

Making dreams come true

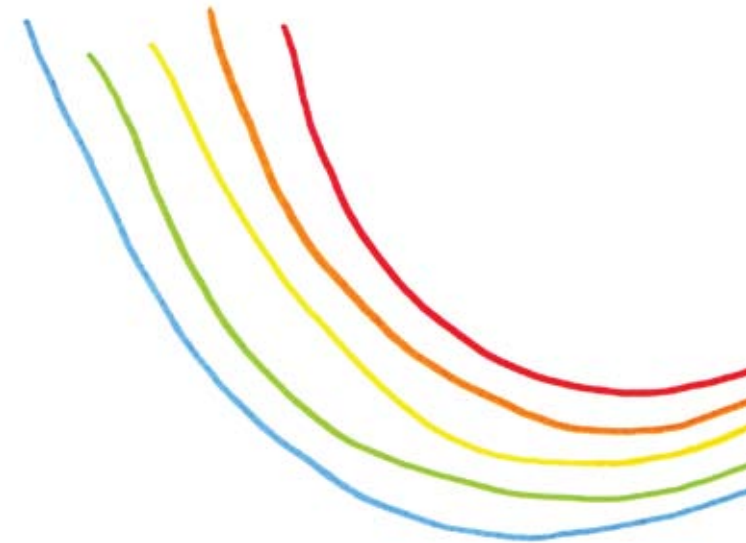


University Medical Center
Utrecht

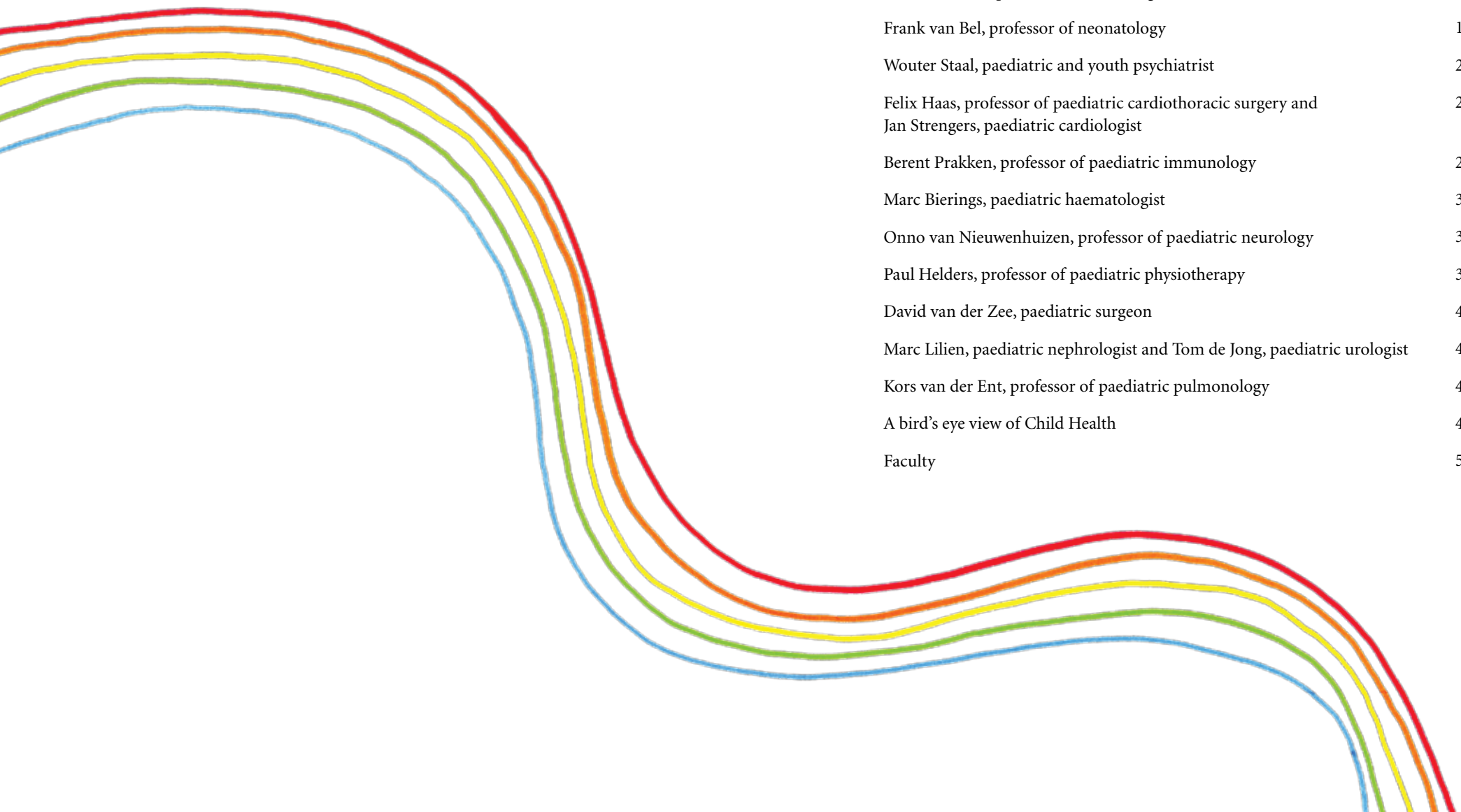
Making dreams come true

Child health in the UMC Utrecht

Wilhelmina Children's Hospital







Index

Foreword	8
Lieke Sanders, professor of paediatric immunology and infectious diseases	10
Paul Coffe, professor of paediatric immunology and Nico Wulffraat, paediatric immunologist	13
Frank van Bel, professor of neonatology	16
Wouter Staal, paediatric and youth psychiatrist	20
Felix Haas, professor of paediatric cardiothoracic surgery and Jan Strengers, paediatric cardiologist	22
Berent Prakken, professor of paediatric immunology	26
Marc Bierings, paediatric haematologist	30
Onno van Nieuwenhuizen, professor of paediatric neurology	35
Paul Helders, professor of paediatric physiotherapy	36
David van der Zee, paediatric surgeon	40
Marc Lilien, paediatric nephrologist and Tom de Jong, paediatric urologist	42
Kors van der Ent, professor of paediatric pulmonology	44
A bird's eye view of Child Health	48
Faculty	52



Wietse Kuis
chairman of the department
of paediatrics

Jan Kimpen
dean and vice-chairman of the board
of UMC Utrecht

Foreword

UMC Utrecht is one of the largest academic medical centres in the Netherlands, with over 1000 beds and about 30,000 admissions and 350,000 outpatient visits every year. UMC Utrecht is where patient care, education and research come together. The medical school of the University of Utrecht is an integral part of UMC Utrecht. UMC Utrecht's mission is: "To be a leading international academic medical centre where knowledge about health, disease and care is created, tested, shared and applied."

"Child health" is a theme that permeates the entire UMC Utrecht, with its focus in the Wilhelmina Children's Hospital (WKZ). WKZ is an integral children's hospital within UMC Utrecht, dedicated to providing top quality care to very sick children.

Paediatric medicine has undergone significant changes over the past years, with innovation in healthcare taking a central role. Examples include new indications for bone marrow transplants, such as metabolic and auto-immune diseases. New technologies that lead to significantly improved prognoses for sick, young, premature infants, innovative heart surgery, new treatment strategies for children with leukaemia and auto-immune diseases, endoscopic laparotomies, epilepsy surgery and new vaccination strategies. These new treatments often begin as interventions based on translational research, which is later followed by the research necessary for care implementation.

Care for sick children extends beyond merely addressing the physical. Child and youth psychiatry treats children and young people with serious psychiatric problems. Research is primarily focused on ADHD and behavioural disorders, autism and psychosis. Additionally, somatic diseases impact the growth and development of children. That's why research is being conducted into developmental disorders and

the influence of exercise on children. The study structure allows illnesses – particularly chronic ones – to be examined from several viewpoints.

