[0004] In addition, traditional techniques are problematic for certain diagnoses. Some tests may be critically time sensitive, but take days or weeks to complete. Over such a time, a disease can progress past the point of treatment. In some instances, follow-up tests are required after initial results, which take additional time as the patient has to return to the specialized locations. This impairs a medical professional's ability to provide effective care. Furthermore, conducting tests at only limited locations and/or infrequently reduces the likelihood that a patient's status can be regularly monitored or that the patient will be able to provide the samples quickly or as frequently as needed. For certain diagnoses or conditions, these deficiencies inevitably cause inadequate medical responses to changing and deteriorating physiological conditions. Traditional systems and methods also affect the integrity and quality of a clinical test due to degradation of a sample that often occurs while transporting such sample from the site of collection to the place where analysis of the sample is performed. For example, analytes decay at a certain rate, and the time delay for analysis can result in loss of sample integrity. Different laboratories also work with different quality standards which can result in varying degrees of error. Additionally, preparation and analysis of samples by hand permits upfront human error to occur at various sample collection sites and laboratories. These and other drawbacks inherent in the conventional setup make it difficult to perform longitudinal analyses, especially for chronic disease management, with high quality and reliability

[0005] Furthermore, such conventional analytical techniques are often not cost effective. Excessive time lags in obtaining test results lead to delays in diagnoses and treatments that can have a deleterious effect on a patient's health; as a disease progresses further, the patient then needs additional treatment and too often ends up unexpectedly seeing some form of hospitalization. Payers, such as health insurance companies and taxpayers contributing to governmental health programs, end up paying more to treat problems that could have been averted with more accessible and faster clinical test results.

SUMMARY

[0006] Being able to detect a disease or the onset of a disease in time to manage and treat it is a capability deeply sought after by patients and providers alike but one that has yet to be realized in the current healthcare system where detection too often coincides with fatal prognoses.

[0007] It may be desirable to provide for improved systems and methods for sample collection, sample preparation, assay, and/or detection. At least some embodiments herein may provide for systems and devices that perform one or more of the sample collection, preparation, assay, or detection steps. At least some embodiments herein may provide for systems and methods at the time and place in which care is provided for rapid, frequent and/or more accurate diagnoses, ongoing monitoring, and facilitatation and guidance of treatment.

[0007a] According to an aspect of the present invention, there is provided a system, comprising:

a housing;

a plurality of modules within said housing, an individual module of said plurality of modules comprising an assay station and a detection station, wherein the assay station comprises a plurality of individually addressable and fluidically isolated assay units and the detection station comprises an optical sensor;

a sample handling system configured to transfer a sample or reagent within said individual module or from said individual module to another module within the housing of said system; and

a cytometry station configured to perform a cytometric assay, wherein the sample handling system is configured to move at least one of the plurality of individually addressable assay units from said assay station to the cytometry station within said housing.

[0008] In accordance with one embodiment described herein, a system may comprise: a plurality of modules mounted on a support structure, wherein an individual module of said plurality of modules comprises a sample preparation station, assay station, and/or detection station, wherein the system is

CLAIMS

~~WHAT IS CLAIMED IS:~~

1. A system, comprising:

a housing; ~~and~~

a plurality of modules within said housing, an individual module of said plurality of modules comprising ~~at least one station selected from the group consisting of a sample preparation station,~~ an assay station~~,~~ and a detection station, wherein the assay station comprises a plurality of individually addressable and fluidically isolated assay units and the detection station comprises an optical sensor;

~~wherein the system comprises a fluid handling system~~ a sample handling system configured to transfer a sample or reagent within said individual module or from said individual module to another module within the housing of said system; and

a cytometry station configured to perform a cytometric assay, wherein the sample handling system is configured to move at least one of the plurality of individually addressable assay units from said assay station to the cytometry station within said housing.

