

Project Title: Early identification and intervention of youth suicide clusters in Hong Kong

Name of Organization: The HKJC Centre for Suicide Research and Prevention, The University of Hong Kong

(1) Goals:

The main goals of current project are 1) to establish a surveillance and alert system in Hong Kong to collect data of suicide for early alert and prevention; and 2) to train and prepare teachers, peer leaders, parents, and other school members how to implement suicide prevention programs and respond to our alerts.

Objectives:

- (i) To make use of big data based on information collected from the stakeholders in the community and online media to develop an early alert system to alert possible outbreak of suicide.
- (ii) To identify risk/protective factors associated with clustering of suicides and remove the myths of student suicides in the community.
- (iii) To promote awareness of youth suicide and train up students, teachers, parents and other key stakeholders to appropriately respond to the alerts.

(2) Targets: 4-6 secondary schools as direct beneficiaries; all other schools in HK, Education Bureau and other key stakeholders are also the beneficiaries

Expected number of direct beneficiaries: Approximately 80-240 peer leaders; 3,200-4,800 students; 40-60 teachers; 3,200-4,800 parents

(3) Implementation Plan: Process (Duration: 36 months; Jan 2018-Dec 2020)

1st year: Development of intervention protocol, training materials, and monitoring and surveillance system (the retrospective part)

2nd year: Development of the prospective part of the surveillance system and test out the alert system

3rd year: Monitoring and evaluating the reliability of the system, review and update the intervention protocol and training materials

(4) Products:

(i) Deliverables/outcomes:

- (a) a 3-level suicide awareness and alertness training
- (b) a series of mental health promotion and suicide prevention activities at schools
- (c) an early alert system for student suicide
- (d) intervention protocol for preventing student suicide
- (e) knowledge hub for sharing information and good practices

(ii) Dissemination of deliverables / outcomes: conferences, website, and academic articles/ pamphlets/ leaflets, sharing sessions etc.

on Grant

Breakdown of	Items	Grant	from
(a)	Staff Cost		
(b)	Equipment		
(c)	Services		
(d)	General Expenses	,057,348	
(f)	Contingency (for project period over 1 year)		

2. Total Expenditure

(6) Evaluation: Outcome measurement: The evaluation of the training consists of quantitative and qualitative data, pre/post-test design. (i) Quantitative measures such as mental health awareness and literacy, attitude towards suicide and help-seeking, school engagement, connectedness to adults may be included. The response and the action taken after receiving the alert will also be measured (ii) Qualitative measures such as process evaluation, feedback and reflection from students, teachers, and focus group and interviews with stakeholders will be included. For the early alert system: to test the system by comparing past known risky period of student suicides (retrospective part); to observe whether there's outbreak of suicide as predicted by the system (prospective part) in the form of natural experiment.

A Proposal on
“Early identification and intervention of youth suicide clusters in Hong Kong”
(QEF Project Number: 2016/0401)

Introduction

The goal of this project is to enhance public awareness and understanding of youth suicide and set up a surveillance system for early identification of emerging clusters of suicide and self-harm. It aims at raising the alertness and making appropriate responses for diverse stakeholders in the community, including schools, parents, media, and general population in a timely manner. Making use of the reported cases and information from social media and printed media, and the relevant data collected from Coroner’s Court and Hospital Authority, we shall develop a surveillance system of suicide for early intervention and prevention. The disparate data collected from different sources enable a comprehensive understanding of temporal clusters of suicide, and serve as the basis to provide early alert and raise public awareness and prevention of emerging suicide clusters to schools and community at large. We shall serve as a hub to provide information and materials for early response for suicide prevention and intervention to schools with the support from media and social media (e.g.).

Background

Hong Kong has a well-established and reliable coronial system to ascertain suicide (Yip, 2008). Suicide data in Hong Kong are of good quality. However, for a coroner to issue a suicide verdict, the individual’s intent to die should be evident or at least capable of being established beyond a reasonable doubt (Linsley et al., 2001). To ascertain the cause of an unnatural death, further investigation by police or an inquest may be ordered if necessary. It typically requires 6 to 12 months or even longer for the Police to further investigate a case and submit a detailed report to the coroner (Coroner’s Court, 2016). Suspected cases of suicide are usually handled with greater caution and are more likely to go through such a lengthy process. Therefore, there is always a time lag in tracking the suicide data. It is difficult to obtain timely data on suicide, and sometimes it is too late to act upon on emerging suicides or self-harm clusters for early intervention.

The local media has provided very timely reports on suicide and self-harm data and the reporting rate has shown to be much higher than that of other countries. By monitoring the media reporting in printed and e-version will provide timely information for the early alert system (Cheng et al., 2015a). There are emerging evidences that Internet-based data including social media, news report, and online searches have the ability in strengthening traditional approaches to public health surveillance in a timely and complementary ways, and acting as proxy surveillance in providing early alert of emerging infectious diseases (McGough et al., 2017; Nsoesie et al., 2016; Wilder-Smith et al., 2016). The evidence of whether this can be extended to suicidality is certainly worthwhile to pursue. A recent study (Cheng et al., 2015b) on Chinese microblog (Weibo) users

showed some evidence that people talk about suicide on social media are actually at greater suicide risk. It is a sign of negative affectivity or suicide ideation, suggesting the possibility of detecting people at risk of suicide in the social media environment and providing intervention beforehand. Some studies in the Chinese community also identified the positive association between online searches using keywords relating to charcoal burning suicide and subsequent increase in suicide using this method (Chang et al., 2015; Cheng et al., 2015a). Extensive media reporting of suicide cases also exhibited contagious effect and contributed to increasing incidence of suicide (Chen et al., 2013). Public sentiment can also be captured using social media information. The appendix shows the influence of social media on suicide and the importance of media engagement.