While our primary goal is the treatment of very sick children, our scientific expertise also focuses on prevention. For example the prevention of secondary complications often associated with the treatment of serious, often lethal diseases. A significant late complication is early cardiovascular disease in young, chronically ill children. Recognising and treating early cardiovascular complications in sick children, but also health problems like obesity, places UMC Utrecht at the centre of social questions. This certainly also applies to the research into new vaccination strategies aimed at preventing serious infections with pneumococci and meningococci. We feel it is essential to work on these kinds of developments, thereby taking on a leading role in addressing important public health issues such as infection, cardiovascular disease and cancer.

The strength of Child Health at UMC Utrecht/WKZ lies in the fact the research conducted specifically addresses the issues important to child health and health problems threatening our society as a whole.

We hope this brochure will give you a taste of the dynamic world of child health at UMC Utrecht. We are not trying to create a definitive guide, but rather share some of the research and care that takes place here through images and short interviews. And to share a little bit of what it's all about: making dreams come true.





Lieke Sanders
professor of paediatric immunology
and infectious diseases

‘Vaccinations represent the greatest breakthrough in preventing child mortality’

“Our work at WKZ in the field of vaccines is primarily focused on keeping children out of the hospital. The National Vaccination Programme (RVP) for infants is the greatest breakthrough in paediatrics of the past decades, and is preventive in nature. For WKZ alone, the administration of vaccines against diseases such as meningitis, including the Haemophilus Influenzae b (Hib) vaccine, the Meningococcal C vaccine and the Pneumococcal vaccine prevents dozens of children from ending up in intensive care every year.

Our research is focused not only on examining the effectiveness of new vaccines and their contribution to public health, but also on optimising current vaccination schedules. For instance, is it possible to protect against a disease equally well while vaccinating less? That would not only mean one less injection per child, but the government could save up to several million euros per year.

The majority of our research is currently focused on vaccination against pneumococcal bacteria. In 2006, a new pneumococcal vaccine targeting seven types of bacteria and specifically aimed at infants was added to the RVP. We’re studying whether inoculation with 3 instead of 4 injections in infants is sufficient and how this would affect the spread of pneumococcal bacteria from infants to others. WKZ’s partners for this project are the Netherlands Vaccine Institute (NVI) and the Centre for Infections Disease Prevention CIB/RIVM.

The study is a cooperation between UMC Utrecht and the public youth health care programme. Over one thousand children and families are participating in the research, via vaccine registration lists. National and international parties are eagerly awaiting the results of this kind of research.”



*Sophie (10),
will become a star.*



*Monica (9),
dreams of becoming a teacher.*



Nico Wulffraat
paediatric immunologist

Paul Coffe
professor of paediatric immunology

‘Stem cells are the medicine of the future’

Coffe: “We study stem cell differentiation at UMC Utrecht/WKZ’s Molecular Immunology Lab. Stem cells from bone marrow can mature into all kinds of different adult blood cells. The key question remains ‘How do the cells do that?’ Equally important is finding out where things go wrong, something that occurs in diseases with decreased blood production.”

