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PERISTAT

Indicators for monitoring and evaluating perinatal health in Europe

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Background: The PERISTAT project aimed to develop an indicator set for monitoring and describing perinatal health in Europe. The challenge was to define indicators that cover common concerns and have the same meaning within the different European health care systems. Methods: PERISTAT included i) a review of existing recommendations on perinatal health indicators, ii) a DELPHI consensus process with a scientific advisory committee composed of a clinician and an epidemiologist or statistician from each European member state as well as with a panel of midwives, and iii) a study of the availability of national statistics to construct recommended indicators. This article describes the first two components. Results: The review identified 10 international and 13 national recommended indicator sets. It also included indicators routinely compiled by WHO, EUROSTAT and OECD. Because of the methodological limits to using existing indicators for European comparisons, a high priority was placed on improving indicators already collected. Using the DELPHI method based on the results of the review, the scientific committee achieved a consensus on ten core and 23 recommended indicators, including 12 requiring further development. Conclusions: The PERISTAT project was successful in identifying a set of indicators, which drew on and consolidated previous work. Consensus was not achieved on precise indicators in areas where uncertainty about appropriate indicators was high, although areas were targeted for future development. Finally, the feasibility study, which is in progress, is an essential part of the project, since it will enable member states to evaluate their capacity to produce these indicators.

Keywords: fetal and neonatal health outcomes, indicators, maternal health, maternity care

Perinatal, infant and maternal mortality rates are among the most commonly used indicators of population health status. These rates, derived from civil and medical registers of births and deaths, are published regularly and historical series exist for many countries. These data make it possible to describe the dramatic decrease in perinatal mortality in the member states of the European Union over the past 40 years *(figure 1)*.

International comparisons of data relating to the outcome of pregnancy and to maternity care date back at least to the mid-nineteenth century.[1–3] The drive in the last quarter of the twentieth century to produce social indicators to measure and compare populations and health services and the post-war focus on maternal and child health programmes in some countries contributed to the development and use of perinatal health indicators. As in earlier decades, national and international expert groups have been convened to define measures of maternal and child health care and outcomes for use in evaluating health care and public health programmes.[4,5] Perinatal epidemiologists, aided by the development of computers, have pursued research on associated demographic, social and behavioural factors that affect maternal and neonatal health. This work provides an empirical basis for past and current efforts to develop indicators. Perinatal health has also been on the European community's research agenda, beginning with a comparative study of antenatal health care twenty years ago.[6]

Despite this rich past, good tools are not currently available for monitoring and comparing perinatal health status and perinatal health care in Europe. As perinatal and maternal health has improved, absolute differences in mortality rates between countries have declined. The methodological shortcomings of many indicators have generated scepticism about the source and derivation of the numbers and their usefulness in comparing health status and quality of care.[7–9] Furthermore, European research projects have cast doubts on the value of many commonly used indicators as measures of quality of care. These projects consistently document extensive hetero-

