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Integrating maternity care through bundled payments In the Netherlands: early results and policy lessons

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Integrating Maternity Care Through Bundled Payments In The Netherlands: Early Results And Policy Lessons

ABSTRACT **Bundled payments are increasingly used globally to move health care delivery in a value-based direction. However, evidence remains scant in key clinical areas. We evaluated bundled payments for maternity care in the Netherlands during the period 2016–18. We used a quasi-experimental difference-in-differences design to measure the association between the bundled payment model and changes in key clinical and economic outcomes. Bundled payments were associated with an increase in outpatient, midwife-led births and a reduction in in-hospital, obstetrician-led births, along with changes in the use of labor inductions and planned versus emergency cesarean deliveries. Total spending on maternity care decreased by US$328 (5 percent) per pregnancy. No changes in maternal or neonatal health outcomes were observed. Several policy lessons emerged. First, bundled payments appeared to help affect providers' behavior in the maternity care setting. Second, bundled payments seemed to exert heterogeneous effects across participating maternity care networks, as the same financial incentive translated into different changes in clinical practices and outcomes. Third, alternative payment models should be designed with clear goals and definitions of success to guide evaluation and implementation.**

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Across the globe, bundled payment models are increasingly being implemented in an effort to slow health care spending and improve the value of care.[1] Bundled payment is an alternative payment model in which providers are paid a prospectively determined fee or budget for an episode of care (for example, pregnancy and delivery) and thus share in potential losses and savings. The theory of bundled payment models is that providers are best positioned to work together to deliver higher-value care and reduce the use of lower-value services by sharing financial incentives to save money and earn part of the savings under the bundled payment.[1–4] Achieving this—ideally with improved health or no detrimental effects on health—could make the health care system more efficient and sustainable and would support transitions toward integrated and value-based care. However, empirical evidence on the effects of bundled payment on spending and outcomes has been broadly mixed to date.[1] Importantly, such evidence has also been scant in many important clinical areas.

Bundled payment models have been implemented in various health care settings and countries during the past twenty-five years—for example, the PROMETHEUS and Bundled Payments for Care Improvement initiatives in the US[5–9] and initiatives in Taiwan,[10] Denmark,[11] and Portugal.[12,13] About two-thirds of the evaluations on these bundled payment models that examined

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changes in spending reported spending (growth) reductions.[1] Associated changes in quality of care were generally favorable, although they were modest or not statistically significant. Two studies reported a negative effect on quality.[1]

Maternity care is an important clinical area in which bundled payments are gaining increased traction,[14–18] as childbirth is often the most common reason for inpatient spending in the population under age sixty-five. Still, empirical evidence on the effects of bundled payments remains particularly scarce in maternity care,[19] with only two US studies to date. One study reported a reduction in neonatal intensive care unit admissions and increased screening and prevention activities,[17] and the other reported reduced spending and no changes in health.[18]

In 2006, managed competition was introduced in the Netherlands, alongside a package of reforms to reinforce market mechanisms within the health care system.[20] Every citizen is obliged to take up basic health insurance. All health insurers are obliged to offer a fixed package of basic health insurance coverage (annually determined by the Ministry of Health, Welfare, and Sport) and are not allowed to deny anyone this basic health plan (by law). Health insurers can compete with each other in terms of price for the basic health plan, but prices may not differentiate between consumers of one health insurer. Citizens are free to choose from which health insurer they want to buy their basic health plan each year. This system gives health insurers the incentives and tools to act as proactive buyers and to steer the providers they contract with toward providing high-quality care for a reasonable price. Part of the expense of this system of mandatory health insurance is covered by the premiums paid by consumers and citizens, and the other part is covered through centrally collected income-related taxes, which are redistributed to health insurers as risk-adjusted capitation payments.[20]

In the Netherlands, bundled payments for maternity care were experimentally introduced in 2017 as part of a series of policy interventions to improve the coordination and quality of maternity care and lower perinatal mortality, which was relatively high in the Netherlands compared with other European countries.[21–29] Maternity care is mainly provided by midwives, obstetricians, and postpartum care providers who operate within regions called maternity care networks. The Netherlands has a strong history and culture of home births, which has strengthened the position of midwives. However, at present, roughly 14 percent of births take place at home and 86 percent in the hospital (either obstetrician led as an inpatient or midwife led as an outpatient).[30] The bundled payment model for maternity care includes all prenatal, natal, and postnatal care services delivered by midwives, obstetricians, and postpartum care providers.[23] A price distinction is made between regular and complex care. Care for the newborn, outside of standard postpartum care, is not included in the bundle. Adoption of the bundled payment model requires the establishment of a new provider-led entity, the integrated maternity care organization, in which midwives, obstetricians, a hospital, and postpartum care providers are united. The organization negotiates contracts with insurers and subcontracts with providers to provide the contracted care. Six regions with a history of interdisciplinary collaboration voluntarily adopted this bundled payment model in 2017. More details on the health and maternity care system in the Netherlands and the bundled payment model are in online appendix 1.[31]

We evaluated the Dutch maternity care bundled payment model through its first two years, studying the six regions that adopted the model. We focused on changes in maternity care use, spending, and maternal and neonatal health outcomes attributable to the payment reform, using a quasi-experimental, difference-in-differences approach.

