

Supplementary Materials

Identification of Gestational diabetes in European electronic healthcare databases: Insights from the ConcePTION project

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METHODS

Search strategy and results of the systematic review of validation studies of GDM algorithms

The search strategy included the following components: (1) terms to identify GDM; (2) terms to identify validation studies of algorithms; and (3) terms to exclude studies not likely to utilize electronic health data. We used Medline and the publications were limited to those in English and published between January 1, 2010 and March 1, 2024 (details of the search terms included in Table S3). Additional inclusion criteria were: (1) studies conducted in North America or Europe; (2) used routinely collected healthcare data to identify GDM; (3) validation studies using different reference standards (e.g. medical charts, electronic health records) and reported performance statistics of the algorithm (e.g. sensitivity, specificity, positive or negative predictive value).

The Medline search identified 127 studies; all titles and abstracts were reviewed. If the title and/or abstract met the inclusion criteria described above, the studies were selected for full text review. This resulted in 12 studies undergoing full text review, after which a further 4 studies were excluded due to the inclusion criteria, leaving 8 studies for data extraction. We extracted key information from the identified studies using a standardized data collection form based on prior work by mini sentinel including specification and performance the outcome-identifying algorithms (further details of the extraction are provided in the Supplementary Table S4).

Supplementary Table S1. Characteristics of the data sources								
Country	Data coverage	Data Access Providers (DAPs)	Name of data sources	Data coverage period		Data domain, healthcare setting for data collection and coding system used		
				Start date	End date	Diagnosis	Medication	Disease-specific variables
Norway	Nationwide	University of Oslo (UOSL)	Norwegian National registries	01-jan-2008 (data from the Medical Birth Registry from 2004)	31-dec-2020	Inpatient and outpatient hospital visits and outpatient specialist visits classified according to ICD-10. Primary care visits (e.g., GPs) classified according to ICPC2	Filled outpatient prescription medication classified according to ATC	Yes, registration during pregnancy of GDM in the Medical birth registry
Finland	Nationwide	Finnish Institute for Health and Welfare (THL)	Finnish National registries	01-jan-2008 (data from the Medical Birth Registry from 1996)	31-dec-2018	Inpatient and outpatient hospital visit classified according to ICD-10 Primary care visits classified according to ICD-10 or ICPC2.	Filled outpatient prescription medication classified according to ATC	Yes, registration during pregnancy of GDM in the Medical birth registry
Italy	Regional: Emilia Romagna	University of Ferrara (UNIFERR)	Healthcare administrative	01-jan-2009	31-dec-2020	Inpatient hospital and emergency room visits classified according to ICD-9.	Dispensed outpatient prescription medication classified according to ATC	No
Spain	Regional: Valencian Region	Rare Disease Research Unit FISABIO	RDRU_Fisabio	01-jan-2013	31-dec-2018	Inpatient hospital visits classified according to ICD-10ES	Dispensed outpatient prescription medication classified according to ATC	No
France	Regional: Haute-Garonne	University Hospital in Toulouse (CHUT)	EFEMERIS	01-jan-2008	31-dec-2020	Inpatient hospital visits classified according to ICD-10	Dispensed outpatient prescription medication classified according to ATC	Yes, registration of maternal GDM in child health certificate

Figure S1. Details of ConcePTION Pregnancy Algorithm for each DAP

Footnotes: ^aPregnancies with gestational age of at least 12 gestational weeks, ^bPregnancies with gestational age of at least 20-22 gestational weeks available

Figure legend. Description of data streams and record quality

PROMT: Birth-, termination- or spontaneous abortion registries where a record implies end of a pregnancy.

CONCEPTSETS: Diagnostic codes, procedure codes or other codes where a record refer to an end of a pregnancy or an ongoing pregnancy.

Green: Pregnancy start date and pregnancy end date recorded.

Yellow: Pregnancy start date imputed and pregnancy end date recorded.

Blue: Pregnancy start date recorded and pregnancy end date imputed.