Wulffraat: “It’s basic research, but with a strong focus on future clinical application. Initially, we want to apply the results in areas WKZ is specialised in: inherited bone diseases, youth rheumatoid arthritis and ‘graft-versus-host’ disease that occurs in some transplant patients. For example, we can make bone fragments from stem cells in the laboratory. The major challenge is making the technique functional so we can apply it in a broken joint.”

Coffe: “Regenerative medicine is a hot topic, and stem cell research is an essential part of that. An understanding of stem cells will allow us to guide – and even manipulate – cell division for therapeutic purposes. In theory, the possibilities are endless. For example, stem cells can be used to slow damaging joint inflammations in rheumatoid arthritis, or restore damaged bone and cartilage in osteoarthritis. Stem cells are the medicine of the future.”

Wulffraat: “Several disciplines cooperate very closely within UMC Utrecht/WKZ. This unique structure brings clinical practice and the laboratory closer together, and together we consider how to apply our knowledge for the benefit of the patient.”





Frank van Bel
professor of neonatology

‘From neonatology to perinatology: our work begins in the womb’

“The Neonatology ward has 28 intensive/high care beds and 15 medium care beds. More important than the number of beds is the available care. WKZ has a unique reputation in the field of Neonatal Neurology in the Netherlands, and is often called upon for its specific expertise.

Our Neonatology department is part of the Perinatal Center along with the Obstetrics department. The centre’s vision is to view mother and child as a whole, and integrated care keeping child and mother together, where ever possible, is a target.

We believe neonatology begins in the womb. Our research area of ‘early life events and adult disease’ investigates links between stress or oxygen deprivation in (un-born) children and the development of certain diseases later in life.

Since brain damage has major impact on long-term outcome, determining possible damage using imaging technologies (MRI/MRA/MRS) and preventive neuroprotection research is of key importance. For example, unborn children may need to be treated with medication to counteract free radicals while still in the womb in order to prevent or limit future brain damage.

We investigate the consequences of such early treatments at the Perinatal Center’s own research laboratory. Administration of corticosteroids to mother and child to accelerate lung maturation in cases where it is lagging behind is a frequently used treatment. But what are the effects on the child’s future development?”

*Cedric ((6 months old),
dreams a lot.*







Wouter Staal
paediatric and youth psychiatrist

‘Over 90% of the risk for autism is genetically determined’

“Autism is a developmental disorder that manifests at a young age. We see hundreds of children at our special outpatient clinic and ward for children with autism. The disorder occurs in 1 out of every 300 children. Boys are affected more often than girls (4:1).

The diagnosis is usually made around the age of three, but thanks to clinical research and new expertise it is sometimes possible to recognize the disease from the age of two. What makes diagnosing the condition difficult is the fact there are a number of paediatric psychiatric conditions with some symptomatic similarity to autism: anxiety disorders, selective mutism as well as certain language disorders. The earlier the diagnosis is made, the better the prognosis and further development of the young patient.

In order to identify autistic disorders earlier in the future, we carry out three types of genetic studies. UMC Utrecht/WKZ participated in a large-scale linkage study, with complete data available for over 7,000 patients. This study showed that a part of chromosome 11 is related to autism.

Additionally, in cooperation with the Rudolf Magnus Institute, we looked for small chromosomal abnormalities that do not occur in healthy individuals but are seen in patients with autism. About fifty such abnormalities were identified. These results will allow us to develop a test kit to make it easier for us to make the correct diagnosis.

We also showed that a variant of the dopamine D3 gene is expressed in patients with an autistic spectrum disorder. This specific gene is involved in rigidity, one of the characteristics of autism. Abnormalities in this gene can also increase the risk of side-effects for a variety of medicines. Therefore, this study also directly affects clinical practice.”

Morris (4), will be king.





Jan Strengers
paediatric cardiologist

Felix Haas
professor of paediatric cardiothoracic surgery

‘Early diagnosis, early operation’

Strengers: “At the congenital heart centre, we see 3300 children each year. Over the past year 220 heart surgeries were performed. We work with a permanent team that only works at the heart centre: cardiologists, heart surgeons, cardiac anaesthesiologists and nursing staff, with very direct, short lines to the ICU. This form of close cooperation is reflected by the results.”

