CITY OF HAMILTON
HEALTHY AND SAFE COMMUNITIES DEPARTMENT
Hamilton Paramedic Service

TO:	Chair and Members Emergency and Community Services Committee
COMMITTEE DATE:	September 9, 2021
SUBJECT/REPORT NO:	Automatic Mechanical Cardio Pulmonary Resuscitation (CPR) Devices (HSC21028) (City Wide)
WARD(S) AFFECTED:	City Wide
PREPARED BY:	Santo Pasqua (905) 546-2424 ext.7386
SUBMITTED BY: **SIGNATURE:**	Michael Sanderson Chief, Hamilton Paramedic Service Healthy and Safe Communities Department

RECOMMENDATION(S)

(a) That Council approve the standardization of the ZOLL AutoPulse® Compression devices, components and accessories manufactured by ZOLL Canada Inc., pursuant to Procurement Policy #14 – Standardization, until December 31, 2030 and that the Chief, Hamilton Paramedic Service, be authorized to negotiate, enter into and execute any required Contract and any ancillary documents required to give effect thereto with an authorized distributor in a form satisfactory to the City Solicitor; and,

(b) That a sum not to exceed $500,000 be authorized to be charged to the approved 2021 Capital Funding Project ID 7642151102 to fund the initial acquisition of the ZOLL AutoPulse® system devices, components and accessories, with all subsequent costs to be charged to the Hamilton Paramedic Service Operating Budget.

EXECUTIVE SUMMARY

The quality and consistency of chest compressions performed during Cardio Pulmonary Resuscitation (CPR) has been demonstrated to impact both the return of spontaneous circulation and patient discharge from hospital following a sudden cardiac arrest. In 2020, Hamilton Paramedic Service (HPS) performed classroom and actual clinical evaluation of two approved mechanical chest compression devices to explore the feasibility of implementation and the interoperability with the current other medical and

technical devices already in use within the paramedic service. Quantitative and qualitative data were collected.

Clear preference was expressed by paramedics involved in the evaluation for the ZOLL AutoPulse® A-CPR board.

Alternatives for Consideration – Not applicable

FINANCIAL – STAFFING – LEGAL IMPLICATIONS

Financial: Council has allocated $500,000 capital block funding in the 2021 budget for the purchase of these devices, project ID 7642151102. Additional purchase costs, if required, will be covered through existing HPS capital equipment reserves. Recapitalization of the devices over the anticipated life cycle has been included in contributions to reserves for 2021 and subsequent years. Operating costs, estimated at approximately $110 per cardiac arrest where the devices are used, have already been incorporated into the HPS operating budget.

Staffing: N/A

Legal: N/A

HISTORICAL BACKGROUND

HPS is responsible for providing pre-hospital emergency care for people experiencing medical and/or traumatic injuries including Out-Hospital-Cardiac-Arrest (OHCA). Over the past several years (Table 1) HPS has responded to an average of 1,200 cardiac arrests per year, a rate of 4.67 per 1,000 population per year.

	Cardiac Arrest or Post Arrest	**Transport Code 4**
2016	**1,184**	**345**
2017	**1,205**	**361**
2018	**1,298**	**388**
2019	**1,257**	**360**
2020	**1,283**	**287**

Table 1 (Source: Interdev Analytics)

Both Primary Care Paramedics (PCP) and Advanced Care Paramedics (ACP) are specially trained to provide additional care to OHCA patients such as advanced cardiac life support including manual rhythm interpretation and manual defibrillation.

POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS

The proposed ZOLL AutoPulse® CPR Board meets the requirements of the Ministry of Health and LTC as well is approved for use in Canada and Ontario.

The recommendation is in accordance with By-law 20-205 City Procurement Policy, Policy 4.14 Standardization.

RELEVANT CONSULTATION

Corporate Services, Financial Planning, Administration and Policy, and the Procurement Section have been consulted with respect to adherence to the City's Procurement Policy and have provided comment on this report.

ANALYSIS AND RATIONALE FOR RECOMMENDATION

HPS evaluated the two most widely used mechanical CPR Devices in Canada and worldwide, the Lucas 3.1 and the ZOLL AutoPulse®.

Both Mechanical CPR devices are certified for use by Health Canada and align with the most recent guidelines from the Heart and Stroke recommendations for resuscitation regarding mechanical or automated CPR devices.[1]

HPS Performance and Development staff were trained in the use of the devices by representatives of the device manufacturers. Our HPS trainers in turn trained, tested and evaluated front line paramedics on the devices prior to the trial.[2]

Equipment Compatibility

HPS currently uses the ZOLL X-Series Cardiac monitor. Evaluation criteria included compatibility and ease of data capture of the automated CPR device on this monitor.

