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Performance Assessment of Point of Care Testing for Blood Glucose – a 5 Year Review

Gareth Davies

Weqas POCT Glucose & Ketones Programme

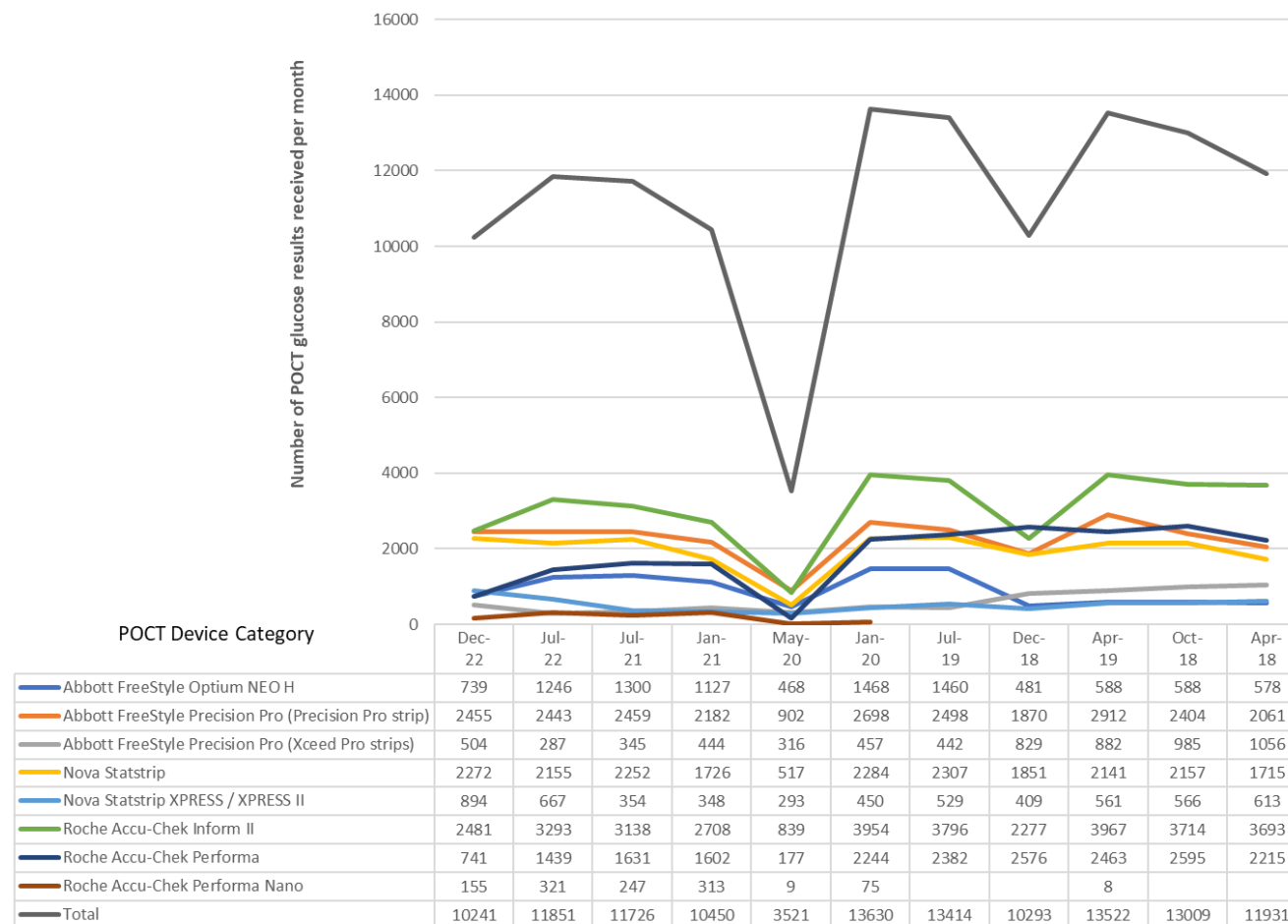
- Ready to use, liquid stable samples in sterile dropper bottles containing glucose and ketone.
- One sample distributed per distribution.
- Frequencies monthly, bimonthly, quarterly available.
- Samples cover a range of 2 to 28 mmol/L annually.
- The aim of the programme is to provide support to POCT Co-ordinators, to identify non compliant sites and improve the analytical performance of users.
- A Co-ordinator in each organisation is given a Group Administrator function for the EQA website and maintains the database for its own organisation.
- Organisation performance summary reports, distribution letters, non-compliance reports, poor performance reports and cumulative reports are generated from one system. The POCT Users are also provided with a simple traffic light system with clear action limits.

Methods

- A review of performance was undertaken between January 2018 and March 2023 for the POCT Glucose programme for a selection of devices.
- Sixty three samples with varying glucose concentrations were distributed over this time period. Devices that were no longer available were excluded, as were devices with < 200 users in the group.
- This represented data from 10,312 devices per month in January 2018 and 12,178 in January 2023.
- A breakdown of the number of results for each device category on selected months over this period is illustrated in Figure 1.