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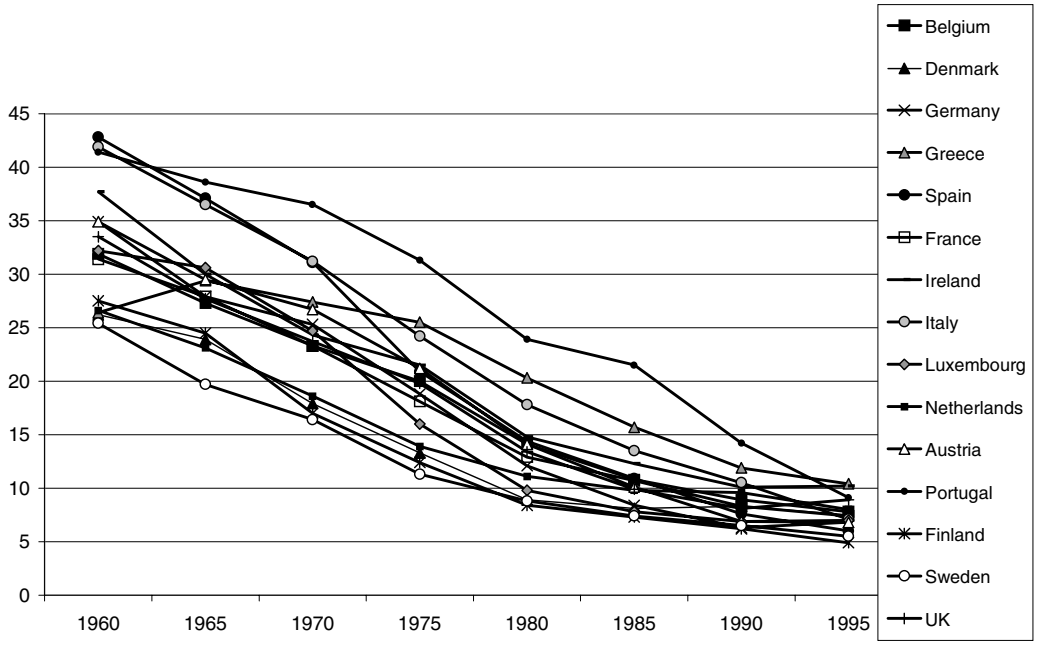

Figure 1 Perinatal mortality rates in the 15 EU members states, EUROSTAT (1999)

geneity in health systems and medical practices.[10–12] In these varied settings, relating indicators of health care practices to quality of care requires contextual information on the health care system and the policy environment.

The PERISTAT project was charged with developing an indicator set for monitoring and describing perinatal health in Europe. The challenge was to define indicators that cover common concerns and have the same meaning within the different health care systems of Europe. The project's guiding principles were to consolidate existing work on perinatal health indicators and to redress known methodological shortcomings of these indicators.

The PERISTAT project was coordinated by a scientific team at the Epidemiolgical Research Unit on Perinatal and Women's Health (U149) at INSERM (the French National Institute for Health and Medical Research) in collaboration with a steering group of seven experts in perinatal health and a scientific advisory committee (SAC) composed of a clinician and an epidemiologist or statistician from each of the European member state. The members are listed in *appendix*. The clinicians include obstetricians, paediatricians, and one midwife. There was also one consumer representative.

The PERISTAT project included three major components, as summarized in *figure 2*:

- a background review of the scientific literature and of existing recommendations on perinatal health indicators;
- a consensus process with the PERISTAT scientific advisory committee as well as a panel of midwives to identify a working list of indicators; and
- a study of the availability of national statistics to test the feasibility of the proposed indicator set.

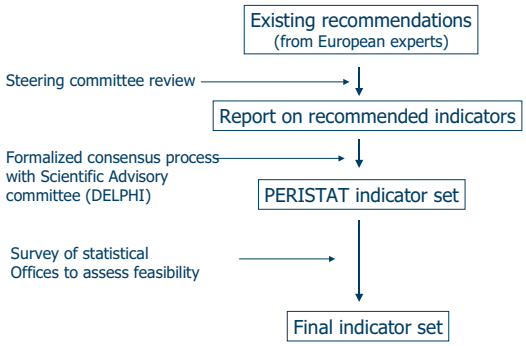

Figure 2 Methods

The aim of the feasibility study was to identify indicators that can be readily compiled from data available in most countries and to pinpoint areas where further development of statistical systems is necessary. This study is still in progress at the time of writing. This article describes the rationale and the methods used in the first two components.

BACKGROUND REVIEW: DEVELOPMENT OF GUIDING PRINCIPLES

The PERISTAT project began its work with widespread requests for information on existing recommendations about perinatal health indicators. In some countries, letters were sent to key informants, designated by members of the scientific advisory committee as those in the country most likely to have knowledge of expert

groups on perinatal health indicators (the number of key informants per country ranged from 8 in Finland to 28 in the UK). In other countries, letters went out to a wider group of perinatal health professionals, composed of past participants of European projects on perinatal health and leaders of perinatal health associations (between 6 and 40 letters sent out per country). Sixty-five responses were received to these requests for information from countries in the EU. Letters were also sent to individuals involved in the development of recommendations on indicators in Australia, Norway, Canada, Poland and the USA. We also collected information on indicators routinely published by EUROSTAT, WHO Regional Office for Europe and the OECD.