Furthermore, monitoring media and online social media to estimate suicide trend may be more useful in youth population, because they are more actively using the media and more vulnerable to copycat effects or suicide contagion. In Hong Kong, student suicide increased substantially in 2016 despite an overall reduction of rate for the general population. A recent study (Robinson et al., 2016) showed that spatial suicide clusters were more common among young people than adults. The negative impact on the communities created by such a suicide cluster warrants the need for effective management and early intervention to reduce subsequent deaths. In the UK, Ireland, Australia, and New Zealand, the local governments and communities have established special task forces to monitor, prevent, and quickly respond to youth suicide clusters (Arensman et al., 2016; Arensman, 2017; Cheung, Spittal, Williamson, Tung & Pirkis, 2014; Public Health England, 2015; Shave & Inder, 2015). By contrast, such efforts are lacking in Hong Kong. Research investigating what factors can predict youth suicide clusters and what efforts can prevent the clusters is warranted for developing evidence-based youth intervention strategies.

In view of the increase in student suicide in recent years from our statistics (CSRP, 2017), it is important to identify factors associated with youth suicide and proactively estimate potential outbreak so that the community can be alerted and timely action can be taken to reduce the adverse outcome. In addition, like regular fire drills are crucial for preparing people respond to emergency situations, regular training and practices in youth crisis intervention is also imperative for quickly and appropriately responding to the alerts.

Goals and Objectives

The main goals of current project include: 1) to establish a surveillance and alert system in Hong Kong to collect data of suicide for early alert and prevention; and 2) to train and prepare teachers, peer leaders, parents, and other school members how to implement suicide prevention programs and respond to our alerts. Through engaging the public of different types of interventions, especially the school community such as campaign, seminars, training workshops, printed and online materials, it is expected that teachers, parents and students are equipped with the knowledge and skills for preventing youth suicide. The system helps in continuously monitoring the trends of suicidal behaviors, and enables early identification of emerging suicide clusters such that timely measure and prevention strategies can be taken to intervene in order to reduce subsequent suicides

especially in school setting and among young people.

Our aims are as follows:

1. To make use of big data based on information collected from the stakeholders in the community and online media to develop an early alert system to alert possible outbreak of suicide
2. To identify risk/protective factors associated with clustering of suicides and remove the myths of student suicides in the community
3. To promote awareness of youth suicide and train up students, teachers, parents and other key stakeholders as appropriately respond to the alerts

Project details

I. Suicide awareness and alertness training

In order to prevent student suicides, it is important to enhance the awareness of suicide of general public, particularly in the school community. CSRP will design and provide three levels of training program to strengthen the understanding of suicide-related matters and the skills to respond to people's suicidal ideation or attempt and the alert detected by the surveillance system effectively among students, teachers, parents and school personnel.

Level 1 training focuses on the general information about suicide, e.g. suicide statistics in Hong Kong, myths and facts of suicide, risk and protective factors, and warning signs of suicide. **Level 2** training targets students, teachers and parents who are interested to be the gatekeepers of student suicide. It provides training on intervention strategies during at risk situation such as identification of warning signs, helpful response to people with emotional distress, empathy and active listening skills, suicide risk assessment etc. **Level 3** training aims at facilitating appropriate response when the alert of suicide is triggered. It targets school management team, teachers, parents, peer leaders, media and other stakeholders.

Upon receipt of different levels of training, school teachers and peer leaders are expected to create and implement activities related to mental health promotion, help-seeking or suicide prevention in their own schools. Overseas youth suicide prevention programme such as Sources of Strength in United States has demonstrated that engaging peer leaders in schools for suicide prevention was more effective to refer suicidal students to adults than untrained students, and increased fellow students' acceptance of adult support and seeking help through schoolwide messaging activities conducted by peer leaders (Wyman et al., 2010). However, gatekeeper training for school staff may not increase suicide identification behaviours (Wyman et al., 2008).

Therefore, it is important to identify the right teachers or school personnel and peer leaders to receive the training in order to generate greater impact and support to other students. CSRP will

facilitate participating schools to identify suitable teachers/staff and peer leaders through mapping of the social network of students. Students will be asked to name their friends and trusted adults in schools, family or the community so that we can know the social support of individual students and then we can recognize how strong and influential of a student, teacher/staff is. This can help to find out trusted adults around, peer leaders and also students who need more social support. When an alert is raised, we can know whom shall we reach out as source of support and whom to receive the support.

11. Monitoring and surveillance system

The design of the surveillance system can be separated into two major parts – retrospective and prospective.

- (i) Retrospectively: We collect the information from the Coroner Court, Police records, online search engines, online forums and social media, and other sources of information for the suicide cases (especially for students and young people) to form a data bank for suicide prevention. So far we have had the support from different stakeholders including Hong Kong Police Force to provide some relevant data for the purpose of monitoring. Mass media data will be collected from . Online data will be extracted by calling open APIs or collaborating with data analysts working at online media outlets. Relationships between media reports, online search (e.g.), online discussions (e.g. posts in etc.), and real incidence of suicide and self-harm will be examined. The information will be incorporated into the alert system to inform schools and other policy makers to have an accurate understanding of temporal effect of suicide.
- (ii) Prospectively: Based on the retrospective dataset, we will establish a prediction model, which will be applied to prospective data for validation and optimization. The prospective surveillance of suicide can be further divided into two systems – traditional and internet surveillance. Traditional surveillance, refers to the traditional approach to public health surveillance, which relies on the reporting of cases from official institutes. Collaborations from different stakeholders such as Hong Kong Police Force, Hospital Authority, and the Coroner’s Court are required to prospectively obtain data on suicide when they occur. Suspected cases should also be included for the purpose of monitoring. The internet surveillance refers to the capturing of Internet-based data including social media, news media, and online search on a real-time basis. These data have the potential of being a sentinel for surveillance of suicide. A digital system will be established to automatically capture news reports related to suicide every day and it will also work closely with many NGOs which are providing online support to vulnerable members in the community. The aim is to establish an early alert system, and to examine when and how this alert system should act. Once the alert is triggered, we shall inform and advise appropriate intervention actions of the stakeholders in the



