Statistical issues in the case of Lucy Letby

Forensic statistics in the UK

Richard D Gill, 12 November 2026
University College Dublin School of Mathematics and Statistics

```
> 100 - 15
[1] 85
> 85 / 15
[1] 5.666667
```

Danger of naive statistics

Length bias

- Researchers say that 15% of convicts in the UK are likely innocent
- 15% : 85% ≈ 1 : 6. Approx 1 in 7 are innocent
- In most developed countries landen, between 5% en 10%
- But: MoJ's are more common in **serious** and **complex** cases with much **indirect** [*circumstantial*] evidence... those are cases with typically **heavy** punishment, thus **long** prison sentence
- The percentage of "false convictions" is likely much lower
- Suppose **on average** five times longer sentence
- A simple calculation says only 5% of **convictions** could be unjust

But still: is there something else odd going on in the UK?

- Six 6 nurses are in UK jails with very long sentences, for the murder (or attempted murder) of their patients with insulin
- In all these cases, the insulin-murder (or insulin-attack is the only "forensically proven" attack; the others are only supported by circumstantial evidence. The "proven" insulin-attack provided the decisive supporting proof.
- The percentage or nurses in British prisons is 10 keer larger than you would expect given the percentage of nurses in the working population
- Are British nurses much more often psychopaths than any other?

Interlude

Witchtrials

- Throughout Europe, there was a peak in witch trials in the early 17th century, ie after the "*Age of science*" and after the *reformation*, and actually at the same time as the *Enlightenment*
- It was more common in protestant than in catholic societies
- Witchhunters were highly educated and intelligent persons, the science of witches was extensive, scholarly, published.
- I could not find any examples of a Dublin witch trial, even in the middle ages

Witch hunting

in Chester (UK)

This is the hat of **Peter Bradshaw**, a fanatical judge, originally from the county of *Cheshire*, who, in London was president of the court which sentenced King Charles 1 to death.De hat is made of iron, covered with felt – he feared assassination and wore iron body armour under his clothes. In Chester, after the restoration, he presided over 32 witch trials leading to three death sentences.

https://morrisoxford.co.uk/bradshaws-hat/

[Photo: Ashmolean museum, Oxford]

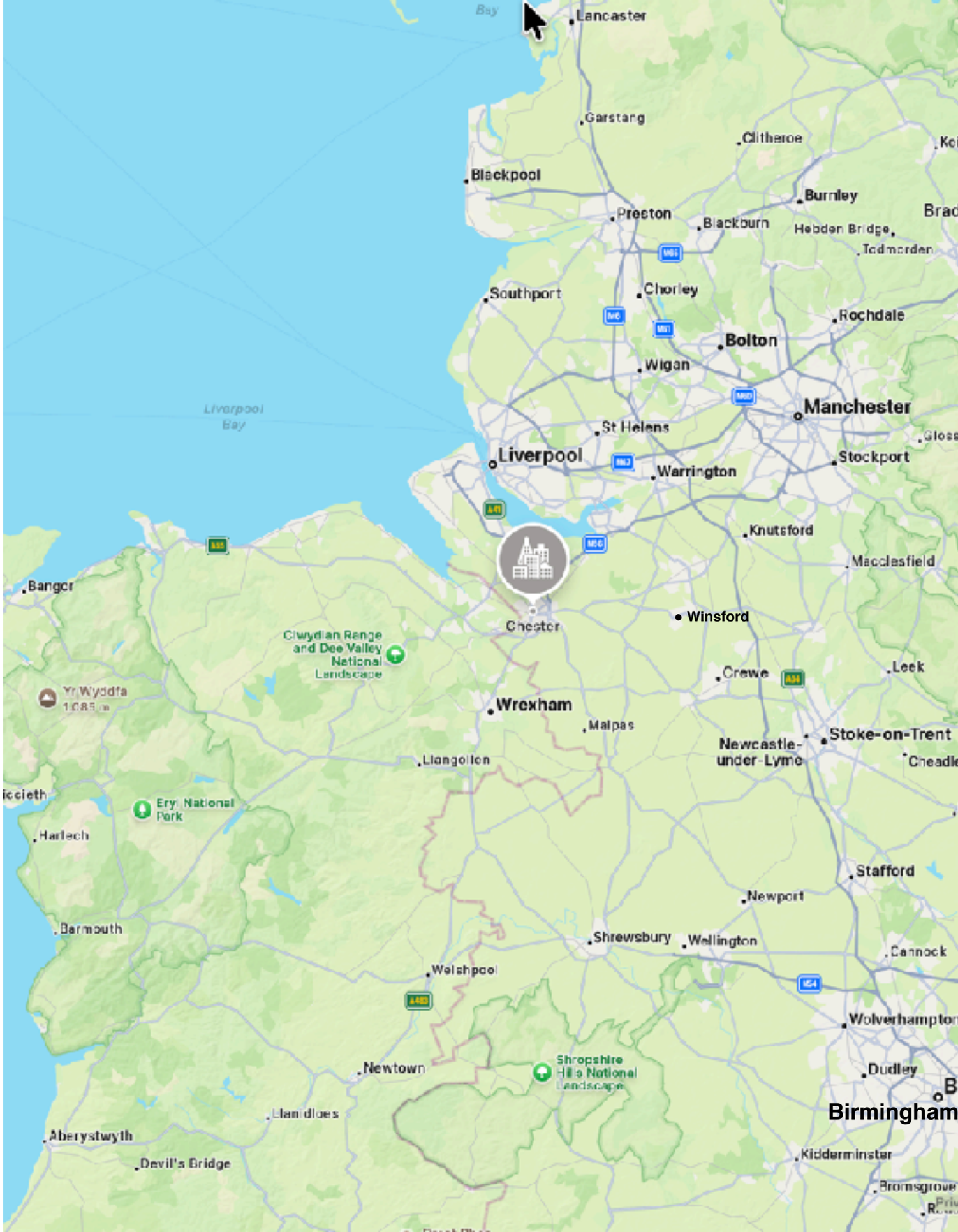


Chester

Bewaker van de grens tussen Engeland en Wales

Chester is a cathedral city and the county town of Cheshire, England, on the River Dee, close to the England-Wales border. With a built-up area population of 92,760 in 2021, it is the most populous settlement of *Cheshire West and Chester*. It is also the historic county town of Cheshire and the second-largest settlement in Cheshire after Warrington. Chester was founded in 79 AD as a "castrum" or Roman fort with the name Deva Victrix during the reign of Emperor Vespasian.





The Countess of Chester Hospital

and its Maternity Unit
Right: five years ago; left: one year ago







The Countess of Chester Hospital

The Maternity and Children Units as they are today



The case of Lucy Letby

De eerste veroordeling

August 18, 2023

- Manchester Crown Court
- Judge: Mr Justice Goss
- Lucy Letby is convicted of the murder of 7 babies (Babies A, C, D, E, I, O, and P) and attempted murder of 6 babies (Babies B, F, G, I, L, and M/N), after a ten month trial
- Methods Used: Air injection, insulin poisoning, and force-feeding milk
- Sentence: Whole life order (imprisonment for the rest of her life with no possibility of release) given in August 2023.



Credit: Cheshire Constabulary

The case of Lucy Letby

(More nails in the coffin)

- CPS was granted a retrial of one case where jury had been undecided. In July 2024, Letby was also convicted of attempting to murder Baby K.
- Letby's legal team applied to the Court of Appeal twice, one for each of the previous judgements. Both applications were dismissed by the Court of Appeal.
- Current Status: Letby is serving 15 whole-life orders for multiple murders and attempted murders.
- Cheshire Constabulary announced further (attempted) murder charges involving nine infants earlier, at Liverpool Women's Hospital. They will also charge CoCH management with gross negligence manslaughter, corporate manslaughter, and perverting the course of justice.
- But: **January 2026**: Crown Prosecution Service (CPS) announced Letby would face no new criminal charges regarding the additional allegations. They concluded that the evidential test was not met.