Review of recommendations issued by international and national expert groups

The review process identified 10 sets of recommendations from international collaborations and 13 sets of national recommendations on perinatal health indicators, from Australia, Canada, Denmark, France, Germany, Italy, Spain, UK and the USA. The number of indicators included in these indicator sets range from 9 to 43. Several of the recommended indicator sets are related to child health more generally and we retained only those indicators relating to the perinatal period. Two parallel projects of the health monitoring programme are considering other reproductive health issues and child health (the REPROSTAT and CHILD projects). Other indicator sets are more specific, concerning the care of high-risk babies or the quality of antenatal services only. The review also included an analysis of indicators that are compiled regularly by three organizations: EUROSTAT, OECD and the WHO Regional Office for Europe.

Fourteen of the documents making recommendations included their selection criteria for indicators. Three major types of criteria are mentioned, although the precise vocabulary used differs. The first centres on an assessment of the importance of the indicators for monitoring perinatal health, using terms such as: significant, useful and relevant. Importance is determined both in relation to the prevalence of the problem and its amenability to change. The second set of criteria are technical. There is broad agreement on the importance of having scientifically robust indicators, which are valid, reliable, sensitive and specific. Finally, the choice of indicators must be practical in relation to the data currently collected in each country. Feasibility and data availability are routinely mentioned. Other less frequently mentioned criteria include ethical indicators and the importance of adequately encompassing all issues or population groups to derive representative and balanced indicators sets.

There are many individual measures that are common to indicator sets. The fetal mortality rate, the neonatal mortality rate, an indicator of birth weight, an indicator of preterm birth and the caesarean section rate are included in over half of all recommended indicator sets. The maternal mortality ratio is also included in most indicator sets which cover maternal health outcomes.

Despite overlap of indicators, individual sets are distinct. *Table 1* provides examples of recommended perinatal health indicator sets. Health policy as well as the organization of the health system shape the selection of 'experts' and the focus of these 'expert groups'. Because of their reference to local health systems and policies, many of the indicators included in these sets would not be appropriate for comparative European analyses. For instance, indicators based on neonatal admission to intensive and special care have been defined in Victoria, Australia and England. These would be difficult to compile, let alone interpret internationally, since the organization and definition of intensive and special care units differ widely.[10] The availability of on-site care and practices not related to the health status of the newborn can affect referral decisions.[13] Similarly, to compare indicators based on the number of antenatal visits, information about national recommendations about the optimal number of antenatal visits would be needed. The recommended number varies from 5 in Austria and Luxembourg to 13 in the Netherlands and 14 in Belgium.[14] More critically, the evidence to support such recommendations is minimal.

Medical practices also affect the feasibility of compiling specific indicators within a European context. For instance, Germany has an indicator of the acidity rate (pH <7.1) among term infants, but this can only be compiled in countries where pH is routinely measured and recorded in all maternity units. Finally, some indicators require a clear consensus on protocols among health professionals in order to be meaningful. For instance, indicator 6 in the state of Victoria's maternity service set is the proportion of women offered appropriate interventions in relation to smoking.

The review of recommended indicator sets also brought up the issue of the differences in definition for individual indicators. As can be seen in *table 1*, different specific indicators can be defined for a common theme, such as mode of delivery. For instance, caesarean sections may be subdivided into those occurring before the onset of labour and those after labour has begun and vaginal deliveries can be subdivided into spontaneous and operative. Denominators can be total births, maternities or vaginal deliveries. Preterm birth provides another example. While WHO publishes internationally agreed definitions, these may be ignored in practice.[15] The OBSQID recommendations have two indicators with cutoff points at 31 and 37 weeks of gestation while the Nordic indicators use less than 34 weeks. To provide an interface with local indicator sets, a European indicator set should use broad definitions of individual indicators and present full distributions.

