

**Supplementary table-1 Evaluation and risk ranking**

<b>Level</b>	<b>Descriptor</b>	<b>Description of Patient</b>	<b>Description of Hospital</b>
1	Insignificant	Patient hurts a little	Nearly no adverse impact, financial loss below RMB 1,000
2	Minor	Aggravates patient's disease	Can be solved quickly, financial loss between RMB 1,000 and 10,000
3	Moderate	Result in other complications of patient	Take time to be solved, financial loss between RMB 1,000 and 300,000
4	Major	Patient is disabled	Take a long time to be solved, financial loss between RMB 300,000 and 500,000
5	Extreme	Patient dies	Never can be solved, financial loss more than RMB 500,000

**Supplementary table-2 Qualitative measures of consequence to patient**

<b>Level</b>	<b>Descriptor</b>	<b>Likelihood</b>	
		<b>Actual frequency</b>	<b>Probability</b>
5	Almost certain	Minimum to occur per week	99%
4	Likely	To occur every two months	90%
3	Possible	May occur per 1-2 years	50%
2	Unlikely	May occur per 2-5 years	10%
1	Remote	Every occur every 5 years or more	1%

Supplementary table-3. Risk register

ID	Risk Type	Risk Description	Actual' or 'Potential' risk?	Consequences	Likelihood	Initial Risk Rating	Ranking	
1	General risk	Risk about case writing	In the complicated medical environment, the doctors assume the tedious work but do not complete the case in time. So the professor in preoperative evaluation center does not understand the general pathogenetic condition. So, it will produce the risk for patients and the management.	P	3	5	15	M
2		Risk about operative record	In the poor management, medical staffs assume considerable work in the general hospital. They may perform a wrong operative record(name, gender, age, ward, admission number, bed number and operative time) for defatigation and irresponsibility. And this will produce the medical risk that the patient will not receive the treatment in time or mismatched operative treatment.	P	4	3	12	M
3	Risk from diagnosis	Risk from diagnosis	The medical staffs meet a lot of patients one day. They may not perform the precise diagnosis in the absence of time or knowledge. As a result, some adverse events happened in the hospital.	A	5	2	10	M
4	Risk from therapeutics	Risk from operative plan	Under the medical technology with fast development, there are many different operative plans for a patient. But the patient will receive the unbefitted operation for the insufficient knowledge of doctors or is influenced by the economic factors. And then the patient could not get the best effective rehabilitation. As a result, it brings the bad influence to the hospital.	P	4	1	4	L
5		Risk from anesthesia	The risk of perioperative period would be occurred by the unbecoming way of anesthesia for the less responsibility.	A	2	3	6	M
6	Risk from operative doctor	Risk from the operative doctor	In the general hospital, the classification of doctors is in line with the grade of operations. Under the current medical regulation, the operative doctor is in charge of the whole process of operation. But the patient could not get the right operation because the level of the operative doctor is not responding to the grade of operations, or the doctors could not understand the condition of the patient to adopt the most measurable operation. As a result, the rehabilitation	P	5	4	20	H
7		Risk from the assistant doctor	Under the current education of medical training, the assistant doctor is the initial point of the operative doctor. In the whole process of operation, the assistant doctor could not master the	P	1	5	5	L
8		Risk from blood type	Sometimes, the medical staffs make a mistake in the blood type to produce the hemolytic risk.	P	5	2	10	M
9		Risk from blood volume	In the general hospital, the level of doctors is responding to the grade of operations. But the patient could get more blood transfusion because the level of the operative doctor is not responding to the grade of operations, or the doctors could not understand the condition of the patient to adopt the most	A	5	5	25	H
10		Risk from blood transfusion	Current, Blood Transfusion Association strands for less or none blood transfusion for patient. Because the blood transfusion would bring the communicable disease (such as AIDS, hepatitis and syphilis) and the destruction of immune system. The patient gets more blood transfusion in the operation for blood loss induced by the unpracticed operation. As a result, the wound could not heal on	A	3	5	15	M
11		Risk from cardiovascular system	In the environment of pursuing the profit in hospital, the patient often claims to get operation as quickly as possible. But the doctor does not treat the patient with coronary heart disease according to the guideline in hospital, the patient will be died in the perioperative	P	5	2	10	M
12		Risk from nervous system	In the environment of pursuing the profit in hospital, the patient often claims to get operation as quickly as possible. But the doctor could not treat the patient with cerebral infarction disease according to the guideline in hospital; the patient was disabled in the	P	4	2	8	M