community to be taken in responding to the alert. The effectiveness of the interventions will be evaluated to accumulate evidence.

Data available

The data to be used to develop the monitoring and surveillance system includes individuals who died by suicide between 2002 and 2016. CSRP contains the completed data of suicides in the above-mentioned period.

For Internet-based data, CSRP has been working on capturing and coding news reports related to suicide published since 1985 up to date. We will further develop computerized programs to capture and analyze relevant online search and online discussions for the proposed project.

The monitoring and surveillance system is proposed to be hosted at cloud storage as the system needs to capture and process large amount of data daily from multiple sources. This cloud arrangement goes with database shadowing onsite and a cross site data replication, which acts as back-up to ensure system stability. The cloud service provider will ensure a secured environment to reduce the risk of downtime and to protect data against attack. The project team will carefully select a suitable and reliable service provider for cloud hosting.

III. Alert system

The outcomes of identified clusters of suicide and its characteristics, accompanied with the access to real-time information on suicide, allows an early identification of emerging suicide clusters in the future. When emerging cluster is detected, we can engage and work with stakeholders in the community, especially among schools, media and other stakeholders in a proactive manner to raise public awareness and for prevention. We shall also work with media professionals and community partners closely in providing advice and suggestion how to report suicides incident and disseminate related information responsibly and try to avoid the copycat effect generated by sensational reporting. We shall also work with _____ and _____ to push the information to its users during the acute period. CSRP is now actively monitoring news related to suicide and recommends dos and don'ts in suicide reporting (Centre for Suicide Research and Prevention, 2016). The response from the media is encouraging and some positive effect has been noted. Data collected prospectively can continuously feed into the existing model and enhance the precision of alert.

The operation details of the alert system will be formed when the monitoring and surveillance system has been established and the project team has discussed with different stakeholders and experts. Although the concrete details of the alert system are not available at the moment, from our previous experience, different levels of alerts can be made according to the nature of the incidents/potential suicide clusters. For example, when a new suicide method, died by helium gas first appeared in 2011, we worried it may replicate the popularity of charcoal burning suicide since



its first case in 1998. Therefore, a public health approach has been adopted to engage different stakeholders to prevent the rise of helium suicide cases, which included the police force, the fire services department, coroners, pathologists, mass media, and online media outlets (Yip et al., 2017). A monitoring system had been set up to review the news report and case files of people died by helium suicide, and intervention strategies had been developed with Fire Service Department, mass media such as Apple Daily, online media outlets such as and and other stakeholders. Results showed that the number of helium suicide did not spread as fast as charcoal burning suicide years ago with the joint effort from the community. This is considered as an alert at group level, which targeted a specific group of stakeholders as we did want to disseminate the new suicide method to wider community.

Another example is about the Blue Whale online game. Media started the reporting of this online game in Apr 2017 that was suspected to be related to some teenage suicides in different countries. Youth and the public in Hong Kong began to discuss this game and some may have joined the game, according to different news reports or online media. We worried about the widespread of the game and vulnerable youth may be affected by the harmful instructions of the game. Therefore, we have prepared different tips for parents, teachers and students to raise their awareness of people around who may involve in the game and also written newspaper article about some coping strategies. Both information have been shared with Education Bureau and all schools in Hong Kong have received the information through the Bureau. This demonstrated an example to alert the general public about potential crisis through the support from key stakeholders.

As the monitoring and surveillance system focuses on detecting suicide clusters only, individual at-risk cases will not be identified with the data available. In case our participating schools identify at risk students, referral will first be made to the school support system such as school social worker or guidance teacher. Further referral will be made to other community resources when necessary.

Target beneficiaries

As a pilot project, 4-6 secondary schools in Hong Kong, their students, teachers and parents will be the direct beneficiaries to receive the training from CSRP and engage in different school mental health promotion and suicide prevention activities. After the pilot project, we plan to scale up the training to more schools.



It is expected that the no. of direct beneficiaries will be as follows:

Target	Expected no. of beneficiaries
School	4-6 secondary schools
Student	20-40 peer leaders x 4-6 schools = 80-240 peer leaders 800 students x 4-6 schools = 3,200-4,800 students
Teacher	10 teachers x 4-6 schools = 40-60 teachers
Parent	800 parents x 4-6 schools = 3,200-4,800 parents

Besides, all other schools in Hong Kong will also benefit from the project as they will receive the alert and the corresponding responses from CSRP. They can become more aware of coming suicide clusters and take necessary action to reduce the risk. Education Bureau will be another beneficiary as this project provides a systematic monitoring of student suicide and self-harm behaviours and inform them the effective intervention protocol and strategies with scientific evidence for preventing student suicides. The results of the project can also facilitate their policy making for promoting student wellbeing.