Perinatal indicators routinely compiled on perinatal health for the countries of Europe

As shown in *table 2*, a considerable number of indicators related to perinatal health and health care are currently compiled in databases maintained by EUROSTAT, the WHO Regional Office for Europe and the OECD.[16–19]

With the notable exception of preterm birth rates, the indicators most commonly contained in the recommended indicator sets are already regularly compiled.

Research on these indicators, however, shows that improvements are necessary before they can be compared on a European level. An important example is the perinatal mortality rate. In the mid-twentieth century, it was suggested that stillbirth had many features in common with deaths in the first week of life and they should therefore be combined.[20] From the 1950s onward, the perinatal mortality rate, defined as the number of stillbirths plus deaths in the first seven days after live birth expressed as a rate per thousand total live and stillbirths, was widely used in statistical publications.

This rate is very sensitive to criteria for inclusion of live and stillbirths. According to the World Health Organisation, 'the perinatal period commences at 22 completed weeks (154 days) of gestation (the time when the birthweight is normally 500 g) and ends seven completed days after birth'.[15] In practice countries differ in their legal criteria for birth registration and their criteria for inclusion in other data collection systems. For example, in Denmark, Spain and Sweden, only fetal deaths after 28 or more completed weeks of gestation are registered as

Table 1 Selected indicator sets

OBSQID quality indicators for perinatal care[a]	Nordic obstetric and gynaecological association[b]	Germany, Hessen and Bavarian Perinatal Quality Assurance Surveys[c]	Victoria's Maternity Services Health Performance Indicators[d]	National Centre for Health Outcomes Development (NCHOD), UK[e]
Maternal 1:Maternal death 2:Number of prenatal visits 3:Eclampsia 4:Previous perinatal death 5:Previous preterm delivery 6:Detection of multiple pregnancies 7:Social class 8:Hysterectomy at delivery	1:Perinatal mortality 2:Preterm birth (<34 weeks) 3:APGAR score <7 4:Small for gestational age 5:Large for gestational age 6:Induction of labours 7:Percentage of vaginal deliveries for breech presentation 8:Caesarean sections (all, planned, other) per 100 deliveries 9:Forceps or ventouse per 100 deliveries 10:Episiotomies per 100 vaginal deliveries 11:Sphincter rupture (III+IV) per 100 vaginal deliveries 12:Epidural analgesia per 100 vaginal deliveries	1:Fetal blood sampling in cases of pathologic fetal heart rate monitoring in singletons 2:Fetal blood sampling in cases of pathologic fetal heart rate monitoring and secondary caesarian section in singletons 3:Presence of a paediatrician in premature birth 4:Premature birth in an obstetrical department without children's hospital 5:First caesarian section in singletons with cephalic presentation at term 6: Repeated caesarian section in singletons with cephalic presentation at term 7:Estimation of pH in the umbilical artery 8:Acidotic newborns pH Umb. art. <7.10 9:Perineal tear III/IV degree 10: Perineal tear III/IV degree with episiotomy 11:Disorders of wound healing with the necessity of a second operation after spontaneous delivery 12:Disorders of wound healing with the necessity of a second operation after caesarian section	1:Birthweight standardised perinatal mortality ratio 2:Rate of term infants transferred or admitted to level 2 or level 3 nursery for reasons other than congenital anomalies 3:Rate of admission of antenatal corticosteroids to women delivered or transferred prior to 34 weeks' gestation 4:The rate of vaginal birth in the birth immediately following a primary caesarean section 5:Selection outcomes for standard primiparae 6:The proportion of women offered appropriate interventions in relation to smoking 7:The provision of appropriate breastfeeding support and advice 8:The proportion of women who receive timely hospital and clinical services 9:The proportion of women from a non-English speaking background without proficiency in English, who receive appropriate interpreter services	1:General health status of mother after delivery 2:Incidence of post-natal depression 3:Smoking among pregnant women 4:Weekly alcohol consumption among pregnant women 5:Illegal drug use among pregnant women 6:Incidence of domestic violence associated with pregnancy and childbirth 7:Incidence and duration of breastfeeding 8:Maternal mortality 9:Stillbirth, neonatal and post-neonatal mortality 10:Incidence of eclampsia 11:Incidence of severe post-partum haemorrhage 12:Perineal trauma and episiotomy rates 13:Pain during labour and delivery 14:Incidence of post-natal urinary incontinence 15:Incidence of post-natal faecal incontinence 16:Gestational age 17:Birthweight 18:Maternal admissions to ICU 19:Use of antenatal corticosteroids to enhance pulmonary maturity 20:Mode of delivery rates 21:Neonatal admission to intensive and special care 22:Emergency post-natal admission of mother 23:Detection and treatment of rhesus iso-immunisation in pregnancy 24:Women's experience of maternity services
Fetal 9:Early neonatal mortality 10:Preterm infants (<37 wks) 11:Caesarean sections 12:Preterm infants (<31 wks) 13:Perinatal mortality rate 14:Fetal death before admission 15:Instrumental delivery 16:Unattended deliveries 17:Late neonatal mortality rate 18:Neonatal seizures 19:Major congenital malformations 20:Low APGAR score 21:Infants with RDS				

