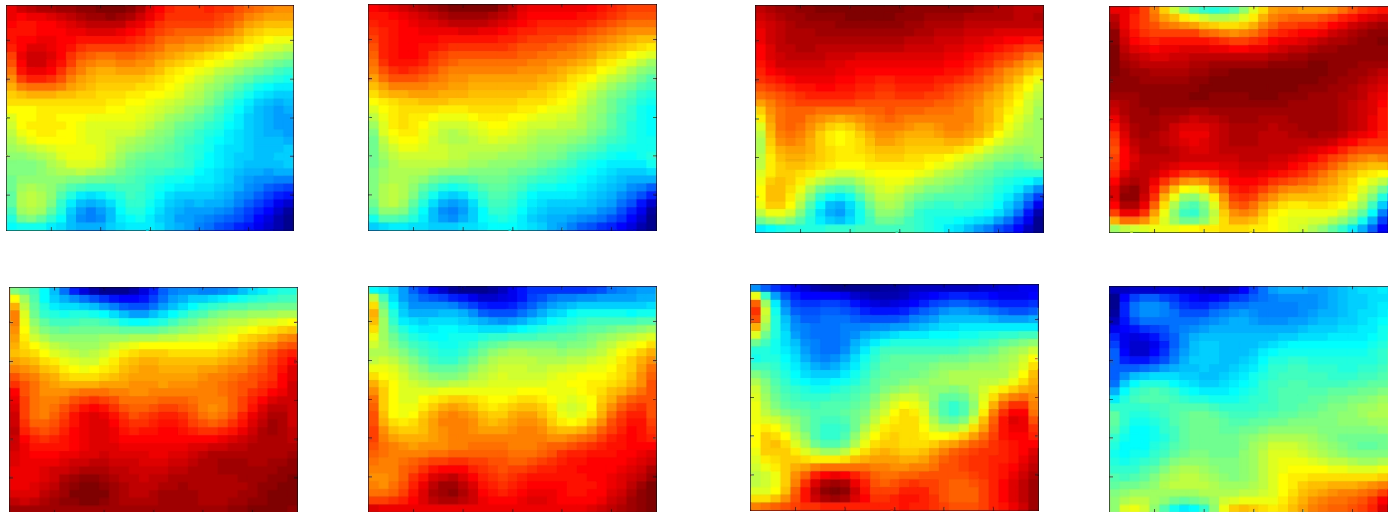


# Propagatiesnelheid

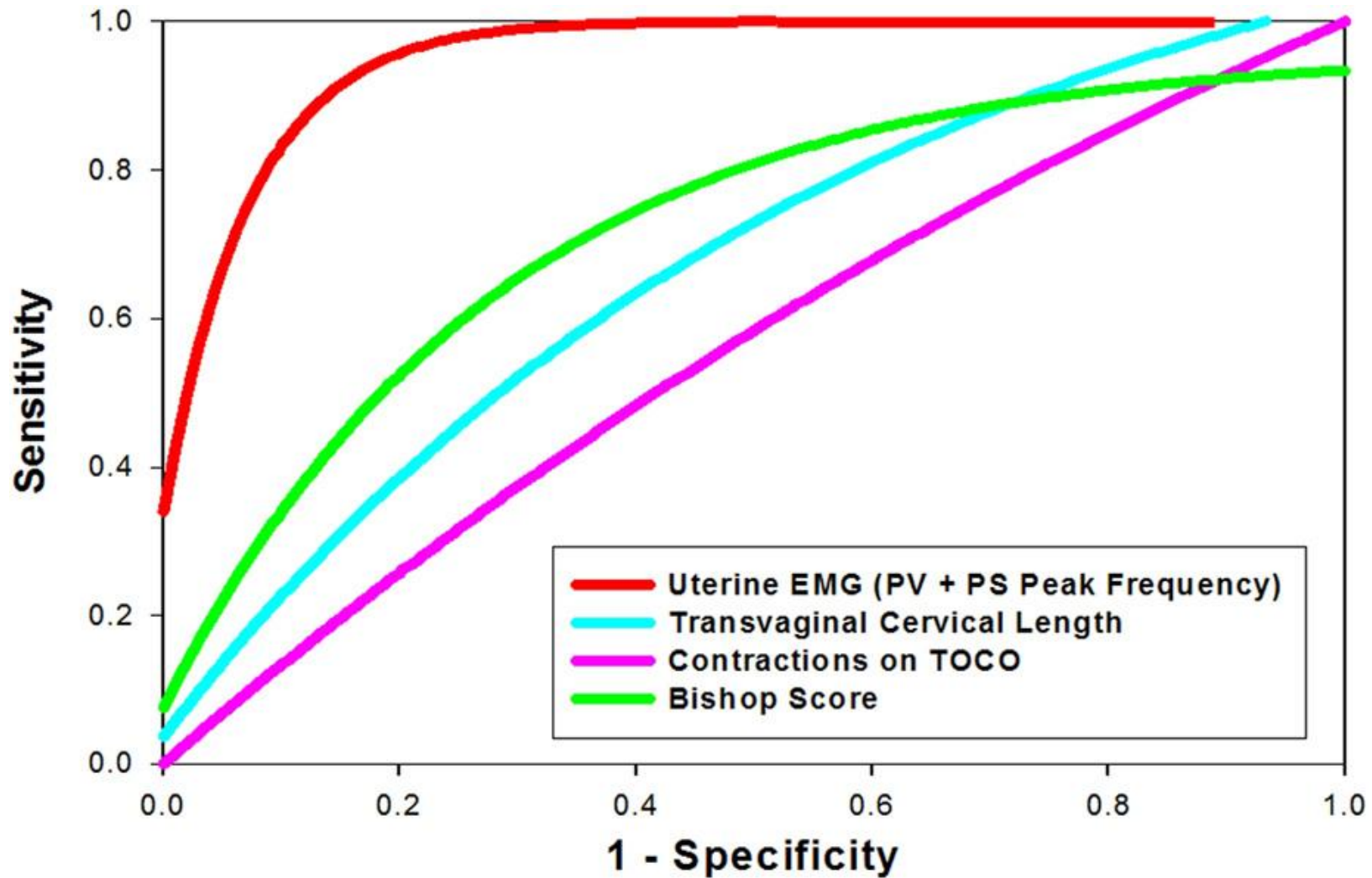


# Propagatiesnelheid

- Partus < 7 dagen
- PV 55 cm/s
- Partus > 7 dagen
- PV 11 cm/s



# EHG om vroeggeboorte te voorspellen



Lucovnik et al. Am J Obstet Gynecol 2011;204:228.

