Reference	Study Design	Data Source	N	DKA Definition	DKA Ascertainment	DKA Event Description in Publication	Incidence per 1,000 PY	Prevalence per 1,000 People
US and Canada								
Beck 2012[35]	Prospective, multicenter, clinic-based patient registry	T1D Exchange Clinic Registry in US	25,833*	NR	Patient self-report via questionnaire	Percent of patients with at least 1 DKA event in the prior 12 months	NR	Overall: 80† Definite T1D: 90
Butalia 2013[22]	Data linkage study combining clinical and administrative health data	T1D patient database, inpatient discharge database, kidney disease laboratory data, and census in Canada	1,994	DKA hospitalization was identified using the ICD-10-CA. The relevant codes included E10.100, E10.101, E10.120, E10.121, E10.10 and E10.12	Based on hospitalization records	Number of patients with and without a DKA hospitalization over the study period	NR	127.9‡
Butalia 2014[23]	Data linkage study combining clinical and administrative health data	T1D patient database, inpatient discharge database, kidney disease laboratory data, census, and database of postal codes in Canada	1,467	DKA hospitalization was identified using the ICD-10-CA. The relevant codes included E10.100, E10.101, E10.120, E10.121, E10.10 and E10.12	Based on hospitalization records	Number of patients with and without a DKA hospitalization over the study period	NR	102.9‡
Cengiz 2013[24]	Prospective, multicenter, clinic-based patient registry	T1D Exchange Clinic Registry in US	13,487 DKA subset, n=13,005 Aged 18 to <26 yrs subset, n=3,624	Patient-reported overnight hospitalization for DKA	Patient self-report via questionnaire	Percent of patients with at least 1 DKA event in the prior 12 months	NR	Overall: 99
Garg 2004[37]	Retrospective analysis from a single center	Electronic patient record system in US	515	NR	Patient medical records	Number of patients who had a DKA event over the study period	Cumulative incidence: 55.6‡	NR
Miller 2015[38]	Prospective, multicenter, clinic-based patient registry	T1D Exchange Clinic Registry in US	16,061* DKA subset, n=2,561	Participant-reported DKA diagnosed by a doctor that required treatment in a	Patient self-report via questionnaire	Percent of patients with at least 1 DKA event in the prior 3 months	NR	Overall: 30

Reference	Study Design	Data Source	N	DKA Definition	DKA Ascertainment	DKA Event Description in Publication	Incidence per 1,000 PY	Prevalence per 1,000 People
				healthcare facility				
Nathan 2009[36]	Observational, longitudinal cohort study	EDIC study (extension of DCCT in Canada and US) EDC study in US	***Conventional treatment*** DCCT, n=730 EDIC, n=606 ***Intensive treatment*** DCCT, n=711 EDIC, n=620 ***EDC*** Baseline, n=161; Year 10, n=105; Year 18, n=88	NR	NR	Incidence rate per 1,000 PY	***Conventional treatment*** DCCT: 18 EDIC Year 6: 24 EDIC Year 12: 0 ***Intensive treatment*** DCCT: 20 EDIC Year 6: 12 EDIC Year 12: 0 ***EDC*** Baseline: 31 Year 10: 13 Year 18: 9	NR
Simmons 2013[39]	Cross-sectional analysis of a prospective clinic-based patient registry	T1D Exchange Clinic Registry in US	1,894	Patient-reported overnight hospitalization for DKA	Patient self-report via questionnaire	Percent of patients with at least 1 DKA event in the prior 12 months	NR	Excellent HbA1c control (<6.5%): 10 Fair/poor HbA1c control (≥8.5%): 120
Trief 2014[31]	Cross-sectional analysis of a prospective clinic-based patient registry	T1D Exchange Clinic Registry in US	6,172	Patient-reported overnight hospitalization for DKA	Patient self-report via questionnaire	Percent of patients with at least 1 DKA event in the prior 3 months	NR	Depressed: 110 Non-depressed: 40
Weinstock 2013[13]	Cross-sectional analysis of a prospective clinic-based patient registry	T1D Exchange Clinic Registry in US	7,012 DKA subset, n=6,796	Patient-reported overnight hospitalization for DKA Clinic-documented hyperglycemia and symptoms such as polyuria, polydipsia, nausea, or vomiting; serum ketones or large/moderate urine ketones; arterial blood pH <7.30, or venous pH	Patient self-report via questionnaire (these data were used for all primary analyses)	Percent of patients with at least 1 DKA event in the prior 12 months	NR	Overall: 48