The case of Lucy Letby

(Yet more nails in the coffin: The Thirlwall Inquiry)

- Established as a statutory public inquiry on **October 19, 2023**, by the UK Secretary of State for Health and Social Care
- Terms of Reference (ToR): Letby is a serial killer. Why was she not stopped earlier?
- **15 September 2026**. Final report. Main conclusions: management failed to listen to whistleblowers (the consultants).
- Numerous logical (given ToR) but utterly stupid recommendations.
- E.g. NHS should not use the more expensive LC-MS/MS method to investigate insulin poisoning because getting a different result from cheap and easy immunoassay would only confuse doctors

The case of Lucy Letby

Light at the end of the tunnel?

- February 4, 2025, retired neonatologist Dr. Shoo Lee and a panel of 14 international medical experts held a press conference in London—alongside barrister Mark McDonald and Conservative MP David Davis—claiming there is no medical evidence to support the conviction of former nurse Lucy Letby
- Letby's new defence team has submitted an application to the CCRC (Criminal Cases Review Commission)
- The CCRC *might* refer the case to the Court of Appeal
- The Court of Appeal *might* allow the case to be reopened, it *might even* quash the existing convictions

The history

Focus on June 2015–June 2016

- **January 2012**: Lucy Letby starts work at the Countess of Chester Hospital
- **Early 2015**: Lucy Letby completes a specialist training course
- **June 2015**: Unexpected deaths of Babies A, B and D; collapse of Baby C. There are usually 2 or 3 deaths per year. Consultants notice that Lucy Letby was involved with all four events.
- **Through till June 2016:** numerous more unexpected and unexplained and deaths and collapses. Consultants' suspicions of Letby keep on growing. Last straw is the triplets Babies O, P, R and then Baby Q.

The history

Investigations and recriminations

- **July 2016:** Lucy Letby is moved to administrative tasks
- **Autumn 2016**: Several internal and external medical investigations are done. No proof of malfeasance is found. Two (out of 14) deaths remain unexplained and a forensic investigation is recommended
- The RCPCH evaluates the unit and publishes damning findings. Letby is cleared. The cause of the spike in deaths is not identified. (No statistician or epidemiologist, no obstetrician on the team of 6 experts)
- Letby submits a complaint that she was unjustly bullied by the specialists. Her complaint is upheld. 6 consultants and one obstetrician are ordered to apologise to her in writing and in person. She is allowed to resume duties on the NICU
- **March 2017**: Consultant paediatricians Brearey ("lead neonatology") and Jayaram ("lead paediatrics") use the conclusion that two deaths are still unexplained to convince management to approach the police

The history

Investigations and recriminations

- **March 2017**: Police request medical data on all deaths and all unexpected unexplained collapses from CoCH. The material is presumably gathered and curated by Brearey. (Jayaram is very busy with his side career as TV doctor)
- The materials arrive but the police have no clue what to do next
- **May 2017: First newspaper reports**
- **July 2017**: Welsh retired paediatrician Dr Dewi Evans [witch-hunter general?] introduces himself to the police and determines in ten minutes that foul play caused Baby P or Q's liver damage

The history

Police get to work

- **3 July, 2018**: Letby is arrested at her home in Westbourne Road, Chester at 6am and officers search the three-bedroom property. **Newspaper and TV crews film police digging up her front garden**. Searches also take place at her parents' home in Hereford and at her place of work in the hospital's Risk and Patient Safety Office. Police say the investigation has widened to 17 deaths and 15 non-fatal collapses between March 2015 and July 2016.
- **10 June, 2019**: Letby is re-arrested at her parents' home.
- **10 November, 2020:** Letby is arrested again (woken at dawn) before she is charged. Police body-cam footage later sold to NetFlix. Appears in court for the first time two days later.
- **4 October, 2022:** Letby goes on trial at Manchester Crown Court accused of the murders of seven babies and the attempted murders of 10 others.

What evidence was there?

Basically, none.

- The spike in deaths and collapses, and their association with nurse Lucy Letby
    - The roster chart
- The alleged confession note
- The alleged insulin poisonings (Babies F and L)
    - 2 (?) off the chart insulin/C-peptide ratios

Lucy Letby: the spike

Early neonatal deaths
2013 + 2014
versus 2015

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Early neonatal deaths
2013 + 2014
versus 2015 + half 2016

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> pbinom(8 + 5 - eps, 6 + 8 + 5, 1.5 / 3.5, lower.tail = FALSE)
[1] 0.02205686
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3, 3, 8, 7, 2, 2

Source: FOI request by Peter Elston

Lucy Letby: the roster chart

Operation Hummingbird — Exhibit Ref: CEH/16 — Staff Presence Report

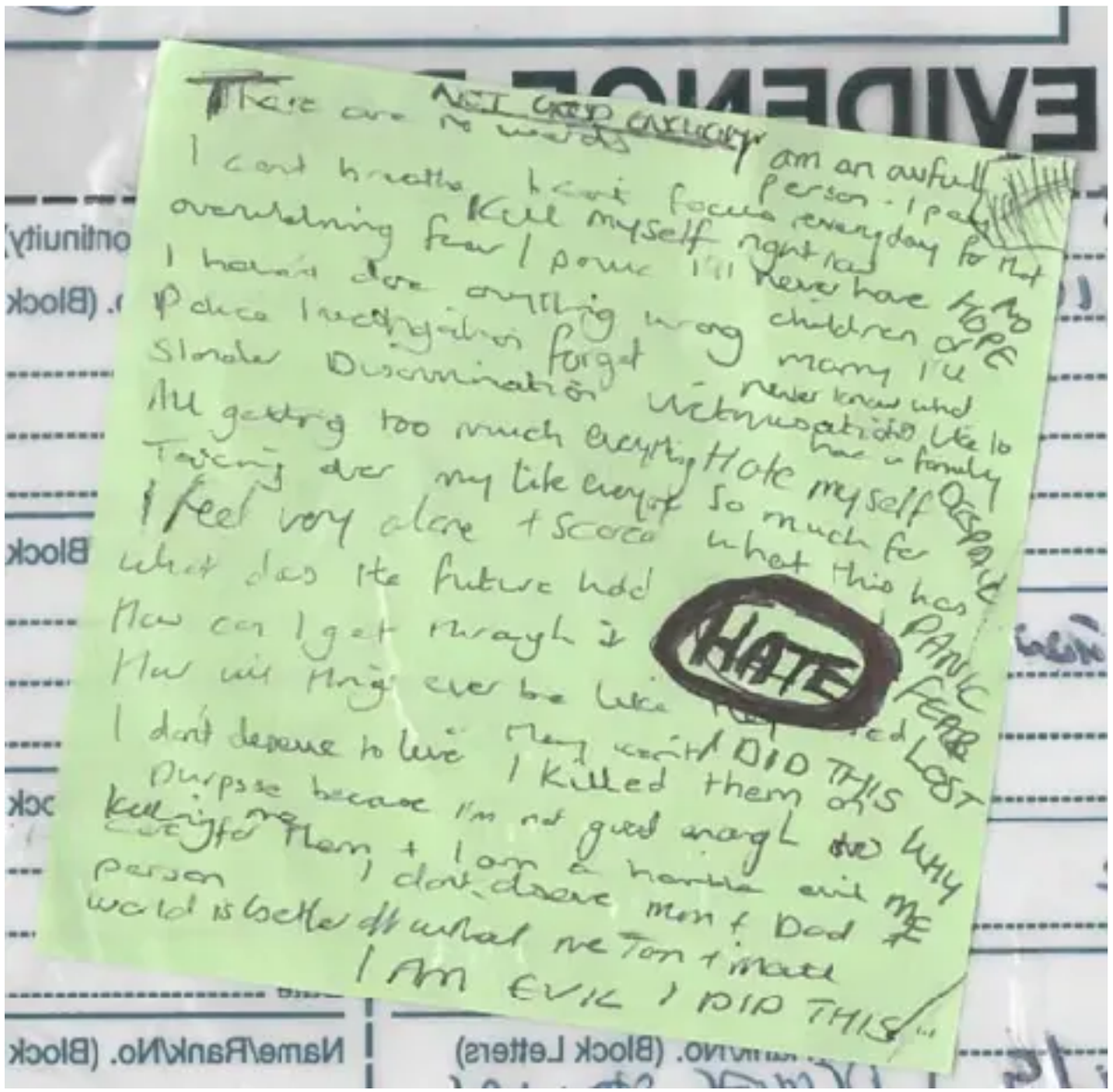
Chart 1: Nurses present on clinical and administrative duties Summary

