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### Communicating with families of critically ill patients about continuing or discontinuing life-sustaining treatment

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# How Physicians Discuss Uncertainty With Parents in Intensive Care Units

## Abstract

### Background and objectives

Physicians and parents of critically ill neonates and children receiving intensive care have to make decisions on the child's behalf. Throughout the child's illness and treatment trajectory, adequately discussing uncertainties with parents is pivotal because this enhances the quality of the decision-making process and may positively affect the child's and parents' well-being. We investigated how physicians discuss uncertainty with parents and how this discussion evolves over time during the trajectory.

### Methods

We asked physicians working in the NICU and PICU of 3 university medical centers to audio-record their conversations with parents of critically ill children from the moment doubts arose whether treatment was in the child's best interests. We qualitatively coded and analyzed the anonymized transcripts, thereby using the software tool MAXQDA 2020.

### What's known on the subject

Prevailing uncertainties complicate decision-making in the NICU and PICU. They also appear to negatively affect patient- and parent-related health outcomes. Adequately discussing uncertainty with parents is pivotal yet challenging for physicians.

### What this study adds

This explorative study shows that physicians use a wide array of strategies to discuss uncertainty with parents. These strategies vary throughout the child's illness and treatment trajectory. Our insights will help physicians to better tailor their approach to parental needs.

### Results

Physicians were found to adapt the way they discussed uncertainty with parents to the specific phase of the child's illness and treatment trajectory. When treatment options were still available, physicians primarily focused on uncertainty related to diagnostic procedures, treatment options, and associated risks and effects. Particularly when the child's death was imminent, physicians had less "scientific" guidance to offer. They eliminated most uncertainty and primarily addressed practical uncertainties regarding the child's dying process to offer parents guidance.

### Conclusions

Our insights may increase physicians' awareness and enhance their skills in discussing uncertainties with parents tailored to the phase of the child's illness and treatment trajectory and to parental needs in each specific phase.

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# Introduction

In the NICU and PICU, physicians and parents often have to engage in complex decision-making on the child's behalf [1, 2]. Parents need to be well-informed about their child's illness, prognosis, and available treatment options to enable participation in the decision-making process. Thus, physicians are tasked to inform parents fully, clearly, and honestly, which includes discussing any potential or existing uncertainties [3-5]. Such uncertainties may include risks versus benefits of diagnostic or therapeutic procedures, the child's well-being in the short and longer term, and dilemmas about the utility of life-sustaining treatment (LST) versus end of life [1, 3, 6-9]. Such conversations can be difficult because uncertainties may diminish parents' sense of hope and increase their emotional distress.

Uncertainty may also provoke avoidance of decision-making [8, 10-16]. Physicians previously expressed reluctance to communicate uncertainties because of concerns about its negative effects for parents and themselves [8, 13, 14, 17-20]. However, growing evidence suggests that adequately discussing uncertainties with parents enhances decision-making and well-being of critically ill children and their parents; for instance, by giving parents a sense of empowerment [3, 11, 21-28].

More insights are needed into how physicians discuss uncertainties with parents and how such discussions evolve over time, especially in cases in which the child's health further deteriorates in the NICU and PICU [10, 29-31]. We aim to prospectively investigate:

1. to which topics physicians' discussion of uncertainty pertains in physician-parent conversations in the NICU and PICU;
2. which communicative strategies physicians use to discuss uncertainty with parents; and
3. how the discussion of uncertainty develops over time.

# Methods

## Procedure and participants

This explorative qualitative study was part of a larger research project about communication and decision-making in family conferences (henceforth: conversations) (FamICom) [32].

Audio-recordings were made of conversations between physicians (neonatologists, pediatric intensivists, and/or consulting specialists), nurses, and parents of children admitted to the NICU and PICU of 3 university medical centers in the Netherlands. Physicians and nurses from the 6 participating ICUs received oral and written study information and signed informed consent before participation. All physicians and all nurses, except for 1 NICU nurse, consented.

Parents were eligible as soon as they themselves or the medical team expressed doubts whether continuing LST was in the child's best interests. Parents were personally approached in the clinic and informed about the study by the attending physician or a member of the research team. If willing to participate, parents provided verbal and written consent. All formal conversations between physicians and parents were audio-recorded until a final decision was made to either continue or to discontinue LST. The university's institutional review board approved the study protocol on behalf of all centers (W17\_475 #17.548).

