

## SUPPLEMENTARY MATERIAL

### Can a field molecular diagnosis be accurate? A performance evaluation of colorimetric RT-LAMP for the detection of SARS-CoV-2 in a hospital setting

Lívia do Carmo Silva<sup>1†</sup>, Carlos Abelardo dos Santos<sup>2†</sup>, Geovana de Melo Mendes<sup>1†</sup>, Kézia Gomes de Oliveira<sup>1†</sup>, Marcio Neres de Souza Júnior<sup>1†</sup>, Paulo Felipe Neves Estrela<sup>1†</sup>, Sérgio Henrique Nascente Costa<sup>3,4,5</sup>, Elisângela de Paula Silveira-Lacerda<sup>2</sup> and Gabriela Rodrigues Mendes Duarte<sup>1\*</sup>

**Table S1.** Samples used for RT-LAMP and RT-PCR

| Laboratory |           |                                |                   | Hospital  |           |                                |                   |
|------------|-----------|--------------------------------|-------------------|-----------|-----------|--------------------------------|-------------------|
| ID Number  | Ct* value | Equivalent in number of copies | Result of RT-LAMP | ID Number | Ct* value | Equivalent in number of copies | Result of RT-LAMP |
| 1          | 15.68     | 3.01E+07                       | Positive          | 111       | 16.96     | 7.55E+06                       | Positive          |
| 2          | 17.45     | 4.57E+06                       | Positive          | 112       | 17.69     | 3.60E+06                       | Positive          |
| 3          | 17.84     | 3.10E+06                       | Positive          | 113       | 17.96     | 2.75E+06                       | Positive          |
| 4          | 18.98     | 1.04E+06                       | Positive          | 114       | 17.99     | 2.67E+06                       | Positive          |
| 5          | 19.15     | 8.90E+05                       | Positive          | 115       | 18.27     | 2.04E+06                       | Positive          |
| 6          | 19.27     | 7.97E+05                       | Positive          | 116       | 19.73     | 5.26E+05                       | Positive          |
| 7          | 19.13     | 9.07E+05                       | Positive          | 117       | 19.75     | 5.17E+05                       | Positive          |
| 8          | 20.25     | 3.33E+05                       | Positive          | 118       | 19.85     | 4.73E+05                       | Positive          |
| 9          | 20.53     | 2.61E+05                       | Positive          | 119       | 19.94     | 4.37E+05                       | Positive          |
| 10         | 21.09     | 1.63E+05                       | Positive          | 120       | 20.36     | 3.03E+05                       | Positive          |
| 11         | 21.23     | 1.45E+05                       | Positive          | 121       | 20.66     | 2.34E+05                       | Positive          |
| 12         | 21.84     | 8.80E+04                       | Positive          | 122       | 21.49     | 1.17E+05                       | Positive          |
| 13         | 21.86     | 8.66E+04                       | Positive          | 123       | 21.74     | 9.54E+04                       | Positive          |
| 14         | 21.90     | 8.39E+04                       | Positive          | 124       | 23.47     | 2.48E+04                       | Positive          |
| 15         | 22.42     | 5.55E+04                       | Positive          | 125       | 23.53     | 2.37E+04                       | Positive          |
| 16         | 22.51     | 5.01E+04                       | Positive          | 126       | 24.08     | 1.58E+04                       | Positive          |
| 17         | 23.27     | 2.30E+04                       | Positive          | 127       | 24.97     | 8.33E+03                       | Positive          |
| 18         | 23.46     | 2.50E+04                       | Positive          | 128       | 25.68     | 5.08E+03                       | Positive          |
| 19         | 23.76     | 2.00E+04                       | Positive          | 129       | 26.25     | 3.45E+03                       | Positive          |
| 20         | 24.15     | 1.50E+04                       | Positive          | 130       | 26.86     | 2.30E+03                       | Positive          |
| 21         | 24.52     | 1.15E+04                       | Positive          | 131       | 28.06     | 1.07E+03                       | Positive          |