13	<b>Risk from organ systems</b>	Risk from respiratory system	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with bronchiectasis disease according to the	A	5	1	5	L
14		Risk from alimentary system	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with gastric ulcer according to the guideline in hospital; the patient produced the serous complication in the perioperative period.	A	3	1	3	L
15		Risk from metabolism system	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with diabetes mellitus according to the guideline in hospital; the patient produced the serous complication (infection, healing in long time) in the perioperative period.	A	3	5	15	M
16		Risk from endocrine system	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with hyperthyroidism according to the guideline in hospital; the patient produced the serous complication (infection, death) in the perioperative period.	P	5	1	5	L
17		Risk from urinary system	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with urinary tract infection according to the guideline in hospital; the patient produced the serous complication (infection) in the perioperative period.	A	4	5	20	H
18		Risk from hematological system	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with thrombus according to the guideline in hospital; the patient produced the serous complication (death) in the perioperative period.	A	5	3	15	M
19			Risk from immune system	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But doctors could not treat the patient with immune deficiency according to the guideline in hospital; the patient produced the serous complication (infection) in the perioperative period.	A	4	1	4
20		Risk from mental disorder risk	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with mental disorder according to the guideline in hospital; the patient produced the serous complication in the	P	3	2	6	M
21	<b>Risk from disease history</b>	Risk from history with great operations	Current, in the general hospital medical staffs communicated with many patients a day. They sometimes ignore the history of great operation to produce the risk of serious complication and death even worse.	P	5	1	5	L
22	<b>Risk from new technology application</b>	Risk from new technology application	Now, the health management takes the strict demand to the new medical technology to guarantee the medical safe. If the ward could not examine and verify the new technology by the professor before, the doctor would produce the risk of medical safe for the patients.	P	5	2	10	M

**Supplementary table-4. Risk evaluation**

ID	Risk type	Adequacy of existing controls			The consequences of an event happening		Risk rating	Risk ranking
		Adequate	Inadequate	Uncertain	Consequences	Likelihood		
1	Risk about case writing		*		3	5	15	M
2	Risk about operative record	*			4	3	12	M
3	Risk from diagnosis		*		5	2	10	M
4	Risk from operative plan	*			4	1	4	L
5	Risk from anesthesia			*	2	3	6	M
6	Risk from the operative doctor		*		5	4	20	H
7	Risk from the assistant doctor		*		1	5	5	L
8	Risk from blood type	*			5	2	10	M
9	Risk from blood volume		*		5	5	25	H
10	Risk from blood transfusion		*		3	5	15	M
11	Risk from cardiovascular system	*			5	2	10	M
12	Risk from nervous system		*		4	2	8	M
13	Risk from respiratory system	*			5	1	5	L
14	Risk from alimentary system		*		3	1	3	L
15	Risk from metabolism system	*			3	5	15	M
16	Risk from endocrine system	*			5	1	5	L
17	Risk from urinary system	*			4	5	20	H
18	Risk from hematological system		*		5	3	15	M
19	Risk from immune system		*		4	1	4	L
20	Risk from mental disorder risk	*			3	2	6	M
21	Risk from history with great operations	*			5	1	5	L
22	Risk from new technology application		*		5	2	10	M