## Sample selection

The full data set consisted of the audio-recordings of conversations regarding 36 children (NICU  $n = 19$ ; PICU  $n = 17$ ). Maximum variation was sought regarding the patient's age, sex, diagnosis, disease progression and course of treatment, and the parents' ethnic background, level of education, and religious beliefs. In this study, we only included cases in which at least 3 conversations were audio-recorded. This enabled us to explore how the discussion of uncertainty evolved over time.

## Qualitative analysis

Audio-recordings were transcribed verbatim and anonymized. The transcripts were then analyzed using the software tool MAXQDA 2020 [33]. All transcripts were carefully read and for each utterance of physicians that contained any aspect of uncertainty, 3 coders (SP, AJL, and MAH) identified the topic, the communicative strategy, whether the expression was implicit or explicit, and if and how parents

responded to the uncertainty, until data saturation was reached [34-36]. In accordance with the widely accepted definition by Han, we defined uncertainty as “the subjective consciousness of ignorance,” which implies that uncertainty concerns a metacognitive personal awareness of one’s lack of knowledge [10]. Details of our steps of coding and explorative analysis are provided in Figure 1.

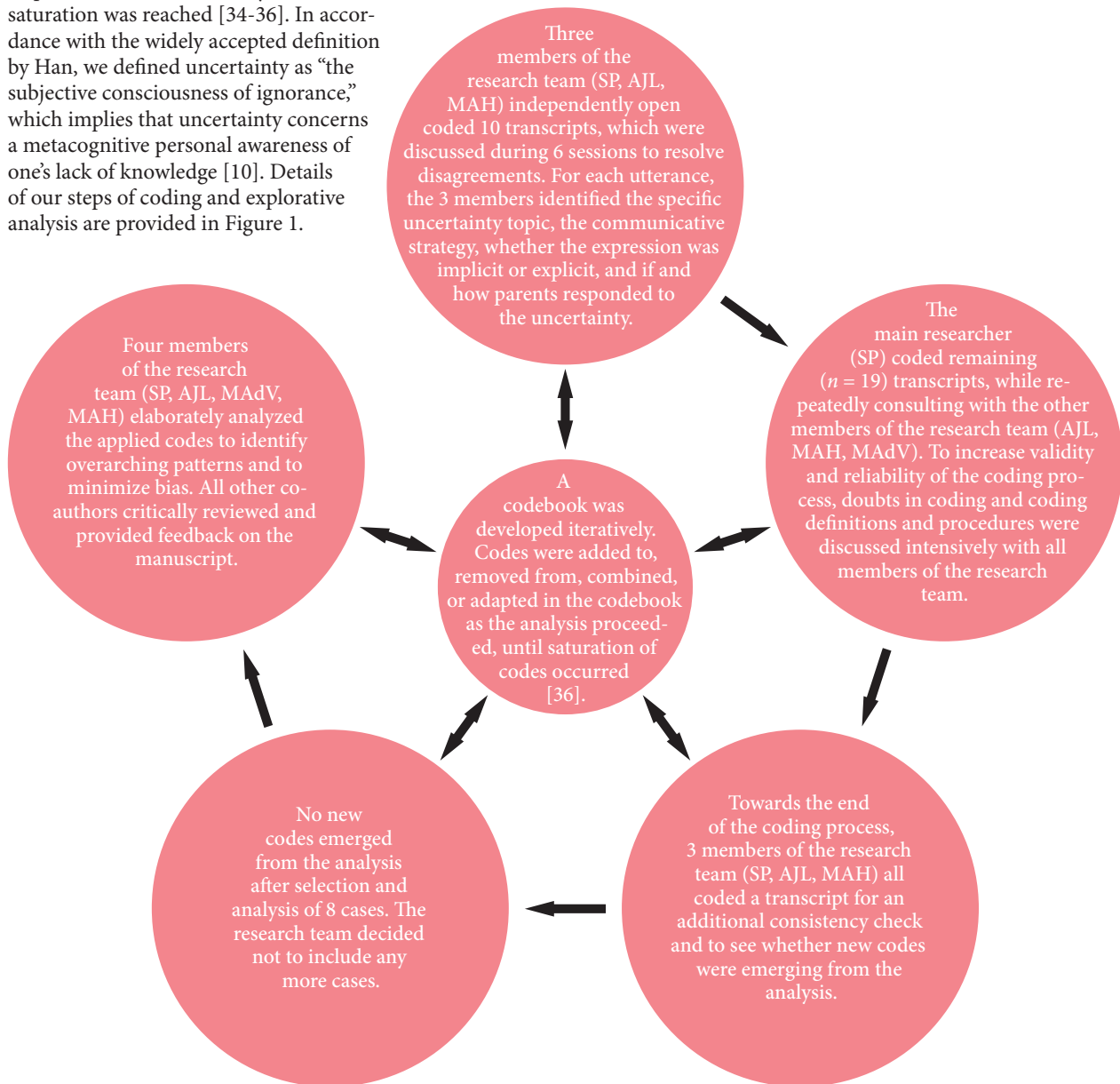


Figure 1. Our steps of coding and analysis of uncertainties

# Results

In total, 29 conversations were analyzed regarding 8 patients (NICU  $n = 4$ , PICU  $n = 4$ ; Supplemental table 1). Sixteen parents and 29 physicians participated in these conversations. Although nurses were present in most conversations, they did not actively participate in the discussion of uncertainties. Physicians rarely addressed uncertainty explicitly; for instance, by stating that they “did not know” something. These few explicit expressions mainly concerned practical topics such as the moment when test results would be known. Yet, physicians predominantly discussed uncertainty in implicit ways; for instance, by using terms such as “it seems” or “it could be.”

The uncertainties that physicians discussed concerned a wide array of topics, ranging from the child’s diagnosis and (short-term) prognosis, to the content, timing and possible risks of diagnostic tests and treatment options, and, eventually, the process of dying.