Study Data And Methods

DATA SOURCES AND STUDY PERIOD This study used data from the Data-Infrastructure for Parents and Children, in which multiple nationwide Dutch administrative data sets are linked.[32] This source combines data from several sources, including an all-payer claims database (Vektis);[33] data on maternal and neonatal health, quality of maternity care, and clinical information (Perined);[30] and the System of Social Statistical Datasets provided by Statistics Netherlands, containing sociodemographic characteristics.[34]

The three linked data sources in the Data-Infrastructure for Parents and Children cover 92 percent of all pregnancies in the Netherlands during the study period (appendix table A2).[31] We checked the characteristics of the sample in our linked data set with the characteristics in the complete registry of Statistics Netherlands, to make sure that the sample in the Data-Infrastructure for Parents and Children was not a selective sample of the general population (appendix table A3).[31] More details are in appendix 2.[31]

The study period spanned 2016–18, with 2016 as the preintervention period and the third quarter of 2017 through 2018 as the postintervention period. The first two quarters of 2017 were excluded from the postintervention period (a

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Our findings add novel evidence and generally support the results of other studies evaluating bundled payment models.

washout period), given the early phases of implementation. For our spending outcome, data from Vektis were not yet available for the third and fourth quarters of 2018 at the time of this study, and therefore the postintervention period was the third quarter of 2017 through the second quarter of 2018 for the spending analysis.

STUDY SAMPLE The six maternity care networks that implemented bundled payments in 2017 (integrated maternity care organizations) made up the intervention group, and the nonparticipating maternity care networks were potential controls.

Our initial, linked data set contained 616,615 pregnancies in total. Applying exclusion criteria led to a study sample of 493,415 pregnancies (see appendix 2.3 and figure A4).[31] We derived matched controls for the intervention groups at the maternity care network level, using k-means clustering, based on the urbanization degree of patients' households and the annual number of pregnancies served by the maternity care networks (see appendix 3 for details on the matching procedure and appendix figure A2 for the result of the match).[31] The final sample contained 139,849 pregnancies: 26,763 in the intervention group and 113,086 in the matched control group. A flow chart (CONSORT diagram) of the sample derivation is in appendix figure A4.[31]

OUTCOMES We focused on key clinical and economic outcome variables in three categories: maternity care use, maternity care spending, and maternal and neonatal health outcomes. These were based on the literature,[35–38] advice of our Scientific Guidance Committee (consisting of senior researchers and health care professionals in maternity and perinatal care and health economics), and data availability.

Maternity care use measures consisted of place of birth, labor induction, and planned and emergency cesarean delivery. Place of birth was divided into three categories: as an inpatient in the hospital (obstetrician-led), as an outpatient in the hospital (midwife-led), and home (midwife-led). Maternity care spending reflected total spending on maternity care, measured in euros and converted to US dollars. Maternal and neonatal health outcome measures included an Apgar score below 7 after five minutes, low birthweight, preterm birth, postpartum hemorrhage, and perineal rupture. Maternal and perinatal mortality were not examined, as these outcomes were very rare.

COVARIATES Based on covariates from previous studies[37,39–41] and data availability, we considered the characteristics shown in exhibit 1, to assess balance between the intervention and control groups—before and after matching at the maternity care network level.

DESCRIPTIVE ANALYSES We first examined descriptive statistics of the outcomes in the intervention and control groups. We plotted unadjusted trends over time to assess the preintervention trends. Next, we compared the population characteristics of the intervention and control groups, both before and after matching, using standardized differences. We also looked at the population characteristics of the intervention and matched control groups in the pre- and postintervention periods (appendix table A5).[31] This enabled us to assess whether the groups were comparable and to determine that potential outside factors (for example, changes in the population composition) likely did not exert a large influence.

QUASI-EXPERIMENTAL ANALYSES To measure the association between the bundled payment model and changes in our key clinical and economic outcomes, we used a quasi-experimental, difference-in-differences design. We focused on the interaction of the treatment indicator and postintervention period for each outcome. We estimated the average treatment effect for the treated for our study population (not the average treatment effect, as this was a voluntary payment reform and the intervention group was nonrandom). Details on the model are in appendix 4.[31]

It was not feasible to statistically test the parallel trend assumption with annual outcomes, as there was only one annual data point in the preintervention period (that is, 2016). However, we showed unadjusted preintervention trends at the quarterly level in 2015 and 2016 for each of our outcomes, to aid visual inspection of the extent to which the intervention and control maternity care networks exhibited parallel or divergent trends before the bundled payments. We found that, in general, unadjusted preintervention trends for most outcomes were largely

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EXHIBIT 1

Characteristics of pregnant women and their partners among maternity care networks (MCNs) participating and not participating in the bundled payment model for maternity care in the Netherlands, before and after matching, 2015–18

	Before matching			After matching		
	Participating MCNs	Nonparticipating MCNs	Standardized difference (unadjusted)	Participating MCNs	Nonparticipating MCNs	Standardized difference (unadjusted)
No. of MCNs	6	64	—[a]	6	24	—[a]
Average no. of pregnancies per MCN[b]	7,368	8,763	—[a]	4,461	4,712	—[a]
Mother						
Age, years	30.8	31.2	−0.1	30.8	31.0	−0.3
Educational level, %						
Low	5.2	4.8	0.0	4.9	4.4	0.0
Middle	54.0	49.6	0.0	54.1	52.1	0.0
High	40.9	45.6	0.0	40.9	43.5	0.0
Country of origin, %						
The Netherlands	74.5	68.9	0.0	74.3	74.0	0.0
Other Western country	11.0	10.7	0.0	11.0	9.6	0.0
Non-Western country	14.6	20.5	0.0	14.7	16.3	0.0
Health spending 2 years before delivery, US$	2,229.9	2,284.7	46.4	2,207.4	2,195.3	−20.8
Father						
Age, years	33.7	34.2	−0.2	33.7	33.9	−0.3
Educational level, %						
Low	5.1	5.4	0.0	4.9	4.9	0.0
Middle	60.4	54.0	0.0	60.8	57.3	0.0
High	34.5	40.7	0.0	34.3	37.8	0.0
Country of origin, %						
The Netherlands	75.5	70.6	0.0	75.3	74.7	0.0
Other Western country	9.5	9.2	0.0	9.4	8.5	0.0
Non-Western country	15.0	20.3	0.0	15.3	16.7	0.0
Health spending 2 years before delivery, US$	731.8	757.3	22.9	721.9	704.3	0.0
Household, %						
Standardized household income percentile						
1–20	14.6	16.4	0.0	14.4	15.6	0.0
21–40	11.7	12.4	0.0	11.6	12.4	0.0
41–60	18.8	18.1	0.0	18.5	19.0	0.0
61–80	27.4	24.8	0.0	27.3	26.6	0.0
81–100	27.5	28.3	0.0	28.1	26.3	0.0
Urbanization degree						
1 (highly urban)	4.1	29.0	−0.1	4.2	11.7	−0.1
2	53.6	28.5	0.2	53.1	36.2	0.2
3	8.8	16.9	−0.1	8.9	21.3	−0.1
4	27.2	18.1	0.1	27.7	21.5	0.1
5 (rural)	6.2	7.5	0.0	6.2	9.3	0.0

