

**THE OPTIMALITY INDEX - US**  
**The Perinatal Background Index**  
**The Optimality Index**  
**Patricia A. Murphy, Dr.P.H., CNM Judith T. Fullerton, Ph.D., CNM, FACNM**  
**August 2011**

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**QUALITY OF THE EVIDENCE**

**I (Positive):** Evidence from at least 1 randomized clinical trial proving the benefit of the optimal outcome, AND/OR compelling evidence that the cost/benefit ratio favors the optimal outcome from the epidemiological or societal perspective.

**I (Negative):** Evidence from at least 1 randomized clinical trial proving the adverse impact of the non-optimal outcome, AND/OR compelling evidence that the presence of a non-optimal outcome has broad adverse impacts from the epidemiologic or societal perspective.

**II (Positive):** Evidence from at least 1 clinical trial without randomization, from cohort or case-controlled analytic studies (preferably from more than 1 center) or from multiple time-series studies, or dramatic results from uncontrolled experiments, AND/OR professional consensus, based on the midwifery philosophy of nonintervention in the absence of complications, that the cost/benefit ratio favors the optimal outcome.

**II (Negative):** Evidence from at least 1 clinical trial without randomization, from cohort or case-controlled analytic studies (preferably from more than 1 center) or from multiple time-series studies, or dramatic results from uncontrolled experiment, AND/OR professional consensus, based on the midwifery philosophy of nonintervention in the absence of complications, that the presence of a non-optimal outcome has broad adverse impacts from the epidemiologic or societal perspective.

**III** Evidence from opinions of respected authorities based on clinical experience, descriptive studies or reports of expert committees

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**Social and medical background**

<b>1.</b> marital status	(as if) married	Auger et al., 2008			X		
		Beeckman et al., 2009				X	
		Havens et al., 2009				X	
		Homann-Marriott, 2009					X
		Kiernan & Pickett, 2006				X	
		Luo et al., 2004			X		

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		Lutgendorf et al., 2009				X	
		Raatikainen et al., 2005				X	
2. ethnic minority <ul style="list-style-type: none"> <li>• White – nonHispanic</li> <li>• Hispanic</li> <li>• Native American/Alaskan Indian</li> <li>• African-American</li> <li>• SouthEast Asian (Vietnamese, Lao, Cambodian) or Asian Pacific Islander</li> <li>• Chinese</li> <li>• Eastern Asian (Korean, Japanese)</li> <li>• East Indian/Pakistani</li> </ul>	No	Berg et al., 2003			X		
		Bryant et al., 2010					X
		Forna et al., 2003			X	X	
		Goedhart et al., 2008			X		
		MacDorman & Mathews, 2009				X	
		Rich-Edwards & Grizzard, 2005					X
		Stewart et al., 2007			X		

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		Whitehead et al., 2009			X		
<b>3. smoking</b>	None	Aagaard-Tillery et al., 2008			X		
		Cornelius & Day, 2009					X
		Delpisheh et al., 2008			X		
		Johansson et al., 2009				X	
		Malik et al., 2008				X	
		Nabet et al., 2005				X	
		Rogers, 2009					X
		Usta et al., 2005				X	
		Wisborg et al., 2001				X	
<b>4. alcohol</b>	None	Aliyu et al., 2008				X	
		Burd et al., 2007					X
		Floyd et al., 2009					X
		Henriksen et al., 2004				X	
		Jaddoe et al., 2007				X	
		Maconochie et al., 2007				X	
		Sen & Swaminathan, 2007				X	

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		Standberg-Larsen et al., 2008				X	
		Standberg-Larsen et al. 2009				X	
<b>5. drug use</b>	None	Arlettaz et al., 2005				X	
		Bada et al., 2007				X	
		Dryden et al. 2009				X	
		El Marroun et al., 2009				X	
		Forrester & Merz, 2007				X	
		Ogunyemi & Hernandez-Loera, 2004				X	
		Pinto et al., 2010				X	
		Pulsifer et al., 2008				X	
		Richardson et al., 2007				X	
		Smith et al., 2006				X	
		Wolfe et al., 2005				X	
<b>6. pre-pregnancy body mass index (weight [in kg] / height [in meters] <sup>2</sup>) [Institute of Medicine and WHO Standards]</b>	Normal weight range BMI 18.5 – 24.9	Cedergren, 2009				X	
		Chu et al. 2009				X	