We distinguished 3 distinct phases in children’s illness and treatment trajectory, each associated with specific topics of uncertainty and identifiable communicative strategies, which physicians used to discuss these topics (Figure 2). Although the term “strategy” might imply intentional use, we were not able to assess how intuitive or intentional physicians’ use of strategies was. In most, but not all, cases, the 3 phases occurred sequentially. In some conversations, we identified 3 additional strategies that appeared to be independent from the 3 identified phases.

## Phase 1: Unstable condition: additional diagnostic testing and care planning

In this first phase, the condition of the child was typically unstable, whereas underlying causes for such instability were unknown in most cases. Physicians’ communication mainly centered around short-term uncertainties; for example, how the child’s condition would develop in the coming days. Physicians addressed these uncertainties using communicative strategies such as providing a range of possible explanations for the causes of the child’s current situation, or by suggesting a most likely explanation.

#N1.1, physician:

*“His problems may be explained by a coarctation, and that when muscle tissue around the duct contracts, it also partly narrows his aorta.”*

Physicians often accompanied these explanations by presenting a short-term action plan. This plan included additional diagnostics, treatments, or a proposition to consult specialized colleagues.

#N1.2, physician:

*“We want to do more tests to find out what causes his acute kidney failure. We want to do another scan, give extra fluids, and if that doesn’t work, we will give diuretics.”*

In presenting such plans, physicians also prepared parents for subsequent uncertainties; for example, about the feasibility and risks of diagnostic tests, as illustrated in the following citation:

#P1.1, physician:

*“Doing an MRI is challenging, because it would be difficult to manage his breathing and oxygen levels. Currently, he is unable to breathe without the mask. Thus, we would have to intubate and sedate him for only an MRI.”*

Parents hardly responded when physicians addressed such kinds of uncertainties in this phase. In the few instances in which they did respond, parents requested additional information, or asked for clarification. Notably, in 1 PICU case, parents took the lead from the first conversation on and clearly indicated their preferences regarding withdrawing their child’s treatment. Only in this case, the physician addressed the process and circumstances of dying in an early phase, including important practical uncertainties (eg, housing situation and place of last phase of life).