## Kosten vroeggeboorte

- In V.S. \$26,2 miljard/jaar<sup>1</sup>
- In NL geschat € 800 miljoen per jaar
- Bij vroegtijdige diagnose is 50% te voorkomen

**Potentiële besparing € 400 miljoen per jaar**

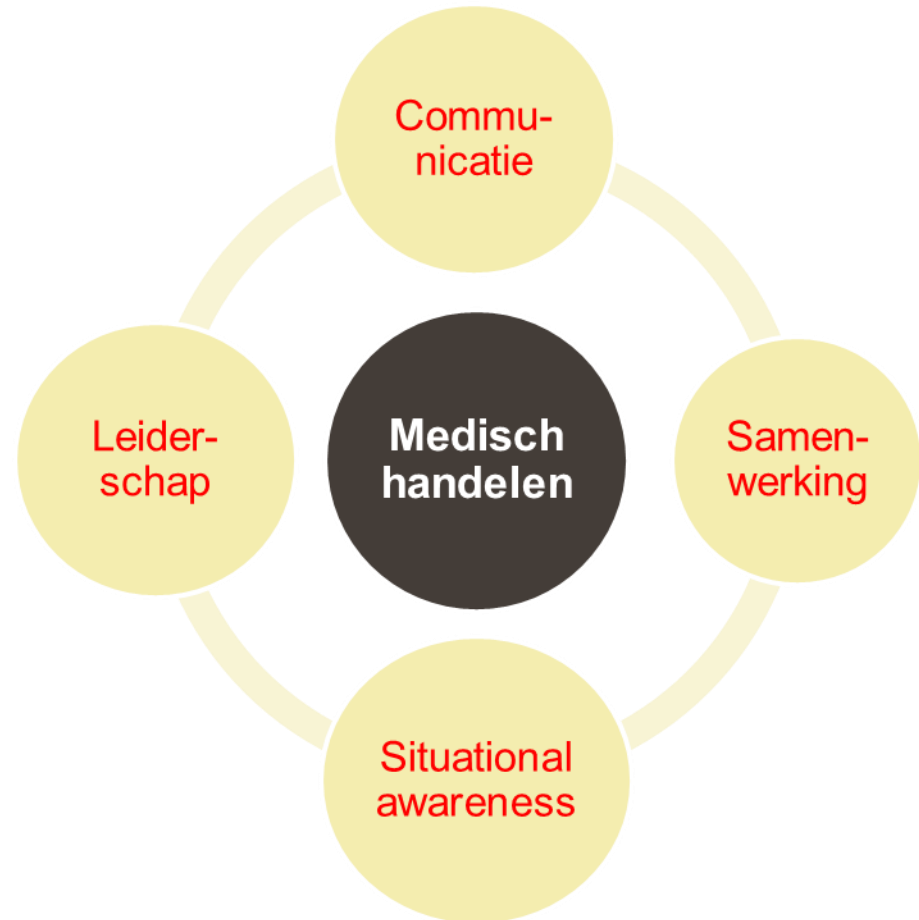
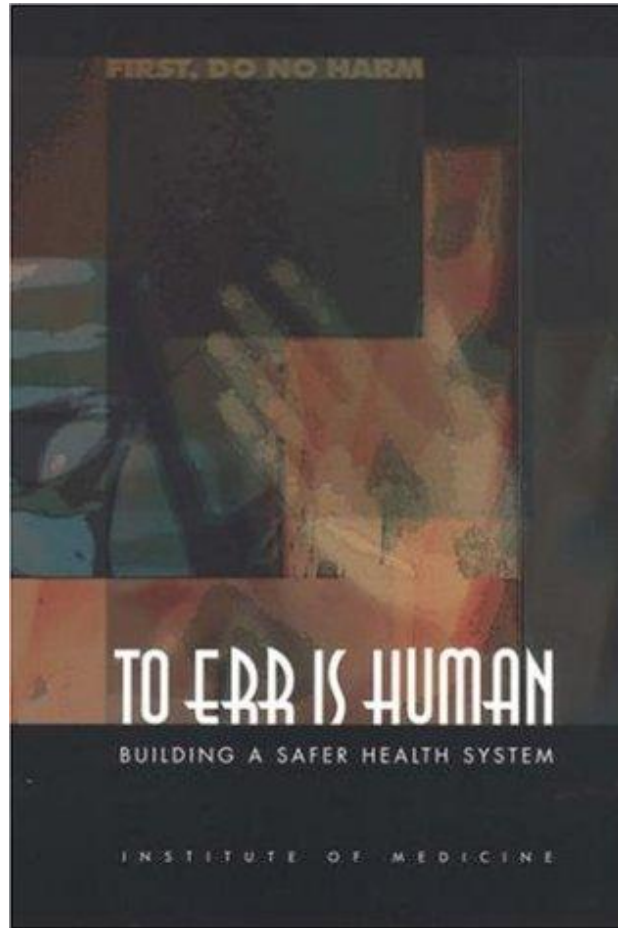
Institute of medicine 2011 <http://national-academies.org>