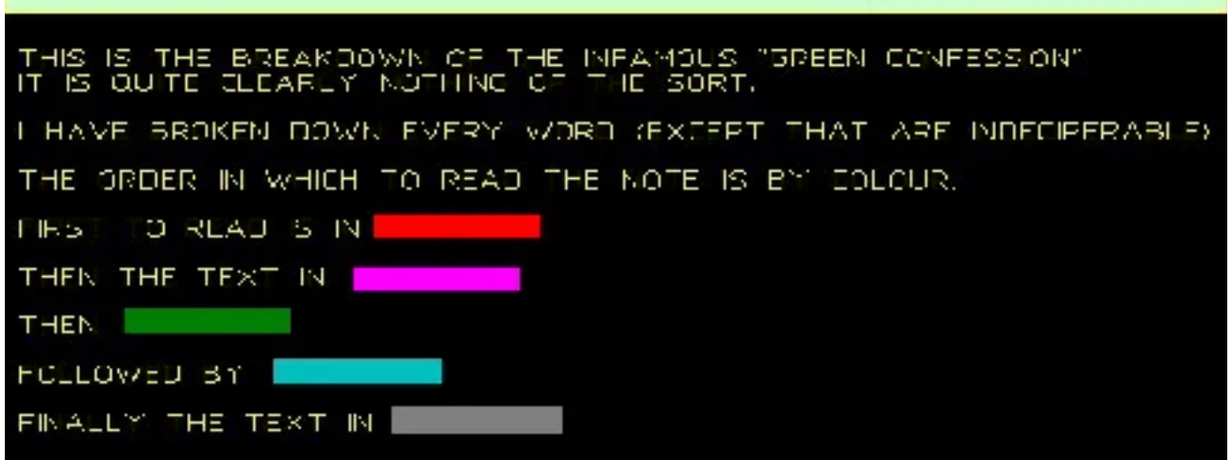
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1	Child A	† G	08/06/2015	NIGHT							X						X								X	X	X	X							X							7
2	Child B	G	09/06/2015	NIGHT										X									X			X	X	X								X							6
3	Child C	† G	13/06/2015	NIGHT													X	X									X		X		X				X							6
4	Child D	† G	21/06/2015	NIGHT								X	X				X						X				X																5
5	Child E	† G	03/08/2015	NIGHT					X				X													X	X											X					5
6	Child F	G	04/08/2015	NIGHT					X					X													X								X	X		X				6
7	Child G	G	06/09/2015	NIGHT	X										X									X		X	X																5
8	Child G	G	21/09/2015	DAY							X		X			X		X	X								X				X			X			X			X	X	11
9	Child H	NG	25/09/2015	NIGHT													X										X								X			X				5
10	Child H	† –	26/09/2015	NIGHT											X		X	X									X							X								5
11	Child I		30/09/2015	DAY				X		X						X		X		X						X	X		X			X				X			X		11
12	Child I		12/10/2015	NIGHT				X					X					X							X		X															5
13	Child I		13/10/2015	NIGHT									X					X			X				X		X							X						X		7
14	Child I	† G	22/10/2015	NIGHT				X							X												X		X								X					5
15	Child J	–	26/11/2015	NIGHT									X											X		X	X			X									X			6
16	Child J	–	17/12/2015	DAY												X			X			X			X		X		X		X							X		X	9
17	Child K	–	16/02/2016	NIGHT									X									X					X									X			X			5
18	Child M		09/04/2016	DAY			X	X	X								X									X	X											X				6
19	Child L	G	09/04/2016	DAY			x	x	x								x									x	x			x								x				7
20	Child N	–	02/06/2016	NIGHT											X											X		X							X			X				5
21	Child N	–	14/06/2016	NIGHT					X	X										X		X	X		X	X																7
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23	Child P		23/06/2016	DAY								X			X				X							X		X			X	X	X				X			X	X	11
24	Child P	† G	24/06/2016	DAY		X									X				X							X	X					X					X			X		8
25	Child Q	–	25/06/2016	DAY														X								X	X		X	X												5
				Total	1	1	2	5	5	2	2	3	7	2	7	3	5	7	6	2	1	3	3	2	4	6	25	7	7	2	3	6	3	2	3	4	4	5	6	2	6	5

*('X' indicates 'on duty' presence on the shift, where a suspicious event has been identified)

Deaths in NICU: 7 G + 1 "–" on chart; 5 not on chart. 4 deaths very soon after transfer

The confession





Insulin immunoassay warning

Please note that the insulin assay performed at RLUH is not suitable for the investigation of factitious hypoglycaemia. If exogenous insulin administration is suspected as the cause of hypoglycaemia, please inform the laboratory so that the sample can be referred externally for analysis.

Insulin	
Description	A peptide hormone secreted physiologically by the β cells of the islets of Langerhans in the pancreas.
Indication	Investigation of the cause of hypoglycaemia.
Additional Info	Proteolytic cleavage of 86 amino acid proinsulin polypeptide prior to secretion produces mature insulin molecule (51 amino acids) and equimolar quantity of c-peptide. Insulin is secreted in response to activation of sulphonylurea-sensitive K+ channel in response to hyperglycaemia and other secretogogues. Insulin is the dominant hormone regulating blood glucose concentration and has numerous modes of action that reduce circulating glucose levels. Insulin action is impaired in diabetes mellitus through either absolute deficiency (type 1) or relative tissue resistance (type 2). Tumoural secretion of insulin (insulinoma) is a rare cause of hypoglycaemia. Very rarely, tumours may cause hypoglycaemia through secretion of proinsulin or IGF-2. Please note that the insulin assay performed at RLUH is not suitable for the investigation of factitious hypoglycaemia. If exogenous insulin administration is suspected as the cause of hypoglycaemia, please inform the laboratory so that the sample can be referred externally for analysis.
Concurrent Tests	Plasma glucose to confirm hypoglycaemia. Serum c-peptide and serum ketones where appropriate.
Dietary Requirements	Fasting sample required
Interpretation	Insulin must be interpreted in the context of the prevailing glucose level, ideally when the patient is demonstrably hypoglycaemic (plasma glucose ≤ 2.5 mmol/L in adults). Normal insulin/glucose ratio: < 5.0 mU/mmol. (See also entry on c-peptide/insulin ratio: http://rlbuhtnet/jps/c_peptide_insulin_ratio.pdf)
Collection Conditions	Fasting sample (where appropriate) or sample collected during hypoglycaemic attack. Inpatients: Sample must be received in laboratory within 30 minutes of venepuncture. External hospitals: Separate serum within 30 minutes of collection and freeze immediately. Send samples frozen.
Frequency of testing	As required, contact lab for urgent analysis.

Dramatis personae (1/4)

https://www.blueprintforfreespeech.net/en/prize/recipients/2023/jayaram-brearey-gibbs

Dr Ravi Jayaram, Dr Steve Brearey, Dr John Gibbs and the other paediatric consultants at the Countess of Chester NHS Trust

2023 BLUEPRINT UK

WHISTLEBLOWING PRIZE







Dramatis personae (2/4)

https://en.wikipedia.org/wiki/James_Goss_%28judge%29



James Richard William Goss was born on 12 May 1953 to judge William Alan Belcher Goss and his wife Yvonne. He was educated at Charterhouse School, an independent boarding school in Surrey. Goss studied at Durham University, where he was a member of University College, and graduated in 1974 with a Bachelor of Arts (BA) degree. He was later appointed an honorary fellow of Durham Law School.