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		Davies et al., 2010					X
		Frederick et al., 2008				X	
		Kristensen et al., 2005				X	
		Rodriguez, 2010				X	
		Torloni, Betrán, Horta et al. 2009	X				
		Torloni, Betrán, Daher et al., 2009	X				
		WHO 2004				X	
<b>7. age</b>	18 – 40	Cleary-Goldman et al., 2005				X	
		Delpisheh et al., 2008				X	
		McIntyre et al., 2009				X	
		Phipps et al., 2002				X	
		Salihu et al., 2008				X	
		Usta & Nassar, 2008					X
		Wilson et al., 2008				X	
<b>8. preexisting, major, chronic, disease</b>	No						
• hypertension		Abalos et al., 2007	X				

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		Chappell et al., 2008		X			
		Gilbert et al., 2007				X	
		Ray et al., 2001				X	
		Zetterström et al., 2006				X	
• chronic renal disease		Fischer et al., 2004				X	
		Imbasciati et al. 2009			X		
		Piccoli, Attini, et al., 2010			X		
		Piccoli, Conijn, et al., 2010				X	
• diabetes (nongestational)		ACOG, 2005					X
		Allen et al., 2007					X
		Balsells et al., 2009				X	
		Kitzmilller et al., 2008					X
		Lapolla et al., 2008					X
		Melamed et al., 2008				X	
		National Collaborating Centre, 2008					X
		Persson et al., 2009				X	

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		Peticca et al., 2009				X	
		Shand et al., 2008				X	
		Temple et al., 2006				X	
• heart disease class II-IV		Chalupczak et al., 2004				X	
		Sidlik et al., 2007				X	
		Siu et al., 2001			X		
		Siu et al., 2002				X	
		Stangl et al., 2008				X	
		Thanajiraprapa & Phupong, 2009					X
• HIV antibody positive		Aebi-Popp et al., 2010				X	
		Haeri et al., 2009				X	
		Massad et al., 2004			X		
		Sturt et al., 2010		X			
		Volmink et al., 2010		X			
		Watts et al., 2009				X	
• major psychiatric history (treated with drugs or inpatient therapy)		Harlow et al., 2007				X	

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		Hizkiyahu et al., 2010				X	
		Howard et al., 2003				X	
		Lee & Lin, 2010				X	
		Lin et al., 2010				X	
		MacCabe et al., 2007				X	
		Schneid-Kofman et al., 2008				X	
<b>9.</b> inter-pregnancy interval between index pregnancy and previous viable birth > 18 months and < 60 months	Yes						
		Cecatti et al., 2008				X	
		Conde-Agudelo et al, 2006		X			
		Conde-Agudelo et al., 2007		X			
		Johnson et al., 2008				X	
		Kaupila et al., 2009				X	
		Stamilio et al., 2007				X	
		Zhu & Le, 2003			X		
<b>10.</b> previous preterm delivery < 37 weeks	No	Auger et al., 2008			X		

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		Beeckman et al., 2009				X	
		Boyd et al., 2009				X	
		Esplin et al., 2008				X	
		Goldenberg et al., 2008					X
		Plunkett et al., 2008				X	
		Plunkett & Buglia, 2008					X
		Sciscione et al., 2008				X	
		Smith et al., 2007				X	
		Surkan, 2004			X		
<b>11. previous intrauterine fetal death</b>	No	Black et al., 2008			X		
		Kovac et al., 2010				X	
		Menezes, 2009		X			
		Menezes, Yakoob, et al., 2009		X			
		Rasmussen et al., 2009				X	
		Said et al., 2010				X	
		Sharma et al., 2006			X		
		Sharma et al., 2007				X	

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<b>12.</b> previous Cesarean section	No	Algert et al, 2008					
		Daltveit et al., 2008				X	
		Galyean et al., 2009				X	
		Getahun et al., 2006				X	
		Gray et al., 2007				X	
		Grobman et al., 2009				X	
		Hansen et al, 2008				X	
		Kennare et al., 2007				X	
		Knight et al., 2008				X	
		Macones et al., 2005				X	
		Richter et al. 2007				X	
		Silver et al., 2006				X	
		Villar et al., 2007				X	
		Wu et al., 2005				X	
		Yang et al., 2007				X	
<b>13.</b> previous baby < 5 1/2 pounds at birth	No	Getahun et al., 2007				X	
		Lykke et al., 2010				X	

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		Oron et al., 2001			X		
		Smith & Shah, 2007				X	
		Surkan et al., 2004				X	
<b>14.</b> other serious antepartum complications (history of)	No						
• gestational diabetes		Alwan et al., 2009	X				
		Golden et al., 2009	X				
		Holmes et al., 2010				X	
		Kwak et al., 2008				X	
		Vambergue et al., 2007				X	
• intrauterine fetal demise		Black et al., 2008			X		
		Measey et al., 2009			X		
		Sharma et al., 2007			X		
• placenta previa		Grobman et al., 2007				X	
		Lone et al., 2010				X	
		Yang et al., 2009				X	
• preeclampsia		Brown et al., 2007				X	