Reference	Study Design	Data Source	N	DKA Definition	DKA Ascertainment	DKA Event Description in Publication	Incidence per 1,000 PY	Prevalence per 1,000 People
				<7.30, or serum bicarbonate <15 mmol/L; and treatment provided in a healthcare facility				
Wong 2014[40]	Cross-sectional analysis of a prospective clinic-based patient registry	T1D Exchange Clinic Registry in US	17,317*	Patient-reported overnight hospitalization for DKA	Patient self-report via questionnaire	Percent of patients with at least 1 DKA event in the prior 3 months	NR	***18 to <26 yrs*** CGM user: 80 CGM non-user: 40 ***≥26 yrs*** CGM user: 30 CGM non-user: 20
Europe								
Bohn 2015[29]	Cross-sectional analysis of prospective, clinic-based patient registry	DPV prospective database of T1D patients in Germany and Austria	18,028	pH value <7.3 or hospital admission due to DKA	Patient medical records	DKA events per 100 PY	51.3	NR
Bryden 2003[30]	Single-center longitudinal cohort study	Case register of a young adult diabetic clinic in United Kingdom	113	Hospital admissions for DKA	Patient medical records	Number of patients with ≥2 admissions for DKA over 1,261 PY of follow-up	7.9‡	NR
Janez 2012[41]	Prospective, single-center, clinic-based patient registry	Registry of adult T1D patients treated with CSII in Slovenia	184	NR	Patient medical records	Number of patients with a DKA episode over the study period	Cumulative incidence: 27.2‡	NR
Laimer 2016[42]	Cross-sectional analysis of prospective, clinic-based patient registry	DPV prospective database of T1D patients in Germany and Austria	5,545	Hospital admission due to ketoacidosis with hyperglycemia >11 mmol/L and pH <7.3	Patient medical records	Percentage of patients with a DKA event	NR	39
Sparud-Lundin 2008[43]	Single-center, clinic-based longitudinal cohort study	Diabetes outpatient medical/nursing records from	104	Blood pH <7.30	Patient medical records	Number and percentage of patients with a DKA event for each year (from 18–24 yrs)	NR	Aged 18: 60 Aged 19: 30 Aged 20: 30 Aged 21: 10

Reference	Study Design	Data Source	N	DKA Definition	DKA Ascertainment	DKA Event Description in Publication	Incidence per 1,000 PY	Prevalence per 1,000 People
		age 18–24 yrs in Sweden						Aged 22: 10 Aged 23: 0 Aged 24: 10
Other Regions								
Lebenthal 2012[25]	Retrospective analysis	Medical records from a single center in Israel	452*	Blood pH <7.3 with bicarbonate <15 mEq/L and need for intravenous fluid and insulin infusion	Patient medical records	DKA events per 100 PY	Familial T1D: 8 Sporadic T1D: 9	NR
Li 2014[44]	Cross-sectional, multicenter, clinic-based study	Patient medical records from 16 tertiary hospitals in China	611*	Hyperglycemia (blood plasma glucose >13.9 mmol/L), blood bicarbonate <15 mmol/L and/or pH <7.30 (arterial), and elevated level of ketones in the urine or blood	Patient medical records; diagnosis based on criteria of the Chinese Diabetes Society, the American Diabetes Association , Lawson Wilkins Pediatric Endocrine Society, and the European Society for Paediatric Endocrinology	DKA events per 100 PY	263	NR
Shalitin 2012[45]	Retrospective analysis of patient medical records from a single center	Medical records from a single center in Israel ***Group 1:*** CSII initiated within 1 year of diagnosis ***Group 2:*** CSII initiated at least 1 year post-diagnosis	488*	Blood pH < 7.3 with bicarbonate <15 mEq/L and need for intravenous fluid and insulin infusion	Patient medical records	Average number of DKA events per patient per year	***Group 1*** >19 yrs at last visit: 10 >19 yrs at CSII initiation: 0 ***Group 2*** >19 yrs at last visit: 40 >19 yrs at CSII initiation: 30	NR

Key: CGM = continuous glucose monitoring; CSII = continuous subcutaneous insulin infusion; DCCT = Diabetes Control and Complications Trial; DKA = diabetic ketoacidosis; EDC = Epidemiology of Diabetes Complications; EDIC = Epidemiology of Diabetes Interventions and Complications; DPV = Diabetes-Patienten-Verlaufsdokumentation; ICD-10-CA = International Classification of Diseases, 10th Revision with Canadian Enhancements; NR = not reported; PY = person-years; SLR = systematic literature review; T1D = type 1 diabetes mellitus; US = United States; yrs = years.

* Overall study population; includes pediatric T1D patients (outcome data not included for pediatric patients).

† The overall patient population includes both definite T1D cases (patients meeting all diagnostic criteria) and probable T1D cases (patients meeting only some of the diagnostic criteria); the results for the definite T1D population were reported separately.

‡ Shaded (gray) cells represent outcome data that were calculated by the authors of this SLR based on the information available in the publication, rather than data directly reported by the study authors. Cumulative incidence was calculated/defined as number of cases out of total study population.