~~2. A system, comprising:~~

~~a plurality of modules mounted on a support structure, wherein an individual module of said plurality of modules comprises a sample preparation station, assay station, and/or detection station,~~

~~wherein the system is configured to (a) prepare a sample for at least one physical or chemical assay; and (b) perform said at least one physical or chemical assay, and~~

~~wherein at least one individual module of said plurality comprises a cytometry station configured to perform cytometry on said sample.~~

~~3. A system, comprising:~~

~~a plurality of modules mounted on a support structure, wherein an individual module of said plurality of modules comprises a sample preparation station, assay station, and/or detection station,~~

~~wherein the system is configured to perform (a) at least one sample preparation procedure selected from the group consisting of sample processing, centrifugation, separation, and chemical processing, and (b) multiple types of assays selected from the group consisting of immunoassay, nucleic acid assay, receptor-based assay, cytometric assay, colorimetric assay, enzymatic assay, electrophoretic assay, electrochemical assay, spectroscopic assay, chromatographic assay, microscopic assay, topographic assay, calorimetric assay, turbidmetric assay, agglutination assay, radioisotope assay, viscometric assay, coagulation assay, clotting time assay, protein synthesis assay, histological assay, culture assay, osmolarity assay, and combinations thereof; and~~

~~wherein the multiple types of assays are performed with the aid of isolated assay units contained within the system.~~

~~4. A system, comprising:~~

~~a plurality of modules mounted on a support structure, wherein an individual module of said plurality of modules comprises a sample preparation station, assay station, and/or detection station,~~

~~wherein the system is configured to perform (a) at least one sample preparation procedure selected from the group consisting of sample processing, centrifugation, magnetic separation, and chemical processing, and (b) one or more types of assays selected from the group consisting of immunoassay, nucleic acid assay, receptor-based assay, cytometric assay, colorimetric assay, enzymatic assay, electrophoretic assay, electrochemical assay, spectroscopic assay, chromatographic assay, microscopic assay, topographic assay, calorimetric assay, turbidmetric assay, agglutination assay, radioisotope assay, viscometric assay, coagulation assay, clotting time assay, protein synthesis assay, histological assay, culture assay, osmolarity assay, and combinations thereof; and~~

~~wherein the system is configured to process or assay a sample having a volume less than or equal to 250 µl, and the system has a coefficient of variation less than or equal to 15%.~~

52. The system of ~~any one of claims 1-4 comprising a fluid handling system, wherein said fluid handling system~~ claim 1, wherein the sample handling system comprises a pipette configured to uptake, dispense, ~~and/~~or transfer said biological sample.

63. The system of ~~any one of claims 1-4~~ claim 1, further comprising an imaging device configured to image one or more of the group consisting of ~~the~~ a biological sample ~~collected~~, processing of the biological sample, and a reaction performed on the system.

74. The system of ~~any one of claims 1-4~~claim 1, wherein the system further comprises a sample, and wherein the system is configured to detect from said sample a plurality of analytes or a disease condition, the concentrations of said plurality of analytes varying from one another by more than one order of magnitude.

85. The system of ~~any one of claims 1-4~~claim 1, wherein the system comprises a sample collection unit configured to draw a fluid or tissue sample from a subject.

96. The system of ~~any one of claims 1-4~~claim 1, wherein the system has a coefficient of variation less than or equal to 15%.

~~10~~7. An automated method for processing a sample at a point-of-service location, comprising:

providing the sample to a system of ~~any one of claims 1-4~~claim 1;

allowing said system to process said sample to yield a detectable signal indicating that the sample is processed.

~~118~~. The method of claim ~~107~~, wherein the processing step assesses histology of the sample or morphology of the sample.

~~129~~. The method of claim ~~107~~, wherein the processing step assesses the presence and/or concentration of an analyte in the sample or a disease condition associated with the sample.

