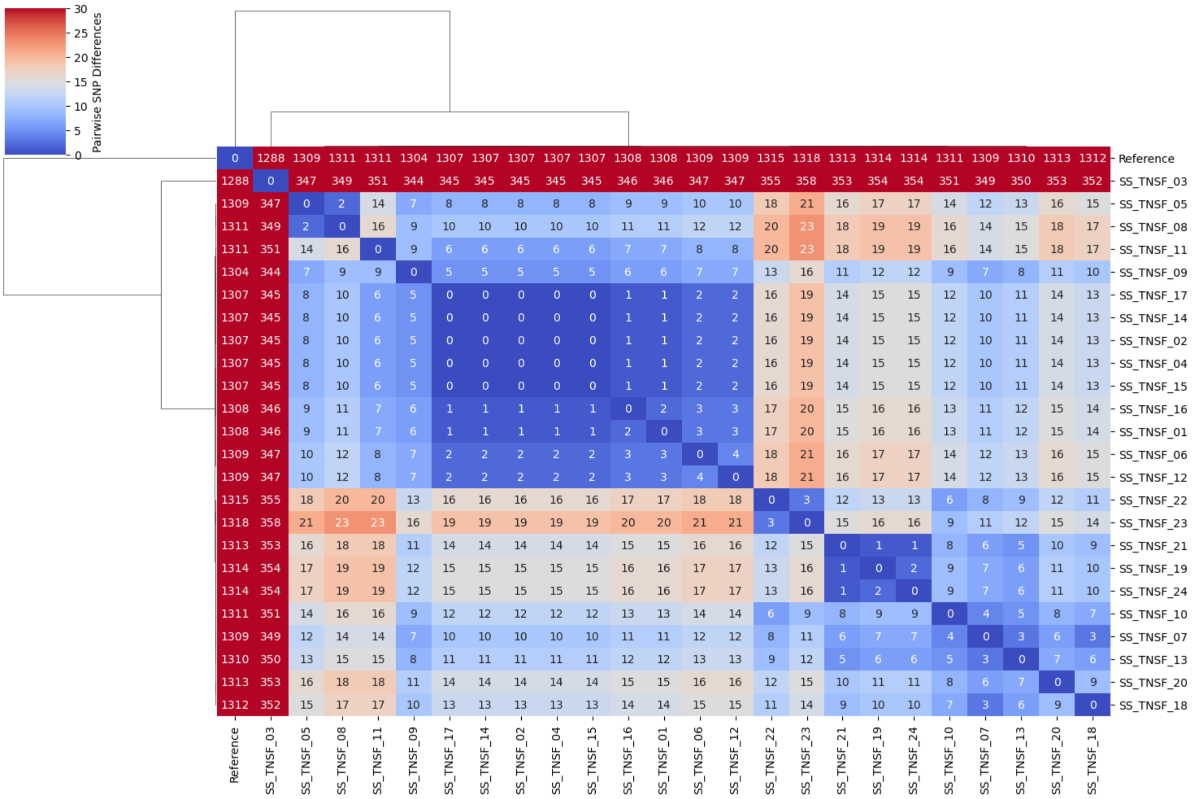

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference | 0 | 1288 | 1309 | 1311 | 1311 | 1304 | 1307 | 1307 | 1307 | 1307 | 1307 | 1308 | 1308 | 1309 | 1309 | 1315 | 1318 | 1313 | 1314 | 1314 | 1311 | 1309 | 1310 | 1313 | 1312 |
| SS_TNSF_03 | 1288 | 0 | 347 | 349 | 351 | 344 | 345 | 345 | 345 | 345 | 345 | 346 | 346 | 347 | 347 | 355 | 358 | 353 | 354 | 354 | 351 | 349 | 350 | 353 | 352 |
| SS_TNSF_05 | 1309 | 347 | 0 | 2 | 14 | 7 | 8 | 8 | 8 | 8 | 8 | 9 | 9 | 10 | 10 | 18 | 21 | 16 | 17 | 17 | 14 | 12 | 13 | 16 | 15 |
| SS_TNSF_08 | 1311 | 349 | 2 | 0 | 16 | 9 | 10 | 10 | 10 | 10 | 10 | 11 | 11 | 12 | 12 | 20 | 23 | 18 | 19 | 19 | 16 | 14 | 15 | 18 | 17 |
| SS_TNSF_11 | 1311 | 351 | 14 | 16 | 0 | 9 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 8 | 8 | 20 | 23 | 18 | 19 | 19 | 16 | 14 | 15 | 18 | 17 |
| SS_TNSF_09 | 1304 | 344 | 7 | 9 | 9 | 0 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 7 | 7 | 13 | 16 | 11 | 12 | 12 | 9 | 7 | 8 | 11 | 10 |
| SS_TNSF_17 | 1307 | 345 | 8 | 10 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 16 | 19 | 14 | 15 | 15 | 12 | 10 | 11 | 14 | 13 |
| SS_TNSF_14 | 1307 | 345 | 8 | 10 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 16 | 19 | 14 | 15 | 15 | 12 | 10 | 11 | 14 | 13 |
| SS_TNSF_02 | 1307 | 345 | 8 | 10 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 16 | 19 | 14 | 15 | 15 | 12 | 10 | 11 | 14 | 13 |
| SS_TNSF_04 | 1307 | 345 | 8 | 10 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 16 | 19 | 14 | 15 | 15 | 12 | 10 | 11 | 14 | 13 |
| SS_TNSF_15 | 1307 | 345 | 8 | 10 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 16 | 19 | 14 | 15 | 15 | 12 | 10 | 11 | 14 | 13 |
| SS_TNSF_16 | 1308 | 346 | 9 | 11 | 7 | 6 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 3 | 3 | 17 | 20 | 15 | 16 | 16 | 13 | 11 | 12 | 15 | 14 |
