Appendix 1. Deliveries and unscheduled cesarean deliveries incidence prior to and following hypoxic-ischemic encephalopathy events, classified as either associated or not associated with obstetric mismanagement.

		Number of weeks prior to\following hypoxic-ischemic encephalopathy deliveries				
		-10 – 0 weeks	0 – 2 weeks	2 – 4 weeks	4 – 6 weeks	
Event 1	Total deliveries	888	155	161	164	mismanaged
	Unscheduled cesarean deliveries	72	17	22	12	
Event 2	Total deliveries	877	167	144	176	
	Unscheduled cesarean deliveries	66	27	12	16	
Event 3	Total deliveries	846	137	160	177	
	Unscheduled cesarean deliveries	73	21	20	17	
Event 1	Total deliveries	840	164	159	167	non-mismanaged
	Unscheduled cesarean deliveries	108	17	10	13	
Event 2	Total deliveries	865	169	168	199	
	Unscheduled cesarean deliveries	82	19	13	18	
Event 3	Total deliveries	905	181	171	179	
	Unscheduled cesarean deliveries	95	14	12	22	
Event 4	Total deliveries	879	193	169	165	
	Unscheduled cesarean deliveries	97	17	20	25	

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Appendix 2. Deliveries and unscheduled cesarean deliveries incidence at Ein-Kerem facility prior to and following hypoxic-ischemic encephalopathy events at Mt. Scopus facility.

		Number of weeks before\ after events of mismanaged hypoxic-ischemic encephalopathy at **Mt. Scopus facility**				
		-10-0 weeks	0-2 weeks	2-4 weeks	4-6 weeks	
Event 1	Total deliveries	1226	243	210	261	Deliveries at **Ein-Kerem facility**
	Unscheduled cesarean deliveries	148	34	22	29	
Event 2	Total deliveries	1248	231	228	213	
	Unscheduled cesarean deliveries	148	32	27	29	
Event 3	Total deliveries	1108	256	233	260	
	Unscheduled cesarean deliveries	156	29	32	46	

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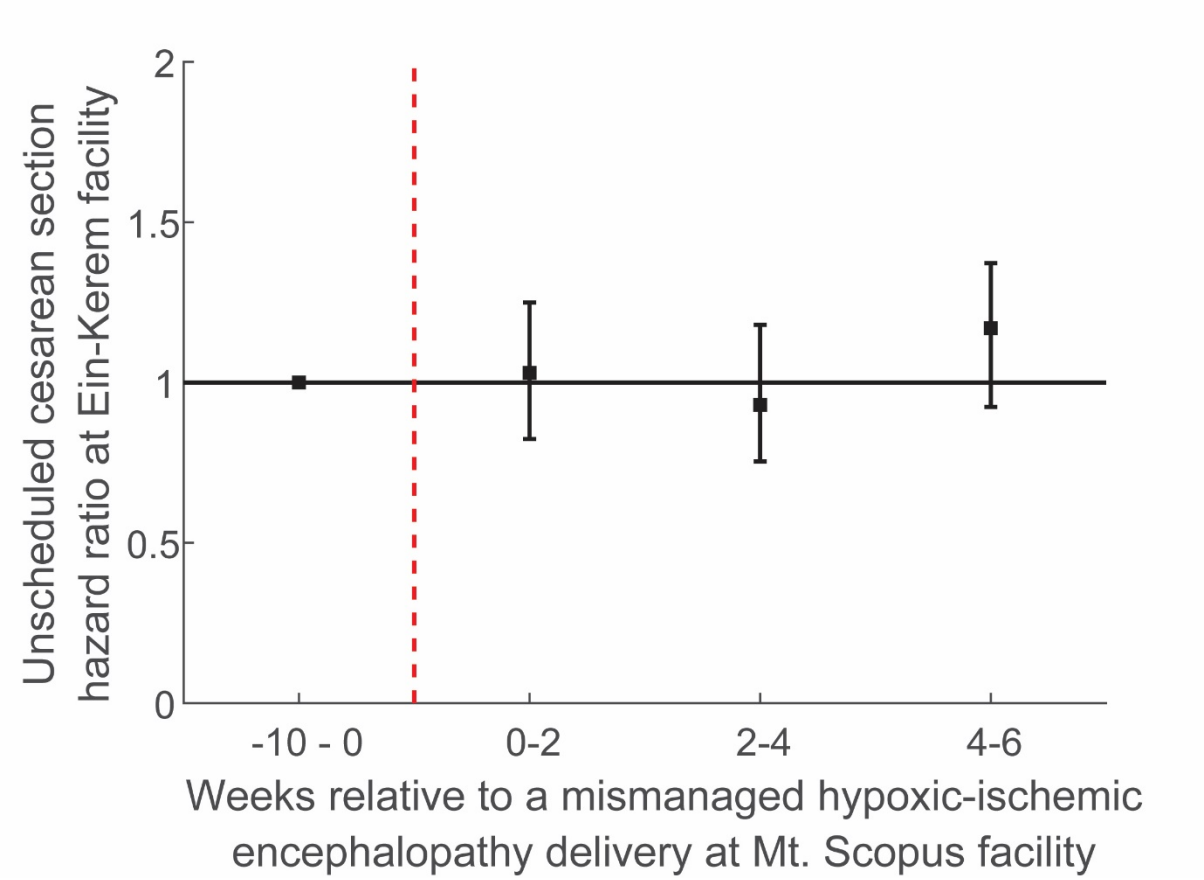
Appendix 3. Hazard ratio (HR) of cesarean deliveries at a control facility is not significantly larger than 1 after mismanaged hypoxic-ischemic encephalopathy deliveries at the reported facility. *Red line* denotes events of obstetric mismanaged hypoxic-ischemic encephalopathy deliveries at the reported facility (Mt. Scopus). The HR of cesarean deliveries was assessed in following weeks at a different facility (Ein-Kerem) to control for possible environmental factors and was not found to be significantly different than 1 (0-2: HR = 1.03, 95% CI 0.82 –1.25, 2-4: HR = 0.93, 95% CI 0.76 – 1.18, 4-6: HR = 1.17, 95% CI 0.93 – 1.37).