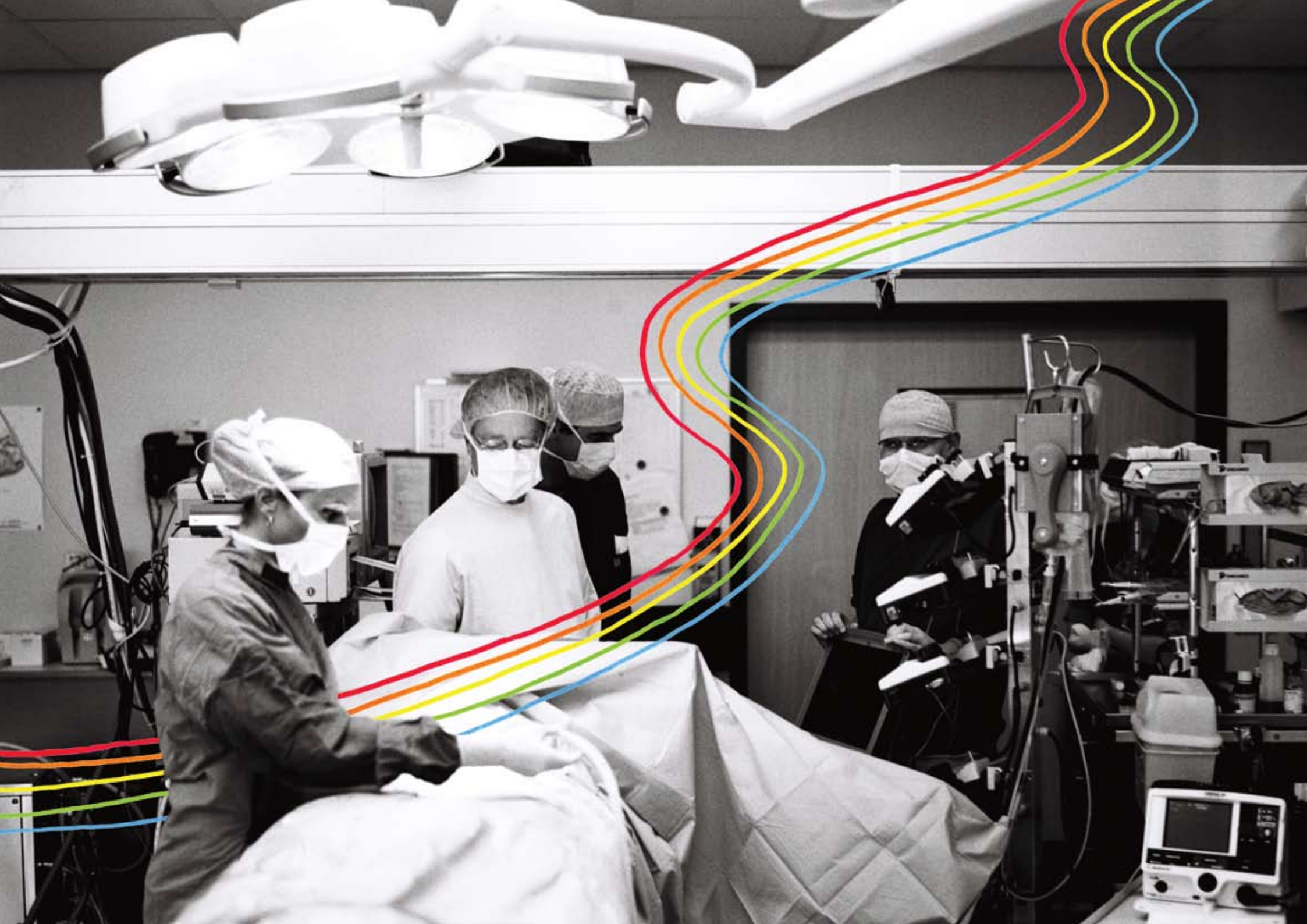
Haas: “We strive for a primary corrective operation in all congenital heart abnormalities. This contrasts with ‘supporting procedures’ that help tackle complaints, but do not actually ‘repair’ the heart. If several heart abnormalities exist at the same time, as many of them as possible are corrected during a single session.

We are specialised in biventricular repair; a corrective procedure for hearts that have one significantly smaller chamber. Compared to the common Fontan circulation (in which the heart uses a single chamber after the operation), the biventricular repair ultimately results in a heart with two chambers. This new treatment method is thought to be superior by preventing serious complications later in life.

Strengers: “We cooperate closely with neonatology and the obstetrics department to identify heart abnormalities in children as early as possible in pregnancy. This gives our team more time to advise and support the parents. Furthermore, it makes it easier to plan surgery right after birth. Children with complex abnormalities are then still in relatively good condition. This condition decreases with every passing hour after birth.”

Haas: “We operate children between the ages of one day and 17 years old, sometime even older. This includes very small patients, some weighing less than 2.000 grams! This places special demands on both surgeon and instruments. Mostly, each operation leads to a heart that works better. Unfortunately, we cannot solve all problems and these patients require continuous care.”

‘Mostly, each operation leads to a heart that works better. Unfortunately, we cannot solve all problems and these patients require continuous care.’





Berent Prakken
professor of paediatric immunology

‘Reeducate the immune system instead of suppressing it’

“Chronic inflammation is a chronic over-reaction by the immune system that leads to serious inflammation in various parts of the body. These are conditions like rheumatoid arthritis, diabetes and serious bowel conditions. Until now, treatment has been focused on suppressing the immune system. This is effective but has its downsides. Particularly in the long-term, suppression of the immune system with medication such as prednisone can have serious consequences for the patient.

Our vision: reeducation instead of suppression. We study the immune system to see where things go wrong and how it can be repaired. To do this, a number of important research questions need answering: ‘How does the immune system work? How does the inflammation process work? And how can we translate this knowledge into new treatments and therapies?’

Using new approaches, we deciphered how the immune system is able to re-educate itself and rebuild tolerance under certain conditions. With true translational research we succeeded in taking steps towards novel therapies, e.g. by identifying new potential targets for therapy in patients, and applying those targets to various experimental models. This brings hope for the development of new therapies more suited to treating human autoimmune diseases.

The WKZ’s immunology department is an ideal research environment. We do basic research on all kinds of species, from mouse to man. Its position at the centre of the clinic and the close cooperation between doctor and researcher ensures that research always begins with a realistic patient-centred question; this is translational medicine. We cooperate closely with several foreign research groups, such as the University of San Diego (California) and the Eureka research institute. Our own research team consists of twenty driven young people. They are familiar with the reality of the sick child, and fully understand the consequences their research can have on the future of these children.”



