West Hertfordshire Hospitals NHS
NHS Trust

# Support from clinical audit data for liberal minimum 9am cortisol cut-off to avoid Short Synacthen Tests.


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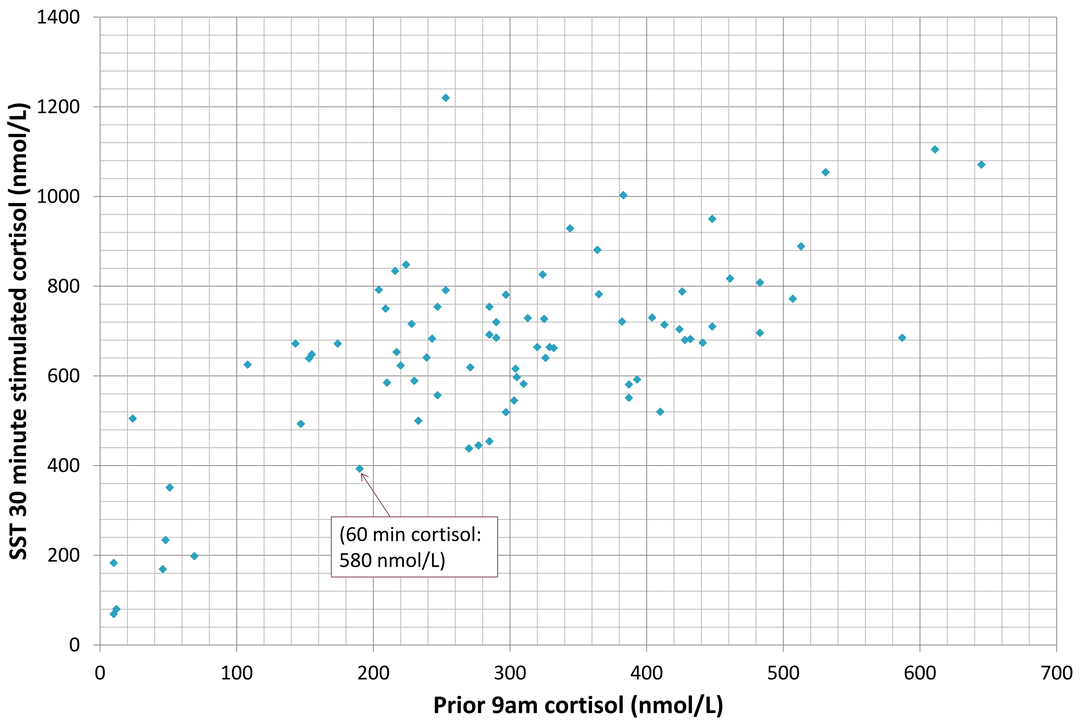
- Short Synacthen Tests (SST's) are most commonly performed to diagnose or exclude adrenal insufficiency.
- A normal 9am serum cortisol level should itself indicate adequate adrenal reserve.
- Our laboratory lower limit of normal for cortisol at 9am is 119 nmol/L (Siemens Centaur immunoassay). However, historic literature on the minimum 9am cortisol required to avoid a SST ranges from 243-500 nmol/L and individual endocrinologist practice varies greatly.
- Reducing the number of SST's performed is a clinical priority, especially given the recent 15x increase in cost of tetracosactide to over £45 per dose.

**Study design:**

- By reviewing all 182 SST's from one year in our institution, it would be possible to determine what 9am cortisol level should predict a normal SST.
- For each SST, a previous 9am cortisol or the basal cortisol as measured in the SST was evaluated together with the 30 minute stimulated cortisol.
- The clinical interpretation and outcome for each patient was derived from documentation in clinic letters and hospital discharge letters.