## Probleem

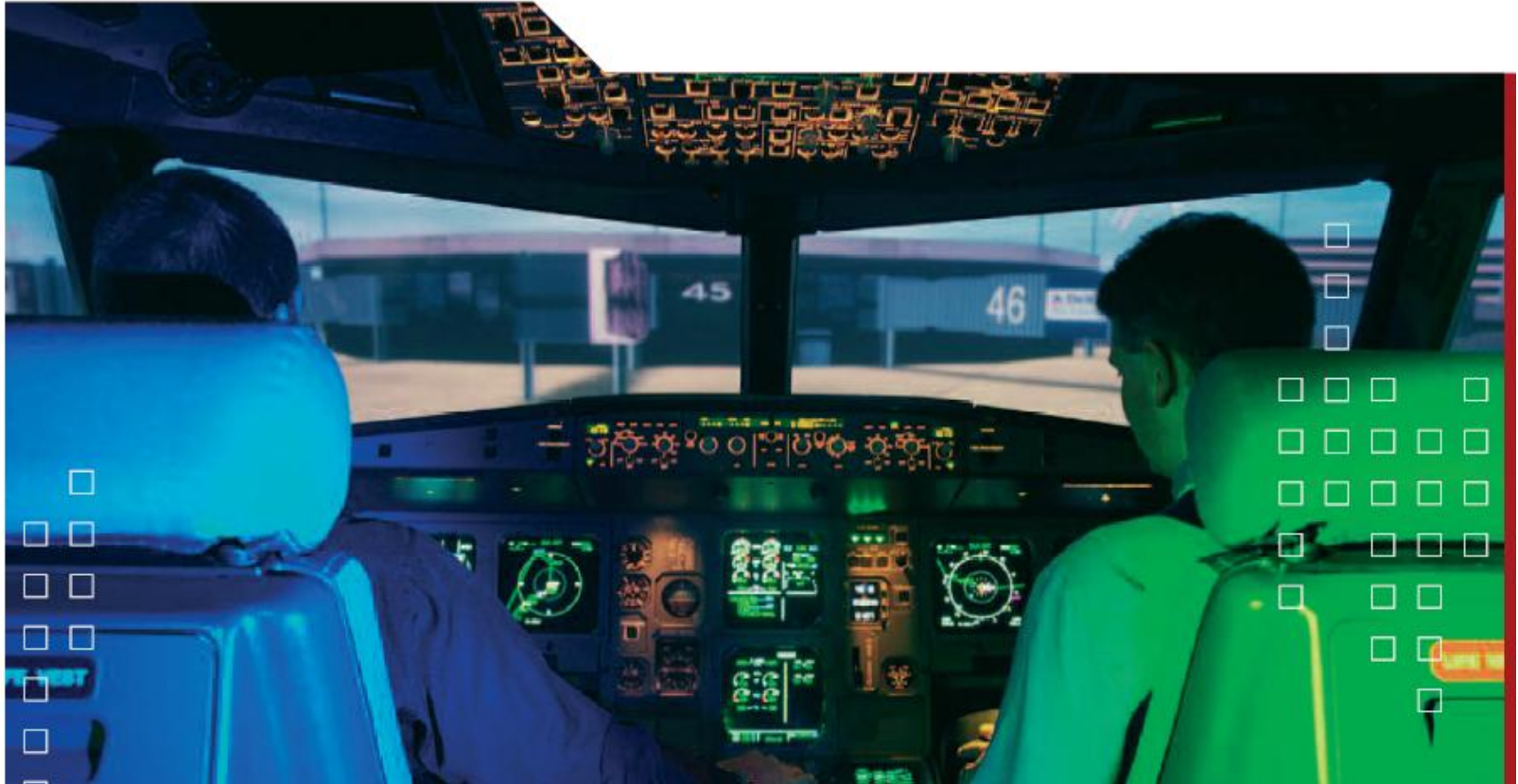
- **In ziekenhuizen te veel vermijdbare doden<sup>1,2</sup>**
- **70% menselijke fouten**
  - (medisch handelen, samenwerking en communicatie)
- **Nederland: 1960 slachtoffers per jaar**
- **V.S.: 98.000 slachtoffers per jaar**
  - **Kosten 29 miljard dollar per jaar<sup>2</sup>**