SOURCE Authors' analysis of the matched study sample derived from the Data-Infrastructure for Parents and Children at the pregnancy level. The Data-Infrastructure for Parents and Children is described in the text, with its components described in notes 30 and 32–34. **NOTES** Participating MCNs were matched to nonparticipating MCNs through k-means clustering based on urbanization degree of the region and number of pregnancies served annually. Standardized differences are shown to compare the population characteristics of the intervention (participating MCNs) and control (nonparticipating MCNs) groups before and after matching (described in the text). According to the standardized differences after matching displayed here, population characteristics were deemed comparable for the main analysis, and additional matching at the pregnancy level was not necessary. Spending was measured in euros and converted to US dollars. [a]Not applicable. [b]After matching, exclusion criteria were applied, which led to a smaller study sample, as described in appendix 2.3 (see note 31 in text).

parallel for most of the preintervention period, with some suggestion of possible anticipatory behavior but no sustained divergence of preintervention trends (appendix figure A5).[31] A 2018 study also examined whether the intervention regions differed in terms of utilization, spending, and health outcomes relative to the other regions in the period before the introduction of the bundled payments.[22]

In adjusted analysis, we estimated the difference-in-differences model (appendix 4)[31] within each cluster of participating maternity

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Bundled payments seem to be an effective tool to guide providers' behavior in the maternity care setting.

care networks with matched nonparticipating maternity care networks, and we pooled each subclass-specific difference-in-differences estimate to derive an overall difference-in-differences estimate for each outcome.

SENSITIVITY ANALYSES To test the robustness of our results, we performed three sensitivity analyses. We first assessed the robustness of findings to alternative control groups. Instead of the matched control group, we used a different control group that comprised the top ten nonparticipating maternity care networks with a high level of collaboration, plausibly similar to maternity care networks in the intervention group, based on expert opinion. The level of collaboration is potentially associated with both the establishment of an integrated maternity care organization and the outcomes. By using this alternative control group, we were able to test whether the observed changes in outcomes in our main analysis were associated with the bundled payment model or with the high level of collaboration in the participating maternity care networks.

Second, we evaluated the associations between bundled payments and outcomes for each participating maternity care network individually to understand whether effect estimates were driven by outlier maternity care networks.

Third, we examined heterogeneity in the estimated treatment effects of the bundled payment model in different segments of the postintervention period. This provides more insight into the stability of estimates over time, and notably the pace at which this payment model may lead to changes in clinician behavior. We looked at the associations in the third and fourth quarters of 2017 (T1), the first and second quarters of 2018 (T2), and the third and fourth quarters of 2018 (T3) compared with the third and fourth quarters of 2016 (T0).

LIMITATIONS We note several limitations. First, despite our matching strategy, our estimates may have been susceptible to unobserved confounding. Participating maternity care networks may have been different on unobserved attributes, such as culture and collaboration, relative to the nonparticipating maternity care networks. Participants are regions that consider themselves as innovators and early adopters, and they voluntarily participated in bundled payments. To limit the possible influence of unobserved confounding, we carefully selected the matching variables and checked the population characteristics of both groups in our sample to make sure that these were comparable. In addition, we performed the sensitivity analysis with an alternative control group to confirm that the high level of collaboration in participating maternity care networks was not driving our estimates.

A second limitation was the relatively short follow-up period of two years. At the end of the study period, the implementation process was still active in the participating maternity care networks, and not all potential implications were measurable yet. As of January 1, 2023, the bundled payment model was permanently implemented as part of the regular payment system for maternity care in the Netherlands, alongside the traditional fee-for-service model. Providers together with health insurers jointly decide which payment model they want to adopt. Furthermore, it is unknown to what extent each individual professional experiences exposure to the incentives of the bundled payment model in daily practice. Despite this limitation, understanding the initial results of payment reform remains important, especially given that reductions in spending and changes in utilization appeared fairly early in the implementation. Early lessons from this study can provide relevant feedback for this experiment and can inform decisions regarding other payment reform initiatives.

Third, we lacked data on patients' experiences with maternity care and the quality of postpartum care at home. The experiences of mothers (to-be) and their partners are an important indicator for the quality of maternity care. Unfortunately, there is no standardized measure available for this in the Netherlands that could have been included in this study. This seems to be a common issue, as patients' experiences are rarely included in evaluations of bundled payment models.[1] Given the importance of patients' experiences and the quality of postpartum care within maternity care, it would be preferable to be able to include these data in future evaluations.