a: OBSQID. European Consensus Conference on Quality Indicators for Perinatal Care. Annex II: The 21 Essential Indicators and their Definitions. Nov 1994.
b: Knut Dalaker, Einar J. Berle (Norwegian Society of Obstetrics and Gynecology): Clinical Guidelines in Obstetrics 1999. Norwegian Medical Association, Oslo, 1999.
c: Geschäftsstelle Qualitätssicherung Hessen (Hrsg.) Qualitätssicherung Geburtshilfe - Neonatologie - Gynäkologie. GQH Eschborn, 2001 page 42.
d: Measuring Maternity Services, Victorian Government Publishing Service, 2001.
e: Troop P, Goldacre M, Mason A, Cleary R, editors. Health Outcome Indicators: normal pregnancy and childbirth. Report of a working group to the Department of Health. Oxford: National Centre for Health Outcomes Development, 1999.

stillbirths. Other countries include birthweight as a criterion, such as Austria, Germany and Portugal. If common criteria are not used this can distort comparisons between countries.[5]

Some countries have explicit criteria for live birth registration and these too differ. Even in countries where there are no such criteria, regulations about stillbirth registration can affect decisions about whether an event is a late miscarriage or should be registered as a live birth and a neonatal death. Furthermore, particularly where data collection systems are not statutory, under-reporting can be a problem.

Indicators of maternal mortality are also extremely sensitive to underreporting.[21,22] When ascertainment is good, maternal mortality is a measure of the quality of obstetrical care, since many direct maternal deaths are associated with substandard care. However, the ascertainment of maternal deaths requires an effort on the part of member states to ensure that deaths during or after pregnancy are identified on death certificates or by other measures.[23,24] In many cases, very low levels of maternal death reflect poor ascertainment rather than good care.

The maternal mortality ratio also illustrates the importance of presenting information about numbers of events alongside indicators. The numbers of births per year in the countries of Europe vary greatly, ranging from 5,000 in Luxembourg to 775,000 in Germany. For rare events such as maternal death, small countries experience much more random variation in ratios. To give an extreme example, in 1995, Luxembourg had 1 maternal death, giving it the highest maternal mortality ratio in the EU, 18.5 per 100000, while in 1996, it had no maternal deaths so its rate was the lowest, 0 per 100000.[19]

Conclusions of review

The review helped to define priorities for the European indicator set and proposed them as a framework for organizing the selection process. These priorities were

- to assess maternal and infant mortality and morbidity associated with events in the perinatal period;
- to describe the factors, including demographic, socio-economic and behavioural characteristics, which can be associated with perinatal health outcomes in the population of childbearing women and trends in these factors;
- to monitor the use and possible consequences of medical intervention in the care of women and babies during pregnancy, delivery and the postpartum period.