|    |       |          |          |     |       |          |          |
|----|-------|----------|----------|-----|-------|----------|----------|
| 22 | 26.05 | 3.95E+03 | Positive | 132 | 28.90 | 6.35E+02 | Positive |
| 23 | 26.90 | 2.24E+03 | Positive | 133 | 29.66 | 4.02E+02 | Positive |
| 24 | 28.80 | 6.75E+02 | Negative | 134 | 30.30 | 2.76E+02 | Negative |
| 25 | 30.60 | 2.32E+02 | Negative | 135 | 30.87 | 1.99E+02 | Positive |
| 26 | 31.92 | 1.10E+02 | Negative | 136 | 31.16 | 1.69E+02 | Negative |
| 27 | 32.15 | 9.73E+01 | Negative | 137 | 34.77 | 2.45E+01 | Negative |
| 28 | No Cq | ND       | Negative | 138 | No Cq | ND       | Negative |
| 29 | No Cq | ND       | Negative | 139 | No Cq | ND       | Negative |
| 30 | No Cq | ND       | Negative | 140 | No Cq | ND       | Negative |
| 31 | No Cq | ND       | Negative | 141 | No Cq | ND       | Negative |
| 32 | No Cq | ND       | Negative | 142 | No Cq | ND       | Negative |
| 33 | No Cq | ND       | Negative | 143 | No Cq | ND       | Negative |
| 34 | No Cq | ND       | Negative | 144 | No Cq | ND       | Negative |
| 35 | No Cq | ND       | Negative | 145 | No Cq | ND       | Positive |
| 36 | No Cq | ND       | Negative | 146 | No Cq | ND       | Negative |
| 37 | No Cq | ND       | Negative | 147 | No Cq | ND       | Negative |
| 38 | No Cq | ND       | Negative | 148 | No Cq | ND       | Negative |
| 39 | No Cq | ND       | Negative | 149 | No Cq | ND       | Negative |
| 40 | No Cq | ND       | Negative | 150 | No Cq | ND       | Negative |
| 41 | No Cq | ND       | Negative | 151 | No Cq | ND       | Negative |
| 42 | No Cq | ND       | Negative | 152 | No Cq | ND       | Negative |
| 43 | No Cq | ND       | Negative | 153 | No Cq | ND       | Negative |
| 44 | No Cq | ND       | Negative | 154 | No Cq | ND       | Negative |
| 45 | No Cq | ND       | Negative | 155 | No Cq | ND       | Negative |
| 46 | No Cq | ND       | Negative | 156 | No Cq | ND       | Negative |
| 47 | No Cq | ND       | Negative | 157 | No Cq | ND       | Negative |
| 48 | No Cq | ND       | Negative | 158 | No Cq | ND       | Negative |
| 49 | No Cq | ND       | Negative | 159 | No Cq | ND       | Negative |
| 50 | No Cq | ND       | Negative | 160 | No Cq | ND       | Negative |
| 51 | No Cq | ND       | Negative | 161 | No Cq | ND       | Negative |
| 52 | No Cq | ND       | Negative | 162 | No Cq | ND       | Negative |
| 53 | No Cq | ND       | Negative | 163 | No Cq | ND       | Negative |
| 54 | No Cq | ND       | Negative | 164 | No Cq | ND       | Negative |
| 55 | No Cq | ND       | Negative | 165 | No Cq | ND       | Negative |

|           |       |    |          |            |       |    |          |
|-----------|-------|----|----------|------------|-------|----|----------|
| <b>56</b> | No Cq | ND | Negative | <b>166</b> | No Cq | ND | Negative |
| <b>57</b> | No Cq | ND | Negative | <b>167</b> | No Cq | ND | Negative |
| <b>58</b> | No Cq | ND | Negative | <b>168</b> | No Cq | ND | Negative |
| <b>59</b> | No Cq | ND | Negative | <b>169</b> | No Cq | ND | Negative |
| <b>60</b> | No Cq | ND | Negative | <b>170</b> | No Cq | ND | Negative |
| <b>61</b> | No Cq | ND | Negative | <b>171</b> | No Cq | ND | Negative |
| <b>62</b> | No Cq | ND | Negative | <b>172</b> | No Cq | ND | Negative |
| <b>63</b> | No Cq | ND | Negative | <b>173</b> | No Cq | ND | Negative |
| <b>64</b> | No Cq | ND | Negative | <b>174</b> | No Cq | ND | Negative |
| <b>65</b> | No Cq | ND | Negative | <b>175</b> | No Cq | ND | Negative |
| <b>66</b> | No Cq | ND | Negative | <b>176</b> | No Cq | ND | Negative |
| <b>67</b> | No Cq | ND | Negative | <b>177</b> | No Cq | ND | Negative |
| <b>68</b> | No Cq | ND | Negative | <b>178</b> | No Cq | ND | Negative |
| <b>69</b> | No Cq | ND | Negative | <b>179</b> | No Cq | ND | Negative |
| <b>70</b> | No Cq | ND | Negative | <b>180</b> | No Cq | ND | Negative |
| <b>71</b> | No Cq | ND | Negative | <b>181</b> | No Cq | ND | Negative |
| <b>72</b> | No Cq | ND | Negative | <b>182</b> | No Cq | ND | Negative |
| <b>73</b> | No Cq | ND | Negative | <b>183</b> | No Cq | ND | Negative |
| <b>74</b> | No Cq | ND | Negative | <b>184</b> | No Cq | ND | Negative |
| <b>75</b> | No Cq | ND | Negative | <b>185</b> | No Cq | ND | Negative |
| <b>76</b> | No Cq | ND | Negative | <b>186</b> | No Cq | ND | Negative |
| <b>77</b> | No Cq | ND | Negative | <b>187</b> | No Cq | ND | Negative |
| <b>78</b> | No Cq | ND | Negative | <b>188</b> | No Cq | ND | Negative |
| <b>79</b> | No Cq | ND | Negative | <b>189</b> | No Cq | ND | Negative |
| <b>80</b> | No Cq | ND | Negative | <b>190</b> | No Cq | ND | Negative |
| <b>81</b> | No Cq | ND | Negative | <b>191</b> | No Cq | ND | Negative |
| <b>82</b> | No Cq | ND | Negative | <b>192</b> | No Cq | ND | Negative |
| <b>83</b> | No Cq | ND | Negative | <b>193</b> | No Cq | ND | Negative |
| <b>84</b> | No Cq | ND | Negative | <b>194</b> | No Cq | ND | Negative |
| <b>85</b> | No Cq | ND | Negative | <b>195</b> | No Cq | ND | Negative |
| <b>86</b> | No Cq | ND | Negative | <b>196</b> | No Cq | ND | Negative |
| <b>87</b> | No Cq | ND | Negative | <b>197</b> | No Cq | ND | Negative |
| <b>88</b> | No Cq | ND | Negative | <b>198</b> | No Cq | ND | Negative |
| <b>89</b> | No Cq | ND | Negative | <b>199</b> | No Cq | ND | Negative |