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Study Results

POPULATION CHARACTERISTICS After matching, the study population consisted of 139,849 pregnancies (26,763 in the intervention group and 113,086 in the control group). Characteristics of the participating maternity care network populations and those in the matched control maternity care networks were generally comparable (exhibit 1). Imbalance was evident in household urbanization degree (4.2 percent highly urbanized in the intervention group, 11.7 percent in the control group). This was among the variables that we adjusted for in the analysis (see appendix 3 and figure A3).[31]

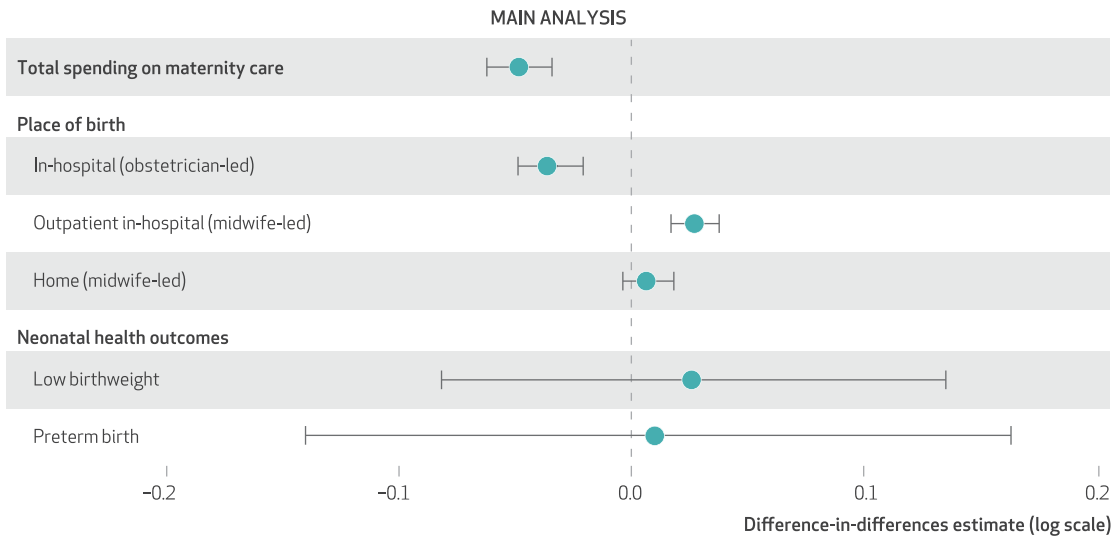
MATERNITY CARE USE In adjusted analysis, participants in the bundled payment program exhibited a statistically significant increase in outpatient in-hospital (midwife-led) deliveries of 2.74 percentage points relative to control (adjusted difference-in-differences estimate in log scale: 0.03; 95% confidence interval: 0.02, 0.04). This was offset by a similar, significant decrease in in-hospital (obstetrician-led) deliveries of −3.52 percentage points relative to control (difference-in-differences estimate in log scale: −0.03; 95% CI: −0.05, −0.02) (exhibits 2 and 3). No relative change in home deliveries was observed in association with the intervention. In addition, the share of deliveries with induced labor decreased by 1.41 percentage points in participating maternity care networks relative to control (difference-in-differences estimate in log scale: −0.01; 95% CI: −0.03, 0.00), as well as the share of deliveries by planned cesarean delivery, which decreased by 1.16 percentage points relative to control (difference-in-differences estimate in log scale: −0.01; 95% CI: −0.02, 0.00). The share of deliveries by emergency cesarean delivery increased by 1.33 percentage points in participating maternity care networks relative to control (difference-in-differences estimate in log scale: 0.01; 95% CI: 0.01, 0.02).

MATERNITY CARE SPENDING Participating in the bundled payment program was significantly associated with a relative decline of US$328 (€311) per pregnancy, or 5 percent, in total spending on maternity care (adjusted difference-in-differences estimate in log scale: −0.05; 95% CI: −0.06 to −0.03) (exhibits 2 and 3). Specifically, total spending on maternity care grew in both the intervention and control groups, but spending growth was slower in the intervention group. To the extent that there was some anticipatory behavior attributable to the intervention in the latter part of 2016 (the beginning of more outpatient deliveries coinciding with less spending), the estimated effect here would be more conservative.

HEALTH OUTCOMES FOR MOTHER AND CHILD Participation in the bundled payment model was

EXHIBIT 2

Changes in total spending on maternity care, place of birth, and neonatal health outcomes in the Netherlands associated with participation in the bundled payment model for maternity care in 2017 and 2018



SOURCE Authors' analysis of the matched study sample derived from the Data-Infrastructure for Parents and Children at the pregnancy level. The Data-Infrastructure for Parents and Children is described in the text, with its components described in notes 30 and 32–34.
NOTES The figure is a forest plot displaying changes in outcomes associated with participation in the bundled payment model for maternity care, for the main analysis. Changes in outcomes are presented in adjusted difference-in-differences estimates in log scale; whiskers indicate 95% confidence intervals.

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EXHIBIT 3

Associations between maternity care network (MCN) participation in the bundled payment model for maternity care and changes in utilization, spending, and health outcomes in the Netherlands, 2017 and 2018

	Participating MCNs		Nonparticipating MCNs		Difference-in-differences	
Outcome variables	Baseline period	Treatment period	Baseline period	Treatment period	Point estimate	*p* value
Utilization, %						
Place of birth						
In-hospital (obstetrician-led)	70.38	67.71	69.37	70.23	−3.52	0.000
Outpatient in-hospital (midwife-led)	15.07	17.55	14.15	13.90	2.74	0.000
Home (midwife-led)	14.56	14.67	16.44	15.85	0.70	0.184
Labor induction	22.42	21.97	21.03	21.99	−1.41	0.030
Cesarean delivery	13.31	14.09	14.89	15.47	0.19	0.696
Planned	6.75	6.41	7.00	7.83	−1.16	0.004
Emergency	6.56	7.65	7.89	7.64	1.33	0.001
Spending, $US						
Total spending on maternity care	6,440	6,459	6,618	6,966	−328	0.000
Health, %						
Apgar score <7 after 5 minutes	1.03	1.07	1.24	1.24	0.04	0.749
Low birthweight	8.44	8.46	8.70	8.54	0.19	0.630
Preterm birth	4.28	4.25	4.43	4.34	0.06	0.884
Postpartum hemorrhage	5.00	5.17	4.65	5.20	−0.39	0.193
Perineal rupture	1.60	2.00	1.69	1.81	0.29	0.138