ZOLL

The ZOLL AutoPulse® A-CPR board works wirelessly with our existing monitors and the ZOLL AutoPulse® also utilizes what is called "ShockSync" technology. These technologies work together to wirelessly calculate when the heart is best able to respond to paramedic treatments such as defibrillation of the heart at the least measured impedance, "Optimal Time". This enhancement will allow paramedics to align with the most current American Heart Association guidelines, of almost no "hands off" time. The ZOLL AutoPulse® board and ZOLL X-Series monitor will also allow for HPS to integrate CPR Feedback/Defibrillation data into its existing ePCR ZOLL data platform Code Review. The addition of the AutoPulse® to the existing cardiac monitoring

[1] https://emspep.cdha.nshealth.ca/LOE.aspx?VProtStr=General%20Cardiac%20Arrest%20Care&VProtID=132
[2] https://www.formstack.com/admin/submission/report/28022332?share=HFbKlFnj75

technology and resuscitation data recorded would allow for a more robust and integrated call review for quality assurance (QA) and Quality Improvement (QI) purposes and patient outcome data. This would allow HPS to align with other current initiatives such as inhouse CPR training, Canadian Emergency Department Information Systems (CEDIS) and Integrated Decision Support (IDS).

Lucas 3.1

The Lucas 3.1 also aligns with the most current American Heart Association guidelines for mechanical CPR and the Lucas can provide Hamilton Paramedic Service with Wi-Fi and Bluetooth data retrospectively. Feedback can be uploaded after a call to the PhysioControl cloud platform for review. The Lucas 3.1 currently has no compatibility with our existing Zoll cardiac monitors. The CPR and call information would be housed virtually on a PhysioControl platform and for QA/QI would need to retrospectively be merged individually with the data files from our current cardiac monitor. This could prove laborious and difficult to reconcile for HPS at this time.

Patient Movement and Ease of Use

Both the Lucas and the AutoPulse® were tested by the same group of paramedics.

Testing and evaluation included movement through a variety of scenarios including elevators, hallways, stretcher loading, and movement into and out of the ambulance.

Both the Lucas and ZOLL mechanical CPR devices proved to do an efficient and equal job of providing adequate mechanical CPR in a static position on the ground or the stretcher. However, when the study group tested the devices in patient movement such as up/down the stairs or to ambulance the AutoPulse® was rated as superior by the testing Paramedics. The ZOLL AutoPulse® had less movement errors or conveyance errors and fewer interruptions in compressions requiring physically resetting, or properly aligning the (A-CPR) device. This ultimately reduced “hands off” time.

Although the ZOLL has a larger footprint (32h x w17.6 x d3.0 inches and a 23.5lbs weight) vs Lucas (22h x w20.5 x d9.4 inches and a weight of 17.7lbs), it has an integrated movement or conveyance device attached. The Lucas required the use of a secondary conveyance device such as a backboard or scoop (18lbs scoop and 19lb longboard), or another stretcher device. This required paramedics to utilize an additional piece of equipment separate from the Lucas. From a paramedic operating perspective this added equipment needed to be brought to the patient’s side and the overall weight carried by paramedics. Simulated evaluation also showed that securing the patient to the Lucas and then a secondary device to be difficult, time consuming and did not provide a good lifting base or ergonomic way of getting the patient up/down the stairs and out to the stretcher. Alternatively, paramedics would have to wait until the patient was on the stretcher to apply the device. Paramedics noted they were not able to adequately secure the patient to the device and the cross-body strapping technique to safely restrain the patient could not be used effectively. The ZOLL proved easier to use

when it came to smaller and tighter areas of extrication as the legs could be “dropped” while still providing adequate safe extrication.

Upon review of the automatic mechanical CPR devices there are only two Health Canada authorized devices available, the preferred Zoll device and the Lucas device. Purchasing the Lucas device would result in additional cost and activities for quality assurance and quality improvement as it does not integrate with the current cardiac monitor defibrillator. Further, the clear preference in field evaluation and testing from the involved paramedics was for the ZOLL AutoPulse® A-CPR board. The recommendation is to standardize on the preferred device.

ALTERNATIVES FOR CONSIDERATION

None

ALIGNMENT TO THE 2016 – 2025 STRATEGIC PLAN

Healthy and Safe Communities
Hamilton is a safe and supportive City where people are active, healthy, and have a high quality of life.

Our People and Performance
Hamiltonians have a high level of trust and confidence in their City government.