*Rianne (17),
will become a secretary
with her own desk.*





Marc Bierings
paediatric haematologist

'Stem cell transplants: custom-fit therapy'

"Every year in the Netherlands, about eighty stem cell transplants take place in children, thirty-five of them in our fully renovated stem cell transplant centre for children at UMC Utrecht. Most of the children undergoing transplant surgery suffer from leukaemia. UMC Utrecht is the only centre in the Netherlands that also focuses on children with serious metabolic disorders, such as Hurler Syndrome, a serious disease we cannot treat in any other way.

Transplants with umbilical cord blood are often the chosen method of treatment. The advantages are that the blood is readily available and that there are fewer cases of graft-versus-host disease (a serious immune response of transplanted cells to patient tissues).

In terms of research, UMC Utrecht currently focuses on topics including the position of stem cell transplantation within the overall treatment of individual patients. Stem cell transplantation is currently viewed as a last resort. We hope to move towards custom-fit therapy in the future.

For example, this means we could tell at an early stage whether a certain patient would benefit from chemotherapy by looking at the leukaemia cells. If this isn't the case, stem cell transplantation can be considered at the beginning of the treatment, when patients are still relatively strong.

Additionally, we are performing intensive research into T cells. Our laboratories are specialised in innovative techniques for the functional classification of T cells and the isolation and manipulation of specific fractions.

T cells play a part in determining the occurrence of graft-versus-host disease. This feared disease also has a positive side when it comes to leukaemia treatment: it attacks the leukaemia cells themselves. It would be great if we could use this property in the fight against cancer. To do this, we must first gain control of the complex progression of graft-versus-host disease.



*Kate (4),
is waiting for the
love of her life.*





*Nicky (6),
will become a famous
ballet dancer.*



Onno van Nieuwenhuizen
professor of paediatric neurology

‘We get the children doctors don’t know what to do with’

“The WKZ houses the Sylvia Tóth Centre, a modern diagnostic centre for children with complex neurological conditions. Experience has shown that these children often follow a difficult, slow diagnostic route. Their conditions are so complex that a multidisciplinary approach is essential. Ideally, specialists should be in constant contact in order to be able to respond quickly to test results. Unfortunately, this often proves impossible in daily practice.

At the Sylvia Tóth Centre we turn things around. The centre is built around a care concept where everything is focused on minimizing inconvenience to the child. The children stay at the centre for an entire day together with their parents. They are given their own room, an internet connection and plenty of relaxation possibilities for the child.

The medical specialists and paramedics go to the child, and all required tests are planned on a single day. This requires that extensive paperwork is done in advance ensuring a complete file is available on each child. We work with timeslots, so we are always welcome to visit the department in question for our examinations.

The centre was founded in 2000, and welcomes two hundred and fifty young patients each year. Demand far exceeds available capacity, and patients have to be selected. The centre is focused on four diagnosis groups: children with medically intractable epilepsy, children with poorly understood developmental delay, children with a possible tethered spinal cord and children with suspected neuromuscular conditions.”



Paul Helders
professor of paediatric physiotherapy

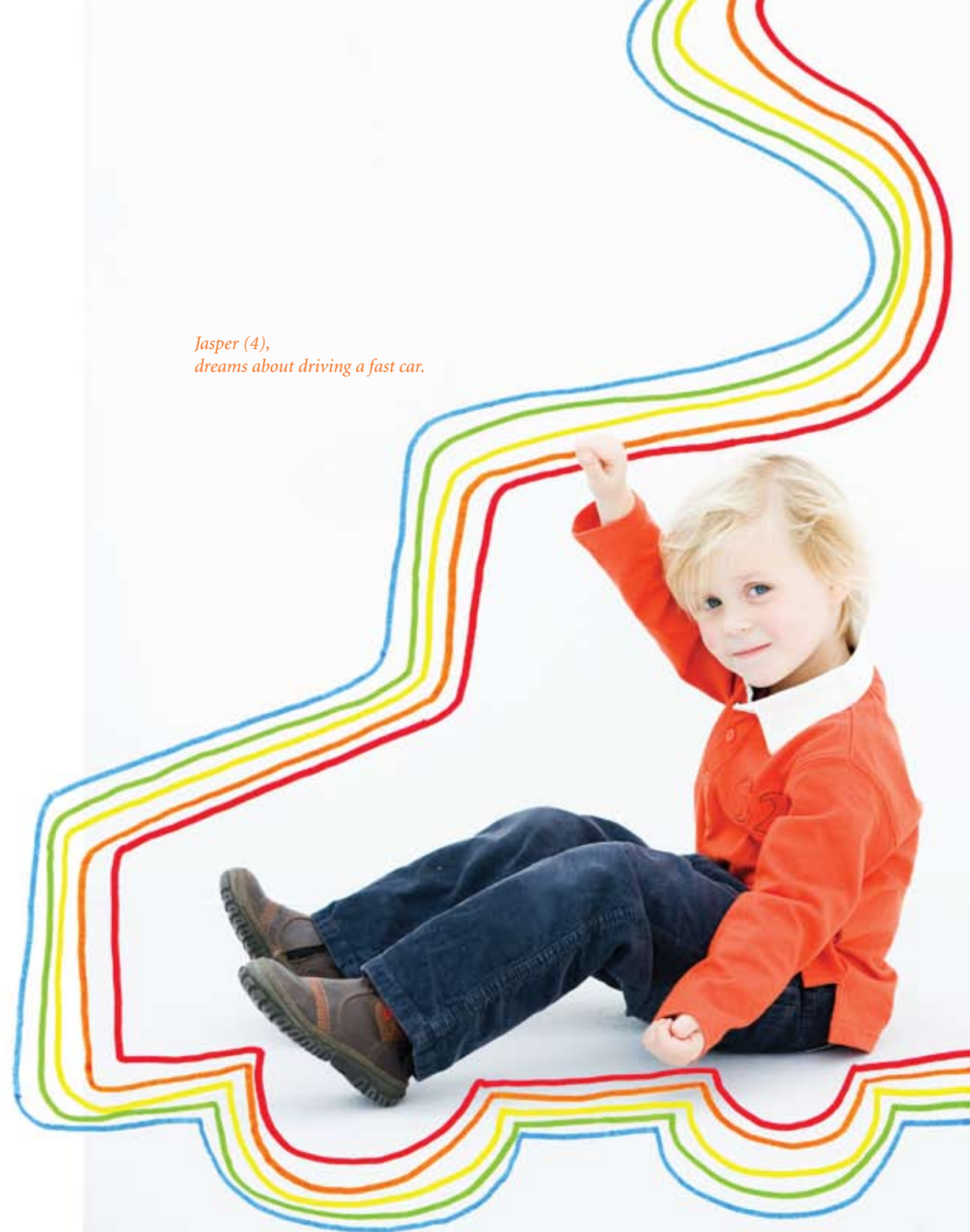
‘We focus on what children are still capable of’