| SS_TNSF_01 | 1308 | 346 | 9 | 11 | 7 | 6 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 3 | 3 | 17 | 20 | 15 | 16 | 16 | 13 | 11 | 12 | 15 | 14 |
| SS_TNSF_06 | 1309 | 347 | 10 | 12 | 8 | 7 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 4 | 18 | 21 | 16 | 17 | 17 | 14 | 12 | 13 | 16 | 15 |
| SS_TNSF_12 | 1309 | 347 | 10 | 12 | 8 | 7 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 0 | 18 | 21 | 16 | 17 | 17 | 14 | 12 | 13 | 16 | 15 |
| SS_TNSF_22 | 1315 | 355 | 18 | 20 | 20 | 13 | 16 | 16 | 16 | 16 | 16 | 17 | 17 | 18 | 18 | 0 | 3 | 12 | 13 | 13 | 6 | 8 | 9 | 12 | 11 |
| SS_TNSF_23 | 1318 | 358 | 21 | 23 | 23 | 16 | 19 | 19 | 19 | 19 | 19 | 20 | 20 | 21 | 21 | 3 | 0 | 15 | 16 | 16 | 9 | 11 | 12 | 15 | 14 |
| SS_TNSF_21 | 1313 | 353 | 16 | 18 | 18 | 11 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 16 | 16 | 12 | 15 | 0 | 1 | 1 | 8 | 6 | 5 | 10 | 9 |
| SS_TNSF_19 | 1314 | 354 | 17 | 19 | 19 | 12 | 15 | 15 | 15 | 15 | 15 | 16 | 16 | 17 | 17 | 13 | 16 | 1 | 0 | 2 | 9 | 7 | 6 | 11 | 10 |
| SS_TNSF_24 | 1314 | 354 | 17 | 19 | 19 | 12 | 15 | 15 | 15 | 15 | 15 | 16 | 16 | 17 | 17 | 13 | 16 | 1 | 2 | 0 | 9 | 7 | 6 | 11 | 10 |
| SS_TNSF_10 | 1311 | 351 | 14 | 16 | 16 | 9 | 12 | 12 | 12 | 12 | 12 | 13 | 13 | 14 | 14 | 6 | 9 | 8 | 9 | 9 | 0 | 4 | 5 | 8 | 7 |
| SS_TNSF_07 | 1309 | 349 | 12 | 14 | 14 | 7 | 10 | 10 | 10 | 10 | 10 | 11 | 11 | 12 | 12 | 8 | 11 | 6 | 7 | 7 | 4 | 0 | 3 | 6 | 3 |
| SS_TNSF_13 | 1310 | 350 | 13 | 15 | 15 | 8 | 11 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 13 | 9 | 12 | 5 | 6 | 6 | 5 | 3 | 0 | 7 | 6 |
| SS_TNSF_20 | 1313 | 353 | 16 | 18 | 18 | 11 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 16 | 16 | 12 | 15 | 10 | 11 | 11 | 8 | 6 | 7 | 0 | 9 |
| SS_TNSF_18 | 1312 | 352 | 15 | 17 | 17 | 10 | 13 | 13 | 13 | 13 | 13 | 14 | 14 | 15 | 15 | 11 | 14 | 9 | 10 | 10 | 7 | 3 | 6 | 9 | 0 |