10. The method of claim 7, wherein the point-of-service location is a retail location.

11. The method of claim 7, wherein the point-of-service location is a subject's home.

~~13. A system, comprising:~~

~~a preparation station configured to perform sample preparation; and~~

~~an assay station configured to perform multiple types of assays selected from the group consisting of immunoassay, nucleic acid assay, receptor-based assay, cytometric assay, colorimetric assay, enzymatic assay, electrophoretic assay, electrochemical assay, spectroscopic assay, chromatographic assay, microscopic assay, topographic assay, calorimetric assay, turbidmetric assay, agglutination assay, radioisotope assay, viscometric assay, coagulation assay, clotting time assay, protein synthesis assay, histological assay, culture assay, osmolarity assay, and combinations thereof; and~~

~~wherein the system is configured to perform said sample preparation and said multiple types of assays within 4 hours or less.~~

~~14. A system, comprising:~~

~~a sample preparation station, assay station, and detection station; and~~

~~a control unit having computer-executable commands for performing a point-of-service service at a designated location with the aid of at least one of said sample preparation station, assay station and detection station,~~

~~wherein the sample preparation station includes a sample collection unit configured to collect a biological sample, and~~

~~wherein the system is configured to assay a biological sample at a coefficient of variation less than or equal to 15%.~~

~~15. A system, comprising:~~

~~a housing; and~~

~~a plurality of modules within said housing, an individual module of said plurality of modules comprising at least one station selected from the group consisting of a sample preparation station, assay station, and detection station,~~

~~wherein the system comprises a fluid handling system configured to transfer a sample or reagent within said individual module or from said individual module to another module within the housing of said system.~~

16. A plug-and-play system, comprising:

a supporting structure having a mounting station configured to support a module among a plurality of modules, said module being

(a) detachable from said mounting station or interchangeable with at least one other module of the plurality;

(b) configured to perform without the aid of another module in said system (i) at least one sample preparation procedure selected from the group consisting of sample processing, centrifugation, magnetic separation, or (ii) at least one type of assay selected from the group consisting of immunoassay, nucleic acid assay, receptor-based assay, cytometric assay, colorimetric assay, enzymatic assay, electrophoretic assay, electrochemical assay, spectroscopic assay, chromatographic assay, microscopic assay, topographic assay, calorimetric assay, turbidmetric assay, agglutination assay, radioisotope assay, viscometric assay, coagulation assay, clotting time assay, protein synthesis assay, histological assay, culture assay, osmolarity assay, and combinations thereof; and

(c) configured to be in electrical, electro-magnetical or optoelectronic communication with a controller, said controller being configured to provide one or more instructions to said module or individual modules of said plurality of modules to facilitate performance of the at least one sample preparation procedure or the at least one type of assay.

17. A system, comprising:

a sample preparation station, assay station, and/or detection station; and

a control unit having computer-executable commands configured to perform a point-of-service service at a designated location,

wherein the system is configured to perform multiple types of assays selected from the group consisting of immunoassay, nucleic acid assay, receptor-based assay, cytometric assay, colorimetric assay, enzymatic assay, electrophoretic assay, electrochemical assay, spectroscopic assay, chromatographic assay, microscopic assay, topographic assay, calorimetric assay, turbidmetric assay, agglutination assay, radioisotope assay, viscometric assay, coagulation assay, clotting time assay, protein synthesis assay, histological assay, culture assay, osmolarity assay, and combinations thereof.

18. The system of any one of claims 13-17, wherein the sample preparation station comprises a sample collection unit configured to collect a biological sample from a subject.

19. The system of claim 16, wherein the supporting structure is a housing that encloses the plurality of modules, said housing optionally provides a power source or communication unit.

20. The system of claim 14 comprising a fluid handling system, wherein said fluid handling system comprises a pipette configured to uptake, dispense, and/or transfer said biological sample.

~~21. The system of any one of claims 13-17 further comprising an imaging device configured to image one or more of the group consisting of the biological sample collected, processing of the biological sample, and reaction performed on the system.~~

~~22~~12. The system of claim ~~21~~3, wherein the imaging device is a camera or a sensor that detects and/or record electromagnetic radiation and associated ~~spacial~~ spatial and/or temporal dimensions.

