

**Appendix Table 1 The general characteristics of six MCH institutions**

Province	MCH institution	Number of				
		Staff	Beds	Outpatients (*1000per year)	Hospitalized (*1000 per year)	Deliveries (*1000 per year)
Hebei	SJZ	1022	450	520	21	16
	MC	90	40	15	1.6	1
	XH	110	60	120	2	1
Beijing	HD	729	460	740	20	14
	CY	443	125	280	6	4
	FT	362	120	280	3.5	2.2

*\*Rough data provided by administrative managers of those MCH institutions.*

**Appendix Table 2 The general characteristics of 118 participants**

Characteristics	Health workers (n1=79)		Patients (n4=39)	Total (N=118)	
	Managers (n2=20)	Care providers (n3=59)			
Sex	Male	5(25.0%)	3( 5.1%)	13(33.3%)	21(17.8%)
	Female	15(75.0%)	56(94.9%)	26(66.7%)	97(82.2%)
Age	20-29 years	0( 0.0%)	8(13.6%)	16(41.0%)	24(20.3%)
	30-39 years	7(35.0%)	33(55.9%)	13(33.3%)	53(44.9%)
	40-49 years	9(45.0%)	16(27.1%)	1( 2.6%)	26(22.0%)
	50-59 years	3(15.0%)	1( 1.7%)	4(10.3%)	8( 6.8%)
	60 years or above	1( 5.0%)	1( 1.7%)	0( 0.0%)	2( 1.7%)
	Missing	0( 0.0%)	0( 0.0%)	5(12.8%)	5( 4.2%)
Education	Primaryorunder	0( 0.0%)	0( 0.0%)	4(10.3%)	4( 3.4%)
	Secondary	0( 0.0%)	0( 0.0%)	7(17.9%)	7( 5.9%)
	Juniorcollege	3(15.0%)	23(39.0%)	6(15.4%)	32(27.1%)
	Undergraduate	10(50.0%)	25(42.4%)	6(15.4%)	41(34.7%)
	Masterorabove	2(10.0%)	9(15.3%)	2( 5.1%)	13(11.0%)
	Missing	5(25.0%)	2( 3.4%)	14(35.9%)	21(17.8%)

**Appendix Table 3 Other general characteristics of 79 health workers**

Characteristics		Managers (n2=20)	Care providers (n3=59)	Total (n1=79)
Working years	0-4 years	0( 0.0%)	3( 5.1%)	3( 3.8%)
	5-9 years	3(15.0%)	14(23.7%)	17(21.5%)
	10 years or above	17(85.0%)	42(71.2%)	59(74.7%)
Professional title*	Clinicians	7(35.0%)	14(23.7%)	21(26.6%)
	Public health	2(10.0%)	15(25.4%)	17(21.5%)
	Nurses	5(25.0%)	21(35.6%)	26(32.9%)
	Administrative	6(30.0%)	0( 0.0%)	6( 7.6%)
	Others	0( 0.0%)	9(15.3%)	9(11.4%)

*\*Professional title is a qualification authenticated by health administrative bureaus, which qualifies medical professionals' specialty legally. Most administrative managers of medical institutions in China had been promoted from frontline staff rather than specialized administrative managers.*

**Appendix Table 4 Dimensions and items of patient safety culture in MCH institutions**

Dimensions/items	Health workers (n1=79)			Total (N=118)
	Managers (n2=20)	Care providers (n3=59)	Patients (n4=39)	
<b>1. Management support</b>	<b>19(95.0%)</b>	<b>53(89.8%)</b>	<b>17(43.6%)</b>	<b>89(75.4%)</b>
1.1 Management gives priority to PS, considering other goals like profits or reputations.	10(50.0%)	14(23.7%)	3( 7.7%)	27(22.9%)
1.2 Management is committed to continuous improvement of PS.	13(65.0%)	27(45.8%)	2( 5.1%)	42(35.6%)
1.3 Management is committed to create a good working atmosphere.	1( 5.0%)	1( 1.7%)	0( 0.0%)	2( 1.7%)
1.4 Management provides adequate allocation of resources to the department where I work.	2(10.0%)	15(25.4%)	0( 0.0%)	17(14.4%)
1.5 Management thinks highly of improving organizational environments and medical facilities.	16(80.0%)	38(64.4%)	14(35.9%)	68(57.6%)
1.6 Management pays more attention to profit-making departments than others.	6(30.0%)	11(18.6%)	0( 0.0%)	17(14.4%)
<b>2.Regulation and procedure</b>	<b>19(95.0%)</b>	<b>54(91.5%)</b>	<b>13(33.3%)</b>	<b>86(72.9%)</b>
2.1Innovations of regulations and procedures are rigorous and flexible.	6(30.0%)	10(16.9%)	1( 2.6%)	17(14.4%)
2.2Motivatemechanism of the organization is fair and feasible.	9(45.0%)	30(50.8%)	0( 0.0%)	39(33.1%)

