Report

Ryotaro Okumura

```
library(tidyverse)
```

```
── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0
──
✔ dplyr     1.1.4     ✔ readr     2.1.5
✔ forcats   1.0.1     ✔ stringr   1.5.2
✔ ggplot2   4.0.0     ✔ tibble    3.3.0
✔ lubridate 1.9.4     ✔ tidyr     1.3.1
✔ purrr     1.1.0
── Conflicts ────────────────────────────────────────── tidyverse_conflicts()
──
✖ dplyr::filter() masks stats::filter()
✖ dplyr::lag()    masks stats::lag()
ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all
conflicts to become errors
```

```
library(ggplot2)
```

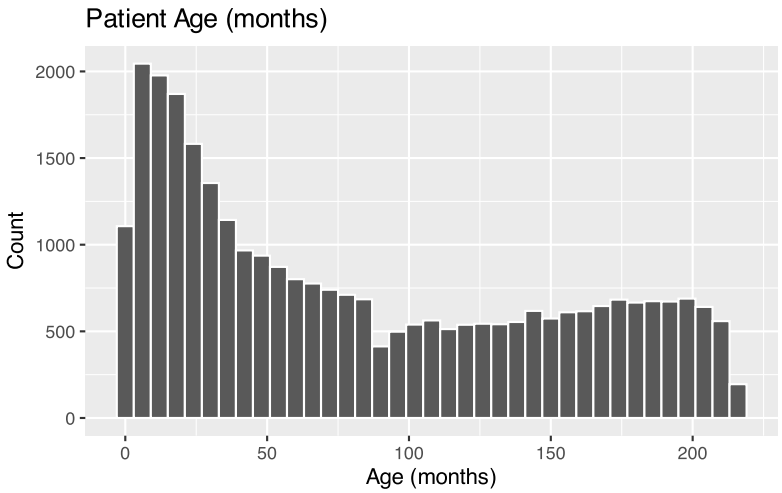
```
er <- readr::read_csv("data/citbi.csv", show_col_types = FALSE)

er <- er |>
  mutate(across(everything(), ~ ifelse(.x %in% c(91, 92, 99), NA, .x))) |>
  rename(
    patient_id = PatNum,
    amnesia_reported = Amnesia_verb,
    loc_duration_min = LocLen,
    seizure = Seiz,
    seizure_duration_sec = SeizLen,
    acting_normal = ActNorm,
    headache_reported = HA_verb,
    vomiting = Vomit,
    dizziness = Dizzy,
    gcs_eye = GCSEye,
    gcs_verbal = GCSVerbal,
    gcs_motor = GCSMotor,
    gcs_total = GCSTotal,
    altered_mental_status = AMS,
```

```
    palpable_skull_fracture = SFxPalp,
    bulging_fontanelle = FontBulg,
    scalp_hematoma = Hema,
    clavicle_trauma = Clav,
    neurologic_deficit = NeuroD,
    other_significant_injury = OSI,
    ct_form1_flag = CTForm1,
    age_months = AgeInMonth,
    sex = Gender,
    ct_done = CTDone,
    death_due_to_tbi = DeathTBI,
    intracranial_injury_final = PosIntFinal
  ) |>
  mutate(
    sex = as.factor(sex),
    age_months = as.integer(age_months),
    gcs_total = as.integer(gcs_total),
    loc_duration_min = as.numeric(loc_duration_min),
    age_years = age_months / 12,
    citbi = case_when(
      is.na(intracranial_injury_final) ~ NA_character_,
      as.character(intracranial_injury_final) %in% c("1","Yes","TRUE","T","Y")
~ "ciTBI",
      as.character(intracranial_injury_final) %in% c("0","No","FALSE","F","N")
~ "No ciTBI",
      TRUE ~ as.character(intracranial_injury_final)
    ) |> factor(levels = c("No ciTBI","ciTBI"))
  )
```