Supplementary Table S2. Ethical and/or governance review boards approval for data use		
Country	Ethical and/or governance review boards	Approval Number
Norway	The study was approved by the Regional Committee for Research Ethics in South-East Norway and by the Data Protection Officer at the University of Oslo. Data were handled and stored in accordance with the General Data Protection Regulation.	85224 and 519858
Finland	Ethical approval is not required for register-based studies. Institutional Review Board at the Finnish Institute for Health and Welfare approved the study and waived the requirement for obtaining informed consent for the secondary use of health administrative data from study participants. Data were handled and stored in accordance with the General Data Protection Regulation.	THL/543/6.02.00/2021
Italy, Emilia Romagna	The study was approved by the local ethical committee. Data were handled and stored in accordance with the General Data Protection Regulation and in agreement with the Authority for Healthcare and Welfare, Emilia Romagna Regional Health Service, Bologna, Italy.	593/2023/Oss/UniFe
Spain, Valencian Region	The study (code: IMI-IMN-2019-01) was classified as an Observational Post-authorisation Study “Other designs” (EPA-OD) by Spanish Medicines Agency (AEMPS), available on: https://sede.aemps.gob.es ; and approved by the Arnau de Vilanova Hospital’s Clinical Research Ethics Committee on 29th January 2020, according to the Spanish regulation. At regional level following the national Personal Data Protection and guaranteeing digital rights (Law 3/2018), the study was approved by the Commission of the Regional Government (PROSIGA) that has the right of giving RDRU Fisabio authorisation to process the data (references: SD2556; SD2577; SD2578; SD2579; SD2580; SD2581; SD2582).	1/2020
France, Haute-Garonne	The EFEMERIS cohort was approved by the French Data Protection Authority on 7 April 2005. This study was performed on anonymized patient data. The women included in the EFEMERIS database were informed of their inclusion and of the potential use of their anonymized data for research purposes. They could oppose the use of their data at any time. The women included in the EFEMERIS database know that their collected and anonymized data can be used for medical research purposes and can thus be published. The study was approved by the EFEMERIS steering group. Data were handled and stored in accordance with the General Data Protection Regulation.	05-1140

Supplementary Table S3. Search terms
1. Terms to identify GDM
diabetes, gestational [MeSH Terms] OR (diabetes[All Fields] AND gestational[All Fields]) OR gestational diabetes[All Fields] OR (gestational[All Fields] AND diabetes[All Fields] AND mellitus[All Fields]) OR gestational diabetes mellitus[All Fields]
2. Terms to identify validation studies
(validation study [Publication Type] OR validation studies as topic [MeSH Terms] OR validation studies [All Fields]) OR (("valid"[All Fields] OR "validate"[All Fields] OR "validated"[All Fields] OR "validates"[All Fields] OR "validating"[All Fields] OR "Validation"[All Fields] OR "validational"[All Fields] OR "validations"[All Fields] OR "validator"[All Fields] OR "validators"[All Fields] OR "validities"[All Fields] OR "validity"[All Fields]) AND ("international classification of diseases"[MeSH Terms] OR ("international"[All Fields] AND "classification"[All Fields] AND "diseases"[All Fields]) OR "international classification of diseases"[All Fields] OR ("international"[All Fields] AND "classification"[All Fields] AND "disease"[All Fields]) OR "international classification of disease"[All Fields] OR "ICD-9"[All Fields] OR "ICD9"[All Fields] OR "ICD-10"[All Fields] OR "ICD10"[All Fields])) OR ("Validation"[Title/Abstract] AND ("algorithms"[Title/Abstract] OR "phenotype"[Title/Abstract] OR "positive predictive value"[Title/Abstract]))
3. Terms to exclude studies not likely to utilize electronic health data
"Case Reports"[pt] OR "Clinical Trial"[pt] OR "Clinical Trial, Phase I" [pt] OR "Clinical Trial, Phase II" [pt] OR "Clinical Trial, Phase III" [pt] OR "Clinical Trial, Veterinary" OR "Comment" [pt] OR "Controlled Clinical Trial" [pt] OR "Editorial" [pt] OR "Guideline"[pt] OR "Letter" [pt] OR "Meta-Analysis" [pt] OR "Observational study, veterinary"[pt] OR "Randomized Controlled Trial" [pt] OR "Review"[pt] OR "systematic review"[pt]
5. Searches 1, 2 combined with AND, excluding Search 3 Total before filters applied: N= 162 English article language only: N=160 Publication date from 01-01-2010 to 01-03-2024: N=127