Supplementary table-5. Treatment plans

ID	Risk Description	Implementation of risk reduction strategies	Time table	Responsibility for action	Residual risk			
					Consequences	Likelihood	Initial Risk Rating	Ranking
1	In the complicated medical environment, the doctors assume the tedious work but do not complete the case in time. So the professor in preoperative evaluation center does not understand the general pathogenetic condition. So, it will produce the risk for patients and the management.	<ul style="list-style-type: none"> <li>* Understand the direction of the health reform to adapt the complicated environment.</li> <li>* Reduce the work force of doctors by control the number of patients visited.</li> <li>* Check in the case writing in a time to guarantee the expert to understand the whole conditions of patients.</li> <li>* Keep training the case writing to ease the quality.</li> <li>* Simplify the case writing and build the tabled pattern of case writing.</li> </ul>	1 month	Deanery, Medical service department and medical record library	2	2	4	L
2	In the poor management, medical staffs assume considerable work in the general hospital. They may perform a wrong operative record(name, gender, age, ward, admission number, bed number and operative time) for defatigation and irresponsibility. And this will produce the medical risk that the patient will not receive the treatment in time or mismatched operative treatment.	<ul style="list-style-type: none"> <li>* Form the mechanism of medical supervision to identify the operative patient.</li> <li>* Adjust the work environment to relieve the work force of medical staffs.</li> <li>* Form the mechanism of punishment to enhance the responsibility.</li> </ul>	In 2 weeks	Medical service department & nursing department	3	2	6	M
3	The medical staffs meet a lot of patients one day. They may not perform the precise diagnosis in the absense of time or knowledge. As a result, some adverse events happened in the hospital.	<ul style="list-style-type: none"> <li>* Control the doctors, diagnosis and treatment man-times to guarantee one patient time.</li> <li>* Enhance the specialization training of doctors.</li> <li>* Form the regulation of consultation of doctors.</li> <li>* Strengthen the mechanism of doctors of three grades for responsibility.</li> </ul>	In 1 year	Medical service department & Scientific and Educated department	4	1	4	L
4	Under the medical technology with fast development, there are many different operative plans for a patient. But the patient will receive the unbefitted operation for the insufficient knowledge of doctors or is influenced by the economic factors. And then the patient could not get the best effective rehabilitation. As a result, it brings the bad influence to the hospital.	<ul style="list-style-type: none"> <li>* Perform strictly the managing regulation of operative classification and doctors grades.</li> <li>* Stick to the r regulation of preoperative discussion to form the most appropriate operative program.</li> <li>* Consummate the convention of diagnosis and treatment gradually to unify the medical principal.</li> <li>* Improve the wage of doctors to reduce the influence by the economic factors.</li> <li>* Enhance the moral education of medical staffs to stand off the influence by the economic factors.</li> </ul>	In 1 year	Medical service department & human resource management (HRM) department	1	1	1	L
5	The risk of perioperative period would be occurred by the unbefitting way of anesthesia for the less responsibility.	<ul style="list-style-type: none"> <li>* Train the doctors the anesthesia knowledge.</li> <li>* Form the mechanism of punishment to enhance the responsibility.</li> <li>* Create the platform for clinical doctors and anesthesia doctors to communicate with each other.</li> <li>* Enhance the mechanism that the anesthetic doctors to visit the patients pre-operation.</li> </ul>	In 0.5 year	Medical service department & Scientific and Education department & Anesthesiology department	2	1	2	L
6	In the general hospital, the classification of doctors is in line with the grade of operations. Under the current medical regulation, the operative doctor is in charge of the whole process of operation. But the patient could not get the right operation because the level of the operative doctor is not responding to the grade of operations, or the doctors could not understand the condition of the patient to adopt the most measurable operation. As a result, the rehabilitation of patients is influenced and the adverse events will happen continuously.	<ul style="list-style-type: none"> <li>* Perform strictly the managing regulation of operative classification and doctors grades.</li> <li>* Ensure the operating doctor to grasp the condition of patients by enhancing the regulation of responsibility by three grades of doctors.</li> <li>* Stick to the regulation of preoperative discussion to form the most appropriate operative program.</li> <li>* Form the training regulation of doctors' professional career to improve the beardless doctors' skills.</li> </ul>	In 2 months	Medical service department & Scientific and Education department & HRM department	3	1	3	L