No of Results Received over 5 year period

Fig 1 - POCT Device results received on selected months over a 5 year period

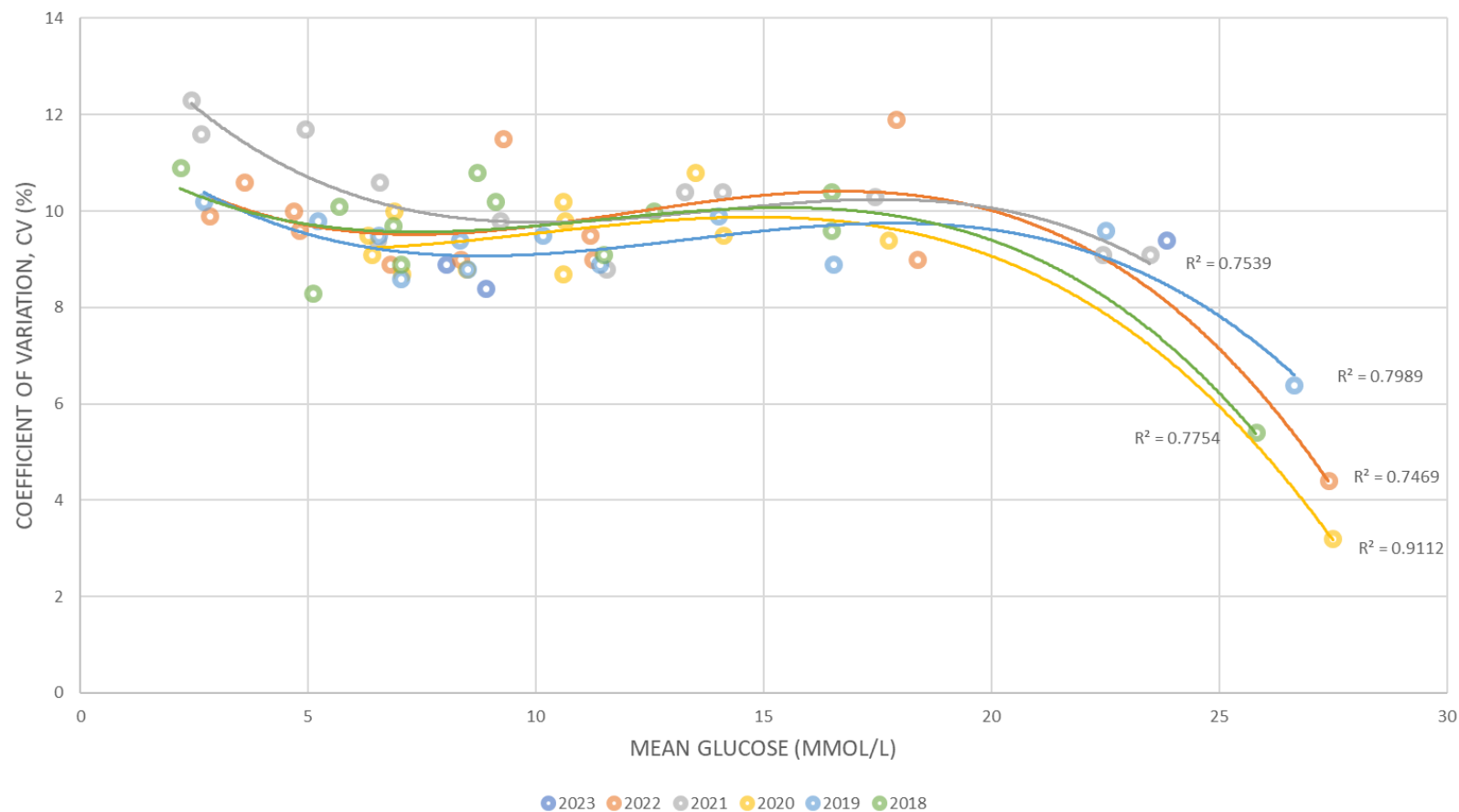


Methods (cont)

- Performance was assessed as the coefficient of variation, (CV%), calculated after outlier exclusion, from glucose results received across all users and hospital sites in the UK and Ireland for each device and for each of the 63 samples distributed over this period.
- This represented analysis of over 600,000 results.
- Precision profiles, calculated as the CV (%) for each sample across the clinical range of glucose concentrations is illustrated for each of the major devices in use over the 5 year period.
- The performance at clinically important concentrations of hypoglycaemia, normoglycaemia and hyperglycaemia are further illustrated

