



The Management of DKA – More Questions than Answers?

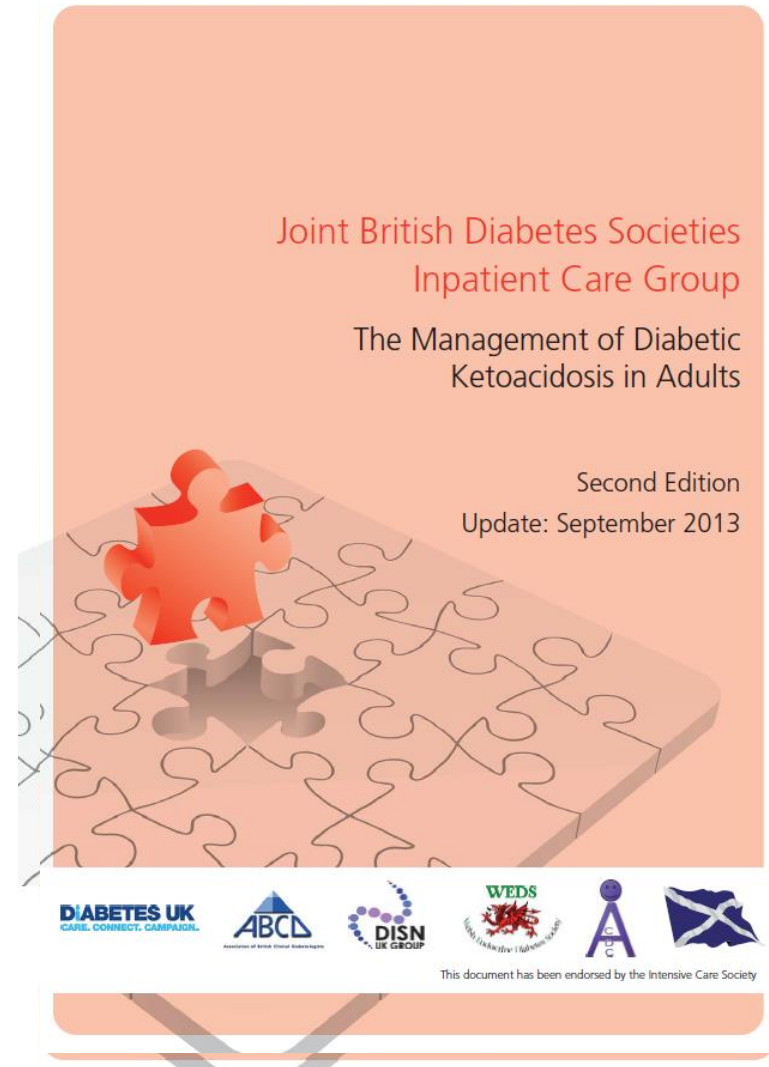
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Some (Recent) History

- In 2010 the JBDS produced a guideline on the management of DKA
- With > 20,000 hard copies given out or downloaded
- An updated guideline was published in late 2013
- A national survey was conducted in Autumn 2014



A Question I Ask Myself

- How do we know that what we are doing is correct?

What Did We do to Answer That Question?

Joint British Diabetes Societies Inpatient Care Group

Data collection tool for the Management of Diabetic Ketoacidosis (DKA) in Adults
(Admission to Discharge)

Name of Hospital: _____ Your grade Consultant SpR CMT DISN Other _____

Year diabetes diagnosed? _____ Age _____ Gender: Male Female

1. Ethnicity Not stated

White	Mixed	Asian / British Asian	Black / Black British	Other
<input type="checkbox"/> a) British <input type="checkbox"/> b) Irish <input type="checkbox"/> c) Any other white background	<input type="checkbox"/> d) White /Black Caribbean <input type="checkbox"/> e) White / Black African <input type="checkbox"/> f) White and Asian <input type="checkbox"/> g) Any other mixed background	<input type="checkbox"/> h) Indian <input type="checkbox"/> i) Pakistani <input type="checkbox"/> j) Bangladeshi <input type="checkbox"/> k) Any other Asian	<input type="checkbox"/> l) Caribbean <input type="checkbox"/> m) African <input type="checkbox"/> n) Any other Black background	<input type="checkbox"/> o) Chinese <input type="checkbox"/> p) Any other ethnic group

2. Date / time of Admission: (dd/mm/yy hh:mm) 3. Date / time of Discharge: (dd/mm/yy hh:mm)

4. Did this episode of DKA occur in someone who was already an inpatient? Yes No Not recorded

5. How many previous admissions for DKA have they had in the last 12 months?..... 6. Date of death(dd/mm/yy)

7. Cause(s) of death: 1)..... 2)..... 3).....

Diagnosis of DKA (Where appropriate please put a x in the box)