SOURCE Authors' analysis of the matched study sample derived from the Data-Infrastructure for Parents and Children at the pregnancy level. The Data-Infrastructure for Parents and Children is described in the text, with its components described in notes 30 and 32–34. **NOTES** Table shows adjusted standardized means (measured in euros and converted to US dollars) for spending and percentages for utilization and health outcomes. Point estimates are based on a standardized population (that is, if the entire sample would take up treatment or not) and show the absolute change in dollars for spending and the absolute change in percentages for utilization and health outcomes. Point estimates are adjusted. *p* values are based on the regression model with the difference-in-differences coefficients.

not significantly associated with any changes in health outcomes such as Apgar score below 7 after five minutes, low birthweight, preterm birth, postpartum hemorrhage, or perineal rupture (exhibits 2 and 3, appendix figure A6).[31]

Forest plots of the adjusted difference-in-differences estimates in log scale with corresponding 95% confidence intervals for the main analysis and sensitivity analyses for all outcomes are in appendix figure A6.[31]

SENSITIVITY ANALYSES

▶ **ROBUSTNESS TO ALTERNATIVE CONTROL GROUP:** Comparing the participating maternity care networks with a control group of the top ten maternity care networks with a high level of collaboration yielded results similar to those of the main analysis (exhibit 4, appendix figure A6).[31]

▶ **HETEROGENEITY ACROSS PARTICIPANTS:** Associations between the bundled payment model and outcomes displayed small differences across the participating maternity care networks. For example, estimates for labor inductions demonstrated some variability across the participating maternity care networks (appendix figure A6).[31] For planned cesarean deliveries, a significant decrease was observed in one maternity care network, and for emergency cesarean deliveries, a significant increase was observed in one maternity care network (not the same region). The other five regions showed no change in planned or emergency cesarean deliveries (appendix figure A6).[31] For total maternity spending, the aggregate slowdown relative to control was driven by four of the six participating maternity care networks (exhibit 4). For health outcomes, the results in sensitivity analyses were generally similar to those of the main analysis (appendix figure A6).[31]

▶ **HETEROGENEITY BY POSTINTERVENTION PERIOD:** Estimated treatment effects of the bundled payment model in different segments of the postintervention period showed similar results for most outcomes (for example, place of birth, emergency cesarean deliveries, and spending) and variation in results for some (for example, planned cesarean deliveries and labor inductions) (exhibit 4, appendix figure A6).[31]

Discussion

In the first two years of the maternity care bundled payment model in the Netherlands (2017–18), participation in the model was associated with a shift from obstetrician-led, hospital-based deliveries to midwife-led, outpatient deliveries; a decrease in labor inductions; and a decline in planned cesarean deliveries that was partly offset by an increase in emergency cesarean deliveries.

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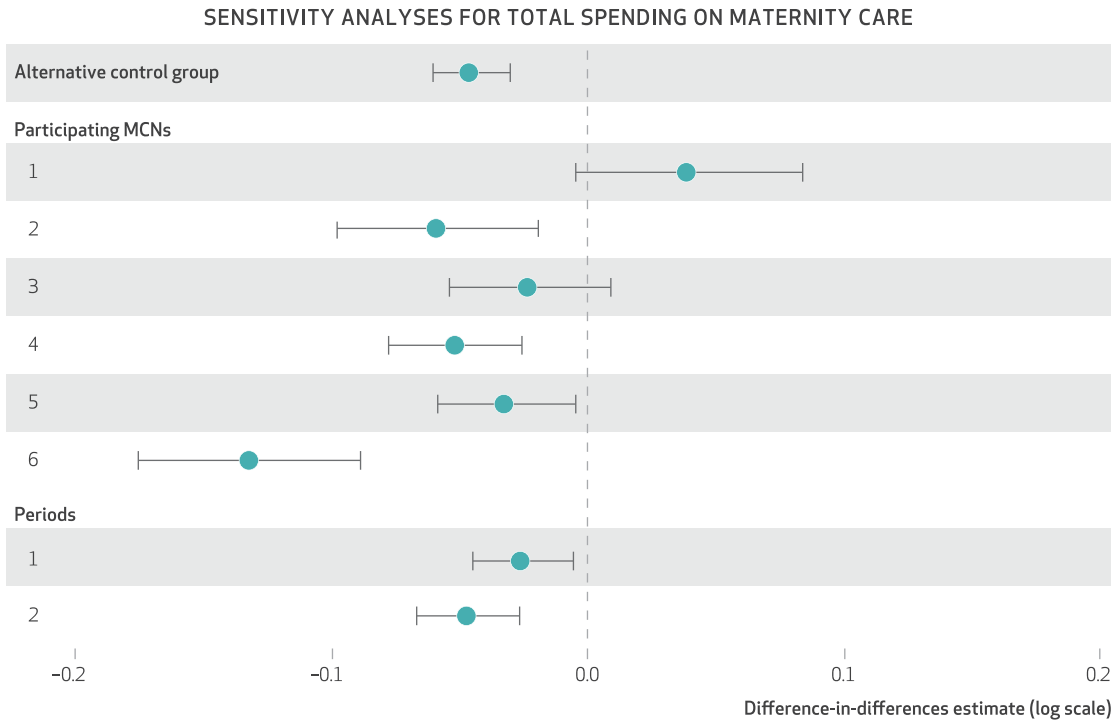
EXHIBIT 4

Changes in total spending on maternity care in the Netherlands associated with participation in the bundled payment model for maternity care in 2017 and 2018, compared with an alternative control group, across participating maternity care networks (MCNs), and over time



SOURCE Authors' analysis of the matched study sample derived from the Data-Infrastructure for Parents and Children at the pregnancy level. The Data-Infrastructure for Parents and Children is described in the text, with its components described in notes 30 and 32–34. **NOTES** The figure is a forest plot displaying changes in total spending on maternity care associated with participation in the bundled payment model, for the sensitivity analysis in which we used an expert-based control group based on the level of collaboration; one in which we looked at the participating maternity care networks individually (as opposed to the pooled associations in the main analysis) to assess participant heterogeneity; and one in which we looked at changes earlier and later in the postintervention period (represented by periods 1 and 2 in the figure, which correspond to T1 and T2 in the text). For "Participating MCNs," numbers correspond with the six MCNs that adopted bundled payment in 2017. Changes in outcomes are presented in adjusted difference-in-differences estimates in log scale; whiskers indicate 95% confidence intervals.