# Smart interventions



Institute of Medicine, 2000

# Teamtraining in simulatiecentrum



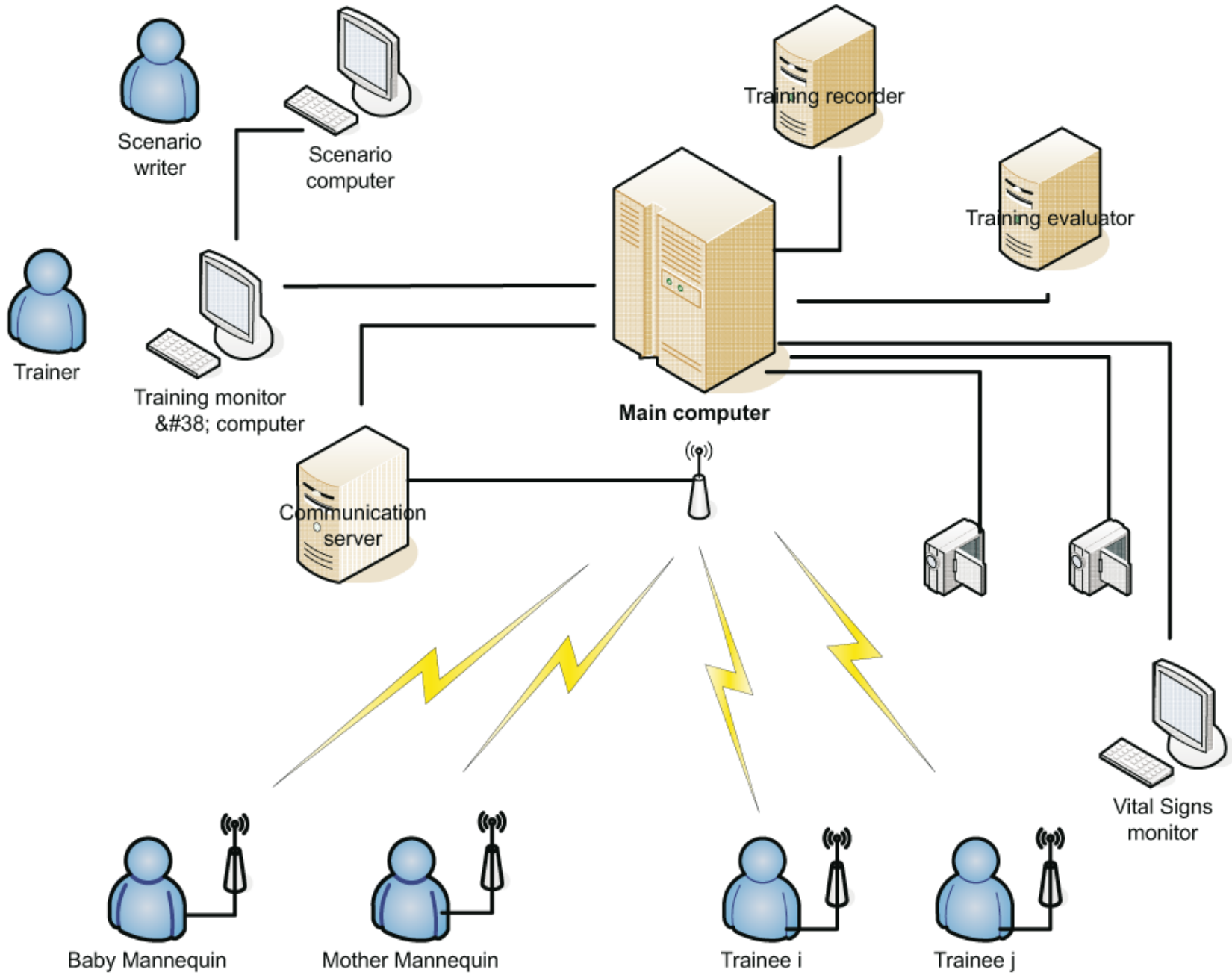


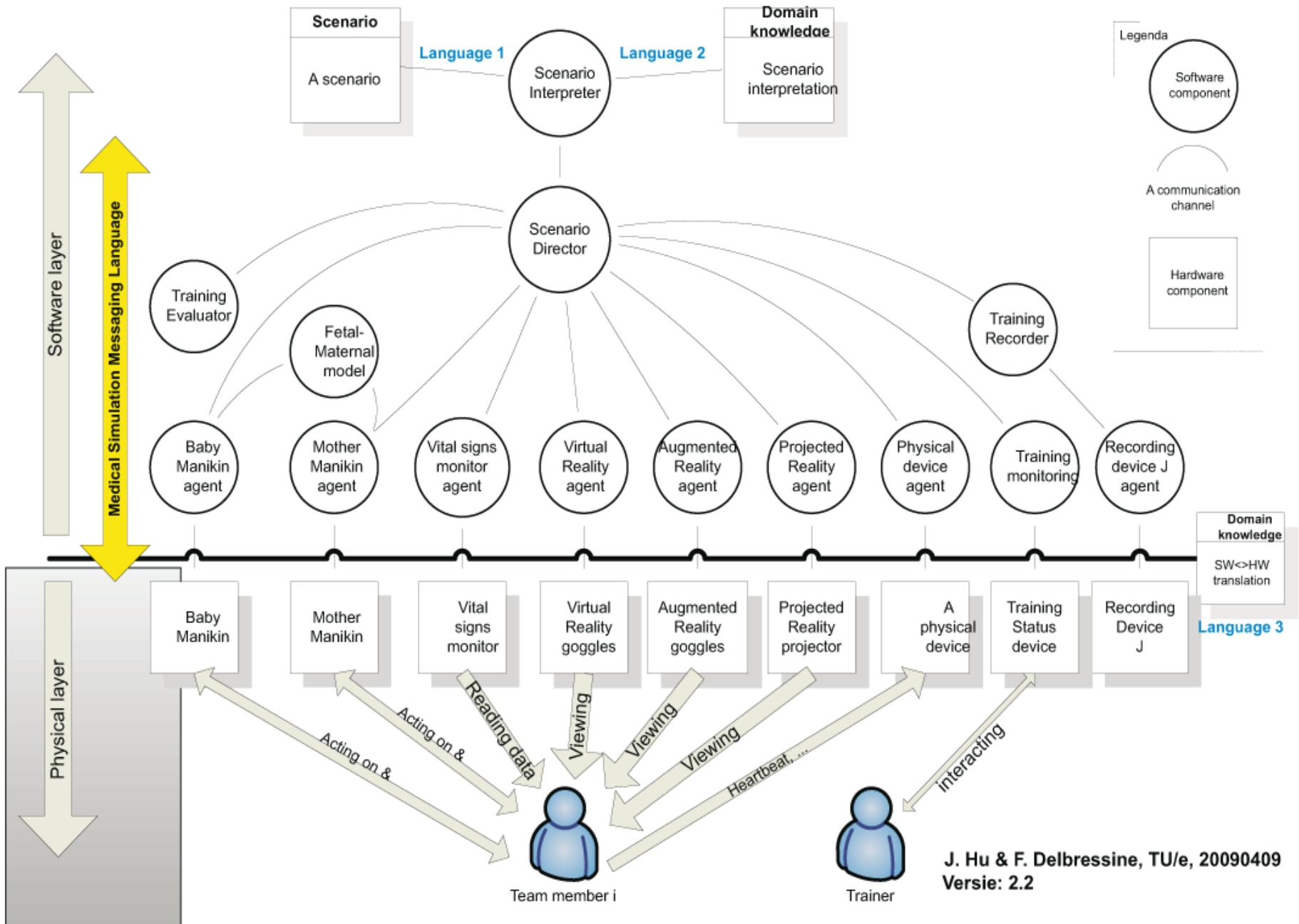
# Teamtraining in simulatiecentrum



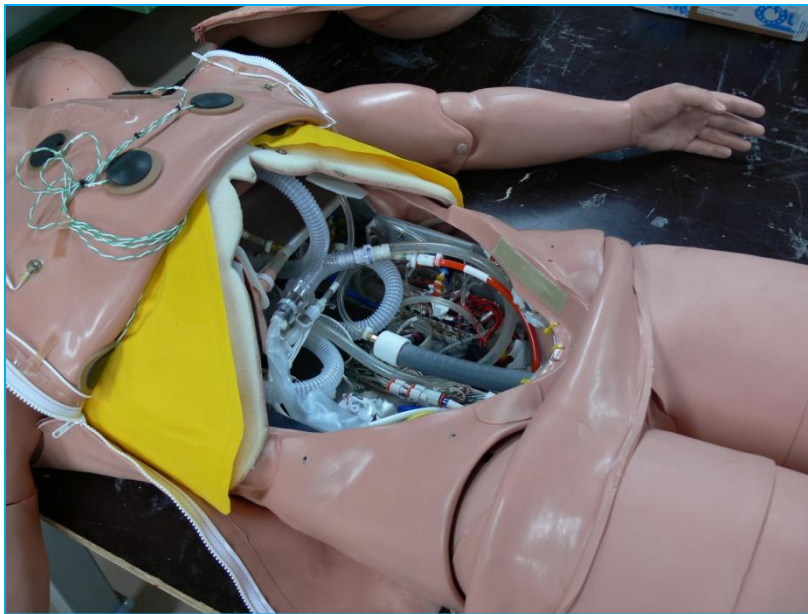
# Teamtraining in simulatiecentrum





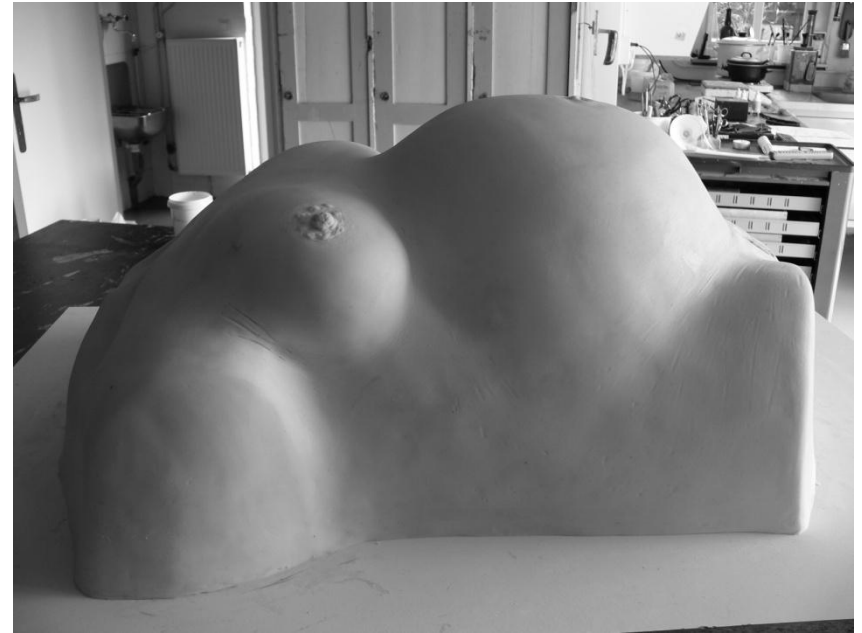
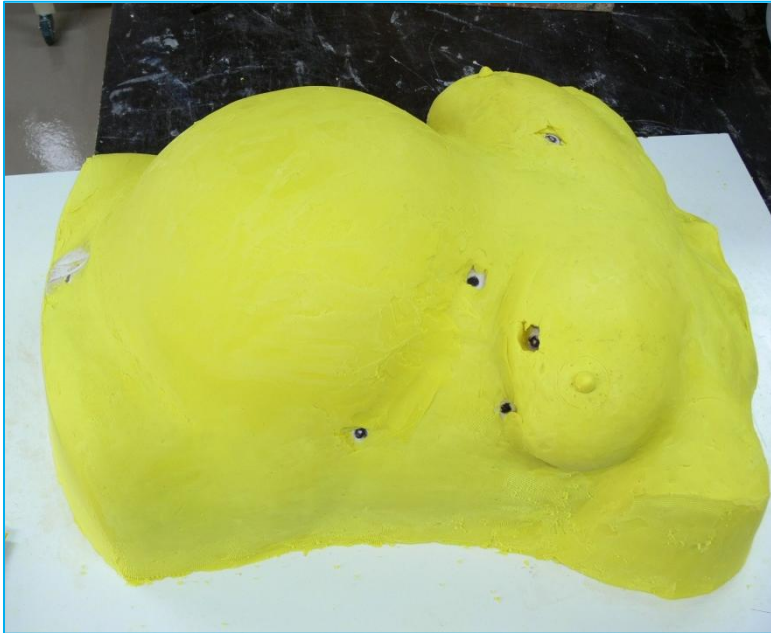


# High fidelity birthing simulator



Body of the ECS from METI

# High fidelity birthing simulator



# High fidelity birthing simulator

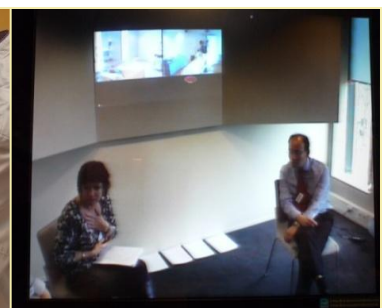