|            |       |    |          |            |       |    |          |
|------------|-------|----|----------|------------|-------|----|----------|
| <b>90</b>  | No Cq | ND | Negative | <b>200</b> | No Cq | ND | Negative |
| <b>91</b>  | No Cq | ND | Negative | <b>201</b> | No Cq | ND | Negative |
| <b>92</b>  | No Cq | ND | Negative | <b>202</b> | No Cq | ND | Negative |
| <b>93</b>  | No Cq | ND | Negative | <b>203</b> | No Cq | ND | Negative |
| <b>94</b>  | No Cq | ND | Negative | <b>204</b> | No Cq | ND | Negative |
| <b>95</b>  | No Cq | ND | Negative | <b>205</b> | No Cq | ND | Negative |
| <b>96</b>  | No Cq | ND | Negative | <b>206</b> | No Cq | ND | Negative |
| <b>97</b>  | No Cq | ND | Negative |            |       |    |          |
| <b>98</b>  | No Cq | ND | Negative |            |       |    |          |
| <b>99</b>  | No Cq | ND | Negative |            |       |    |          |
| <b>100</b> | No Cq | ND | Negative |            |       |    |          |
| <b>101</b> | No Cq | ND | Negative |            |       |    |          |
| <b>102</b> | No Cq | ND | Negative |            |       |    |          |
| <b>103</b> | No Cq | ND | Negative |            |       |    |          |
| <b>104</b> | No Cq | ND | Negative |            |       |    |          |
| <b>105</b> | No Cq | ND | Negative |            |       |    |          |
| <b>106</b> | No Cq | ND | Negative |            |       |    |          |
| <b>107</b> | No Cq | ND | Negative |            |       |    |          |
| <b>108</b> | No Cq | ND | Negative |            |       |    |          |
| <b>109</b> | No Cq | ND | Negative |            |       |    |          |
| <b>110</b> | No Cq | ND | Negative |            |       |    |          |

---

\* Mean CT (Cycle Threshold) determined for N1 and CT N2. ND (Not determinate). No Cq - No cycle quantification.

## Statistical Analysis

In order to calculate the values for sensitivity, specificity, disease prevalence, positive and negative predictive values and accuracy, the following data was considered:

Laboratory:

| RT-LAMP<br>Results | RT-qPCR Results    |       |                    |       |       |
|--------------------|--------------------|-------|--------------------|-------|-------|
|                    | Present            | n     | Absent             | n     | Total |
| Positive           | True Positive (a)  | 23    | False Positive (c) | 0     | a + c |
| Negative           | False Negative (b) | 4     | True Negative (d)  | 83    | b + d |
| Total              |                    | a + b |                    | c + d |       |

Hospital:

| RT-LAMP<br>Results | RT-qPCR Results    |       |                    |       |       |
|--------------------|--------------------|-------|--------------------|-------|-------|
|                    | Present            | n     | Absent             | n     | Total |
| Positive           | True Positive (a)  | 24    | False Positive (c) | 1     | a + c |
| Negative           | False Negative (b) | 3     | True Negative (d)  | 68    | b + d |
| Total              |                    | a + b |                    | c + d |       |

Given that: true positive = a, false negative = b, false positive = c and true negative = d, the results were calculated considering the following:

$$Sensitivity = \frac{a}{(a + b)}$$

$$Specificity = \frac{d}{(c + d)}$$

$$PPV = \frac{sensitivity \times prevalence}{sensitivity \times prevalence + (1 - specificity) \times (1 - prevalence)}$$

$$NPV = \frac{specificity \times (1 - prevalence)}{(1 - sensitivity) \times prevalence + specificity \times (1 - prevalence)}$$

$$Accuracy = Sensitivity \times Prevalence + Specificity \times (1 - Prevalence)$$

Cohen's Kappa was calculated using the following. N = the total number of samples

$$\kappa = \frac{Pr(\alpha) - Pr(e)}{1 - Pr(e)}$$

$$Pr(\alpha) = \frac{a + d}{N}$$

$$Pr(e) = \frac{\frac{(a + b) \times (a + c)}{N} + \frac{(c + d) \times (b + d)}{N}}{N}$$