Dramatis personae (3/4)

Retired paediatrician Dr Dewi Evans (lead prosecution expert)



Dramatis personae (4/4)

Lady Justice Thirlwall (chair of Thirlwall Inquiry)



Twins and multiples

Baby	Baby's fate
A	Neonatal death
B	Survived
E	Neonatal death
F	Survived
J	Survived
J's sibling	Died In utero > 24 wks
L	Survived
M	Survived
N	Survived
N's sibling	Unknown
O	Neonatal death
P	Neonatal death
O & P's sibling	Survived
Q	Survived
Q's sibling	Died In utero > 24 wks

The four ingredients

Cf. Lucia de Berk

- **A spike in deaths**
- **Association between bad events & presence of a notable nurse**
  - Something bad was going on from June 2015 – June 2016
  - Consultants associated this with Lucy from the beginning
  - July 2016: unit demoted to Level 1
  - Lucy placed on administrative duties
  - The deaths stopped
- **Disturbing forensic evidence**
- **Weird writings seen as a confession**

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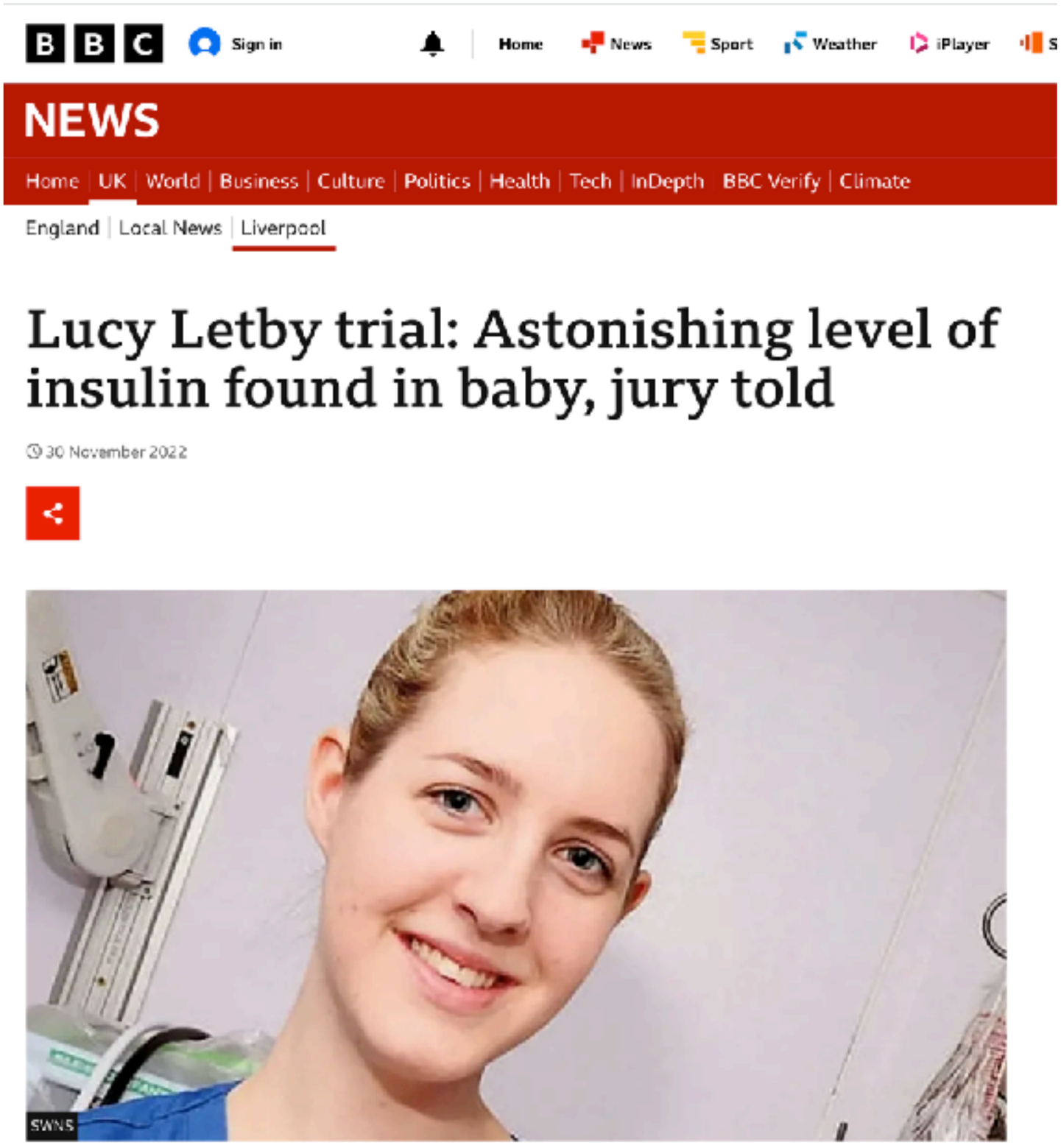
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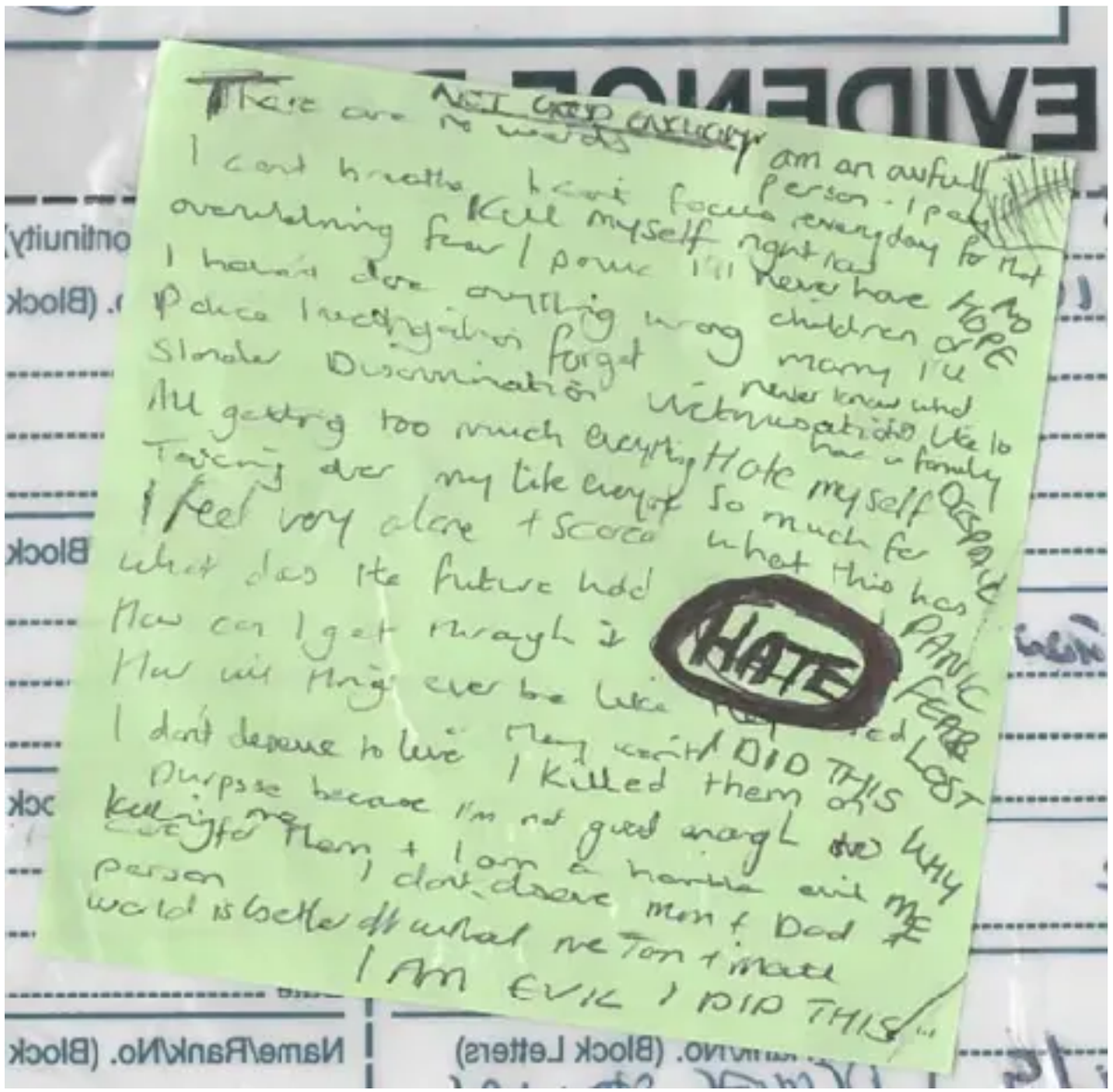
The insulin poisonings

