Supplementary table 1 Summary of quality assurance and quality control procedures in NCEC-HRP study

Aspects	Quality assurance and quality control procedures
Research design	Protocol development • The objectives, research design, participants' recruitment, sample size, as well as other basic points of the research protocol were developed by the NCEC Project Committee and its Advisory Committees. • Small adjustments to the initial protocol were performed during the operationalization of the research. Development of the Operations Manual • The Operations Manual with a clear and detailed description of all the activities were produced by the Project Committee and working group in the planning stage.
Training, Certification and pre-survey	Training and certifications of interviewers for data collection • Trainings and certifications were planned before the pilot study and performed by experts from the National Cancer Center • Training was first conducted in a centralized way to ensure uniformity. Then the training team went to the each center for further training possible if needed. • Certification of the interviewers was carried out at the end of the training process. The interviewer completed a specific questionnaire according to the simulated on-site survey and compared it with the standard answer. Certification could only be approved when the consistency of the survey is met. Pre-survey • A pilot study was conducted in Feicheng, Shandong before the official study began. • The flowchart to execute the procedures was tested, including the difficulties for understanding of the questionnaire by the participants, arrangements for investigation and endoscopy, and the limitations of pad-based survey. • Problems were discussed and the necessary alterations were made to the protocol and manuals.
Data collection and analysis	Data collection • Survey system were designed with built-in functions to avoid missing items and minimize logic errors during the interview • Repeat questionnaire and measures on selected items were conducted based on a 10% randomly selection of the participants • The data were uploaded to the platform weekly and were checked for skip errors, missing values, outliers and discrepant values by data

	monitoring team Data analysis • All data would be cleaned and encrypted before analysis • An analytical protocol would be developed prior to data analysis and all results would be reported
Sample collection and transportation	Sample collection • A standard procedure for sample collection, storage and transportation were developed by the Project Committee and working group • Samples were collected from each center and dispensed according to the protocol • Reagents and tubes were purchased uniformly to ensure consistency Sample transportation and storage • Tissue, saliva sample and half of the blood samples, including two pipes of blood cell and two pipes would be transported on dry ice to the central biobank in Linxian • All samples would be stored at -80℃ freezer for long-term preservation at each local site and central biobank • All samples were tracked by the management center
Supervision and assessment	Periodic site visits • Periodic site visits to each center to check whether the screening were carried out according to the protocol • Periodic centralized communication to one center to exchange experience and answer questions Assessment • There were a series of indicators to assess the investigators, including the quality of the questionnaire, the duration of the survey, and the completeness of the questionnaire, etc. For the investigators who fail in the assessment, a re-training and re-certification was required before they participated in the survey. • An annual report with detail work description in the previous year was required for each center at the end of the year • Performance was evaluated based on the annual report and assessment of periodic site visits