~~23~~13. The system of claim ~~21~~3, wherein system stores and/or transmits electronic data representative of the image to an external device via a communication unit comprised in the system.

~~24~~14. The system of ~~any one of claims 13-17~~claim 1, further comprising a centrifuge.

~~25~~15. The system of ~~any one of claims 13-17~~claim 1 that is configured to perform two-way communication with an external device via a communication unit comprised in said system, wherein the communication unit is configured to send data to said external device and receive instructions with said system.

16. The system of claim 1, wherein the assay station comprises a thermal block.

17. The system of claim 1, wherein the optical sensor is a component of a spectrophotometer.

~~26~~18. A method of detecting the presence or concentration of an analyte suspected to be present in a biological sample from a subject, said method comprising:

providing the biological sample to a system of ~~any one of claims 13-17~~claim 1;

performing at least one type of assay selected from the group consisting of immunoassay, nucleic acid assay, receptor-based assay, cytometric assay, colorimetric assay, enzymatic assay, electrophoretic assay, electrochemical assay, spectroscopic assay, chromatographic assay, microscopic assay, topographic assay, calorimetric assay, turbidmetric assay, agglutination assay, radioisotope assay, viscometric assay, coagulation assay, clotting time assay, protein synthesis assay, histological assay, culture assay, osmolarity assay, and combinations thereof, to yield a detectable signal indicative of the presence or concentration of said analyte

~~27~~19. The method of claim ~~26~~18 further comprising the step of generating a report comprising information relating to a time dependent change of the presence or concentration of said analyte.

~~28~~20. The method of claim ~~26~~18 further comprising the step of generating a report comprising information relating to diagnosis, prognosis and/or treatment of a medical condition for said subject based on the presence or concentration of said analyte.

~~29. A fluid handling apparatus comprising:~~

~~a plurality of pipette heads, wherein an individual pipette head comprises a pipette nozzle configured to connect with a tip that is removable from the pipette nozzle;~~

a plurality of plungers that are individually movable, wherein at least one plunger is within a pipette head and is movable within the pipette head; and

an actuator configured to effect independent movement of individual plungers of the plurality.

30. The apparatus of claim 29, wherein the plurality of plungers are capable of removing at least one individually selected tip from the pipette nozzle.

31. The apparatus of claim 29, wherein the actuator is a motor and is configured to permit independent movement of the plurality of tip removal mechanisms.

32. The apparatus of claim 31, wherein the at least one tip removal mechanism is external to the pipette head.

33. The apparatus of claim 31, wherein the at least one tip removal mechanism is a collar wrapping around at least a portion of the pipette head.

34. The apparatus of claim 29, further comprising a plurality of switches, an individual switch having an on position and an off position, wherein the on position permits the plunger associated with the individual switch to move in response to movement by the motor, and wherein the off position does not permit the plunger associated with the individual switch to move in response to movement by the actuator.

35. The apparatus of claim 34, wherein the switch is a solenoid.

36. The apparatus of claim 34, wherein the switch is operated by a cam operably linked to an additional actuator.

37. A fluid handling apparatus comprising:

at least one pipette head, wherein an individual pipette head comprises a pipette nozzle configured to connect with a tip that is removable from said nozzle;

at least one plunger within a pipette head of said plurality, and wherein the plunger is configured to be movable within the pipette head; and

at least one actuator configured to permit movement of the plurality of plungers that are not substantially parallel to the removable tip.

38. The apparatus of claim 37, wherein the plunger is capable of moving in a direction that is substantially perpendicular to the removable tip.

39. The apparatus of claim 37, wherein the plunger is capable of moving in a horizontal direction, and wherein the removable tip is aligned vertically.

40. A fluid handling apparatus comprising:

at least one pipette head, wherein an individual pipette head comprises a pipette nozzle configured to connect with a tip that is removable from said nozzle,

wherein said at least one pipette head has a fluid path of a given length that terminates at the pipette nozzle,

and wherein the length of the fluid path is adjustable without affecting movement of fluid from the tip when the tip and the pipette nozzle are engaged.