2.3 Some regulations and procedures are unreasonable and lead to inconveniences, barriers or risks.	14(70.0%)	37(62.7%)	13(33.3%)	64(54.2%)
2.4 Frontlines can obey regulations and procedures in the organization.	16(80.0%)	26(44.1%)	2( 5.1%)	44(37.3%)
2.5 Risk preventing and responding mechanism has been introduced to reduce or avoid errors.	6(30.0%)	15(25.4%)	0( 0.0%)	21(17.8%)
2.6 Frontline staff can be able to involve in decision-making.	3(15.0%)	10(16.9%)	0( 0.0%)	13(11.0%)
<b>3. Staffing</b>	<b>16(80.0%)</b>	<b>52(88.1%)</b>	<b>16(41.0%)</b>	<b>84(71.2%)</b>
3.1 I often feel busy too much.	3(15.0%)	9(15.3%)	4(10.3%)	16(13.6%)
3.2 Staffing is far from sufficient to deal with workload.	13(65.0%)	41(69.5%)	11(28.2%)	65(55.1%)
3.3 Because of overload working, we cannot provide patients the best services as we could.	13(65.0%)	48(81.4%)	10(25.6%)	71(60.2%)
<b>4. Teamwork</b>	<b>13(65.0%)</b>	<b>47(79.7%)</b>	<b>5(12.8%)</b>	<b>65(55.1%)</b>
4.1 Referrals between the organization and other institutions are efficient to ensure PS.	5(25.0%)	9(15.3%)	3( 7.7%)	17(14.4%)
4.2 Cross-department teamwork in the organization is not satisfying.	9(45.0%)	34(57.6%)	1( 2.6%)	44(37.3%)
4.3 Communication is not pleasant between supervisors and subordinates.	3(15.0%)	3( 5.1%)	0( 0.0%)	6( 5.1%)
4.4 Handoffs are handled seriously and carefully.	1( 5.0%)	8(13.6%)	0( 0.0%)	9( 7.6%)
4.5 Teamwork is satisfying in the department where I work.	8(40.0%)	31(52.5%)	1( 2.6%)	40(33.9%)
<b>5. Non-punitive response to adverse events</b>	<b>17(85.0%)</b>	<b>42(71.2%)</b>	<b>6(15.4%)</b>	<b>65(55.1%)</b>
5.1 Frontlines might not report adverse events happened due to worries about punishments.	4(20.0%)	4( 6.8%)	0( 0.0%)	8( 6.8%)
5.2 Frontlines are encouraged to report adverse events.	5(25.0%)	17(28.8%)	0( 0.0%)	22(18.6%)
5.3 Adverse events are mostly attributed to individuals in the organization.	2(10.0%)	2( 3.4%)	6(15.4%)	10( 8.5%)
5.4 Feedback of adverse events reported is delivered in time.	3(15.0%)	7(11.9%)	0( 0.0%)	10( 8.5%)
5.5 Efforts are much engaged in preventing adverse events to reoccur.	2(10.0%)	18(30.5%)	0( 0.0%)	20(16.9%)
5.6 In the organization, it is preferred to learn from adverse events than blame or punish individuals.	17(85.0%)	41(69.5%)	0( 0.0%)	58(49.2%)
<b>6. Openness to adverse events</b>	<b>10(50.0%)</b>	<b>38(64.4%)</b>	<b>0( 0.0%)</b>	<b>48(40.7%)</b>
6.1 If adverse event happen and might harm patients, I will report it.	8(40.0%)	21(35.6%)	0( 0.0%)	29(24.6%)
6.2 If adverse event happen but nearly not harm patients, I will report it as well.	10(50.0%)	22(37.3%)	0( 0.0%)	32(27.1%)
6.3 If adverse event happen to colleagues, I will report it as well.	5(25.0%)	20(33.9%)	0( 0.0%)	25(21.2%)
6.4 If adverse event happen, individuals involved will be regarded by colleagues not as usual.	1( 5.0%)	7(11.9%)	0( 0.0%)	8( 6.8%)