8) Was the diagnosis confirmed according to diagnostic criteria? Yes No N/A

a) Blood ketones mmol/L	DIAGNOSIS OF DKA (JBDS): Ketonuria > 3.0mmol/L or significant ketonuria (more than 2+ on standard urine sticks) Blood glucose > 11.0mmol/L or known diabetes mellitus Bicarbonate (HCO ₃ ⁻) < 15.0mmol/L and/or venous pH < 7.3	10. Was treatment area?
b) Urine ketones		<input type="checkbox"/> a) Level 1? (eg general ward area) <input type="checkbox"/> b) Level 2? (eg high dependency area) <input type="checkbox"/> c) Level 3? (eg ITU) <input type="checkbox"/> d) Acute medical unit? <input type="checkbox"/> e) A&E <input type="checkbox"/> f) Other? (please state)
c) Blood glucosemmol/L		
d) pH		9. If you use different diagnostic criteria for diagnosing DKA – please list them here
e) Bicarbonatemmol/L		Ketonesmmol/L Glucose.....mmol/L pH..... Other.....

11. Do you use the JBDS DKA guidelines?
a) Yes b) No

Joint British Diabetes Societies Inpatient Care Group

Institutional Standards for the Management of Diabetic Ketoacidosis (DKA) in Adults
(Complete one per Institution)

Name of Hospital: _____ Date form completed: _____
Form completed by: _____ Grade _____

(Put N/A= not applicable or NR = not recorded)

1. Guidelines

	Yes	No	Don't know
a) Do you have a DKA treatment pathway?			
b) Do you have local guidelines for managing DKA?			
c) Do you have an Integrated Care Plan (ICP) for DKA?			
d) Are your guidelines current and valid?			
e) What are your guidelines based on? <input type="checkbox"/> i) Joint British Diabetes Societies guidance? <input type="checkbox"/> ii) Other..... (please state)			

2. Staffing

	Yes	No	Don't know
a) In the clinical areas where patients with DKA are initially cared for, do you have trained health care professionals available to measure blood ketone levels 24 hours per day?			
b) Do you have dedicated inpatient diabetes specialist nurses at a staffing level of 1WTE per 300 beds? If the answer is NO – what is your current DISN staffing level per 300 beds?.....WTE			
c) Do you have a clinical lead responsible for the implementation & audit of DKA guidelines?			

3. Monitoring

	Yes	No	Don't know
a) In the clinical areas where patients with DKA are initially cared for, do you have the facility to measure blood ketones in your Trust?			
b) Do you have blood glucose testing meters that are centrally connected in your Trust?			

4. Audit / Education

	Yes	No	Don't know
a) Do you have a quality assurance scheme in place for both glucose and ketone meters?			
b) Have you audited the outcomes of your patients admitted with DKA the last past?			
c) Do you monitor against performance indicators eg those listed in the JBDS guideline?			
d) Do you have a rolling educational programme for medical staff?			
e) Do you have a rolling educational programme for nursing staff?			