Supplementary Table S4. Data extraction of validation studies of GDM algorithms identified in the systematic literature review

Reference	Algorithm to identify GDM	Algorithm performance			Study characteristics	ConcePTION
PMID, First author and year of publication	Specifications of algorithm components	Reference standard (including No.of charts / cases reviewed)	PPV, SEN, NPV, SPEC	Other Findings	Country, Data Source and Dataset dates	Comments
PMID: 22020902 Andrade, 2011	≥1 procedure code for OGTT (CPT code 82951 or 82952) OR ≥1 diagnostic code for GDM (ICD-9 code 648.8–648.89) during pregnancy. AND NO antidiabetic drug OR no diagnostic codes for pre-gestational diabetes (ICD-9 250–250.99) 365-180 days prior to delivery Additional criteria: 1) ≥2 outpatient diagnoses of GDM on different dates 2) ≥1 outpatient diagnosis of GDM AND ≥1 procedure code of DM management / training 3) ≥1 outpatient diagnosis of GDM AND ≥1 dispensing of an antidiabetic medication 4) ≥1 diagnosis of GDM during an inpatient visit	172 Medical records	PPV 82% (75–87) w. additional criteria: 1) PPV 88% (75–95) 2) PPV 68% (43–87) 3) PPV 85% (71–94) 4) PPV 79% (67–89) (GDM prevalence 4%)	Preliminary data showed that 50% of women with a diagnosis of GDM recorded during pregnancy also had a diagnosis of pre-gestational diabetes in the 6-month prior to pregnancy. Therefore, necessary to exclude pre-gestational diabetes.	US, Health plans and claims data, 2006-2008	The algorithm includes procedure code for OGTT for which there may be low specificity (false positives) in most settings e.g. if universal OGTT is screening practice. Algorithm b that includes procedure code of DM management / training only had a moderate performance.
PMID: 33252439 Stanhope, 2021	Delivery hospitalization ICD codes of O24.41x, O24.42x, O24.43x GDM case definition: a 1-hour glucose loading test results greater than 200mg/dL, a failed 1-hour test (<140mg/dL) followed by a failed 3-hour glucose tolerance test (defined as two or more elevated glucose values of the four measurements using the Carpenter Coustan Criteria) or elevated glucose based on home blood glucose monitoring.	3654 medical records	PPV 85.6% (80.8-90.4) SEN 94.7% (91.5-97.9) SPEC 99.1% (98.8-99.4) NPV 99.7% (99.5-99.9) <i>(ICD-10 code prevalence 5.7% (4.9-6.4))</i> <i>Medical record prevalence 5.1% (4.4-5.9)</i>	Of false positive GDM cases, 7% (2/30) had pre-gestational DM according to MR (both had ICD-10 codes of pre-gestational DM). The rest of false positive case had not diabetes according to MR. In addition, 4 cases with ICD-10 code O34.9x (unspecified diabetes during pregnancy), all had GDM according to MR.	US, deliveries at Grady Memorial Hospital in Atlanta, 2016-2018.	30 false positives cases of GDM where the majority had not any diabetes according to MR. The algorithms only include ICD-10 codes from delivery hospitalization and may not be extrapolated to the validity of ICD-10 codes for ambulatory prenatal care. Delivery hospitalization codes may be more accurate, as claims filed at the end of the stay when diagnoses have been verified and unlikely to represent rule-out diagnoses.