All the criteria mentioned in the recommendations were considered relevant to the selection of indicators for a European health information system. Comparability was added to the list of criteria.

Because of the methodological limits to using existing indicators for comparisons in Europe the PERISTAT group placed a high priority on improving indicators already collected routinely. One way to improve quality and facilitate interpretation is to cross-tabulate indicators by other factors to form sub-groups. In the selection process, the panel of experts were asked not only to select individual indicators, but also to specify the associated factors needed for cross-tabulation. For instance, fetal and neonatal mortality rates can be tabulated by gestational age or by birthweight. The user can then interpret with caution sub-groups for which variation due to reporting bias is greatest, such as the most preterm or low birthweight babies. Other methodological principles included presenting indicators as full distributions, and including confidence intervals and population sizes.

Finally, despite a strong emphasis on improving existing indicators, the PERISTAT group also focused on setting goals for future indicator development. In particular, indicators on the longer-term consequences for mothers and their children of events that occur in the perinatal period are absent from most previous recommendations.

Table 2 Routinely compiled perinatal indicators for European countries

EUROSTAT[a]	WHO Regional Office for Europe Health for All database[a]	OECD Health database[a]
Perinatal mortality rate	Perinatal mortality rate	Perinatal mortality rate
Fetal mortality rate	Fetal death rate	Infant mortality rate
Early neonatal mortality rate	Early neonatal death rate	Low birth weight
Late neonatal mortality rate	Late neonatal death rate	Prevalence of congenital anomalies (results from EUROCAT registers)
Infant mortality rate	Low birth weight <2500 g	Maternal mortality ratio
Prevalence of selected congenital anomalies (results from EUROCAT registers)	Rates of selected infectious diseases (congenital syphilis, rubella, neonatal tetanus)	Fertility rate
Fertility rate	Prevalence of selected congenital anomalies	Caesarean section rate
Distribution of maternal age	Percent infants breast-fed at 3 and 6 months of age	Expenditures on maternal/child health
Births by birth order	Maternal mortality ratio	Length of hospital stay for childbirth
Births by marital status	Fertility rate	
	Induced abortion	
	% young mothers	
	% older mothers	
	Number of midwives per 100,000 population	

a: Extracted from published reports or databases.[16–19]

Another neglected area is the views of new mothers and their families about the care and support they receive from clinicians in the perinatal period.

SELECTING AN INDICATOR SET: A MODIFIED DELPHI PROCESS

The report from the background review provided the working document for the first plenary meeting of the PERISTAT scientific advisory committee. This included a master inventory list containing all perinatal health indicators found in existing recommendations with a tally of the number of times each indicator was mentioned. At this meeting, the scientific advisory committee, divided into three discussion groups, agreed upon the general principles used for the selection process and added indicators it felt were missing to the list of indicators. Indicators were also eliminated from the list, but only if there was agreement in all three groups. This process left us with a list of 97 indicators sub-divided into four categories: fetal/neonatal health, maternal health, demographic, socio-economic or behavioural factors associated with health outcomes and health services.

Delphi consensus process among the scientific advisory committee

To achieve a consensus on the indicator set, we used a modified Delphi process. The Delphi process is a formalized consensus method in which a panel of people respond to a successive series of questionnaires with the aim of achieving a consensus on key principles or proposals.[25,26] Participants rank items by priority or importance, although they can also give more extensive comments. The benefits of this approach are anonymity, iteration – making it possible for participants to change their opinions during the process, controlled feedback in which participants are provided with the distribution of the group's previous response to individual questions, and the derivation of summary measures of agreement.[27] Moreover, in a European context, where many people are asked to participate in meetings that are not held in their native tongue, the Delphi provides less fluent members additional time to read and respond. Finally, the Delphi process is useful when it is logistically difficult to bring people together.