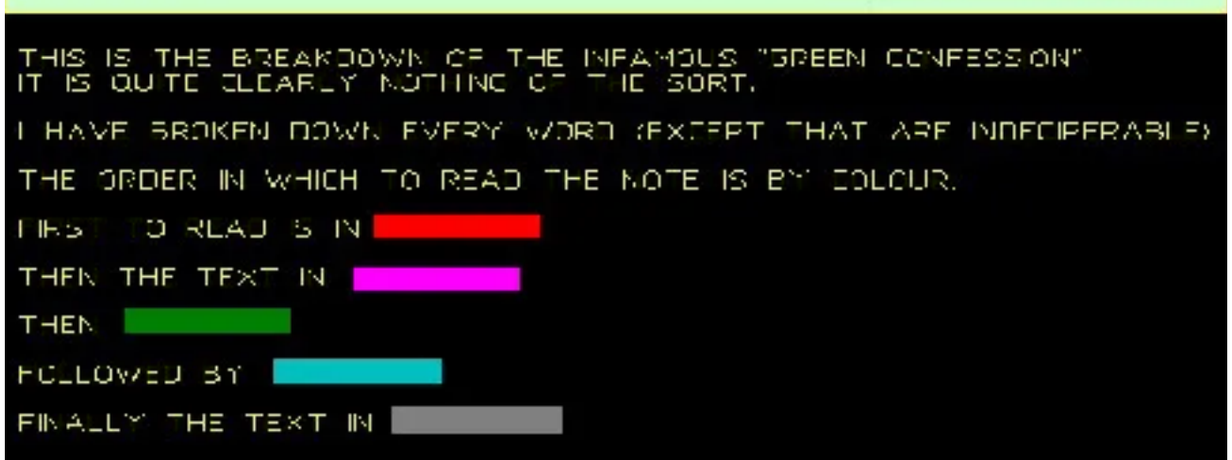
Babies F and L



https://www.bbc.co.uk/news/uk-england-merseyside-63808514

The confession





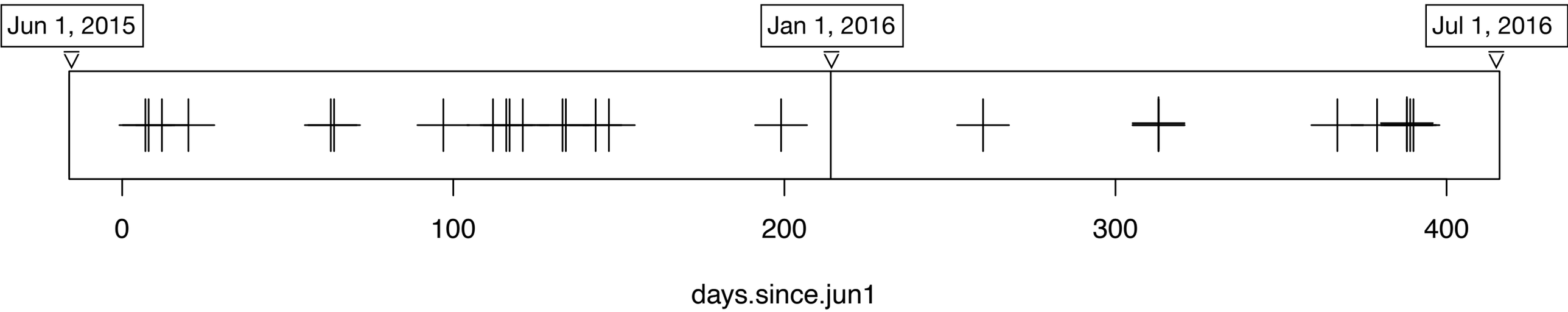
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Concurrent Tests	Plasma glucose to confirm hypoglycaemia. Serum c-peptide and serum ketones where appropriate.
Dietary Requirements	Fasting sample required
Interpretation	Insulin must be interpreted in the context of the prevailing glucose level, ideally when the patient is demonstrably hypoglycaemic (plasma glucose ≤ 2.5 mmol/L in adults). Normal insulin/glucose ratio: < 5.0 mU/mmol. (See also entry on c-peptide/insulin ratio: http://rlbuhtnet/jps/c_peptide_insulin_ratio.pdf)
Collection Conditions	Fasting sample (where appropriate) or sample collected during hypoglycaemic attack. Inpatients: Sample must be received in laboratory within 30 minutes of venepuncture. External hospitals: Separate serum within 30 minutes of collection and freeze immediately. Send samples frozen.
Frequency of testing	As required, contact lab for urgent analysis.

Timeline of 25 indictment events

Lucy Letby: fully qualified and full time on unit, January 2015–June 2016



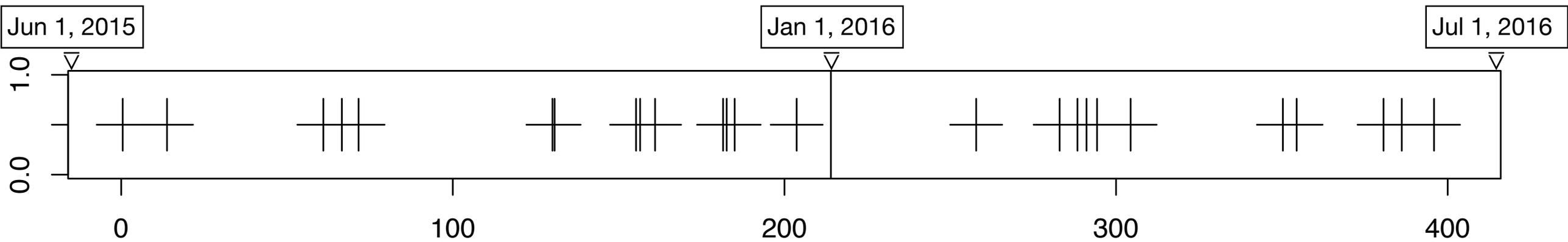
First event: June 8, 2015

Last event: June 27, 2016

Note the tight clustering

Timeline of 25 random events

Does this look random? Or do you see gaps and clusters?




```
> set.seed(12345)
> plot(x = runif(25, 0, 400), y = rep(0.5, 25),
+     xlim = c(0, 400), ylim = c(0, 1),
+     type = "p", pch= 3, lab = c(5, 3, 7),
+     ylab ="", cex = 3)
```