Abbott Freestyle Optium Neo H Precision Profile

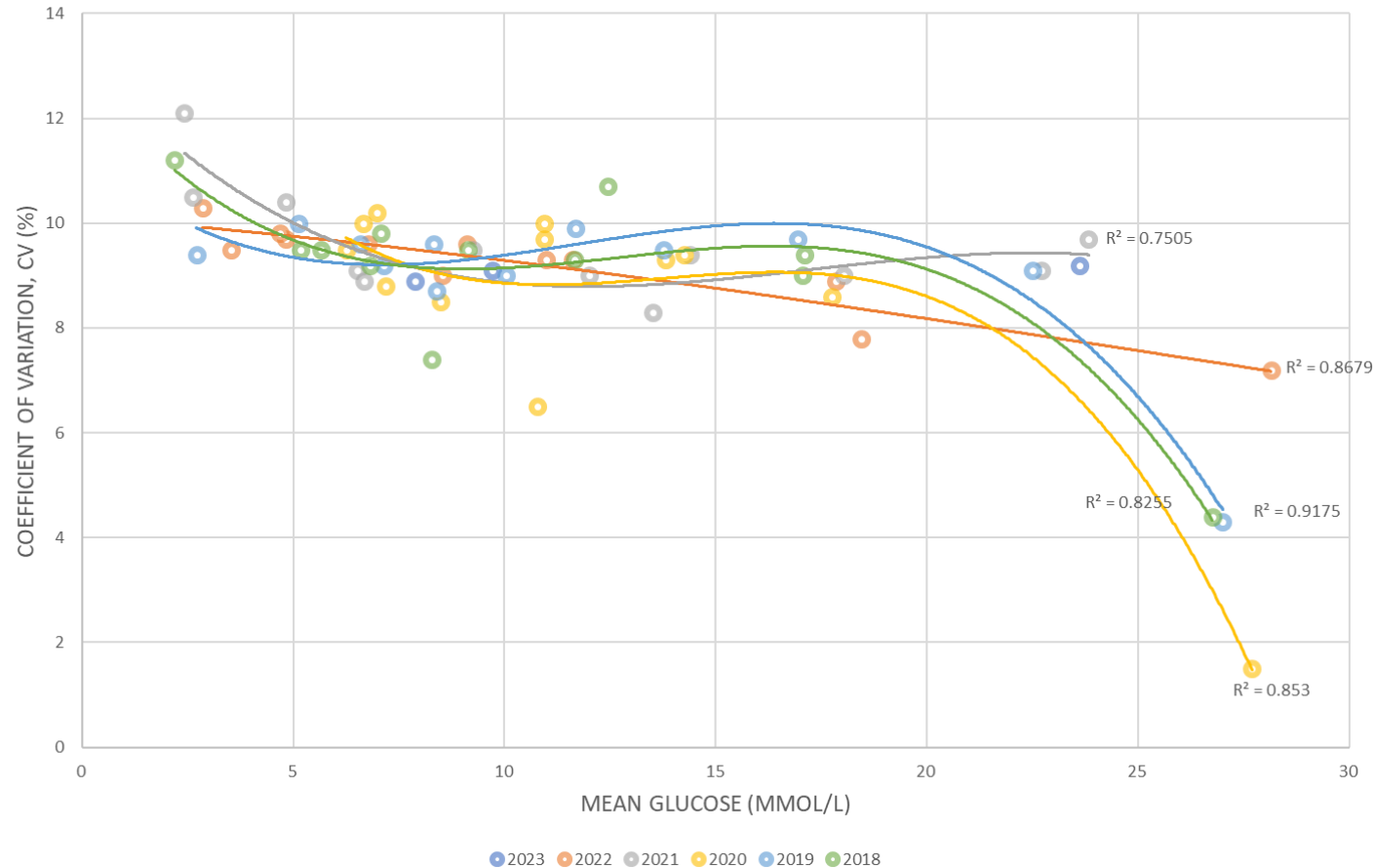
Figure 2 - Precision Profile for Abbott FreeStyle Optium Neo H from 2018 to 2023



Abbott Freestyle Precision Pro (Pro strips)