41. The apparatus of claim 40, wherein pipette nozzle is movable relative to a base operably connected to the at least one pipette head, thereby adjusting the fluid path length.

42. The apparatus of claim 40, wherein the fluid path is formed using rigid components.

43. The apparatus of claim 40, further comprising a ventilation port within the pipette head, said port having an open position and a closed position.

44. The apparatus of claim 43, further comprising a solenoid and/or a valve that control opening or closing of the ventilation port.

45. The apparatus of claim 43, wherein the ventilation port is coupled to a positive pressure source that is useful for the expulsion of the fluid, and/or a negative pressure source that is useful for the aspiration of the fluid.

46. The apparatus of claim 43, wherein the ventilation port is coupled to a reversible pump capable of delivering positive or negative pressure.

47. The apparatus of claim 43, wherein the removable tip comprises two openings, each of which has an embedded passive valve.

48. A fluid handling apparatus comprising:

a removable tip; and

at least one pipette head, wherein an individual pipette head comprises a pipette nozzle configured to connect with the tip that is removable from said pipette nozzle,

wherein the apparatus is operably connected to a image capture device that is configured to capture an image within and/or through the tip.

49. The apparatus of claim 48, wherein the image capture device is located within at least one pipette head.

50. The apparatus of claim 48, wherein the image capture device is a camera and optionally the tip is a waveguide.

51. The apparatus of any one of claims 29, 37, 40 and 48, wherein the apparatus is characterized in that (1) it has a height, width, and length each of which dimension does not exceed 20 cm.

52. A method of transporting fluidic or a non-fluidic component comprising:

providing an apparatus of any one of claims 29, 37, 40 and 48;

transporting from one location to another location the fluidic or the non-fluidic component with the aid of at least a pipette nozzle of said apparatus that is configured to connect with a removable tip, wherein the individual pipette head is capable of dispensing and/or aspirating a fluid, or engaging the non-fluidic component to effect said transportation.

53. A sample processing apparatus comprising:

a sample preparation station, assay station, and/or detection station;

a control unit having computer-executable commands for performing a point-of-service service at a designated location with the aid of at least one of said sample preparation station, assay station and detection station; and

at least one pipette having a pipette nozzle configured to connect with a tip that is removable from said pipette nozzle, wherein said pipette is configured to transport a fluid no more than 250 uL within or amongst said preparation station, assay station and/or detection station.

54. The apparatus of claim 53, wherein the pipette is configured to dispense and/or aspirate through the tip a fluid no more than 100 uL.

55. The apparatus of claim 53, wherein the tip is configured to hold a sample having a volume no more than 100 uL.

56. The apparatus of claim 53, wherein the control unit having computer-executable commands configured for performing the point-of-service service at a site selected from the group consisting of a retailer site, the subject's home, or a health assessment/treatment location. office.

57. A fluid handling apparatus comprising:

a plurality of pipette heads, wherein an individual pipette head comprises a pipette nozzle configured to connect with a tip that is removable from said pipette nozzle,

wherein the fluid handling apparatus is capable of dispensing and/or aspirating 0.5 uL to 5 mL of fluid while functioning with a coefficient of variation of 5% or less.

58. The apparatus of claim 57 dispenses and/or aspirates fluid with a minimum increment of no more than 1 uL.

59. The apparatus of claim 57 further comprising a plurality of plungers, wherein at least one plunger is within a pipette head and is configured to be movable within the pipette head, and wherein individual plungers are movable independent of each other.

60. The apparatus of claim 57 wherein a first pipette head of said plurality is configured to dispense and/or aspirate up to 100 uL and a second pipette head of said plurality is configured to dispense and/or aspirate up to 5 mL.