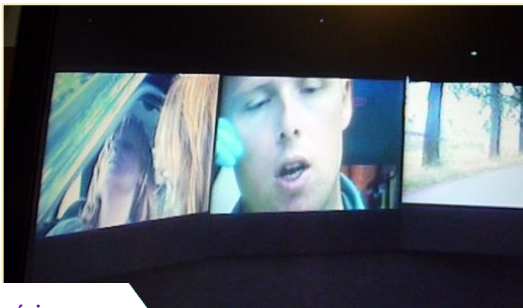


# High fidelity birthing simulator





# Teamtraining in simulatiecentrum



- **Afname baby's met zuurstofgebrek met 50%<sup>1</sup>**
- **Afname baby's met blijvende hersenbeschadiging met 50%<sup>1</sup>**

**Teamtraining kan het aantal medische missers halveren**

1. *Prof. Tim Draycott. British Journal of Obstetrics and Gynaecol 2006;113:177*

# Kosten-Effectiviteit Teamtraining

- **Kosten medische missers V.S. 29 miljard dollar/ jaar**
- **Kosten medische missers in NL 1,4 miljard euro/jaar<sup>1</sup>**
- **Kosten team training van 15.000 medisch specialisten met hun teams 5.000 = € 75 miljoen/jaar**
- **Stel 50% reductie medische missers**

Potentiële besparing  
Teamtrainingen € 625 miljoen/jaar

1. TNS NIPPO, 2004

## Probleem

- Te hoge babysterfte en ontevredenheid patiënt
- Oplossing stuurgroep 24/7 aanwezigheid, meer begeleiding bij de patiënt
- Kosten: €311 miljoen per jaar

## Probleem

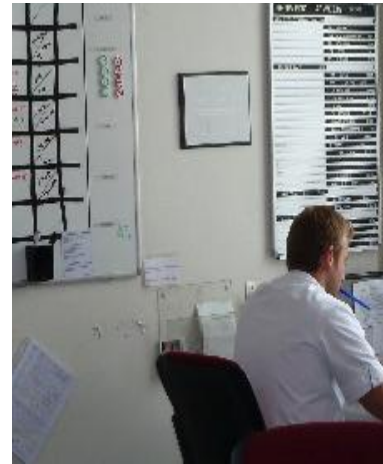
- **Overdracht tijdens de bevalling**
- **Schot tussen eerste en tweedelij n leidt tot informatieverlies**
- **Te weinig personeel leidt tot te weinig aandacht**