PMID: 37451402 Ngwezi, 2023	ICD-10 codes of O24.4 or O24.8 in: 1) Delivery hospitalization records only 2) Outpatient clinical records during pregnancy only 3) Delivery hospitalization records and outpatient records during pregnancy	749 pregnant women with GDM in the Diabetes in pregnancy clinical registry	2002-2009: 1) PPV 97% NPV 59% 2) PPV 97% NPV 99% 3) PPV 98% NPV 99%		Canada, the Alberta Pregnancy Birth Cohort (administrative health care data, Alberta), 2002-2019	
PMID: 36008250 Shah, 2023	ICD-10 codes of O24.4 or O24.8 in: 1) Delivery hospitalization records with ICD-10 codes of O24.4 or O24.8 2) Physician claims with ICD 8 codes 250 (only code for diabetes in ICD-8) in 90-day lookback period before delivery GDM case definition: 75-g oral glucose tolerance test with a -fasting glucose of ≥5.3 mmol/L or, -1-hour glucose of ≥10.6 mmol/L or, -2-hour glucose of ≥9.0 mmol/L	Pregnant women with oral glucose tolerance test results in the Ontario Laboratory Information System	1) PPV 92.6% (91.8-93.4) NPV 99.0% (98.9-99.1) SEN 83.2% (82.1-84.4) SPEC 99.6% (99.6-9.7) (GDM prevalence 5%) 2) PPV 90.7% (89.8-91.6) NPV 99.1% (99.1-99.2) SEN 85.1% (84.1-86.2) SPEC 99.5% (99.4-99.5) (GDM prevalence 5.3%)		Canada, MOMBABY (administrative health care data, Ontario), January 2019-December 2019	
PMID: 26555571 Bowker, 2017	Two algorithms: 1) National Diabetes Surveillance System algorithm: Diabetes incidence date followed by an obstetrical claim within 0–120 days or if it preceded an obstetrical claim by 0–180 days, the diabetes case was gestational diabetes (Diabetes case: one hospitalization for diabetes (ICD-9 code: 250 or ICD-10: E10 - E14); or two physician fee-for-service claims for diabetes within a 2-year period) 2) Gestational diabetes-specific ICD code-based algorithm: ICD-9 codes of 648.8 or ICD-10 code of O24.4, O24.8 (i.e. gestational diabetes-specific codes) in any diagnosis field of the delivery-related hospitalization. GDM diagnosis in the APHP database was considered the reference (gold) standard.	The Alberta Perinatal Health Program (APHP), a database with detailed information of all deliveries in the province of Albert.	1) PPV 78% NPV 97% SEN 25% SPEC 100%. (GDM prevalence 1.3%) 2) PPV 85% NPV 99% SEN 86% SPEC 99% (GDM prevalence 4%) (GDM prevalence gold standard 3.9%)		Population-level health-care administrative data, Alberta, Canada, 1999-2010	
PMID: 27743395 Bowker, 2017	1) ICD-10 code of O24.4 (in any diagnosis field) recorded up to 270 days prior to delivery a. In outpatient data only b. In inpatient data only c. In outpatient or inpatient data 2) GDM recoded the APHP database GDM case definition: A gestational diabetes diagnosis was defined in the laboratory data as ≥2 abnormal values on a 75-g oral glucose tolerance test or a 50-g glucose screen ≥10.3 mmol/l. (reference standard)	Laboratory data	1a) PPV 59% (57–60) SEN 86% (84–87) SPEC 98% (98–98) (GDM prevalence 5.2%) 1b) PPV 62% (60–64) SEN 83% (82–85) SPEC 98% (98–98) (GDM prevalence 4.8%) 1c) PPV 57% (55–59) SEN 92% (91, 93) SPEC 97% (97, 98)		Canada, population-level health-care administrative data, Alberta, Canada, 2008-2010	The positive predictive value ranged from 57 to 62% in all databases because of a high number of false-positives; however, 81.0, 84.8, 77.9, and 85.3 of false-positives in the outpatient only, inpatient only, outpatient or inpatient combined, and APHP databases, respectively, met the criteria for impaired glucose tolerance.

			(GDM prevalence 5.8%) 2) PPV 61% (60–63) SEN 83% (81–85) SPEC 98% (98-98) (GDM prevalence 4.8%)			
PMID: 32404391 Goueslard, 2020	1) Discharge abstract with ICD-10 Codes O24.4 2) Discharge abstract with ICD-10 Codes O24.4-O24.9	482 medical records	1) PPV 80.6% (79.2-82.0) SEN 78.4% (77.0-79.8) 2) PPV 80.8% (79.4-82.2) SEN 79.5% (78.1-80.9)		The French hospital database, France, 2014	
PPV: Positive predictive value, SEN: Sensitivity, NPV: Negative predictive value, SPEC: Specificity						