61. A fluid handling apparatus comprising:

a plurality of pipette heads, at least one pipette head being operably connected to a base and comprising a pipette nozzle that is configured to connect with a removable tip; and

at least one plunger within a pipette head of said plurality, wherein the plunger is configured to be movable within the pipette head,

wherein the pipette nozzle of said at least one pipette head is movable relative to the base, such that the pipette nozzle is capable of having (a) a retracted position, and (b) an extended position wherein the pipette nozzle is further away from the base than in the retracted position.

62. The apparatus of claim 61, wherein at least a 0.5 cm vertical difference exists between the retracted position and the extended position.

63. The apparatus of claim 61, wherein the pipette nozzle is movable relative to the at least one plunger.

64. The apparatus of claim 61, wherein adjusting the pipette nozzle between the retracted position and the extended position changes a fluid path length terminating at the pipette nozzle.

65. The apparatus of claim 61, wherein the fluid path is confined by rigid components.

66. The apparatus of claim 61, wherein the plunger comprises a first section and a second section wherein at least a portion of the first section is within the second section when the pipette nozzle is in the retracted position, and wherein the first section is not within the second section when the pipette nozzle is in the extended position

67. A fluid handling apparatus comprising:

a supporting body, extending therefrom a plurality of pipette heads comprising:

a positive displacement pipette head, comprising a positive displacement pipette nozzle configured to connect with a first removable tip; and

an air displacement pipette head, comprising an air displacement pipette nozzle configured to connect to an air displacement pipette tip.

68. The apparatus of claim 67 that is configured to dispense and/or aspirate 1 uL to 5 mL of fluid with a coefficient of variation of 5% or less.

69. The apparatus of claim 67 comprising at least one pipette having a pipette nozzle configured to connect with a tip that is removable from said pipette nozzle, wherein the pipette has a height, width, and length each of which dimension does not exceed 20 cm.

70. The apparatus of claim 69 wherein the pipette has a height which does not exceed 7 cm.

71. A method of transporting fluidic or a non-fluidic component comprising:

providing an apparatus of any one of claims 53,57, 61, and 67;

transporting from one location to another location the fluidic or the non-fluidic component with the aid of at least a pipette head of said apparatus that is configured to connect with a removable tip, wherein the individual pipette head is capable of dispensing and/or aspirating a fluid, or engaging the non-fluidic component to effect said transportation.

72. A centrifuge comprising:

a base having a bottom surface, said base being configured to rotate about an axis orthogonal to the bottom surface,

wherein the base comprises one or more wing configured to fold over an axis extending through the base, wherein a wing comprises an entire portion of base on a side of the axis, wherein the wing comprises a cavity, wherein the cavity is oriented in a first orientation when the base is at rest, and is configured to be oriented at a second orientation when the base is rotating.

73. The centrifuge of claim 72, wherein the cavity is configured to receive a sample vessel.

74. The centrifuge of claim 72, wherein an individual wing has a first portion and a second portion, wherein the first portion is formed of a material of less mass than the second portion.

75. The centrifuge of claim 74, wherein the first portion forms at least part of a top surface of the wing, and a second portion forms at least part of the bottom surface of the wing.

76. The centrifuge of claim 72, wherein the one or more wing has a center of mass below the axis extending through the base.

77. The centrifuge of claim 72, wherein the base has a circular cross-section.

78. The centrifuge of claim 72, wherein the first orientation is vertical and the second orientation is horizontal.

79. A centrifuge comprising:

a base having a bottom surface and a top surface, said base being configured to rotate about an axis orthogonal to the bottom surface,

wherein the base comprises one or more bucket characterized in that (a) it is configured to pivot about a pivot axis that permits at least a portion of the bucket to pivot upwards past the top surface, and/or (b) it is attached to a weight configured to move in a linear direction, thereby causing the bucket to pivot; and

wherein the bucket comprises a cavity to receive a sample vessel, wherein the cavity is configured to be oriented in a first orientation when the base is at rest, and is configured to be oriented at a second orientation when the base is rotating.