6.5 It is not superstitious to discuss adverse events among colleagues.	5(25.0%)	25(42.4%)	0( 0.0%)	30(25.4%)
6.6 I am not worried about discussing my errors.	2(10.0%)	4( 6.8%)	0( 0.0%)	6( 5.1%)
6.7 If adverse event happen and is not found by patient, he/she will be not informed to avoid dispute.	3(15.0%)	12(20.3%)	0( 0.0%)	15(12.7%)
6.8 If adverse event happen, patient will be comforted to relieve feelings of unsafety.	5(25.0%)	6(10.2%)	0( 0.0%)	11( 9.3%)
<b>7.Risk awareness and warning</b>	<b>15(75.0%)</b>	<b>44(74.6%)</b>	<b>13(33.3%)</b>	<b>72(61.0%)</b>
7.1 Besides incidents, management pay much attention to errors or potential risks as well.	3(15.0%)	6(10.2%)	0( 0.0%)	9( 7.6%)
7.2 If potential risks emerge, efforts will be much engaged to avoid reoccurring.	7(35.0%)	17(28.8%)	0( 0.0%)	24(20.3%)
7.3 I cannot ignore errors and potential risks in work.	1( 5.0%)	5( 8.5%)	0( 0.0%)	6( 5.1%)
7.4 I agree that most of errors are preventable.	6(30.0%)	16(27.1%)	2( 5.1%)	24(20.3%)
7.5 I agree that 'to err is human'.	6(30.0%)	17(28.8%)	6(15.4%)	29(24.6%)
7.6 I consider my work as part of PS.	11(55.0%)	26(44.1%)	2( 5.1%)	39(33.1%)
<b>8.Continuous learning</b>	<b>19(95.0%)</b>	<b>55(93.2%)</b>	<b>20(51.3%)</b>	<b>94(79.7%)</b>
8.1 Continuous learning is considered as an important thing in the organization.	15(75.0%)	40(67.8%)	4(10.3%)	59(50.0%)
8.2 Colleagues always discuss how to improve work.	7(35.0%)	30(50.8%)	0( 0.0%)	37(31.4%)
8.3 I am competent to handle my job.	16(80.0%)	39(66.1%)	19(48.7%)	74(62.7%)
8.4 I need to learn continuously.	12(60.0%)	35(59.3%)	2( 5.1%)	49(41.5%)
8.5 New employees are trained enough to be acquainted with regulations and procedures.	7(35.0%)	17(28.8%)	0( 0.0%)	24(20.3%)
8.6 Staff is trained enough (not limited to knowledge and skills).	10(50.0%)	40(67.8%)	1( 2.6%)	51(43.2%)
<b>9.Working perception</b>	<b>20(100.0%)</b>	<b>54(91.5%)</b>	<b>37(94.9%)</b>	<b>111(94.1%)</b>
9.1 I have a sense of satisfaction and accomplishment in my work.	9(45.0%)	21(35.6%)	0( 0.0%)	30(25.4%)
9.2 I feel tired of my work.	13(65.0%)	22(37.3%)	2( 5.1%)	37(31.4%)
9.3 I can receive patients with compassion and empathy.	13(65.0%)	30(50.8%)	14(35.9%)	57(48.3%)
9.4 I can perform patience and kind attitudes in my work.	14(70.0%)	41(69.5%)	37(94.9%)	92(78.0%)
9.5 I work seriously and responsibly.	12(60.0%)	36(61.0%)	13(33.3%)	61(51.7%)
<b>10.Providers' defensive behaviors</b>	<b>9(45.0%)</b>	<b>22(37.3%)</b>	<b>9(23.1%)</b>	<b>40(33.9%)</b>
10.1 To avoid high risk, we might refuse patients who we are able to treat in fact.	2(10.0%)	9(15.3%)	0( 0.0%)	11( 9.3%)