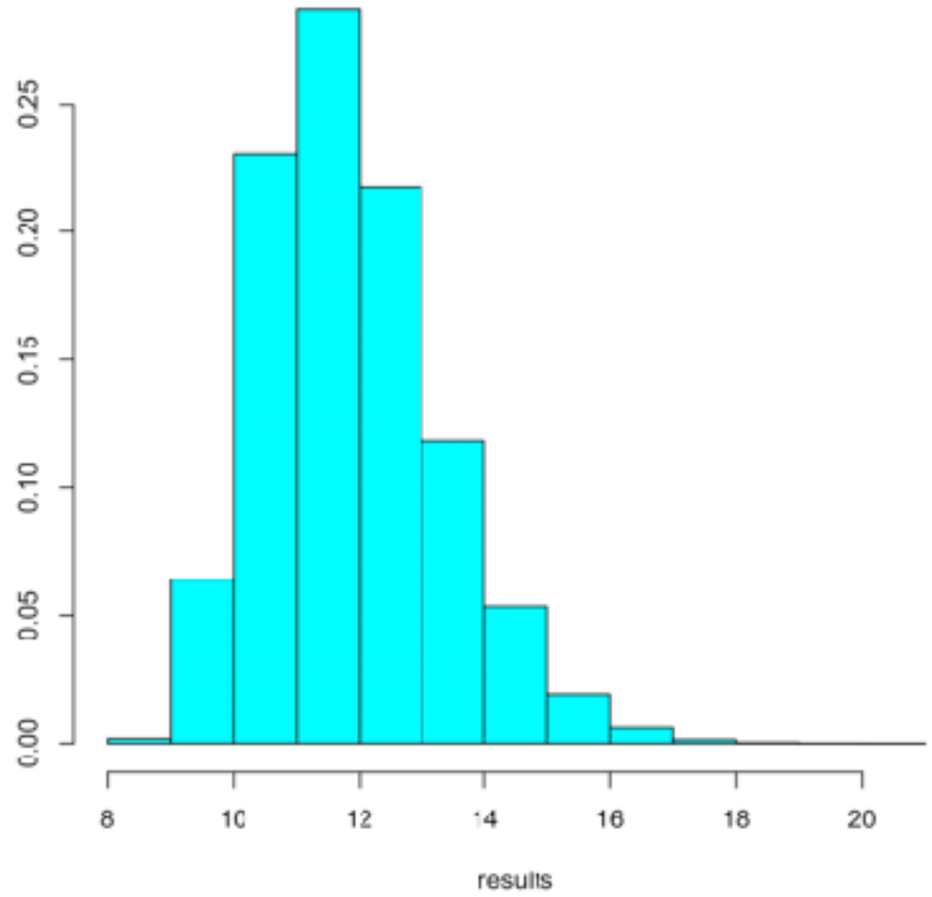
First event: June 1, 2015

Last event: June 26, 2016

Note the not quite as tight clustering, similar gaps

Lucy Letby: the spike

```
> simulate_max_fixed_n <- function(n, window_w, total_T, n_reps = 1000) {
+   max_counts <- replicate(n_reps, {
+     # 1. Generate n events from a Uniform distribution
+     arrivals <- sort(runif(n, min = 0, max = total_T))
+
+     # 2. Sliding window count
+     # For each arrival, count how many others fall within [t, t + w]
+     window_counts <- sapply(arrivals, function(t) {
+       sum(arrivals >= t & arrivals <= (t + window_w))
+     })
+
+     max(window_counts)
+   })
+   return(max_counts)
+ }
>
> results <- simulate_max_fixed_n(n = 24, window_w = 13/12,
+     total_T = 3.5, n_reps = 10^6)
>
> truehist(results, h = 1)
>
> sum(results > 11) / 10^6
[1] 0.418451
```



- The probability of a spike under the null hypothesis of complete randomness is 42%
- Statistically speaking, there was no spike! [?]

But what about the deaths?

We now know there were 17 *early neonatal deaths* during the "index period" of 13 months, including deaths of babies transferred to other hospitals

Lucy was on shift when the death happened in 6 of those cases (not charged with causing it, in several cases)

Could that be chance?

Dramatis personae (1/4)

https://www.blueprintforfreespeech.net/en/prize/recipients/2023/jayaram-brearey-gibbs

Dr Ravi Jayaram, Dr Steve Brearey, Dr John Gibbs and the other paediatric consultants at the Countess of Chester NHS Trust

2023 BLUEPRINT UK

WHISTLEBLOWING PRIZE







Dramatis personae (2/4)

https://en.wikipedia.org/wiki/James_Goss_%28judge%29



James Richard William Goss was born on 12 May 1953 to judge William Alan Belcher Goss and his wife Yvonne. He was educated at Charterhouse School, an independent boarding school in Surrey. Goss studied at Durham University, where he was a member of University College, and graduated in 1974 with a Bachelor of Arts (BA) degree. He was later appointed an honorary fellow of Durham Law School.

Dramatis personae (3/4)

Retired paediatrician Dr Dewi Evans (lead prosecution expert)



Dramatis personae (4/4)

Lady Justice Thirlwall (chair of Thirlwall Inquiry)



Twins and multiples

Baby	Baby's fate
A	Neonatal death
B	Survived
E	Neonatal death
F	Survived
J	Survived
J's sibling	Died In utero > 24 wks
L	Survived
M	Survived
N	Survived
N's sibling	Unknown
O	Neonatal death
P	Neonatal death
O & P's sibling	Survived
Q	Survived
Q's sibling	Died In utero > 24 wks

Let’s look more closely at the timeline

2nd half 2016 …

- Letby moved to administrative tasks [without good explanation]
- Management degrades unit to Level 1
- Deaths stop abruptly
- RCPCH (Royal College of Paediatrics and Child Health visits hospital
- A coroner had already determined natural death in all cases [root cause often “extreme prematurity” or “congenital deformations”; immediate cause “sepsis” or “pneumonia”. A new pathologist reviews all deaths. All are quite understandable, but in two cases further forensic investigation would be needed. [No preserved biological samples, no investigation performed at time of death]
- In 2015 and 2016, 6000 births in total. One expects 6 x 0.3 =1.8 **unexplained deaths**

The RCPCH report

Published early 2017

- Extremely critical of clinical management of CoCH NICU
- Only two consultant rounds per week, should have been two per day
- No neonatologist
- Not enough sufficiently qualified nurses
- Insufficient guidance given to trainee doctors
- Too many cots/incubators in too small rooms
- Apparatus kept in hallway, insufficient apparatus

Let’s look more closely at the timeline

End of 2nd half 2016 …

- Lucy Letby believes she had been publicly bullied and unjustly accused by 6 paediatricians and one obstetrician, and her removal from patient care was uncalled for

- Brearey had been collecting evidence in his “drawer of doom”

- Gossip overheard in canteen lunch queue “seems you have an angel of death in your unit”

- She starts up a formal complaint procedure

- Her complaint is investigated by an external committee which upholds her complaint. Report states that consultants have lied.

Let’s look more closely at the timeline

Early 2017 …

- Consultants are ordered by management to apologise in person and writing to Lucy Letby
- Management starts discussing “managing out” Brearey and Jayaram
- Management contact Chester Constabulary [some deaths still unexplained, forensic investigation still needed].
- Note: the RCPCH team did not include a statistician or epidemiologist. **The cause of the spike has still not been investigated!** Brearey and Gibbs present statistics which suggest there was no increase in activity or acuity
- Brearey and Jayaram panic. Contact police directly

Early 2017 …

- Thanks to Thirlwall we now have the WhatsApp group chats and emails between the consultants in this crucial period

- The consultants had been explicitly discussing how to “pique the interest” of the police by cherry picking statistics; Jayaram brings up a fantasised story “**etched in his memory for ever**” involving Letby and Baby K

- The notion that many unexplained and unexpected collapses and deaths involved a strange mottling of the skin (or a strange rash) starts to be discussed … air embolism? **Lee & Tanswell 1989**



Lee & Tanswell 1989

Lee's sign

- A remarkable shifting pattern of mottling (pink on grey) occurs in 10% of Vascular Air Embolisms
- It is unique to Vascular Air Embolism
- The CoCH doctors claim to have seen it again and again!

March, May, 2017 …

- Jayaram and Brearey visit the police and convince them to investigate
- Operation Hummingbird is started in May
- Police request medical notes of all deaths Jan 2015 – June 2016 and of all babies experiencing unexplained and unexpected collapses [who do you think compiles that material?]
- Newspaper report police investigating a cluster of unexplained deaths at CoCH NICU
- Dewi Evans turns up at police station and diagnoses criminal activity in 10 minutes over a cup of coffee. Suggests police get nursing rosters

The police investigation

Tunnel vision; violation of standard rules of procedure

- Letby is arrested for questioning three times: 2018, 2019, 2020
- TV cameras are ready in the street
- The third time she is charged with murder and attempted murder
- Police dig up her front garden in Chester and search the gutters of her house
- Brearey, looking through old medical notes, discovers the two insulin cases
- Due to Covid, trial only starts in 2020, lasts 10 months

What never happened

- Mothers' medical notes were never investigated
- Police started to get advice from a statistician (Prof Jane Hutton) but the local CPS told them to “drop that line of enquiry”, and so they did
- Dewi Evans was the sole medical expert during the police investigation (standard procedure is to recruit a multidisciplinary medical team)
- The case was handled by the regional CPS while the case required national level

What did the defence do?

Why was the defence so feeble?

- One defence expert witness did testify during the trial: the plumber
- The defence sole medical expert witness was never called to the stand
- Five key requests were made to the judge, all five were turned down:
    - Request that prosecution reveals how the 25 cases were selected?
    - Request to bar Dewi Evans as expert witness (letter from Lord Justice Jackson)
    - Request to bar jurors who talked about case in a pub and admitted media influence
    - Request to go through the indictments in order, prosecution & defence for each indictment. Judge ruled all prosecution first, then all defence
    - “Each indictment stands on its own” yet: first trial convictions can be used to evaluate case of baby K in second trial
        - [Prosecution kept saying: “Letby is the common denominator”]

Pretrial meeting of experts

- About 10 scientific experts for prosecution
- One for the defence
- My guess: the judge was convinced of Letby’s guilt. Perhaps her defence team was too

What convinced judge, jury, and public?