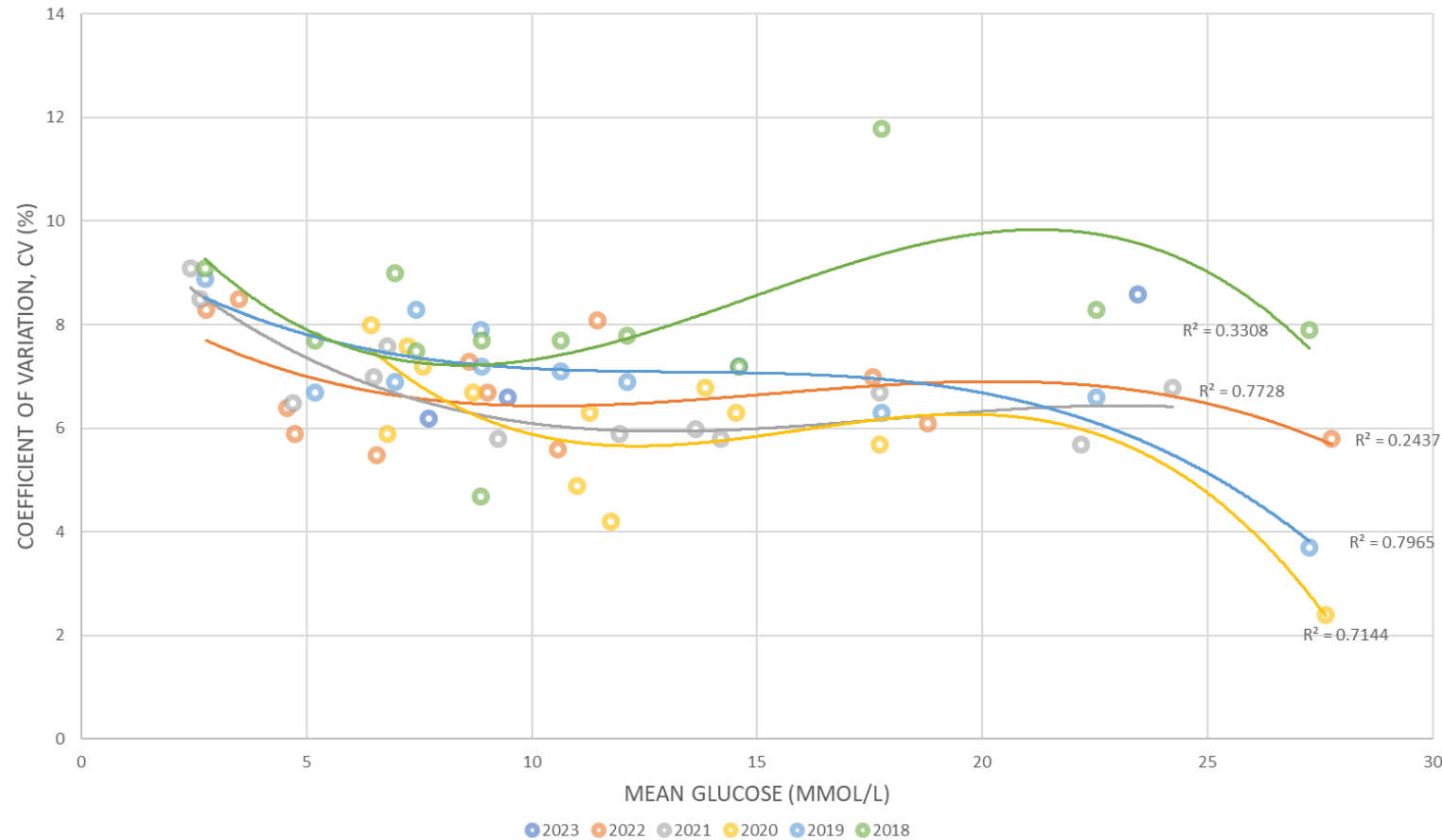
Precision Profile

Figure 3 - Precision Profile for Abbott FreeStyle Precision Pro (Precision Pro strips) from 2018 to 2023



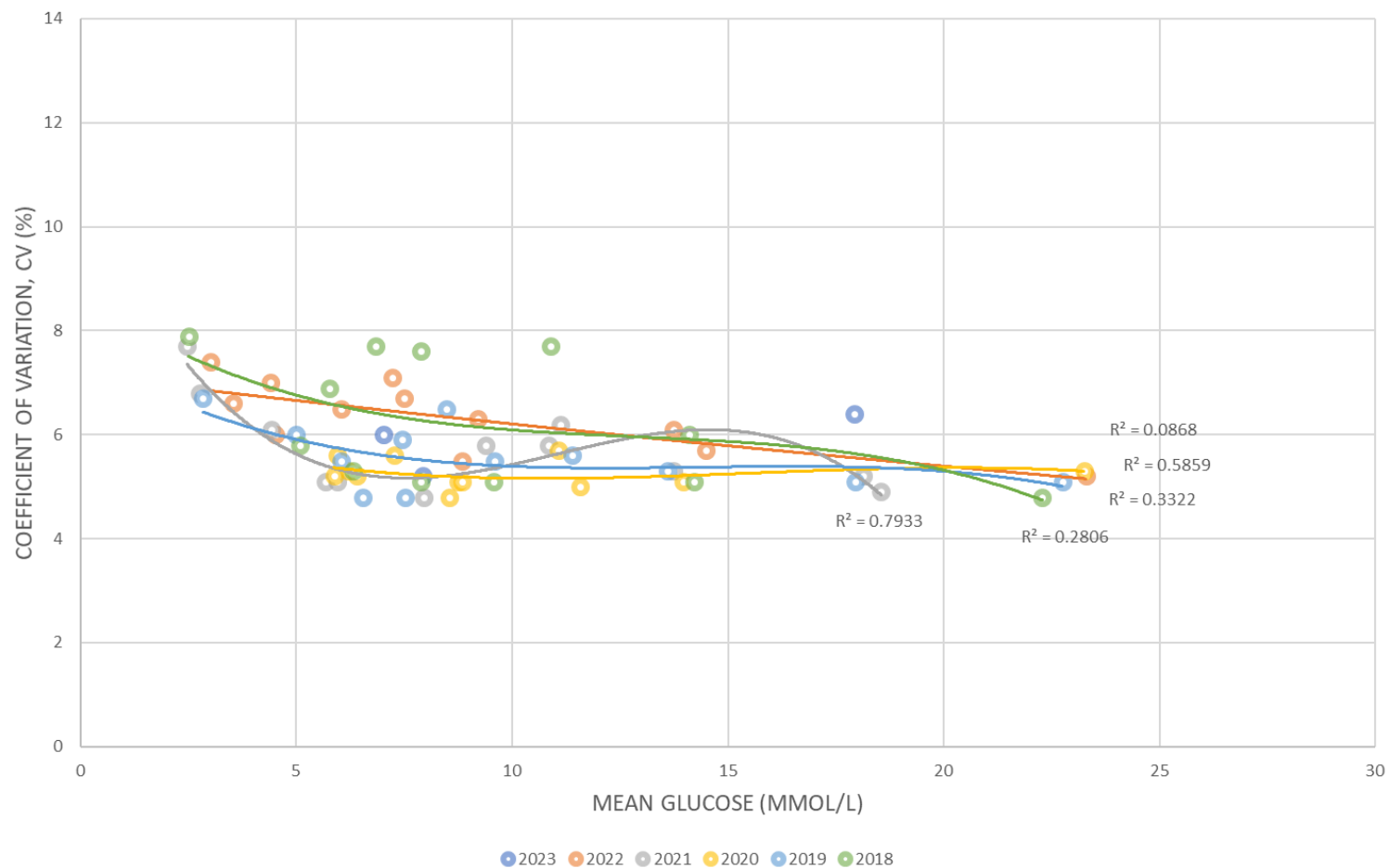
Abbott Freestyle Precision Pro (Xceed Pro strips) Precision Profile