Supplementary Table S5. Concept Set to Identify GDM and (Pre-Gestational) Diabetes Mellitus				
Data domain	Concept set label	Concept	Coding system	Code
Diagnosis	GDM	GDM	ICD10	O24.4
			ICD10ES	O24.4, O24.41, O24.410, O24.414, 24.415, O24.419, O24.42, O24.420, O24.424, O24.425, O24.429, O24.43, O24.430, O24.434, O24.435, O24.439,
			ICD9	648.8
			ICPC2	W85
		Unspecified diabetes mellitus in pregnancy	ICD10	O24.9
			ICD10ES	O24.9, O24.91, O24.911, O24.912, O24.913, O24.919, O24.92, O24.93
			ICD9	NA
			ICPC2	NA
	Diabetes mellitus	Pre-existing diabetes mellitus in pregnancy	ICD10	O24.0 O24.1, O24.2, O24.3
			ICD10ES	O24.0, O24.01, O24.011, O24.012, O24.013, O24.19, O24.02, O24.03, O24.11, O24.111, O24.112, O24.113, O24.119, O24.12, O24.13, O24.31, O24.311, O24.312, 24.313, O24.319, O24.32, O24.33, O24.8, O24.81, O24.811, O24.812, O24.813, O24.819, O24.82, O24.83
			ICD9	648.0
			ICPC2	NA
		Diabetes mellitus	ICD10	E10, E11, E12, E13, E14
			ICD10ES	E10.10, E10.11, E10.21, E10.22, E10.29, E10.31, E10.311, E10.319, E10.321, E10.3211, E10.3212, E10.3213, E10.3219, E10.329, E10.3291, E10.3292, E10.3293, E10. 3299, E10.33, E10.331, E10.3311, E10.3312, E10.3313, E10.3319, E10.339, E10.339, E10.3391, E10.3392, E10.3393, E10.3399, E10.34, E10.341, E10.3411, E10.3412, E10.3413, E10.3419, E10.349, E10.3491, E10.3492
			ICD9	250
			ICPC2	T89, T90
Medication	GDM or Diabetes Mellitus (depending on timing of records)	Antidiabetic medication	ATC	A10A, A10B, A10X

Supplementary Table S6. Additional Concepts to Identify GDM for Each Data Source						
Data domain	Concept set label	Concept/variable	DAP	ConcePTION CDM table	Original variable	Value/Code
Data source specific variables	GDM	GDM registration	UiO	SURVEY_OBSERVATIONS	diabetes_mellitus	4
			THL	SURVEY_OBSERVATIONS	Vocabulary (ICD10)	O24.4
			UNIFERR	NA	NA	NA
			RDRU_FI SABIO	NA	NA	NA
			CHUT	SURVEY_OBSERVATIONS	J8_DIABETE, IMG_DIABETE	1,1

Supplementary Table S7. Component algorithms for GDM and (pre-gestational) diabetes mellitus					
No.	Description of component	Setting	Data domain	Time window of records	Concept set label
1	Diagnosis of GDM in primary or secondary care	Primary care, Hospital	Diagnosis	From gestational week 12 until pregnancy end date	GDM
2	Diagnosis of unspecified diabetes during pregnancy in secondary care	Hospital	Diagnosis	From gestational week 12 until pregnancy end date	GDM
3	Diagnosis of early GDM (unrecognized pre-existing diabetes) in primary or secondary care	Primary care, Hospital	Diagnosis	From pregnancy start until gestational week 12	Diabetes mellitus
4	Diagnosis of diabetes mellitus in primary or secondary care	Primary care, Hospital	Diagnosis	Up to 6 months prior to pregnancy start until gestational 12	Diabetes mellitus
5	Diagnosis of pre-existing diabetes mellitus during pregnancy in secondary care	Hospital	Diagnosis	Up to 6 months prior to pregnancy start until gestational 12	Diabetes mellitus
6	Registration of GDM during pregnancy in birth registry	Hospital	Data source specific variables	Pregnancy end	GDM
7	Filled/dispensed outpatient antidiabetic medication for GDM	Primary care	Medication	From gestational week 12 until pregnancy end date	GDM
8	Filled/dispensed outpatient antidiabetic medication for diabetes mellitus	Primary care	Medication	Up to 6 months prior to pregnancy start until gestational 12	Diabetes mellitus

Figure S2. Flow chart of study populations

Footnotes:

^aInformation in Figure S1.