The insulin poisonings

- There is no evidence at all that anyone tampered feeding bags of otherwise administered insulin without authorisation

- Three insulin experts (all NHS employees) testified that the **only** explanation of the anomalous insulin/C-peptide ratios observed for babies F and L was administration of insulin

- One of them is the co-author of a standard paper on the question. Her testimony contradicts her own published work

Review > Diabetes Res Clin Pract. 2013 Sep;101(3):248-54.
doi: 10.1016/j.diabres.2013.05.002. Epub 2013 Jun 14.

Forensic aspects of insulin

Vincent Marks [1], Gwen Wark

Affiliations + expand

PMID: 23751444 DOI: 10.1016/j.diabres.2013.05.002

V Marks, G Wark (2013), Forensic aspects of insulin

Diabetes Research and Clinical Practice **101 (3) 248–254**

Insulin or, more appropriately, hypoglycaemia gives rise to a wide variety of interactions with the law. In most cases its role is not seriously open to question occasionally however, it is. This is especially true of situations in which insulin is suspected of having been used inappropriately or maliciously. The major differences between investigation of hypoglycaemia in clinical and forensic situation are that in the latter the history is often unreliable, appropriate samples for analysis were not collected, preserved or labelled correctly and analytical results are likely to be challenged on grounds of specificity, accuracy and interpretation. Immunoassay remains the mainstay of clinical investigation of hypoglycaemia but likely to become displaced by mass-spectrometry in the forensic situation especially now that human insulin is being replaced by synthetic insulin analogues for the treatment of diabetes.

Discussion in social media

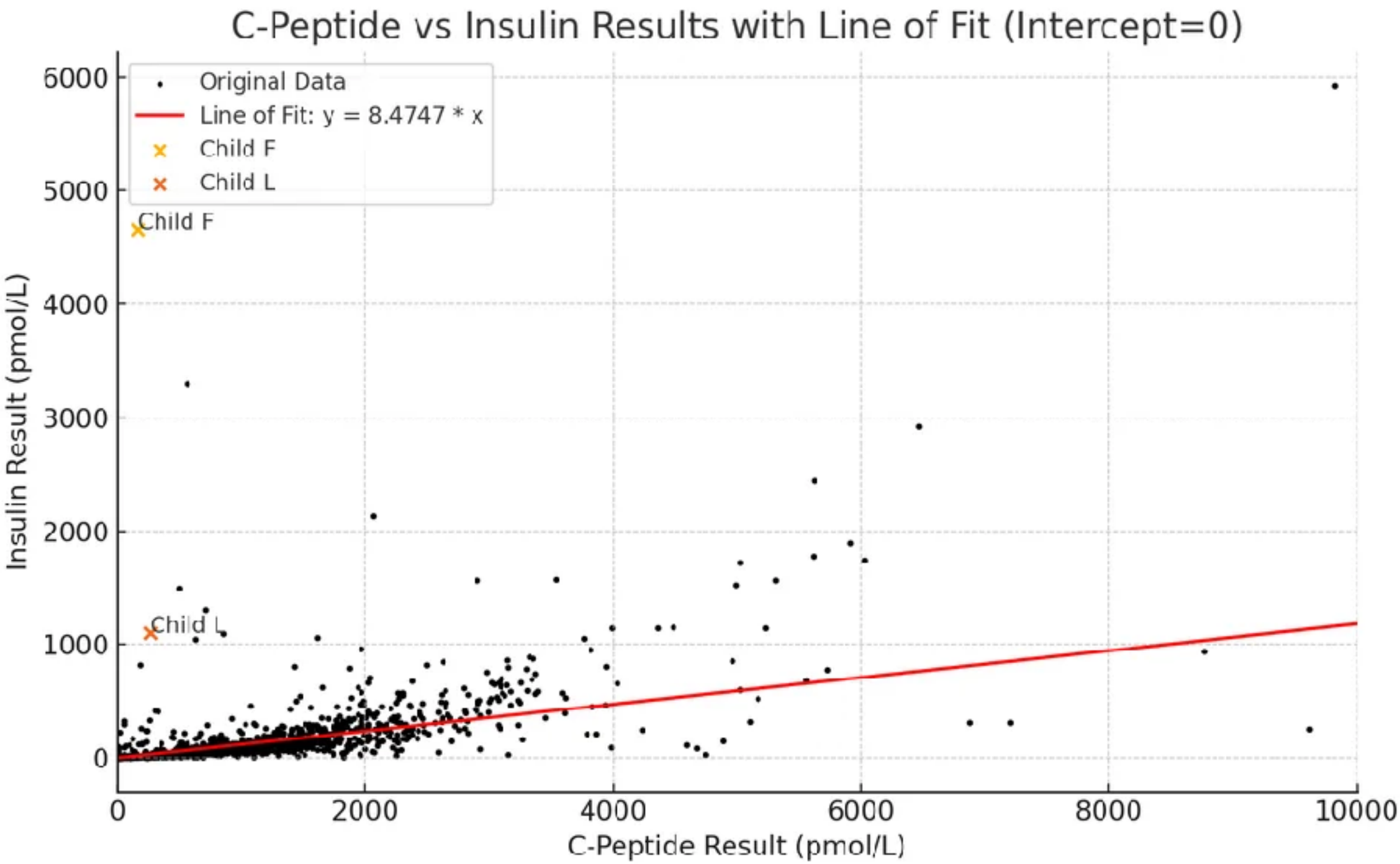
- “Thanks to a Freedom of Information request, blood test records from (2020-2023) the Liverpool University Hospitals NHS Foundation Trust are available for a quick analysis.”

- https://www.reddit.com/r/LucyLetbyTrials/comments/1e8l9oc/comparing_insulin_and_cpeptide_levels_in_lucy/

- 1368 measurements (later period, newer machine)

Year of Test	C-Peptide Result (pmol/L)	Insulin Result (pmol/L)	NA = Sample haemolysed and therefore no result
2020	2498	817	
2020	1806	169	
2020	1442	88	
2020	34	3	
2020	343	19	
2020	1513	298	
2020	3041	650	
2020	98	115	
2020	2254	318	
2020	NA	NA	