Other key stakeholders involving in suicide prevention such as media, social media and community partners (such as popular , illustrators, parents/youth groups) will be the indirect beneficiaries. They will collaborate with CSRP to disseminate the early alert to the general public and proper responses when receiving such alert. Therefore, they will be informed of the intervention protocol and strategies, which may increase their understanding of suicide-related issues.

Implementation plan

This project is proposed to be a 3-year project started from Jan 2018 to Dec 2020. The first year will develop the intervention protocol and training materials, and establish the monitoring and surveillance system (the retrospective part). The second year will develop the prospective part of the surveillance system and test out the alert system. The third year will be used to monitor and evaluate the reliability of the system and review the intervention protocol and update the training materials. Suicide awareness and alertness training will be provided throughout the three years project period. Table 1 shows the detailed schedule.



Table 1 Schedule of the 3-year project

Milestones	Tasks	Activity by Months from the start of the project											
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36
Project initialization and requirements elicitation	Elicit data and functional requirements of the early alert system with stakeholders.												
Data acquisition plan	Liaison with data providers for data acquisition Design data architecture for data integration												
Data capturing software development	Design and implement data capturing systems based on requirements obtained												
Data capturing and integration	On-going data capturing and integration												
Machine learning models for suicide risk scoring	Design machine learning model for assessing and predicting suicide risks and patterns												
Intervention protocol	Liaison with stakeholders to design the early intervention protocol												
Intervention materials	Design information manual and educational materials for intervention												
Knowledge dissemination activities	Organize training, seminars and workshops to schools and other stakeholders												
Intervention materials enhancement	Revision and enhancement of materials based on the feedback and system testing												
System testing and project evaluation	Evaluation of the alert systems and intervention protocols												



The development of the monitoring and surveillance system and the intervention protocol will be started in parallel by the system development team (lead by data analyst and assist by programmer) and intervention team (consists of educators, mental health professionals, social workers or related professionals) respectively. Each team will liaise with corresponding stakeholders about the system and intervention protocol requirements and then started the system, protocol and training materials development.

School recruitment will start when the intervention materials are ready and onsite training will be provided to teachers, students and parents. Invitation letters will be sent to all secondary schools in Hong Kong. Interested schools will return an application form and the project team will arrange interviews with school applicants. Selection criteria include 1) the schools share the vision of CSRP on preventing student suicides; 2) the schools are willing to commit to the project for 3 years; 3) the school and teachers are ready to participate in the research study as data will be collected from teachers, students and parents to facilitate system development and assess the effectiveness of the project; 4) the participating schools represent a range of school types and school districts; and 5) priority may be given to schools who have previous student suicide case or can demonstrate the needs of the schools. Constant feedback will be collected from participants to improve the protocol, training and its materials. The system will also be tested and reviewed regularly through ongoing data collection from multiple sources.

Data quality and data management

To ensure that high-quality data can be collected from the public domain, i.e. online search engines, online forums, social media, and news reporting, the following best practices are proposed (Pingitore, 2012):

1. Our data collection involves multiple data sources. In each query, the focus of topics should be precisely defined. The crawling should also be determined by which kinds of information is included, such as only personal narratives or/and informational posts. These will affect the volume of sound bites and the percentage of false positives.
2. Establish a right balance between precision and coverage - It is obvious that the more exclusive criteria being added in a query, the lower the chance of false positives. However, as a trade-off, this will result in the loss of some valid sound bites.
3. Set up a separate team for quality assessment - A separate team for quality assessment that randomly extracts a portion of information from all queries, carefully investigate the texts and evaluates their accuracy will definitely help in obtaining reliable results.
4. Establish an efficient and effective feedback mechanism between analysts and quality

assessment team. It is important that the quality assessment team can efficiently and effectively provide detailed feedback to analysts and thus analysts can improve their queries of data crawling.

To ensure the accuracy of data collection methods, Tufekci (2014) recommended using multiple data collection methods (on the same data source) and compared the results of these methods. Cheliotis et al. (2015) further suggested some measures for assessing and comparing the reliability of the data using different data collection methods. In developing a query, we will adopt the same approach until the best method is identified (or combination of a several methods).

Concerning the privacy issue, the data collected from public domain are all open to public. No private message / post of any individual (e.g. messages between users, private posts to friend groups only) will be collected. Theoretically there is no confidentiality issue on the data. For the social media data, we will only call their open API to collect data, which is a common practice for social media data analytics and has been granted by the Human Research Ethics Committee (HREC) of The University of Hong Kong in our previous studies using the same data collection approach.

For those data collected from Coroner's Court, personal data such as name and address of the deceased may be available. However, the project team will observe the guidelines and procedures from HREC and obtain ethical approval for the research study. From our previous research studies involved the same data source, we will remove all personal identifier before data analysis and we will not contact the deceased family or friends with the information obtained from the case files. Such procedures have been approved by HREC as well. For those data involving living person (e.g. obtain from students), we will also comply with the Personal Data (Privacy) Ordinance (Cap. 486) and guidelines of HREC to handle the data and ensure confidentiality of the data. All data collected for this project will be stored in password-protected computers/cloud storage and only eligible members could gain access. No personal identifier or identifiable information will be published in future reports, publications or other dissemination activities.