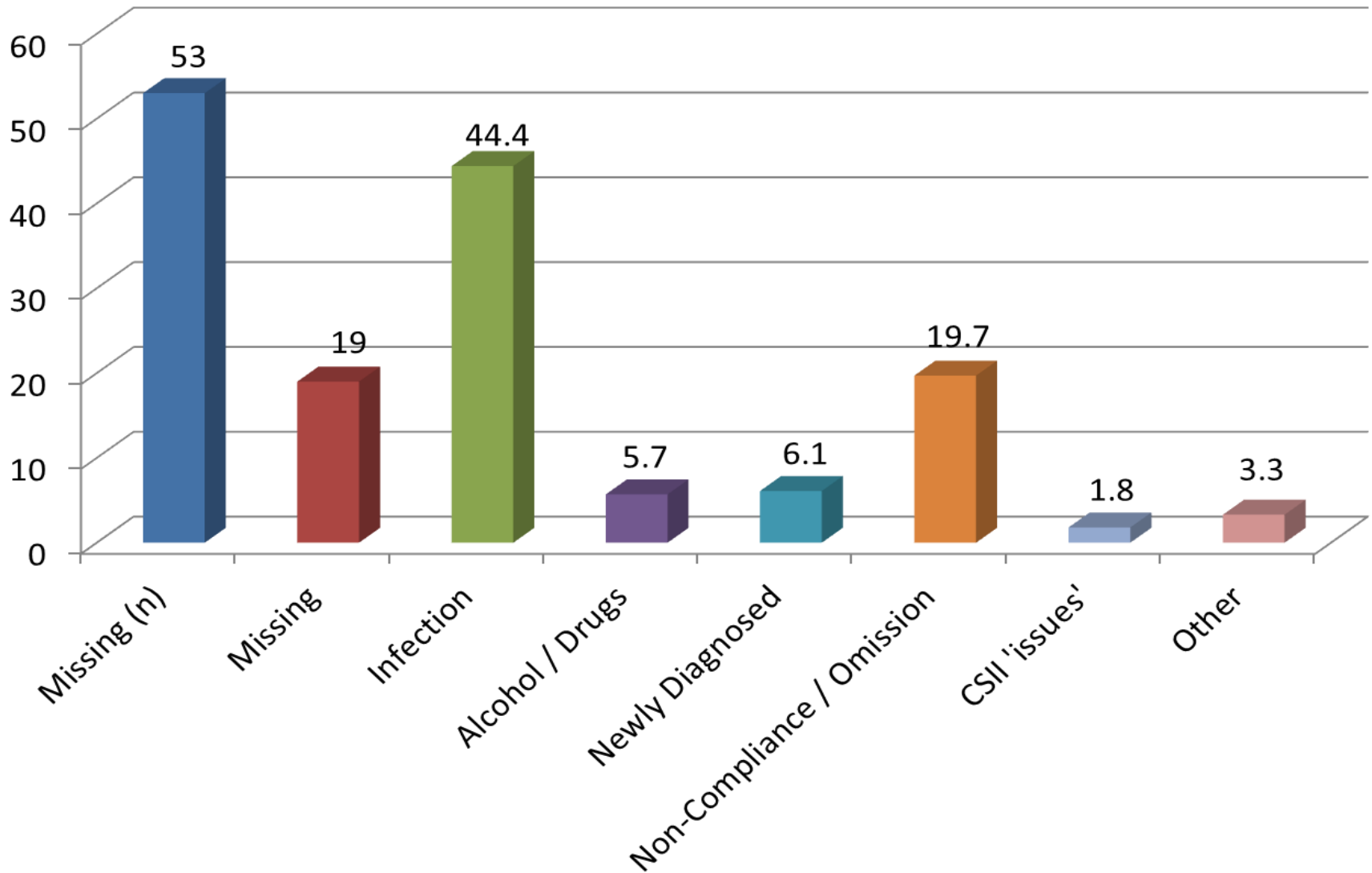
5. Patients

	Yes	No	Don't know
a) Do your patients have access to the specialist diabetes team within 24 hours of admission?			
b) Do your patients have the choice to self-manage their diabetes?			

Results

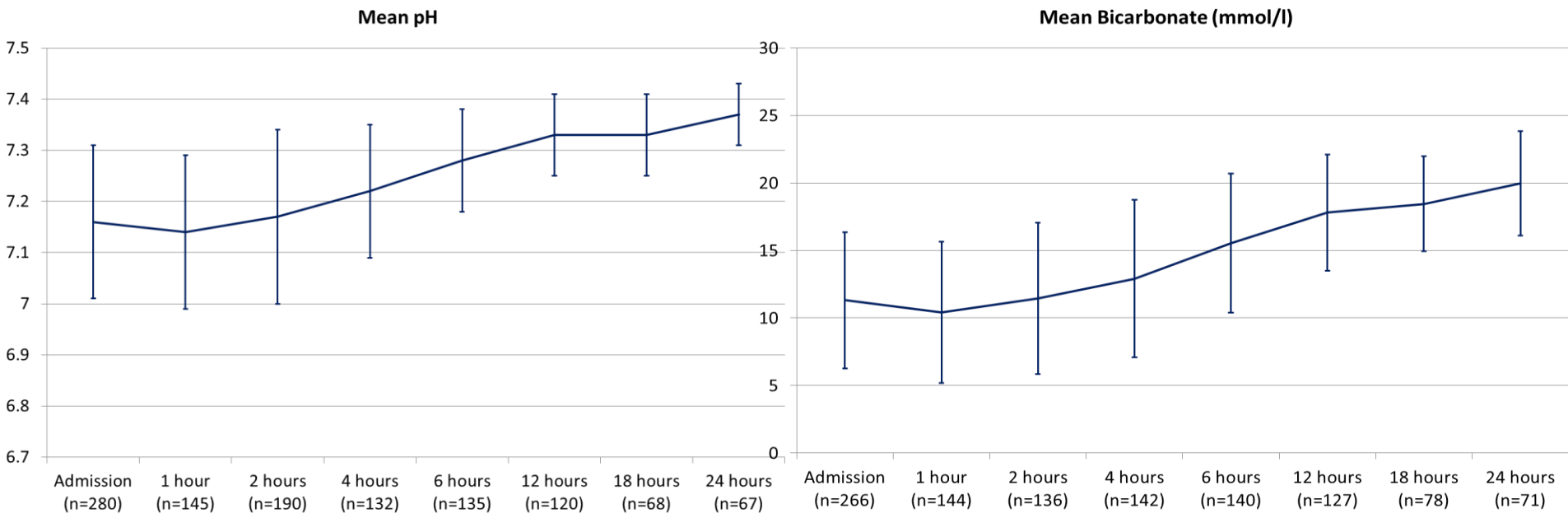
- 283 forms were received from 72 hospitals between May and November 2014
- There are hundreds of messages in the data!
- A few of the main ones are:

Precipitants (%)



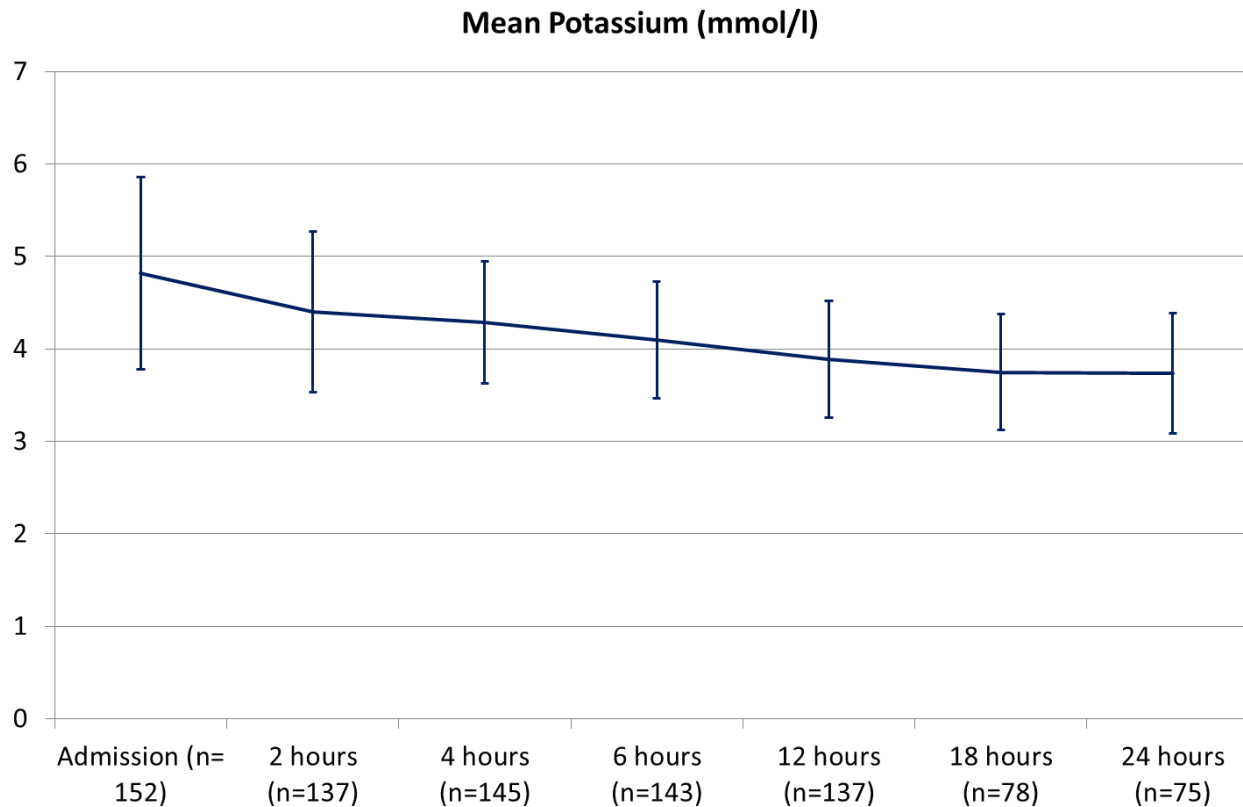
Fixed Rate Intravenous Insulin

- The use of 0.1units/kg/hr led to excellent rises in pH and bicarbonate – so DKA resolved by 18.77 hours