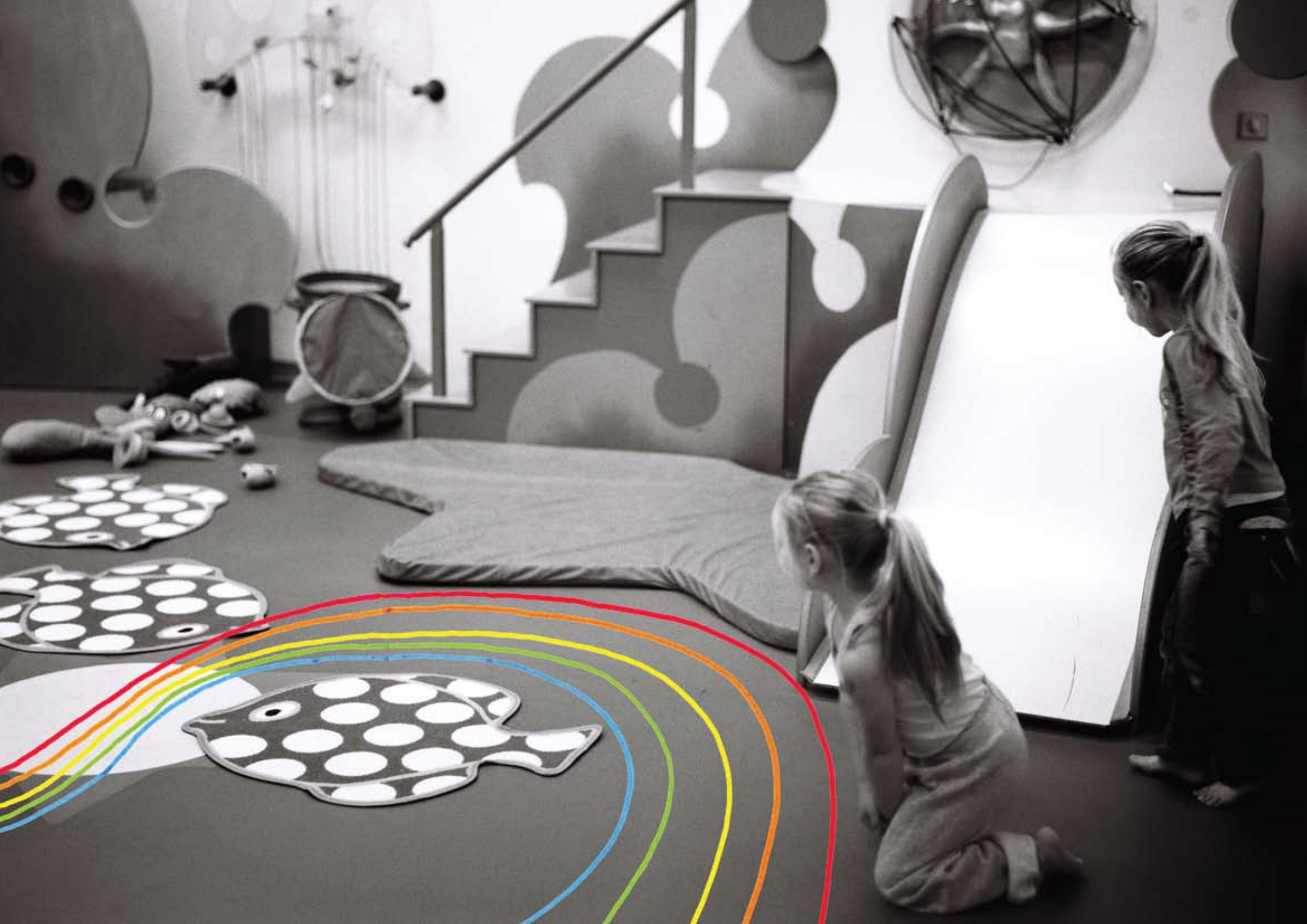
“Our focus is on investigating the effects of rheumatic diseases and the exercise capacity of children with these conditions. The latter aspect makes us unique in the world. Chronically ill children develop differently from healthy children in terms of motor skills and stamina. In order to provide children with chronic motion problems with good support through a suitable physiotherapy programme, we first need to determine ‘residual capacity’: what is the child still capable of? And how is this different from what a healthy child of the same age can do?”