## Phase 2: Deteriorating condition: limited treatment options

In phase 2, the child’s situation typically deteriorated, where reasons for deterioration often remained unclear and treatment options became limited. The primary treatment goal shifted toward protecting the child from suffering. During

these conversations, physicians stated that “something” needed to be done, but that it also became more and more uncertain what could be done exactly. Thereby, a balance of whether the remaining options would not cause more harm than benefit in the short or long term were discussed. In this phase, physicians used more diverse strategies to address uncertainty than in phase 1 and 3. Primarily, physicians emphasized uncertainties, thereby making parents aware of the possible negative outcomes of tests and treatments.

#N3.3, physician:

*“But I want you to realize that, still, anything can happen. Because he will be undergoing heart surgery, which comes with a lot of risks.”*

Additionally, physicians stressed their increased worries about the child’s condition. In this way, they put even more emphasis on how problematic and uncertain the situation had become.

Simultaneously, physicians appeared to reduce the burden of the uncertainty for parents; for instance, by reassuring them about the quality of care their child was receiving. In

the following example, the physician had just explained to the parents that an intubation is a risky procedure that could also alleviate the child’s suffering:

#P2.2, physician:

*“The procedure of intubating is difficult and carries the risk that he will die during this procedure. But I assure you that you are in the right place. We have all kinds of physicians here who are highly experienced in intubating children in complex circumstances.”*

Particularly in the NICU setting, physicians addressed uncertainties by sketching different possible scenarios. This was done in 3 different ways. First, physicians sometimes only sketched a positive scenario, seemingly in an effort to help parents retain their hope.

Second, they sketched a negative or worst-case scenario. Physicians sometimes did so in reaction to parents’ utterances of hope. Here, it appeared a way of counterbalancing parents’ unrealistic hopes. Third, physicians neutrally listed multiple possible scenarios or outlined the most likely scenario that might happen.

Interestingly, when sketching a negative scenario, physicians were more likely to generalize uncertainty instead of referring to the situation of this specific child.

**Phase 1:  
Unstable condition: additional  
diagnostic testing and care planning**

**Topics**

- Diagnosis
- Diagnostic tests
- Necessity of treatment
- Efficacy and risks of treatment

**Strategies**

- Providing explanations
- Presenting action care plan
- Preparing (for continued) uncertainty)

**Phase 2:  
Deteriorating condition: limited  
treatment options**

**Topics**

- Current health condition
- Short-term prognosis
- Timing of treatment
- Choice of treatment including risks

**Strategies**

- Emphasizing uncertainty
- Reducing burden of uncertainty
- Sketching scenarios
- ‘Wait and see’

**Phase 3:  
Imminent death: treatments become  
futile**

**Topics**

- Withholding or withdrawing treatment
- Process of dying
- Circumstances of dying and comfort care
- Practicalities final phase of life

**Strategies**

- Eliminating uncertainty
- Minimizing uncertainty
- Managing expectations /preparing

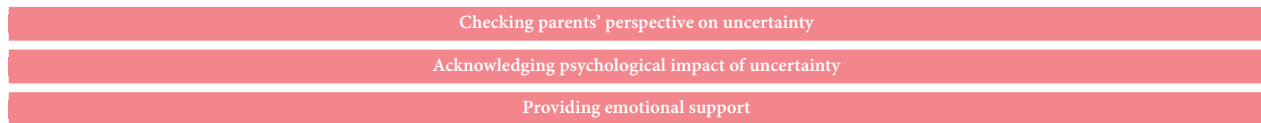


Figure 2. Main topics to which uncertainty pertained and main strategies to discuss uncertainty with parents per phase of children’s illness and treatment trajectory

#N4.3, physician:

*“It appears to go well right after the breathing tube has been taken out; but we often see that children slowly deteriorate later on.”*

Finally, physicians addressed uncertainty in this second phase by stating that they would “wait and see” how the child’s situation would develop over the coming hours or days. This is in stark contrast to the strategy used in phase 1, where physicians would propose a concrete action plan to diminish uncertainty.

Again, very few parents directly responded to physicians’ various strategies to address uncertainty. If parents did respond, they expressed their understanding or stressed their hope that things would still work out for their child.