Budget

Budget plan for the first 12 months

Expenses	Details	Cost (HK\$)
Staff Cost	<p>1) 1 Part-time Project Officer (at the rank of SRA)</p> <ul style="list-style-type: none">• Preferably with a Master's degree in Psychology or Social Sciences, and experience in educational and psychological research and project management <p>Duties:</p> <ul style="list-style-type: none">• Plan, execute and monitor the whole project;• Organize training workshops, seminars and liaise with different stakeholders;• Responsible for programme development, implementation and evaluation;• Manage and run tests on the data;• Writing reports of the project <p>HK\$14,000 (Jan-Dec 2018) + HK\$8,400 (MPF)</p>	176,400
	<p>2) 1 Part-time Data Analyst</p> <ul style="list-style-type: none">• Preferably with at least a Master's degree in Computer Science, Mathematics, Statistics and related fields with 5-8 years' experience in data analytics, system development and machine learning <p>Duties:</p> <ul style="list-style-type: none">• Develop statistical models and machine learning algorithms for analyzing and identifying the patterns and trends of suicidal behaviours• Supervise Programmer to establish the monitoring and surveillance system and the early alert system <p>HK\$16,000 (Jan-Dec 2018) + HK\$9,600 (MPF)</p>	201,600
	<p>3) 1 Full-time Programmer</p> <ul style="list-style-type: none">• Preferably with a Bachelor's degree in Computer Science and at least 3-5 years of relevant experience <p>Duties:</p> <ul style="list-style-type: none">• Set up the monitoring and surveillance system and the early alert system under the supervision of Data Analyst• Script writing for data collection• Regular updating and improving the systems <p>HK\$26,000 (Jan-Dec 2018) + HK\$15,600 (MPF)</p>	327,600



	<p>4) Part-time Educators/mental health professionals/ social workers</p> <ul style="list-style-type: none"> • At least a Master's degree in social sciences, education or health-related discipline; • Experienced in child development, healthcare, education, mental health, public health, conducting seminars, workshops, and research <p>Duties:</p> <ul style="list-style-type: none"> • Develop intervention protocol and training materials • Liaise with schools and other stakeholders and provide trainings/seminars/workshops for teachers, students and parents <p>HK\$20,000 (Jan-Dec 2018) + HK\$12,000 (MPF)</p> <p><i>Remarks: Staff cost for individual post will be based on the qualification and experience of the appointees, and with reference to HKU's pay point scale. The salary for each appointee will be charged under this project according to actual expenditure.</i></p>	252,000
	Staff Cost Sub-total	957,600
Services	<p>1) Research support</p> <ul style="list-style-type: none"> • To provide support in research studies such as data collection, data entry and transcription • HK\$80 x 600 hours <p>2) Time relief for Principal Investigator</p> <ul style="list-style-type: none"> • This is to compensate the time relieved by the Principal Investigator (at the rank of Chair Professor) to get involved in this project, included but not limited to provide supervision and consultation of the project and its research study. • It will be used to support experienced researchers or professionals who could take up some of the works of the Principal Investigator while he/she is released for participating in the project. • Estimated man-hours: 100 • Est. HK\$1000 x 100 hours (around 1-2 days per month) <p>3) Data acquisition</p> <ul style="list-style-type: none"> • To acquire data from multiple source such as Hospital Authority, Census and Statistics Department etc. for system development and machine learning 	<p>48,000</p> <p>100,000</p> <p>100,000</p>
	Services Sub-total	248,000



Equipment	1) Computer hardware (including 1 desktop computer, 1 notebook computer and a workstation) <ul style="list-style-type: none">All computers and workstation need to be high performance for developing the systems and machine learningHK\$5,600 x 3 2) Cloud hosting <ul style="list-style-type: none">To host the systems on cloud and to process and manage data onlineHK\$20,000 x 12 months	16,800 240,000
	Equipment Sub-total	256,800
General Expenses	<ul style="list-style-type: none">Office supplies (included but not limited to photocopy, stationery, sundries, postage, computer software etc.), [est. HK\$6,000]Transportation and travelling expenses (included transportation for to and from partner schools and function venues etc.), [est. HK\$4,000]Seminars/Workshops (included but not limited to rent for venue and equipment etc.), [est. HK\$5,000]Printing and publication (included but not limited to research reports, pamphlets, programme materials, souvenirs, journal articles etc.), [est. HK\$82,000]Reference books, manuals [est. HK\$2,000]Miscellaneous items [est. HK\$1,000]	100,000
	General Expenses Sub-total	100,000
Contingency		33,200
Project total		1,595,600
University overhead charge (15% of project total exclude contingency)*		234,360
Gross project sum		1,829,960

* It is a University policy of charging overheads from non-University Grants Committee-funded projects to cover the operating cost of using University resources derived from the projects. The overhead charge mainly will cover the following items:

1) Administrative support

- To process project grant agreement according to the University and QEF guidelines;
- To facilitate staff recruitment for the project according to the University and QEF guidelines, e.g. preparing job advertisement, appointment letter and staff contract; reviewing the qualification of applicants and appointees; arranging job interviews etc.;
- To provide other administrative support such as arranging the use of University facilities etc.

2) Financial management

- To open and manage an account specific for the project according to the University and QEF guidelines;
- To support the procurement matters for the project such as reviewing the quotation for different items/services, issuing of purchase orders, arranging payment etc.;
- To oversee the use of budget according to the project requirements, University and QEF guidelines;



- To provide interim and final financial reports according to the QEF guidelines;
- To provide other administrative support related to financial matters, e.g. processing staff salary, reimbursement etc.

In order to show the commitment of CSRP on suicide prevention and for the benefit of the Hong Kong community, we are willing to reduce the budget for this project and use existing resources to cover part of the expenses. Therefore, there is only one full-time programmer in this project and others are part-time positions in the first two years of the project. The budget of the staff cost for the third year has further reduced to 25% of full-time cost for Data Analyst and 50% for Programmer. Below section shows the 3 years' budget plan and the total funding for this proposal will be HK\$5,320,714 (rounded up to \$5,320,800).