Supplementary Table S8. Prevalence of GDM Stratified by Calendar Year for Each Data Source								
Data source		Total number of pregnancies, no.	Prevalence per 100 (95% CI) according to diffent composite algorithms					
Calendar yearscategories	Only diagnosis		Diagnosis or prescriptions	Confirmed diagnosis or prescriptions	Diagnosis (incl. unspecified diabetes in pregnancy) or prescriptions	Diagnosis (excl. pre-existing diabetes in pregnancy) or prescription	Registration of GDM in birth registry	
Norway								
2009-2012	223,705	2.6 (2.5-2.7)	2.7 (2.6-2.8)	2.1 (2.0-2.2)	3.0 (2.9-3.1)	2.1 (2.0-2.2)	2.2 (2.1-2.3)	
2013-2016	217,649	5.0 (4.9-5.1)	5.1 (5.0-5.2)	4.0 (3.9-4.1)	5.2 (5.1-5.3)	4.5 (4.4-4.6)	4.5 (4.4-4.6)	
2017-2020	161,543	5.8 (5.7-5.9)	5.9 (5.8-6.0)	4.9 (4.8-5.0)	6.0 (5.9-6.1)	5.4 (5.3-5.5)	5.3 (5.2-5.4)	
Finland								
2009-2012	237,033	11.0 (10.9-11.1)	11.1 (11.0-11.2)	8.8 (8.7-8.9)	12.5 (12.4-12.6)	10.5 (10.4-10.6)	11.1 (11.0-11.2)	
2013-2016	215,815	16.3 (16.1-16.5)	16.3 (16.1-16.5)	14.0 (13.9-14.1)	17.7 (17.5-17.9)	15.9 (15.7-16.1)	15.4 (15.2-15.6)	
2017-2020	55,056	20.9 (20.6-21.2)	21.1 (20.8-21.4)	18.7 (18.4-19.0)	22.3 (22.0-22.6)	20.8 (20.5-21.1)	21.7 (21.4-22.0)	
Italy, Emilia Romagna								
2009-2012	146,254	2.1 (2.0-2.2)	2.7 (2.6-2.8)	0.7 (0.7-0.7)	2.7 (2.6-2.8)	2.3 (2.2-2.4)	NA	
2013-2016	131,478	4.6 (4.5-4.7)	5.5 (5.4-5.6)	1.3 (1.2-1.4)	5.5 (5.4-5.6)	4.8 (4.7-4.9)	NA	
2017-2020	96,277	8.0 (7.8-8.2)	9.2 (9.0-9.4)	2.2 (2.1-2.3)	9.2 (9.0-9.4)	8.1 (7.9-8.3)	NA	
Spain, Valencian Region								
2009-2012	NA	NA	NA	NA	NA	NA	NA	
2013-2016	118,514	4.9 (4.8-5.0)	5.7 (5.6-5.8)	1.4 (1.3-1.5)	5.7 (5.6-5.8)	5.4 (5.3-5.5)	NA	
2017-2020	74,981	6.2 (6.0-6.4)	7.0 (6.8-7.2)	1.8 (1.7-1.9)	7.1 (6.9-7.3)	6.6 (6.4-6.8)	NA	
France, Haute-Garonne								
2009-2012	42,630	2.7 (2.5-2.9)	4.1 (3.9-4.3)	1.4 (1.3-1.5)	4.1 (3.9-4.3)	4.0 (3.8-4.2)	4.2 (4.0-4.4)	
2013-2016	43,658	3.2 (3.0-3.4)	4.8 (4.6-5.0)	1.8 (1.7-1.9)	4.8 (4.6-5.0)	4.7 (4.5-4.9)	6.1 (5.9-6.3)	
2017-2020	30,474							