7	Under the current education of medical training, the assistant doctor is the initial point of the operative doctor. In the whole process of operation, the assistant doctor could not master the condition of the patient or the operative plan that influenced the operative effectiveness. As a result, the risk was produced.	<ul style="list-style-type: none"> <li>* Form the training regulation of doctors' professional career to improve the beardless doctors' skills.</li> <li>• Improve the beardless doctors knowledge structures by training the medical professional knowledge.</li> <li>* Supervise and to urge the young doctors to learn skills by enhancing the regulation of responsibility by three grades of doctors.</li> <li>• Encourage the young person join in the operative discussion in order to understand the condition of patient sufficiently.</li> </ul>	Long time	Medical service department & Scientific and Education department & HRM department	1	1	1	L
8	Sometimes, the medical staffs make a mistake in the blood type to produce the hemolytic risk.	<ul style="list-style-type: none"> <li>* Reduce the work force of doctors by control the number of patients visited.</li> <li>• Adjust the work environment to relieve the work force of medical staffs.</li> <li>* Stick to the regulation of preoperative discussion to form the most appropriate operative program.</li> <li>• Form the regulation of checking up blood type in the clinical links to avoid the adverse event happened.</li> <li>* Enhance the transfusion knowledge training and cut off non-medical staffs to deal with transfusion.</li> </ul>	Immediately	Medical service department & Scientific and Education department & Transfusion department & nursing department	2	1	2	L
9	In the general hospital, the level of doctors is responding to the grade of operations. But the patient could get more blood transfusion because the level of the operative doctor is not responding to the grade of operations, or the doctors could not understand the condition of the patient to adopt the most measurable operation. As a result, the patient could not get enough blood in the operative process that produces more risk.	<ul style="list-style-type: none"> <li>* Perform strictly the managing regulation of operative classification and doctors grades.</li> <li>• Ensure the operative doctor to grasp the condition of patients by enhancing the regulation of responsibility by three grades of doctors.</li> <li>* Stick to the regulation of preoperative discussion to form the most appropriate operative program.</li> <li>• Develop the professional training of operation to strengthen the operative combination.</li> <li>* Build the platform for clinical department and blood transfusion department to communicate with each other in order to get ready of appropriate blood volume before operation.</li> </ul>	Immediately	Medical service department & Transfusion department	3	3	9	M
10	Current, Blood Transfusion Association strands for less or none blood transfusion for patient. Because the blood transfusion would bring the communicable disease (such as AIDS, hepatitis and syphilis) and the destruction of immune system. The patient gets more blood transfusion in the operation for blood loss induced by the unpracticed operation. As a result, the wound could not heal on time, and the opportunity of infection would increase.	<ul style="list-style-type: none"> <li>* Perform strictly the managing regulation of operative classification and doctors grades.</li> <li>• From the clinical tranfusion committee and build the clinical transfusion standard to guide the blood transfusion.</li> <li>* Improve the flow sheet of clinical transfusion and do immunologic test before blood transfusion.</li> <li>• Train the knowledge of blood transfusion.</li> <li>* Develop the professional training of clinical operation to reduce bleeding in operation.</li> <li>• Publicize and develop the auto transfusion.</li> </ul>	In 2 months	Medical service department & Scientific and Education department & Blood Transfusion department	2	2	4	L
11	In the environment of pursuing the profit in hospital, the patient often claims to get operation as quickly as possible. But the doctor does not treat the patient with coronary heart disease according to the guideline in hospital, the patient will be died in the perioperative period.	<ul style="list-style-type: none"> <li>* Build the diagnosis and treatment standard in the perioperative period.</li> <li>• Form the mechanism of communication between doctors and patients.</li> <li>* Train the knowledge of coronary heart failure.</li> <li>• Form the mechanism of punishment to enhance the responsibility.</li> </ul>	In 0.5 year	Medical service department & Scientific and Education department & HRM department	2	1	2	L