Figure 4 - Precision Profile for Abbott FreeStyle Precision Pro (Xceed Pro strips) from 2018 to 2023



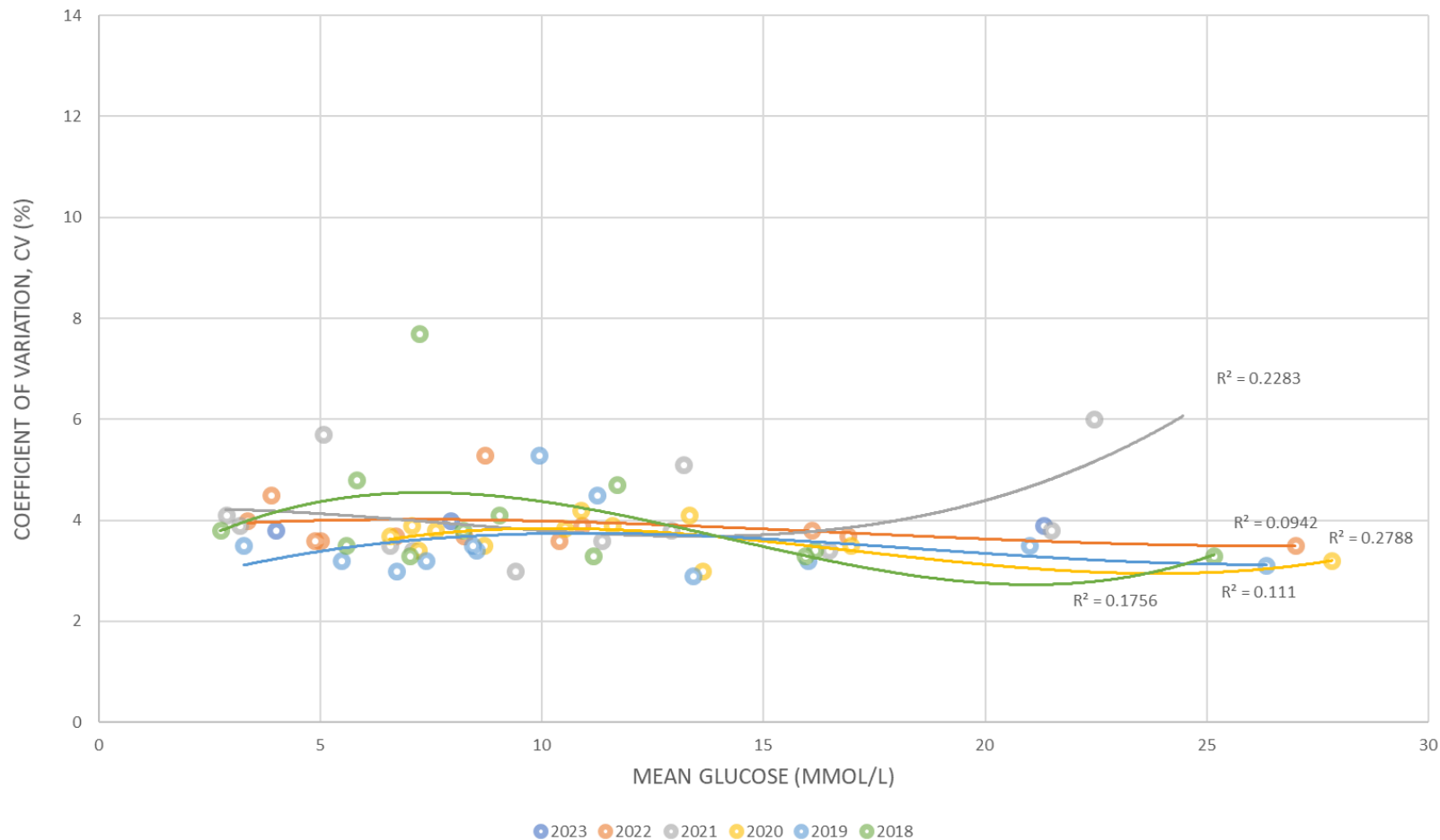
Nova StatStrip Precision Profile

Figure 5 - Precision profile for Nova StaStrip from 2018 to 2023