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Appendix 4. Statistical analysis.

Assessing the significance of unscheduled cesarean deliveries' rate change following hypoxic-ischemic encephalopathy delivery. To assess the significance of change in unscheduled cesarean deliveries' rate following a hypoxic-ischemic encephalopathy event (separately for obstetric mismanaged and non-mismanaged deliveries) we performed the following permutation test. First, all deliveries were sorted according to the time of delivery and indexed. Let N be the number of hypoxic-ischemic encephalopathy deliveries. Denoted by i_j, $j \in \{1 \dots N\}$, the index of hypoxic-ischemic encephalopathy incidents, we considered as surrogate-incidents all indexes of the N-tuple of deliveries i'_j that were equally spaced in the index space, such that $i'_{j+1} - i'_j = i_{j+1} - i_j \; \forall j < N$. This generated tuples of deliveries that were similarly spaced in time as the original hypoxic-ischemic encephalopathy deliveries. For each surrogate-incidents tuple, we compared the mean rate of unscheduled cesarean deliveries following the surrogate-incidents to that mean rate preceding these surrogate-incidents. Because of boundary conditions, we did not consider the small fraction of tuples in which the time of the first surrogate incident i'_1 was less than 10 weeks from the first delivery in the dataset, precluding us from estimating the baseline rate. Similarly, we did not consider the small fraction of tuples, in which we were similarly unable to compute the rate of events following the last surrogate incident, i'_N. This procedure yielded a null-hypothesis distribution of differences in the rates of unscheduled cesarean deliveries following a hypoxic-ischemic encephalopathy delivery and we computed the percentile of difference in the rates of unscheduled cesarean deliveries in view of this distribution. We note that this permutation

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statistical test is more conservative than a Binomial test, which yielded qualitatively similar results.