80. The centrifuge of claim 79, wherein the first orientation is vertical and the second orientation is horizontal.

81. The centrifuge of claim 79, wherein the one or more bucket includes a weight insert.

82. The centrifuge of claim 81, wherein the weight insert is formed of a material of a mass greater than one or more other portion of the bucket.

83. The centrifuge of claim 79, wherein the bucket has a center of mass below the pivot axis.

84. The centrifuge of claim 83, wherein the center of mass is further from the axis orthogonal to the bottom surface than the pivot.

85. The centrifuge of claim 79, wherein the bucket is attached to a bucket module that is removable from the base.

86. The centrifuge of claim 79, wherein a force is exerted on the weight to retain the weight at a first position when the base is at rest.

87. The centrifuge of claim 86, wherein the force is exerted by a spring.

88. The centrifuge of claim 79, wherein the weight is at a second position when the base is rotating.

89. A centrifuge comprising:

a motor assembly comprising a rotor configured to rotate about a stator about an axis of rotation, wherein the motor has a height in the direction of the axis of rotation; and

a base comprising one or more cavities configured to receive one or more fluidic samples, said base affixed to the rotor,

wherein the base rotates about the stator and said base has a height in the direction of the axis of rotation, and wherein the height of the motor assembly is no greater than twice the height of the base.

90. The centrifuge of claim 89, wherein the base rotates about the stator and a plane orthogonal to the axis of rotation of the brushless motor is coplanar with a plane orthogonal to the axis of rotation of the base.

91. The centrifuge of claim 89, wherein the one or more cavities is configured to receive one or more sample vessels.

92. The centrifuge of claim 89, wherein the fluidic samples has a volume of 250 μL or less.

93. A sample processing apparatus comprising:

a sample preparation station, assay station, and/or detection station;

a control unit having computer-executable commands for performing a point-of-service service at a designated location with the aid of at least one of said sample preparation station, assay station and detection station; and

at least one centrifuge configured to perform centrifugation of a sample from a fingerstick.

94. The apparatus of claim 93, wherein the centrifuge is contained within the sample preparation station and/or the assay station.

95. The apparatus of claim 93, wherein the computer-executable commands are configured to perform the point-of-service service at a site selected from the group consisting of a retailer site, the subject's home, or a health assessment/treatment location.

96. A centrifuge comprising:

a motor assembly comprising a rotor configured to rotate about a stator about an axis of rotation, wherein the motor has a height in the direction of the axis of rotation;

a base comprising one or more cavities configured to receive one or more samples, said base affixed to the rotor, wherein the base rotates about the stator;

wherein the centrifuge exhibits a rotational speed no less than 10,000 RPM; and wherein the centrifuge has a footprint of 200 cm^2 or less.

97. The apparatus of claim 96, wherein the centrifuge is configured to perform centrifugation of a sample less than about 10 uL.

98. A sample processing apparatus comprising:

a sample preparation station, assay station, and/or detection station;

a control unit having computer-executable commands for performing a point-of-service service at a designated location with the aid of at least one of said sample preparation station, assay station and detection station; and

at least one centrifuge of any one of claims 72, 79, 89, and 96.

99. A vessel, comprising:

a body configured to accept and confine a sample, wherein the body comprises an interior surface, an exterior surface, an open end, and a tapered closed end,

wherein the vessel is configured to engage with a pipette and comprises a flexible material extending across the open end and having a slit/opening that is configured to prevent fluid from passing through the flexible material in the absence of an object inserted through the slit/opening.

100. The vessel of Claim 99, wherein the flexible material is formed from a silicon-based material.

101. The vessel of Claim 99, further comprising a cap configured to contact the body at the open end, wherein at least a portion of the cap extends into the interior of the body.

102. The vessel of Claim 101, wherein the cap comprises a passageway through which the flexible material extends.

103. The vessel of Claim 99, wherein the body has a cylindrical portion of a first diameter having an open end and a closed end, and a funnel shaped portion contacting the open end, wherein one end of the funnel shaped portion contacting the open end has a first diameter, and a second end of the funnel shaped portion has a second diameter.