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		Lykke et al., 2009				X	
		McDonald et al., 2009				X	
		Rasmussen et al., 2009				X	
• eclampsia		Gaugler-Senden et al., 2008				X	
		Lykke et al., 2009				X	
		Tang et al., 2009				X	
		Zhang et al., 2001				X	
• pyelonephritis		Hill et al., 2005				X	
		Luders et al., 2010				X	
		Scholes et al., 2005				X	
• Rh sensitization		Cotter et al., 2005					X
		Crowther & Middleton, 2003			X		
		Koelewijn et al., 2009				X	
		Lobato & Soncini, 2008				X	
		Schonewille et al., 2007				X	

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<b>Present pregnancy, diagnostic and therapeutic measures</b>							
<b>15.</b> intrauterine fetal demise	No	Black et al., 2008				X	
		Froen et al., 2004				X	
		Magann et al., 2001				X	
		Measey et al., 2009				X	
		Menezes, 2009					X
		Sundby & Vangen, 2009				X	
<b>16.</b> domestic violence (includes intimate partner)	No	Boy & Salihu, 2004.					X
		Kaye et al., 2006				X	
		Kiely et al., 2010	X				
		Rosen et al., 2007				X	
		Sharps et al., 2007					X
		Silverman et al., 2006				X	
<b>17.</b> other serious antepartum complications (current pregnancy)	No						

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<ul style="list-style-type: none"> <li>anemia (Hgb &lt; 10 gm in any trimester) – not improved with treatment</li> </ul>		Brabin et al., 2001				X	
		Kidanto, 2009					X
		Lone et al., 2004				X	
		Rasmussen, 2001				X	
		Reveiz, 2007					X
		Scanlon et al., 2000				X	
		Sloan et al., 2002		X			
<ul style="list-style-type: none"> <li>diabetes diagnosed in pregnancy</li> </ul>		Crowther et al., 2005		X			
		Langer et al., 2005				X	
		Metzger et al., 2008			X		
		Moore et al., 2002				X	
		Yang et al., 2002				X	
<ul style="list-style-type: none"> <li>major psychiatric history (formally diagnosed or treated with drugs/inpatient therapy)</li> </ul>		Jablensky et al, 2005				X	
		Webb, 2008				X	
		Wisner, 2009				X	

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• multiple birth (twins or higher number of births anticipated)		Conde-Aguedelo et al., 2000				X	
		Ortibus, 2009				X	
		Tang et al., 2006				X	
• placenta praevia		Bahar et al., 2009				X	
		Getahun et al., 2004				X	
		Madan et al., 2010				X	
		Sheiner et al., 2001			X		
• pre-eclampsia (diagnosed in antepartum period)		Tang et al., 2009				X	
		Villar et al., 2006				X	
		Xiao et al., 2003				X	
• pyelonephritis		Archabald et al., 2009					X
		Foxman, 2002			X		
		Hill et al., 2005				X	
• Rh sensitization		Ben-David et al., 2008				X	
		Crowther, 2003	X				

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• Vaginal bleeding in 2nd or 3rd trimester, from cause other than placenta praevia.		Harlev et al., 2008				X	
		Koifman et al., 2008				X	
<b>18.</b> prenatal care: initiation in first trimester (<14 weeks) and minimum of 5 visits	Yes	Carrolli et al., 2001	X				
		Herbst et al., 2003				X	
		Raatikainen et al., 2007				X	
		Villar et al., 2001	X				
<b>19.</b> amniocentesis NOTE: that if CVS is documented, a note should be added to the abstraction record	No	Alfirevic, 2003		X			
		Alfirevic et al., 2003		X			
		Cederholm et al., 2003				X	
		Cederholm et al., 2005				X	
		Eddleman et al., 2006			X		
		Grobman et al., 2009				X	
<b>20.</b> nonstress test/contraction stress test/biophysical profile	No	Alfirevic & Neilson, 2003		X			
		Grivell et al., 2009		X			