Confidence intervals for HRs and unscheduled cesarean deliveries' rate. We used bootstrapping to compute the 95% CIs of unscheduled cesarean deliveries' rates (figure 1) and HR (figure 2) in a given period of time before or after obstetric mismanaged and non-mismanaged hypoxic-ischemic encephalopathy deliveries, independently. Let N be the number of hypoxic-ischemic encephalopathy deliveries. Denoting by i_j, $j \in \{1 \dots N\}$, the index of hypoxic-ischemic encephalopathy delivery, we considered, independently for each event, the empirical number of labors n_i and the respective ratios of unscheduled cesarean deliveries p_i in the given time period. We used these empirical values as parameters for a binomial distribution from which we simulated 10^5 independent, random draws for each incident. The average over the values drawn per incident, $\frac{\sum_{j=1}^{N} x_j}{\sum_{j=1}^{N} n_j}, s.t. x_j \sim Bin(p_j, n_j)$, was used to construct a simulated distribution. The 2.5 and 97.5 percentiles of this distribution were used for estimating the CI.

Comparing HRs of obstetric mismanaged and non-mismanaged hypoxic-ischemic encephalopathy deliveries. To estimate whether the HR was significantly different following obstetric mismanaged and non-mismanaged hypoxic-ischemic encephalopathy deliveries in a given time period (e.g. 2-4 weeks) we used one-sided Wilcoxon rank sum test.

Estimating the time-scale and magnitude of increase in unscheduled cesarean deliveries following obstetric mismanaged hypoxic-ischemic encephalopathy deliveries. To estimate the time-scale and the extent of increase in unscheduled cesarean deliveries associated with obstetric mismanaged hypoxic-ischemic encephalopathy deliveries, an exponential decay

model was fitted to the sequence of deliveries. The model assumes that there exists a base-rate of unscheduled cesarean deliveries b which, following the incidents, is increased by a constant factor and then decays exponentially back to the baseline with every subsequent delivery, such that the probability of an unscheduled cesarean delivery at the n^{th} delivery following an incident is given by:

$$\Pr[n^{th} \text{ delivery is unscheduled cesarean}] = b + a\frac{e^{-n/\tau}}{\tau} \text{ (Eq. 1)}$$

The parameter τ denotes the timescale of the change in behavior (in units of deliveries) and the parameter a denotes the total number of excessive unscheduled cesarean deliveries after a long period of time ($n \to \infty$).

The value of b was estimated by considering the average rate of unscheduled cesarean deliveries in the ten-week period prior to obstetric mismanaged hypoxic-ischemic encephalopathy deliveries (b = 0.086, 95% CI = 0.072 – 0.10); the values of a and τ were estimated using the method of maximum likelihood over all deliveries in the period of six weeks following the obstetric mismanaged hypoxic-ischemic encephalopathy deliveries. The saturation value of the function (a in Eq. 1) is 17 (95% CI 8 – 27; $p < 0.01$), indicating that each obstetric mismanaged hypoxic-ischemic encephalopathy delivery resulted in approximately additional 17 ECDs. The rise time (τ in Eq. 1) was 210 (95% CI 88 – 322), which corresponds to approximately 17 days. To assess the significance of a ($a > 0$), we simulated the null hypothesis ($a = 0$) 10,000 times and used this simulation to compute the probability of obtaining a value of a that is larger than observed ($p < 0.01$). To estimate the confidence intervals for a and τ we used parametric bootstrapping: we simulated the model 10,000 times (Eq. 1) with the estimated parameters and recomputed these parameters from each

of the simulations. To estimate the confidence interval for b we used the empirical values of number of deliveries (n_i) and rate of emergent cesarean deliveries (p_i) following each of the events $(i \in \{1,2,3\})$ as parameters for a binomial distribution from which we simulated 10^5 independent, random draws for each incident. The average over the values drawn per incident, $\frac{\sum_{i=1}^{3} x_i}{\sum_{i=1}^{3} n_i}, s.t. x_i \sim Bin(p_i, n_i)$, was used to construct a simulated distribution. The 2.5 and 97.5 percentiles of this distribution were used for estimating the CI.