17	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with urinary tract infection according to the guideline in hospital; the patient produced the serious complication (infection) in the perioperative period.	<ul style="list-style-type: none"> <li>* Build the diagnosis and treatment standard in the perioperative period.</li> <li>* Form the mechanism of communication between doctors and patients.</li> <li>* Train the knowledge of the urinary system disease.</li> <li>* Form the mechanism of punishment to enhance the responsibility.</li> <li>Strengthen the mechanism of pre-operative discussion to understand the condition of patients and the operative program sufficiently.</li> </ul>	In 0.5 year	Medical service department & Scientific and Education department & HRM department	3	3	9	M
18	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with thrombus according to the guideline in hospital; the patient produced the serious complication (death) in the perioperative period.	<ul style="list-style-type: none"> <li>* Build the diagnosis and treatment standard in the perioperative period.</li> <li>* Form the mechanism of communication between doctors and patients.</li> <li>* Train the knowledge of the hematological system disease.</li> <li>* Form the mechanism of punishment to enhance the responsibility.</li> <li>Strengthen the mechanism of pre-operative discussion to understand the condition of patients and the operative program sufficiently.</li> </ul>	In 0.5 year	Medical service department & Scientific and Education department & HRM department	2	3	6	M
19	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But doctors could not treat the patient with immune deficiency according to the guideline in hospital; the patient produced the serious complication (infection) in the perioperative period.	<ul style="list-style-type: none"> <li>* Build the diagnosis and treatment standard in the perioperative period.</li> <li>* Form the mechanism of communication between doctors and patients.</li> <li>* Train the knowledge of the immune system disease.</li> <li>* Form the mechanism of punishment to enhance the responsibility.</li> <li>Strengthen the mechanism of pre-operative discussion to understand the condition of patients and the operative program sufficiently.</li> </ul>	In 0.5 year	Medical service department & Scientific and Education department & HRM department	3	1	3	L
20	In the environment of pursuing the profit in hospital, the patient claims to get operation as quickly as possible. But the doctor could not treat the patient with mental disorder according to the guideline in hospital; the patient produced the serious complication in the perioperative period. As a result, the medical adverse events were produced.	<ul style="list-style-type: none"> <li>* Build the diagnosis and treatment standard in the perioperative period.</li> <li>* Form the mechanism of communication between doctors and patients.</li> <li>* Train the knowledge of the mental disorder system disease.</li> <li>* Form the mechanism of punishment to enhance the responsibility.</li> <li>Strengthen the mechanism of pre-operative discussion to understand the condition of patients and the operative program sufficiently.</li> </ul>	In 0.5 year	Medical service department & Scientific and Education department & HRM department	2	1	2	L
21	Current, in the general hospital medical staffs communicated with many patients a day. They sometimes ignore the history of great operation to produce the risk of serious complication and death even worse.	<ul style="list-style-type: none"> <li>* Build the diagnosis and treatment standard in the perioperative period.</li> <li>* Form the mechanism of communication between doctors and patients.</li> <li>* Form the mechanism of punishment to enhance the responsibility.</li> <li>Strengthen the mechanism of pre-operative discussion to understand the condition of patients and the operative program sufficiently.</li> <li>Adjust the work environment to relieve the work force of medical staffs.</li> </ul>	In 0.5 year	Medical service department & Scientific and Education department & HRM department	1	1	1	L
22	Now, the health management takes the strict demand to the new medical technology to guarantee the medical safe. If the ward could not examine and verify the new technology by the professor before, the doctor would produce the risk of medical safe for the patients.	<ul style="list-style-type: none"> <li>* Form the new technology introducing mechanism.</li> <li>* Build the committee of the new technology auditing experts.</li> <li>* Form the mechanism of communication between doctors and patients, and tell the disadvantages and advantages of the new technology to patients.</li> <li>* Ensure the grades of the new operations and the commensurate doctors.</li> <li>* Build the mechanism of asking for instructions to the new technology.</li> </ul>	In 2 weeks	Medical service department & Scientific and Education department	2	1	2	L