Two structured questionnaires were sent out to the scientific advisory committee over the four-month period after our first meeting. Each member was asked to engage in a priority assessment exercise. In round 1, all indicators from the master list were ranked from 0 to 3 (3 = essential; 2 = important; 1 = less important 0 = not useful). Participants were also asked to give separately their list of 'top 10' indicators and to rank associated analytic variables needed for the tabulation of indicators. The second questionnaire retained all indicators considered essential by 40% of the participants; those with an average priority score of 2 (important) and those included the top 10 lists of at least two participants. In round 2, participants were asked to select between 10 and 15 essential indicators and 20 recommended indicators. A question about whether the indicator could be implemented immediately or was to be developed in the future was also included. Participants could object to the removal of indicators from the shortlist and provide general comments on the results of the first round. Twenty-seven participants gave responses to both rounds of the Delphi.

The 10 core indicators

In the second round Delphi, the vast majority of participants agreed on ten core indicators. Agreement on these ten indicators was clear and robust; at least 80% of the participants agreed that the indicators should be in a core indicator set. The top 10 indicators, with the percentage of participants considering them to be core are given in *table 3*. In contrast, the level of agreement among respondents dropped to 50% for the eleventh highest ranked indicator, demonstrating a clear demarcation in the consensus around this set of indicators.

Recommended indicators

To arrive at the next tier of recommended indicators, we examined a cross-tabulation of two rankings from the second Delphi questionnaire: i) indicators selected as core, and ii) those selected as recommended. These two rankings were very similar and fewer than four indicators were in one list but not the other. This list was refined to obtain a shorter list of 20 recommended indicators. First, overlapping indicators were integrated into single indicators. For instance, deaths from congenital anomalies became a sub-category of an indicator of cause of death. We also eliminated indicators that were very similar to others that had a higher rank. We accorded extra weight to indicators that are on the European Community Health Indicators (ECHI) list developed by the Health Monitoring Programme. We also considered whether there was overlap with other Health Monitoring Programme projects, such as the project on other reproductive health issues (REPROSTAT).

Nine of the initial list of 20 indicators were considered to require significant research before they could be im-

Table 3 Selection of the PERISTAT 10 core indicators

Indicator (associated factors for tabulating indicator)	Participants selecting as core indicator (%)
Fetal mortality rate (gestational age, birthweight, plurality)	96
Neonatal mortality rate (gestational age, birthweight, plurality)	96
Maternal mortality rate	93
Maternal age	93
Birth weight distribution (vital status at birth, gestational age, plurality)	89
Gestational age distribution (vital status at birth, plurality)	89
Multiple birth rate	85
Mode of delivery	85
Parity	81
Infant mortality rate	78

plemented. Of these nine, three were 'topics', rather than specific indicators because no clear consensus around one or two 'best' indicators emerged. These were severe maternal morbidity, an indicator on care of high-risk babies, and an indicator of support for mothers. For maternal morbidity, for example, eclampsia had the highest score, but 85% of experts selected at least one indicator of severe maternal morbidity in addition to eclampsia. This shows that they did not feel that eclampsia should be the only indicator of severe maternal morbidity. No consensus emerged on another indicator, such as severe haemorrhage or transfer to an adult intensive care unit.

This initial list of recommended indicators that emerged from the Delphi process was refined at the last scientific advisory committee meeting. The group decided to remove the indicators on care for high-risk babies because they could not agree on a definition. Also, many other indicators are cross-tabulated by birthweight and gestational age and can thus be used to describe the population of high-risk babies. The group agreed on a specific definition for an indicator of severe maternal morbidity in a discussion led by a SAC member with expertise in this area. Finally, we agreed to add an indicator on maternal satisfaction for future development as part of the discussion of the indicator on 'maternal support'.