**Fig. S1. Pairwise core-genome SNP differences between South Tunisian *S.sonnei* sequences after removing recombination sites.**

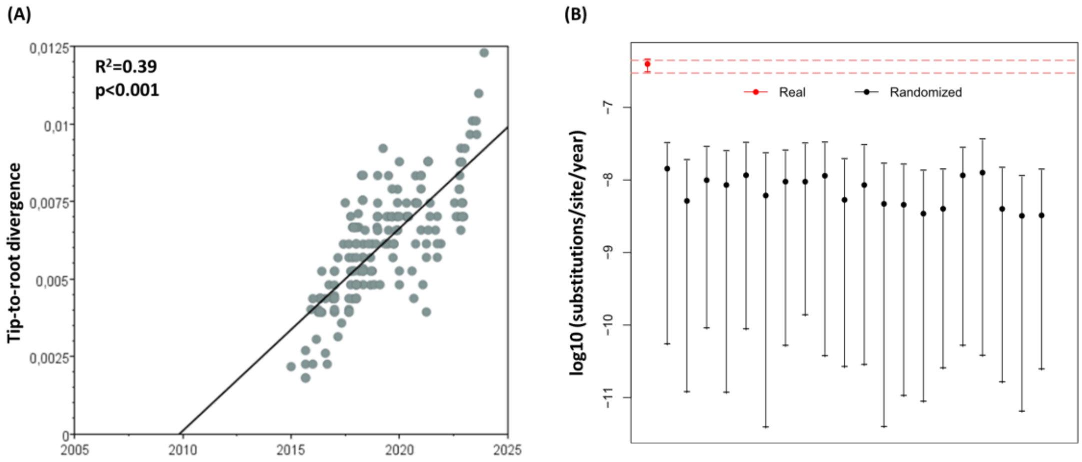

**Fig. S2. Temporal signal assessment preceding phylodynamic analysis of South Tunisian *Shigella sonnei* belonging to the HC10-20663 genotype.**

*To strengthen the temporal signal, 147 additional international sequences from strains isolated before 2022 were incorporated.*

*A: Tip-to-root regression analysis generated using TempEst. Pearson correlation p-value and* $R^2$ *displayed in the plot.*

*B: Date-randomization test conducted with the PlotDRT function in the TipDatingBeast R package.*