### Phase 3: Imminent death: treatments become futile

In this last phase, appropriate therapeutic treatment options had been exhausted and it became clear that the child would die soon. Uncertainties in this phase, especially, entailed decisions whether to continue or withdraw LST, the implementation and timing of such decisions, and other practical uncertainties, such as how long the process of dying lasts and how parents could best support their child during this process.

Physicians’ main strategy in this phase was to eliminate any remaining uncertainty about whether treatment had truly become futile and about the inevitability of the child’s death.

#P2.3, physician:

*“We don’t think it’s fair to do anything to him anymore [ ... ]. Uhm, it would not be appropriate to continue mechanical ventilation. Because we know for sure that he will die.”*

Moreover, physicians minimized uncertainty by reassuring parents that they would do everything they could to prevent the child from suffering.

#P3.2, physician:

*“The most important aspect is that we are going to make sure she is comfortable so that she will not suffer.”*

Finally, physicians thoroughly prepared parents for the dying process of their child, thereby managing parents’ expectations, as illustrated in the following example:

#P1.6, physician:

*“Things such as the ventilator, we will stop them. We do not know for sure how he will respond to that; whether he will keep breathing. I expect that he won’t.”*

In response to the addressed uncertainties, a few parents requested more practical information, whereas others reacted emotionally; for example, by expressing their feelings of fear or guilt or by starting to cry.

### Strategies throughout the whole trajectory

We observed 3 strategies that physicians used to address uncertainty, which were not phase-specific but occurred in every phase of the illness and treatment trajectory. Although these strategies occurred quite rarely, they appeared to help parents express their needs, as underlined by more explicit responses from parents.

The first strategy consisted of physicians checking parents’ perspective on the uncertainty.

#P4.1, physician:

*“We need to take time to see how the situation will develop. How do you feel about that?”*

The second strategy consisted of acknowledging the psychological impact of uncertainty, by explicitly mentioning how difficult the uncertainty had to be for parents. The last strategy consisted of providing emotional support to help parents cope with the high amount of uncertainty; for instance, by stating:

#P1.5, physician:

*“We are here for you if you need us.”*

# Discussion

In this study, we explored how physicians discuss uncertainty with parents of critically ill children admitted to the NICU and PICU, and how this discussion evolves over time, by inductively coding and analyzing successive audio-recorded conversations.

We identified 3 distinct phases with a clear relationship between the uncertainty topics physicians addressed, the communicative strategies they used to discuss these topics, and how these combinations of topics and strategies evolved during the child's illness and treatment trajectory. These 3 phases align with the "Phases of Illness" previously classified in palliative care [37, 38]. Our results contribute to the literature by showing that physicians adapt the way they discuss uncertainty with parents to the specific phase of the child's illness and treatment trajectory, either consciously or unconsciously.

In previous studies, physicians were found to focus almost exclusively on "scientific uncertainty;" that is, uncertainty related to diagnosis, prognosis, treatment options, and the possible risks and effects of these options [3, 30, 39-43]. Physicians in our study appeared to discuss a wider array of uncertainty topics, including practical and personal uncertainties. Particularly in the last phase, physicians had less scientific guidance to offer and primarily addressed practical uncertainties regarding the child's dying process to still offer parents some guidance in coping with these uncertainties. In the literature, 3 overarching strategies are presented in how physicians (may) address uncertainty with patients or their representatives:

1. preparing for the discussion of uncertainty; for example, explicitly warning for uncertain outcomes before initiating diagnostic or therapeutic procedures;
2. informing about uncertainty; and
3. helping to deal with uncertainty; for example, by providing emotional support [14, 44, 45].