104. The vessel of Claim 103, wherein the second diameter is less than the first diameter.

105. The vessel of Claim 103, wherein the second end of the funnel shaped portion is configured to engage with a removable cap.

106. A vessel, comprising:

a body configured to accept and confine a sample of no more than about 100 μL, wherein the body comprises an interior surface, an exterior surface, and an open end,

wherein the vessel comprises a flexible material extending across the open end and having a slit/opening that is configured to prevent fluid from passing through the flexible material in the absence of an object inserted through the slit/opening.

107. The vessel of Claim 106, wherein the flexible material is a membrane.

108. The vessel of Claim 106, further comprising a cap configured to contact the body at the open end.

109. The vessel of Claim 108, wherein the cap comprises a passageway through which the flexible material extends.

110. The vessel of Claim 106, wherein the body has a cylindrical portion of a first diameter having an open end and a closed end, and a funnel shaped portioned contacting the open end, wherein one end of the funnel shaped portion contacting the open end has a first diameter, and a second end of the funnel shaped portion has a second diameter.

111. The vessel of Claim 110, wherein the second diameter is less than the first diameter.

112. The vessel of Claim 110, wherein the second end of the funnel shaped portion is configured to engage with a removable cap.

113. A vessel, comprising:

a body configured to accept and confine a sample, wherein the body comprises an interior surface, an exterior surface, a first end, a second end, and a passage between the first end and the second end,

wherein the vessel comprises a material extending across the passage capable of having (1) molten state that is configured to prevent fluid from passing through the material in the absence of an object inserted through the material, and (2) a solid state that is configured to prevent fluid and the object from passing through the material.

114. The vessel of Claim 113, wherein the material is a wax.

115. The vessel of Claim 113, wherein the material has a melting point between about 50°C and 60°C.

116. The vessel of Claim 113, wherein the object is capable of being inserted through the material and removed from the material while the material is in the molten state.

117. The vessel of Claim 113, wherein the material is configured to allow said object to be inserted into the material and removed from the material while the material is in the molten state.

118. The vessel of Claim 113, wherein at least a portion of the object is coated with the material when the object is removed from the material.

119. A setup, comprising:

a vessel configured to accept and confine a sample, wherein the vessel comprises an interior surface, an exterior surface, an open end, and an opposing closed end; and

a tip configured to extend into the vessel through the open end, wherein the tip comprises a first open end and second open end, wherein the second open end is inserted into the vessel,

wherein the vessel or the tip further comprises a protruding surface feature that prevents the second open end of the tip from contacting the bottom of the interior surface of the closed end of the vessel.

120. The system of Claim 119, wherein the surface features are integrally formed on the bottom interior surface of the vessel.

121. The system of Claim 119, wherein the surface features are a plurality of bumps on the bottom interior surface of the vessel.

122. The system of Claim 119, wherein the protruding surface feature is at or near the closed end.

123. An apparatus, comprising:

a planar substrate comprising a plurality of depressions; and

a plurality of tips having the configuration of claim 99, 106, 113, or 119, wherein the tips are at least partially inserted into the plurality of depressions and supported by the substrate.

124. The apparatus of Claim 123, wherein the apparatus is a cartridge or a microtiter plate.

125. The apparatus of Claim 123, wherein the tips have a volume of 250 μL or less.

126. A point of service system for diagnosing or treating a subject, comprising:

a point of service device having a three-dimensional imaging device for providing a dynamic three-dimensional spatial representation of the subject; and

a remote computer system being configured to be in communication with the three-dimensional imaging device and being configured to retrieve the dynamic three-dimensional spatial representation of the subject, wherein the remote computer system is optionally configured to authenticate the subject.

127. The system of Claim 126, wherein the point of service system comprises an image recognition module for analyzing at least a portion of the dynamic three-dimensional spatial representation of the subject for treatment.