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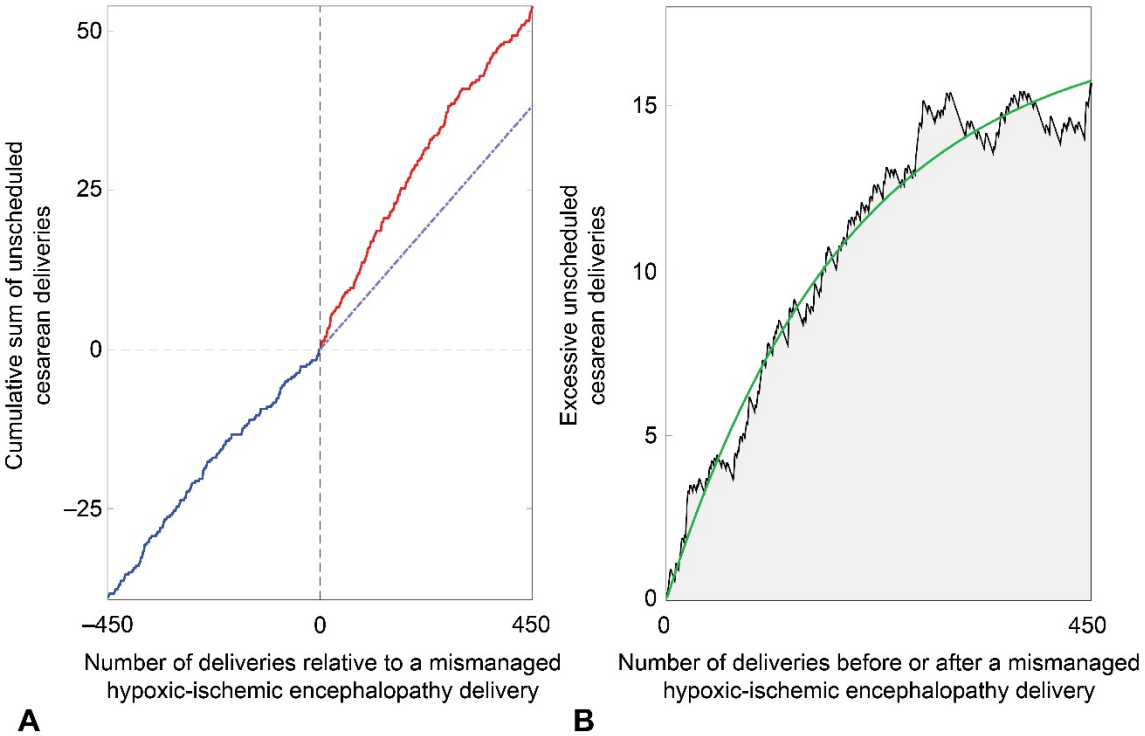
Appendix 5. The dynamics of change in unscheduled cesarean deliveries' rate after an obstetric mismanaged hypoxic-ischemic encephalopathy delivery.

A. The mean cumulative sum of unscheduled cesarean deliveries. *Blue solid line* denotes the mean cumulative sum of unscheduled cesarean deliveries prior to obstetric mismanaged hypoxic-ischemic encephalopathy deliveries; *Red line* denotes the mean cumulative sum of unscheduled cesarean deliveries after obstetric mismanaged hypoxic-ischemic encephalopathy deliveries; *Blue dashed line* denotes the *predicted* mean cumulative sum of unscheduled cesarean deliveries based on the rate of unscheduled cesarean deliveries in the 10 weeks prior to obstetric mismanaged hypoxic-ischemic encephalopathy deliveries. Zero index at the abscissa denotes the time of an obstetric mismanaged hypoxic-ischemic encephalopathy delivery. **B. Number of excessive caesarean deliveries**. *Black line* denotes the difference between the mean cumulative sum of unscheduled cesarean deliveries (*red line* in **A**) and the predicted mean cumulative sum of unscheduled cesarean deliveries (*dashed blue line* in **A**). *Green line* is an exponential fit to the excessive unscheduled cesarean deliveries over time (measured in units of deliveries) relative to prediction (i.e. fitted to *black line*). The saturation value of the exponential fit denotes the total excessive number of unscheduled cesarean deliveries, 17 unscheduled cesarean deliveries for each obstetric mismanaged hypoxic-ischemic encephalopathy delivery. The width of the fitted curve is indicative to the number of deliveries that were associated with an increased rate of unscheduled caesarean deliveries, following an obstetric mismanaged hypoxic-ischemic encephalopathy delivery, estimated as 210 deliveries (approximately 17 days). See Appendix 4 for details.



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