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21. medication use	No	Briggs et al., 2002					X
		Shaw et al., 2004				X	
<b>Parturition</b>							
22. period of time between first digital examination following rupture of membranes and birth	24 hours	ACOG, 2002					X
		Ezra et al., 2004			X		
		Flenady & King, 2003		X			
23. amniotic fluid	Clear	Bhat & Rao, 2008					X
		Liu et al., 2005				X	
		Locatelli et al., 2005			X		
		Tran et al., 2003				X	
		Wong et al., 2002				X	
		Xu et al., 2009				X	
		Ziadeh & Sunna, 2000				X	
24. induction/augmentation of labor	No	Ben-Haroush et al., 2004				X	
		Caughey et al., 2009	X				

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		Cammu et al., 2002				X	
		Elsedeek et al., 2009		X			
		Glantz, 2010				X	
		Heinemann et al., 2008		X			
		Lin & Raynor, 2004				X	
<b>25.</b> amniotomy	No	Smyth, 2007		X			
<b>26.</b> oral or injectable (IM or IV) medication during first or second stage of labor	None	Elbourne et al., 2003	X				
		Hill et al., 2003		X			
<b>27.</b> epidural analgesia for labor and/or birth	No	Abrao et al., 2009		X			
		Anim-Somuah et al., 2005		X			
		Beilin et al., 2005		X			
		Decca et al., 2004				X	
		Howell, 2003	X				
		Howell et al., 2002	X				
		Jain et al., 2003		X			
		Nystedt et al., 2004				X	

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		O'Connell et al., 2003				X	
		Reynolds et al., 2002		X			
		Volmanen et al., 2004				X	
<b>28.</b> fetoscope, Doppler, or intermittent electronic monitoring during labor (rather than continuous electronic fetal monitoring)	Yes	Bailey, 2007		X			
		Gourounti & Sandall, 2007		X			
		Kassanos et al., 2003			X		
		Natale & Dodman, 2003					X
		Sisco et al., 2009					X
		Thacker et al., 2003		X			
		Williams et al., 2003	X				
<b>29.</b> fetal heart rate abnormalities that altered management of the labor process <b>(SEE CODE BOOK!)</b>	No	Althaus et al., 2005				X	
		Haydon et al., 2006				X	
		Larma et al., 2007				X	
		Ridgeway et al., 2004				X	

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		Williams & Galerneau, 2002				X	
<b>30.</b> presence of a support person during labor (other than care provider)	Yes	Campbell et al., 2007	X				
		Hodnett, 2003	X				
		Hodnett et al., 2007					
		McGrath & Kendell, 2008	X				
<b>31.</b> nondirected pushing	Yes	Bloom et al., 2005	X				
		Hanson et al., 2002	X				
		Roberts, 2002					X
		Schaffer et al., 2005	X				
		Simpson & James, 2005	X				
		Wong et al., 2003		X			
<b>32.</b> delivery occurred in the place originally intended at the onset of labor	Yes	Olsen & Jewell, 2003	X				
		Sheiner, Shohan-Vardi, et al., 2002				X	
<b>33.</b> nonsupine position at birth	Yes	De Jonge et al., 2004	X				
		Gupta et al., 2006	X				

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			I Pos	I Neg	II Pos	II Neg	III	
		Lawrence et al., 2009	X					
		Soong & Barnes, 2005			X			
		Terry et al., 2006			X			
<b>34.</b> presentation at birth	Cephalic	Stitely & Gherman, 2005			X			
<b>35.</b> instrumental (vaginal) delivery	No	Demissie et al., 2004						X
		O'Mahony et al., 2010	X					
<b>36.</b> Cesarean section	No	Bodner et al., 2011						X
		Declercq et al., 2007			X			
		Dodd et al. 2004	4					X
<b>37.</b> episiotomy	No	Carroli & Mignini, 2009	X					
		Hartmann et al., 2005					X	
		Viswanathan et al., 2005			X			
		Youseff et al., 2005			X			
<b>38.</b> 1st or 2nd degree laceration of perineum or perineal tissue <i>requiring sutures</i> (including sulcus and cervical lacerations)	No	Lai et al., 2009			X			
<b>39.</b> 3rd or 4th degree extension of either an episiotomy or a 1st or 2nd degree laceration	No	Fernando et al., 2006	X					

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		Fleming et al., 2003		X			
		Lundquist et al., 2000	X				
<b>40.</b> medication (other than oxytocin or local anesthetic for perineal repair) during the third stage of labor	No	McDonald et al., 2002	X				
<b>41.</b> skin-to-skin contact	Yes	Anderson et al., 2003	X				
		Carfoot et al. 2003	X				
		Charpak et al., 2001	X				
		Conde-Agudelo et al., 2003	X				
		Moore et al., 2007	X				
		Rojas et al., 2003	X				
<b>42.</b> placental retention ( $\geq 30$ minutes)	No	Sosa et al., 2009				X	
<b>43.</b> postpartum hemorrhage (provider's documentation that this did not occur; actual amount of blood loss not relevant)	No	Al-Zirqi et al., 2008				X	
		Bateman et al., 2010					X
<b>44.</b> blood transfusion	No	Jansen et al., 2005					X
<b>45.</b> other serious intrapartum complications	No						