The strategies identified in the current study mainly fall under the overarching strategy 2, rarely under strategy 3, and never under strategy 1. However, recent studies indicate that the needs and well-being of caregivers are best met by combining information-oriented strategies with coping-oriented strategies [9, 18, 22, 46-50]. Studies that retrospec-

tively investigated parents' experiences during their child's stay in the NICU or PICU concluded that openly discussing uncertainty positively affected parents' well-being and their (preparation for) bereavement, but only if the discussion was combined with sufficient emotional support [4, 9, 31, 50-53]. By using information-oriented strategies, physicians may seem to solely focus on cognitive aspects and neglect emotional aspects [9]. Our study shows that this is not always the case. By using information-oriented strategies such as sketching scenarios, physicians seemed to not only inform parents about the current uncertainties, but also to make these uncertainties bearable for parents and help them to prepare for potential worst-case scenarios. This may well improve parents' emotional coping on the longer term [54]. In none of the conversations did physicians explicitly ask parents about their information and emotional needs. Parents, for their part, hardly gave any explicit reaction to the uncertainties presented to them. We hypothesize that such limited or even lack of dialogue made it harder for physicians to tailor their communication strategies to the specific needs and wishes of individual parents. These needs and wishes may as well change over the course of their child's illness and treatment trajectory [38]. The 3 additional strategies we rarely found (ie, checking parents' perspective on the uncertainty, acknowledging the psychological impact of uncertainty, and providing emotional support), may be promising ways to help parents express their needs besides receiving sufficient guidance and support.

We found that physicians rarely disclosed prognostic uncertainty, in contrast to other topics of uncertainty. It may well be that physicians hesitated to explicitly share prognostic uncertainty out of fear to increase parents' anxiety and diminish their hope and trust [17, 55, 56]. In neonatal and pediatric intensive care, prognostication may be particularly challenging because of the high unpredictability of how an individual child will react to treatments and to what extent he or she will recover [57, 58]. Yet, failing to timely and clearly address uncertain prognoses can lead to false hope or misunderstandings among parents [18, 23]. Rather than by nondisclosure, physicians could provide prognostic information in line with parents' information needs at that point in time, thereby also honestly explaining the limits of their prognosis [18, 38, 44, 56, 59, 60].



Recommendations presented in Figure 3 are a preliminary effort to support physicians in discussing uncertainty with parents.

Although presenting novel and in-depth insights, our study has several limitations. First, our study took place in the Netherlands, where end-of-life practice allows withdrawal of life support. More research is needed to investigate whether and how discussions of uncertainty might be different in other countries with different regulations and practices. Second, in this study, we included only cases involving 3 or more conversations to explore the development of uncertainty. Consequently, in the PICU, no parents were included whose otherwise healthy child had suddenly fallen critically ill. In future research, it would be of interest to investigate how discussions of uncertainty in such acute situations might be different. Third, in the context of our study, parents encountered a relatively large number of different physicians throughout the care trajectory. Such lack of continuity has been suggested to negatively affect the patient–provider relationship and information transfer [61-64]. Further research is needed to investigate whether the discussion

of uncertainty develops differently in settings with more provider continuity. Fourth, we were unable to test effects or draw conclusions about how parents experienced physicians' communicative strategies about uncertainties. Previous studies have indicated that how uncertainty is communicated may positively or negatively affect patients' and families' levels of satisfaction and their trust in the competence of health care providers [41, 42, 65-68]. Last, physicians' intentions when addressing uncertainty could only be implicitly inferred from the context. We do not know whether physicians strategically made use of specific strategies or did this rather intuitively. Previous studies found that physicians sometimes deliberately use uncertainty to steer parents toward a certain decision [69]. Future research should address these limitations. We thereby suggest a mixed methods design in which audio or video recordings of actual conversations are combined with evaluative interviews with parents and physicians. In this way, a better insight can be obtained whether physicians use strategies deliberately and whether parents experience these strategies as helpful in the short and longer term.

1. A wide range of strategies is available for physicians to discuss uncertainty with parents of critically ill children in and over the phases of the child's illness and treatment trajectory.
2. Physicians may use their awareness of the 3 identified phases to choose how to discuss uncertainty with parents throughout the child's illness and treatment trajectory.
3. Physicians could explicitly explore parents' individual responses to uncertainty, enabling them to tailor their discussion of uncertainty to parents' needs.
4. Using affective strategies when discussing uncertainty; that is, checking and acknowledging the impact of uncertainty and providing emotional support, might facilitate parents in expressing their needs and help them in dealing with the conveyed uncertainty.
5. Particularly when appropriate treatment options are still available, physicians could consider discussing uncertainty in a more explicit way as this may help them to manage parents' expectations and facilitate prognostic awareness.
6. When death is imminent, addressing practical uncertainties; for example, by explaining the practicalities of the last moments of the child's life in detail, could offer parents helpful guidance and support.
7. In the child's last phase of life, eliminating any remaining uncertainty may help parents accept that nothing more can be done, and that death is inevitable.