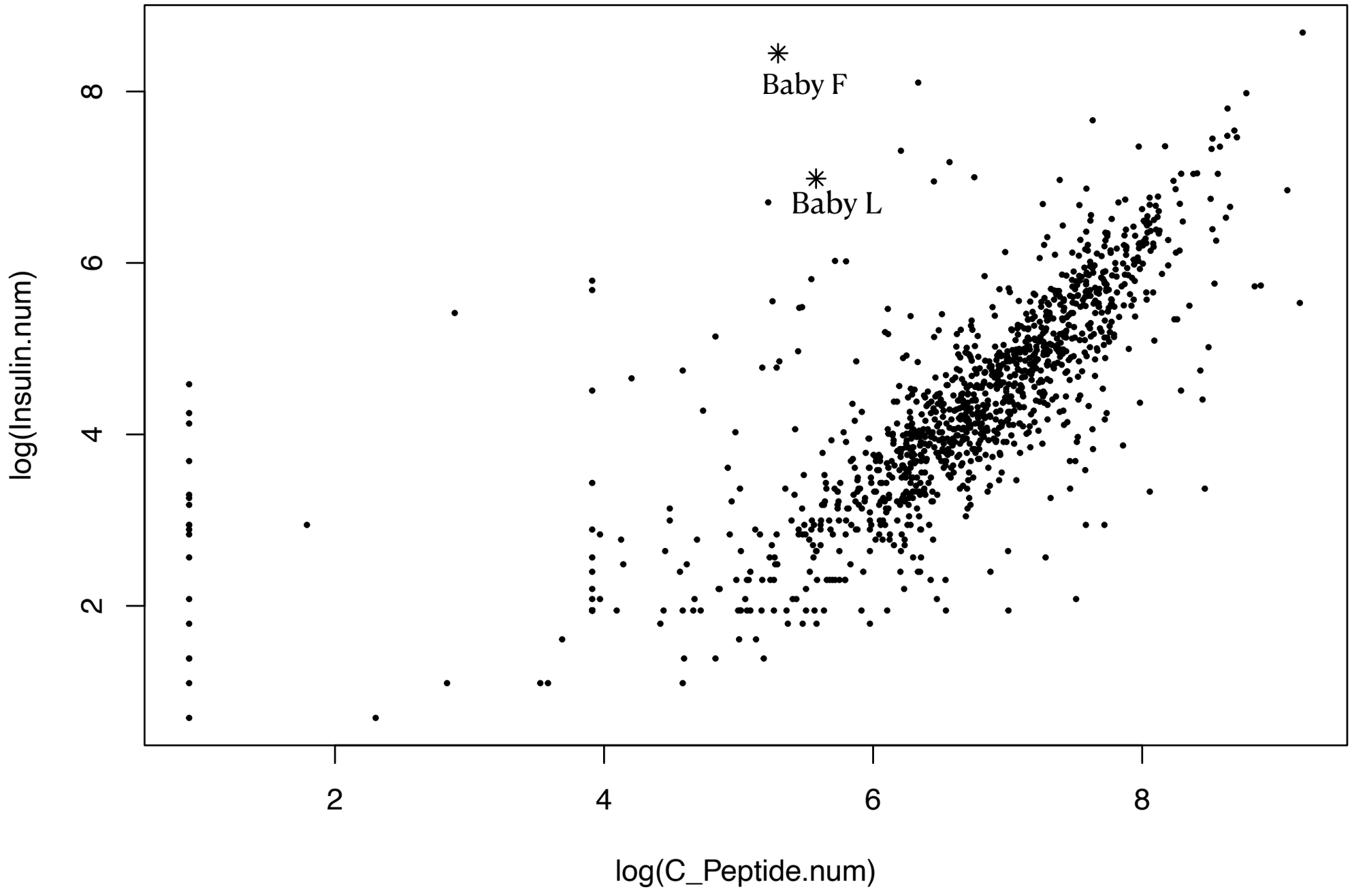
The wrong plot



https://www.whatdotheyknow.com/request/blood_test_records_for_insulin_a

The correct plot

- Child F: C-Peptide < 169, Insulin 4657
- Baby L: C-peptide 264, Insulin 1079



New developments

…and controversy

- Chase and Shannon
    - Chase JG, Shannon HD (2026) Inverted insulin to C-Peptide ratios in neonatal intensive care: is there something we don't know? *Front. Pediatr.* 14:1900675. doi: 10.3389/fped.2026.1900675
- Ismail and Wilkinson-Herbots; Neil Aiton
    - Ismail AAA, Wilkinson-Herbots HM (2016) Insulin/C-peptide interpretation in infants with hypoglycaemia of unknown origin. *Annals of Clinical Biochemistry: International Journal of Laboratory Medicine*. 2026;0(0). doi:10.1177/0004563261489517

Why so many deaths and why was Lucy so often present?

- **Peter Elston** has recently predicted for each known baby (trial plus data published by dear lady Thirlwall) the chance of early neonatal death, using the statistical model published by MBRRACE-UK

- The sum of those probabilities was about 10; about equal to the actual number!

- Further, he has calculated for each shift (two per day) an index of total acuity of babies on the unit, on that day

- Lucy's presence is highly correlated with "total acuity"

- We know exactly why: she is the only young nurse with the qualification needed for nursing the most critically ill babies; she is unmarried and living "on site" and saving money for her first house. Enthusiastic for night shifts, overtime and challenging work

Some further titbits

Three crucial medical witnesses were granted anonymity

- One anonymised doctor had recently accidentally caused the death of baby Noah Robinson by wrong insertion of a breathing tube!
- Another anonymised doctor became rather close with Lucy Letby ask was the only one of the “higher up” colleagues to support her. At her trial he betrayed her trust. His betrayal was rewarded by rapid promotion. However later the Mother of one of the baby’s accused him of having given confidential information about her baby to Letby. As a result he was fired from his consultant position in Liverpool. He also got cancer. Committed suicide, about the same time as former Cambridge Prof. Jason Arday. He was given anonymity to protect his wife and two children who at the time were doing GCE examinations!

Some further titbits

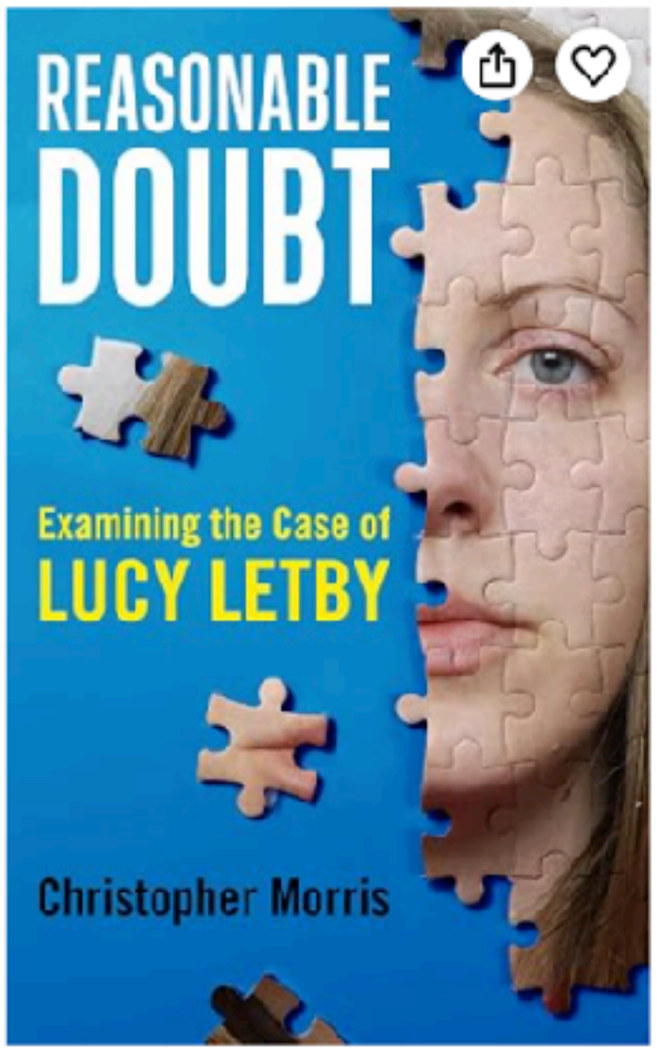
Several journalists got very close to the police investigators and made a heap of money out of the case

- Judith Moritz (BBC)
- Liz Hull (Daily Mail)

- Fortunately some media are now fighting back, especially The Sun

A very important resource

- https://www.amazon.nl/-/en/Christopher-Morris-ebook/dp/B0GSKLM8D6/



Reasonable Doubt: Examining the Case of Lucy Letby (English Edition)

English edition | by Christopher Morris (Author), Christopher Morris (Author) | Format: Kindle Edition

4.9 ★★★★★ (197) See all formats and editions

Christopher Morris believes Lucy Letby has been the victim of a miscarriage of justice, and that her guilty verdict is not beyond reasonable doubt. He is not the only one.

Ever since the nurse was condemned to fifteen life sentences, highly-regarded professionals in their fields have gone on record to raise concerns about the evidence used to convict her. The science behind how her victims died, the reliance on circumstantial evidence, and the interpretation of the statistics used against Lucy Letby are all being questioned. Controversially, the defence did not call an expert witness to challenge the medical evidence presented by the prosecution. Nobody, except her lawyers, knows why.

In a quest to find out if he is correct, the author has interviewed scores of those experts. He has also pored over the thousands of documents submitted to the Thirlwall Inquiry, which is examining what went wrong at the Countess of Chester Hospital, as well as the transcripts of the trial. He has pulled this vast amount of information together into an engrossing journey through the uncertainties many feel undermine the conviction of Lucy Letby.

The answer matters for us all, as it raises serious questions about whether our justice system really does seek the truth.

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