Potassium

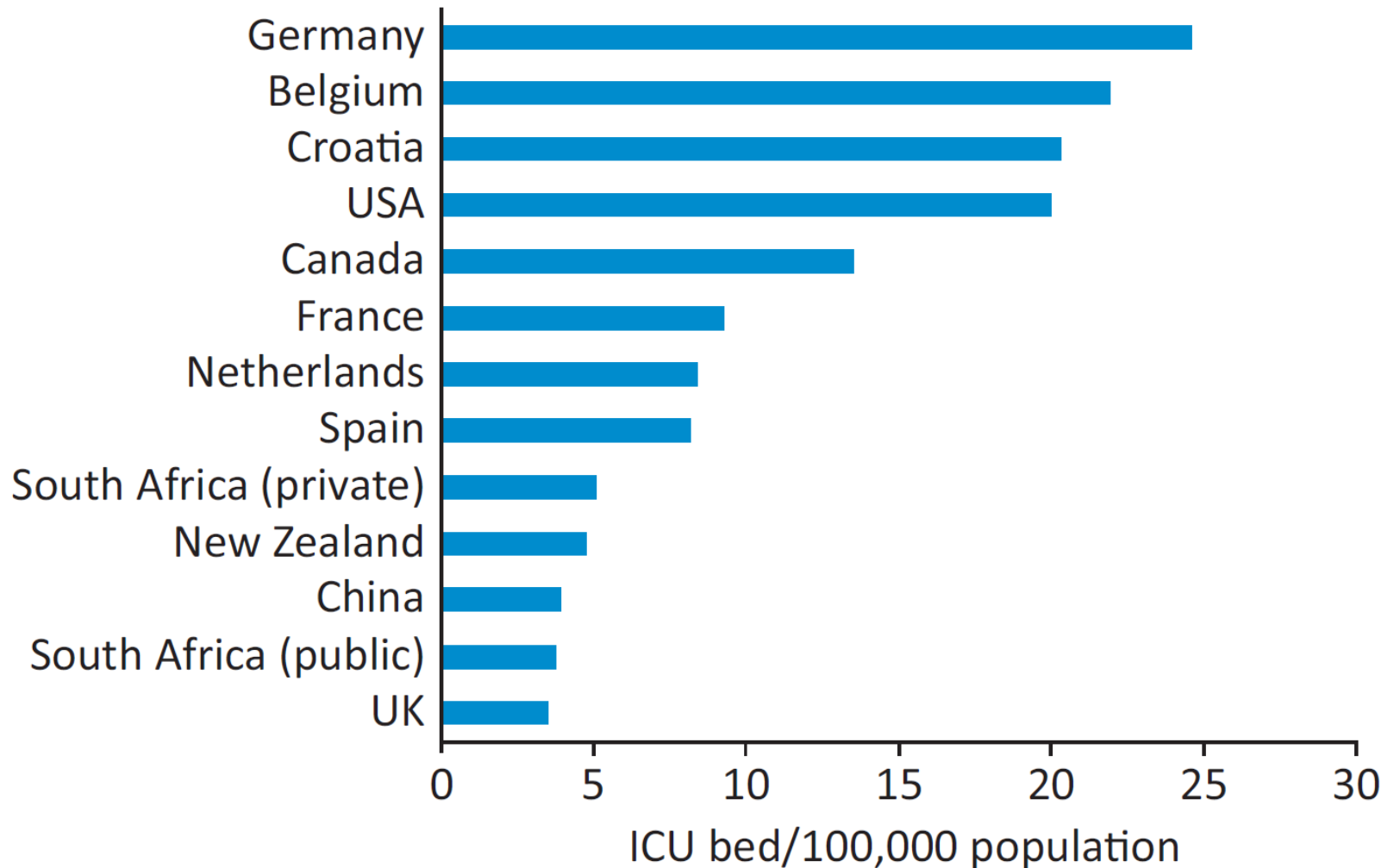
- But despite an aggressive potassium replacement regimen – more than 50% of patients became hypokalaemic



Questions for Discussion – in No Particular Order

- The 'processes' at the front door were done well – but later were done less well
 - What can be done to ensure consistent good practice?
- In 67% of patients, potassium dropped to less than 4.0mmol/L at 24h. No harm came to them, but was this luck or judgement?
 - Should the rate of potassium infusion be increased, even if this incurs more resource – e.g. central lines, transfer to HDU, more intensive monitoring?
 - (See the poster on outcomes of paediatric DKA where ~25% of children developed hypokalaemia)

But the Beds Aren't Available



Hypoglycaemia

- 27.6% of patients had glucose levels <4.0 mmol/L during their treatment
 - Should anything be done about that? (almost 20% of children developed hypoglycaemia)
- In the patients in whom the long acting insulin was not continued, 30% patients became hypoglycaemic, in those in whom it was continued, 36.6% developed hypoglycaemia
 - Does this matter?
- One suggestion is to change to a VRIII when the ketone levels drop to <3 mmol/L regardless of the glucose



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