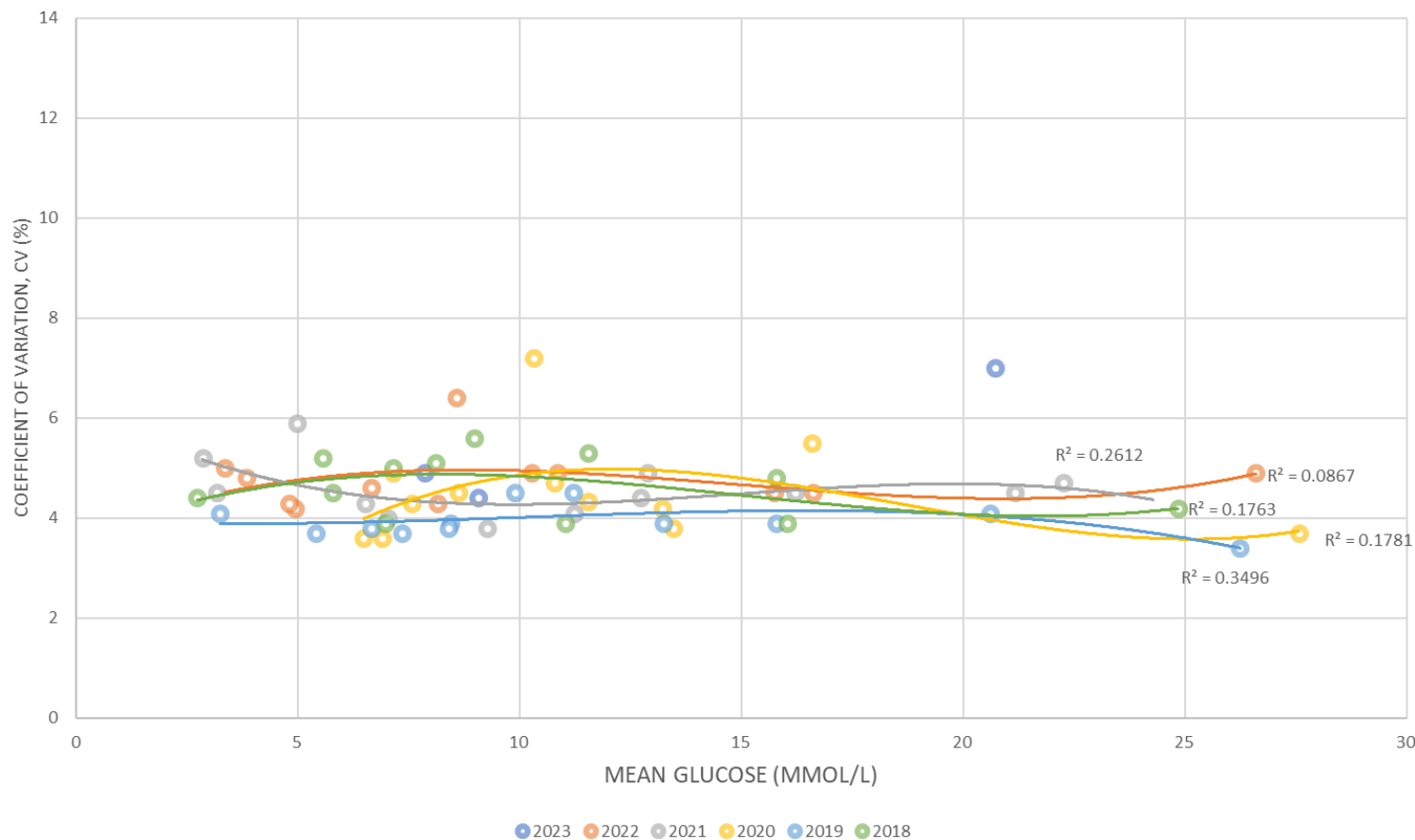
Roche Accuchek Inform II Precision Profile

Figure 6 - Precision profile for Roche Accu-Chek Inform II from 2018 to 2023



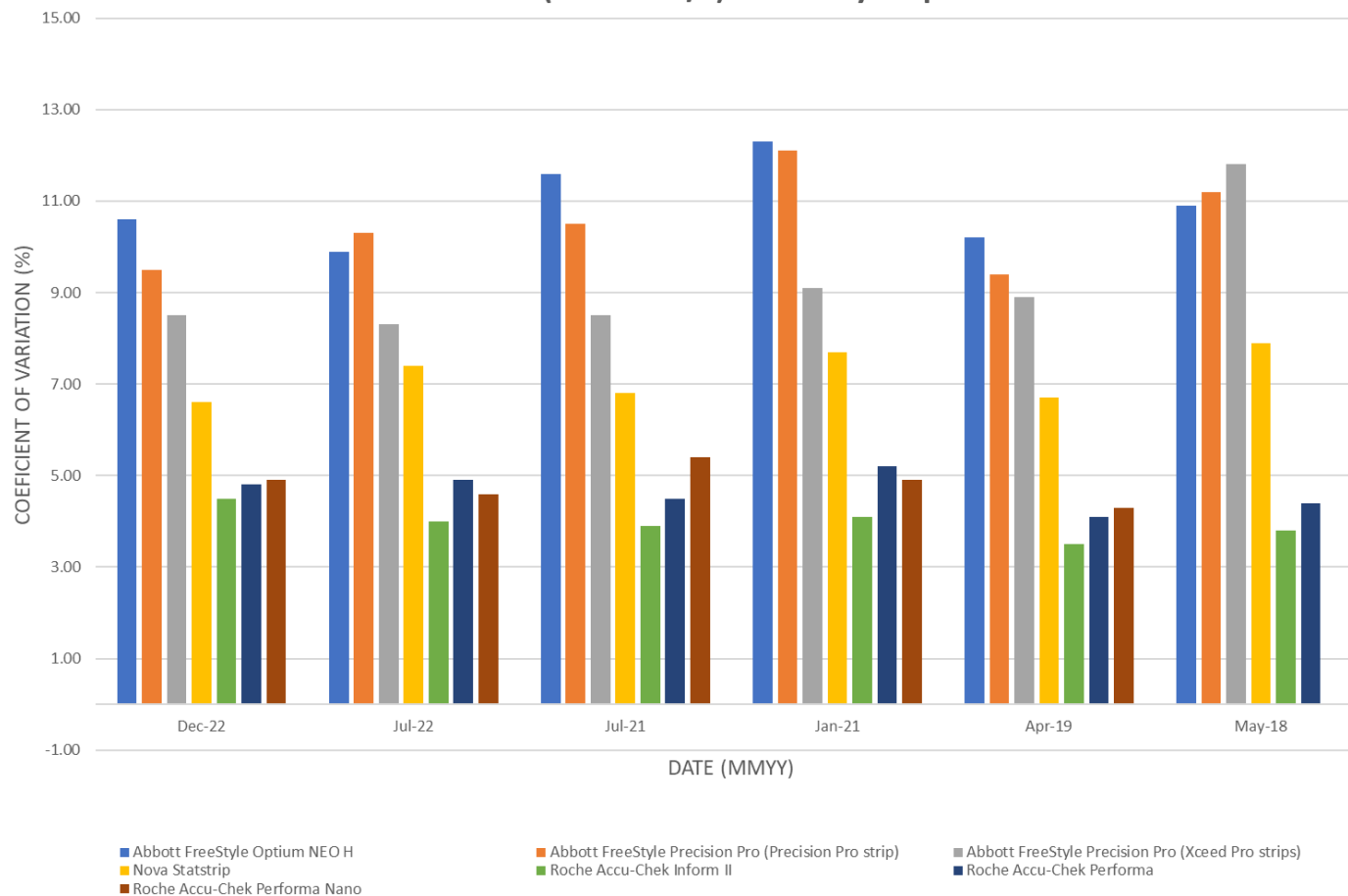
Roche Accucheck Performa Precision Profile