## Oplossing:

- **Design for an enhanced labor & delivery experience**
- **Masterproject Jeanine Kierkels**

# Field research > methods

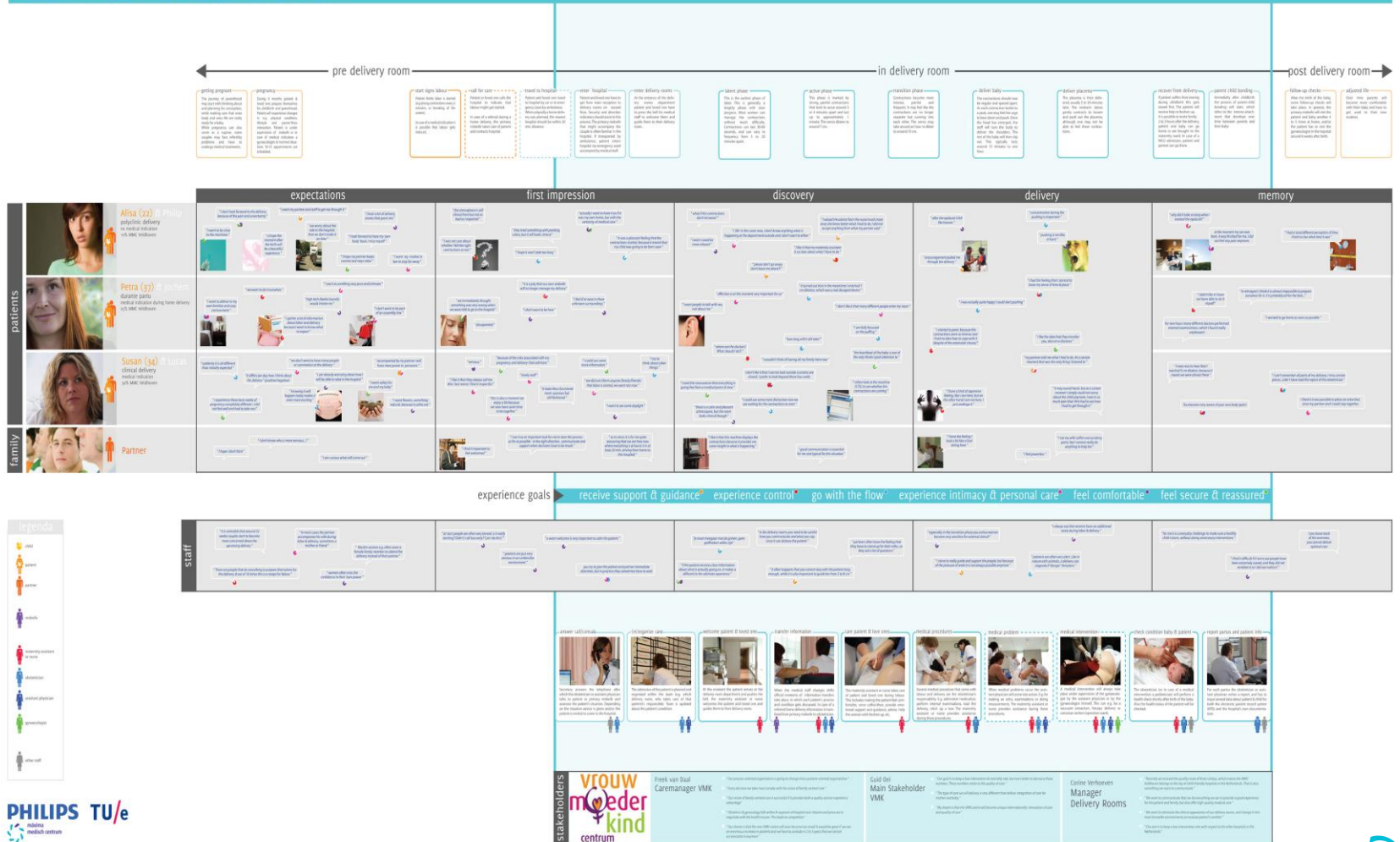
- Observation & participation  
antenatal classes
- Observation of deliveries and shadowing  
clinical staff members & patients
- Interviews with clinical staff members
- Patient & partner interviews during  
delivery
- Focus group with pre-delivery group
- Focus group with post-delivery group