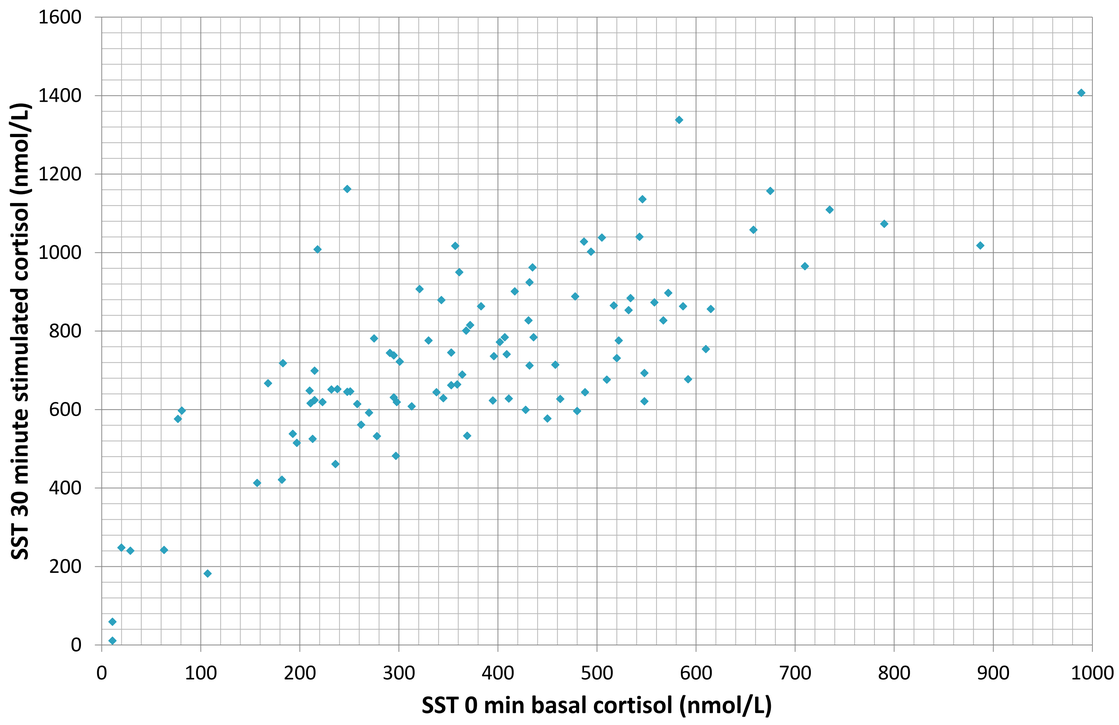
**PATIENTS WITH PRIOR 9AM CORTISOL**

- 71 out of 79 patients had a prior 9am cortisol measurement above our laboratory's 9am lower limit of 119 nmol/L.
- 66/71 of these had a 30 minute stimulated cortisol above 500 nmol/L, and all SST's were interpreted as normal.
- The other 5 patients all had a stimulated cortisol above 400 nmol/L, but only 1 was judged to require commencement of hydrocortisone and 2 were already taking hydrocortisone.




**PATIENTS WITHOUT PRIOR 9AM CORTISOL**

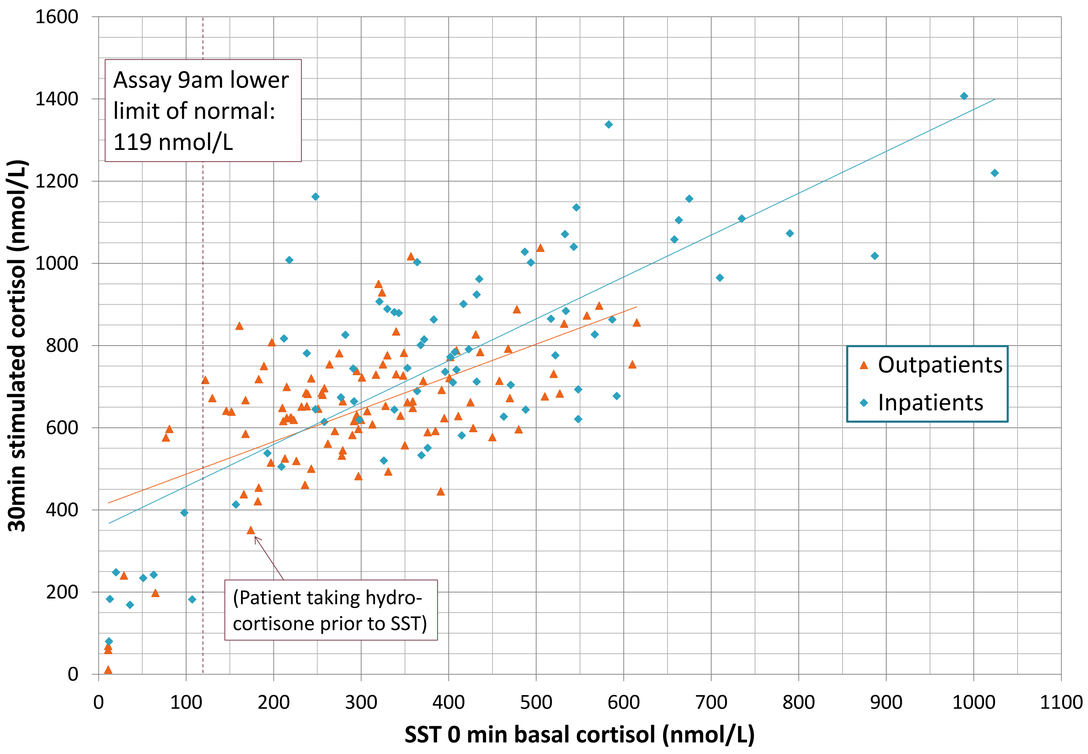
- Of 103 patients without a previous 9am cortisol, 95 had a basal cortisol in the SST above 119 nmol/L.
- 91/95 of these had a 30 minute stimulated cortisol above 500 nmol/L, and all SST's were interpreted as normal.
- The other 4 patients all had a borderline stimulated cortisol above 400 nmol/L, but only 1 was judged to require steroid replacement.




**COMPARISON OF INPATIENT AND OUTPATIENT SST'S (with and without prior 9am cortisol combined)**

To ensure it is valid to generalise the findings from both inpatients and outpatients, the results from all SST's performed in both groups were compared and showed no clinically relevant difference between the two groups.

(NB none of the inpatients were in critical care wards.)




## Discussion:

SST did not change management in 99% of cases when a basal or prior 9am cortisol was within the lab normal range:

- Only 2 out of 166 patients with a basal or 9am cortisol above 119 nmol/L commenced hydrocortisone replacement as a consequence of the SST. In both of these patients, the stimulated cortisol was 'borderline'-normal at above 400 nmol/L.
- Borderline SST cortisol responses above 400 nmol/L may be variations of normality and these results often do not change management. Detection of these cases is unlikely to be a high clinical priority. In many of these cases, repetition of the SST or extending the test to 60 minutes will exclude genuine adrenal insufficiency.

## Conclusion:

- This study supports that most SST's could be avoided by measuring a 9am cortisol level if it is within the local laboratory normal range.
- The definition of normality for 9am cortisol should correspond with the population normal range as per the specific assay used. Pre-test probability is commonly low, so higher thresholds are not usually required to exclude adrenal insufficiency.
- Clinicians should be reassured that in most clinical contexts, a normal 9am cortisol is an adequate confirmation of normal adrenal function.