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• chorioamnionitis		Aziz et al., 2009				X	
		Blume et al., 2008				X	
		Botet et al., 2010				X	
		Holzman et al., 2007				X	
		Soraisham et al., 2009				X	
• cord prolapse		Kahana et al., 2004				X	
		Onwuhafua et al., 2007				X	
• eclampsia		Duley 2009					X
		Knight, 2007				X	
		Zwart et al., 2008				X	
• placental abruption		Ananth & Wilcox, 2001				X	
		Pitaphrom & Sukcharoen, 2006				X	
		Sheiner, Shoham-Vardi, Hadar, et al., 2002				X	
• pre-eclampsia present during intrapartum period		Gul et al., 2005				X	
		Yücesoy et al., 2005					X
• shoulder dystocia		Bjørstad et al., 2010				X	

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		Rahman et al., 2009				X	
<b>Neonatal condition</b>							
<b>46.</b> estimate of gestational age	37-42 weeks	Erez et al., 2005				X	
		Khashu et al., 2009				X	
		Zhang & Kramer, 2009			X		
<b>47.</b> birth weight	2500-4000 grams	Esakoff et al., 2009				X	
<b>48.</b> Apgar score at 5 minutes	7, 8,9 or 10	AAP and ACOG, 2006					X
		Harrington et al., 2007				X	
		Odd et al., 2008				X	
		Thorngren-Jerneck & Herbst, 2001				X	
<b>49.</b> transfer to high risk neonatal care setting	No	Brady, 2005					X
<b>50.</b> congenital anomalies	No	Tennant et al., 2010				X	
<b>51.</b> birth trauma, or other serious medical problem	no						
• bacterial infections other than sepsis		Volante et al., 2004					X
• bronchopulmonary dysplasia		Christou & Brodsky, 2005					X

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• cardiac failure		Hoch & Netz, 2005					X
• hypovolemia, hypotension, shock		Dasgupta & Gill, 2003					X
• intraventricular hemorrhage		Owens, 2005					X
• necrotizing enterocolitis		Guner et al., 2008				X	
• pneumonia		Hoffman et al., 2003				X	
• persistent pulmonary hypertension		Kinsella & Abman, 1995					X
		Konduri, 2004					X
• renal failure		Andreoli, 2004					X
• respiratory distress syndrome		Soll, 2005	X				
• Rh disease		Bussel, 2003					X
• seizures		Granelli & McGrath, 2004					X
• sepsis		Osrin et al., 2004					X
		Schrag & Schuchat, 2005					X
		Vergnano et al., 2005					X
<b>52.</b> breastfeeding (time period: at time of mother's discharge from birth setting or up to 72 hours postpartum)	yes	Donnelly et al., 2005	X				

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		Dyson et al., 2005	X				
		Horvath et al., 2009	X				
		Sadauskaite-Kuehne et al., 2004				X	
		Sikorski et al., 2005	X				
		PAHO, 2002					X
<b>53.</b> perinatal death: (time period birth: up to 72 hours of age)	no	Simhan, 2010					X
<b>Condition of the mother prior to discharge from birth facility or from provider's care (to 72 hours)</b>							
<b>54.</b> fever (100.4 degrees F or higher) while mother remains in the birth setting, OR provider diagnosis of infectious process or major complication	no	Shipp et al., 2003				X	
		Smulian et al., 2001					X
		Yokoe et al., 2001					X
• cystitis		Evron et al., 2008				X	
• endometritis		Chaim et al., 2000				X	
		French & Smaill, 2002	X				

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		French, 2003					X
• hematoma		Saleem & Rydhström, 2004				X	
• local infection of sutures		Normand & Damato, 2001				X	
		Yokoe et al., 2004					X
• mastitis		Barbosa-Cesnik et al., 2003					X
<b>55.</b> prescription medications for conditions newly identified in IP or PP period (exception: iron and vitamins, oral contraceptives, RhoGam©, rubella vaccine)	no	Briggs, 2008					X
<b>56.</b> maternal mortality	no	Khan et al., 2006		X			
		Ronsmans et al., 2006					X
		WHO, 2005					X
		WHO, 2006					X