In aggregate, these changes in utilization corresponded to reduced maternity spending growth by about 5 percent, with no associated decrements in health outcomes for the mother or the child. Sensitivity analyses largely supported the findings of the main analysis, with variability between maternity care networks and, for some outcomes, over time.

COMPARISON WITH OTHER STUDIES Our findings add novel evidence and generally support the results of other studies evaluating bundled payment models, both in maternity care[19] and in other areas of health care.[1,9] Similar to most other studies on the association between bundled payments and spending,[1,9] we found a reduction in spending among participants in the bundled payment model. Estimates in these studies varied widely, from low, single-digit reductions in spending to roughly 30 percent decreases. However, studies looking at spending effects in the first one to three years generally found estimates closer to the 5 percent reduction that we found in this study.[1,9] Studies looking at longer follow-up periods generally found an increase in savings over time.[42,43] It is important to note that the savings we measured may have been an underestimate. This is because the additional overhead that participating maternity care networks received to set up and manage their organizations was included in their total spending. Our finding that health outcomes did not change after two years is also consistent with the results of other studies that found no effects of bundled payment models on quality. Two prior studies reported a negative effect on quality,[1] which we specifically did not find.

FUTURE RESEARCH Future research on bundled payments in maternity care should focus on longer-term effects and investigate heterogeneity by subpopulation and provider context.

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Alternative payment models should be designed with clear goals, ideally defined before implementation, with all parties involved.

Given that the effects of the bundled payment model may be different for low-risk and high-risk pregnancies, as well as for regions with different characteristics, assessing treatment effect heterogeneity will likely yield important new insights. This should also improve understanding of the mechanisms behind the bundled payment model's plausible effects. For example, in one participating maternity care network, we observed an increase in emergency cesarean deliveries, whereas in another maternity care network, we observed a decrease in planned cesarean deliveries (appendix figure A6).[31] At this point, it is unclear what caused these findings, as this did not seem to be the result of a policy change regarding cesarean deliveries in one maternity care network. An increase in emergency cesarean deliveries could, however, negatively affect health outcomes and should therefore be investigated further in the future.

It is also important to consider other methods of evaluation in the future. Evaluation methods are currently focused on quantitative methods, whereas qualitative methods may better assess changes in collaboration, joy in the workforce, patient experience, and changes in care practices. Along with these factors, evaluations should also pay attention to possible undesired and potentially harmful effects and how they can be explained (for example, the observed increase in emergency cesarean deliveries in this study).

POLICY IMPLICATIONS These results offer three important lessons for policy makers, payers, and providers who are considering alternative payment models in health care. First, bundled payments seem to be an effective tool to guide providers' behavior in the maternity care setting, even after a limited follow-up period of two years. In previous qualitative studies that we conducted, care professionals reported positive experiences and stated that collaboration intensified through shared accountability and commitment to shared goals.[22–25] Professionals also reported task shifting from obstetricians to midwives as a focal point of the transition toward integrated maternity care. These changes in care practices as a direct result of the bundled payment model may explain the observed changes in utilization and spending outcomes. Adding more nonfinancial supports alongside the financial and quality incentives of the bundled payment model might further stimulate provider behavior change.[44] This is relevant for both the Dutch initiative and payment reform initiatives around the world.

Second, bundled payments seemed to exert heterogeneous effects across participating maternity care networks. Heterogeneity in outcomes can be explained by the ways in which the incentives from the bundled payment model were translated differently into practice, which seems to be influenced by contextual factors. Although each participating maternity care network was exposed to the same financial incentive and all reported intensified collaboration among providers, they implemented different interventions (for example, a multidisciplinary electronic patient record, a joint consultation hour, and projects regarding task shifting). It remains unclear through which mechanisms maternity care networks decide what interventions to implement and how these interventions affect outcome heterogeneity. This motivates further research into the role of contextual differences across participating maternity care networks,[23] which is relevant for payment reform initiatives around the globe.

Third, alternative payment models should be designed with clear goals, ideally defined before implementation, with all parties involved. Moreover, it is important to define when the reform will be considered successful[45]—for example, if quality is not affected, but spending is contained. In the Dutch experiment, the rationale was clear (that is, enhance multidisciplinary collaboration to improve quality), but the policy goals were not formulated explicitly (enough). This lack of explicit goals has led to a situation in which policy makers and other stakeholders all have a (slightly) different expectation of the experiment and can select results to support their given positions. This complicates drawing clear, broadly agreed-on conclusions on whether or not the experiment has been successful. In turn, this hinders policy decisions on whether the uptake of the bundled payment model should be stimulated or, ultimately, become mandatory for all maternity care networks. Thus, we emphasize the importance of early evaluations such as this one, as explicit goals can still be formulated at

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this stage that can inform future evaluations and policy decisions regarding the Dutch experiment. New payment reform initiatives could benefit from stating the goals and defining success from the beginning.

Conclusion

In this first quasi-experimental evaluation of maternity care bundled payments in the Netherlands with a two-year follow-up period, participation in the intervention was associated with small changes in maternity care use and slower spending, with no observed changes in maternal and neonatal health outcomes at this point.