			3.8 (3.6-4.0)	6.0 (5.7-6.3)	2.0 (1.8-2.2)	6.0 (5.7-6.3)	5.9 (5.6-6.2)	7.4 (7.1-7.7)
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Supplementary Table S9. Prevalence of GDM Stratified by Maternal Age for Each Data Source								
Data source		Total number of pregnancies, no.	Prevalence per 100 (95% CI) according to diffent composite algorithms					
Maternal age categories, years	Only diagnosis <i>(Dx)</i>		Diagnosis or prescriptions <i>(DxRx)</i>	Confirmed diagnosis or prescriptions <i>(2Dx2Rx)</i>	Diagnosis (incl. unspecified diabetes in pregnancy) or prescriptions <i>(DxRx broad)</i>	Diagnosis (excl. pre-existing diabetes in pregnancy) or prescription <i>(DxRx narrow)</i>	Registration of GDM in birth registry <i>(BR)</i>	
Norway								
15-24	98,988	2.6 (2.5-2.7)	2.6 (2.5-2.7)	2.0 (1.9-2.1)	2.8 (2.7-2.9)	2.3 (2.2-2.4)	2.2 (2.1-2.3)	
25-34	402,253	3.9 (3.8-4.0)	4.0 (3.9-4.1)	3.2 (3.1-3.3)	4.2 (4.1-4.3)	3.5 (3.4-3.6)	3.5 (3.4-3.6)	
35-49	101,656	7.5 (7.3-7.7)	7.7 (7.5-7.9)	6.3 (6.2-6.4)	8.0 (7.8-8.2)	6.6 (6.4-6.8)	6.9 (6.7-7.1)	
Finland								
15-24	99,377	9.0 (8.8-9.2)	9.0 (8.8-9.2)	7.2 (7.0-7.4)	10.1 (9.9-10.3)	8.8 (8.6-9.0)	9.1 (8.9-9.3)	
25-34	323,712	14.0 (13.9-14.1)	14.1 (14.0-14.2)	11.8 (11.7-11.9)	15.4 (15.3-15.5)	13.7 (13.6-13.8)	13.7 (13.6-13.8)	
35-49	84,815	21.9 (21.4-22.0)	21.9 (21.6-22.2)	18.9 (18.6-19.2)	23.7 (23.4-24.0)	21.0 (20.7-21.3)	21.3 (21.0-21.6)	
Italy, Emilia Romagna								
15-24	37,428	2.7 (2.5-2.9)	3.2 (3.0-3.4)	0.7 (0.6-0.8)	3.2 (3.0-3.4)	2.8 (2.6-3.0)	NA	
25-34	215,930	4.0 (3.9-4.1)	4.8 (4.7-4.9)	1.1 (1.1-1.1)	4.8 (4.7-4.9)	4.2 (4.1-4.3)	NA	
35-49	120,651	5.9 (5.8-6.0)	7.1 (7.0-7.2)	1.8 (1.7-1.9)	7.1 (7.0-7.2)	6.2 (6.1-6.3)	NA	
Spain, Valencian Region								
15-24	22,253	2.3 (2.1-2.5)	2.6 (2.4-2.8)	0.5 (0.4-0.6)	2.6 (2.4-2.8)	2.4 (2.2-2.6)	NA	
25-34	109,122	4.7 (4.6-4.8)	5.4 (5.3-5.5)	1.3 (1.2-1.4)	5.4 (5.3-5.5)	5.0 (4.9-5.1)	NA	
35-49	62,120	7.7 (7.5-7.9)	9.0 (8.8-9.2)	2.5 (2.4-2.6)	9.1 (8.9-9.3)	8.6 (8.4-8.8)	NA	
France, Haute-Garonne								

15-24	18,268	2.3 (2.1-2.5)	3.1 (2.8-3.4)	0.9 (0.8-1.0)	3.1 (2.8-3.4)	3.0 (2.8-3.2)	3.8 (3.5-4.1)
25-34	79,645	2.9 (2.8-3.0)	4.3 (4.2-4.4)	1.5 (1.4-1.6)	4.3 (4.2-4.4)	4.2 (4.1-4.3)	5.2 (5.0-5.4)
35-49	18,849	5.4 (5.1-5.7)	8.9 (8.5-9.3)	3.6 (3.3-3.9)	8.9 (8.5-9.3)	8.8 (8.4-9.2)	10.0 (9.6-10.4)