3-year budget plan

	1st Year	2nd Year	3rd Year	Total
Staff cost				
<i>Project Officer (50%)</i>	176,400	185,220	194,481	556,101
<i>Data Analyst (50%)</i>	201,600	211,680	111,132 ^a	524,412
<i>Programmer (100%)</i>	327,600	343,980	180,590 ^b	852,170
<i>Educators / trainers (50%)</i>	252,000	264,600	277,830	794,430
Service				
<i>Research support</i>	48,000	48,000	48,000	144,000
<i>Time relief for PI</i>	100,000	100,000	100,000	300,000
<i>Data acquisition</i>	100,000	100,000	100,000	300,000
Equipment				
<i>Computer hardware</i>	16,800	--	--	16,800
<i>Cloud hosting</i>	240,000	240,000	240,000	720,000
General expenses	100,000	117,750	137,750	355,500
Audit fee	--	--	15,000	15,000
Contingency	33,200	11,170	11,169	55,539
Project total	1,595,600	1,622,400	1,415,952	4,633,952
HKU overhead (15%)^c	234,360	241,685	210,717	686,762
Total	1,829,960	1,864,085	1,626,669	5,320,714*
*Rounded up to 5,320,800 with \$86 dollars added to General Expenses				

a 25% of full-time cost b 50% of full-time cost c 15% of project total excluding contingency



Justifications for Staff Recruitment and Service Procurement

1) Project Officer

Project Officer is responsible for planning, execution, and monitoring the whole project and will participate in the coordination of data management, statistical analysis and reporting/paper writing. He/she is required to have at least a good Bachelor's degree and preferably a Master's degree in Psychology or Social Science, with record of academic paper publication; and at least three years' relevant working experience; strong communication, analytical, organization and project management skills; be able to work independently; team leader; strong written and spoken skills in Chinese/English.

Monthly salary is based on the suggested rate for the position of Senior Research Assistant, provided by the Human Resources, The University of Hong Kong.

2) Data Analyst

Data Analyst is responsible for developing statistical models and machine learning algorithms for analyzing and identifying the patterns and trends of suicidal behaviours. He/she is also required to supervise Programmer to establish the monitoring and surveillance system and the early alert system. As the monitoring and surveillance system is the key element of this project, it is important to have an experienced Data Analyst to oversee the development and application of the system in order to provide accurate identification of potential suicide clusters. He/she is preferably with at least a Master's degree in Computer Science, Mathematics, Statistics and related fields with 5-8 years' experience in data analytics, system development and machine learning.

Monthly salary is based on the suggested rate for the position of IT Officer/IT Manager, provided by the Human Resources, The University of Hong Kong.

3) Programmer

The Programmer will set up the monitoring and surveillance system and the early alert system under the supervision of the Data Analyst. He/she will be responsible to capture data daily from multiple sources and to update the system based on the newly available data and analysis results to refine the machine learning prediction model. It is also important for the Programmer to interact



with the research team very closely in order to provide timely response and implement the system according to the design based on research and data analysis results. A position of this requires a bachelor degree holder in computer science with at least 3-5 years of working experience in related field.

Monthly salary is based on the suggested rate for the position of IT Technician, provided by the Human Resources, The University of Hong Kong.

4) Educators/mental health professionals/social workers

The Educators/mental health professionals/social workers will develop intervention protocol and training materials for the project, liaise with schools and other stakeholders and provide trainings/seminars/workshops for teachers, students, parents and different stakeholders. He/she is required to have at least a Master's degree in social sciences, education or health-related discipline, and at least 3-5 years of clinical, academic or professional experience in mental health, education, healthcare or other related areas.

Monthly salary is based on the suggested rate for the position of Counsellor/Psychologist, provided by the Human Resources, The University of Hong Kong.

5) Research support

Research support is required for data collection, data coding and entry, data transcription and other supportive role in the research studies of the project. For example, research support is needed to collect data from Coroner's Court in person and to retrieve useful data by reading the case files. Qualitative data collected from focus groups/interviews also require transcription for further analysis.

Monthly salary is based on the suggested rate for the position of Research Assistant, provided by the Human Resources, The University of Hong Kong.

6) Cloud hosting

The cloud service is mainly for storing, analyzing and downloading the data from multiple

sources on a daily basis in a timely manner to produce a daily estimation on suicide risk and related factors. It also allows us to push information to users about 30,000 sessions per month. As the proposed system needs to process a large amount of data daily and social media messages and newspaper articles may contain images, audio, and videos, it is important to have a stable and reliable area to host the system and the data. Estimated cost for cloud service can be found at <https://azure.microsoft.com/en-us/pricing/calculator/> or appendix.

Assets Usage Plan

Category	Item / Description	No. of Units	Total Cost	Proposed Plan for Deployment
computer hardware	Desktop computer/Notebook computer/Workstation	3	HK\$16,800	Retain at Centre for Suicide Research & Prevention for usage

Deliverables

1. Develop a 3-level suicide awareness and alertness training for school teachers, students and parents
2. Organize a series of mental health promotion and suicide prevention activities at schools as created by peer leaders
3. Establish an early alert system with the support of big data science to raise public awareness and respond to emerging suicide cluster
4. Generate a timely, focused and effective response (intervention protocol) to the community in preventing suicides for schools and others.
5. Maintain a knowledge hub for suicide prevention for stakeholder's consumption such that timely and accurate information are always available.
6. Share good practice models in suicide prevention locally and internationally.

