**S1 Table.** Inclusion and exclusion criteria

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| Inclusion criteria | Exclusion criteria |
| Adults aged over 40 years living in Yangpyeong, Korea | Children and young adults aged younger than 40 years |
| Have six or more natural teeth | Have less than six natural teeth |
| Generally healthy with only history of chronic systemic disease (e.g. controlled DM or hypertension) | Systemic conditions with acute symptoms requiring possible hospitalisation |
| Intend to cooperate the protocol of assessing oral malodour by avoiding eating/drinking for three hours | Unable or not intend to cooperate the protocol of assessing oral health |
| Can understand and fill in questionnaires and informed consent | Refuse or incompletely submit questionnaires and informed consent |