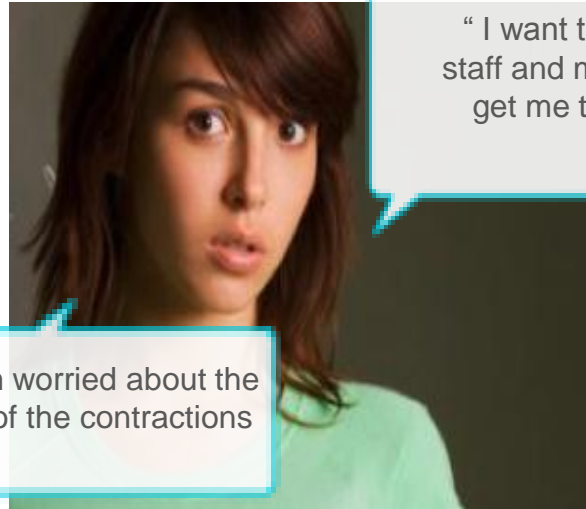
# Experience flow

blijde gebeurtenis

## Labor & Delivery Experience Flow



# Patient personas



“ I want the support of the staff and my partner to get me through it “

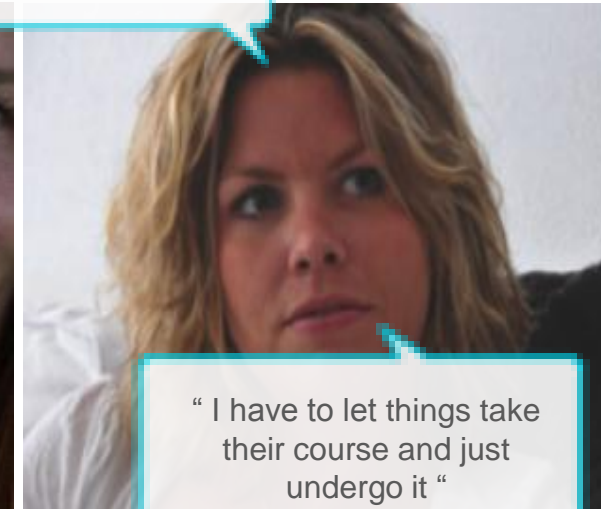
“ I am worried about the pain of the contractions “

Alisa (22) & Philip  
Polyclinic delivery  
10% MMC Veldhoven



“We want to do it ourselves “

Petra (37) & Jochem  
Durante partu  
25% MMC Veldhoven



“ I have to let things take their course and just undergo it “

Susan (34) & Lucas  
Clinical delivery  
50% MMC Veldhoven

“ I need the reassurance that everything is going fine from a medical point of view “

“ I hope to experience intimacy, balance and confidence “

the beurtenis



# Design Opportunity

de  
blijde  
gebeurtenis

Continuity of care would be ideal



In practice this is **not the case**



# Design Opportunity

Continuity of care would be ideal



In practice this is **not the case**



Among patients there is a strong need  
for  
not being left alone, more coaching and  
more information during labor

# Design Opportunity



‘ Develop a design concept that guides the patient through labor  
in a personal and unobtrusive way ‘



# blijde<sup>de</sup> gebeurtenis

expectation

prepare for labor...  
practice and prepare different  
labor breathing techniques  
prior to your delivery



first impression / discovery / usage

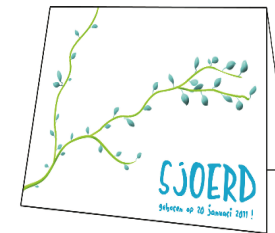
labor & delivery  
receive personalized and  
real-time guidance during  
your delivery

duration of contraction  
intensity of contraction  
time between contractions



memory

... celebration  
a personal memento to  
enrich the happy events  
after your delivery



vrouw  
moeder  
kind  
centrum

## prepare for labor...

practice and prepare different labor breathing techniques prior to your delivery



de  
blijde  
gebeurtenis

labor & delivery  
receive personalized and  
real-time guidance during  
your delivery



intensity of contraction

duration of contraction

time between contractions

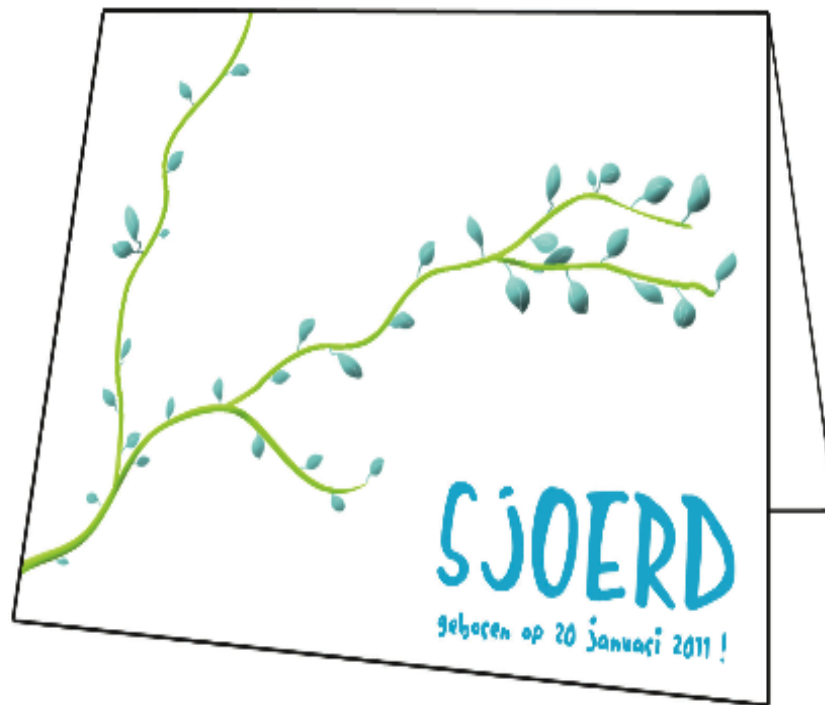


... celebration

a personal memento to  
enrich the happy events  
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de  
blijde  
gebeurtenis



vrouw  
moeder  
kind  
centrum

Scenario movie

de  
blijde  
gebeurtenis)





# C...ia

*Dank voor uw aandacht*