1) Q5 Age (months): Histogram

```
p1 <- ggplot(er, aes(x = age_months)) +
geom_histogram(binwidth = 6, color = "white") +
labs(title = "Patient Age (months)", x = "Age (months)", y = "Count")
p1
```

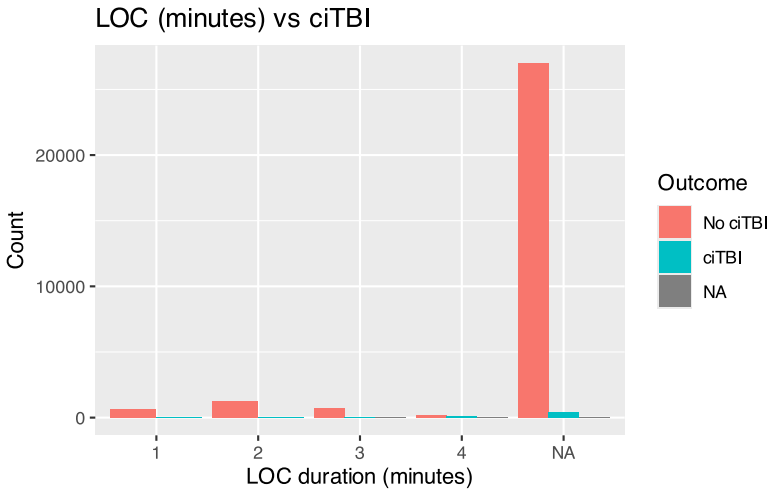
```
Warning: Removed 264 rows containing non-finite outside the scale range
(`stat_bin()`).
```



Note: Many patients are in early childhood. This helps us plan how to examine younger kids.

2) Q6-7 Loss of Consciousness (LOC) × ciTBI: Counts

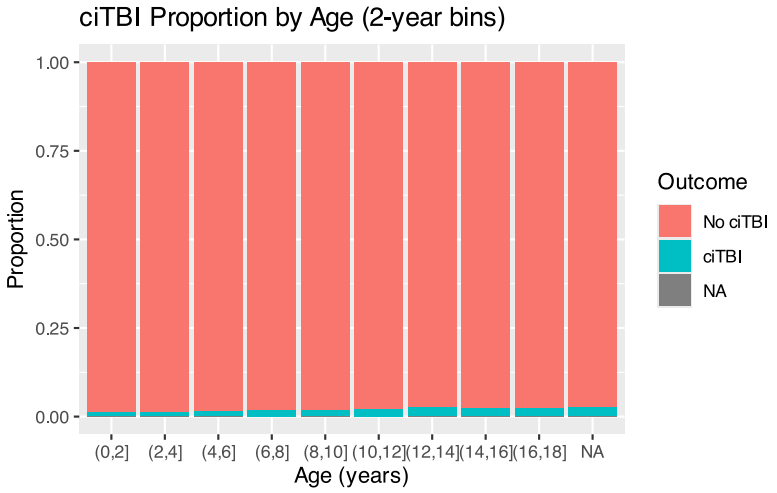
```
loc_tbl <- er |>
group_by(loc_duration_min, citbi) |>
summarise(n = n(), .groups = "drop")

p2 <- ggplot(loc_tbl, aes(x = factor(loc_duration_min), y = n, fill = citbi))
+
geom_col(position = "dodge") +
labs(title = "LOC (minutes) vs ciTBI", x = "LOC duration (minutes)", y =
"Count", fill = "Outcome")
p2
```



Note: If longer LOC has more ciTBI, it suggests closer checks or imaging for those patients.

3) Q8a Age (years) × ciTBI: Proportion (stacked, normalized)

```
p3 <- ggplot(er, aes(x = cut(age_years, breaks = seq(0, 18, 2)), fill =
citbi)) +
geom_bar(position = "fill") +
labs(title = "ciTBI Proportion by Age (2-year bins)", x = "Age (years)", y =
"Proportion", fill = "Outcome")
p3
```



Note: The ciTBI rate can change across age groups. Younger groups may show higher rates.