Although the results reported here were early and modest, our evaluation of this experiment yielded several lessons for policy makers, payers, and providers considering alternative payment models. First, bundled payments appeared to be capable of affecting providers' behavior in the maternity care setting. Second, bundled payment incentives played out differently in different contexts; more insight is needed into the mechanisms behind this treatment effect heterogeneity. Third, explicitly formulating reform goals and defining success before payment reform is helpful for determining whether the reform is successful, which in turn is key for policy decisions. ■

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NOTES

1 Struijs JN, de Vries EF, Baan CA, van Gils PF, Rosenthal MB. Bundled-payment models around the world: how they work and what their impact has been [Internet]. New York (NY): Commonwealth Fund; 2020 Apr 6 [cited 2024 Jul 2]. Available from: https://www.commonwealthfund.org/publications/2020/apr/bundled-payment-models-around-world-how-they-work-their-impact

2 Miller HD. From volume to value: better ways to pay for health care. Health Aff (Millwood). 2009;28(5):1418–28.

3 Nijagal MA, Shah NT, Levin-Scherz J. Both patients and maternity care providers can benefit from payment reform: four steps to prepare. Am J Obstet Gynecol. 2018;218(4):411.e1–6.

4 Frakt AB, Mayes R. Beyond capitation: how new payment experiments seek to find the "sweet spot" in amount of risk providers and payers bear. Health Aff (Millwood). 2012;31(9):1951–8.

5 Hussey PS, Ridgely MS, Rosenthal MB. The PROMETHEUS bundled payment experiment: slow start shows problems in implementing new payment models. Health Aff (Millwood). 2011;30(11):2116–24.

6 de Brantes F, Rosenthal MB, Painter M. Building a bridge from fragmentation to accountability—the Prometheus Payment model. N Engl J Med. 2009;361(11):1033–6.

7 Cassidy A. Health Policy Brief: Bundled Payments for Care Improvement initiative. Health Affairs [serial on the Internet]. 2015 Nov 23 [cited 2024 Jul 2]. Available from: https://www.healthaffairs.org/content/briefs/bundled-payments-care-improvement-initiative

8 Centers for Medicare and Medicaid Services. Bundled Payments for Care Improvement initiative (BPCI) fact sheet [Internet]. Baltimore (MD): CMS; 2015 Aug 13 [last updated 2016 Aug 18; cited 2024 Jul 2]. Available from: https://www.cms.gov/newsroom/fact-sheets/bundled-payments-care-improvement-initiative-bpci-fact-sheet

9 Rolnick JA, Liao JM, Emanuel EJ, Huang Q, Ma X, Shan EZ, et al. Spending and quality after three years of Medicare's bundled payments for medical conditions: quasi-experimental difference-in-differences study. BMJ. 2020;369:m1780.

10 Wang CJ, Cheng SH, Wu J-Y, Lin Y-P, Kao W-H, Lin C-L, et al. Association of a bundled-payment program with cost and outcomes in full-cycle breast cancer care. JAMA Oncol. 2017;3(3):327–34.

11 Rudkjøbing A, Vrangbaek K, Birk HO, Andersen JS, Krasnik A. Evaluation of a policy to strengthen case management and quality of diabetes care in general practice in Denmark. Health Policy. 2015;119(8):1023–30.

12 Ponce P, Marcelli D, Guerreiro A, Grassmann A, Gonçalves C, Scatizzi L, et al. Converting to a capitation system for dialysis payment—the Portuguese experience. Blood Purif. 2012;34(3-4):313–24.

13 Rocha MJ, Ferreira S, Martins LS, Almeida M, Dias L, Pedroso S, et al. Cost analysis of renal replacement therapy by transplant in a system of bundled payment of dialysis. Clin Transplant. 2012;26(4):529–31.

14 Grigg CP, Tracy SK. New Zealand's unique maternity system. Women Birth. 2013;26(1):e59–64.

15 Grigg CP, Tracy SK, Tracy M, Daellenbach R, Kensington M, Monk A, et al. Evaluating Maternity Units: a prospective cohort study of freestanding midwife-led primary maternity units in New Zealand—clinical outcomes. BMJ Open. 2017;7(8):e016288.

16 Monitor. The maternity pathway payment system: supplementary guidance [Internet]. London: NHS England; [cited 2024 Aug 8]. Available from: https://assets.publishing.service.gov.uk/media/5a7ddc7940f0b65d8b4e3f32/maternity_payment_pathway_system_supplementary_guidance.pdf

17 Berry SA, Laam LA, Wary AA, Mateer HO, Cassagnol HP, McKinley KE, et al. ProvenCare Perinatal: a model for delivering evidence/guideline-based care for perinatal populations. Jt Comm J Qual Patient Saf. 2011;37(5):229–39.

18 Kozhimannil KB, Graves AJ, Ecklund AM, Shah N, Aggarwal R, Snowden JM. Cesarean delivery rates and costs of childbirth in a state Medicaid program after implementation of a blended payment policy. Med Care. 2018;56(8):658–64.

19 de Vries EF, Scheefhals ZTM, de Bruin-Kooistra M, Baan CA, Struijs JN. A scoping review of alternative payment models in maternity care: insights in key design elements and effects on health and spending. Int J Integr Care. 2021;21(2):6.

20 Schut FT, Varkevisser M. Competition policy for health care provision in the Netherlands. Health Policy. 2017;121(2):126–33.