When approaching the end of the project, the monitoring and surveillance system, the training materials, the intervention protocol are ready and well-established, a dissemination seminar will be organized to share the results to schools, other organizations, and the general public. Specific training workshop on the alert system will be organized for other schools and organizations of interest. Other knowledge dissemination activities such as conference presentation and academic publication will be prepared where appropriate. The table overleaf shows the details of dissemination seminar and workshop.



Activity	Aim	Target	Frequency
Dissemination seminar	To share the project and its findings to people of interest	General public	1 (at the end of the project, 1.5-2 hrs)
Training workshop	To understand the alert system and the corresponding responses	School management, teachers, parents and relevant stakeholders	1 (at the end of the project and separate session may be provided for different types of stakeholders, 2-3 hrs)

As a knowledge hub for suicide prevention, general information about suicide, useful information for strategies for preventing youth suicide, the intervention protocol for at risk situations, the alert systems etc. will be provided online/offline. Professional training can be provided to parties in need (where charge may be incurred). Data acquisition is also available on request so that more research or intervention can be developed to enrich the knowledge of the field.

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Evaluation

In order to evaluate the effectiveness of the project, both quantitative and qualitative data will be collected. For evaluating the suicide awareness and alertness training, data will be collected from participants in the form of questionnaires (quantitative data) and focus groups/interviews (qualitative data). Questionnaire will be delivered to participants before and after attending the training (pre/post-test design), measures for different outcome indicators such as mental health awareness and literacy, attitude towards suicide and help-seeking, school engagement, connectedness to adults may be included. The response and the action being taken after receiving the alert will also be measured as the outcome indicators. Other feedback on the training usefulness and personal experience on application of the skills will be collected through focus groups or interviews. In addition, we will compare the outcomes between those trained schools and non-trained schools to examine the added value of the training.

To assess the reliability of the monitoring and surveillance system, the results generated can be compared with past known risky period of student suicides (retrospective part) while the prospective part will be assessed in the form of natural experiment. When an emergence of student suicide has been detected and alert has been sent, the research team will observe whether there is truly a cluster of suicide coming up, and whether the intervention protocol and training are in place to prevent student suicide outbreak.



Sustainability plan

After three years of project implementation, it is expected that participating schools and different stakeholders involved are equipped with the knowledge and skills on suicide prevention, including the risk and protective factors, warning signs of suicide, and proper responses to alerts/suicide attempt/suicide incidents. We hope teachers, peer leaders and parents of the participating schools could sustain the good practices within the schools and share in their school network. With different kinds of dissemination activities of the project, it is believed that wider community will also have enhanced their understanding on youth suicide prevention. As a knowledge hub for suicide prevention, we will ensure to share information to different parties in need.

Nevertheless, CSRP is ready to continue the operation of suicide awareness and alertness training, the monitoring and surveillance system, and also the alert system when additional resources are available. We are also ready to collaborate with other governmental departments/bureau for long term development of early identification and intervention on suicide prevention to population level, not limited to youth suicide prevention only.





Report Submission Schedule

My organization commits to submit proper reports in strict accordance with the following schedule:

Project Management		Financial Management	
Type of Report and covering period	Report due date	Type of Report and covering period	Report due date
Progress Report 01/01/2018 - 30/06/2018	31/07/2018	Interim Financial Report 01/01/2018 - 30/06/2018	31/07/2018
Progress Report 01/07/2018 - 31/12/2018	31/01/2019	Interim Financial Report 01/07/2018 - 31/12/2018	31/01/2019
Progress Report 01/01/2019 - 30/06/2019	31/07/2019	Interim Financial Report 01/01/2019 - 30/06/2019	31/07/2019
Progress Report 01/07/2019 - 31/12/2019	31/01/2020	Interim Financial Report 01/07/2019 - 31/12/2019	31/01/2020
Progress Report 01/01/2020 - 30/06/2020	31/07/2020	Interim Financial Report 01/01/2020 - 30/06/2020	31/07/2020
Final Report 01/01/2018 - 31/12/2020	31/03/2021	Final Financial Report 01/07/2020 - 31/12/2020	31/03/2021

References

- Arensman, E., Bennardi, M, Larkin, C., Wall, A., McAuliffe, C., McCarthy, J, et al., 2016. Suicide among Young People and Adults in Ireland: Method Characteristics, Toxicological Analysis and Substance Abuse Histories Compared. *PLoS ONE*, 11(11): e0166881. doi:10.1371/journal.pone.0166881
- Arensman, E., 2017. *Early identification of clusters of self-harm and suicide: developing of a pulse system*. Proposal to National Suicide Research Foundation, Ireland.
- Centre for Suicide Research and Prevention, 2016. *Recommendations on suicide reporting and online information dissemination for media professionals*. Centre for Suicide Research and Prevention, Hong Kong SAR.
- Centre for Suicide Research and Prevention, 2017. Suicide rate. Retrieved from <http://csrp.hku.hk/statistics/>
- Chang, S.S., Kwok, S.S., Cheng, Q., Yip, P.S., Chen, Y.Y., 2015. The association of trends in charcoal-burning suicide with Google search and newspaper reporting in Taiwan: a time series analysis. *Social psychiatry and psychiatric epidemiology* 50, 1451-1461.
- Cheliotis, G., Lu, X., & Yi, S. (2015, April). Reliability of Data Collection Methods in Social Media Research. In *ICWSM* (pp. 586-589).
- Chen, Y.Y., Chen, F., Gunnell, D., Yip, P.S., 2013. The impact of media reporting on the emergence of charcoal burning suicide in Taiwan. *Plos One* 8, e55000.
- Cheng, Q., Chang, S.S., Guo, Y., Yip, P.S., 2015a. Information Accessibility of the Charcoal