A DELPHI with a panel of midwives

One consistent comment made by members of our panel of respondents was that because the scientific advisory board included only one midwife this clinical perspective was underrepresented in the SAC DELPHI. In many countries, midwives are the principal providers of care to

Table 4 Final list of PERISTAT indicators: summary table

Category	Core		Recommended		Recommended further development needed	
Neonatal health	C1	Fetal mortality rate by gestational age, birthweight plurality	R1	Prevalence of selected congenital anomalies (Down's syndrome Neural tube defects)	F1	Causes of perinatal death
	C2	Neonatal mortality rate by gestational age, birthweight plurality	R2	Distribution of APGAR score at 5 minutes	F2	Prevalence of cerebral palsy
	C3	Infant mortality rate by gestational age, birthweight plurality			F3	Prevalence of hypoxic-ischemic encephalopathy
	C4	Birthweight distribution by vital status, gestational age plurality				
	C5	Gestational age distribution by vital status, plurality				
Maternal health	C6	Maternal mortality ratio by age, mode of delivery	R3	Maternal mortality by cause of death	F4	Prevalence of severe maternal morbidity
					F5	Prevalence of trauma to the perineum
					F6	Prevalence of faecal incontinence
					F7	Postpartum depression
Population characteristics or risk factors	C7	Multiple birth rate by number of fetuses	R4	Percentage of women who smoke during pregnancy	F8	Distribution of mothers' country of origin
	C8	Distribution of maternal age	R5	Distribution of mothers' education		
	C9	Distribution of parity				
Health care services	C10	Distribution of births by mode of delivery by parity, plurality, fetal presentation, previous CS	R6	Percentage of all pregnancies following fertility treatment	F9	Indicator of support to women
			R7	Distribution of timing of 1st antenatal visit	F10	Indicator of maternal satisfaction
			R8	Distribution of births by mode of onset of labor	F11	Births attended by midwives
			R9	Distribution of place of birth	F12	Births without medical intervention
			R10	Percentage of infants breast-feeding at birth		
			R11	Percentage of very preterm births delivered in units without a NICU		

The PERISTAT indicator set, with definitions for each indicator, is available on: europeristat.aphp.fr

women with low-risk pregnancies. With the help of our SAC, we identified 15 midwives in 11 member states. We allowed for no more than two respondents per member state. Representation included: Austria, Denmark, France, Greece, Ireland, Netherlands, Portugal, and the UK. Missing from the process were: Belgium, Sweden, Germany, Finland, Italy, Spain, and Luxembourg. These countries are missing because either no midwife could be identified, or due to non-response to the questionnaires. This panel was asked to select a top 10 list indicators using the same instrument as for the SAC DELPHI. The selection process also included two rounds.

In the midwives' top 10, there were three indicators that were not present on the list selected by the SAC. These included: births without medical intervention, post-partum depression and births attended by a midwife. These indicators require further development to operationalize both their definitions and to identify suitable data sources to construct them at the national level. The decision was made to add these indicators to the list as recommended indicators for future development. The other indicators that were on the midwives' top 10 list were already included in the list: fetal-neonatal mortality rate, maternal mortality ratio, gestational age distribution, growth restriction (birthweight by gestational age), mode of delivery, APGAR score and breast-feeding.

Our final list of indicators is presented in *table 4*.

CONCLUSION

The PERISTAT project achieved its aims of obtaining an internal consensus on a perinatal health indicator set. The methods used to compile this list drew on and consolidated previous work in the domain. The Delphi process was successful in identifying a strong core set of indicators. We also focused on making these core indicators, many of which are already routinely compiled in European countries, effective tools for monitoring health. The SAC defined associated factors for sub-group analyses for the core indicators that will improve comparability and interpretation.

In contrast, we did not achieve consensus on precise indicators in areas where uncertainty about appropriate indicators was high. For instance, no consensus emerged around specific definitions for the indicators of maternal support or maternal satisfaction, areas where data are not routinely available. The Delphi method, in tandem with the group meetings of the scientific committee and the Delphi undertaken with a group of midwives, did make it possible to establish goalposts for future development.

Finally, the feasibility study, which is still in progress, will provide member states with baseline data with which to evaluate their data collection systems as well as the ability to contrast their systems with others in the European Union. In this way, the PERISTAT project aims to encourage national and regional efforts to improve the collection of information on the health and care of mothers and babies in the perinatal period. A high quality European information system can only be built if there are good local and national systems to form a foundation.

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