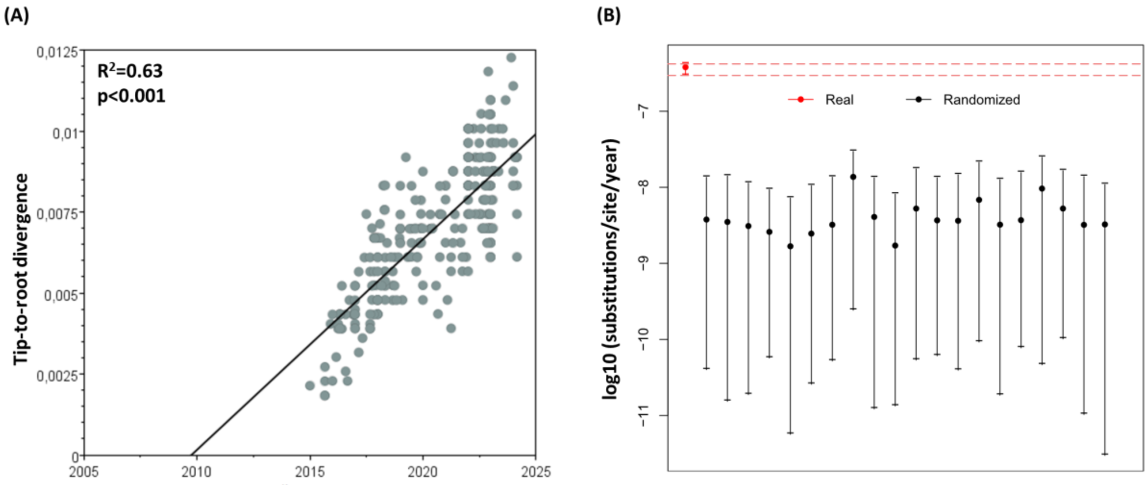

**Fig. S3. Temporal signal assessment preceding phylodynamic and phylogeographic analyses of the HC10-20663 genotype internationally.**

*A: Tip-to-root regression analysis generated using TempEst. Pearson correlation p-value and R² displayed in the plot.*

*B: Date-randomization test conducted with the PlotDRT function in the TipDatingBeast R package.*

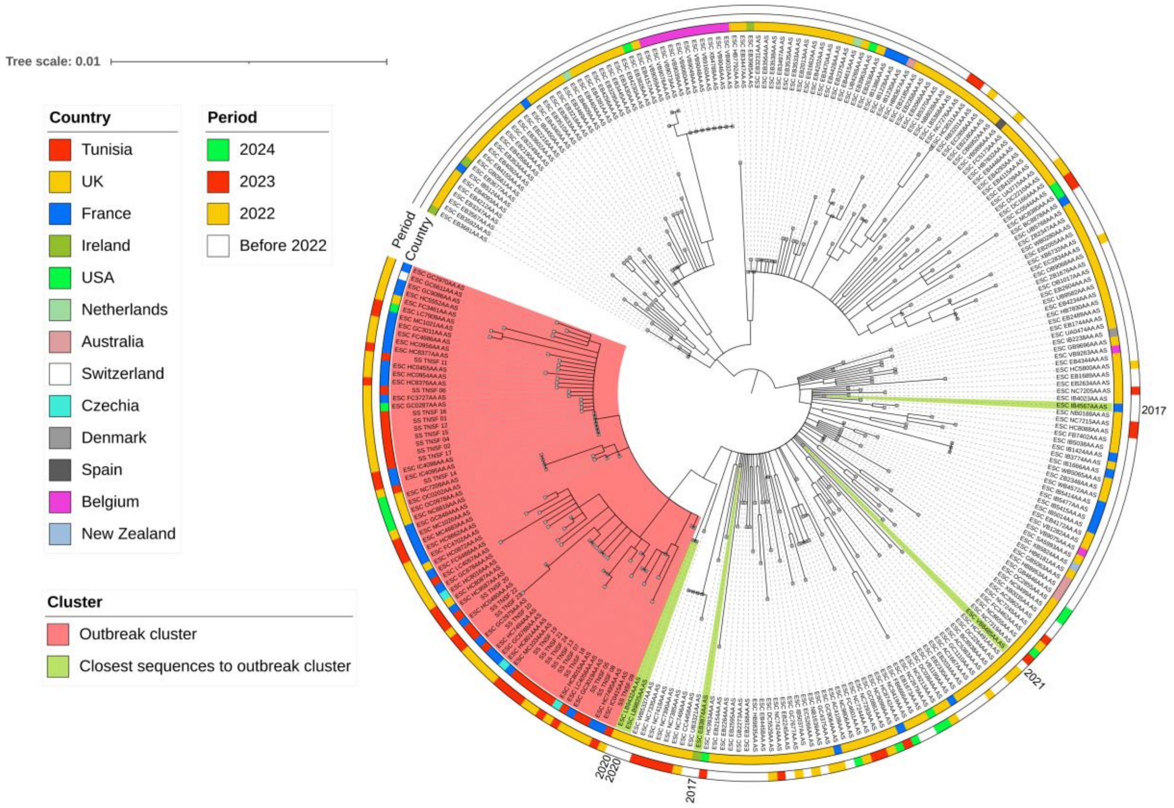

**Fig. S4. Maximum likelihood phylogenetic tree of international HC10-20662 sequences**

*The outbreak cluster is highlighted in red. The sequences with the highest genetic relatedness to the outbreak cluster are highlighted in green.*