Figure 7- Precision profile for Roche Accu-Chek Performa from 2018 to 2023



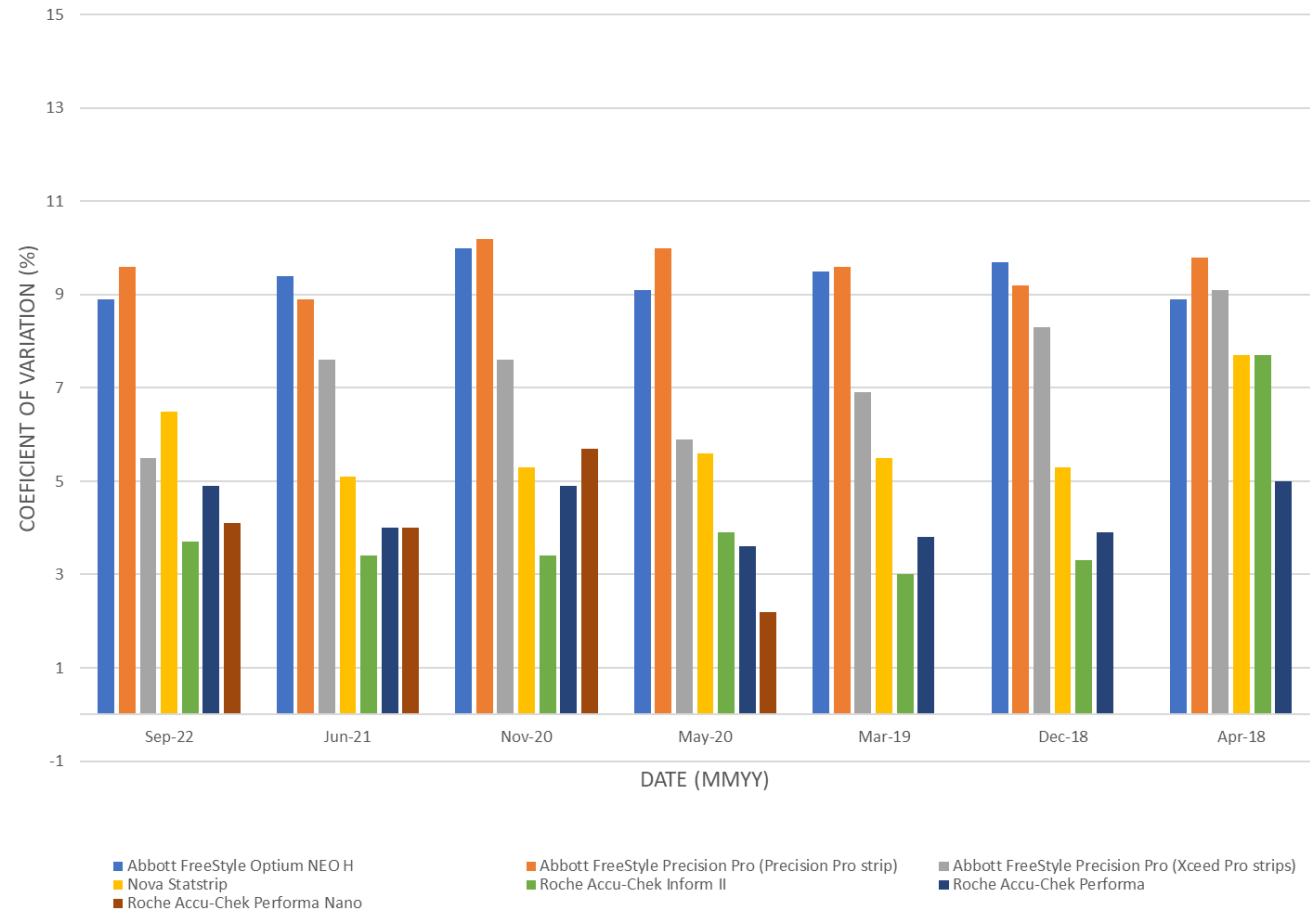
CV at hypoglycaemic concentrations (2-3 mmol/L)