Our research unit is a movement landscape that looks like a kind of giant playground. By allowing the children to explore it freely, we can observe how they use motor capacity to interact with their environment. What a child can still do also depends on the condition of the individual child, including disease status and medication use.

Social context for each individual child is also important. What form does the family unit take, and how do parents deal with the child? Coaching and advising the family is an important task, as they also need to learn how to live with a chronically ill child. A child with wrist pain, for example, will crawl differently. Parents are worried by this, but have to understand that ‘abnormal’ can be ‘normal’ in certain cases. Children have a way of solving their own problems, and sometimes their solution is better than anything we doctors can think of. In that case, we leave things as they are.”

*Jasper (4),
dreams about driving a fast car.*







David van der Zee
paediatric surgeon

‘Endoscopic surgery: operating on a square millimetre’

“Right from the beginning in 1992, we at UMC Utrecht /WKZ have been leaders in the field of endoscopic surgery in neonates and the growing child. Our department has developed countless new operations and techniques, of which gastrointestinal surgery in children with an oesophageal occlusion is one of the most prominent examples.

Endoscopic surgery uses a minimally invasive technique. This form of operating leaves only small scars. This is an important advantage for growing children. Internal scarring is also minimized, which further reduces the chance of complications. Finally, patients have less pain, heal faster and can go home sooner.

The technique is used frequently at WKZ on children with oesophageal occlusion or children with reflux disease. Where a child with an anti-reflux operation used to spend 12 days in the hospital, the stay has now been reduced to 3 days.

The increase in the number of endoscopic surgical procedures also affects personnel. The work of operating assistants has become more technical. Anaesthesiologists and nursing staff also work in a different way now. We have developed an international training programme for (paediatric) surgeons, involving box and virtual reality trainings as well as a phased clinical programme.”



*Marc (10),
will become a pilot.*



Marc Lilien
paediatric nephrologist

Tom de Jong
paediatric urologist

‘Tackling urinary tract infections early prevents kidney damage’

De Jong: “300,000 adults in the Netherlands wear diapers, and 8% of children suffer from urinary incontinence..The major breakthrough of the past twenty years is that research has shown incontinence in children should not be viewed primarily as a behavioural problem, but as a medical one. Addressing urinary incontinence and urinary tract infections at an early stage can prevent kidney damage later in life.”

Lilien: “At the WKZ, nephrology, urology and urotherapy are brought together in the Pediatric Renal Center. The centre is one of the largest in Europe, and treats about one thousand new patients with urinary incontinence problems every year. On top of that, we also have 160 new patients a year with renal disease.”

De Jong: “As a leader in the field of paediatric urology, WKZ primarily treats patients with intricate incontinence problems and complex congenital abnormalities.

Second-line care is transferred to general hospitals throughout the country with whom we cooperate intensely.

This complex care often requires long-term follow-up well past puberty. We have a separate line of adolescent care, including facilities for psychosexual support within WKZ’s psychosocial department. The paediatric urology department at WKZ was the first centre in Europe authorized to carry out European accredited specialist training.”

Lilien: “WKZ has an independent pediatric dialysis department. Dialysis has a major impact on a child’s social life. We try to limit this damage as much as possible by addressing the child on his or her own level and providing good psychological care and school support.”



*Pier (9),
will attend magic school.*



Kors van der Ent
professor of paediatric pulmonology

*‘Continually working on the future;
a greatly improved prognosis means there is
a future to look forward to.’*

“The WKZ Cystic Fibrosis Centre (CF-Centre) is the largest in the Netherlands, treating 35% of all children with cystic fibrosis in the country. Cystic fibrosis is a chronic disease in which constant inflammation and infection damage the lungs and other organs.

Thirty years ago, children with CF didn’t live past the age of ten. Thanks to greatly improved treatment options, the average age for CF patients is now forty-five. This improved future has a significant impact on the already intensive care programme.

One aspect is the transition to adult care. The paediatric and adult pulmonology departments of the UMC Utrecht work together closely to ensure a smooth transition. Experience has shown that many patients have trouble with the switch. That’s why we have introduced a special transition programme around the age of fifteen.

The CF Centre offers a total care package; from the very beginning all the way to a final treatment option such as lung transplantation. The trust that grows between the medical team and the patient over the years brings with it responsibilities. Next to the medical aspects, an improved prognosis brings an increasing number of social and psychological issues with it, including: eating disorders, problems at school, sexual education, and career coaching.

We continually strive for ways to improve treatment through directed research. This is very basic research that always begins with a real patient problem: ‘Where does the inflammation come from, and why is it so severe?’

WKZ is a leader in infection and immunology research, a fact our CF patients also benefit from. For example, our discovery that inflammatory processes in children with CF are abnormal from birth provides new options for improving treatment using anti-inflammatory agents”.