10.2 To avoid dispute, I might yield to patient, rather than adhere to rules and guidelines.	5(25.0%)	15(25.4%)	2( 5.1%)	22(18.6%)
10.3 To avoid dispute, we have to do massive informed consents in writing or orally to protect ourselves.	4(20.0%)	7(11.9%)	3( 7.7%)	14(11.9%)
10.4 Unnecessary interventions exist in the organization.	3(15.0%)	2( 3.4%)	5(12.8%)	10( 8.5%)
<b>11. Patient involvement</b>	<b>15(75.0%)</b>	<b>44(74.6%)</b>	<b>34(87.2%)</b>	<b>93(78.8%)</b>
11.1I inform patients (like alternative plans and risks) as enough as I can.	13(65.0%)	42(71.2%)	34(87.2%)	89(75.4%)
11.2I response to any question of patients.	0( 0.0%)	9(15.3%)	13(33.3%)	22(18.6%)
11.3 We often take advice from patients.	7(35.0%)	13(22.0%)	12(30.8%)	32(27.1%)
11.4 We emphasize health education to patients.	5(25.0%)	19(32.2%)	7(17.9%)	31(26.3%)
11.5 I respect patient's willing and rights.	4(20.0%)	21(35.6%)	7(17.9%)	32(27.1%)
11.6 Patients are encouraged to participate in risk management in the organization.	4(20.0%)	13(22.0%)	9(23.1%)	26(22.0%)
<b>12.MCH specific</b>	<b>6(30.0%)</b>	<b>6(10.2%)</b>	<b>0( 0.0%)</b>	<b>12(10.2%)</b>
12.1 Management doesn't support to complete all of public health tasks.	8(40.0%)	14(23.7%)	0( 0.0%)	22(18.6%)
12.2 Staffing allocated on public health is insufficient.	4(20.0%)	7(11.9%)	0( 0.0%)	11( 9.3%)
12.3 Staffing allocation make priority to clinic departments rather than public health departments.	1( 5.0%)	1( 1.7%)	0( 0.0%)	2( 1.7%)
12.4 Our cooperation with other MCH institutions is satisfying.	4(20.0%)	13(22.0%)	1( 2.6%)	18(15.3%)
12.5 I agree that public health is very important and necessary part of a MCH institution.	6(30.0%)	4( 6.8%)	0( 0.0%)	10( 8.5%)
12.6 I agree that public health should be given more attentions than is now.	3(15.0%)	1( 1.7%)	0( 0.0%)	4( 3.4%)
12.7 Public health workers are neglected frequently.	0( 0.0%)	1( 1.7%)	0( 0.0%)	1( 0.8%)
12.8 Public health departments are prejudiced as 'special' in the organization.	0( 0.0%)	3( 5.1%)	0( 0.0%)	3( 2.5%)

	Original codes		Operational codes	Final codes
	<i>Researcher A</i>	<i>Researcher B</i>		
Concept of PS		Concept of PS	Concept of PS	Concept of PS
Patient factors		Environmental factors	Environmental factors	Management support
Medical industry				Regulation and procedure
Policies and regulations		Management support	Organizational structures	Staffing
Legal		Working atmosphere	Working atmosphere	Teamwork
social		Individual factors	Individual factors	Non-punitive
		Providers' defensive behaviors	Providers' defensive behaviors	Openness to adverse events
Organizational goals				Risk awareness and warning
Organizational structures		Patients' defensive behaviors	Patients' defensive behaviors	Continuous learning
Organizational environment and facilities				Working perception
Individual perceptions, attitudes, behaviors				Providers' defensive behaviors
				Patient involvement
				MCH specific
				Environmental factors
				Patients' defensive behaviors

**Appendix Figure 1 The modifying process of main dimensions coded by two parallel researchers**

*\*Not showing specific sub-dimensions and items in each main dimension, and some dimensions of final codes came from sub-dimensions of operational codes.*

**Appendix Table 5 The coding reliability of 12 re-test cases**

<b>No. of cases</b>	<b>Group</b>	<b>Consistency reliability between researchers</b>	<b>Re-test reliability</b>
1	Manager	85.0%	68.2%
2	Manager	68.8%	66.7%
3	Care provider	79.4%	62.2%
4	Care provider	85.0%	73.9%
5	Care provider	66.7%	69.2%
6	Care provider	63.3%	66.1%
7	Care provider	75.6%	76.1%
8	Care provider	82.9%	82.5%
9	Patient	100.0%	66.7%
10	Patient	88.2%	73.7%
11	Patient	92.9%	62.5%
12	Patient	75.0%	63.9%