Figure 8 - Performance of POCT glucose devices at a hypoglycaemic concentration (2-3 mmol/L) over a 5 year period



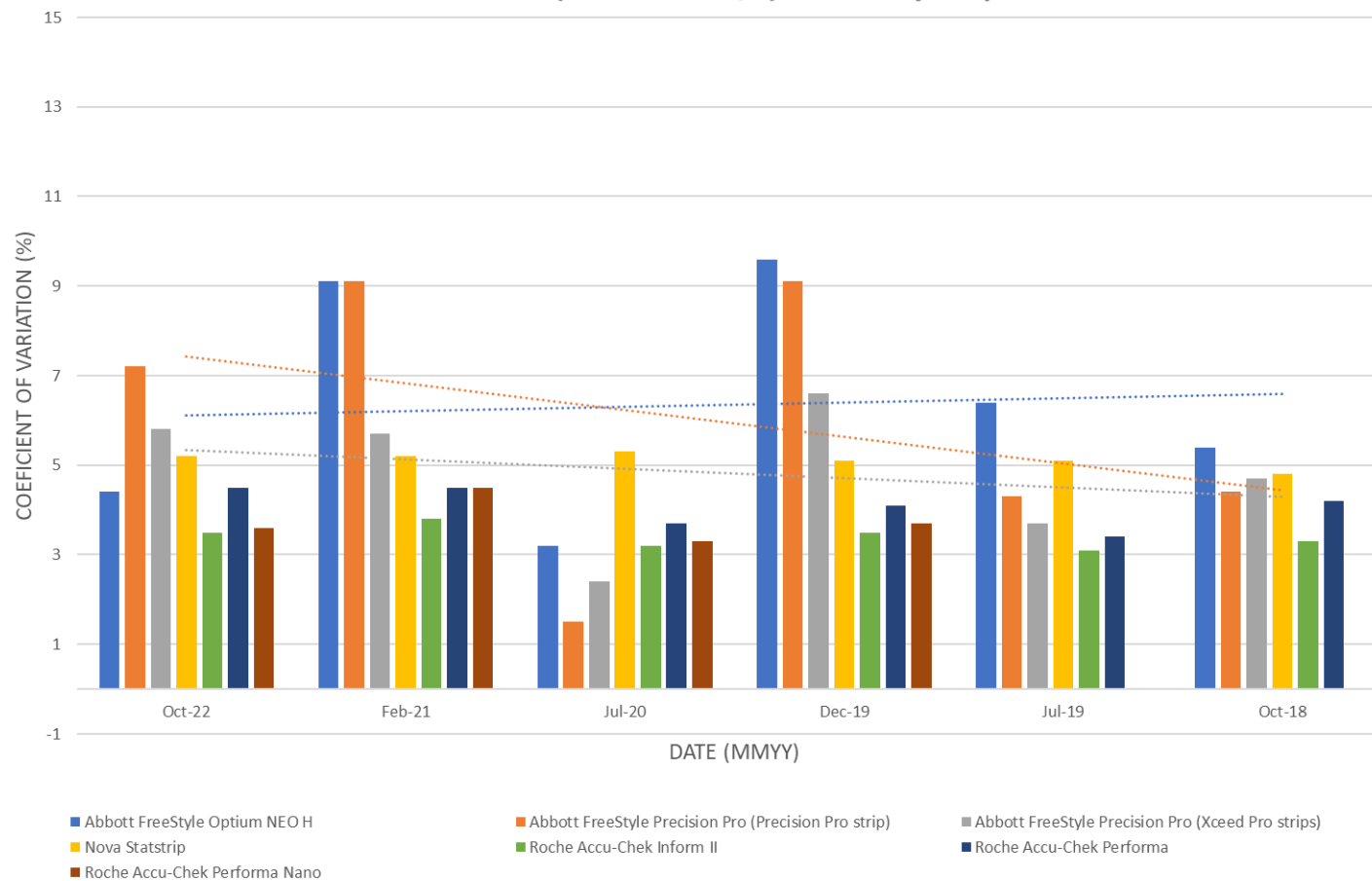
CV at normoglycaemic concentrations (6-7 mmol/L)

Figure 9 - Performance of POCT glucose devices at a normoglycaemic concentration (6-7 mmol/L) over a 5 year period



CV at hyperglycaemic concentrations (20-26 mmol/L)

Figure 10 - Performance of POCT glucose devices at a hyperglycaemic concentration (20-26 mmol/L) over a 5 year period



Results

- At hypoglycaemic concentrations, there was generally no further improvement in the performance of devices with an initial $CV \leq 5\%$ in 2018, however at this concentration there was a slight improvement observed for the Abbott devices.
- For the normoglycaemic samples, there was no further improvement from December 2018 apart from the Abbott Freestyle Precision Pro (Xceed pro strips).
- For the hyperglycaemic samples, the majority of devices reported an initial $CV \leq 5\%$ which remained relatively consistent apart from the Abbott devices where the CVs varied greatly from sample to sample.
- It was noted that the participation rates during the pandemic plummeted to $< 30\%$ of previous rates, however there was no observed deterioration in performance (CV).

Conclusions

Despite improvements in technology, and the introduction of more robust oversight processes by healthcare organisations managing their POCT services, there was little evidence to suggest that the performance of POCT glucose devices had improved significantly over the last 5 years.

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Thank you

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