21 Struijs JN, de Bruin-Kooistra M, Heijink R, Baan CA. On the way to bundled payments for maternity care

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[Internet]. Bilthoven: RIVM (National Institute for Public Health and the Environment); 2016 Jun 22 [cited 2024 Jul 2]. (Report No. 2016-0031). Dutch. Available from: https://www.rivm.nl/publicaties/op-weg-naar-integrale-bekostiging-van-geboortezorg
22 Struijs JN, de Vries EF, van Dorst HDCA, Over EAB, Baan CA. Maternity care in the picture: a baseline measurement and initial experiences with working with bundled payments [Internet]. Bilthoven: RIVM; 2018 Nov 26 [cited 2024 Jul 2]. (Report No. 2018-0109). Dutch. Available from: https://www.rivm.nl/publicaties/geboortezorg-in-beeld-nulmeting-en-eerste-ervaringen-met-werken-met-integrale
23 Struijs JN, de Vries EF, Scheefhals ZTM, Molenaar JM, Baan CA. Bundled payments for maternity care: experiences after three years and the first visible effects [Internet]. Bilthoven: RIVM; 2020 Sep 9 [cited 2024 Jul 2]. (Report No. 2020-0124). Dutch. Available from: https://www.rivm.nl/publicaties/integrale-bekostiging-van-geboortezorg-ervaringen-na-drie-jaar-en-eerste-zichtbare
24 de Vries EF, Scheefhals ZTM, van Exel NJA, Struijs JN. Systematic study into the different perspectives on payment reform in maternity care [Internet]. Bilthoven: RIVM; 2022 Jul 14 [cited 2024 Jul 2]. (Report No. 2022-0033). Dutch. Available from: https://www.rivm.nl/publicaties/systematische-studie-naar-verschillende-opvattingen-rondom-bekostigingshervorming-in
25 Scheefhals ZTM, de Vries EF, Struijs JN, Numans ME, van Exel NJA. Stakeholder perspectives on payment reform in maternity care in the Netherlands: a Q-methodology study. Soc Sci Med. 2024;340:116413.
26 Euro-Peristat Project. European perinatal health report: health and care of pregnant women and babies in Europe in 2010 [Internet]. Paris: Euro-Peristat Project; 2013 May [cited 2024 Jul 2]. Available from: https://www.europeristat.com/images/European%20Perinatal%20Health%20Report_2010.pdf
27 Steering Committee on Pregnancy and Birth. A good start: safe care surrounding pregnancy and birth. Utrecht: The Committee; 2010. Dutch.
28 Struijs JN, Hargreaves DS. Turning a crisis into a policy opportunity: lessons learned so far and next steps in the Dutch early years strategy. Lancet Child Adolesc Health. 2019;3(2):66–8.
29 Ministry of Health, Welfare, and Sport. A suitable payment model for integrated maternity care. The Hague: Ministry of Health, Welfare, and Sport; 2022. Dutch.
30 Perined. Key numbers for Dutch maternity care 2021. Utrecht: Perined; 2022. Dutch.
31 To access the appendix, click on the Details tab of the article online.
32 Scheefhals ZTM, de Vries EF, Molenaar JM, Numans ME, Struijs JN. Observational data for integrated maternity care: experiences with a Data-Infrastructure for Parents and Children in the Netherlands. Int J Integr Care. 2023;23(4):20.
33 de Boo A. Vektis "Informatiecentrum voor de zorg." Tijdschrift voor gezondheidswetenschappen. 2011;89(7). Dutch.
34 Bakker BFM, Van Rooijen J, Van Toor L. The system of social statistical datasets of Statistics Netherlands: an integral approach to the production of register-based social statistics. Stat J IAOS. 2014;30(4):411–24.
35 Seijmonsbergen-Schermers AE, Zondag DC, Nieuwenhuijze M, Van den Akker T, Verhoeven CJ, Geerts C, et al. Regional variations in childbirth interventions in the Netherlands: a nationwide explorative study. BMC Pregnancy Childbirth. 2018;18(1):192.
36 Glantz JC. Obstetric variation, intervention, and outcomes: doing more but accomplishing less. Birth. 2012;39(4):286–90.
37 Elferink-Stinkens PM, Brand R, le Cessie S, Van Hemel OJ. Large differences in obstetrical intervention rates among Dutch hospitals, even after adjustment for population differences. Eur J Obstet Gynecol Reprod Biol. 1996;68(1-2):97–103.
38 Mann S, Pratt S, Gluck P, Nielsen P, Risser D, Greenberg P, et al. Assessing quality obstetrical care: development of standardized measures. Jt Comm J Qual Patient Saf. 2006;32(9):497–505.
39 Portrait FR, van der Galiën O, Van den Berg B. Measuring healthcare providers' performances within managed competition using multidimensional quality and cost indicators. Health Econ. 2016;25(4):408–23.
40 International Consortium for Health Outcomes Measurement. Pregnancy and childbirth data collection reference guide [Internet]. Cambridge (MA): ICHOM; c 2016 [revised 2017 Apr 10; cited 2024 Aug 8]. Available from: https://ichom.org/files/medical-conditions/pregnancy-and-childbirth/pregnancy-childbirth-reference-guide.pdf
41 Khandwala YS, Baker VL, Shaw GM, Stevenson DK, Lu Y, Eisenberg ML. Association of paternal age with perinatal outcomes between 2007 and 2016 in the United States: population based cohort study. BMJ. 2018;363:k4372.
42 Song Z, Ji Y, Safran DG, Chernew ME. Health care spending, utilization, and quality 8 years into global payment. N Engl J Med. 2019;381(3):252–63.
43 Song Z, Rose S, Safran DG, Landon BE, Day MP, Chernew ME. Changes in health care spending and quality 4 years into global payment. N Engl J Med. 2014;371(18):1704–14.
44 Pandey A, Eastman D, Hsu H, Kerrissey MJ, Rosenthal MB, Chien AT. Value-based purchasing design and effect: a systematic review and analysis. Health Aff (Millwood). 2023;42(6):813–21.
45 Kadakia KT, Song Z. Saving money or improving health? Reconsidering payment reform. Milbank Quarterly Opinion [serial on the Internet]. 2022 Oct 25 [cited 2024 Jul 22]. Available from: https://www.milbank.org/quarterly/opinions/saving-money-or-improving-health-reconsidering-payment-reform/

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