Figure 3. Practical recommendations for discussing uncertainty

# Conclusions

This study thoroughly explored how physicians address uncertainties in complex and emotionally charged conversations in neonatal and pediatric intensive care. Physicians used a wide array of strategies to discuss uncertainty with parents, which they adapt to the specific phase of the child's illness and treatment trajectory. Physicians rarely checked parents' needs. They did not explore which strategy parents found helpful at that point in time. Our insights may help physicians in becoming more aware of how they actually discuss uncertainties with parents and how they can improve this important part of their communication.

# Supplementary figures

#Case	Description
#N1 data:	A prematurely born boy admitted to the NICU, who seemed stable, but suddenly deteriorated because of unexplainable kidney failure and would die soon. Three conversations between both parents with a migration background, 2 neonatologists, and 2 nurses.
#N2 data:	A prematurely born girl admitted to the NICU, who was transferred to medium care at another hospital because of sudden improvement. Three conversations between a Dutch father and immigrant mother and 2 neonatologists.
#N3 data:	A prematurely born boy admitted to the NICU. The child's twin brother was also admitted to the NICU. Whereas the brother was doing well, this child's situation remained unstable and deteriorated. Three conversations between Dutch parents and 3 neonatologists.
#N4 data:	A prematurely born girl admitted to the NICU. The child's situation remained unchanged (ie, did not improve but also did not get worse) while receiving life-sustaining treatment. Four conversations between Dutch parents and 2 neonatologists.
#P1 data:	A male toddler (age range 1–4 y) with a congenital disorder, admitted to the PICU, who deteriorated and died. Six conversations between immigrant parents and 3 pediatric intensivists, 2 pediatricians, 2 pediatric neurologists, a metabolic pediatrician, 7 nurses, and a social worker.
#P2 data:	A teenage boy (age range 12–16 y) with a congenital disorder, admitted to the PICU. During earlier hospital admissions, the boy had a good quality of life, but now deteriorated and died. Three conversations between Dutch parents and the patient's brother, and a pediatrician, 2 pediatric intensivists, an anesthesiologist, a nurse, a medical educationalist, and a social worker.
#P3 data:	A girl (age range 16–21 y) with a congenital disorder, admitted to the PICU. Parents quickly decided that the child suffered too much, and they requested palliative care, to which physicians eventually agreed. Parents took their child home for the final phase of life. Four conversations between Dutch parents and an anesthesiologist–pediatric intensivist, 2 pediatric intensivists, a pediatric neurologist, 2 pediatricians, and 2 nurses.
#P4 data:	A girl (age range 4–12 y) with a congenital disorder, admitted to the PICU. Physicians were committed to do everything possible, although the child's situation seemed unexplainable. Child had been admitted to the ICU for already 5 mo. Situation slightly improved and the plan was to transfer the child to a special care unit, but this seemed too risky. Four conversations between Dutch parents and 2 pediatricians.

Because of privacy regulations, we report age ranges instead of exact ages.

*Supplementary table A. Case characteristics*

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## Author contributions

Ms Prins conceptualized and designed the study, collected, analyzed, and interpreted the data, drafted and finalized the initial manuscript and figures, and reviewed and revised the manuscript; Drs Linn and Hillen conceptualized and designed the study, analyzed and interpreted the data, drafted the initial manuscript, and critically reviewed and revised the manuscript; Ms Akkermans collected data, conceptualized and designed the study, and reviewed and revised the manuscript; Drs van Kaam, van de Loo, van Woensel, van Heerde, Dijk, Kneyber, de Hoog, Simons, and Smets conceptualized and designed the study and critically reviewed and revised the manuscript for important intellectual content; Dr de Vos collected, coordinated, and supervised data collection, conceptualized and designed the study, analyzed and interpreted the data, drafted the initial manuscript, and critically reviewed and revised the manuscript; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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The authors have indicated they have no conflicts of interest relevant to this article to disclose.

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