*‘Where does the inflammation come from, and why is it
so severe? WKZ is a leader in infection and immunology
research, a fact our CF patients also benefit from.’*



A bird's eye view of Child Health

UMC Utrecht is the national centre for paediatric epilepsy surgery. Additionally, UMC Utrecht is a centre of excellence in the field of hydrocephalus and dynamic CSF circulation problems.

Children with various kinds of allergies are placed in a multidisciplinary setting in the paediatric allergy centre of the UMC Utrecht. Research and care in the areas of allergy prevention and early identification of high-risk children are research spearheads.

The Child and Communication care group run by the ENT-surgery department offers multidisciplinary care to children with difficulties hearing and speaking. Utrecht is known for its research into upper respiratory tract infections and otitis media. A second key multidisciplinary care group treats children with respiratory, nutritional and/or swallowing problems.

The medical genetics department provides advice on hereditary issues and performs chromosome and DNA testing. UMC Utrecht acts as a national expertise centre for epilepsy genetics and teratogenesis. It coordinates the national EURAP study into the effects of antiepileptic medications during pregnancy.

www.umcutrecht.nl/erfelijkheid

The centre for metabolic and endocrine diseases brings together research and patient care. Clinicians and laboratory scientists work closely together in this centre. Utrecht has built a strong reputation in the field of metabolomics.

The paediatric intensive care unit has 16 beds as well as a transport gurney which allows children to be transported to and from the ICU in a fully controlled environment.

The psychotrauma centre for children and young people provides acute care and short-term support to children confronted with traumatic experiences. If necessary, patients are referred to mental healthcare institutions. www.psychotraumacentrum.nl

Young people with chronic fatigue syndrome are treated according to the latest scientific insights. Cognitive behavioural therapy is offered via a web portal.

The Medical Psychology and Social Work department offers diagnostics and treatment across the board, from neuropsychology to counselling on gender identity. Research is primarily focused on developmental disorders caused by chronic disease.

The multidisciplinary schisis team at WKZ treats all types of cleft lips and palates, and has a particular interest in speech problems in children with a 22q11 deletion syndrome (VCF syndrome) and children with a Pierre Robin Sequence. The team runs a special clinic for antenatally diagnosed schisis.

The craniofacial team treats children with congenital and acquired abnormalities of the head and face.

The Centre for Congenital Vascular Defects is a multidisciplinary centre for children with congenital vascular abnormalities such as haemangiomas.

The Paediatric Plastic Surgery department holds a special clinic for children with microtia (small or absent ears). They cooperate closely with our Craniofacial Team and the ENT department.

Paediatric orthopaedics focuses on performing corrective surgery on the spine and extremities, often in children with multiple handicaps. The department's research is primarily focused on the aetiology of the most common forms of scoliosis, early diagnosis of hip dysplasia and on bone metabolism, particularly in the context of skeletal dysplasias.

The child ophthalmology department is a national expertise centre for children with complex strabismus, congenital cataracts, uveitis, secondary glaucoma and cerebral poor vision.

UMC Utrecht cooperates closely with the De Hoogstraat Rehabilitation Centre in Utrecht. Rehabilitation programmes may begin at WKZ and continue at De Hoogstraat. www.dehoogstraat.nl

The Friends of the WKZ Society supports the paediatric hospital with projects that make a child's stay more comfortable. www.vriendenwkz.nl



Faculty

J.L.L. Kimpen, MD PhD, professor of paediatrics, dean of the faculty of medicine.

F. van Bel, MD PhD, professor of neonatology.

R. Berger, MSc PhD, professor of biochemistry of and metabolic diseases disorders.

M.J.M. Bonten, MD PhD, professor of moleculair epidemiology of infectious diseases.

R.M. Castelein, MD PhD, professor of orthopaedic surgery.

P.J. Coffe, MSc PhD, professor of pediatric immunology.

H. van Engeland, MD PhD, professor of child and adolescent psychiatry of childrens and youth.

C.K. van der Ent, MD PhD, professor of paediatric pulmonology.

D.E. Grobbee, MD PhD, professor of clinical epidemiology.

F. Haas, MD PhD, professor of congenital cardiothoracic surgery.

C.J. Heijnen, MD PhD, professor of psycho-neuro immunology.

P.J.M. Helders, MD PhD, professor of paediatric physiotherapy.

M.J. Jongmans, MSc PhD, professor of pediatric psychology.

R.S. Kahn, MD PhD, professor of psychiatry.

W. Kuis, MD PhD, professor of paediatric rheumatology.

E. Lindeman, MD PhD, professor of rehabilitation medicine.

D. Lindhout, MD PhD, professor of medical genetics.

F. Miedema, MSc PhD, professor of immunology.

O. van Nieuwenhuizen, MD PhD, professor of paediatric neurology.

B.J. Prakken, MD PhD, professor of paediatrics and chronic inflammation.

E.A.M. Sanders, MD PhD, professor of paediatric immunology and infectuous diseases.

G. Sinnema, MSc PhD, professor of psychology of the child with special health care needs.

L.S. de Vries, MD PhD, professor of paediatrics and neonatal neurology.

A.J. van Vught, MD PhD, professor of acute paediatric care and intensive care.





WVKZ



Colophon

Publisher

UMC Utrecht
Postbus 85500
3508 GA Utrecht
www.umcutrecht.nl

Text and production

Stephanie Pander

Design

Studio Beet

Photography

Brenda van Leeuwen (photography)
Dana van Leeuwen (photography)
Esther de Munnik (styling)

Printing

ZuidamUithof Drukkerijen

Concept and editing

Ernest Müter
Julianne Meijers