- Burning Suicide Method in Mainland China. *Plos One* 10, e0140686.
- Cheng, Q., Kwok, C.L., Zhu, T., Guan, L., Yip, P.S., 2015b. Suicide Communication on Social Media and Its Psychological Mechanisms: An Examination of Chinese Microblog Users. *International journal of environmental research and public health* 12, 11506-11527.
- Cheung D.Y.T., Spittal M.J., Williamson, M.K., Tung S.J., Pirkis, J., 2014. Predictors of suicides occurring within suicide clusters in Australia, 2004-2008. *Social Science Medicine*, 118:135-42. doi: 10.1016/j.socscimed.2014.08.005.
- Coroner's Court, 2016. Coroners' report 2015. Hong Kong Judiciary, Hong Kong SAR, p. 66.
- Huen, J. M., Lai, E. S., Shum, A. K., So, S. W., Chan, M. K., Wong, P. W., ... Yip, P. S., 2016. Evaluation of a Digital Game-Based Learning Program for Enhancing Youth Mental Health: A Structural Equation Modeling of the Program Effectiveness. *JMIR Mental Health*, 3, e46.
- Lai, E. S. Y., Kwok, C.-L., Wong, P. W. C., Fu, K.-W., Law, Y.-W., & Yip, P. S. F., 2016. The Effectiveness and Sustainability of a Universal School-Based Programme for Preventing Depression in Chinese Adolescents: A Follow-Up Study Using Quasi-Experimental Design. *PLOS ONE*, 11, e0149854.
- Linsley, K.R., Schapira, K., Kelly, T.P., 2001. Open verdict v. suicide - importance to research. *The British Journal of Psychiatry* 178, 465-468.
- McGough, S.F., Brownstein, J.S., Hawkins, J.B., Santillana, M., 2017. Forecasting Zika Incidence in the 2016 Latin America Outbreak Combining Traditional Disease Surveillance with Search, Social Media, and News Report Data. *PLoS neglected tropical diseases* 11, e0005295.
- Nsoesie, E.O., Flor, L., Hawkins, J., Maharana, A., Skotnes, T., Marinho, F., Brownstein, J.S., 2016. Social Media as a Sentinel for Disease Surveillance: What Does Sociodemographic Status Have to Do with It? *PLoS currents* 8.
- Pingitore, G. (2012). Understanding and improving the quality of social media data. Retrieved from <https://rwconnect.esomar.org/understanding-and-improving-the-quality-of-social-media-data/>
- Public Health England, 2015. *Identifying and responding to suicide clusters and contagion: A practice resource*. Retrieved from <https://www.gov.uk/government/publications/suicide-prevention-identifying-and-responding-to-suicide-clusters>
- Robinson, J., Too, L.S., Pirkis, J., Spittal, M.J., 2016. Spatial suicide clusters in Australia between 2010 and 2012: a comparison of cluster and non-cluster among young people and adults. *BMC psychiatry* 16, 417.
- Shave, R., & Inder, M., 2015, June. *Priming postvention: timely transmission of suspected suicide details to District Health Boards (New Zealand)*. Presentation at the World Congress of International Association for Suicide Prevention, Montreal, Canada.
- Tufekci, Z. (2014). Big Questions for Social Media Big Data: Representativeness, Validity and Other Methodological Pitfalls. *ICWSM*, 14, 505-514.
- Wilder-Smith, A., Cohn, E., Lloyd, D.C., Tozan, Y., Brownstein, J.S., 2016. Internet-based media coverage on dengue in Sri Lanka between 2007 and 2015. *Global health action* 9, 31620.
- Wong, P. W. C., Fu, K.-W., Chan, K. Y. K., Chan, W. S. C., Liu, P. M. Y., Law, Y.-W., & Yip, P. S. F., 2012. Effectiveness of a universal school-based programme for preventing depression in Chinese adolescents: A quasi-experimental pilot study. *Journal of Affective Disorders*, 142(1), 106-114. doi:10.1016/j.jad.2012.03.050
- Wyman, P. A., Brown, C. H., Inman, J., Cross, W., Schmeelk-Cone, K., Guo, J., & Pena, J. B. (2008). Randomized Trial of a Gatekeeper Program for Suicide Prevention: 1-year Impact



on Secondary School Staff. *Journal of Consulting and Clinical Psychology*, 76(1), 104-115.
doi:10.1037/0022-006X.76.1.104

Wyman, P. A., Brown, C. H., LoMurray, M., Schmeelk-Cone, K., Petrova, M., Yu, Q., . . . Wang, W. (2010). An Outcome Evaluation of the Sources of Strength Suicide Prevention Program Delivered by Adolescent Peer Leaders in High Schools. *American Journal of Public Health*, 100(9), 1653-1661. doi:10.2105/AJPH.2009.19002

Yip, P.S.F., 2008. Introduction, In: Yip, P.S.F. (Ed.), *Suicide in Asia: Causes and prevention*. Hong Kong University Press, Hong Kong.

Yip, P. S. F., Cheng, Q., Chang, S.-S., Lee, E. S. T., Lai, C.-s. C., Chen, F., Law, Y.-W. F., Cheng, T. M. E., Chiu, S. M., Tse, Y. L. J., Cheung, K.-w. R., Tse, M.-l., Morgan, P. R., & Beh, P. (2017, March 24). A Public Health Approach in Responding to the Spread of Helium Suicide in Hong Kong: A Case Report. *Crisis*. Advance online publication.

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The influence of social media on suicide



The importance of media engagement